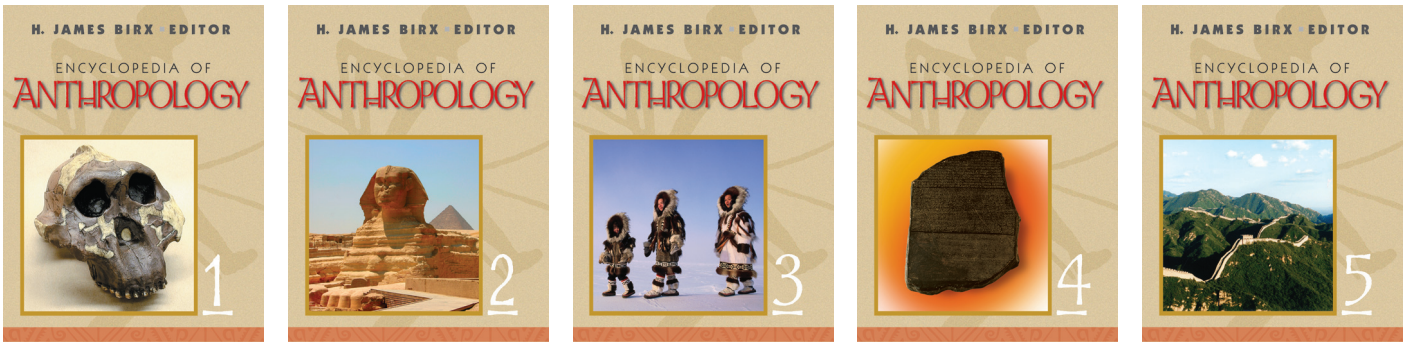
ENCYCLOPEDIA OF ANTHROPOLOGY



ENCYCLOPEDIA OF ANTHROPOLOGY

H. JAMES BIRX ▪ EDITOR
Canisius College, SUNY Geneseo

1

A SAGE Reference Publication

SAGE Publications
Thousand Oaks ▪ London ▪ New Delhi

Copyright © 2006 by Sage Publications, Inc.

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

For information:

Sage Publications, Inc.
2455 Teller Road
Thousand Oaks, California 91320
E-mail: order@sagepub.com

Sage Publications Ltd.
1 Oliver's Yard
55 City Road
London EC1Y 1SP
United Kingdom

Sage Publications India Pvt. Ltd.
B-42, Panchsheel Enclave
Post Box 4109
New Delhi 110 017 India

Printed in China.

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Encyclopedia of anthropology / H. James Birx, editor.
p. cm.
Includes bibliographical references and index.
ISBN 0-7619-3029-9 (cloth)
1. Anthropology—Encyclopedias. I. Birx, H. James.

GN11.E63 2005
301′.030—dc22
2005013953

05 06 07 08 09 10 9 8 7 6 5 4 3 2 1

Sage Reference:	Rolf Janke, Sara Tauber
Production:	Claudia A. Hoffman
Permissions and Image Research:	Karen Wiley
Typesetting:	C&M Digitals (P) Ltd.
Indexing:	Will Ragsdale
Cover Designers:	Ravi Balasuriya and Michelle Lee Kenny

CONTENTS

List of Entries
ix

Reader's Guide
xvii

About the Editor
xxix

Editorial Board
xxxi

Advisory Board
xxxiii

Contributors
xxxv

Acknowledgments
xli

Foreword
Biruté Mary F. Galdikas
xliii

Introduction
H. James Birx
xlvii

Entries A–B
1–434

Index
I-1–I-96

CHRONOLOGY

Date	*Event*	*Refer to*
1314 BCE	**Born:** Ramses II, pharaoh of Egypt	Abu Simbel, Pyramids, Ramses II, Rosetta Stone, Egypt
551 BCE	**Born:** Confucius, Chinese philosopher	Asia, Confucianism, Daoism, Great Wall of China
384 BCE	**Born:** Aristotle, ancient Greek philosopher and author of *The History of Animals*	Acropolis, Animals, Aristotle, Naturalism, Teleology
96 BCE	**Born:** Titus Lucretius Carus, ancient Roman philosopher and author of *On the Nature of Things*	Coliseum, Lucretius, Rome
1735	**Published:** *Systema Naturae* by Carolus Linnaeus	Carolus Linnaeus, Pongids, Primate taxonomy
1799	**Discovered:** Rosetta Stone in the Nile delta, west of Alexandria	Jean-François Champollion, Egyptology
1848	**Published:** *The Communist Manifesto* by Karl Marx and Friedrich Engels	Friedrich Engels, Karl Marx
1859	**Published:** *On the Origin of Species* by Charles Darwin	Charles Darwin
1871	**Published:** *Primitive Culture* by Edward Burnett Tylor	Edward Burnett Tylor
1908	**Discovered:** Venus of Willendorf figurine in Austria by archaeologist Josef Szombathy	Venus of Willendorf
1912	**Discovered:** Machu Picchu in Peru by Hiram Bingham	Machu Picchu, Peru
1921	**Published:** *Language* by Edward Sapir	Language and Culture, Edward Sapir
1922	**Published:** *Argonauts of the Western Pacific* by Bronislaw Malinowski	Bronislaw Malinowski
1922	**Completed:** *Nanook of the North*, a film by Robert J. Flaherty	Eskimos, Inuit
1922	**Published:** *The Andaman Islanders* by A. R. Radcliff-Brown	A. R. Radcliff-Brown
1922	**Discovered:** Tutankhamun's pharaonic tomb by Howard Carter in the Valley of the Kings, Egypt	Howard Carter, Egypt, Egyptology
1924	**Discovered:** Taung skull, the first Australopithecine fossil found in South Africa	Raymond A. Dart, Australopithecines
1928	**Published:** *Coming of Age in Samoa* by Margaret Mead	Margaret Mead
1934	**Published:** *Patterns of Culture* by Ruth Benedict	Ruth Benedict
1940	**Discovered:** Lascaux cave, with its magnificent Cro-Magnon cave murals, in France	Altamira Cave, Lascaux Cave, Ochre
1940	**Published:** *The Nuer* by Sir Edward E. Evans-Pritchard	Edward Evans-Pritchard
1940	**Published:** *Race, Language, and Culture* by Franz Boas	Franz Boas, Language, Culture
1949	**Published:** *Social Structure* by George Peter Murdock	George Peter Murdock
1953	**Proposed:** DNA molecule working model by James D. Watson and Francis F. H. C. Crick	DNA Molecule, RNA Molecule

Date	*Event*	*Refer to*
1955	**Published:** *Theory of Culture Change* by Julian H. Steward	Culture Change, Julian H. Steward
1956	**Published:** *Language, Thought, and Reality* by Benjamin Lee Whorf	Sapir-Whorf Hypothesis
1959	**Published:** *The Evolution of Culture* by Leslie A. White	Culture, Leslie A. White
1959	**Discovered:** *Zinjanthropus boisei* fossil skull by Mary D. Leakey at Olduvai Gorge in Tanzania	Mary D. Leakey, Olduvai Gorge, *Zinjanthropus boisei*
1960	**Published:** *Evolution and Culture* by Marshall D. Sahlins and Elman R. Service	Marshall D. Sahlins, Elman R. Service
1961	**Discovered:** *Homo habilis* by Louis S. B. Leakey at Olduvai Gorge in Tanzania	*Homo habilis*, Louis S. B. Leakey, Olduvai Gorge
1963	**Published:** *Anthropology: Culture Patterns and Processes* by Alfred Louis Kroeber	Alfred Louis Kroeber
1963	**Published:** *Race, Science, and Humanity* by Ashley Montagu	Ashley Montagu
1963	**Published:** *Structural Anthropology* by Claude Lévi-Strauss	Claude Lévi-Strauss, Structuralism
1963	**Published:** *The Mountain Gorilla: Ecology and Behavior* by George B. Schaller	Dian Fossey, Gorillas
1966	**Published:** *Religion: An Anthropological View* by Anthony F. C. Wallace	Anthropology of Religion, Anthony F. C. Wallace
1968	**Published:** *The Rise of Anthropological Theory: A History of Theories of Culture* by Marvin Harris	Marvin Harris, Theories
1972	**Discovered:** *Homo habilis* skull #1470 by Richard E. F. Leakey at Koobi Fora in Kenya	*Homo habilis*, Richard E. F. Leakey
1973	**Published:** *The Interpretation of Cultures* by Clifford R. Geertz	Clifford R. Geertz, Postmodernism
1974	**Discovered:** *Australopithecus afarensis* "Lucy" skeleton by Donald C. Johanson at Hadar in the Afar Triangle of Ethiopia	Australopithecines, Donald C. Johanson
1975	**Published:** *Reflections on Language* by Noam Chomsky	Noam Chomsky, Language
1975	**Published:** *Sociobiology: The New Synthesis* by Edward O. Wilson	Sociobiology, Edward O. Wilson
1976	**Discovered:** Laetoli footprints of *Australopithecus afarensis* by Mary D. Leakey in Tanzania	Bipedal Locomotion, Mary D. Leakey
1983	**Published:** *Gorillas in the Mist* by Dian Fossey	Dian Fossey, Gorillas, Primate Conservation
1983	**Published:** *In the Shadow of Man* by Jane Goodall	Chimpanzees, Jane Goodall
1983	**Published:** *Marxism and Anthropology: The History of a Relationship* by Maurice Bloch	Karl Marx, Marxism
1997	**Published:** *Bonobo: The Forgotten Ape* by Frans B. M. de Waal	Bonobos, Frans B. M. de Waal
2000	**Published:** *Extinct Humans* by Ian Tattersall and Jeffrey H. Schwartz	Hominid Taxonomy, Jeffrey H. Schwartz, Ian Tattersall
2003	**Completed:** Human Genome Project, working draft version	Human Genome Project
2005	**Completed:** Chimpanzee genome mapping	Chimpanzees, Bonobos
2005	**Published:** *The Great Apes* by Biruté Mary F. Galdikas	Apes, Pongids, Primate Conservation

CONVERSION CHART

Metric to Imperial

Length		
mm	1 millimeter	= 0.04 inch (in)
cm	1 centimeter	= 0.40 inch (in)
m	1 meter	= 39.40 inches (in)
		= 3.28 feet (ft)
		= 1.09 yards (yd)
km	1 kilometer	= 0.62 mile (mi)
Area		
cm^2	1 square centimeter	= 0.16 square inch (in^2)
m^2	1 square meter	= 10.77 square feet (ft^2)
		= 1.20 square yards (yd^2)
km^2	1 square kilometer	= 0.39 square mile (mi^2)
ha	1 hectare	= 107,636 square feet (ft^2)
		= 2.5 acres (ac)
Volume (Dry)		
m^3	1 cubic centimeter	= 0.061 cubic inch (in^3)
m^3	1 cubic meter	= 1.31 cubic yards (yd^3)
		= 35.31 cubic feet (ft^3)
hL	1 hectoliter	= 2.8 bushels (bu)
Volume (Liquid)		
mL	1 milliliter	= 0.035 fluid ounce (Imp)
L	1 liter	= 1.76 pints (Imp)
		= 0.88 quart (Imp)
		= 0.26 U.S. gallon (U.S. gal)
		= 0.22 Imperial gallons (gal)
Weight		
g	1 gram	= 0.035 ounce (oz)
kg	1 kilogram	= 2.21 pounds (lb)
t	1 ton	= 1.10 short tons
		= 2,205 pounds (lb)
Speed		
m/sec	1 meter per second	= 3.28 feet per second (ft/sec)
		= 2.24 miles per hour (mph)
km/h	1 kilometer per hour	= 0.62 mile per hour (mph)
Temperature		
°F	degrees Fahrenheit	$= (°C \times {}^{9/5}) + 32$

Imperial to Metric

Length		
in	1 inch	= 2.54 centimeters (cm)
ft	1 foot	= 0.30 meter (m)
yd	1 yard	= 0.91 meter (m)
mi	1 mile	= 1.61 kilometer (km)
Area		
ft^2	1 square foot	= 0.09 square meters (m^2)
yd^2	1 square yard	= 0.84 meter (m^2)
ac	1 acre	= 0.40 hectare (ha)
Volume (Dry)		
yd^3	1 cubic yard	= 0.76 cubic meter (m^3)
bu	1 bushel	= 36.37 liters (L)
Volume (Liquid)		
oz	1 fluid ounce	= 28.41 milliliters (mL)
pt	1 pint	= 0.57 liter (L)
gal	1 gallon (U.S.)	= 3.79 liters (L)
gal	1 gallon	= 4.55 liters (L)
Weight		
oz	1 ounce	= 28.35 grams (g)
lb	1 pound	= 453.6 grams (g)
ton	1 ton	= 0.91 ton (t)
Speed		
ft/sec	1 foot per second	= 0.30 meters per second (m/sec)
mph	1 mile per hour	= 1.61 kilometers per hour (km/h)
Temperature		
°C	degrees Celsius	$= (°F - 32) \times {}^{5/9}$

LIST OF ENTRIES

Aborigines
- ❖ Aborigines

Acheulean culture
Acropolis
Action anthropology
Adaptation, biological
Adaptation, cultural
Aesthetic appreciation
Affirmative action
Africa, socialist schools in
African American thought
African Americans
African thinkers
Aggression
- ❖ Ape aggression

Agricultural revolution
Agriculture, intensive
Agriculture, origins of
Agriculture, slash-and-burn
Alchemy
Aleuts
ALFRED: The ALlele FREquency Database
Algonquians
Alienation
- ❖ Alienation

Altamira cave
Altruism
Amazonia
Amish
Anasazi
Ancestor worship
Angkor Wat
Animals
Animatism
Animism
Anthropic principle
Anthropocentrism
Anthropology and business
Anthropology and epistemology
Anthropology and the Third World
Anthropology of men
Anthropology of religion
Anthropology of women
Anthropology, careers in
Anthropology, characteristics of
Anthropology, clinical
Anthropology, cultural
Anthropology, economic
Anthropology, history of
- ❖ Future of anthropology

Anthropology, humanistic
Anthropology, philosophical
Anthropology, practicing
Anthropology, social
- ❖ Anthropology and sociology
- ❖ Social anthropology

Anthropology, subdivisions of
Anthropology, theory in
Anthropology, Visual
- ❖ Visual anthropology

Anthropometry
Anthropomorphism
Aotearoa (New Zealand)
Ape biogeography
Ape cognition
Ape language
- ❖ Ape communication
- ❖ Ape intelligence

Apes, fossil
Apes, greater
Apes, lesser
Apollonian
Aquatic ape hypothesis
Aquinas, Thomas
Arboreal hypothesis
Archaeology
Archaeology and gender studies
Archaeology, biblical
Archaeology, environmental
Archaeology, maritime
Archaeology, medieval
Archaeology, salvage
Architectural anthropology
Arctic
Ardrey, Robert
Argentina
Aristotle
Arsuaga, J. L.
Art, universals in
Artificial intelligence
- ❖ Artificial intelligence

Asante
Assimilation
Atapuerca
Athabascan
Auel, Jean Marie
Aurignacian culture
Australia
- ❖ Australia

Australian aborigines
Australopithecines
Axes, hand
Aymara
Aztec agriculture

Baboons
❖ Baboons
Babylon
Bakhtin, Mikhail
Balkans
Baluchistan
Bates, Daniel G.
Bayang Medicine Man
Becker, Gary S.
Behavior, collective
Benedict, Ruth
❖ Ruth Benedict
Berdache
Bergson, Henri
Bermudez de Castro, J. M.
Big bang theory
Binford, Lewis Roberts
Bingham, Hiram
Bioethics and anthropology
Biogeography
Bioinformatics
Biological anthropology
❖ William Bass
❖ Forensic anthropology
❖ Mary Huffman Manhein
Biological anthropology and neo-Darwinism
Biomedicine
Biometrics
Bipedal locomotion
❖ Origin of bipedality
Black, Davidson
Blombos cave
Blood groups
Blumenbach, Johann Friedrich
Boas, Franz
❖ Franz Boas
Bonobos
❖ Bonobos in captivity
❖ Kanzi
Boucher de Perthes, Jacques
Bourdieu, Pierre
Brace, C. Loring
Brachiation
Braidwood, Robert John
Brain, evolution of primate
Brain, human
Brain, primate
Brazil
Breuil, Henri
Bride price
Briggs, Jean L.
Bruno, Giordano
Buber, Martin
Buddhism
Buechel, Eugene
Bunzel, Ruth
Burial mounds

Cannibalism
Carbon-14 dating
Cardiff giant hoax
Caribs
Carpenter, C. R.
Carson, Rachel
Carter, Howard
Caste systems
Catastrophism
Categorical imperative
Cavalli-Sforza, Luigi Luca
Cave art
Cazden, Courtney B.
Cebids
Celtic Europe
Cercopithecines
Chachapoya Indians
Chagnon, Napolean
Chants
Chaos theory
Chaos theory and anthropology
Chichen Itza
Child abuse
Childbirth
Childhood
Childhood studies
Childe, Vere Gordon
Chimpanzees
Chimpanzees and bonobos, differences
Chimpanzees, saving
❖ Chimpanzees in captivity
City, history of
❖ Ghost towns
❖ Urban anthropology
Civil disobedience
Cladistics
Clans
Clines
Clinical genetics
Clovis culture
Coliseum
Collectors
Colobines
❖ Interspecies communication
❖ Susan Savage-Rumbaugh
Communism
Communities
Complexity
Computers and humankind
❖ Computer languages
Comte, Auguste
Condorcet, Marquis de
Configurationalism
Conflict
Confucianism
Consciousness
Continental drift
Coon, Carleton S.
Copper Age
Coptic monasticism
Cosmology and sacred landscapes
Counseling
Cousteau, Jacques Yves
Craniometry
❖ Craniometry
❖ Phrenology
Creationism versus geology
Creationism, beliefs in
Crete, ancient
Crime
❖ Criminology and genetics
❖ Forensic artists
❖ Physiognomy
Critical realism
Critical realism in ethnology
Croizat, Leon C.
Cross-cultural research
Cuba
Cultivation, plant
Cults
Cultural conservation
Cultural constraints
Cultural ecology
Cultural relativism
❖ Cultural relativism
Cultural traits
Cultural tree of life
Culture
Culture and personality
Culture area concept

Culture change
Culture of poverty
Culture shock
Culture, characteristics of
Cyberculture
Cybernetic modeling
❖ Cybernetics

Danilevsky, Nikolaj Jakovlevich
Daoism
Darkness in El Dorado controversy
Darrow, Clarence
Dart, Ramond A.
Darwin and Germany
Darwin and India
Darwin and Italy
Darwin, Charles
Darwinism, modern
❖ Darwinism versus Lamarckism
Darwinsim, social
❖ Social Darwinism
Dating techniques
❖ New dating techniques
Dating techniques, radiometric
Dating techniques, relative
Dawkins, Richard
de Angulo, Jaime
de Waal, Frans B. M.
Death rituals
Degenerationism
Deleuze, Gilles
Deloria, Ella Cara
Dementia
Demography
Dendrochronology
Dennett, Daniel C.
Derrida, Jacques
Determinism
Deviance
DeVore, Irven
Dewey, John
Diamond, Jared
Dictatorships
Diffusionism
Dinosaurian hominid
Diseases
Dispute resolution
DNA molecule
DNA testing
DNA, recombinant
Douglas, Mary
Dowry
Dryopithecus
Dubois, Eugene
Durkheim, David Émile

Ecology and anthropology
Ecology, human behavioral
Economics and anthropology
Education and anthropology
Egypt, ancient
❖ Abu Simbel
❖ Tutankhamun and Zahi Hawass
Egyptology
❖ Jean-François Champollion
El Cerén
Elders
Eliade, Mircea
Emics
Empedocles
Enculturation
❖ Nature and nurture
Endogamy
Engelbrecht, William Ernst
Engels, Friedrich
Enlightenment, age of
❖ Enlightenment versus postmodernism
Entelechy
Environment
❖ Global warming
Environmental philosophy
❖ Environmental ethics
Eoliths
Eskimo acculturation
Eskimos
Essentialism
Ethics and anthropology
Ethnocentrism
Ethnoecology
Ethnogenesis
Ethnographer
❖ Objectivity in ethnography
❖ Verification in ethnography
Ethnographic writing
Ethnography
Ethnohistory
Ethnology
❖ Ethology and ethnology
Ethnomedicine
Ethnopharmacology
Ethnopsychiatry
Ethnoscience
Ethnosemantics
Ethology
Ethology, cognitive
Etics
Eudysphoria
Eugenics
Euthenics
Evans-Pritchard, Edward
Eve, mitochrondrial
Evil
Evolution, arc of
❖ Interpreting evidence
Evolution, disbelief in
Evolution, human
❖ Evolution education controversy
❖ Futurology
❖ Monogenesis versus polygenesis
❖ Ian Tattersall
Evolution, models of
Evolution, molecular
Evolution, organic
Evolutionary anthropology
Evolutionary epistemology
Evolutionary ethics
❖ Evolutionary ethics
❖ Evolutionary psychology
Evolutionary ontology
Excavation
Exobiology and exoevolution
Exogamy
Extinction
❖ Mass extinctions

Fa Hien cave
Fagan, Brian M.
Family, extended
Family, forms of
Family, nuclear
Farber, Marvin
Fayoum culture
Feasts and Festivals

Feminism
Fertility
Feuding
Feuerbach, Ludwig
Field methods
Fieldwork, ethnographic
Fiji
Firth, Raymond
Folk culture
❖ Folk speech
Folkways
Folsom culture
Food
Fortes, Meyer
Fossey, Dian
❖ Dian Fossey
Fossil record
Fossils
Foucault, Michel
Frazer, Sir James
Freeman, Derek
French structuralism
Freud, Sigmund
❖ Neo-Freudianism
Fried, Morton H.
Friendships
Fromm, Erich
Functionalism

Gaia hypothesis
Galapagos Islands
Galdikas, Biruté Mary F.
❖ Biruté Mary F. Galdikas
Galton, Francis
Gandhi, Mahatma
Gangs
Geertz, Clifford R.
Gemeinschaft
Gender
Gene distributions
Gene flow
Generative grammar
Genetic drift
Genetic engineering
❖ Genetic engineering
❖ Stem cell research
Genetics, history of
Genetics, human
❖ Primate genetics
❖ Twin studies
Genetics, population
❖ Human diversity
Genocide
Genomics
Geologic column
Geology
Geomagnetism
Geomythology
Gerontology
Gesellschaft
Ghost dance
Gibbons
Gigantopithecus
Globalization
❖ Cultural convergence
❖ Vanishing cultures
Glottochronology
Gluckman, Max
God gene
Gods
von Goethe, Johann Wolfgang
Goodall, Jane
❖ Jane Goodall
Goode, William Josiah
Gorillas
❖ Gorillas in captivity
Gorillas, saving
Gosse, Philip
Gramsci, Antonio
Graves
Greenberg, Joseph
Grooming
Guaraní Nandéva Indians
Gutenberg, Johannes
Gypsies

Haddon, A. C.
Haeckel, Ernst
❖ Primate embryology
Haidas
Haiti
Harappa
Hardy-Weinberg principle
Harlow, Harry F.
Harris, Marvin
Harrisson, Barbara
Health care, alternative
Heath, Shirley Bryce
Hegel, G.W.F.
Heidegger, Martin
Henotheism
Heraclitus
Hermeneutics
Herskovits, Melville
Heyerdahl, Thor
Hinduism
Historicism
HIV/AIDS
Hoaxes in anthropology
Hobbes, Thomas
Hoebel, E. Adamson
Hominization, issues in
Hominoids
❖ Hominid taxonomy
Homo antecessor
Homo erectus
Homo ergaster
Homo habilis
Homo sapiens
Homosexuality
Hopi Indians
Horticulture
Howell, F. Clark
Howling monkeys
Hrdlicka, Ales
Huari [Wari]
Human canopy evolution
Human competition and stress
Human dignity
Human excellence
Human Genome Project
Human paleontology
Human rights and anthropology
Human rights in the global society
Human variation
Humanism, evolutionary
Humanism, religious
Humanism, secular
❖ Secularization
Humankind, psychic unity of
❖ Unity of humankind
Humans and dinosaurs
von Humboldt, Alexander
Hume, David
Huntington, Samuel P.
Hylobates

Ice man
Ideology

Ik
Incest taboo
India and evolution
India, philosophies of
India, rituals of
Indonesia
Indus civilization
Informants
Inokun Village
Instincts
Integrity, dynamic
Intelligence
❖ Cognitive science
❖ Intelligence and genetics
❖ IQ tests
Intercultural education
International organizations
Inuit
Iron Age
Iroquoian Nations, Northern
Iroquois
Irrigation
Islam
Israel

Jarmo
Java man
Jewelry
Jews
Jews and pseudo-anthropology
Johanson, Donald C.
❖ Donald C. Johanson
Jones, William
Justice and anthropology

Kant, Immanuel
Kardiner, Abram
Keith, Sir Arthur
Kennewick man
Kenyanthropus platyops
Kenyapithecus wickeri
Kettlewell, H.B.D.
Kibbutz
King, Dr. Martin Luther, Jr.
Kinship and descent
Kinship terminology
Kluckhohn, Clyde K. M.
Koba
Kohler, Wolfgang
Koko (lowland gorilla)
Kovalevskii, Aleksandr O.
Kovalevskii, Vladimir O.
Kroeber, Alfred Louis
❖ Alfred Louis Kroeber
Kropotkin, Prince Peter A.
Kula ring
Kulturkreise
!Kung Bushmen
Kwakiutls

LaBarre, Weston
Labor
Labor, division of
Lafitau, Joseph-Francois
Language
❖ Noam Chomsky
Language and biology
Language and culture
❖ Global language
❖ Vanishing languages
Language use, sociology of
Language, animal
Language, classification of
Language, origin of
❖ Origin of language
Language, types of
Lapps
Lascaux cave
Law and anthropology
❖ Rights of indigenous peoples today
Law and society
Lazaret cave
Leakey, Louis S.B.
❖ Louis S. B. Leakey
❖ Olduvai Gorge
Leakey, Mary D.
❖ Mary D. Leakey
Leakey, Meave Epps
❖ Meave Epps Leakey
Leakey, Richard E. F.
Legends
Lemurs
Lenin, Vladimir I. U.
Leonardo da Vinci
Levalloisian tradition
Levinas, Emmanuel
Lévy-Bruhl, Lucien
Libby, Willard
Life cycle, human
Life, characteristics of
❖ Artificial life
❖ Unity of life
Life, origin of
Lineage systems, segmentary
Linguistic reconstruction
Linguistics, descriptive
Linguistics, historical
Linguistics, transformational
Linnaeus, Carolus
Linton, Ralph
❖ Ralph Linton
Llano culture
Lorenz, Konrad
Lorises
Lovejoy, C. Owen
Lucretius
Lucy reconstruction models
Lyell, Charles

Maasai
Macaques
Machu Picchu
Magic
❖ Magic versus religion
Maine, Henry Sumner
❖ Henry Sumner Maine
Malinowski, Bronislaw
Malthus, Thomas
Mana
Manioc beer
Mann, Thomas
Māori
❖ Māori
Marett, Robert Ranulph
Marmosets
Marquesas
Marriage
Marx, Karl
Marxism
❖ Neo-Marxism
Masks, ceremonial
Materialism, cultural
Matriarchy
Mauss, Marcel
Mayas
Mbuti Pygmies
McCown, Theodore D.
McLuhan, Marshall
❖ Global society

Mead, Margaret
❖ Margaret Mead
❖ Mundugamor
Medical genetics
Medicine man
Meganthropus
Mehan, Hugh
Melanin
Memes
Mesolithic cultures
Mesopotamian civilization
Metallurgy
Mexico
❖ National Museum of Anthropology
Miami Indians
Middens
Midwifery
Migrations
❖ Migrations to the Western Hemisphere
Mintz, Sidney Wilfred
Missing link
Modal personality
Models, anthropological
Modjokerto
Mohenjo Daro
Monasticism
Mongolia
Monkey Trial [1925]
Monkeys, New World
Monkeys, Old World
Monogamy
Montagu, Ashley
Montaigne, Michel Eyquem de
Monte Verde
Mores
Morgan, Elaine
Morgan, Lewis Henry
Morphology versus molecules in evolution
Morris, Desmond
Muller, Friedrich Max
❖ Friedrich Max Muller
Multiculturalism
Mummies and mummification
Mungo lady / man
Murdock, George Peter
Museums
Music
Muslims
Mutants, human
Mutations
Myths and mythology

Napier, J. R.
Narmada man
Naroll, Raoul
Nash, June C.
Nationalism
Native North American religions
Native Peoples of Central and South America
Native Peoples of the Great Plains
Native Peoples of the United States
Native studies
Natufian culture
Naturalism
Nature
Nature, role of human mind in
Navajo
Nazca culture
Neandertal burials
Neandertal evidence
Neandertal sites
Neandertals
❖ Neandertals
Neo-Darwinism
Neo-Darwinism, origin of
Neolithic cultures
Neurotheology
Ngandong
Nietzsche, Friedrich
Nomads
Non-Darwinian evolutionary mechanisms
Norms

Oakley, Kenneth Page
Ochre
Ogbu, John
Ohio Hopewell
Ojibwa
Oldowan culture
Olmecs
Omaha Indians
Onas
Oparin, A. I.
Oral literature
Orality and anthropology
❖ Orangutan-human evolution
Orangutan survival, threats to
Orangutans
❖ Orangutans in captivity
Orce
Oreopithecus
Ornamentation
Orwell, George
Osteology, human

Pacific rim
Pacific seafaring
Paleoanthropology
Paleoecology
Paleomagnetism
Paleontology
Paluxy footprints
Palynology
Panama
Pantheism
Paralinguistic communication
❖ Paralanguage
Park, Robert Ezra
Participant-observation
Pascal, Blaise
Patriarchy
Patterson, Francine G.
Peasants
Pentecostalism
People's Republic of China and Taiwan
❖ Asia
❖ Great Wall of China
Peru
Petra
Petroglyphs
Peyote rituals
Philosophy, dynamic
Phonetics
Phonology
Pictographs
Pike, Kenneth L.
Pinker, Steven
Political anthropology
Political economy
Political organizations
Political science

Polyandry
Polygamy
Polygyny
Polynesians
Polytheism
Pongids
❖ Ape culture
Popper, Karl
Population explosion
Positivism
Postcolonialism
Postmodernism
Potassium-Argon dating
Potlatch
Pottery and ceramics
Pragmatism
Prehistory
Primate behavioral ecology
Primate extinction
❖ Primate conservation
❖ Primate extinction
Primate locomotion
Primate morphology and evolution
Primate taxonomy
Primates, quadrupedalism
Primatology
Prosimians
Protolanguage
Psychiatry, transcultural
Psychology and genetics
❖ Forensic psychologists
Pu'uhonua o Honaunau
Pyramids

Qing, the Last Dynasty of China
Quechua

Radcliffe-Brown, A. R.
Radin, Paul
Ramses II
❖ Ramses II
Rank and status
Rapa Nui
❖ Rapa Nui
Rappaport, Roy
Rarotonga
Reciprocity
Redfield, Robert
Reichard, Gladys
Religion
Religion and anthropology
Religion and environment
Religion, liberal
❖ Comparative religion
Religious rituals
Reproduction
Research methods
❖ Research in anthropology
Revitalization movements
Rites of passage
Rivers, W.H.R.
RNA molecule
Robbins, Richard H.
Rock art
Role and status
Rome, ancient
Rowe, John Howland
Rumbaugh, D. M.
Russell, Dale Allen
Russia and evolution
❖ State Darwin Museum, Moscow, Russia

Sagan, Carl
Sahara anthropology
Sahelanthropus tchadensis
Sahlins, Marshall D.
Sambungmachan
Samburu
Samoa
Sangiran
Sapir, Edward
Sapir-Whorf hypothesis
Sardinia
Sartono
Sasquatch
Saussure, Ferdinand de
Schaller, George B.
Schliemann, Heinrich
Schmidt, Wilhelm
Schneider, David
Schwartz, Jeffrey H.
Science, philosophy of
Scientific method
❖ Scientism versus fundamentalism
Scopes, John
Selection, natural
Semantics, ethnographic
Service, Elman R.
Sex identity
Sex roles
Sexual harassment
Sexual selection
Sexuality
Shaman
Shanidar cave
Siamangs
Siberia
Sickle-cell anemia
Simpson, George Gaylord
Simulacra
Siwalik Hills
Slavery
Smith, Grafton Elliot
Smith, William
Smuts, Barbara B.
Social change
Social structures
Socialization
Societies, class
Societies, complex
Societies, egalitarian
Societies, rank
Societies, secret
❖ Secret societies
Sociobiology
Sociolinguistics
Sociology
Sorcery
Speech, folk
❖ Anatomy and physiology of speech
Spencer, Herbert
Spengler, Oswald
Spider monkeys
Stereotypes
Steward, Julian H.
Stonehenge
Stratigraphy
Structuralism
❖ Claude Lévi-Strauss
Strum, Shirley C.
Subcultures
Sudanese society
Sufi Islam
Sumerian civilization
Sumner, William Graham
Superorganic

Survivals, cultural
Swahili
Symboling
Syncretism

Taboos
Tahiti
Taj Mahal
Tamarins
Taphonomy
Tarsiers
Tasmania
Tax, Sol
Technology
Teilhard de Chardin, Pierre
Teleology
Temples
Tenochtitlan
Terra Amata
Territoriality
❖ Territoriality in primates
Textiles and clothing
Theories
Thomas, Elizabeth Marshall
❖ Hottentots
❖ San Bushmen
Tierra del Fuego
Tikal
❖ Tikal
Tikopia
Time
Time in anthropology
Tiwanaku [Tiahuanaco]
Tlingit
Tlingit culture
Tonga
Tools and evolution
Totem poles
Totemism
Toynbee, Arnold Joseph
Transnationalism
Travel
Treeshrews
Tropical rain forests
Troy
Tswana Bantu
Turnbull, Colin M.
Turner, Edith
Tylor, Edward Burnett

Ubirr
Unamuno, Miguel de
Uniformitarianism
United Nations and anthropology
Universals in culture
Universals in language
Untouchables
Ur
Uranium-Lead dating
Urban ecology
Urban legends
Urbanism in ancient Egypt
Uxmal

Values and anthropology
Vayda, Andrew
Venezuela
Venus of Willendorf
Vernadsky, Vladimir Ivanovich
Verne, Jules
Vikings
Villages
Virchow, Rudolf Lothar
Voros, Gyozo
Vygotsky, Lev Semenovich

Wagner, Richard
Wallace, Alfred Russel
Wallace, Anthony F. C.
Wallerstein, Immanuel
War, anthropology of
War, archaeology of
Washburn, Sherwood L.
Washoe
Wegener, Alfred
Weidenrich, Franz
Wells, H. G.
White, Leslie A.
White, Timothy
Whitehead, Alfred North
Whorf, Benjamin Lee
Williams, Raymond
Wilson, Edward O.
Wissler, Clark
Witch doctor
Witchcraft
Wolf, Eric Robert
Wolfian perspective in cultural anthropology
Women and anthropology
Women's studies
Work and skills

Xenophanes
Xenophobia

Yabarana Indians
Yaganes
Yanomamo
Yerkes, Robert M.
❖ Robert M. Yerkes
Yeti
Y-STR DNA

Zafarraya cave
Zande
Zapotecs
Ziggurats
Zinjanthropus boisei
Zooarchaeology
Zoos
❖ Zoos
Zulu
Zuni Indians

❖ Denotes sidebar accompanying main entry.

READER'S GUIDE

This list classifies main entries and sidebars into these categories: Applied Anthropology, Archaeology, Biography, Cultural/Social Anthropology, Evolution, Geography/Geology, Linguistics, Paleontology, Philosophy, Psychology, Physical/Biological Anthropology, Religion/Theology, Sociology, Research/Theoretical Frameworks. Some entries may appear in more than one category.

Applied Anthropology

Action anthropology
Aesthetic appreciation
Affirmative action
ALFRED: The ALlele FREquency Database
Anthropology and business
Anthropology and the Third World
Anthropology, careeers in
Anthropology, clinical
Anthropology, economic
Anthropology, history of
Anthropology, practicing
Anthropology, social
Anthropology, visual
Artificial intelligence
Bioethics and anthropology
Bioinformatics
Biomedicine
Biometrics
Carbon-14 dating
Counseling
Dating techniques
Dating techniques, radiometric
Dating techniques, ralative
Demography
Dendrochronology
Dispute resolution
DNA testing
Ecology and anthropology
Ecology, human behavioral
Economics and anthropology
Environmental ethics
Ethics and anthropology
Ethnoecology
Ethnomedicine
Ethnopharmacology
Ethnopsychiatry
Ethnoscience
Ethnosemantics
Field methods
Forensic anthropology
Forensic artists
Geomagnetism
Health care, alternative
Human rights and anthropology
Human rights in the global society
Intercultural education
Irrigation
Justice and anthropology
Law and anthropology
Law and society
Medical genetics
Multiculturalism
Museums
Native studies
New dating techniques
Paleomagnetism
Political anthropology
Political economy
Potassium-Argon dating
Rights of indigenous peoples today
Tutankhamun and Zahi Hawass
Twin studies
United Nations and anthropology
Uranium-Lead dating
Urban anthropology
Urban ecology
Women's studies
Y-STR DNA
Zoos

Archaeology

Abu Simbel
Acheulean culture
Acropolis
Altamira cave
Angkor Wat
Anthropology, history of
Archaeology
Archaeology and gender studies
Archaeology, biblical
Archaeology, environmental
Archaeology, maritime
Archaeology, medieval
Archaeology, salvage
Architectural anthropology
Atapuerca
Aurignacian culture
Axes, hand

Aztec agriculture
Babylon
Binford, Lewis Roberts
Bingham, Hiram
Blombos cave
Boucher de Perthes, Jacques
Braidwood, Robert John
Breuil, Henri
Burial mounds
Carter, Howard
Cave art
Celtic Europe
Chichen Itza
City, history of
Clovis culture
Coliseum
Copper age
Crete, ancient
Egypt, ancient
Egyptology
Eoliths
Excavation
Fa Hien cave
Fagan, Brian M.
Fayoum culture
Folsom culture
Ghost towns
Graves
Great Wall of China
Harappa
Historicism
Indus civilization
Iron age
Jarmo
Koba
Lascaux cave
Lazaret cave
Leakey, Mary D.
Levalloisian tradition
Llano culture
Machu Picchu
Mayas
Mesolithic cultures
Mesopotamian civilization
Metallurgy
Middens
Modjokerto
Mohenjo Daro
Monte Verde
Mummies and mummification
Museums
National Museum of Anthropology
Natufian culture
Nazca culture
Neandertal burials
Neandertal evidence
Neandertal sites
Neolithic cultures
Ochre
Ohio Hopewell
Oldowan culture
Olduvai Gorge
Olmecs
Orce
Petra
Petroglyphs
Pictographs
Pottery and ceramics
Prehistory
Pu'uhonua o Honaunau
Pyramids
Ramses II
Rapa Nui
Rock art
Rome, ancient
Sahara anthropology
Sangiran
Shanidar cave
Stonehenge
Sumerian civilization
Taj Mahal
Technology
Temples
Tenoctitlan
Terra Amata
Tikal
Tiwanaku [Tiahuanaco]
Tools and evolution
Troy
Tutankhamun and Zahi Hawass
Ubirr
Ur
Urbanism in ancient Egypt
Uxmal
Venus of Willendorf
Vikings
War, archaeology of
Zafarraya cave
Ziggurats
Zooarchaeology

Biography

Aquinas, Thomas
Ardrey, Robert
Aristotle
Arsuaga, J. L.
Auel, Jean Marie
Bakhtin, Mikhail
Bass, William
Bates, Daniel G.
Becker, Gary S.
Benedict, Ruth
Bergson, Henri
Bermudez de Castro, J. M.
Binford, Lewis Roberts
Bingham, Hiram
Black, Davidson
Blumenbach, Johann Friedrich
Boas, Franz
Boucher de Perthes, Jacques
Bourdieu, Pierre
Brace, C. Loring
Braidwood, Robert John
Breuil, Henri
Briggs, Jean L.
Bruno, Giordano
Buber, Martin
Buechel, Eugene
Bunzel, Ruth
Carpenter, C. R.
Carson, Rachel
Carter, Howard
Cavalli-Sforza, Luigi Luca
Cazden, Courtney B.
Chagnon, Napolean
Champollion, Jean-François
Childe, Vere Gordon
Chomsky, Noam
Comte, Auguste
Condorcet, Marquis de
Coon, Carleton S.
Cousteau, Jacques Yves
Croizat, Leon C.
Danilevsky, Nikolaj Jakovlevich
Darrow, Clarence
Dart, Ramond A.
Darwin, Charles
Dawkins, Richard

de Angulo, Jaime
de Waal, Frans B. M.
Deleuze, Gilles
Deloria, Ella Cara
Dennett, Daniel C.
Derrida, Jacques
DeVore, Irven
Dewey, John
Diamond, Jared
Douglas, Mary
Dubois, Eugene
Durkheim, David Émile
Eliade, Mircea
Empedocles
Engelbrecht, William Ernst
Engels, Friedrich
Evans-Pritchard, Edward E.
Fagan, Brian M.
Farber, Marvin
Feuerbach, Ludwig
Firth, Raymond
Fortes, Meyer
Fossey, Dian
Foucault, Michel
Frazer, Sir James
Freeman, Derek
Freud, Sigmund
Fried, Morton H.
Fromm, Erich
Galdikas, Biruté Mary F.
Galton, Francis
Gandhi, Mahatma
Geertz, Clifford R.
Gluckman, Max
von Goethe, Johann Wolfgang
Goodall, Jane
Goode, William Josiah
Gosse, Philip
Gramsci, Antonio
Greenberg, Joseph
Gutenberg, Johannes
Haddon, A. C.
Haeckel, Ernst
Harlow, Harry F.
Harris, Marvin
Harrisson, Barbara
Heath, Shirley Bryce
Hegel, G. W. F.
Heidegger, Martin
Heraclitus
Herskovits, Melville
Heyerdahl, Thor
Hobbes, Thomas
Hoebel, E. Adamson
Howell, F. Clark
Hrdlicka, Ales
von Humboldt, Alexander
Hume, David
Huntington, Samuel P.
Johanson, Donald C.
Jones, William
Kant, Immanuel
Kardiner, Abram
Keith, Sir Arthur
Kettlewell, H.B.D.
King, Dr. Martin Luther, Jr.
Kluckhohn, Clyde K. M.
Kohler, Wolfgang
Kovalevskii, Aleksandr O.
Kovalevskii, Vladimir O.
Kroeber, Alfred Louis
Kropotkin, Prince Peter A.
LaBarre, Weston
Lafitau, Joseph-Francois
Leakey, Louis S. B.
Leakey, Mary D.
Leakey, Meave Epps
Leakey, Richard E. F.
Lenin, Vladimir I. U.
Leonardo da Vinci
Lévi-Strauss, Claude
Levinas, Emmanuel
Lévy-Bruhl, Lucien
Libby, Willard
Linnaeus, Carolus
Linton, Ralph
Lorenz, Konrad
Lovejoy, C. Owen
Lucretius
Lyell, Sir Charles
Maine, Henry Sumner
Malinowski, Bronislaw
Malthus, Thomas
Manheim, Mary Huffman
Mann, Thomas
Marett, Robert Ranulph
Marx, Karl
Mauss, Marcel
McCown, Theodore D.
McLuhan, Marshall
Mead, Margaret
Mehan, Hugh
Mintz, Sidney Wilfred
Montagu, Ashley
Montaigne, Michel Eyquem de
Morgan, Elaine
Morgan, Lewis Henry
Morris, Desmond
Muller, Friedrich Maximillian
Murdock, George Peter
Napier, J. R.
Naroll, Raoul
Nash, June C.
Nietzsche, Friedrich
Oakley, Kenneth Page
Ogbu, John
Oparin, A.I.
Orwell, George
Park, Robert Ezra
Pascal, Blaise
Patterson, Francine G.
Pike, Kenneth L.
Pinker, Steven
Popper, Karl
Radcliffe-Brown, A. R.
Radin, Paul
Ramses II
Rappaport, Roy
Redfield, Robert
Reichard, Gladys
Rivers, W.H.R.
Robbins, Richard H.
Rowe, John Howland
Rumbaugh, D. M.
Russell, Dale Allen
Sagan, Carl
Sahlins, Marshall D.
Sapir, Edward
Saussure, Ferdinand de
Savage-Rumbaugh, Susan
Schaller, George B.
Schliemann, Heinrich
Schmidt, Wilhelm
Schneider, David
Schwartz, Jeffrey H.
Scopes, John
Service, Elman R.
Simpson, George Gaylord
Smith, Grafton Elliot

Smith, William
Smuts, Barbara B.
Spencer, Herbert
Spengler, Oswald
Steward, Julian H.
Strum, Shirley C.
Sumner, William Graham
Tattersall, Ian
Tax, Sol
Teilhard de Chardin, Pierre
Thomas, Elizabeth Marshall
Toynbee, Arnold Joseph
Turnbull, Colin M.
Turner, Edith
Tylor, Edward Burnett
Unamuno, Miguel de
Vayda, Andrew
Vernadsky, Vladimir Ivanovich
Verne, Jules
Virchow, Rudolf Lothar
Voros, Gyozo
Vygotsky, Lev Semenovich
Wagner, Richard
Wallace, Alfred Russel
Wallace, Anthony F. C.
Wallerstein, Immanuel
Washburn, Sherwood L.
Wegener, Alfred
Weidenrich, Franz
Wells, H. G.
White, Leslie A.
White, Timothy
Whitehead, Alfred North
Whorf, Benjamin Lee
Williams, Raymond
Wilson, Edward O.
Wissler, Clark
Wolf, Eric Robert
Xenophanes
Yerkes, Robert M.

Cultural/Social Anthropology

Aborigines
Adaptation, cultural
Agricultural revolution
Agriculture, intensive
Agriculture, slash-and-burn
Aleuts
Algonguians
Altamira cave
Anasazi
Anthropology, cultural
Anthropology, history of
Aotearoa (New Zealand)
Ape culture
Argentina
Asante
Asia
Athabascan
Australia
Australian aborigines
Aymara
Balkans
Baluchistan
Benedict, Ruth
Berdache
Boas, Franz
Brazil
Bride price
Cannibalism
Caribs
Caste system
Celtic Europe
Chachapoya Indians
Chants
Childhood
Childhood studies
Clans
Collectors
Configurationalism
Copper Age
Cross-cultural research
Cuba
Cultivatiion, plant
Cults
Cultural conservation
Cultural constraints
Cultural convergence
Cultural ecology
Cultural relativism
Cultural traits
Cultural tree of life
Culture
Culture and personality
Culture area concept
Culture change
Culture of poverty
Culture shock
Culture, characteristics of
Cyberculture
Darkness in El Dorado controversy
Diffusionism
Dowry
El Ceren
Elders
Emics
Endogamy
Eskimo acculturation
Eskimos
Ethnocentrism
Ethnographer
Ethnographic writing
Ethnography
Ethnohistory
Ethnology
Etics
Eudyspluria
Evans-Pritchard, Edward E.
Exogamy
Family, extended
Family, forms of
Family, nuclear
Feasts and Festivals
Feuding
Fieldwork, ethnographic
Fiji
Firth, Raymond
Folk culture
Folk speech
Folkways
Frazer, Sir James
Freeman, Derek
French structuralism
Functionalism
Gangs
Geertz, Clifford R.
Genocide
Gerontology
Globalization
Great Wall of China
Guarani Nandeva Indians
Gypsies
Haidas
Haiti
Harris, Marvin
Hinduism
Homosexuality
Hopi Indians
Horticulture

Hottentots
Huari [Wari]
Human competition and stress
Ik
Indonesia
Informants
Inoku Village
Intelligence
Inuit
IQ tests
Iron Age
Iroquoian Nations, Northern
Iroquois
Irrigation
Israel
Jewelry
Jews
Kibbutz
Kinship and descent
Kinship terminology
Kluckhohn, Clyde K. M.
Koba
Kroeber, Alfred Louis
Kula ring
Kulturkreise
!Kung Bushmen
Kwakiutls
LaBarre, Weston
Labor
Labor, division of
Lafitau, Joseph-François
Language and culture
Lapps
Lascaux cave
Life cycle, human
Lineage systems, segmentary
Maasai
Malinowski, Bronislaw
Mana
Manioc beer
Māori
Marquesas
Marriage
Matriarchy
Mbuti Pygmies
Mead, Margaret
Memes
Mexico
Miami Indians
Migrations
Modal personality
Mongolia
Monogamy
Mores
Morgan, Lewis Henry
Multiculturalism
Mundugamor
Music
Native Peoples of Central and South America
Native Peoples of the Great Plains
Native Peoples of the United States
Navajo
Nomads
Objectivity in ethnography
Ojibwa
Oldowan culture
Olmecs
Omaha Indians
Onas
Oral literature
Orality and anthropology
Ornamentation
Pacific rim
Pacific seafaring
Panama
Patriarchy
Peasants
People's Republic of China and Taiwan
Peyote rituals
Political organizations
Political science
Polyandry
Polygamy
Polygyny
Polynesians
Population explosion
Potlatch
Psychiatry, transcultural
Qing, the Last Dynasty of China
Quechua
Radcliffe-Brown, A.R.
Rank and status
Rarotonga
Redfield, Robert
Rites of passage
Role and status
Sambungmachan
Samburu
Samoa
San Bushmen
Sardinia
Sartono
Sex identity
Sex roles
Sexual harassment
Sexuality
Siberia
Simulacra
Slavery
Social structures
Societies, class
Societies, complex
Societies, egalitarian
Societies, rank
Societies, secret
Sociobiology
Speech, folk
Stereotypes
Steward, Julian H.
Structuralism
Subcultures
Sudanese society
Symboling
Tahiti
Taj Mahal
Tasmania
Tax, Sol
Technology
Textiles and clothing
Thomas, Elizabeth Marshall
Tierra del Fuego
Tikopia
Tlingit
Tlingit culture
Tonga
Travel
Tswana Bantu
Turnbull, Colin M.
Tylor, Edward Burnett
Ubirr
Untouchables
Urban legends
Vanishing cultures
Venezuela
Venus of Willendorf
Verification in ethnography
Villages
War, anthropology of

White, Leslie A.
Work and skills
Yabarana Indians
Yaganes
Yanomamo
Zande
Zapotecs
Zulu
Zuni Indians

Evolution

Adaptation, biological
Ape biogeography
Aquatic ape hypothesis
Arboreal hypothesis
Ardrey, Robert
Australopithecines
Biological anthropology
Biological anthropology and neo-Darwinism
Black, Davidson
Brain, evolution of primate
Catastrophism
Cladistics
Creationism versus geology
Darrow, Clarence
Dart, Raymond A.
Darwin and Germany
Darwin and India
Darwin and Italy
Darwin, Charles
Darwinism versus Lamarckism
Darwinism, modern
Darwinism, social
Dawkins, Richard
Dennett, Daniel C.
Diamond, Jared
Dinosaurian hominid
Dropithecus
Dubois, Eugene
Evolution education controversy
Evolution, arc of
Evolution, disbelief in
Evolution, human
Evolution, models of
Evolution, molecular
Evolution, organic
Evolutionary anthropology
Evolutionary epistemology
Evolutionary ethics
Evolutionary ontology
Evolutionary psychology
Extinction
Fossil record
Fossils
Galapagos Islands
Genetics, human
Genetics, primate
Gigantopithecus
Haeckel, Ernst
Harris, Marvin
Hominid taxonomy
Hominization, issues in
Hominoids
Homo antecessor
Homo erectus
Homo ergaster
Homo habilis
Homo sapiens
Howell, F. Clark
Hrdlicka, Ales
Human canopy evolution
Humans and dinosaurs
India and evolution
Integrity, dynamic
Johanson, Donald C.
Kenyanthropus platyops
Kenyapithecus wickeri
Leakey, Louis S. B.
Leakey, Mary D.
Leakey, Meave Epps
Leakey, Richard E. F.
Life, origin of
Lovejoy, C. Owen
Lucy reconstruction models
Mass extinctions
Meganthropus
Monkey Trial [1925]
Monogenesis versus polygenesis
Morgan, Elaine
Morgan, Lewis Henry
Morphology versus molecules in evolution
Morris, Desmond
Napier, J. R.
Narmada man
Neandertal evidence
Neandertals
Neo-Darwinism, origin of
Neo-Darwinism
Non-Darwinian evolutionary mechanisms
Olduvai Gorge
Oparin, A.I.
Orangutan-human evolution
Oreopithecus
Primate extinction
Primate morphology and evolution
Russel, Dale Allen
Russia and evolution
Sahelanthropus tchadensis
Schwartz, Jeffrey H.
Scopes, John
Selection, natural
Sexual selection
Spencer, Herbert
State Darwin Museum, Moscow, Russia
Tattersall, Ian
Teilhard de Chardin, Pierre
Theories
Tylor, Edward Burnett
Uniformitarianism
Vernadsky, Vladimir Ivanovich
Wallace, Alfred Russel
Weidenrich, Franz
White, Leslie A.
White, Timothy
Zinjanthropus boisei

Geography/Geology

Acheulean culture
Acropolis
Altamira cave
Amazonia
Aotearoa (New Zealand)
Ape biogeography
Arctic
Argentina
Asia
Australia
Axes, hand
Biogeography
Brazil
Carbon-14 dating
Catastrophism
Cave art
Clovis culture
Continental drift

Cuba
Darwin, Charles
Dating techniques
Dating techniques, radiometric
Dating techniques, relative
Eoliths
Fa Hien cave
Fiji
Folsom culture
Galapagos Islands
Geologic column
Geology
Geomagnetism
Graves
Haiti
Heyerdahl, Thor
Israel
Lascaux cave
Leonardo da Vinci
Levalloisian tradition
Lyell, Charles
Machu Picchu
Marquesas
Mexico
Mongolia
Nazca culture
New dating techniques
Ochre
Oldowan culture
Olduvai Gorge
Pacific rim
Paleomagnetism
Paleontology
Paluxy footprints
Peru
Petra
Petroglyphs
Pictographs
Pierre Teilhard de Chardin
Potassium-Argon dating
Rapa Nui
Rock art
Samoa
Sardinia
Siberia
Siwalik Hills
Smith, William
Stonehenge
Stratigraphy
Tierra del Fuego
Uniformitarianism
Uranium-Lead dating
Venezuela
Wegener, Alfred

Linguistics

Anatomy and physiology of speech
Anthropology, history of
Ape communication
Ape intelligence
Ape language
Artificial intelligence
Champollion, Jean-François
Chants
Chomsky, Noam
Cognitive science
Computer languages
Computers and humankind
Counseling
Culture
Ethnographic writing
Ethnosemantics
Folk speech
Generative grammar
Global language
Glottochronology
Intelligence
Kanzi
Kinship terminology
Koko (lowland gorilla)
Language
Language and biology
Language and culture
Language use, sociology of
Language, animal
Language, classification of
Language, origin of
Language, types of
Lévi-Strauss, Claude
Linguistic reconstruction
Linguistics, historical
Lingusitics, transformational
Memes
Myths and mythology
Oral literature
Orality and anthropology
Paralanguage
Paralinguistic communication
Patterson, Francine G.
Phonetics
Phonology
Protolanguage
Sapir, Edward
Sapir-Whorf hypothesis
Semantics, ethnographic
Sociolinguistics
Speech, folk
Swahili
Symboling
Universals in culture
Universals in language
Vanishing languages
Washoe
Whorf, Benjamin Lee

Paleontology

Apes, fossil
Atapuerca
Australopithecines
Black, Davidson
Coon, Carleton S.
Dart, Raymond A.
Dryopithecus
Dubois, Eugene
Evolution, human
Fa Hien cave
Fossil record
Fossils
Gigantopithecus
Graves
Hominid taxonomy
Hominization, issues in
Hominoids
Homo antecessor
Homo erectus
Homo ergaster
Homo habilis
Homo sapiens
Howell, F. Clark
Hrdlicka, Ales
Human paleontology
Humans and dinosaurs
Java man
Johanson, Donald C.
Kennewick man
Kenyanthropus platyops
Kenyapithecus wickeri
Lazaret cave
Leakey, Louis S. B.

Leakey, Mary D.
Leakey, Meave Epps
Leakey, Richard E. F.
Leonardo da Vinci
Lucy reconstruction models
Meganthropus
Mungo lady/man
Napier, J. R.
Neandertal burials
Neandertal evidence
Neandertal sites
Neandertals
Olduvai Gorge
Oreopithecus
Paleoanthropology
Paleoecology
Paleontology
Palynology
Sahelanthropus tchadensis
Schwartz, Jeffrey H.
Shanidar cave
Siwalik Hills
Taphonomy
Tattersall, Ian
Teilhard de Chardin, Pierre
Weidenrich, Franz
Xenophanes
Zafarraya cave
Zinjanthropus boisei
Zooarchaeology

Philosophy

Altruism
Anthropology, philosophical
Bergson, Henri
Bruno, Giordano
Buber, Martin
Categorical imperative
Comte, Auguste
Condorcet, Marguis de
Critical realism
Deleuze, Gilles
Dennett, Daniel C.
Derrida, Jacques
Dewey, John
Empedocles
Engels, Friedrich
Enlightenment versus postmodernism
Enlightenment, age of
Entelechy
Environmental ethics
Environmental philosophy
Essentialism
Ethics and anthropology
Evolutionary epistemology
Evolutionary ethics
Evolutionary ontology
Feuerbach, Ludwig
Fromm, Erich
Hegel, G. W. F.
Heidegger, Martin
Heraclitus
Hermeneutics
Hobbes, Thomas
Human dignity
Human excellence
Humanism, secular
India, philosophies of
Integrity, dynamic
Kant, Immanuel
Kropotkin, Prince Peter A.
Lucretius
Marx, Karl
Marxism
Naturalism
Neo-Marxism
Nietzsche, Friedrich
Pantheism
Philosophy, dynamic
Popper, Karl
Positivism
Postmodernism
Pragmatism
Science, philosophy of
Spencer, Herbert
Teilhard de Chardin, Pierre
Teleology
Theories
Time
Unamuno, Miguel de
Vernadsky, Vladimir Ivanovich
Whitehead, Alfred North
Xenophanes

Psychology

Agression
Alienation
Altruism
Ape agression
Ape cognition
Ape communication
Ape intelligence
Ape language
Apollonian
Ardrey, Robert
Artificial intelligence
Behavior, collective
Benedict, Ruth
Childhood
Civil disobedience
Cognitive science
Confirgurationalism
Conflict
Consciousness
Counseling
Crime
Criminology and genetics
Cross-cultural research
Cultural constraints
Cultural relativism
Culture and personality
Culture shock
Dementia
Dennett, Daniel C.
Deviance
Ecology, human behavioral
Enculturation
Ethnocentrism
Ethnopsychiatry
Ethology, cognitive
Eudysphoria
Evolutionary ethics
Evolutionary psychology
Folkways
Forensic artists
Forensic psychologists
Freud, Sigmund
Friendships
Fromm, Erich
Gangs
Harlow, Harry F.
Human competition and stress
Human excellence
Humankind, psychic unity of
Incest taboo
Intelligence
Intelligence and genetics
IQ tests

Kanzi
Kluckhohn, Clyde K. M.
Koko (lowland gorilla)
Kroeber, Alfred Louis
Lorenz, Konrad
Mead, Margaret
Modal personality
Mores
Morris, Desmond
Nationalism
Neo-Freudianism
Neurotheology
Nietzsche, Friedrich
Norms
Pinker, Steven
Psychiatry, transcultural
Psychology and genetics
Reciprocity
Sex identity
Sex roles
Sexuality
Taboos
Territoriality
Twin studies
Washoe
Xenophobia

Physical/Biological Anthropology

Acheulean culture
Adaptation, biological
Altamira cave
Anatomy and physiology of speech
Anthropology, history of
Anthropometry
Ape agression
Ape biogeography
Ape cognition
Ape communication
Ape intelligence
Apes, fossil
Apes, greater
Apes, lesser
Aquatic ape hypothesis
Arboreal hypothesis
Ardrey, Robert
Artificial life
Atapuerca
Aurignacian culture
Australopithecines
Axes, hand
Baboons
Biological anthropology
Biological anthropology and neo-Darwinism
Biomedicine
Biometrics
Bipedal locomotion
Black, Davidson
Blood groups
Blumenbach, Johann Friedrich
Bonobos
Bonobos in captivity
Brace, C. Loring
Brachiation
Brain, evolution of primate
Brain, human
Brain, primate
Cebids
Cercopithecines
Chimpanzees
Chimpanzees and bonobos, differences
Chimpanzees in captivity
Chimpanzees, saving
Colobines
Coon, Carleton S.
Craniometry
Dart, Raymond A.
Darwin, Charles
de Waal, Frans B. M.
DeVore, Irven
Diamond, Jared
Dinosaurian hominid
Diseases
DNA molecule
DNA recombinant
DNA testing
Dryopithecus
Dubois, Eugene
El Ceren
Eugenics
Eve, mitochrondrial
Evolutioin, human
Forensic anthropology
Fossey, Dian
Galdikas, Biruté Mary F.
Genetics, human
Gibbons
Gigantopithecus
Goodall, Jane
Gorillas
Gorillas in captivity
Gorillas, saving
Graves
Groooming
Haeckel, Ernst
HIV/AIDS
Hominid taxonomy
Hominization, issues in
Hominoids
Homo antecessor
Homo erectus
Homo ergaster
Homo habilis
Homo sapiens
Howell, F. Clark
Howling monkeys
Hrdlicka, Ales
Human canopy evolution
Human diversity
Human Genome Project
Human paleontology
Human variation
Humans and dinosaurs
Hylobates
Iceman
Java man
Johanson, Donald C.
Kanzi
Kennewick man
Kenyanthropus platyops
Kenyapithecus wickeri
Koko (lowland gorilla)
Lascaux cave
Lazaret cave
Leakey, Louis S. B.
Leakey, Mary D.
Leakey, Meave Epps
Leakey, Richard E. F.
Lemurs
Lorises
Lucy reconstruction models
Macaques
Marmosets
Meganthropus
Monkeys, New World
Monkeys, Old World
Montagu, Ashley
Morris, Desmond

Mummies and mummification
Mungo lady/man
Museums
Mutants, human
Napier, J. R.
Narmada man
Neandertal burials
Neandertal evidence
Neandertal sites
Neandertals
Ngandong
Oldowan culture
Olduvai Gorge
Orangutan survival, threats to
Orangutan-human evolution
Orangutans
Orangutans in captivity
Oreopithecus
Origin of bipedality
Osteology, human
Paleoanthropology
Pongids
Population explosion
Primate behavioral ecology
Primate conservation
Primate extinction
Primate genetics
Primate locomotion
Primate morphology and evolution
Primates, quadrupedalism
Primate taxonomy
Primatology
Prosimians
RNA molecule
Sahelanthropus tchadensis
Sambungmachan
Sangiran
Sasquatch
Savage-Rumbaugh, Susan
Schaller, George B.
Schwartz, Jeffrey H.
Shanidar cave
Siamangs
Sickle-cell anemia
Siwalik Hills
Smuts, Barbara B.
Sociobiology
Spider monkeys
Strum, Shirley C.
Tamarins
Tarsiers
Tattersall, Ian
Teilhard de Chardin, Pierre
Territoriality in primates
Tools and evolution
Treeshrews
Twin studies
Wallace, Alfred Russel
Washburn, Sherwood L.
Washoe
Weidenrich, Franz
Yerkes, Robert M.
Yeti
Zinjanthropus boisei
Zoos

Religion/Theology

Ancestor worship
Animatism
Animism
Anthropology of religion
Aquinas, Thomas
Bayang medicine man
Buddhism
Comparative religion
Confucianism
Coptic monasticism
Creationism, beliefs in
Cults
Daoism
Death rituals
Evil
Feuerbach, Ludwig
Frazer, Sir James
Freud, Sigmund
Ghost dance
God gene
Gods
Gosse, Philip
Graves
Henotheism
Hinduism
Humanism, religious
India, rituals of
Islam
Jews
Magic
Magic versus religion
Mana
Marett, Robert Ranulph
Marx, Karl
Masks, ceremonial
Medicine man
Monasticism
Muslims
Native North American religions
Neurotheology
Nietzsche, Friedrich
Pantheism
Pentecostalism
Peyote rituals
Polytheism
Religion
Religion and anthropology
Religion and environment
Religion, liberal
Religious rituals
Scientism versus fundamentalism
Shaman
Sorcery
Sufi Islam
Taboos
Taj Mahal
Teilhard de Chardin, Pierre
Totem poles
Totemism
Tylor, Edward Burnett
Voodoo
Wallace, Anthony F.C.
Witch doctor
Witchcraft

Sociology

Africa, socialist schools in
African American thought
African Americans
African thinkers
Alienation
Amish
Anthropology and sociology
Anthropology, social
Balkans
Behavior, collective
Child abuse
Childhood studies
City, history of
Civil disobedience
Communities
Comte, Auguste

Crime
Criminology and genetics
Cuba
Cultural convergence
Culture of poverty
Culture shock
Deviance
Durkheim, David Émile
Euthenics
Family, extended
Family, forms of
Family, nuclear
Feminism
Folk culture
Folk speech
Folkways
Friendships
Gangs
Genocide
Gerontology
Globalization
Gypsies
Homosexuality
International organizations
Israel
Labor
Labor, division of
Language use, sociology of
Mark, Karl
Marxism
Midwifery
Nationalism
Peasants
Population explosion
Rank and status
Sex identity
Sex roles
Sexual harassment
Sexuality
Slavery
Social anthropology
Social Darwinism
Social sturctures
Socialization
Societies, class
Societies, complex
Societies, egalitarian
Societies, rank
Societies, secret
Sociobiology
Sociolinguistics
Sociology
Speech, folk
Spencer, Herbert
Subcultures
Untouchables
Urban legends
Women's studies
Xenophobia

Research/Theoretical Frameworks

Alchemy
Alienation
Altruism
Anthropic principle
Anthropocentrism
Anthropology and business
Anthropology and epistemology
Anthropology and sociology
Anthropology of men
Anthropology of religion
Anthropology of women
Anthropology, characteristics of
Anthropology, humanistic
Anthropology, philosophical
Anthropology, subdivisions of
Anthropology, theory in
Anthropomorphism
Ape biogeography
Apollonian
Aquatic ape hypothesis
Arboreal hypothesis
Architectural anthropology
Art, universals in
Artificial life
Big bang theory
Cardiff giant hoax
Catastrophism
Chaos theory
Chaos theory and anthropology
Cladistics
Communism
Complexity
Computers and humankind
Configurationalism
Conflict
Cosmology and sacred landscapes
Creationism versus geology
Creationism, beliefs in
Critical realism
Critical realism in ethnology
Cross-cultural research
Cultural conservation
Cultural constraints
Cultural ecology
Cultural relativism
Cultural tree of life
Culture
Culture and pesonality
Culture area concept
Culture change
Culture, characteristics of
Cybernetic modeling
Cybernetics
Darkness in El Dorado controversy
Darwinism versus Lamarckism
Darwinism, social
Degenerationism
Determinism
Dictatorships
Diffusionism
Dinosaurian hominid
Education and anthropology
Egyptology
Emics
Enculturation
Enlightenment versus postmodernism
Enlightenment, age of
Entelechy
Environmental philosophy
Environments
Ethnocentrism
Ethnogenesis
Ethnohistory
Ethology and ethnology
Etics
Eve, mitochrondrial
Evolutionary anthropology
Evolutionary epistemology
Evolutionary ethics
Evolutionary ontology
Exobiology and exoevolution
Feminism
French structuralism
Functionalism
Future of anthropology
Futurology

Gaia hypothesis
Gemeinschaft
Geomythology
Gesellschaft
Global society
Global warming
Glottochronology
God gene
Hardy-Weinberg principle
Henotheism
Hermeneutics
Historicism
Hoaxes in anthropology
Hominization, issues in
Human canopy evolution
Human dignity
Humanism, evolutionary
Humanism, religious
Humanism, secular
Humankind, psychic unity of
Humans and dinosaurs
Iceman
Ideology
Incest taboo
Instincts
Integrity, dynamic
Interpreting evidence
Jews and pseudo-anthropology
Kulturkreise
Legends
Lucy reconstruction models
Marxism
Materialism, cultural
Memes
Migrations to the Western Hemisphere
Missing link
Models, anthropological
Monogenesis versus polygenesis
Myths and mythology
Nationalism
Naturalism
Nature
Nature and nurture
Nature, role of human mind in
Neo-Darwinism
Neo-Freudianism
Neo-Marxism
Neurotheology
Non-Darwinian evolutionary mechanisms
Norms
Objectivity in ethnography
Orangutan-human evolution
Origin of bipedality
Paluxy footprints
Pantheism
Participant-observation
Phrenology
Physiognomy
Positivism
Postcolonialism
Postmodernism
Pragmatism
Reciprocity
Research in anthropology
Research methods
Revitalization movements
Sasquatch
Science, philosophy of
Scientific method
Scientism versus fundamentalism
Secularization
Social change
Sociobiology
Stereotypes
Structuralism
Superorganic
Survivals, cultural
Syncretism
Teleology
Territoriality
Theories
Time in anthropology
Transformationalism
Unifromatarianism
Unity of humankind
Universals in culture
Universals in language
Values and anthropology
Verification in ethnography
Wolfian perspective in cultural anthropology
Women in anthropology
Women's studies
Xenophobia
Yeti

ABOUT THE EDITOR

H. James Birx (PhD, DSci) is Professor of Anthropology at Canisius College. He received his MA in anthropology and his PhD with distinction in philosophy from SUNY University at Buffalo. Dr. Birx has twice been an invited Visiting Scholar at Harvard University and has lectured worldwide at universities from Australia to Russia, including Oxford, Princeton, and Yale. His research has taken him from the Galapagos Islands and the Wyoming Dinosaur Center to Koobi Fora in Kenya, Africa and the State Darwin Museum in Moscow, Russia. Dr. Birx has published more than 400 articles and reviews, edited six volumes, and authored eight books, including the award-winning *Theories of Evolution*. He was the recipient of the 2003 Professional Achievement Award from SUNY Geneseo, where he is Distinguished Research Scholar in the Department of Anthropology. In 2005, Dr. Birx was a Visiting Professor at the Friedrich-Schiller-University in Jena and an invited presenter at both the Max-Planck-Institute for Evolutionary Anthropology in Leipzig, Germany and Cambridge University in England. He is editor of the World Lecture Series in Anthropology.

EDITORIAL BOARD

Philip Appleman
Distinguished Professor Emeritus, Indiana University

Sir Arthur C. Clarke
Author, 2001: A Space Odyssey

Antony Flew
Professor Emeritus, Reading University

Biruté Mary F. Galdikas
Camp Leakey, Simon Fraser University, Orangutan Foundation International

Sarah H. Parcak
Cambridge University

Christina B. Rieth
New York State Museum, Albany

Mark J. Thompson
Geopaleontologist, South Perth, Australia

Anne P. Underhill
The Field Museum, Chicago

ADVISORY BOARD

Simon Brascoupé
Carleton University, Trent University

Bill Cooke
University of Auckland at Manukau

Suzanne E. D'Amato
Medaille College

Patricia E. Erickson
Canisius College

John R. Grehan
Buffalo Museum of Science

Gregory Scott Hamilton
Honolulu Zoo, Hawai'i

Karen E. Hodge-Russell
Rochester Museum & Science Center

David Alexander Lukaszek
University of Montana

Eustoquio Molina
University of Zaragoza

Stefan Lorenz Sorgner
Friedrich-Schiller-University Jena

Emil Visnovsky
Slovak Academy of Sciences

John A. Xanthopoulos
University of Montana-Western

Paul A. Young
University of California at Berkeley

Zhiming Zhao
SUNY Geneseo

CONTRIBUTORS

Karen Ahrens
University of Arizona

Reyk Albrecht
Friedrich-Schiller-University Jena

Stuart Altmann
Princeton University

John P. Anton
University of South Florida, Tampa

Philip Appleman
Indiana University

Stefan Artmann
Friedrich-Schiller-University Jena

M. Fernanda Astiz
Canisius College

Mark Auslander
Brandeis University

Marietta L. Baba
Michigan State University

Hans A. Baer
Case Western Reserve University

Shara E. Bailey
New York University

Virginia A. Batchelor
Medaille College

Brian Bentel
Ada, Oklahoma

Caryn M. Berg
University of Denver

Brianna C. Berner
Creighton University

H. James Birx
Canisius College and SUNY Geneseo

A. Lynn Bolles
University of Maryland College Park

Michel Bouchard
University of Northern British Columbia

Glenn Branch
National Center for Science Education

Simon Brascoupé
Carleton University and Trent University

Michael Brass
Institute of Archaeology University College London England

Derek P. Brereton
Adrian College

Douglas C. Broadfield
Florida Atlantic University

Dan Brockington
Oxford University

Stephanie N. Brown
University of North Dakota

Stephen L. Brusatte
University of Chicago

Margaret L. Buckner
Southwest Missouri State University

Raymond A. Bucko
Creighton University

Jo Ellen Burkholder
University of Wisconsin, Whitewater

Shirley F. Campbell
Australia National University

Justin M. J. Carré
Brock University

David G. Casagrande
Arizona State University

Eric C. Chadwick
Canisius College

Gang Chen
Ohio State University

Rose-Marie Chierici
SUNY Geneseo

Patricia B. Christian
Canisius College

Patricia N. Chrosniak
Bradley University

Jill M. Church
D'Youville College

Warren B. Church
Columbus State University

Tad A. Clements
SUNY College at Brockport

Peter Collings
University of Florida, Gainesville

Bill Cooke
University of Auckland at Manukau

Pam J. Crabtree
New York University

Jerome Crowder
University of Houston

John Curra
Eastern Kentucky University

Jennifer Currie
University of Arizona

Glynn Custred
California State University, Hayward

Marianne Cutler
East Stroudsburg University

Suzanne E. D'Amato
Medaille College

Christyann M. Darwent
University of California, Davis

Robbie E. Davis-Floyd
Case Western Reserve University

Emily A. Denning
Creighton University

Barbara J. Dilly
Creighton University

Judith A. Dompkowski
Canisius College

Meredith Dudley
Tulane University

Dennis C. Duling
Canisius College

Hans-Rainer Duncker
Phyletic Museum Jena

Elizabeth Dyer
Creighton University

Nold Egenter
Zurich, Switzerland

Patricia E. Erickson
Canisius College

Ellen Eschwege
SUNY University at Buffalo

Peter I. Eta
Chicago, Illinois

Jenny Etmanskie
Carlton University

Brandon Evans
University of North Dakota

Paul E. Farmer
Case Western Reserve University

Kenneth L. Feder
Central Connecticut State University

Richard Feinberg
Kent State University

Daniel Horace Fernald
Georgia College and State University

Luci Fernandes
University of Connecticut

Olin Feuerbacher
University of Arizona

Martin S. Fischer
Phyletic Museum Jena

Scott M. Fitzpatrick
North Carolina State University

Brian Q. Flannery
Creighton University

Antony Flew
Reading University

Beverly J. Fogelson
Wayne State University

Tera Fong
University of North Dakota

Ted Fortier
Seattle University

Michael Joseph Francisconi
University of Montana-Western

Sarah Franklin
Case Western Reserve University

Catherine Mitchell Fuentes
University of Connecticut

Artwood D. Gaines
Case Western Reserve University

Biruté Mary F. Galdikas
Camp Leakey,
Orangutan Foundation International,
and Simon Fraser University

Pamela L. Geller
University of Pennsylvania

Jean Gilbert
California State University,
Long Beach

Lourdes Giordani
SUNY at New Paltz

Alan D. Gishlick
National Center for Science Education

Stephen D. Glazier
University of Nebraska-Lincoln

Jared D. Glick
University of North Dakota

James L. Gould
Princeton University

John K. Grandy
Buffalo, New York

Sophie Grapotte
University of Ottawa

Isabelle Vella Gregory
Wolfson College,
Cambridge University

John R. Grehan
Buffalo Museum of Science

Lawrence P. Greksa
Case Western Reserve University

Colin Groves
Australian National University

Carla M. Guerron-Montero
University of Delaware

Michael Gurven
University of California,
Santa Barbara

Kenneth C. Gutwein
Dowling College

Jacqueline Hagen
University of North Dakota

Gregory Scott Hamilton
Honolulu Zoo, Hawai'i

Barbara Happe
Phyletic Museum Jena

Terry Harrison
New York University

Sara R. Hegge
University of North Dakota

Michael Hesson
University of Pennsylvania

Emma Hettrich
University of North Dakota

Josiah McC. Heyman
University of Texas at El Paso

Phillip R. Hodge
Lebanon, Tennessee

Karen E. Hodge-Russell
Rochester Museum and
Science Center

C. A. Hoffman
San Buenaventura, California

Mary Carol Hopkins
Northern Kentucky University

Jean-Jacques Hublin
Max-Planck-Institute for Evolutionary
Anthropology, Leipzig

I. Niklas Hultin
University of Pennsylvania

Kevin D. Hunt
Indiana University

Pamela Rae Huteson
Klawock, Alaska

Adam M. Isaak
University of North Dakota

Linda Mohr Iwamoto
Chaminade University of Honolulu

Gwynne L. Jenkins
Case Western Reserve University

Andreas Jensen
University of North Dakota

Mary Lee Jensvold
Central Washington University

Sebastian Job
University of Sydney

Aldona Jonaitis
University of Alaska Museum

Richard R. Jones
Lee University

Bruce R. Josephson
University of Texas at Arlington

Benjamin N. Judkins
University of Utah

Jason M. Kamilar
University of North Dakota

Derik Arthur Kane
Canisius College

Vassilios Karakostas
University of Athens

Satish Kedia
University of Memphis

Ian Keen
Australian National University

William E. Kelly
Auburn University

Robert V. Kemper
Southern Methodist University

Kenneth A. R. Kennedy
Cornell University

Ronald Kephart
University of North Florida, Jacksonville

Kenneth K. Kidd
Yale University

Diane E. King
American University of Beirut

Peter J. King
Pembroke College, Oxford University

Ellen R. Kintz
SUNY Geneseo

Susan Marie Kirwan
Wayne State University

Nikolaus Knoepffler
Friedrich-Schiller-University Jena

Eduard I. Kolchinsky
St. Petersburg State University, Russia

Jill E. Korbin
Case Western Reserve University

Christopher David Kreger
Rutgers University

Ramdas Lamb
University of Hawai'i at Manoa

Katherine Lamie
SUNY Geneseo

Samatha J. Larson
University of North Dakota

Richard S. Laub
Buffalo Museum of Science

Abraham D. Lavender
Florida International University

Robert Lawless
Wichita State University

Jenna Lawson
University of North Dakota

Murray J. Leaf
University of Texas, Dallas

Nancy Leclerc
Vanier College

Aikaterini Lefka
University of Luxembourg and University of Liege, Belgium

Philippe D. LeTourneau
University of New Mexico

Walter E. Little
SUNY University at Albany

Roger Ivar Lohmann
Trent University

Debra M. Lucas
D'Youville College

Keridwen N. Luis
Brandeis University

David Alexander Lukaszek
University of Montana

Edward A. Lukaszek
Cheektowaga, New York

Aurolyn Luykx
University of Oklahoma

Mahgoub El-Tigani Mahmoud
Tennessee State University

Miki Makihara
Queens College and CUNY

Alberto A. Makinistian
National University of Rosario, Argentina

Louis Herns Marcelin
University of Miami

Maxine L. Margolis
University of Florida, Gainsville

Ilias D. Mariolakos
National University of Athens

Jessica M. Masciello
Canisius College

Christopher C. Matson
Two Medicine Dinosaur Center

Gerald L. Mattingly
Johnson Bible College

Kerstin May
Friedrich-Schiller-University Jena

Grant S. McCall
University of Iowa

Martha L. McCollough
University of Nebraska

David V. McFarland
Friedrich-Schiller-University Jena

Scott McKee
Barrett Memorial Hospital, Dillon, Montana

Kristine Gentry McKenzie
Auburn University

Penelope A. McLorg
Indiana University-Purdue University, Fort Wayne

James Paul McMillan
SUNY University at Buffalo

Francis John Meaney
University of Arizona

Belete K. Mebratu
Medaille College

Frederick Meli
University of Rhode Island

Marcia Mikulak
University of North Dakota

Christine Z. Miller
Wayne State University

Eustoquio Molina
University of Zaragoza

Jim Moore
Victoria, British Columbia

Paula B. Moore
Eastern Kentucky University

Belen Marquez Mora
Museo Arqueological Regional, Madrid

Justine Movchan
University of North Dakota

Kenneth Mowbray
American Museum of Natural History

Komanduri S. Murty
Clark Atlanta University

Jamie L. Neary
University of North Dakota

Justin M. Nolan
University of Arkansas

Heidi M. Northwood
Nazareth College of Rochester

Adam W. Nurton
Creighton University

Neil P. O'Donnell
Canisius College

Jackie L. Orcholl
University of Montana

Keith F. Otterbein
SUNY University at Buffalo

Paul J. Pacheco
SUNY Geneseo

Lisa Paciulli
Ithaca College

Abha Pal
Pt. Ravishankar Shukla University, India

Sarah H. Parcak
Cambridge University

Nancy J. Parezo
University of Arizona

Thomas K. Park
University of Arizona

Larry A. Pavlish
University of Toronto

Donald R. Perry
University of California, Los Angeles

Mark Allen Peterson
Miami University

Markus Helmut Friedrich Peuckert
Friedrich-Schiller-University Jena

Evie Plaice
Grand Valley State University

Benjamin W. Porter
University of Pennsylvania

Thomas M. Prince
Canisius College

Zoe Proctor-Weber
Nova Southeastern University

Constantinos V. Proimos
University of Crete

Kathy Prue-Owens
University of Arizona

Keith M. Prufer
Wichita State University

Linda L. Reiten
University of Montana-Western

Juergen Reyer
Erfurt University

John Rhoades
St. John Fisher College

Christina B. Rieth
New York State Museum, Albany

Uzma Z. Rizvi
University of Pennsylvania

Erin Elizabeth Robinson-Caskie
Canisius College

Nicholas L. Roehrdanz
University of North Dakota

Kara Rogers
University of Arizona

Larry Ross
Lincoln University

Molly D. Roth
University of Pennsylvania

Elisa Ruhl
SUNY University at Buffalo

Adam B. Ruszinko
Semmelweis Medical University, Hungary

Debika Saha
Barasat College, University of Calcutta

Frank A. Salamone
Iona College

Philip Carl Salzman
McGill University

Manuela Schmidt
Plyletic Museum Jena

Susan G. Schroeder
Medaille College

Jeffrey H. Schwartz
University of Pittsburgh

Shaun Scott
University of Montana-Western

Hans Otto Seitschek
Ludwig-Maximilians-University Munich

Richard M. Seklecki
Minot State University

Audrey C. Shalinsky
University of Wyoming

Kerrie Ann Shannon
University of Alaska, Fairbanks

Lori K. Sheeran
Central Washington University

Anne Siegetsleitner
Friedrich-Schiller-University Jena

Michael J. Simonton
Northern Kentucky University

Josef Šmajs
Masaryk University, Brno, Czech Republic

Kathleen C. Smith
University of North Dakota

Olena V. Smyntyna
Odessa I.I. Mechnikov National University, Ukraine

Jay Sokolovsky
University of South Florida, St. Petersburg

Stefan Lorenz Sorgner
Friedrich-Schiller-University Jena

Leslie E Sponsel
University of Hawai'i at Manoa

James Stanlaw
Illinois State University

Michael F. Steltenkamp
Wheeling Jesuit University

Phillips Stevens
SUNY University at Buffalo

Barry Stocker
Yeditepe University, Istanbul

Gerald Sullivan
University of Notre Dame

Peter Sykora
Comenius University, Slovakia

Saranindra Nath Tagore
National University of Singapore

Holly Tanigoshi
Canisius College

Ian Tattersall
American Museum of Natural History

Barbara Tedlock
SUNY University at Buffalo

Mark J. Thompson
South Perth, Australia

Clayton M. Tinsley
SUNY University at Binghamton

Megan Tracy
University of Pennsylvania

David Trexler
Two Medicine Dinosaur Center

Frances Trix
Wayne State University

Donald E. Tyler
University of Idaho

Anne P. Underhill
The Field Museum, Chicago

Maria Velioti-Georgopoulos
General State Archives, Nafplio, Greece

Therese de Vet
University of Arizona

Emil Visnovsky
Slovak Academy of Sciences

Ashwin G. Vyas
Clark Atlanta University

Carrie Wannamaker
Buffalo, New York

Dustin M. Wax
Las Vegas, Nevada

William A. Wedenoja
Southwest Missouri State University

Martin Weiss
Trento Institute of Culture, Italy

James R. Welch
Tulane University

Barbara J. Welker
SUNY Geneseo

E. Christian Wells
University of South Florida, Tampa

Barbara West
University of the Pacific

Paul F. Whitehead
Capital Community College

Stewart B. Whitney
Niagara University

John S. Wilkins
University of Melbourne

Cathy Willermet
University of Texas at El Paso

Seth Williamson
University of Denver

Daniel R. Wilson
Creighton University

Sara Withers
Brandeis University

Linda D. Wolfe
East Carolina University

Andrew P. Xanthopoulos
University of Florida, Gainsville

John A. Xanthopoulos
University of Montana-Western

Paul A. Young
University of California at Berkeley

Veronica A. Young
Erie Community College

Joshua M. Zavitz
Harrow, Ontario, Canada

Zhiming Zhao
SUNY at Geneseo

Jintang Zheng
Shanghai, China

John P. Ziker
Boise State University

ACKNOWLEDGMENTS

At SAGE Reference, I was especially fortunate to have had the guidance, support, and wisdom of both Rolf A. Janke, Vice President and Publisher, and Claudia A. Hoffman, Project Editor, Books. I deeply appreciated their vision for this project and their steadfast commitment to its fulfillment, without which this *Encyclopedia of Anthropology* would not have been accomplished. It was a joy to work with each of them.

Also, at SAGE, I benefited from having worked with the following individuals concerning the artistic and practical aspects of preparing this encyclopedia for its publication and distribution: Ravi Balasuriya, Eileen Gallaher, Michelle Lee Kenny, Karen Wiley, Carmel Withers, and Astrid Virding. My sincere gratitude goes to Sara Tauber for her persistent encouragement and invaluable help during the preparation of these five volumes.

It is a distinct honor for me to include the Foreword by Biruté Mary F. Galdikas. Her dedication to saving wild orangutans from extinction in their natural habitats clearly represents one of the best examples of the relevant value of modern anthropology for our human world.

I am greatly indebted to the professional assistance provided by Sylvia S. Bigler during the past three years. Her secretarial expertise, especially the meticulous attention to all the facets of preparing manuscripts for publication, was an enormous benefit to the successful completion of my own entries for this huge project.

It is a pleasure for me to acknowledge the contributing authors for their scholarly entries and outstanding illustrations. Both the range and depth of these articles and sidebars clearly attest to the ongoing significance of the anthropological quest.

Over the years, these colleagues and friends have been particularly helpful in terms of providing inspiration and giving assistance: Philip Appleman; Stefan Artmann; Marietta L. Baba; Jill M. Church; Bill Cooke; Christopher C. Dahl; Suzanne E. D'Amato; Susanne Des Jardins; Barbara J. Dilly; Michael J. Eadie; E. Joyce Eulner; Marvin Farber; Martin S. Fischer; Edward G. Garwol, III; Shirley A. Garwol; Gregory Scott Hamilton; Regina M. Hendricks; Debra G. Hill; Jean-Jacques Hublin; Pamela Rae Huteson; Alberta F. Kelley; Nikolaus Knoepffler; Margaret M. Kraatz; Minka Kudrass; Aikaterini Lefka; Debra Lucas; David Alexander Lukaszek; Rose M. Malone; Kerstin May; Lawrence J. Minet; Eustoquio Molina; Lisa Paciulli; Thomas M. Prince; Robert Ranisch; Brendan G. Reints; Joseph F. Rizzo; Rev. Edmund G. Ryan, S. J.; Gisela Schmidt; Stefan Lorenz Sorgner; Mark J. Thompson; David Trexler; Michel D. Tyson; Karl E. Ulrich; Emil Visnovsky; and Zhiming Zhao.

I am very grateful to both Charles C Thomas, publisher, and Joseph P. Berry, editor and publisher of Legend Books, for giving me permission to expand and update my previously published materials for inclusion in the *Encyclopedia of Anthropology*. Their thoughtfulness is deeply appreciated.

Lastly, I wish to thank Pat Bobrowski who, when I phoned SAGE with the desire to edit an encyclopedia of anthropology, connected me with Rolf A. Janke. The rest is history.

— *H. James Birx*
Invited Speaker, Max-Planck-Institute for
Evolutionary Anthropology
9 June 2005
Leipzig, Germany

FOREWORD

Odyssey—A Life in Anthropology

When Dr. H. James Birx, the editor of the *Encyclopedia of Anthropology*, and I first met over lunch in a restaurant near the La Brea Tar Pits in Los Angeles, we discovered that, in addition to our commitment to anthropology, we both have a passion for Charles Darwin and the profound way that his writings have permeated the fabric of Western science and culture. At that lunch, James proposed that I write the foreword to the encyclopedia, a foreword that relates to my life in anthropology.

Anthropology is the scientific study of humankind's origin, biology, and culture. It encompasses a vast—and some might say, untidy—body of knowledge that has rarely been organized. In real-life terms, an informal but yawning gap has existed between those who study culture, especially of present and past historically known societies, and those who wrestle with the issues of human origin.

Anthropology has many mothers and fathers, but it was Charles Darwin who shone the brightest light on the biological nature of humans and the fact that human culture ultimately emerged out of the biological reality of human beings and their evolution. Darwin also emphasized the unmistakable kinship of humans and apes.

It has been said that freedom is like air: You don't notice it, but if you lose it, then you suffocate. Culture is also like air in that most people don't notice it, but it is essential to human survival. Culture is the knowledge, beliefs, patterns of behavior, and institutions that are transferred from one generation to the next and shared by a group of people. Culture has enabled human beings to survive as a species, to prosper, and ultimately to have dominion over the earth. Culture is the interface between humans and the environment. It buffers us. The extent of our dependence on culture is part of what makes us unique as a species. Without culture, a human being is naked.

I have been studying a population of wild orangutans now for almost 35 years. When a group of colleagues and I recently published a paper in *Science*

Source: Photograph by Linda Leigh/OFI.

citing evidence that orangutans have culture, the media took notice. We were interviewed by the *New York Times* and the *Washington Post*, as well as by other media. Our conclusion was seen as news. Yet, the observation that orangutans have culture should not have come as a surprise. Human beings and the great apes are close relatives, and we have known for some time that great apes possess the most fundamental elements of culture. Jane Goodall and others have long demonstrated that wild chimpanzees make tools in their natural environments according to patterns learned from other chimpanzees. In captivity, great apes such as the gorilla Koko and, under free-ranging conditions, the orangutan Princess have exhibited a limited but demonstrable ability to communicate through symbols.

The exception proves the rule. Other animals demonstrate culture, and it has been argued that even some bird species do. Nonetheless, in some ways, human culture is unique. Complex tool-making and full-blown language have long been considered the distinguishing characteristics of humans. It has been argued that humans are the only animals who make tools to make other tools. Yet, I have never believed in an absolute divide between humans and other animals. At most, we can certainly argue that no other animal depends so much on culture to survive as do human beings.

Thus, anthropology is the most global and inclusive of all disciplines. When H. James Birx first asked me to write the foreword to this encyclopedia, I was surprised to learn that this will be the first comprehensive international encyclopedia of anthropology. I was immediately impressed by the worldwide nature of the enterprise. Over 250 authors from dozens of universities, institutes, and museums have contributed to these five volumes, which were assembled in California for printing in China. In addition, contributors present subjects and issues in geology, paleontology, biology, evolution, sociology, psychology, philosophy, and, yes, even theology that are relevant to anthropology.

I became an anthropologist out of my interest in human origins and history. Human evolution has been interwoven with cultural evolution. I thought, like many before me, that the better we understand animals—especially our closest living relatives in the animal kingdom, the great apes—the better we would understand ourselves, our culture, and our evolution. My initial odyssey into anthropology came from reading. I was a child who read everything that came into my hands, including the proverbial back of the cereal box. In elementary school, the very first book I took out from the public library was *Curious George*, the story of an adventurous and unruly monkey, who was brought to an urban environment by an explorer in a tall yellow hat. It had a profound affect on me. But it wasn't until my third year in university that I actually took an anthropology class, and the effect was like a parched person receiving water.

In my last year of undergraduate work, when I was 19, I had an epiphany. My psychology professor mentioned, in passing, a young English woman, who was living with wild chimpanzees in Africa. I didn't know who the woman was, but I later discovered that it was Jane Goodall. At that moment, in the psychology class, I knew that my destiny was to live with and study orangutans in their native habitat. I decided, however, that I would first get my PhD in archaeology. When I had achieved that, I would go to Southeast Asia and study wild orangutans in their natural habitat. I conducted archaeological fieldwork in Arizona, California, British Columbia, and the former Yugoslavia.

But fate intervened in the form of the late charismatic paleoanthropologist, Louis S. B. Leakey. In 1959, Louis and his wife Mary had electrified the world by finding ancient hominid fossils that demonstrated the great antiquity of humankind. He put actual bones, fossil bones that were dated scientifically, into the evolutionary story of our species. And he believed that the study of our nearest living kin, the great apes, would help add flesh and blood to those bones. Louis Leakey enabled me to pursue my life's work: the study and conservation of orangutans in Indonesia. Consequently, instead of archaeology, I received my PhD in physical anthropology for my study of wild orangutans.

Other anthropologists also inspired me. As I entered the graduate program in anthropology at UCLA, I learned about many anthropologists who played important roles in the life of Western societies. I am proud to be an anthropologist because anthropologists played a key role in steering Western culture away from racism and sexism. Anthropologists are also playing an important role in trying to save great apes from extinction in their own environments and by fighting for their rights in captivity. Clearly, anthropologists are not immune to the thoughts and beliefs of their times. But, both generally stressing the

unitary origin of our modern human species, in terms of biological evolution, and documenting the diversity and legitimacy of human cultures are important achievements that resonate in Western thinking.

We tend to understand the more recent work in our field better than we do its history. Cultural evolution is not a new area of work. Edward Tylor, who was the first professor of anthropology at Oxford, a Quaker who nurtured anthropology in Great Britain, influenced anthropology by his investigations into the similarities among cultures. Tylor also tried to understand prehistory when no historical record existed. Darwin's writings influenced Tylor; he saw cultures as examples of progressive evolution rather than cultures being the products of random selection. That the goal of culture was to progress to the next state or grade was a view that persisted in anthropology even into the 1960s.

Rebelling against 19th century cultural evolutionists, Franz Boas, the father of American anthropology, taught respect for technologically primitive peoples and fought long and hard against racism during all the years of his adult life in academia. He also left generations of his students, "Boasians," who were influenced by his views and carried on his work. One of his students, Alfred Kroeber, saw anthropology as a united field rather than a collection of specializations (physical/biological anthropology, archaeology, cultural/social anthropology, and linguistics). At the Department of Anthropology at UCLA where I was a graduate student in the 1960s, Kroeber's influence was very much felt. I had to take core courses in all four of the disciplines of anthropology before I received my master's degree.

While I was a graduate student at UCLA, two of the "stars" of the department were the archaeologists Lewis and Sally Binford. The Binfords introduced the "new archaeology" to the world, an archaeology that stressed scientific method and the processes that produced prehistoric societies. The Binfords ultimately departed UCLA, but the excitement they generated was palpable; like Louis Leakey, Lewis Binford could have been an Old Testament prophet for all the emotions that he stirred up with his proselytization of the new archaeology among faculty and students. But the new archaeology had not sprung fully formed from Binford's brain, like fully-armed Athena from the head of Zeus. Rather, Julian Steward's influence in developing ideas about cultural ecology and multilinear evolution was very apparent. Cultural ecology, similar to biological ecology, investigates the relationship between environments and cultures or societies. Although his view of evolution stemmed from the idea of evolution as progress, Steward did not believe that all cultures follow the same pathway. Similarities among groups with no demonstrable contact were due to adaptations rather than diffusion.

But perhaps the most famous anthropologist in the world was Margaret Mead, certainly the anthropologist who was the most widely read of her time and a "Boasian" herself. Her work in Samoa, specifically on adolescence and child-rearing, had an unprecedented impact on American child-rearing practices through her influence on Dr. Benjamin Spock, the child-rearing guru of post-World War II North America. Her tangential influence on Dr. Spock permeated his advice. Child-rearing practices in North America reflected his thinking so much that his advice was taken as the natural way to parent.

Margaret Mead's influence on the development of feminism was also indirect but persuasive. Her detailed ethnographies were interesting for the way that they exploded conventional Western thinking on gender and sexual divisions in society. Other writers took division of labor for granted. Mead, however, demonstrated that gender differences meant more than just foraging issues and that they were played out in very complex and different ways in different societies. Mead described three cultures in New Guinea: In one, men were expected to be feminine (by Western standards); in another, women were masculine, even "macho"; in a third, gender differences were considered inconsequential because men and women were thought to be alike.

Although Mead's research was questioned after her death, she was probably the most influential anthropologist of the 20 th century. In addition to her books, her frequent columns in a popular women's magazine helped propagate her views on child-rearing and gender. I briefly met Margaret Mead at a conference a few years before her death, and she was as solid as the Rock of Gibraltar. Ironically, I also had a long correspondence with Derek Freeman, the Australian National University professor who led a campaign against Mead's academic work after her death. This campaign generated much controversy and very much reflected the stubborn character I knew through his correspondence. But in the end, North American society had moved on beyond the controversy and Mead's influence remains.

The influence of Louis Leakey, Raymond Dart, and Phillip Tobias in demonstrating that humankind had a unitary origin, which includes all modern humankind, also cannot be underestimated, and I should mention as well the late Ashley Montagu as an indefatigable fighter against racism. In lectures, conferences, and documentaries and also in their writings, these men preached the message that all modern humans are descended from the same ancestors and are therefore kin. Perhaps this is the reason why a very inclusive *Encyclopedia of Anthropology* is so needed. We need to underscore the fact that anthropology gets its strength from its diversity of practitioners and disciplines, and that one of its main strengths is its global nature. Also, we need to understand that, ultimately, every human being is a natural anthropologist, simply by becoming aware of his or her own biology and culture.

As we do air, we frequently take culture for granted and ignore its influence on our own thoughts, beliefs, actions, and prejudices. Even in this era of global communication, we interpret what we see through our own local cultural lens. At the same time, human exploits and activities are constrained by the biological realities and limits imposed by our own origin and evolution. This is why anthropology is so important: It illuminates and explains the continuum of human biological and cultural evolution, and it addresses its limits. Until we understand and acknowledge the importance of culture, we are doomed to make terrible mistakes. As the world becomes increasingly global, these mistakes can have greater repercussions than ever before. Ideally, there should be anthropologists at every important treaty negotiation, that is, anthropologists who can interpret the cultural realities that so often guide conflict and war. Perhaps if anthropologists rode on the tanks going to war, then there would be less war.

This monumental encyclopedia makes an astonishing contribution to our understanding of human evolution, human culture, and human reality through an inclusive global lens. These interesting five volumes will be important in explaining humans as biological and cultural beings, not only to academic anthropologists but also to all the natural anthropologists who constitute our human species.

— *Biruté Mary F. Galdikas*
Camp Leakey,
Tanjung Puting National Park,
Borneo, Indonesia

INTRODUCTION

The Anthropological Quest

Anthropology is the study of humankind in terms of scientific inquiry and logical presentation. It strives for a comprehensive and coherent view of our own species within dynamic nature, organic evolution, and sociocultural development. The discipline consists of five major, interrelated areas: physical/biological anthropology, archaeology, cultural/social anthropology, linguistics, and applied anthropology. The anthropological quest aims for a better understanding of and proper appreciation for the evolutionary history, sociocultural diversity, and biological unity of humankind. Anthropologists see the human being as a dynamic and complex product of both inherited genetic information and learned social behavior within a cultural milieu; symbolic language as articulate speech distinguishes our species from the great apes.

Genes, fossils, artifacts, monuments, languages, and societies and their cultures are the subject matter of anthropology. The holistic approach is both intradisciplinary and interdisciplinary. It incorporates evidence from geology, paleontology, psychology, and history, among other special sciences. Anthropologists strive to present generalizations about the origin and evolution of our own species from remote hominid ancestors, as well as ideas about the emergence of social organizations and cultural adaptations. As a result of both research over scores of decades and the convergence of facts and concepts, anthropologists now offer a clearer picture of humankind's natural history and global dominance.

With the human being as its focus, the discipline of anthropology mediates between the natural and social sciences while incorporating the humanities. Its acceptance and use of discoveries in biology, for example, the DNA molecule, and its attention to relevant ideas in the history of philosophy, such as the concepts presented in the writings of Marx and Nietzsche, make anthropology a unique field of study and a rich source for the relevant application of facts,

H. James Birx, Uluru (Ayers Rock), Australia

concepts, methods, theories, and perspectives. Forensic anthropology, medical anthropology, business anthropology, and advocacy anthropology have emerged as significant areas of applied anthropology in the changing modern human world.

Growing fossil evidence reveals that our remote beginnings started in a very diversified group of hominid species that had, in turn, emerged from earlier fossil apelike forms living in Africa. Over several millions of years, some hominid forms evolved while others became extinct. Clearly, hominid evolution has been an extraordinarily long and incredibly complex process, with only our own species having survived human evolution to the present time. How dearly would one love to have seen our earliest hominid ancestors of the deep, prehistoric past as they struggled to adapt and survive in those precarious environments of the open woodlands and grassy savannahs! Indeed, it is intriguing to speculate on both the overt and covert behavior of these primitive hominids: They gazed at the same stars, experienced drastic habitat changes, and were no doubt perplexed by birth and disease and death.

As with most species, past civilizations—including their languages—have emerged, evolved, flourished, and vanished. The anthropologist is challenged to reconstruct both the material cultures of these societies and the social behaviors of their inhabitants.

Anthropologists also compare and contrast the human animal with the other primates, especially the four great apes: orangutans, gorillas, chimpanzees, and bonobos. One consequence of this research is that we have found our own species to differ from these pongids more in degree than in kind. With fossil evidence that apes, monkeys, and prosimians are our evolutionary kin, human beings may be closer to the four great apes than Huxley, Haeckel, or even Darwin himself could have imagined in the 19th century.

Ongoing advances in science and technology enhance the anthropological quest, particularly in terms of more precise dating techniques, DNA analyses, and computers for cross-cultural studies and linguistic research.

As a youngster growing up on a farm in New York, I developed a lasting love for movies. Films such as *King Kong* (l933), *Mighty Joe Young* (1949), *The Ten Commandments* (1956), *The Thief of Baghdad* (1940), *Quo Vadis* (1951), and *Unknown Island* (1948) introduced me to apes, prehistoric life forms, and ancient civilizations. Moving images on the silver screen left indelible impressions on my curious imagination.

In secondary school, Charles Darwin's scientific theory of organic evolution was added to my interest in natural history. Then, as a college student at SUNY Geneseo, I took my first courses in anthropology and evolution. On my own, I also discovered the history of philosophy and was fascinated with the ideas of Aristotle and Nietzsche. Since childhood, I have had a philosophical orientation that, as a college student, found delight in reading about the great thinkers in Western culture.

During my 5 years at Geneseo, one highlight was meeting Margaret Mead, complete with her large walking stick, which she no doubt brought with her from some Pacific island. At that time, neither she nor I could have imagined that her inspiring auditorium presentation would contribute, four decades later, to my editing this encyclopedia. Over the years, I have also met Donald C. Johanson, Richard E. F. Leakey, and Jeffrey H. Schwartz, as well as numerous scientists and philosophers. Each of them has played a role in the materialization of this work.

As a graduate student in anthropology at SUNY University at Buffalo, I did research in human craniometry and enjoyed reading the cultural theorists, particularly the writings of Leslie A. White. The framework of evolution gave meaning and purpose to my many interests, which ranged from astronomy to theology. Again on my own, I discovered that several significant thinkers had been influenced by the writings of Charles Darwin, including the early anthropologists.

During my graduate studies in philosophy, distinguished professor Marvin Farber (l901–1980) understood, encouraged, and appreciated my desire to integrate anthropology, philosophy, and evolutionary thought. Under his guidance, I wrote a dissertation on Pierre Teilhard de Chardin. This study prepared me for critically analyzing interpretations of evolution in the world literature. I am forever grateful for Farber's insights, help and wisdom.

My interests in anthropology and related fields have taken me to numerous zoos, museums, institutes, universities, and historic sites from Australia to Russia. My own anthropological quest has been fascinating and enriching: I have walked among the ancient ruins of Egypt, Greece, and Rome; visited Stonehenge, Teotihuacan, and Machu Picchu; mingled with the Inuits of Kotzebue, Maasai of Kenya,

and Aborigines of the Karunga Rain Forest of Australia. In 2003, my discovery of the first fossil bone of an *Allosaurus* at the Wyoming Dinosaur Center was a particularly exciting experience for me.

Twice I visited the Galapagos Islands to experience—to some degree—the wonderment that Darwin must have felt when he first walked among the strange animals that had adapted to this unique archipelago that is seemingly detached from, but actually demonstrates the consequences of, organic evolution.

The year 1959 had been a pivotal point in the history of anthropology. In July, prehistoric archaeologist Mary D. Leakey had discovered the "Zinj" skull in the lower rock strata of Olduvai Gorge in Tanzania, central East Africa. It was the first hominid specimen to be found in this part of the world. *Zinjanthropus boisei* was 1.75 million years old. Even though this species represented a side branch in hominid evolution that became extinct, this remarkable specimen inspired other anthropologists to search for hominid fossils and paleolithic artifacts in central East Africa. Since l959, scientists and researchers have made other incredible discoveries that shed significant light on the origin, evolution, and diversity of early hominids in Africa.

In l985, I was fortunate to participate in field research at Koobi Fora in Kenya, Africa. I quickly developed a great respect for the paleoanthropologists and prehistoric archaeologists who spend months or years searching for those fossils and artifacts that offer more and more insights on hominid biocultural evolution. It's not surprising that some anthropologists are very protective of their rare discoveries.

Another major advance in the middle of the 20th century was the beginning of close-range, long-term studies of the wild apes in their natural habitats. Primate behavior research benefited greatly from such rigorous studies, supplemented by comparative primate genetics research. I have met the three major primatologists of our time: Dian Fossey, Jane Goodall, and Biruté Mary F. Galdikas. Their pioneering field work has made substantial contributions to biological anthropology and pongid psychology.

Planet earth is both a graveyard and museum. The more anthropologists search, the more they find. Surely, there are other fossil hominids to be unearthed and other artifacts to be discovered. Even unknown species of primates and lost civilizations may yet be found in dense jungles.

The value of anthropology lies not only in the indispensable knowledge and sweeping perspective that it gives to science and philosophy but also in the tolerance that it instills in and the relevance that it has for our converging global species.

Although anthropologists are still interested in the biocultural evolution of humankind, some have turned their attention to solving problems in the modern world. Future anthropologists will likely study human adaptations to living in outer space and perhaps on other worlds.

As I was, millions of people have been introduced to evolution through the 1968 film *2001: A Space Odyssey*. Its engaging story of transition from ape through human to star child contains ideas and symbols from the writings of Darwin, Freud, and Nietzsche, among others. Stanley Kubrick and Sir Arthur C. Clarke presented both the cosmic perspective and an evolutionary framework in a stunning visual manner that remains compelling and plausible. It is now crucial that our species has the will to evolve, as well as the desire to learn from the wisdom of evolution.

From time to time, I have fantasized how it would be to direct epic films such as *Quo Vadis*. As the editor of the *Encyclopedia of Anthropology*, I come as close as I ever will to directing such a motion picture. This "film" is the human story of our epic journey that has been over five million years in the making. The authors are its actors, and the entries are scene-like contributions that fill these five colorful volumes. Numerous individuals at SAGE have worked on the editing, production, and marketing aspects of this project. I now hope that these pages will result in many readers having a deeper understanding of and appreciation for the biological and cultural aspects of our species. And as films introduced me to anthropology, perhaps this encyclopedia will inspire readers to become a part of the future anthropological quest.

— *H. James Birx*
Distinguished Research Scholar
Department of Anthropology, SUNY Geneseo
June 1, 2005

Further Readings

Barnard, A. (2000). *History and theory in anthropology*. New York: Cambridge University Press.

Bass, B., & Jefferson, J. (2003). *Death's acre: Inside the legendary forensic lab— The Body Farm—where the dead do tell tales*. New York: Putnam.

Benedict, R. (1934/1959). *Patterns of culture.* New York: Mentor Books.
Birx, H. J. (1984). *Theories of evolution.* Springfield, IL: Charles C Thomas.
Birx, H. J. (1988). *Human evolution.* Springfield, IL: Charles C Thomas.
Birx, H. J. (1991). *Craniometry of the Orchid Site Ossuary, Fort Erie, Ontario.* Buffalo, NY: Persimmon Press.
Birx, H. J. (1991). *Interpreting evolution: Darwin & Teilhard de Chardin.* Amherst, MA: Prometheus Books.
Boyd, R., & Richerson, P. J. (2005). *The origin and evolution of cultures.* New York: Oxford University Press.
Chomsky, N. (1975). *Reflections on language.* New York: Pantheon.
Corbey, R. (2005). *The metaphysics of apes: Negotiating the animal-human boundary.* Cambridge: Cambridge University Press.
Darwin, C. (1887/1958/2000). *Autobiography.* Amherst, MA: Prometheus Books.
de Waal, F. B. M. (2005). *Our inner ape: A leading primatologist explains why we are who we are.* New York: Riverhead Books.
de Waal, F. B. M., & Lanting, F. (1997). *Bonobo: The forgotten ape.* Berkeley: University of California Press.
Diamond, J. (1992). *The third chimpanzee: The evolution and future of the human animal.* New York: HarperCollins.
Diamond, J. (2005). *Collapse: How societies choose to fail or succeed.* New York: Viking.
Evans-Pritchard, E. E. (1940). *The Nuer: A description of the modes of livelihood and political institutions of a Nilotic people.* Oxford: Oxford University Press.
Fagan, B. M. (2005). *World prehistory: A brief introduction,* 6th ed. Upper Saddle River: Pearson Prentice Hall.
Foley, W. A. (1997). *Anthropological linguistics: An introduction.* Malden, MA: Blackwell.
Fortey, R. (1998). *Life: A natural history of the first four billion years of life on earth.* New York: Alfred A. Knopf.
Fossey, D. (1983). *Gorillas in the mist.* Boston: Houghton Mifflin.
Galdikas, B. M. F. (1995). *Reflections of Eden: My years with the orangutans of Borneo.* Boston: Little Brown.
Galdikas, B. M. F. (2005). *Great ape odyssey.* New York: Harry N. Abrams.
Goodall, J. (1986). *In the shadow of man.* Boston: Houghton Mifflin.
Harris, M. (1968). *The rise of anthropological theory: A history of theories of culture.* New York: Thomas Y. Crowell.
Harris, M. (1980). *Cultural materialism: The struggle for a science of culture.* New York: Random House.
Langness, L. L. (2005). *The study of culture,* 3rd ed. Novato, CA: Chandler & Sharp.
Larson, E. J. (2004). *Evolution: The remarkable history of a scientific theory.* New York: Modern Library.
Leakey, M. D. (1984). *Disclosing the past: An autobiography.* Garden City, NJ: Doubleday.
Leakey, R.E.F. (1984). *One life: An autobiography.* Salem, MA: Salem House.
Leakey, R.E.F. (1994). *The origin of humankind.* New York: BasicBooks/HarperCollins.
Malinowski, B. (1954). *Magic, science and religion, and other essays.* Garden City, NJ: Doubleday.
Malinowski, B. (1961). *Argonauts of the western Pacific.* Bergenfield, NJ: E. P. Dutton.
Manhein, M.H. (1999). *The bone lady: Life as a forensic anthropologist.* New York: Penguin.
Mayr, E. (1991). *One long argument: Charles Darwin and the genesis of modern evolutionary thought.* Cambridge: Harvard University Press.
McGee, J., & Warms, R. L. (Eds.). (2000). *Anthropological theory: An introduction*, 2nd ed. Mountain View, CA: Mayfield.
Mead, M. (1928/1961). *Coming of age in Samoa.* New York: Morrow.
Montgomery, S. (1991). *Walking with the great apes: Jane Goodall, Dian Fossey, Biruté Galdikas.* Boston: Houghton Mifflin.
Moore, J. D. (2004). *Visions of culture: An introduction to anthropological theories and theorists*, 2nd ed. Walnut Creek, CA: AltaMira.
Perry, R. J. (2003). *Five key concepts in anthropological thinking.* Upper Saddle River, NJ: Prentice Hall/Pearson Education.
Powell, J. F. (2005). *First Americans: Race, evolution and the origin of native Americans.* Cambridge: Cambridge University Press.
Radcliffe-Brown, A. R. (1922). *The Andaman Islanders: A study in social anthropology.* Cambridge: Cambridge University Press.
Richardson, J. (2004). *Nietzsche's new Darwinism.* Oxford: Oxford University Press.
Sapir, E. (1921/1949). *Language: An introduction to the study of speech.* New York: Harcourt Brace Jovanovich.
Service, E. R. (1975). *Origins of the state and civilization: The process of cultural evolution.* New York: Norton.

Tattersall, I., & Schwartz, J. H. (2000). *Extinct humans*. Boulder, CO: Westview Press.
Teilhard de Chardin, P. (1975). *The phenomenon of man*, 2nd ed. New York: Harper & Row.
Thomas, E. M. (1989). *The harmless people*. New York: Random House.
Turnbull, C. M. (1983). *Mbuti pigmies: Change and adaptation*. New York: Harcourt Brace.
Turnbull, C. M. (1987). *The forest people*. New York: Simon & Schuster.
Turnbull, C. M. (1987). *The mountain people*. Riverside, NJ: Touchstone Books.
Watson, J. D. (2003). *DNA: The secret of life*. New York: Alfred A. Knopf.
Wells, S. (2002). *The journey of man: A genetic odyssey*. Princeton, NJ: Princeton University Press.
White, L. A. (1959). *The evolution of culture: The development of civilization to the fall of Rome*. New York: McGraw-Hill.
Whorf, B. (1956). *Language, thought, and reality*. New York: Wiley.
Wilson, E. O. (1992). *The diversity of life*. Cambridge: Harvard University Press.

A

Aborigines

The word *aborigine* means "from the beginning." In Australia, this word began to be used to refer specifically to the continent's nearly one million indigenous inhabitants at the time of the British invasion in 1788. Many cultures have been lost since then, due to violent conflict between Aborigines and successive waves of new settlers. Some cultures have survived and renewed their focus on kin networks, close religious and legal relationships to the land, and revitalization of their culture and language. Of 250 languages, 20 remain.

Experts believe ancestral Aborigines arrived approximately 46,000 years ago, possibly when sea levels were low during the Ice Age. Archaeological sites near Melbourne and Perth are dated to 40,000 years ago, shell middens to 30,000 years ago. Indigenous peoples of Australia and New Guinea, closely related, probably share a common origin in Indonesia. Aboriginal language diversified into a large number of families with no clear relationships, suggesting a much longer period of differentiation than the single Austronesian language family had in the South Pacific.

Early tools consisted of flakes and pieces of stone with sharp edges. Ground-edged hatchet heads found in the North were the only prehistoric tools shaped into regular patterns. From 3000 BC, stone tools spread throughout the continent and may have been used as currency as well as for woodworking.

The clan, the most important social group, moved within a specific tract of land in response to seasonal variation or the need to be at a specific place for ritual purposes. Clans were linked as part of exchange networks that moved objects or ideas over long distances. They also maintained and transmitted culture with images and songs describing creation, short songs containing powerful information related to specific localities, and series of songs strung together in song lines. Rock and body painting and decoration of portable objects linked clans to the land, each other, and the past.

Aboriginal people believed in the continuing existence of spirit-being ancestors who lived on earth during "the Dreaming" and created the natural world before the arrival of humans. They took various forms represented by totems and behaved as people. They aged and had to return to the sleep from which they awoke at the dawn of time, but they continued to influence natural events and breathe life into newborns. Their wisdom regarding kinship, hunting, and marriage relationships was highly desired.

Australian Aborigines were hunter-gatherers identified by a managerial forager prehistoric lifestyle that included vegetation burning, replanting, and occasional wetland ditching, depending on available natural resources. In western Victoria, elaborate systems were constructed for trapping eels. In northern wetlands, tubers were replanted to promote future growth. Elsewhere, wells were sunk to raise large crops of yams; trees were transplanted; streams were diverted for irrigation; and digging was undertaken to encourage roots. Fire was widely used to open pathways, kill vermin, remove dry vegetation and promote new growth, cook edible animals in their burrows and nests, and prevent more destructive natural fires. Yet when Europeans saw these methods of managing grasslands and diversifying plant and animal life, they did not recognize Aborigines as farmers, gardeners, or herders. Absence of defined fields, permanent villages, and edible domestic animals led them to regard Aboriginal country as unproductive and unclaimed. Aborigines seemed to be wanderers, an inferior people who were not using the land and who should

be forcibly removed to make way for colonization. Australia was annexed to the British Empire on the basis that it was *terra nullius,* or uninhabited wasteland. This myth prevailed until 1992, when a High Court judged in the Mabo case that native title to land still existed in Australia.

— *Susan Schroeder*

See also **Australian Aborigines**

Further Readings

Elkin, A. P. (1954). *The Australian Aborigines: How to understand them.* Sydney, Australia: Angus & Robertson.

Swain, T. (1993). *A place for strangers: Towards a history of Australian Aboriginal being.* Cambridge; New York: Cambridge University Press.

Tindale, N. B. (1974). *Aboriginal tribes of Australia: Their terrain, environmental controls, distribution, limits, and proper names.* Berkeley: University of California Press.

ABORIGINES

Cultural anthropologists have long been fascinated by the study of Australian Aborigines, and many foreign anthropologists have emigrated to Australia to study Aborigines. The new arrivals often outnumber local anthropologists at academic institutions. In addition to the historical aspects of Aborigine studies, cultural anthropologists as well as social scientists have become concerned with myriad problems that have surfaced as Aborigines have been acclimatized into mainstream Australian life.

The quality of education in many indigenous communities lags behind standards for Australians in general, resulting in lower literacy rates and a deficit of basic skills needed to prepare young people for facing the realities of the adult world. Aborigines in the most remote areas also lack quality health care and a general knowledge of how poor sanitation makes individuals more susceptible to certain diseases. For instance, in the remote area of Mulan, where more than 60% of Aborigine children have been stricken with blindness-inducing trachoma, the Australian government agreed to improve fuel access only if local authorities guaranteed that Aborigine children would take daily showers and wash their hands at least twice a day and that residents would regularly remove household garbage. The infant morality rate among Aborigines is 6 times that of the White population. Aborigines are also more likely than other Australians to die from health-related causes as well as from violence.

The Australian government announced in late 2004 that welfare policies have created a cycle of lifelong dependency among Aborigines, while doing little to change the endemic problems of Aborigine acclimatization. These include lower life expectancy, chronic alcoholism, and high rates of domestic violence. *The Australian* reported on December 16, 2004, that Aborigine males born between 1996 and 2001 face a life expectancy of 59.4 years compared with 77.8 years for their white male counterparts. While comparable Aborigine females fare better with a life expectancy of 64.8 years, that number lags far behind the 82.8-year life expectancy of their white female counterparts. Experts believe that incidences of alcoholism and the flogging deaths of Aborigine wives by their husbands are a result of poverty and alienation. Prime Minister John Howard of the Liberal Party has proposed reforms that stress Aborigine self-help and independence.

Charges of racism have threatened Aborigine acclimatization, leading some experts to claim that the country is in the midst of a racial crisis. This issue exploded in late 2004 after publication of a report by the Equal Opportunity Commission (EOC). The commission's investigation revealed that Aborigine families in Western Australia who make up 18% of the tenants of Homeswest, a public housing complex, were 3 times more likely to be evicted for allegedly being behind with their rent, damaging property, or being socially incompatible with their white neighbors.

As proof of Homeswest's racism, the EOC pointed to the fact that most Aborigine tenants were relegated to inferior housing, which in many cases had been scheduled for demolition. The investigation also uncovered evidence that the housing authority's staff was trained to treat Black

and white tenants differently and that the staff advised white tenants on how to successfully lodge complaints against their Aborigine neighbors, heightening chances of eviction.

While Homeswest stated that it had implemented 43% of the committee's recommendations, the executive director rejected the remaining 57%, claiming that they smacked of paternalism. Rejected recommendations included moving overcrowded Aborigine families into better, more spacious quarters rather than evicting them, because many of the problems had resulted from overcrowding. Recommendations implemented by Homeswest included cultural training for staff members and an agreement to conduct interviews with tenants privately rather than publicly, as had been done in the past.

— Elizabeth Purdy

Acheulean Culture

The Acheulean stone tool "culture" refers to the suite of typological characteristics associated with the stone tool technology of the later part of the Lower Paleolithic or Early Stone Age. In terms of stone tool culture chronology, the Acheulean culture immediately follows the Oldowan culture in Africa, and contemporary industries that possibly existed elsewhere in the world, and precedes the Middle Paleolithic or Middle Stone Age. The range of dates associated with the Acheulean is the subject of some controversy, although the general consensus is that it began around 1.6 my and ended around 200 ky.

The Acheulean was distributed throughout the tropical and temperate zones of the Old World. Acheulean sites are found over most of Africa (with the possible exception of tropical forested regions), range into the Near East and India, and extend into Northern and Western Europe. The earliest occurrences of the Acheulean culture are seen in the Rift Valley of East Africa. The Acheulean was present in the Near East and India certainly no later than 1 my and perhaps as early as 1.4 my. The Acheulean appeared in Europe no later than 800 ky. Until recently, hand axes were not thought to be present in Southeast Asia, which was thought to be divided from Europe and the Near East by the so-called Movius Line, named for Harvard prehistorian Hallam Movius. Recent discoveries in Southeast Asia have called this conventional understanding into question. It appears now that the Acheulean may have been present in Southeast Asia as early as 800 ky, depending on how the Acheulean is defined.

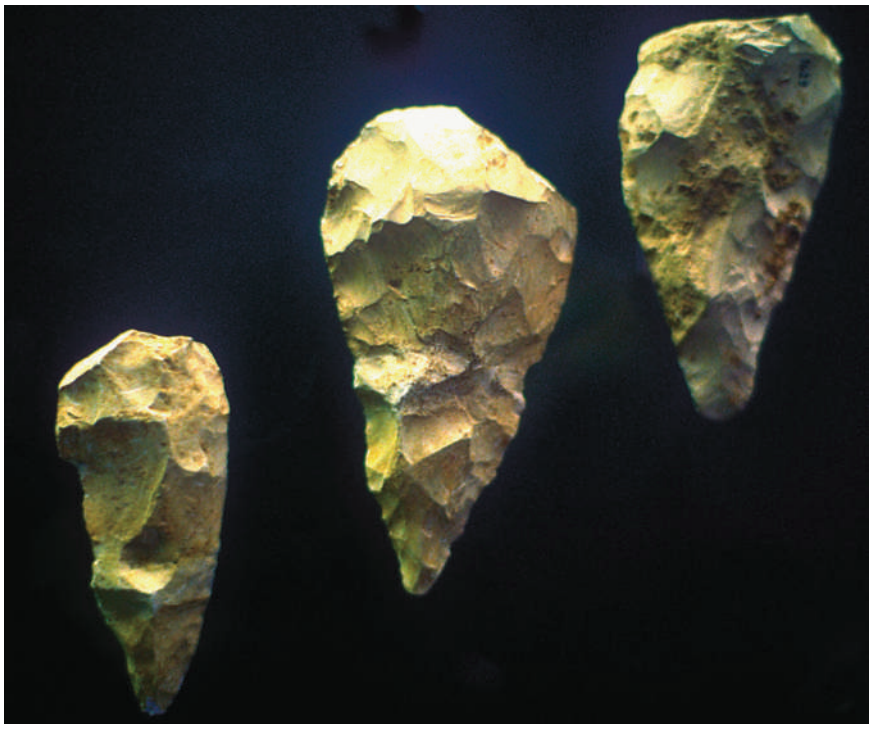
The Acheulean culture ranged remarkably widely in terms of both geography and chronology. It therefore likely represents the product of a substantial diversity of hominids, including *Homo ergaster*, *Homo erectus*, *Homo heidelbergensis*, *Homo neanderthalensis*, and *Homo sapiens*. Much of this, of course, is dependent upon how hominid phylogeny is arranged.

History of Research

The Acheulean culture has an important place in Old World Paleolithic prehistory. The defining characteristic of the Acheulean is the presence of large bifacial reduced core tools, conventionally called "hand axes" or "cleavers." The most remarkable feature of the Acheulean culture is the persistence of hand axes over an incredible duration of time—almost the entire course of the Pleistocene. Over the course of the Acheulean, hand axes gradually became thinner and more refined, incorporating technological advances such as core platform preparation. However, the overall design and shape of hand axes changed very slowly and remained remarkably consistent. This is the case both within individual sites that contain records of long periods of time and more generally across the Old World in prehistory.

The persistence of the Acheulean hand axe represents a substantial research problem, with numerous proposed explanations. These possibilities include inherited biological programming for hand axe manufacture, sexual signaling using hand axes, cultural instruction of offspring by parents for the production of hand axes, or simply the functional unity of an effective technological design, which was invented and utilized innumerable times in prehistory. The explanations are too numerous to list here, and there is extremely little consensus concerning this problem.

Hand axes were among the first stone tools recognized by modern prehistorians in Europe, likely because of their distinctive appearance. John Frere, an English scientist writing at the end of the 18th century,



Source: © Kathleen Cohen.

is frequently cited as the first to recognize hand axes and other Acheulean implements as the results of ancient human activity. However, the Acheulean culture is named for the type site of Saint-Acheul, discovered along the Somme River of France during the mid-19th century by Jacques Boucher de Perthes. In addition, the observation of hand axes in association with the bones of extinct animal species at sites like Saint-Acheul was instrumental in the recognition of the antiquity of human presence in Europe, as well as the rest of the world. Among these early researchers of hand axes were the pioneer geological prehistorians, such as Boucher de Perthes and Gabriel de Mortillet, working in the mid-1800s. These scholars and their contemporaries saw hand axes as "type fossils," indicative of the earliest time periods of human prehistory in the same way that animal fossil specimens were used to date ancient geological layers.

Likewise, hand axes were noticed by archaeologists working in Africa very early at sites such as Stellenbosch, and this lent support to speculation concerning the early origins of humans on that continent. Here, hand axes became important features of stone tool typologies as early as the 1920s. Hand axes and their stratigraphic associations were extremely important to Louis Leakey's early work in Kenya. He used hand axes as a linchpin in developing a stone tool chronology for East Africa. Among the most prominent of the natural historians to discuss the subject of hand axes and the Acheulean culture was Thomas Henry Huxley, who saw such stone tool industries as indicative of the sophistication of early humans.

By the first part of the 20th century, archaeologists were beginning to conventionally speak of the Acheulean culture as a ubiquitous industry of the early Paleolithic in the Old World. It was during this time that archaeologists began to speak of "the Acheulean" as a unitary set of stone tool types significant of a specific time range. In this context, the term was basically entirely restricted to chronology. It is important to understand that stone typology was one of the few methods for determining the age of archaeological sites. By identifying sequences of archaeological cultures, such as the Acheulean, with consistent sets of attributes, it was possible to determine the relative age of archaeological sites. With the Acheulean, the term was used to describe the relative position of stone tool remains in the chronology of the Paleolithic. The Acheulean has never really been used as a descriptive term for any patterns of behavior associated with this time period.

The Emergence of Modern Viewpoints

The emergence of chronometric dating techniques in the mid-20th century significantly changed the place of the Acheulean culture concept. This took the burden off of analysis of stone tools in terms of determining the age of archaeological sites and freed analysis to answer questions of behavior and culture change. Because of the newer importance of questions inferring behavior, the Acheulean culture has been defined using other technological characteristics, taking emphasis away from hand axes as type specimens almost exclusively defining the culture. These features include centripetal removal of flakes from cores, bifacial removal of flakes, low frequencies

of "formal" or shaped or retouched tools, and large assemblages of unmodified flakes. In certain technological vocabularies, the Acheulean is referred to as "Mode 2" technology because of the presence of these features. In general, the Acheulean is characterized by simple flake reduction, without much evidence of core preparation until the transition to the Middle Paleolithic or Middle Stone Age. The early Acheulean is marked by deep, aggressive flake removal using stone hammers, while the later Acheulean is defined by more refined flaking using bone, wood, or antler hammers, especially in the thinning of bifaces.

The emphasis on hand axes as markers of the Acheulean was also largely based on the assumption that such core tools were the functional parts of the technology; flakes were viewed as waste products of the manufacturing process. More recent studies have recognized flakes as the most useful part of Acheulean technology, because they have a much sharper edge than either core tools like hand axes or retouched "formal" tools. This has somewhat challenged the validity of defining this culture as using hand axes so exclusively. In fact, this newer view sees cores, such as hand axes, as the waste product of flake production—the exact reverse of the classical notion. In this revised view, the Acheulean is no longer defined by the designed manufacture of specific tool types like hand axes, but instead by specific strategies of flake manufacture, core reduction, and lithic raw material economy. Because of this, more recent scholarship has been extremely wary of the hand axe as typological marker.

In addition, after the dating advances in the mid-20th century, numerous sites appeared within the date range associated with the Acheulean, but they lacked hand axes. Oftentimes, sites without hand axes were even in close geographical proximity with contemporary sites containing hand axes. Such contemporary sites lacking hand axes have often been referred to as belonging to the "Developed Oldowan" industry, because of their presumed connection with the earlier culture. However, the Developed Oldowan is a term that has largely fallen out of favor within Paleolithic archaeology. Quickly, it became apparent that a number of factors affected whether or not hand axes were deposited at a given site, including the availability of appropriate raw material and the occurrence of technological problems for which the manufacture of hand axes was a solution. The absence of hand axes could not, by itself, indicate a separate technological culture. These rationales have also been used to explain the scarcity of hand axes east of the Movius Line. The geology of Southeast Asia is characterized largely by sedimentary contexts, which seldom produce the quality of raw material needed for hand axe manufacture found in Europe, the Near East, or Africa.

Further complicating the definition of the Acheulean tied to the presence of hand axes, with refinement of absolute dating techniques, many archaeological sites with hand axes were dated outside of the range usually associated with the Acheulean. This was especially the case in Europe, where numerous well-documented sites with hand axes were dated to surprisingly late in the Middle Paleolithic. For example, the Mousterian-of-Acheulean culture of the European Middle Paleolithic is defined by the presence of hand axes but occurs long after the end of the Acheulean in that region. Furthermore, it is unclear whether the hand axes present in the Mousterian-of-Acheulean tradition operated in the same way as their earlier counterparts.

These factors have meant that the use of hand axes as the definitional characteristic of the Acheulean has become problematic. In addition, few other features of equal clarity have been offered to redefine the Acheulean. In fact, in many circles, the use of the term "Acheulean" has been eliminated in favor of more general terminology more closely tied to chronology, rather than stone tool typology. Advances in dating techniques and new conceptual approaches to the archaeology of stone tools have presented a substantial critique of the Acheulean culture as a singular phenomenon. It now appears that the Acheulean was neither a group of related hominids nor a single "cultural" way of manufacturing stone tools. The term now has little agreed-upon significance beyond its meaning for chronology.

— *Grant S. McCall*

See also **Axes, Hand; Dating Techniques; Oldowan Culture; Paleontology**

Further Readings

Deacon, H. J., & Deacon, J. (1999). *Human beginnings in South Africa: Uncovering the secrets of the Stone Age.* Cape Town, South Africa: David Philip.

Klein, R. G. (1999). *The human career: Human biological and cultural origins.* Chicago: University of Chicago Press.

Leakey, M. D. (1971). *Olduvai Gorge: Excavations in Bed I and II, 1960–1963.* Cambridge: Cambridge University Press.
Sampson, C. G. (1974). *The Stone Age archaeology of southern Africa.* New York: Academic Press.
Schick, K. D., & Toth, N. (1993). *Making silent stones speak: Human evolution and the dawn of technology.* New York: Simon & Schuster.

Acropolis

The word *acropolis* literally means the higher, fortified part of a city. While there may be many of these in Greece, when we speak of the Acropolis, most understand the reference to be to the Acropolis of Athens. The Acropolis sits more than 500 feet above the plain of Attica in the city of Athens, bordered on three sides by cliffs and accessible by foot on only one side. Its geography made it a natural fortress during the iron-age beginnings of Athens, and it functioned primarily as a fort until sometime after the end of the Persian Wars (479 BC).

Evidence of human habitation dates from the Neolithic. Through the centuries, the Acropolis has served the people of Athens as a place of residence, palaces, centers of worship, a citadel, and monuments to their gods and goddesses. One such temple was dedicated to Athena, the city's patron goddess, as early as 650 BC.

Major Monuments

On the Acropolis, major monuments include the Parthenon, the Erechtheion, the Temple of Athena Nike, and the Propylaea.

The Parthenon

Built around 440 BC and dedicated to the city's patron goddess Athena Parthenos, the Parthenon's creators were Pericles, the Athenian sculptor Pheidias, and architects Kallikrates and Iktinos. The *cella* or center of the temple was designed to shelter Pheidias's statue of Athena. On four sides of the Parthenon, a frieze of the Procession of the Panathenaea, one of ancient Athens's most holy religious festivals, depicts the figures of more than 300 human beings as well as gods and beasts in procession.

Through the centuries following its construction, the Parthenon has served as a Byzantine church, a Latin church, and a Muslim mosque. When the Venetians attacked the Acropolis in 1687, the Turks used the Parthenon to store gun powder during the seige. As the Venetians bombed the Acropolis, one of the bombs hit the Parthenon, destroying much of the structure.

The Erechtheion

Built about 20 years after the Parthenon, the Erechtheion sits on a sacred site of the Acropolis, the

Source: © iStockphoto/Andy Didyk.

site where Greek legend claims the goddess Athena and the god Poseidon-Erechtheus battled over which would be the patron of the city. Athena won. The Erechtheion's main temple was divided so that Athenians could worship both Athena and Poseidon. The monument's most famous feature is the porch of the Caryatids or maidens, in which statues of maidens border the porch's perimeter. One of these was removed from the Acropolis by Lord Elgin and subsequently sold to the British Museum, where it remains. The other maidens are now housed in the Acropolis Museum, so the figures we now see decorating the porch of the Erechtheion are only copies of the original statues.

The Temple of Athena Nike

About the same time as the building of the Erechtheion, the architect Kallikrates constructed the Temple of Athena Nike. The small monument's walls are friezes depicting the meeting of the gods on one side and battle scenes on the three remaining sides. In 1686, the Turks dismantled the temple to use the site for a large cannon. The Greeks rebuilt the temple around 1840 and again in 1936, when the platform on which it had been built was found to be crumbling.

The Propylaea

Pheidias's associate, the architect Mnesicles, built the Propylaea, a monumental gateway entrance to the Acropolis just before the beginning of the Peloponnesian wars. It consisted of a central structure and two wings, with one wing serving as an art gallery. The Propylaea's massive colonnades faced the east and west, and two rows of columns divided the central corridor. Its coffered ceiling was complete with painted decoration.

The Acropolis Today

Earthquakes, fires, bombs, vandalism, and war have, through the centuries, taken their toll on the structures of the Acropolis. In some instances, parts of buildings were demolished and used in the construction of new monuments. But once the Greeks liberated Athens from the Turks, they began major restoration efforts to protect, conserve, and restore the Acropolis.

These efforts continue today. The Greek government reports completed restoration of the Erechtheion, parts of the Propylaea, and the east facade of the Parthenon. Projects in progress include the north side of the Parthenon, the Propylaea's central building, and the Temple of Athena Nike.

— *C. A. Hoffman*

Further Readings

Acropolis Restoration Project, Government of Greece website: http://ysma.culture.gr/english/index.html

Bruno, V. J. (1996). *The Parthenon: Illustrations, introductory essay, history, archeological analysis, criticism* (2nd ed.). New York: Norton.

Cosmopoulos, M. B. (Ed.). (2004). *The Parthenon and its sculptures.* Cambridge: Cambridge University Press.

Hellenic Ministry of Culture website: http://www.culture.gr/

Hurwit, J. M. (2004). *The Acropolis in the age of Pericles.* Cambridge: Cambridge University Press.

Action Anthropology

Action anthropology is a scholarly enterprise based in field research, data collection, and theory building, during which the anthropologist is also committed to assisting local communities in achieving their goals and meeting specific felt needs. Rather than pursuing pure science or perusing their own agendas, action anthropologists see themselves more as tentative coexplorers who help the host community to identify challenges and seek ways to meet them. In the process, action anthropologists contribute to the community while learning from their experiences. While applied anthropology generally focuses on programmatic concerns of nonlocal funders, both public and private, action anthropology discovers local concerns in the course of ethnographic work and engages local resources in addressing them. Though related to applied anthropology, which began in Great Britain in the 1920s and the United States in the 1930s and which shares the goal of being a useful rather than purely scholarly field, action anthropology takes a more populist approach. The anthropologist must be committed to assisting the host community by serving as an educator and a resource, not as a source of money or expertise. Mutually agreed-upon plans for action arise from knowledge gained by fieldwork and the reception of knowledge by the host group.

Primarily derived from research with Native American communities, action anthropology was a product of and sustained by the personal dynamism of anthropologist Sol Tax (1907–1995). Anthropology has, from its inception, been more than disinterested research and data collection. E. B. Tylor (1832–1917) described anthropology as a reformer's science. Lewis Henry Morgan (1818–1881) advocated against Iroquois removal. Bronislaw Malinowski (1884–1942) publicly excoriated British colonial policy, and James Mooney of the Bureau of American Ethnology critiqued the federal government as part of the cause of Plains Indians' social and economic problems in the 1880s. Nevertheless, it was many decades before anthropologists came to the idea that host individuals in the field were colleagues rather than "informants" or to the belief that the relationship between fieldworker and host community was one of mutual help and reciprocity rather than simply scholar and subject population. Also, action anthropologists are participants as well as participant observers, both objectively learning from outside and eventually entering the fray when and where appropriate. Though not without good intentions, early anthropology simply suggested solutions for Native peoples, anathema to action anthropologists. Action anthropology facilitates what is now referred to as *community-based needs assessment.*

Tax articulated his own understanding of action anthropology in 1975. He stressed professional tolerance for ambiguity in action anthropology, as its methodology was tentative and contextual, much like the clinical situation of a physician interacting with a patient. He cautioned that this process was not social work; theory building and understanding remained paramount but should never be separated from assisting communities with their specific difficulties. Local people must make their own decisions and identify their own problems and target the specific situations they wish to address. Tax stressed three values in carrying out action anthropology: the value of truth couched in science and scholarship, the value of freedom of communities to make their own decisions, and the value of focusing on only the specific task at hand rather than attempting to change total situations.

Tax worked out the program for action anthropology while teaching at the University of Chicago and directing the work of graduate students at a field school, which ran from 1948 to 1959. Tax himself worked for a short period of time in 1928 among the Fox (Mesquakie) of Tama, Iowa, and steered his students into the Fox Project, where they engaged in cooperative activities such as establishing an American Legion hall, educating the local non-Indian population about the Mesquakie and the Mesquakie about their neighbors, setting up an artists' cooperative, assisting the Mesquakie in maintaining the integrity of their own local school system, encouraging small-scale communal gardening, establishing scholarships for Native students, and opening their own off-reservation residence as an informal social hall for young people to form strong relationships with members of the Native community.

Tax's own larger anthropological career demonstrated his commitment to the ideals that find their expression in action anthropology, particularly his organizing the Chicago American Indian Conference in 1961, his activism regarding Native American rights, and his founding of the international journal *Current Anthropology,* which published new research

and facilitated collegial dialogue, academic and Native. In addition to his research and political action in Guatemala, Dr. Tax worked for the improvement of his own Hyde Park neighborhood; participated in the organization and early growth of the American Indian Center of Chicago; supported a Native-based educational venture, Native American Educational Services (NAES) College in Chicago; encouraged Native American participation in the Master of Arts Program in the Social Sciences (MAPSS) at the University of Chicago, the Chicago Indian Center; and facilitated the establishment of the tribal research D'Arcy McNickle Center at the Newberry Library, named after his friend, colleague, and key American Indian Chicago Conference associate D'Arcy McNickle (of the Salish culture).

Many scholars have carried on the mission of action anthropology using Tax's insights and continue to do so. Among the most significant action anthropologists to emerge directly under Sol Tax's mentorship were Robert Reitz, Robert K. Thomas, and Nancy Lurie. Robert Reitz started with the Fox Project in 1955 and began an artists' cooperative. He also worked among the Three Confederated Tribes (Mandan, Hidatsa, and Arikara) at Fort Berthold and was director of the Indian Center of Chicago until his death in 1971. Unfortunately, his legacy was in action and not in writing, and thus we have little from his pen. Robert Thomas, a Cherokee anthropologist trained at Chicago, worked on the Fox Project, the National Indian Youth Council, was a founding board member of NAES, and was deeply involved in the struggle for Native American rights. Nancy Lurie of the Milwaukee public museum also based her approach to museum anthropology in the realm of action anthropology, stressing Native community involvement and partnership with the Native community in constructing museum displays and establishing activities and programs. She also promoted displays of contemporary Native life rather than simply focusing on the Native past.

Other anthropologists credited with direct assistance to indigenous populations that presage the tenants of action anthropology include Allan Holmber's work in Vico, Peru, assisting in the aftermath of an earthquake, and James Spillius's intervention in Tikopia (Polynesia), after a horrific hurricane. Both anthropologists' roles moved from pure research to what Tax would call "action": communal assistance at the time of a crisis.

The invisibility of Tax's own action program as well as that of others became painfully evident when Vine Deloria Jr. and other Native Americans took anthropology to task for remaining apart from the real needs of Native communities, exploiting them through research that furthered only the career of the anthropologist. Deloria, who attended the American Indian Chicago Conference in 1961, published his initial critique in 1969, some 20 years after the inception of the Fox Project and at a time when research with Native American communities had significantly diminished. Nevertheless, his words served to challenge the discipline to take seriously its commitment to peoples as much as to research and to carry out research not "pure" but practical to lived situations.

Deloria's critique was part of a larger change in consciousness experienced among U.S. anthropologists who experienced not only paradigmatic meltdown but also a crisis of conscience in the 1970s. Many came to believe that their discipline was too closely associated with the rise of colonialism at best, and instrumental or essential to colonialism's success at worst. Anthropology as a field grew self-conscious and self-critical, attempted to distance itself from power structures (although the academy itself is a power structure), and sought consciously and even radically to identify and side with indigenous peoples who were once objects of study.

While action anthropology was being formulated both in the mind and heart of Sol Tax and in the praxis of the Fox Project, a similar community organizing was beginning in urban Chicago. Fostered by such activists as Sol Alinsky, who knew Tax well, this movement sought to improve the lives of the urban poor, particularly industrial and meatpacking workers. Tax's work in the Chicago Community Trust mirrored these concerns.

There is no formal "school" of action anthropology today, nor does it have specific institutional locus. Lecture, meetings, and concrete field model its methods and practices. Tax and his students Fred Gearing and Robert Rietz presented their work on the Fox Project at the Central States Anthropological Society in the spring of 1956. Information on the Fox Project and action anthropology was also presented at a symposium at the annual meeting of the American Anthropological Association in 1957. There have been significant conferences on action anthropology itself, including the Panajachel Symposium, held

in Guatemala in November 1974. The majority of contemporary reflections on action anthropology are intimately linked to the career of Sol Tax and the Fox Project.

Action anthropology is not without its critics. Most trenchant of the critiques is precisely that anthropology should be conducted as an objective science whose goals are research, publication, and instruction. To become aligned with people in the field is to betray that objectivity. Furthermore, critics point out, the more students became aligned with the helping aspect of action anthropology, the less likely they were to complete their doctorates, and therefore, they ultimately could do little to interact with and help change larger power structures. While these criticisms are fair, action anthropologists are inclined to empower others to construct solutions rather than to deal with these power structures themselves. Action anthropology is sometimes accused of a hidden paternalism in the assumption that a group needs to change or that outsiders are necessary to effect successful or appropriate change.

Finally, there are critics who say that American anthropological theory was insufficient to the goals of action anthropology and action anthropology would have been better served through British applied social anthropology and a multiplicity of social science approaches. Because the methods of action anthropology are an outcome of Sol Tax's particular way of proceeding in the field, it may have been too dependent on his own personality and action anthropology is still finding its tentative, experimental way within the discipline. Many anthropologists adhere to the ideals of service to the host group, theory building through social interaction and process, and the transformation of anthropology from ivory-tower science to collaborative venture.

Sol Tax's ideals are manifest in today's "service learning courses," in which elements of action anthropology are found, as well as in applied anthropology and hyphenated disciplines such as medical-anthropology and legal-anthropology. With the growth of service learning and values-centered education, there will continue to be a place for action anthropology. Action anthropology turned fieldwork into a lifelong profession and activity, not just something required in graduate school and contemplated for the rest of one's career. The fundamental notions of action anthropology are widespread today, especially as anthropologists and "Natives" around the world continue to build collaborative relationships. The present generation of anthropologists, especially those who work with Native Americans, has practitioners who consciously identify themselves as action anthropologists and shape their fieldwork and teaching accordingly.

The tension between publishing within the academy versus development of ongoing reciprocal relationships with one's field is the tension between doing and being, and that tension can be productive. Action anthropology has more often than not revealed the difficulty of change rather than the importance of total transformation. Indeed, in value-oriented anthropology, the deepest relationships are not utilitarian, but simply *are*. Perhaps that is the more important legacy of action anthropology: fieldworkers learn this lesson through interaction and actively establish these relations, rather than simply gathering knowledge or applying templates for local change.

In my own first year at graduate school in Chicago, Sol Tax told me that ultimately anthropology is an academic discipline that is relegated to the bastions of offices with securely closed doors, libraries, and classrooms. After he said this, he looked up at me and said, with a twinkle in his eye, "But I hope you will prove me wrong on this."

When Creighton University sought to increase enrollment and improve retention of Native students, it was an anthropologist instructor (me) and a Native American colleague working in retention who *together* recognized the need to increase the layers of support given to each high school student. They required help filling out both admissions and scholarship applications, and the faculty needed help to better understand the cultural situation of an increasing population of reservation and urban Native individuals on campus. Our work, funded only with gas money and room and board, was in the best tradition of Tax's action anthropology. We shared the recognition with communities on a local reservation of an addressable problem, the expenditure of a few tanks of gas, and mutually discovered solutions as we worked toward direct assistance to students, to evaluate our successes and failures, and to build better relations with Native students and their relatives.

The best explications of action anthropology come from Sol Tax's own pen. Keep in mind that Tax's view was constantly being modified both in particular field contexts as well as in intellectual discourse.

While Sol Tax himself attributed the Fox Project as the birthplace of action anthropology, this program is best understood in the context of Tax's entire life as demonstrated by Blanchard. Fred Gearing, Robert McC. Netting, and Lisa R. Peattie assembled a documentary history of the Fox Project, which exposes a lot of the thought processes involved in formulating action plans and was used for some time as a textbook for Tax's seminars on action anthropology. Frederick Gearing also wrote a more analytical text on his work in the Fox Project. Assessments of action anthropology and the Fox Project have originated from a variety of authors, such as Piddington, Stucki, Washburn, Rubenstein, Foley, Bennett, Daubenmeier, and Mertens. While there are many critiques of anthropology by Native people, the most trenchant remains that of Vine Deloria Jr.

— *Raymond A. Bucko*

Further Readings

Bennett, J. W. (1998). Applied and action anthropology: Ideological and conceptual aspects with a supplement: The career of Sol Tax and the genesis of action anthropology. In J. W. Bennett, L. A. Despres, & M. Nagai (Eds.), *Classic anthropology: Critical essays, 1944–1996* (pp. 315–358). New Brunswick, NJ: Transaction.

Daubenmier, J. M. (2003). The Meskwaki and Sol Tax: Reconsidering the actors in action anthropology (Iowa). *Dissertation Abstracts International 64*(06A), 394.

Deloria, V. Jr. (1969). *Custer died for your sins: An Indian manifesto.* New York: Macmillan.

Foley, D. E. (1991). The Fox Project: A reappraisal. *Current Anthropology, 40,* 171–191.

Gearing, F. O. (1970). *The face of the Fox.* Chicago: Aldine.

Mertens, R. (2004). Where the action was. *University of Chicago Magazine 96*(4), 30–35.

Piddington, R. O. (1960). *Action anthropology.* Wellington, New Zealand: Polynesian Society.

Tax, S. (1975). Action anthropology. *Current Anthropology, 16,* 514–517.

Washburn, W. (1984). Ethical perspectives in North American ethnology. In J. Helm (Ed.), *Social contexts of American ethnology: Proceedings of the American Ethnological Society* (pp. 50–64). Washington, DC: American Anthropological Association.

Adaptation, Biological

Adaptation has a diversity of meanings, even within areas in which it is widely used, such as anthropology, biology, the humanities, and in common parlance.

The study of adaptations is a central activity in biology, where interpretations of the concept have received much scrutiny in recent years, for example, in the articles and monographs of Andrews, Brandon, Gould and Lewontin, Gould and Vrba, Rose and Lauder, Sober, and Williams. Gould and Verba pointed out the presence of two distinct adaptation concepts in the literature: one historical, emphasizing traits' origins and their past histories of selection, the other nonhistorical, emphasizing current functions of traits and their contributions to fitness. For example, some argue that to be regarded as an adaptation, a trait must have been produced by natural selection, and so must be genetically inherited. Gould and Lewontin distinguished adaptations from *exaptions.* The latter are preexisting traits that at some time in the past acquired beneficial effects without being selected for them at that time. However, exaptions may subsequently be modified by natural selection as a result of their new functions. The concept of exaptions seems to have little relevance to studies of extant species.

A meaning common in physiology and the social sciences is that an adaptation is a beneficial modification of an organism that adjusts it to changes in the environment. In many cases, these changes are homeostatic. For example, changes in the size of the pupil keep the light intensity at the retina within the optimal range for vision. If effects of such phenotypic adjustments lead to increased survival and reproductive success, that is, to greater fitness, they and the machinery of the body (nerves, muscles, and so on) that produce them are adaptations in the core sense described below.

Another common requirement for a trait to be considered adaptive is that its functional consequences must be consistent with a priori design specifications for accomplishing a specified task. For example, in order to transport oxygen from the lungs to the rest of the body, blood must include a component that binds to oxygen in the lungs yet subsequently releases it in tissues that are oxygen depleted. Hemoglobin has exactly this property, as revealed by its oxygen dissociation curve. Optimality models used in behavioral ecology and many other areas of functional biology

are comparable to the engineering specifications used in functional anatomy. Both attempt to identify characteristics of functional designs for specific tasks. At the heart of the use of design specifications is the question: Under existing circumstances, how would a well-adapted organism of this species behave or be structured? Design specifications play an important role in the study of adaptations, at every level of biological organization.

At the core of these diverse interpretations is the idea that adaptations are traits that benefit the organism. In many cases, these benefits result from effects on vital processes, such as maintaining osmotic balance, obtaining food, avoiding predators, caring for offspring, and so forth. The ultimate criterion of benefit is that a trait's effects must be functional, in the sense of enhancing fitness. In some cases, adaptation refers to the processes that select for such traits. Adaptations may be at any level of organization: biochemical, physiological, anatomical, or behavioral.

Measuring Adaptiveness in Extant Species

From the standpoint of the current functions of traits and their impact on fitness, a trait variant is better adapted, relative to competing variants in other individuals of the same species, to the extent that it directly augments fitness. Thus, in studies of living organisms, one can confirm that a trait is adaptive and measure its degree of adaptiveness by determining its effect on fitness. However, just confirming that traits are adaptive leaves unanswered some of the most interesting questions about a trait, such as: What correlated traits augment fitness because they affect the same vital functions, and what are their relative contributions? By what means does a trait augment fitness, and how strongly is it being selected? Adaptation requires a mechanism.

Following is an abbreviated description of several research approaches that, depending on one's choice among them, can answer the questions above, providing quantitative measures of the relative adaptiveness of traits in terms of their contributions to functions as well as fitness. They enable one to evaluate the direct force of characters on fitness, excluding effects from correlated traits. They are based on phenotypic selection but not the genetic response to selection; thus, they require only data that can be obtained within a single generation and require no assumptions about the genetic basis or evolutionary history of the traits. They take advantage of individual differences in traits in a local population of a species and are applicable to polygenic traits, such as those commonly studied by anthropologists, evolutionary psychologists, and biologists. Some are based on *a priori* design specifications of optimal phenotypes, others on multivariate selection theory, especially the work of Russell Lande and Stevan Arnold, which deals with the effects of selection acting simultaneously on multiple characters.

Components

Depending on the choice of approach, various combinations of the following four empirical components are used: (a) samples, taken in a local population of a species, of individual variants in a set of phenotypic traits known or thought to affect a specified vital activity, such as getting food or obtaining mates; (b) samples of proximate effects ("performances") of these variants, whether functional or otherwise; (c) a quantitative optimality model of one or a combination of traits and corresponding proximate effects that are posited to augment biological fitness; and (d) estimates of lifetime fitness of each individual.

The approaches will be illustrated by a fictitious study of fishing success of women in a local population. They spearfish independently in the nearby lakes. The fish that a woman catches are eaten only by her family and are the primary staple of their diet. The only exceptions are fish exchanged in barter for other goods. Three traits of the women affect their relative fishing styles and are measured. Women with the best visual acuity favor lake edge shallows, where only they can see the small fish hiding among the water plants. Only the tallest women fish regularly in deep water, where fish are largest, oldest, and relatively slow moving, but scarce. Women with the greatest competence with a spear tend to fish in water of intermediate depth, where they have a unique ability to catch the fast-moving, mature fish.

Two aspects of the women's daily catch seem to be of particular importance: their success at catching pescos, a rare and highly prized fish, very valuable in barter, and the total mass of other fish that they catch. Each day, the weight of pescos caught by each female and the weight of the rest of her catch are recorded. Seasonal totals of these two sets of values for each female provide two measures of her fishing success.

First approach: Evaluate the causal link from any selected trait to fitness. To measure the potential

impact on relative fitness of each phenotypic trait, regress relative fitness w on it. However, because fitness-affecting traits may be correlated, use partial regression β_{wz_i} (ordinary, not standardized) to measure the direct impact of the ith trait, z_i, on relative fitness w, with indirect effects from correlated traits thus held constant. Repeat for each of the other traits that may affect relative fitness. Then, to document any correlations among these traits, calculate their covariances (unstandardized correlations).

Relative fitness w of an individual is defined with respect to the mean fitness in the population, $w = W/\overline{W}$, where W is the absolute fitness of an individual and $\overline{W}$ is the mean fitness in the population. The fitness of individuals can be estimated in several ways, particularly by using aspects of reproductive success, such as the number of surviving offspring. Individual fitness can be measured at long-term study sites of populations on which basic demographic data are consistently recorded and maintained; for data sets of shorter duration, it can be estimated from various components of fitness.

The partial regression of relative fitness on a given character is its *selection gradient*. It measures the change in relative fitness expected if that character were changed by a unit amount but none of the other characters varied. A remarkable result, due to Russell Lande, is that for a set of characters that affect fitness, including all phenotypically correlated traits that directly affect fitness, their selection gradients, arranged as a vector, include all the information about phenotypic selection (but not inheritance) that is needed to predict the directional response to selection.

So, in the case of our study of fisherwomen, we would regress their relative fitness on their visual acuity (ability to see fish hiding in the shallows), on their height (deep-water fishing ability), and on their spearing competence, then calculate the three covariances among these three traits.

Second approach: Evaluate the causal link from each trait to its proximate effects, then the link from each proximate effect to fitness. The first approach, above, evaluates the causal links from traits to fitness by determining their selection gradients. However, that approach does not tell us anything about the intervening functional effects of traits that augment fitness. In 1983, Stevan Arnold used Sewall Wright's method of path analysis to provide a convenient means of partitioning selection gradients (see Figure 1). He showed

Source: © iStockphoto/Paul Piebinga.

that for any character z_i (such as z_1 in Figure 1) that affects only one performance variable f_j, a selection gradient β_{wz_i} can be partitioned into two parts: a *performance gradient* $\beta_{f_j z_i}$, representing the effect of the trait on some aspect of performance, and a *fitness gradient* β_{wf_j}, representing the effect of performance of fitness. That is,

$$\beta_{wz_i} = \beta_{f_j z_i} \cdot \beta_{wf_j}$$

$$\begin{bmatrix} \textit{selection} \\ \textit{gradient} \end{bmatrix} = \begin{bmatrix} \textit{performance} \\ \textit{gradient} \end{bmatrix} \cdot \begin{bmatrix} \textit{fitness} \\ \textit{gradient} \end{bmatrix}$$

where β_{wf_j} is the partial regression of relative fitness w on the performance variable and $\beta_{f_j z_i}$ is the partial regression of the performance variable on its trait variable.

A trait may affect more than one performance variable, resulting in branching paths. For example, the second trait z_2 in Figure 1 affects two performance variables, f_1 and f_2. In that case, the total path connecting

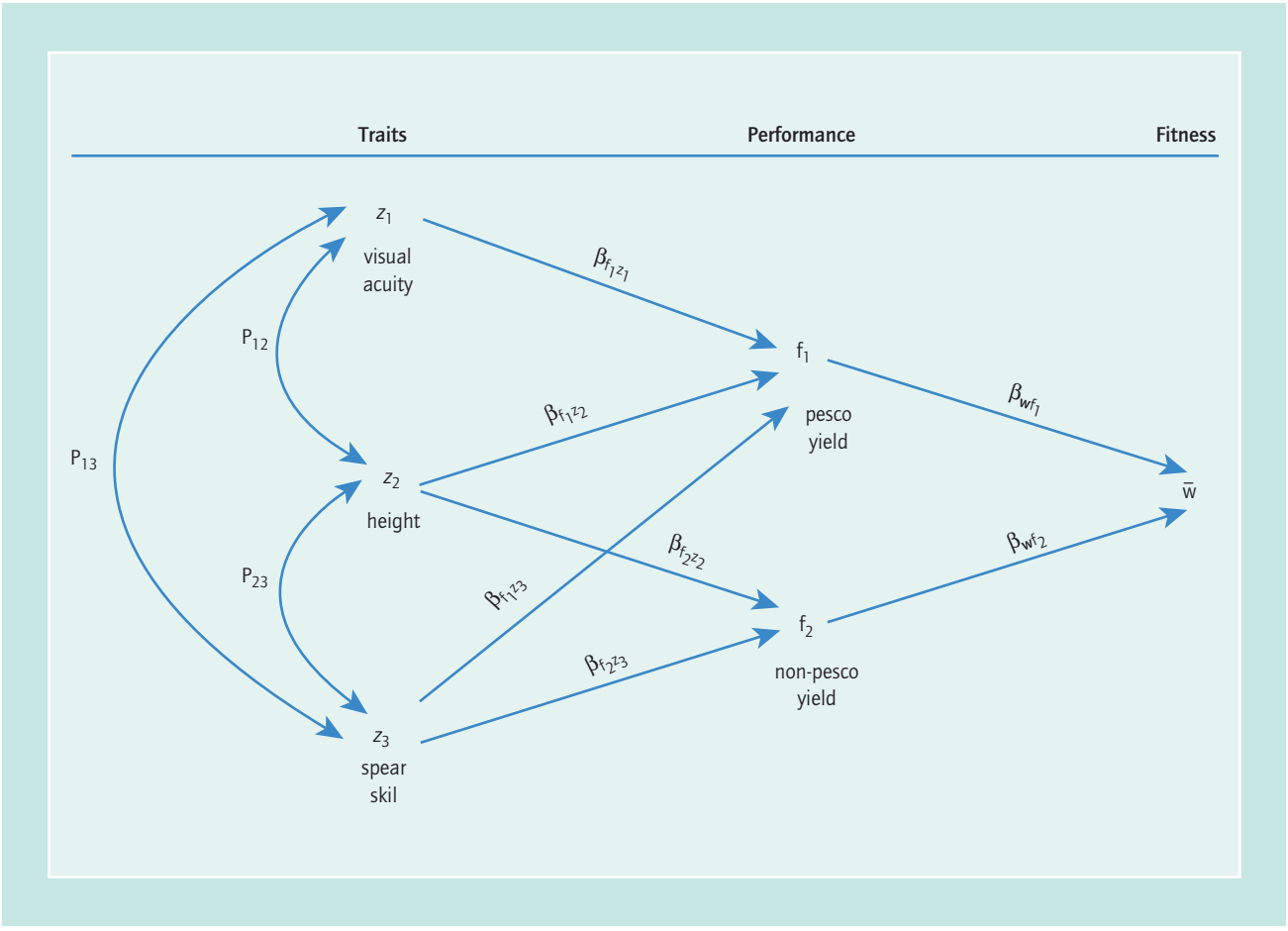


Figure 1 Effects of each phenotypic trait (z terms), such as visual acuity, height, and spear skill in fisherwomen, on performance (f terms), such as yields of pesco and non-pesco fish, and then the effects of performance variables on biological fitness (w term). P terms on double-headed arrows represent covariances among traits, and β terms represent partial correlations, as described in text.

character z_2 with relative fitness is the sum of the two paths, one through effect variable f_1 and one through effect variable f_2, as shown in Figure 1. The corresponding relationship in partial regression coefficients is $\beta_{wz_2} = \beta_{f_1z_2}\,\beta_{wf_1} + \beta_{f_2z_2}\,\beta_{wf_2}$. Thus, the total selection gradient can be partitioned into parts, corresponding to branching paths of influence on fitness, as well as factored along paths. These elementary results can be expanded for analysis of selection gradients in situations considerably more complicated than that of the fictitious fisherwomen depicted in Figure 1.

Of course, we want to know the magnitude of the influence of various traits on a given proximate effect, not just whether they can have any influence. For this purpose, we use each trait's performance gradient to calculate that trait's average contribution to the mean value of a given effect.

To illustrate, consider our example of spearfishing women. The yield of pesco fish of the average woman can be expressed as the sum of mean contributions from each trait that affects these yields: Each such contribution is the product of that trait's average value and its performance gradient for pesco yield:

$$\begin{aligned}
\bar{f}_1 &= \text{average woman's pesco yield} \\
&= \beta_{f_1z_1}\cdot\bar{z}_1 = \text{average contribution of visual acuity} \\
&\quad + \beta_{f_1z_2}\cdot\bar{z}_2 = \text{average contribution of height} \\
&\quad + \beta_{f_1z_3}\cdot\bar{z}_3 = \text{average contribution of spearing ability} \\
&\quad + \cdots = \text{contribution from other elements.}
\end{aligned}$$

We can proceed similarly for the second causal link, evaluating the contribution made by each performance variable to fitness. For example, the mean fitness $\overline{w}$ of the spearfishers can be partitioned into additive components:

$$\overline{w} = \beta_{wf_1} \cdot \overline{f}_1 + \beta_{wf_2} \cdot \overline{f}_2 + \text{contribution from other elements,}$$

where the first two terms in the summation on the right are the contributions to mean fitness made by the average woman's catch of pesco and non-pesco fish, respectively. Such contributions of performance variables to fitness are good indicators of their relative adaptiveness.

Third approach: For a selected vital task, devise and test an optimality model. Such a model would be based on optimizing (maximizing or minimizing, as appropriate) a performance variable presumed to have a major net impact on fitness, taking into account the variable's benefits and also correlated costs and entailed constraints.

The benefit variable to be optimized is represented by an objective function. If the detrimental effects of some cost variables change continually as the benefit variable changes, the cost and benefit variables can be combined into a single cost-benefit function, to be optimized. For cost variables that exhibit their detrimental effects only when they exceed a threshold value, those values are each represented by an appropriate constraint function. Those diets that meet all constraints are adequate: They meet minimum requirements for all nutrients without exceeding any limits on toxins or other hazards.

For our hypothetical fisherwomen, their fishing is a contribution to the vital task of getting enough food and the right kinds. Suppose that during a period when catches are poor, their protein intakes and those of their families are so low that increases in protein intakes are expected to result in greater increases in survival and reproductive success than would a change in any other attribute of their diets. Then, their objective would be to increase their protein intake, which for them comes almost entirely from fish.

In a protein maximization model for their fishing, this objective is made explicit by an objective function. Suppose that pesco fish are 17% protein and all other fish are 12% protein. Then, the weight of protein P in a woman's catch on a given day can be calculated from the linear function $P = 0.17f_1 + 0.12f_2$, where f_1 is the weight of her pesco catch that day and f_2 is the weight that day of her catch of other fish. In a simple model, the objective could be to maximize P. Suppose, however, that greater time devoted to fishing results in progressively less time available for other vital activities, and thus in decrements in fitness. In that case, the objective function would be for a net effect, chosen to reflect this cost-benefit trade-off.

A variety of constraints would further limit a woman's ability to obtain more protein. She cannot maximize protein by limiting her catch to the protein-rich pescos, because they are rarely caught. Other constraints that might restrict her protein yield include maximum effort that she can devote to fishing and the need to remain below her maxima for all toxins or other hazards entailed by consuming any given diet. For example, if pesco fish are unusually rich in vitamin D, the upper limit on safe vitamin D intake establishes a maximum daily safe consumption of pesco, even though they are very rich in protein. If the largest non-pesco fish occur only in the cold, deep water, the dangers of hypothermia and drowning might place an upper limit on the time that can safely be devoted to those fish. The success of an optimality model depends on one's ability to incorporate as much relevant natural history as possible into the choice of the objective function and its constraints.

In addition to the optimality model itself, three forms of data are required for this approach. They are the same as in the second approach, namely, (a) individual values of phenotypic traits that are relevant to the model (in our example, values for the three traits that contribute to successful fishing and for each constraint-related trait); (b) proximate effects (the weight of each female's pesco and non-pesco catch and their respective protein concentrations); and (c) fitness (how long each subject survived and her lifetime reproductive success).

A model is basically an elaborate hypothesis, for which the common method of confirmation is a goodness-of-fit test. For an optimality model, such a test would tell us whether the individuals or their mean were at or near the specified optimum. However, for a host of reasons, reviewed by Altmann, Dawkins, Rose and Lauder, and also Emlen, most organisms are unlikely to be performing at or near optimum. For example, the constraint set may not

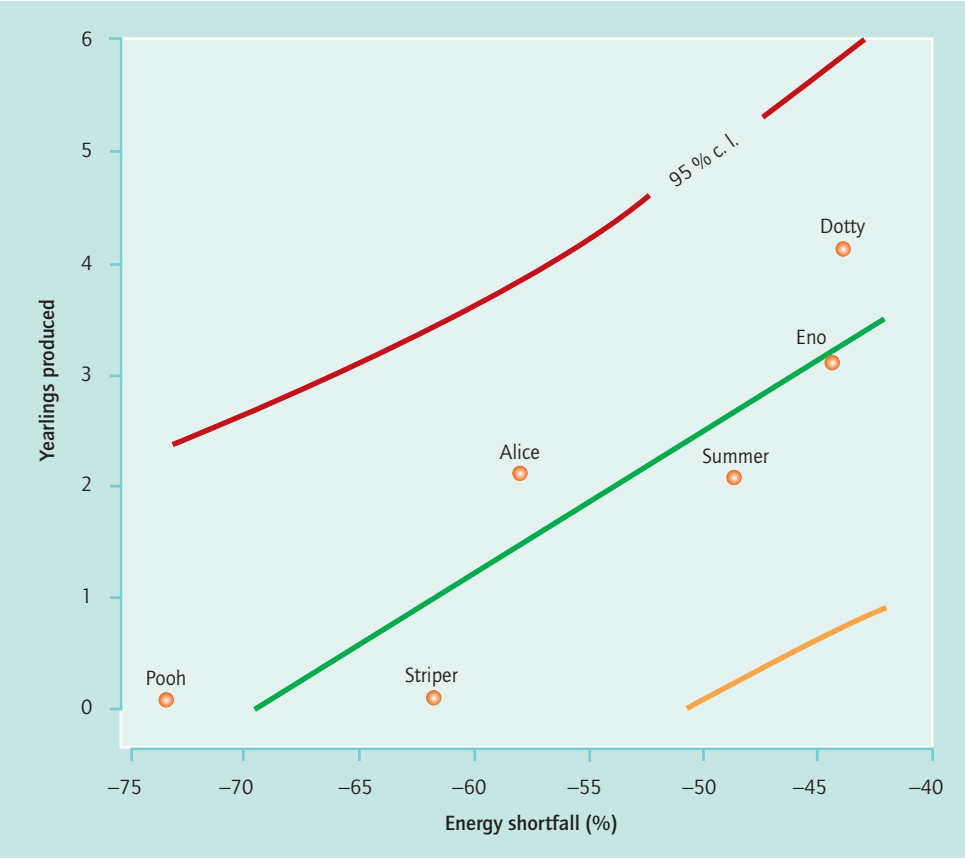


Figure 2 Reproductive success of female baboons (number of surviving yearlings that they each produced in their lifetime) as a function of their energy shortfalls as yearlings (percent deviation of their actual intakes from their respective optimal intakes). Adjusted $R_2 = 0.76$, $p = 0.05$.

Source: From Altmann, S., *Foraging for Survival*, copyright © 1998, reprinted with permission of The University of Chicago Press.

be complete, and so the putative optimum may be beyond reach. A more reasonable question to ask is whether those individuals that are closer to the optimum specified by the model have higher fitness, as in Altmann's study of foraging in yearling baboons (see Figure 2).

Confirming an optimality model in this way is, at the same time, a confirmation of adaptive differences in the specified traits and in our identification of the functional mechanisms by which these traits affect fitness.

Thus, if, up to a point, women whose catches yielded more protein have higher fitness than other women—if the objective function of the model is, as had been assumed, a limiting factor for fitness—her fishing and the constellation of traits involved in it are more adaptive than those of the other women.

Fourth approach: Evaluate the causal links from each trait to its proximate effects. What can we do to evaluate adaptiveness if data on fitness are not (yet) available? Method 2 was based on Arnold's separation of fitness into two parts: a performance gradient representing the effect of the trait on some aspect of performance and a fitness gradient representing the effect of performance on fitness. We can take advantage of the ability of performance gradients to isolate the effect that each trait has on a given performance from effects of correlated traits, and we can quantitatively evaluate the contribution made by each trait to each performance variable. If we assume that through their impact on vital processes, each of these performance variables affects fitness, they are indicative of the adaptiveness of the traits, even though in the absence of fitness data, we would be unable to test that assumption.

If we had an optimality model (third approach), we would already have hypothesized how to combine trait variables into quantitative predictions of each individual's level of performance on the most fitness-enhancing performance variable, and thus to predict its fitness.

Recent developments in interspecific comparative methodology, involving phylogenetic analysis of homologous traits, provide another approach to documenting that a trait is an adaptation and studying the evolution of correlated traits. For the study of living humans, however, the lack of any surviving species of the same genus or even family greatly limits the applicability of these methods in cultural anthropology. Similarly, alteration or removal of traits,

though sometimes used in experimental biology to study the functions of traits, would be unacceptable in studies of living humans, except perhaps where such changes are made independently, for cultural or medical reasons. (Do I chew differently without my third molars?)

Fifth approach: Evaluate the adaptiveness of a trait by whether its effects are beneficial by intuitively reasonable criteria. Suppose that we have neither the data to evaluate performance gradients or selection gradients nor a model of optimal phenotype. What then? One possibility is to use our knowledge of the subjects' needs or deficiencies, particularly ones having major effects on survival or reproduction, and our evaluation of the efficacy of various traits to satisfy these needs. This basic technique has enabled medical research to uncover hundreds of functional traits, without recourse to measures of fitness or heritability.

If members of our local fishers' families show signs of protein malnutrition, then even before the first of them has died from it, we can reasonably assert that those fishers who bring home a larger harvest of fish have adaptive fishing practices. On the other hand, if the local human population shows signs of scurvy, then the woman who brings back a bounteous catch of fish only because she fished longer has traits that are less adaptive than the one who fished just long enough to satisfy her family's protein requirement, then went off in search of fruit—which, she has noticed, alleviates the symptoms of scurvy.

For centuries, descriptive naturalists have identified a wide variety of adaptations. Charles Darwin described dozens of them. Although the criteria that descriptive naturalists use to identify adaptations seem never to be made explicit, their descriptions indicate that they rely on noticing uses to which physical traits and behaviors are put, particularly exaggerated ones, and especially in comparison with corresponding traits in related species. These methods of observant physicians and naturalists are no less valid today, even if they have neither the scope of some methods described above nor the ability of those methods to systematically disentangle and measure complex interrelationships.

— *Stuart A. Altmann*

See also **Selection, Natural**

Further Readings

Altmann, S. A. (1998). *Foraging for survival: Yearling baboons in Africa.* Chicago: University of Chicago Press.

Arnold, S. J. (1983). Morphology, performance, and fitness. *American Zoologist, 23,* 347–361.

Cronk, L., Chagnon, N., & Irons, W. (Eds.). (2000). *Adaptation and human behavior: An anthropological perspective.* New York: Aldine de Gruyter.

Hill, K., & Hurtado, A. M. (1996). *Ache life history: The ecology and demography of a foraging people.* New York: Aldine de Gruyter.

Lande, R., & Arnold, S. J. (1983). The measurement of selection on correlated characters. *Evolution 37,* 1210–1226.

Rose, M. R., & Lauder, G. A. (Eds.). (1996). *Adaptation.* New York: Academic Press.

Smith, E. A., Mulder, M. B., & Hill, K. (2001). Controversies in the evolutionary social sciences: A guide for the perplexed. *Trends in Ecology and Evolution, 16,* 128–135.

Sober, E. (1984). *The nature of selection.* Cambridge: MIT Press.

Williams, G. C. (1966). *Adaptation and natural selection.* Princeton, NJ: Princeton University.

Adaptation, Cultural

Cultural adaptation is a relatively new concept used to define the specific capacity of human beings and human societies to overcome changes of their natural and social environment by modifications to their culture. The scale of culture changes depends on the extent of habitat changes and could vary from slight modifications in livelihood systems (productive and procurement activity, mode of life, dwellings and settlements characteristics, exchange systems, clothing, and so on) to principal transformation of the whole cultural system, including its social, ethnic, psychological, and ideological spheres.

History of the Idea

The origin of the concept of cultural adaptation and dissemination in contemporary anthropological literature is connected with the concept of cultural

Source: © Photo provided by www.downtheroad.org, The Ongoing Global Bicycle Adventure.

systems that, to a certain extent, fit the living conditions of their transmitters. The theoretical background of such an approach was created at the end of the 19th century in the American school of possibilism led by Franz Boas. Possibilists regarded nature as a basis from which a great number of different versions of cultural communities could arise and develop. Bronislaw Malinowski, the founder of the functional approach to the interpretation of culture, understood culture as the specific answer to the challenges of nature. Representatives of the New York school of culture studies, led by Ashley Montagu, regarded culture as an adaptive dimension of human society.

Western European anthropologists in the 1950s and 1960s—in line with a reconsideration of the fundamental basis of theoretical reflection in the humanities—took the next step. Julian Steward put forward the idea that we should regard the natural environment as one of many factors of cultural change. About the same time, Leslie White proposed the view that human culture was an extrasomatic system of adaptation with three basic directions: technological, social, and ideological.

With this theoretical background, a social direction was formed for investigations in the fields of cultural and social anthropology, cultural geography, ecology, psychology, and archaeology. Its proponents see their primary task as the detection of the ecological function of culture. In the mid-1990s, we could distinguish two basic approaches within this framework: the phenomenological approach, which paid special attention to the active character of primitive populations' engagement with their environments, and the cognitive approach, which tried to classify mental representations of the environment. As a result, western European and American science now thinks of cultural systems and societies as autonomous but mutually interdependent units in which complicated mechanisms of adaptation to living conditions are elaborated and realized. In this process, cultural systems act as determinants of social trajectory, and society is an indispensable component of this trajectory.

In Marxist Soviet and post-Soviet science, the analysis of natural geographic factors in the genesis of culture and detection of culture's ecological function is connected with the ethnographic direction of interpreting culture from an actional approach. The movement's most prominent founder and promoter, E. Markaryan, regarded culture as a system of extrabiological mechanisms, through which the whole cycle of human activity is realized, primarily in all of its specific manifestations: stimulation, programming, regulation, fulfillment, maintenance, and reproduction. The adaptive effect here could be achieved as a result of the plurality of a culture system's potentialities. At the same time, the majority of actionalism's proponents don't deny that the specific mode of adaptation to living conditions is elaborated in human society. There, the cultural system no longer acts as an adaptive unit but only as a universal mechanism of adaptation.

The concept of the ecological function of culture has been further developed in recent studies by

Russian ethnologist Sergei Arutyunov. According to Arutyunov, we should regard culture as a set of different ways of institutionalizing human activity. Culture's principal functions are the formation and transformation of the environment, on one hand, and of human beings with their spiritual and physical characteristics, on the other. The formation of a cultural system is a process of adaptation to specific niches, at first only natural ones, but niches that, in the course of time, become more social. To be able to realize its adaptive function, culture should not only be capable of responding to a minimum of environmental requirements, but also have at its disposal the potential necessary for the achievement of its adaptive effect in new conditions.

Main Notions and Theories of Cultural Adaptation

In recent decades, the concept of cultural adaptation has become an integral part of many fields of behavioral studies, such as behavioral psychology, behavioral archaeology, behavioral anthropology, and others. Their principal subject of investigation is behavioral systems, which are regarded as a model of connections between human activity and components of natural environment. In the second half of the 1990s, such notions as behavioral selection, behavioral flow, behavioral repertoire and others contributed to the rise in popularity of a cultural adaptation concept.

Series of theories, notions, and concepts have been elaborated on in connection with the concept of cultural adaptation, among them, adaptive level, adaptive policies and processes, and accommodation and assimilation. Most are subjects of sharp discussions. At the present, the concept of optimum adaptive level appears to be the only one that does not invoke substantial opposition. The idea of optimum adaptive level is that the human group always tries to minimize the changes necessary for achieving an adaptive effect. We can trace the roots of this idea to physics in the 18th century. Lagrange formulated for the first time the principle of least action. In the first half of the 20th century, this theory in different variations was explored by Losch in economic geography and by Zipf in social sciences. It plays an important role in systems analysis (as in the concept of minimum potential energy) and in operational analysis (the route of optimum transfer or geodesic line). Environmental psychologists have also adapted it.

In applying the concept of cultural adaption, there are several acute problems, including the gradation of adaptive levels for each adaptive policy. During the past 40 years, anthropologists have discussed a broad spectrum of variation in parameters. Among them, we can discern criteria that can be defined rather precisely, such as the concrete scoring of the net efficiency of food acquisition, alongside absolute abstract notions, such as happiness.

— Olena V. Smyntyna

Further Readings

Arutyunov, S. (1993). Adaptivnoie znachenie kulturnogo polimorfizma [Adaptive meaning of cultural polymorphism]. *Etnograficheskoe obozrenie 3,* 41–56.

Bell, P. A., Green, T. C., Fisher, J. D., & Baum, A. (1996). *Environmental psychology.* Orlando, FL: Harcourt Brace.

Cohen, Y. A. (1974). Culture as adaptation. In Y. A. Cohen (Ed.), *Man in adaptation: The cultural present.* Chicago: Aldine.

Ingold, T. (1994). Introduction to culture. In T. Ingold (Ed.), *Companion encyclopaedia of anthropology* (pp. 329–349). London: Routledge.

Markaryan, E. S. (1975). K ponimaniyu specifiki chelovecheskogo obschestva kak adaptivnoi sistemy [To the understanding of specificity of human society as adaptive system]. In A. D. Lebedev (Ed), *Geograficheskie aspekty ecologii cheloveka* [Geographic aspects of human ecology] (pp. 139–149). Moscow: Institut geografii AN SSSR.

Steward, J. H. (1955). *Theory of culture change.* Urbana, IL: Urbana University Press.

White, L. (1959). *The Evolution of culture.* New York: McGraw-Hill.

Aesthetic Appreciation

Aesthetics is the area of philosophy that studies the nature of beauty and art. Aesthetic appreciation, then, is the admiration of beauty, such as valuing the fine arts of music, literature, dance, and visual art. What is considered beautiful and even what is considered

Source: © iStockphoto/Radu Razvan.

art are not always agreed upon by everyone in the same culture, much less across different times. Recognizing what is appreciated aesthetically for a given group can help us understand the values that inform their decisions, how individuals interact with each other, and even how advanced a past civilization was according to how art was incorporated into their tasks. Much of what we know about ancient civilizations in Egypt, Greece, South America, and China, for example, comes from the art and artifacts that have been uncovered by archaeologists. The word *aesthetics* comes from the Greek word *aisthanomai,* which means *to perceive.*Theories of aesthetics fall under the study of philosophy and other disciplines concerned with how we value what we perceive.

Artifacts are objects created for human use, such as tools, weapons, clothing, utensils, and individual works of art. The word *art* usually refers to the intentional process of creating something to fulfill an aesthetic purpose. Because there are choices in how artifacts are designed, they can be artistic and carry an aesthetic quality. While some people share reactions to certain objects of art, the aesthetic properties themselves are usually subject to individual interpretation. That a painting is square, framed in gold, and brushed with blue and yellow pigments are aesthetic facts; they are not questionable. That the square represents perfect order, the gold depicts the prestige of royalty, and the vibrant blue and yellow convey the peace, warmth, and contentment of the sun shining in the sky are aesthetic determinations that could be interpreted differently. They are judgments. Aesthetic properties often have the power to inspire emotional response, and such a response is not likely to be consistent.

Whether or not there is a universal concept of beauty is a question philosophers have asked for centuries. Nevertheless, the beauty and aesthetic properties found in art serve many purposes. Art can be educational, as with an illustration that details the bones in the human skeleton. It can be representative, as with a play that tells the life of two characters in history. It can motivate, as with a speech that inspires listeners to action. Art can enrich our lives in the way that a sculpture adorns a room or music inspires a mood. The ways we communicate what we perceive in the world are expressed in how we create, value, and respond to the aesthetic properties of art. Contemporary philosophers of aesthetics are concerned with our perceptions, both immediate images that present themselves in our minds and the personal manner in which we make sense of such impressions. Because aesthetic appreciation inspires emotional response, it is also of interest to cognitive psychologists who seek to know how the brain processes what we see.

Major Contributors

The term *aesthetics* was first used in 1735 by Alexander Gottlieb Baumgarten, a German philosopher who separated the study of knowledge into two subgroups: logic as the study of abstract ideas and aesthetics as the study of how feelings influence sensory perception. The topic itself is much older, having been explored by ancient Greek philosophers. Plato (427–347 BC) believed that true reality exists in perfect forms of

concepts like good, beauty, triangle, and so on. People and objects can at best only be imitations of the ideal forms, because the world we live within is made of appearances. If something is beautiful, it is because we strive to know the ideal form of beauty. In the dialogue *The Republic,* Plato suggests that art can be dangerous. Poems and stories can be entertaining and beautiful, but they are falsehoods because they are only representations of true reality. Plato saw art as an imitation of life and life as an imitation of the ideal forms. Aristotle (384–322 BC) similarly recognized the imitative value of art but more as an instrument for communicating with nature. When we appreciate something for its aesthetic value, positive emotions are aroused because we step away from our individual selves and recognize the universal beauty we share with all of nature. Aristotle saw poetry and tragedy as ways of rising above individual emotional situations; aesthetic appreciation paves the way for spiritual purification.

Medieval philosophers expanded Aristotle's religious focus. For Thomas Aquinas (AD 1224–1274), the beauty we witness in the world proves cosmic order and the power of the divine. Aquinas also identified what he saw as the necessary components of beauty: perfection, proportion, and clarity. Theories of aesthetics since this time have tried to define art and beauty. During the 18th-century Age of Enlightenment, the emphasis shifted toward shedding superstitions and recognizing the human capacity for reason. The Earl of Shaftesbury (1671–1713) looked to human nature to explain why we have certain tastes. We identify some objects as aesthetically pleasing because they affect our sentiments. Like Shaftesbury, Baumgarten (1714–1762) believed that the emotions were not necessarily something that should be repressed. He saw aesthetic experience as a means of interacting with the world through our thoughts or cognition, such as poetry and the truth it reveals about the world.

Immanuel Kant (1724–1804) was concerned less with emotions than with separating the world of appearances from things as they truly exist. For aesthetics, this means that unlike Shaftesbury, we admire things because they are beautiful and not because of the pleasure they produce. Beauty is a universal concept, something that exists independently of our recognition of it. Arthur Schopenhauer (1788–1860) and Friedrich Nietzsche (1844–1900) both emphasized the role of the human will and art as a means of freeing oneself from misery. Music for Schopenhauer is the purest of the arts because of the abstract creative powers it employs. For Nietzsche, two opposing powers are present in both art and the artist: Apollonian (light, beauty, and measure) and Dionysian (chaos). Nietzsche's "will to power"—inspired by Schopenhauer's "will to live"–embraces pain. Aesthetics here is a natural drive that reveals and transcends the burden of the individual human condition, uniting all of humanity across cultures.

Art is defined by R. G. Collingwood (1889–1943) as self-expression and by Monroe C. Beardsley (1915–1985) as something produced for the purpose of aesthetic pleasure. Unlike an artist, a craftsperson creates artifacts for the purpose of function. The 20th-century "new criticism" movement saw aesthetic appreciation as having its own value and "good" art as representing the common human experience through Western history. More recently, Arthur Danto (1924–) has

suggested that what is appreciated as art can be influenced by the evolving discussion of theorists such as himself but nonetheless has specific content and meaning. Art is much broader for George Dickie (1926–) and is defined according to the aesthetic principles that are able to contain the viewer's awareness; Dickie also formulated the "institutional theory of art" to explain the systematic way of restricting aesthetic value to what is appreciated within society.

— *Elisa Ruhl*

Further Readings

Beardsley, Monroe. (1966). *Aesthetics from classical Greece to the present: A short history.* New York: Macmillan.

Carroll, Noël (Ed.). (2000). *Theories of art today.* Madison: University of Wisconsin Press.

Dickie, George. (1997). *Introduction to aesthetics: An analytic approach.* Oxford, UK: Oxford University Press.

Affirmative Action

Just as with many phrases, *affirmative action* can mean different things to different people. Not only do we find a difference in definition, but we find a difference among people in how they view it. Perhaps an individual's view of affirmative action is sometimes affected by how it personally affects that person or someone close to that person. It is understandable that if one is personally helped by its presence, a person might be inclined to be in favor of it. Of course, if one believes that affirmative action should be used because it is better for society to provide opportunities for those who have not had them in the past, such an individual might also be in favor of it. On the other hand, if one has been personally deprived of an opportunity because of its implementation, this person may not be in favor of it. In addition, if a person believes affirmative action is not necessary today in our society, there might be opposition to it. Obviously, there are a host of other reasons for being in favor of it or being against it.

Affirmative action makes it possible for a number of our citizens who have not traditionally been given equal opportunities in this country to improve themselves and make contributions to our society. The policy has not remained the same over time. It continues to change and expand from the 1960s, when it first started to gain public notice. A number of former presidents and court cases have extended affirmative action policies. This is important because it recognizes the political implication of the policy. It is also important because government has the power and influence to bring about substantial changes in a society. Thus, we can expect affirmative action to be a topical concern for our present and future political leaders. We can also expect various public groups to lobby for and against the issue. Of course, it will be of interest to private individuals and concerns because it will also affect them in many ways.

Source: © iStockphoto/Lise Gagne.

There are a variety of reasons why affirmative action is present in our society. Certainly, a number of pressure groups or interest groups worked to bring it about. One can also cite a variety of other reasons for its presence. For example, there is ample evidence that some populations in our society, such as women and

minorities, have not been treated fairly or equally in their aspirations to improve their lives. It is especially important to note this has taken place in the areas of employment and education. Affirmative action policies could reduce this inequity of treatment. In addition, one could cite a history of discrimination toward certain individuals in our society based on race, ethnic origin, and gender. Unfortunately, remnants of this discrimination still exist in our society. Perhaps they are not as evident in our public arena today as they were in the past, but they are still manifested in the behavior of some people. One should not believe that affirmative action will quickly eliminate all inequalities in our society, but it is a good start to improving the lives and conditions for many of our citizens who traditionally have had the doors of opportunity closed to them.

Of course, affirmative action policies have also been criticized for a number of reasons. For example, a popular view is that only the most qualified individual should be given preference in hiring or in acceptance for admission to a particular program. However, it is a view that does not lack criticism and is not without difficulties, such as determining the meaning of "most qualified." Others may also believe that affirmative action is in reality a form of reverse discrimination. They suggest that those who are not chosen when qualified are really discriminated against because of their particular characteristics, such as gender and race. Still others may believe that the days of discrimination have been put aside and that our society can operate fairly without an affirmative action policy.

Advocates of affirmative action certainly can cite good reasons for its presence in our society. Obviously, it has helped and will help certain individuals obtain opportunities to improve their lives in many ways and also brings them into positions of influence, prestige, and power in our society. Many of these individuals may not be able to advance as well without an affirmative action program. Of course, their representation in desirable public and private areas will have an effect on the attitudes of our citizens. In particular, their presence should change some views about their abilities and their roles. For example, law enforcement has traditionally been a male-oriented type of employment, and it still remains so. However, with the hiring of more females as police officers, our society is learning that females are capable law enforcement officers. The same may be said for a number of other professions, such as law and medicine, which have traditionally been occupied primarily by white males.

No one knows for sure what the future holds for affirmative action. However, there is no doubt that our society is becoming more pluralistic. We can expect to see more calls for an extension of affirmative action policies—as well as opposition to this extension. In any case, we have seen and will continue to see a higher percentage of individuals who have traditionally not been publicly prominent in our society becoming more evident in a wide variety of positions. This occurrence will be due to a number of reasons, and certainly one is affirmative action. It is not easy to assess the effectiveness of affirmative action policies and whether our society is better with their enforcement. Again, we may see a difference of opinion here among our citizens. Thus, the controversy regarding affirmative action will probably continue in the future.

— *William E. Kelly*

Further Readings

Bergman, B. (1996). *In defense of affirmative action.* New York: Basic Books.

Curry, G. E. (Ed.). (1996). *The affirmative action debate.* Cambridge, MA: Perseus Books.

Eastland, T. (1997). *Ending affirmative action: The case of colorblind justice.* New York: Basic Books.

Lynch, F. R. (1991). *Invisible victims: White males and the crisis of affirmative action.* New York: Praeger.

Africa, Socialist Schools in

The African concern for the state and society socioeconomic and political advancement led to the consideration of both capitalist and socialist paths of development, which brought about a wealth of anthropological studies on precapitalist forms of the social organization, colonialist policies innovating the society, and the challenges of postindependence

times to carry out sustainable development by the new states. African socialist thought incorporated the African supernatural values, including Islam or Christianity, into socialist ideas. Nkrumah adopted both Marxist socialism and Christianity in Ghana without any contradiction between the two. Leopold Senghor (1960–1980) maintained reconciliatory relations between the Christian and the Muslim groups of Senegal, and Nasser considered Islam as an essential part of Egyptian life and which, perhaps, could assist the revolution.

The early 1950s throughout the 1960s witnessed the continent's rejection of the inherited capitalist planning of the colonial authorities and an increasing yearning to do away with the state of sluggish economic growth in the face of mounting demands by the rural and urban populations for the modern services of education, health, and the other welfare programs for which high agricultural and industrial productivity was seriously sought by the nationalist bureaucracies. The failure of most African states, however, to ensure successful achievements of these goals led to an acute drift from free-market capitalist planning to a complete adoption of socialist policies for which more state powers were adamantly enforced. It was with these drastic transformations in the structure of state bodies that Africa passed the cold war era with subtle alliances that mostly reinstated an African cult of leadership rather than installing deep consistent changes in the social structure for the vast majority of the poor populations.

In a few African states, significant changes in political representation, land reform, and a vital access to health and education nonetheless enabled the peasants and the working urbanites to acquire parliamentary seats and a few portfolios in the cabinet. The emphasis of socialist ideas on national unity and popular mobilization and the effective sharing by the poor peasantry and the working people in state management motivated many African liberation movements to eradicate apartheid in South Africa; liberate Congo, Angola, and Mozambique; and open up intriguing approaches for state planning and development programs. The African socialist experiences, however, were largely marked with short-lived systems of rule that further ensued in the emergence and growth of bureaucratic-authoritarian regimes—the totalitarian police-states that seriously curtailed civil rights and public freedoms. Before the end of the 1980s, therefore, many African socialists advocated liberal democracy as the best alternative to state socialism.

Starting with Gamal 'Abd al-Nasser's massive nationalizations of the Suez Canal Company and the feudal lords' land ownership in Egypt, Kwame Nkrumah announced unrelenting war to combat neocolonialism in Ghana and the whole continent, and Amilcar Cabral armed revolutionary activists to liberate Guinea Bissau from Portugal. Signaling the engagement of Africans in the cold war era, a wave of pro-Soviet ideologies embraced the African states, for which eager intellectuals developed schools of socialism that uniquely added African thought to the European-based Marxist doctrine.

The African socialism of Julius Nyerere was closely linked in Tanzania with self-help programs and the pan-African movement. In general, the common characteristics of African socialism embodied a commitment to replace the free-market economies of colonial capitalism with state policies that gradually led to the sequestration of private property, the prohibition of private firms from free trade, and the monopoly of national wealth by the state as a sole regulator of society. The result of these restrictive policies, however, depleted the national resources by security concerns, escalated the brain drain, and increased the corruption of state officials that further aggravated the impoverishment of rural populations.

Kwame Nkrumah's *Towards Colonial Freedom* (1947) and *Class Struggles in Africa* (1970) emphasized the commonness of African cultures as a basis for emancipation of the African continent. His *consciencism* aimed to end exploitation, solidify class divisions, and promote planned egalitarian development and social justice. By the mid-1960s, the Nkrumah-led pan-African movement successfully motivated the African heads of state to sign the establishment of the Organization of African Unity (OAU) in Accra, and the following years saw the African Charter for Human and People's Rights that embraced both nationalist and socialist orientation.

Theoretically, the African socialist state aimed to increase popular participation in national decision making. The state-socialist changes of the Egyptian *Pasha* feudalism culminated in the Charter for National Action in 1962. It defined the objectives of the Arab world as freedom, socialism, and unity.

The enforcement of state socialism, regardless of popular participation in decision making, by Mu'amar

Qadafi in Libya, Siyad Berre in Somalia, Mangistu Mariam in Ethiopia, Kaonda in Zambia, and Ja'far Nimeiri in Sudan alienated many national and democratic parties and generated similar repercussions: the Sudanese Socialist Union (SSU) (1970–1985) created more problems for the state and society than it was originally established to reform. Excessive use of administrative and financial powers by the SSU ruling elite consolidated state hegemony and isolated the masses from policy making. In Algeria, the Front Islamique du Salut (FIS: the Islamic Salvation Front) was the victor, giving rise to opposition by the ruling military and violent confrontations between the two.

— *Mahgoub El-Tigani Mahmoud*

Further Readings

Arhin, K. (Ed.). (1993). *The life and work of Kwame Nkrumah.* Trenton, NJ: African World Press.

Hopwood, D. (1982). *Egypt: Politics and society 1945–1981.* London: Allen & Unwin.

Hughes, A. J. (1963). *East Africa: Kenya, Tanzania, Uganda.* Baltimore: Penguin.

Rawson, D. (1994). Democracy, socialism, and decline. In A. I. Samatar (Ed.)., *The Somali challenge from catastrophe to renewal.* Boulder, CO: Lynne Rienner.

Willis, M. (1996). *The Islamist challenge in Algeria: A political history.* New York: New York University Press.

African American Thought

African American thought has been uniquely influenced by the African love of nature, cruelties of aggression, and an increasing need to adapt to hostile environments and to contribute creatively to overcome the challenges of new worlds, civilizations, and lifestyles tremendously different from the African ancestral heritage. The resistance of Africans to the hardships of life in the new world, including enslavement, sexual exploitation, and cultural genocide was strongly articulated in the works of the succeeding generations of the African American thinkers who purposefully aimed to ensure constructive participation of the black people in community affairs, sciences, and technological advancement by the full enjoyment of civil liberties and the other constitutional rights.

The early writings of Frederick Douglass, Maria W. Stewart, Sojourner Truth, Ida B. Wells-Barnett, Anna Julia Copper, Booker T. Washington, Marcus Garvey, and William Edward Burghardt (W.E.B) DuBois, among many others, revealed consistent striving for the observance of social justice, with persistent emphasis on the cause of liberation, unity, and the perseverance of human dignity in the American society. Rooted in the centuries' spirituality of Africa, the African American thought was largely influenced by spiritual leaders. The use of spiritual principles to uplift the social status of blacks was forcibly applied by Marcus Garvey, a founder of pan-African and a self-sufficiency doctrine for blacks in the diaspora, as well as Elijah Muhammed, the founder of the Nation of Islam, who taught his disciples blacks had been the chosen children of God. The civil rights movement marked the leadership of the Nobel Laureate Martin Luther King Jr., of the southern Christian churches, who taught millions of demonstrators in the civil rights movement era that "character, not color" was the determining criterion for human merits, and the Muslim leader El-Haj Malik El-Shabazz (Minister Malcolm X) of the Nation of Islam, whose teachings impacted the concern of African Americans with the ethics of power.

The African American contemporary thought has been developed by generations of the African American thinkers who continued to develop the centuries-old intellectual-activist tradition in modern times. This included the liberation schools of black thought that adopted both liberal and socialist philosophies in the pursuit for citizenship rights and privileges of the good life within American democracy. Anne Walker Bethune, Na'im Akbar, Angela Davis, Nyara Sudarkasa, Manning Marable, Maulana Karenga, Frances Cress Welsing, and Nobel Laureate Toni Morrison introduced new scholarly concepts to strengthen the blacks' social movement for personal integrity, political activity, and economic prosperity. Toward this end, the African American thought drew heavily from the history of the continent of Africa, the contributions of Africans in the American and Caribbean diaspora, and the need to emulate cultural heritage to reconstruct the image of blacks "in their own interests." Stressing the deep concerns of African

value systems with justice, discipline, and productive behavior, the Kawanza doctrine exemplified the African American concern for unity, self-determination, collective work and responsibility, cooperative economics, purpose, creativity, and faith.

Faced by the challenges of adaptability in the new world, the need for effective social equality and women's rights occupied a central part of the African American thinking, which further impacted the international literature on social equality and the striving for women's rights. Early endeavors were greatly initiated by Sojourner Truth and Ida Wells, who called for the eradication of enslavement and all racist attitudes from society with direct public speech and community-based activism. Wells-Barnett (b. 1862) developed a reputation for intelligence, eloquence, and public persona, since she was the first black person to initiate a legal challenge to the Supreme Court's nullification of the 1875 Civil Rights Bill, regarding Wells's appeal versus the Chesapeake and Ohio Railroad train in May 1884. Wells encouraged the establishment of the national black women's club movement to advance women's status, and helped to revive the Afro-American League national organization to promote black unity. She became editor of the *Evening Star* and another black weekly, called *Living Way,* as well as editor and part owner of the *Memphis Free Speech and Headlight.* Her early journalistic emphasis was on children and education, but that changed dramatically in 1892 to a strong campaign against lynching, in which she wrote a powerful exposé entitled "Southern Horrors: Lynch Law in All Its Phases," and toured the country and eventually Europe to speak against this terrorism, probably in the most radical statements made by an African American leader of the time.

Booker T. Washington's (1856–1915) "accommodationist" philosophy was expressed in his speech in Atlanta, in 1895: "In all things that are purely social, we can be as separate as the fingers, yet one as the hand in all things essential to mutual progress." This was described by DuBois as the "Atlanta Compromise" and noted as socially retrogressive and predicated on "Uncle Tomism" racist discrimination against blacks. Du Bois believed that Washington's conservatism appealed to white America, whose politicians—both northern and southern—courted him because of his declaration to the world that political and social equality were not priorities for blacks. Instead, Washington recognized the nature of racism in the South, where 90% of black Americans lived, and he suggested that what they wanted—and should be willing to work very hard to get—was economic prosperity, out of which all else might follow.

Frederick Douglass (1817–1895) was a pioneering abolitionist, orator, and journalist, who initiated a school of thought that merged the spiritual activity of church sermons with liberal journalism and a lifelong commitment to political activism. Assisted by antislavery women, his *North Star* paper helped to promote the antislavery movement with a strong support for an independent, organized movement for women's suffrage and other rights. In 1848, the Seneca Falls Convention in New York, led by Elizabeth Cady Stanton, discussed the social, civil, and religious conditions and rights of women.

The multiple-perspective activist school of Douglass was diligently developed throughout the 20th century by the distinguished academician W.E.B. DuBois (1868–1963), the first black to receive a PhD from Harvard University (in history), and a sociologist, writer, and educator who taught Latin, Greek, English, and German. Opting for a vanguard role for African American intellectuals to excel as social change agents in American society, DuBois worked in higher education for the establishment of "The Talented Tenth, developing the Best of this race that they may guide the Mass away from the contamination and death of the Worst, in their own and other races." Concerned with the social progress of colored peoples, he pursued scholarly work from his early career to study *The Philadelphia Negro* (1899), among many other succeeding works. His deep knowledge about the civilization heritages of Africa, coined with a liberal socialist political activism, motivated him to become "the leading intellectual voice of black America," cofounder and leading participant of the pan-African Movement, cofounder of the National Association for the Advancement of Colored People (NAACP), and editor of its magazine, *The Crisis.*

Afrocentricity, a contemporary African American school of thought, has largely benefited from the earlier emphasis of Black thinkers on the African cultural heritage as a fundamental source to promote the psychological, ideological, and political well-being of black peoples. Molefi Asante reinvigorated the African frame of reference to establish the self-worth and creativity of the African person. Criticizing Western reformist and traditional theories of psychology, Na'im Akbar and Frances Cress Welsing stressed the

intellectual repression that had victimized the blacks of America with mental degradation since enslavement times. Welsing provided a new psychological approach, rejecting race supremacy and asking for a healthy code of self-awareness by black males and females for the achievement of justice "in a common effort against injustice to express the strongest possible statement about respect and love for themselves as individuals." Furthering the tradition of the early pioneers of African American thought, the post-civil-rights era thinkers Anne Walker Bethune, Angela Davis, Nyara Sudarkasa, Manning Marable, Maulana Karenga, Nobel Laureate Toni Morrison, and hundreds of others shared a renewable concern for the African American present-time and future generations: cherishing the African cultures and the African American heritage, preserving sisterly, extended-family relations, increasing access to high education and jobs, and actively participating in the intellectual search within the democratic life of America for an African-based philosophy and a viable plan of action.

Toward this end, Manning Marable theorized that justice demanded affirmative action based on race and gender to address continuing patterns of inequality. Marable suggested defining a new moral assignment and vision of emancipation. He believed that equality is about social justice and the realities of human fairness, such as health care, education, housing, jobs. Stressing the "consideration of duty to one's family, community, or society," Nyara Sudarkasa has noted the vital role that black families consistently played in the advancement of African Americans from racism, gender discrimination, and poverty. Sudarkasa has emphasized the complementary roles of black women and men in the family.

African American concern for the improvement of their social, political, and economic status helped a great deal to bring to light the affirmative action legislation, which can be viewed as a way to help minorities "catch up" by delivering access to the benefits and opportunities historically reserved to white people. The principles of affirmative action continue to be interpreted and refined through court action. Legal opinion on affirmative action is inconclusive. The Supreme Court decided in 1978 that race can be used as a criterion for admission to undergraduate or graduate and professional schools or for job recruitment, as long as race is combined with other criteria and racial quotas are not used. In 1996, however, the University of California Board of Regents decided to eliminate race, but not social class, as a basis for admitting students to its campuses. Also in 1990, in *Hopwood v. Texas,* a panel of judges of the Fifth Circuit Court of Appeals in Texas ruled as unconstitutional the affirmative action admissions policy of the University of Texas, Austin, law school.

— Mahgoub El-Tigani Mahmoud

See also **African Thinkers; Social Change**

Further Readings

Andersen, M. L., & Taylor, H. (2000). *Sociology understanding a diverse society.* Belmont, CA: Wadswoth/Thompson Learning.

Hine, D. C., & Thompson, K. (1998). *The history of black women in America: Shining thread of hope.* New York: Broadway Books.

Karenga, M. (2002). *Introduction to black studies.* Los Angeles: University of Sankore Press.

King, M. L., Jr. (1962). *Why we can't wait.* New York: Harper & Row.

Marable, M. (1997). *Black liberation in conservative America.* Boston: South End Press.

Staples, R. (1999). *The black family.* Belmont, CA: Wadsworth.

Sudarkasa, N. (1996). *The strength of our mothers.* Trenton, NJ: Africa World Press.

African Americans

The quest for equality among African Americans has always been difficult, and some may argue with good reason that our present-day society has much further to go in reaching a semblance of equity for this minority group in American society. A casual perusal of economic, social, and political situations in the United States makes this quite evident.

African Americans are unique in a number of ways. Their skin color distinguishes them from other citizens, and their history is distinct in that most of their ancestors were brought to America against their will under a legalized system of slavery. How many can say the same about their heritage as it relates to the United States? The institution of slavery to which African Americans were subjected lasted from their arrival to the end of the Civil War.

Source: Courtesy of the Library of Congress.

Even after the conclusion of the war between the states, the conditions of African Americans in many parts of the United States were not noticeably different than pre–Civil War days, despite the Emancipation Proclamation and the passage of a number of amendments to the Constitution. This was clearly demonstrated by the emergence of the Ku Klux Klan—an extremist group dedicated to white supremacy that numbered in the millions at one time in the United States.

To complicate matters, the U.S. Supreme Court legalized segregation in this country when it enunciated the famous "separate but equal" doctrine via the case of *Plessy v. Ferguson* (1896). Hence, states could and did segregate African Americans by the passage of Jim Crow laws, which mandated separate facilities for them. The *Plessy* doctrine lasted until 1954, when the Court reversed itself in the famous case of *Brown v. Board*—which outlawed legal segregation or *de jure segregation* in public schools on the basis of race. However, there was massive resistance to the implementation of this important court decision in many parts of the United States. In addition, the reality of an integrated educational system did not evolve the way some had hoped it would after this prominent court case. In fact, some may argue that there is another type of segregation at work, *de facto segregation*, which involves a variety of economic and social factors, such as housing patterns, not mandated by law. This type of segregation has been quite difficult to eradicate in America society.

The 1960s have often been described as a turbulent time for African Americans in the United States, primarily because they were required to pay a heavy cost for needed social, economic, and political improvements in their lives. Two important federal laws were passed by Congress as a result of obvious social and political inadequacies. One was the Civil Rights Act of 1964—a law that provided African Americans the opportunity to receive equal public accommodations in areas such as restaurants and hotels. It was followed the next year by the Voting Rights Act of 1965, which resulted in more African Americans not only having the right to vote but the election of many others to public office. Both laws resulted from many unjust hardships endured by African Americans for too long a period of time.

Governments and other agencies have also enacted policies of affirmative action to provide African Americans and other groups with employment and educational opportunities as a means to achieve a better life. Increased educational opportunities are particularly important, since the level of formal education that one obtains is often related to the level of one's economic income.

As for the future, on one hand, some will argue that laws and policies have increased opportunities for African Americans that were not available a number of generations ago. In addition, it is certainly true that the African American presence is more noticeable in many areas of our society. Some of the more prestigious and powerful positions in our society are now occupied by African Americans. On the other hand, some may say that the African American presence is yet a distinct minority among a greater mass of citizens who traditionally have benefited from this country's advantages. They may

also note that we have two distinct and different societies, both unequal in terms of opportunity and other factors.

Many of our large cities are seeing a migration of whites and others who can afford it to the more affluent suburbs, causing a resurgence of segregation in business and housing. The trend has also affected the integration of urban schools as a means of achieving a greater understanding and tolerance for our fellow citizens. Yet it has also resulted in increased political opportunities in large American cities for African Americans, as well as for more employment opportunities in municipal governments. The important question today is, How many African Americans are really experiencing these benefits? Many in America are still far from it.

— *William E. Kelly*

See also **Affirmative Action**

Further Readings

Bever, E. (1996). *African Americans and civil rights: From 1619 to the present.* Phoenix, AZ: Oryx Press.

Jackson, M. N., & Lashley, M. E. (Eds.). (1994). *African Americans and the new policy consensus: Retreat of the liberal state?* Westport, CT: Greenwood Press.

Jackson, R. L. (1999). *The negotiation of cultural identity: Perceptions of Europeans and African Americans.* Westport, CT: Praeger.

Polednak, A. P. (1997). *Segregation, poverty, and mortality in urban African Americans.* New York: Oxford University Press.

African Thinkers

In the cradle of humanity, Africa, thought was creatively practiced in a natural environment of bountifulness and human diversity. Languages, artistic works, inscriptions, cave paintings, and architectural constructs of huge irrigation schemes and other colossal monuments testify to the intellectual abilities of the African peoples who thought about them, and then designed and erected them. In the deeply rooted African spirituality, the African thought was expressed in a great many deities, rituals, ethical stands, and religious teachings.

Since ancient times, African thinkers used thousands of languages that have been grouped in the large families of the Saharan, Sudanic, Kordofanian, and others. Some of these languages were written in Egyptian hieroglyphics, Nubian Meroitic, Ethiopian Geez, or Arabic. Perhaps one of the oldest inscriptions in Africa is the Stale of Piankhi, the Nubian king who invaded Egypt and founded the 25th Dynasty (ca. 734), which reads "I am a king, the image of God, the good divine one, beloved of the divine ones." Another stale by Ethiopian King Ezana of Aksum (325 CE) carried with it a story of invasion. The African thinkers were also some of the earliest to establish cosmological doctrines on theology and monotheism. The Egyptian Pharaoh Akhenaten called for the veneration of the one almighty Lord, instead of the polytheist deities of his time.

African thinkers have contributed distinguished achievements to the arts and sciences, for example, the knowledgeable architect Imhotep, builder of the first pyramid, who was equally a prime minister, philosopher-teacher, and father of medicine. The continent witnessed prolific leaders of thought in the medieval times. In the 15th century, among the Mali and the Songhay, Timbuktu and Jenne began their long careers, with ideas from their schools of theology and law spreading far into Muslim Asia. 'Abd al-Rahman ibn Khaldun of Tunisia (1332–1406) was a researcher on education and psychology, a political activist and a statesman, a jurist and judge who innovated autobiography as well as a scientific methodology for the science of history and founded a science of sociology in the course of his rigorous research to correct the reported events of history.

Endowed with intensive knowledge about the holy *Koran,* the *Hadith* (the Prophet's sayings and deeds), monotheism, jurisprudence, linguistics, poetry, metaphysics, natural science, mathematics, arts and foreign languages, Ibn Khaldun spent about 8 years authoring his magnanimous masterpiece *Muqaddimat Ibn Khaldun* (the Ibn Khaldun Introduction), which is one of the seven volumes, *Kitab al-'Ibar wa Diwan al-Mubtada wa al-Khabar* (The Book on Events on the Days of the Arabs, the non-Arabs, the Berber, and Contemporary Relatives of the Superior Sultan). Excluding some historical events as "impossible" judged by "the nature of things," the methods of scientific research and the rules of investigating

historical events as "codes of society," the *Muqaddimat* dealt with the study of "the *'Umran* [societal life or sociological activity], social phenomena, ownership, authority, acquisitions, craftsmanship, sciences, and the factors and the causes underlying them." Ibn Khaldun's history of the Berber is perhaps the strongest, richest, and most genuine historical research. The French historian Dozy described his accurate writing on Spain as "outstanding: nothing of the sort is found or comparable in the accounts of the medieval Christian westerners of whom no one successfully documented what Ibn Khaldun clearly wrote."

Ant'nor Firmin, a Haitian thinker, is considered a pioneer of anthropology in the African domain. Early in 1885, Fermin realized that the human species appeared in various parts of the world with the same primordial constitutional imprint of the species, the same intellect and that same morality as in the original human blueprint.

In recent times, a number of African writers have added significant strides to our knowledge of the continent's societal life and challenging realties, as they penetrated the arenas with intriguing thought. The Sudanese writer Jamal, a founding member of the 1962 *African Encyclopedia*, authored *Sali Fu Hamar,* a collection of stories on the African mythology, as well as other literary works on the African cultural and political affairs. The first African writer to be awarded a Nobel Prize in literature in 1986, the Nigerian writer Woll Soyinka earned his fame with a consistent critique of authority impositions upon the personal freedoms of people and the severe repercussions of state intrusions with respect to the peaceful competition in power relations. Soyinka addressed the traditional African rituals that continue to influence the mentality of Africans: "The king has died, and his horseman is expected by law and custom to commit suicide and accompany his ruler to heaven."

Based on rigorous anthropological investigation on the impact of human geography on human behavior, Diop, a Senegalese historian and cultural anthropologist, developed a theory on the north and the south cradles of civilization in Europe and Africa, respectively. Diop discovered "for certain that ancient Egyptian Pharaonic civilization was a black civilization. Herodotus had no interest saying that 'the Egyptians had black skin and frizzy hair.'" According to Diop, "The harsh and for long periods cold climate in Europe gave rise to the patriarchal family system." Diop showed that Ethiopia [Nubia], Kush, and Ta-Set, the world's first nation state, were "matriarchal." Focusing on the Egyptian female, Nawal El-Saadawi, a prolific writer who has authored several plays, mostly translated into international languages, has analyzed with factual materials the current state of affairs of African and Arab women. Including her deep insights in *The Hidden Face of Eve* (1977), the stories of El-Saadawi have unveiled the conflicts of modernity with traditional forms of life in the society, in which women, in particular, suffer male domination and state repression.

African thought has been remarkably geared and engineered to address reality with a view to help enforce optimum change—a deeply rooted tradition that the African American scholar Maulana Karenga eloquently conceptualized as "the intellectual-activist tradition." This norm, moreover, should be further linked to the richness of the continent and the colorful life of its peoples since ancient times, which further explains the African diverse, prolific, and multiple forms of thinking, compared with strict specializations of thought experienced in other places. *The Cairo Trilogy* and the other stories of Naguib Mahfuz have analyzed the lively experiences of people, the contrasting portrayals of secular versus profane situations in the spheres of family, neighborhoods, educational institutions and government agencies, and the contradictory encounters both women and men confront within the context of the African oriental life.

— Mahgoub El-Tigani Mahmoud

See also **African American Thought**

Further Readings

Diop, C. A. (1996). *Towards the African renaissance, essays in culture & development* (1946–1960). Egbuna P. Modum, trans. London: Karnak House.

Ferraro, G. (2003). *Cultural anthropology.* Belmont, CA: Wadsworth.

Hafez, S. (2001). *Naguib Mahfuz—The Cairo trilogy: Palace talk, palace of desire, sugar street.* New York: Everyman's Library.

Karenga, M. (2002). *Introduction to black studies* (3rd ed.). Los Angeles: Sinakore University Press.

Woll, S. (2002). *Death and the king's horseman.* New York: W. W. Norton.

Aggression

Aggression is simply defined as "Any form of behavior directed toward the goal of harming another living being who is motivated to avoid such treatment." Aggression is most commonly studied in its application to humans and may include both verbal confrontations and physical gestures. Singular aggression between two humans is the most typical form of aggression found in the social world. The most destructive occurrence of aggression is found in warfare between sovereign nations. Numerous studies and analyses of the many forms of aggression reveal a host of potential variables that are social, gender, racial, biological cultural/geographic, psychological, historical, and even situational factors.

Aggression is usually thought of negatively because of its association with harm, such as in assaults and homicides. While this may be the prevailing popular perception, the use or display of aggression is clearly relative to its immediate social or cultural context. Consider, for example, the aggression in competitive sports, such as boxing. The same actions outside the arena are condemned as criminal and requiring a formal response in the form of punishment. The ancient Romans were famous for promoting gladiatorial contests that culminated in the deaths of humans, all in the pursuit of entertainment. Government punishment of criminals is aggression mandated by the state for the purpose of correcting or deterring an assault committed against another citizen. However, in some cultures, it is perfectly acceptable for an individual member to exact justifiable justice or revenge. Among other cultures, aggression may actually be prescribed in response to personal status building or status defense. In our culture, self-defense or defense of another may justify acts of aggression to the extent of causing death. Self-defense as a validation for aggression can clearly be extended to sovereign nations. An act of war or even the threat of war is morally justified because it both defends its people from potential conquerors and prevents a greater harm from a prolonged bloody struggle.

An understanding of aggression begins with a broad examination of human beings and our capacity for aggression. Why should some people have a greater willingness or need than others to display aggression? The study of children is a particularly popular avenue of exploration of aggression. It is commonly understood that the behaviors a child learns (suitable or unsuitable) can become deeply ingrained and carried into adulthood. This behavioral approach maintains that there are three primary sources of influence that shape a child's behavior and comprehension of appropriate responses: family, peers, and symbolic models.

Households in which the parents do not discipline, are permissive in the child's expression of aggression, and use power assertion in disciplining tend to produce aggressive children. The family provides the earliest socialization through the interaction of its members, from which the child learns the use of aggressive behaviors and patterns of interaction. The influence of interaction with peers is also very powerful because it provides children the opportunity to learn both aggressive behaviors and vie for, and possibly establish, a coveted position of dominance. Rough play such as chasing, catching, tumbling, and other competitive strength comparison activities provide a usually safe means to learn some of the benefits of aggression, such as victory and peer status/recognition.

Modeling is the third social influence on acquired aggressive behavior in children. Live models are the most common source of childhood-learned aggression, and of all the potential sources, parents are the most powerful and far-reaching. In addition, prolonged observation of aggressive actions causes a gradual desensitization to violence and the pain or suffering of others. Self-modeling is the effect of a child who is the victim of aggression either in the home or at the hands of peers. The child begins to utilize aggression as a means to resolve conflict or in play. The mass media model claims that the effects of observing televised or filmed violence in either physical or verbal forms produces childhood aggression. This model has been under study for several years. The exact impact of viewing aggressive behaviors by children cannot always be accurately predicted because of other confounding variables. However, the effect of any two or all three influences (family, peers, and media) must certainly be significant.

Social factors are certainly not the sole influence on human aggression, because biology may also contribute significantly. Various gender and psychological differences also account for the differences in manifestations of aggression. Much research debate exists over the influence of biology and its impact on human intellect, physical ability, and behavior and especially how it affects human

aggression. Debate between those that embrace theories supporting the social causes of human aggression and those that advance a belief in biological influences is commonly referred to as "nature versus nurture." Some of the most popular biology-based research has been along the lines of heritability and studies of twins, adopted children, and chromosome examinations.

Twins separated at birth have been examined with regard to their histories of aggression and the records of both their natural parents and adopted parents. Research has revealed that adopted children displaying generally aggressive behavior most often shared this same characteristic with their biological father as opposed to a low aggression correlation with the adopted father. This research supports the belief that nature (biology) rather than nurture (environment) has a clear bearing on aggressive behavior.

Studying children has also provided another source for the validation of biological-based explanations into human aggression. The disparity in the aggression levels between boys and girls is well recognized and documented. Research into the type of play that children engage in reveals that boys are more competitive and their play activities tend toward a more physical orientation as opposed to girls. When similar comparisons are conducted on adults, the differences are not as dramatic; however, they are nonetheless identifiable. The disagreement over the causes of gender aggression differences is further complicated by studies of chromosome variation and abnormality. The cells within the human body are comprised of 23 pairs of chromosomes. In females, the pairs are both "X shaped"; in males, the pairs contain one "X" and one "Y-shaped" chromosome. It is the "Y" chromosome that researchers maintain accounts for males having a greater capacity for aggressive behavior than females. This is commonly referred to as the "Y-chromosome hypothesis." Consistent with this thesis is the belief that males with the rare "XYY" chromosome abnormality must be especially aggressive and would likely have a criminal history of violence. However, studies of "XYY" males in prison do not support that particular hypothesis.

There are other potential influences on aggression not directly attributable to social or biological factors. We must understand that some individuals are more affected than others by these influences. The first of these effects is temperature, specifically hot temperature. It is widely recognized that assault offenses increase during the summer months, and within heat wave periods, individual irritability can be particularly elevated. Noise levels can also impact aggression. The significant contributors to noise are naturally located in the more urban areas: automobile movements, industrialization, and airplane traffic. Increased noise levels have been associated with reduced interpersonal interaction as well as a decrease in citizens helping others and less sociability. Associated with noise is the influence of crowds or high-density populated geographic areas. The studies that have been conducted are inconclusive with respect to what particular quality of crowds causes increased aggression. However, it has been determined that males are more affected than females.

— Richard M. Seklecki

See also **Crime; War, Anthropology of**

Further Readings

Baron, R. A., & Richardson, D. R. (1994). *Human aggression.* New York: Plenum Press.

Humphrey, A. P., & Smith, P. K. (1987). Rough and tumble, friendship, and dominance in school children: Evidence for continuity and change with age. *Child Development,* 58.

Mednick, S. A., Gabrielli, W. F. Jr., & Hutchings, B. (1987.) Genetic factors in the etiology of criminal behavior. In S. A. Mednick, T. E. Moffitt, & S. A. Stack (Eds.), *The causes of crime: New biological approaches.* New York: Cambridge University Press.

National Research Counsel. (1993). *Understanding and preventing violence.* Washington, DC: National Academy Press.

Perry, D. G., & Beussey, K. (1984). *Social development.* Englewood Cliffs, NJ: Prentice Hall.

APE AGGRESSION

The study of nonhuman primate behavior allows biological anthropologists and other scientists to come closer to understanding why human primates act as they do. Traditionally, scientists have viewed members of the ape family as aggressive and competitive. More recent research, however, has demonstrated that apes are more inclined toward

cooperation and affiliation than aggression. This shift in how apes were viewed first occurred in the 1970s at a zoo in the Netherlands, when Frans de Waal observed two male chimpanzees embracing one another immediately after a fierce fight had taken place. De Waal maintained that the chimpanzees were engaged in reconciliation. After thousands of hours spent observing members of the ape family, de Waal concluded that apes had been unfairly identified as killers. De Waal contends that because apes live in groups, community interests often predominate over tendencies toward aggression.

In early 2004, primatologists Paul Garber of the University of Illinois and Robert Sussman of Washington University set out to disprove the theory that aggression is a dominant behavior in apes. Like de Waal, Garber and Sussman discovered that apes were more likely to exhibit cooperation and affiliation than aggression. They found that only 1% of the apes' time was spent in aggressive behavior, while 10% to 20% of their time was devoted to affiliate behavior.

The notion that apes are more likely to cooperate than fight has been borne out by a number of research studies. For instance, the Yerkes National Research Primate Center of Emory University in Atlanta, Georgia, concluded after long-term observations that monkeys cooperated in order to obtain food, rather than fighting for it. Observations of chimpanzees also revealed that when the animals were exposed to crowding, they used coping methods rather than aggression to deal with the problem. Studies of bonobo have been particularly instrumental in advancing theories of nonviolent apes. Bonobos, which live in matriarchal societies, have been labeled as peacemakers because they use sex rather than aggression to deal with confrontations that arise.

On the other hand, baboons, which are classified as monkeys rather than apes, have repeatedly exhibited aggressive behavior. Recent studies, however, have also begun to question whether or not baboons are biologically prone to aggression or whether it is a learned behavior. After half of the males in a group of olive baboons contracted tuberculosis and died in 1983, after being exposed to tainted meat at a tourist lodge at the Masi Mara Reserve in Kenya, Stanford University primatologist Robert Sapolsky observed that younger male leaders who had migrated into the group were less aggressive than their predecessors.

Returning to study the same troop of baboons 10 years later, Sapolsky found that male baboons were still pacific. They were also less likely to attack females than were baboons in other troops. When blood samples of the pacific baboons were compared with those of the males who had died, Sapolsky discovered that the younger baboons had lower levels of glucocorticoids, a hormone released as a response to stress. Sapolsky posited that the continuing lack of aggression might be the result of observed pacific behavior in others in the troop, combined with the efforts of female baboons that perpetuated the pacific behavior because they preferred a less aggressive society.

— Elizabeth Purdy

Agricultural Revolution

The *agricultural revolution* is a notion applied to a wide spectrum of new kinds of human activities and a variety of new forms of social and cultural life resulting from the practice of soil cultivation, cattle breeding, and livestock raising. In some cases, it could be understood as opposition to the "Neolithic revolution" concept, proposed in the 1920s by W. G. Childe in order to characterize the origin of self-sufficient societies that produce their food. Such understanding emphasizes a broader sense of an agricultural revolution versus a Neolithic one, implying at the same time their common economic and ecological background. Unlike the Neolithic revolution, which indicated strict chronological frameworks of the event, in most cases we apply the term agricultural revolution to long-lasting gradual processes and their historic consequences. So, the "evolutionary" is interpreted as "revolution," exclusively based on its important impact in all spheres of human life.

Technological Components of the Agricultural Revolution

The origin of a productive economy was accompanied by a series of technological innovations. One of the

most important among them was the *origin of ceramics,* which is regarded as the first artificial raw material used by prehistoric populations. Pottery enabled the process of boiling and cooking; it gave rise to soups and cooked cereals, an introduction to the paleodiet, substantially broadening its spectrum of microelements and vitamins that human beings could receive from food, and changing in some manner the processes of metabolism. Pottery utilization also greatly promoted storage strategy development, which helped to secure subsistence as well. Beginning with primitive handmade multipurpose forms, pottery gradually evolved toward fine vessels made with the help of a potter's wheel. Pottery ornamentation traditionally is regarded as one of the basic ethnic markers, while the morphology of ceramic artifacts is connected with the sphere of their utilization and economic orientation of their makers.

Tool-Making Technology Improvement

The beginning of land cultivation required new tools. New forms of tools connected with wood processing (deforestation being the first stage of land preparation) appeared at the Neolithic times, and a variety of axes is the most striking feature of the tool kit of this time. A series of tools for land cultivation was also widely distributed. The technique of polishing and grinding widely distributed in the Neolithic enabled the origin of specific tools for cereal processing (for example, millstones, graters, and the like). The peculiarities of the natural habitat of early forms of productive-economy promoters contributed to spatial differentiation of their tool kits and techniques of tool production.

House building gradually replaced hunter-gatherers' temporary huts, and tent construction could be regarded as another important technological innovation connected with agricultural revolution. The necessity of looking after their crops and herds promoted the need for a well-prepared house accompanied by special facilities for crop storage and domestic animals and birds.

The origin of spinning and weaving was an inevitable reply to the need for food transportation and storage, and enabled interior house decoration as well.

Transportation meant improvement. Transport by wheel and sail is one more important technological element of agricultural revolution. It mirrors the needs of the socioeconomic processes accompanying land cultivation and improved cattle breeding.

Socioeconomic Implications of the Agricultural Revolution

Transition to a Settled Mode of Life and the Premise of Town Origin

The origins of plant cultivation and cattle breeding helped to secure the food procurement system and contributed greatly to the creation of a rather settled mode of life. It was grounded on a relatively stable quantity of product, which could be obtained during a long period of time from the same territory using different sources or/and different ways of their exploitation, combining traits of hunter-gatherers with a productive economy. The most suitable areas for living later were developed into towns with wide specialization (trade or/and crafts, war shelters, ritual and/or administration centers).

Exchange System Transformation

The establishment of a productive economy caused a transformation of the exchange process function. Traditional for hunter-gatherers' community rituals and "strategic" implication of exchange aimed to establish peaceful contacts among different communities after the beginning of land cultivation and cattle breeding was added by real economic value. The appearance of intercommunity exchange of food obtained from different sources in many cases guaranteed the survival of communities and satisfaction of their vital needs and, in this way, contributed to the growth of prestige of early agricultural communities. The origin of the first equivalent of money, "protomoney," occurred in such exchange. A specific form of exchange, so-called prestige, or potlatch, became one of the basic elements of the transformation of prehistoric communities, promoting the appearance of individuals possessing relatively more authority, property, and power in their groups.

Surplus Product Origin, Prestige Economy

The development of farming and cattle breeding, for the first time in human history, guaranteed the existence of surplus product during a rather long period of time (till the next crop or next calving, for example). Crucial for its basic existence (excluding the display of any sort of inequality in its frame), prehistoric society faced the necessity of managing this surplus. The original form of prestige exchange, potlatch, which appeared at organized festivals,

promoted the redistribution of surplus product among the community members. As a result, a restricted number of "big men," relatively more authoritative and wealthy persons, appeared in the historical arena. This group gave rise to private property, exploitation, and class structure formation, promoting in this way the origin of civilization and state power.

Demographic Revolution

Food base improvement and the gradual growth of the term of occupation on the same settlement removed earlier natural limitations on child birth rate and thus caused rapid population growth, accompanied by the formation of heterogeneity. Thus, territories more suitable for productive economy became more attractive for occupation, and the tendency toward overpopulation was demonstrated. In turn, the tension of excessive population on the territory created the first ecological problems for early farmers and cattle breeders. Most probably, one such crises originated a special form of productive economy, nomad cattle breeding, which has often been interpreted as an accelerated way to property accumulation, trade, and nonequivalent exchange development. Territories with excessive population density gave rise to the first wars, contributing to an early form of exploitation.

Ideological and Cultural Displays of Agricultural Revolution

Another development in the productive economy was the appearance of leisure, that is time free from subsistence, in particular from food procurement activities. And the needs of new forms of economy and social relations required rational knowledge as well as an ideological background and ritual sanction.

The *fertility cult* is one of the most striking features of mental life with origins in the productive economy. Fertility cults usually were accompanied by the growth of the role of Woman-Mother (foremother), as well as inspiration by natural forces and phenomena. Common economic backgrounds and the extreme importance of such forms of ideology in everyday life

Source: © iStockphoto/William Walsh.

of early agriculturists caused the curious situation in which similar ritual activity was realized in principally different forms in different locations.

Rapid development of astronomy and time-count systems could be regarded as a specific element of the agricultural revolution and at the same time as its necessary premise. The first calendars enabled rational and well-timed agricultural processes, in this way guaranteeing surplus product.

Protoscientific knowledge development (zoology, veterinary, etiology, agronomy, genetics, geography, climate, and soil studies, among others) also contributed greatly to the development of agriculture and promoted the rise of its effectiveness.

Primitive writing systems used for the fixation and transmission of new knowledge systems and newly formed traditions is also connected with the agricultural revolution.

Other Displays of the Agricultural Revolution

The gradual transition from hunter-gatherers to an agricultural mode of life was accompanied by changes in human morphology. This is displayed in the modification of facial and postcranial (connected with the consumption of boiled instead of roasted food), the degradation of human dens (because of lack of necessity to chew fresh vegetation), and many diseases and epidemics connected with a stationary mode of life that included constant contact with animals.

Alongside the weakening of the human body, the natural habitat also deteriorated. Human society has participated in the disturbance of the balance in nature by its intervention into physical geographic processes, in particular, by deforestation, by soil erosion, and by introducing new sorts of plants and animals into environments.

Changes in the mode of life, from a subsistence system to the formation of a prestige exchange network, resulted in the degradation of prehistoric social dogmas and stereotypes and promoted modification of the marriage system (polygamy) and changes in community structure (formation of lineage) and kinship systems.

It should be stressed, nevertheless, that most components of the agricultural revolution displayed themselves only when farming and cattle breeding became not only a guaranteed supplement but the necessary bases of food procurement system in prehistoric populations. The replacement of hunting, gathering, and fishing in prehistoric subsistence was a long and gradual process, whose realization in different parts of the world depended on a set of natural geographic, economic, and cultural agencies.

— *Olena V. Smyntyna*

See also **Agriculture, Origins of; Anthropology, Economic;**

Further Readings

Mathewson, K. (2000). Cultural landscape and ecology III: Foraging/farming, food, festivities. *Progress in Human Geography, 24,* 3.

Smith, B. (1999). *The emergence of agriculture.* New York: Freeman.

Vasey, D. E. (1992). *An ecological history of agriculture, 10,000 B.C.–10,000 A.D.* Ames: Iowa State University Press.

Vink, A. P. A. (1975). *Land use in advancing agriculture.* Berlin: Springer-Verlag.

Agriculture, Intensive

Agricultural intensification can affect any of the inputs of an agricultural system—the crops planted, the labor expended, and the productivity exacted from the land. It can be driven by increasing population relative to the land available or by changes in market prices and demand for crops. It can result in dramatic investments in and transformations of the landscape, and it can be accompanied by, but will not necessarily result in, intensive social change.

There are several ways of categorizing the changes in intensive agriculture. In small-holder systems, intensive agriculture is marked by high investments of time in weeding, planting, and especially watering crops and manuring the soil. Several crops will be planted in the same field and mature at different times, and fields will also be worked several times a year as long as conditions support growth. All this requires a high population density and a strong work ethic. In Chagga agriculture on Kilimanjaro, Tanzania, for example, competition for land is high, and use of space intensified by the complex systems of agroforestry that are practiced. These involve planting shade-tolerant species (yams, coffee) intermingled with banana and

fruit and timber trees. In anthropology, the work of Robert Netting is probably the most well-known corpus of study on the ecology and practices of intensive small-holder agriculture in diverse parts of the world.

Agricultural intensification can be driven by population increase. This has been famously theorized by Esther Boserup in *The Conditions of Agricultural Growth.* Boserup, in contrast to Malthus, saw population growth as the independent variable driving agricultural and social change, not as the consequence of agricultural output or social systems. But the changes resulting are also intimately related to market pressures and increased demand for crops. The development of labor-intensive irrigated agriculture in the Pare mountains, in Tanzania, for example, is thought to have preceded their dense settlement and was driven by the need to acquire livestock for marriage through trade with neighboring pastoralists. Similarly, there are many cases where population increase has not been marked by intensification.

The landscapes of intensive small-holder agriculture have tended to attract admiration from people who enjoy the gardenscape of different patches of intensive use. Some of the most dramatic anthropogenic landscapes in the world are the complex layers of irrigated rice terraces, which can produce 5 to 10 tons per hectare per year (higher yields are dependent on advanced technology). One famous study of intensification in Machakos, Kenya, has recorded the transformation of a land characterized by extensive land use and apparent erosion to a gardenscape of trees, terraces, and well-tended land.

But we should note that changes in landscape are never socially neutral. The Machakos case was widely received as a good-news story of averted degradation. But at the same time, the transformation in the land has had its social costs, with poorer families finding it harder to cope with population pressure. In other parts of Africa, investment in agricultural intensification and land improvement is reduced

because of the changes they portend to social support mechanisms. Similarly, the intensification of agriculture in the United Kingdom in the 18th and 19th centuries was accompanied by an extraordinarily vigorous enclosure movement, which concentrated land in the hands of wealthy estate owners. Improving estates was intimately bound up in denying others access to rural resources. Clifford Geertz has famously characterized change in Indonesian agriculture as "Agricultural Involution," which saw increased labor investment in agriculture with no real increase in per capita productivity.

The diversity and intricacy of small-holder intensive farming stands in sharp contrast to the landscapes and practices of capital intensive agriculture. This is characterized by monocropping; heavy investment in machinery and chemicals, which maximizes productivity per person; as well as working with high-yielding, fast-maturing crops and animals. The spread of scientifically and, more recently, genetically engineered crops has been associated with global booms in production (the Green Revolution) and at the same time erosion of the genetic diversity of crops; increased use of pesticides, fertilizers, and antibiotics; and a decline in the quality, especially taste, of food.

Capital intensive farming's great service is that it provides cheap food, which, as Bjorn Lomborg noted, means that people are healthier from the better nutrition. But it has provoked opposition in diverse quarters. First, there are the environmental costs of pesticides and fertilizers, and there are also potential problems of feeding growth hormones and antibiotics to domestic stock, as these may affect consumers. Fears here and dissatisfaction with the miserable lives of factory-farmed animals have generated a whole industry of "organic" agriculture. Second, there is a tendency to produce a great deal of food where there is no market for it, and this leads to "dumping" of food at low prices in places where there is apparent demand, but at considerable cost to local producers. The fact that this agricultural production can be heavily subsidized makes the whole situation rather perverse. Others observe that factory farming and agribusinesses can be characterized by low wages and poor working conditions.

Nonetheless, agricultural development is generally assumed to mean greater intensification along the lines of capital intensive agriculture practiced in the Global North. It was the hallmark Netting's work to resist that assumption. Intensive agriculture, Netting argued, could be achieved in other ways apart from concentrating land and resources to a few farmers who work the land with machines and chemicals. Small-holder agriculture could be just as productive, with fewer environmental costs and different sorts of social costs.

— Dan Brockington

See also **Aztec Agriculture; Ecology and Anthropology**

Further Readings

Geertz, C. (1963). *Agricultural involution: the processes of ecological change in Indonesia.* Berkeley: University of California Press.

Kates, R. W., Hyden, G., & Turner B. L. II. (1993). *Population growth and agricultural change in Africa.* Gainesville: University of Florida Press.

Netting, R. McC. (1993). Smallholders, householders, farm families, and the ecology of intensive, sustainable agriculture. Stanford, CA: Stanford University Press.

Agriculture, Origins of

The origins of the practices of soil cultivation, crop harvesting, and livestock raising traditionally are regarded as the main criteria of transition to the next stage of human society and culture development following hunter-gatherers community and directly preceding the formation of state and private property. The premises of the origin of agriculture as well as the mechanisms of its dissemination over the world remain under discussion in contemporary cultural anthropology.

Theories and Premises

One of the earliest explanations of the origin of agriculture was proposed by G. Childe, in his idea of "Neolithic revolution." According to Childe, drought and supply shortage stimulated food production in oases. Later, demographic agency has been put forward as a necessary background of transition to the productive economy (L. Binford), alongside a

wide spectrum of social and ecological factors (R. Braidwood, K. Flannery, C. Renfrew, V. Masson, V. Shnirelman, L. White, and many others). Today, most researchers tend to interpret the origin of agriculture as the inevitable response to a crisis in the traditional hunter-gatherer economy and the necessity of securing a subsistence system in a new ecological situation. Alongside a disparity of natural resources and human needs, other factors contributed to the origin of agriculture, such as presence of plants suitable for cultivation and human knowledge about the biological peculiarities of these plants.

Mechanisms and Chronology

The mechanisms and chronology of the origin of agriculture traditionally are conceptualized throughout several binary oppositions existing in prehistoric science for the last two centuries. Monocentric versus polycentric paradigms are rivals when discussing the place of plant cultivation origin; in the frameworks of each theory, revolutionary versus evolutionary views coexist. At the same time, in different case studies, early farming has been interpreted as fundamental to late prehistoric population subsistence system or only as an additional food supply alongside hunting, gathering, and fishing.

Today, agriculture dissemination over the world is considered a long-lasting process that was generated independently in several regions (primary loci), starting around 9,000 BC ("effective" village stage, Jarmo culture of the Middle East). Harvest collecting arose from seed gathering. The earliest evidences of plant domestication are traces at Natufian settlements of Palestine, Shanidar, and Ali Kosh (in present-day Iran and Iraq) and are dated about 9000 BC to 7000 BC.

Seven primary loci of agriculture origin, huge areas where the transition to an agricultural mode of life was based on a complex of cultural plants, have been distinguished by Soviet geneticist N. Vavilov:

1. East Mediterranean locus, or Fertile Crescent (Iran, Iraq, Israel, Jordan, Syria, Turkey); 9000–7000 BC; wheat, barley, rye.
2. South Asian locus (southern China, southeastern India, and southeastern Asia); 7000–5000 BC; rice, tuberousals.
3. East Asian locus (Mongolia, Amour region, northern China); 7000–5000 BC; Chinese millet, beans.
4. Sahara and Sudan; 4000–3000 BC; pearl millet, sorghum.
5. Guinea and Cameroon; 4000–2000 BC; yams, beans, oil-bearing palms.
6. Mesoamerican locus (central and southern Mexico); 9000–4000 BC; maize, amaranth, string beans, pumpkins, peppers, garden trees.
7. Andean locus (Colombia, Ecuador, Bolivia); 7000–5000 BC; potatoes and sweet potatoes, manioc, amaranth.

Historical Significance and Economic Consequences

The historical significance and economic consequences of the development of agriculture are connected, first of all, with the cyclical character and long-lasting effects resulting from the regularities of land cultivation and harvesting. Improvement of such activity required the formation of a settled mode of life, the concept of land as property, and labor division in its social (gender, age) as well as seasonal forms. These tendencies led to the transformation of the whole system of social distribution of food supply and material valuables of the society. The possibility of obtaining predictable excess of the products gave the opportunity (or even necessity) for its holders ("big men") to organize ritual ceremonies (potlach), which resulted in the growth of their importance in the community. A so-called prestige economy led to the formation of property and social inequality and, in turn, to the formation of social classes, exploitation, and political organization.

Transition to the settled mode of life required the formation of many sorts of household activities necessary to secure the livelihood of early farmers. The origins of ceramic production, spinning, weaving, advanced tool production technique and means of transportation, and other phenomena are connected with the needs of a new form of production. First, the negative consequences of early farming (environment pollution, forest reduction, soil deterioration, infections, and epidemics) also could be traced as early as the Neolithic.

Agriculture improvement necessarily accompanied with development of rational knowledge in the field of plant biology and soil peculiarities; weather prediction and first calendars have been elaborated at that time.

A new form of ideology was required to accommodate the new form of production and secure its repetition by following generations. Fertility cults and cosmogony and the beginning of deification of elements of nature coincided with the advent of agriculture.

The diversity and global character of the historical consequences of the transition to agriculture, and its deep influence on all spheres of human life, are reasons to consider this phenomenon as the background for the "wide-spectrum revolution" theory proposed by K. Flannery.

— *Olena V. Smyntyna*

See also **Agricultural Revolution; Agriculture, Intensive**

Further Readings

Higgs, E. S. (Ed.). (1972). *Papers in economic prehistory.* Cambridge: Cambridge University Press.

Hutchinson, J. (Ed.). *Essays on crop plant evolution.* (1965). Cambridge: Cambridge University Press.

Rindos, D. (Ed.). (1984). *Origins of agriculture: An evolutionary perspective.* Orlando, FL: Academic Press.

Agriculture, Slash-and-Burn

Slash-and-burn agriculture, sometimes known as *swiddening* or *shifting cultivation*, involves felling trees and vegetation on a plot of land, leaving them to dry, and then setting fire to them. Crops planted on the plot benefit from the nutrients provided by the ash. A diversity of crops tend to be planted and intermingled with each other. Depending on the fertility of the soil, once cleared, a plot is used for a further 2 to 5 years before being left to fallow. The reasons for abandoning plots vary. It may reflect decreased soil fertility, excessive weeding effort, or combinations of both.

Slash-and-burn agriculture has been widely practiced in human history. It is still extensively used in tropical forests, where some 250 to 500 million people are thought to practice it. Slash-and-burn agriculture can also be viewed as an extensive early stage in the evolution of agricultural practice to more intensive measures. Depending on the fallowing time, it will require 10 to 30 hectares per person. The fallowing period will decline with the increasing population density, with attendant consequences for soil fertility and agricultural practice. But where slash-and-burn agriculture is not practiced just for subsistence, but is one of several pursuits within more diverse livelihoods, it will be less directly dependent on population density.

Slash-and-burn agriculture has its advocates. It minimizes human effort, while maximizing the input of energy from burnt vegetation. It can leave larger trees protecting the soil from vigorous rains. The timing of the burns, the temperature of the flames, and planting the right mix and rotation of crops can take considerable skill.

But slash-and-burn agriculture has rarely been popular in development or conservation circles. It was castigated in the early years of agricultural development for being wasteful and inefficient or lazy. This overlooked both its productivity, per person, and the ecology of intercropping. It is currently widely criticized for its impact on biodiversity conservation where habitat conversion is assumed to be driven by increasing populations and intensity of use. The threats are real, but these criticisms can exaggerate the blame due to small holders, when more profound forces drive their action. They also privilege the role of population growth, when other forces are more significant. Finally, they can overplay the detrimental consequences of anthropogenic disturbance, without acknowledging that disturbance can foster biodiversity at some scales.

— *Dan Brockington*

See also **Cultivation, Plant; Ecology and Anthropology**

Further Readings

Lambin, E. F., Turner, B. L., Geist, H. J., Agbola S. B., Angelsen, A., Bruce, J. W., et al. (2001). The causes of land-use and land-cover change: Moving beyond the myths. *Global Environmental Change, 11,* 261–269.

Moore, H., & Vaughn, M. (1994). *Cutting down trees. Gender, nutrition, and agricultural change in the northern province of Zambia, 1890–1990.* London: James Currey.

Sponsel, L. E. (1995). *Indigenous peoples and the future of Amazonia: An ecological anthropology of an endangered world.* Tuscon: University of Arizona Press.

Alchemy

The last few decades have seen the growth of a vigorous research program investigating alchemy and a subsequent increase in our understanding of how it functioned both in late antiquity and early Europe. The ultimate origins of alchemy, however, are still obscure. Different scholars place its genesis either in Egypt, India, or China. In fact, the difficulties posed by a historical field of study that spans three continents and nearly two millennia are increasingly leading students to speak in terms of "alchemies" rather than seeing the movement in unified or totalizing terms.

Two basic goals, common to many historical schools of alchemy, were the creation of a universal medicine, capable of curing disease and extending life, and the mastery of the art of transmutation. The technical body of knowledge that supported these aims apparently arose out of the workshops of Egypt between 500 BCE and 200 CE. An investigation of period sources, such as the Leyden Papyrus X and the Stockholm Papyrus, show that Egyptian artisans and jewelers had become skilled at making glass, artificial gems, pigments, and even being able to change the properties of gold or other metals through using chemical dyes or alloys.

Nevertheless, true alchemy did not emerge until the third and fourth centuries of the current era, when these technical procedures were combined with Greek thought and philosophy. Authors such as pseudo-Democritus, Zosimos, and Stenphanos of Alexandria sought to integrate this body of art with both classic philosophical texts and more contemporary Hellenistic movements like Neoplatonism and Gnosticism. It was only after these associations were made that the phenomenon known as alchemy can be said to have existed. Interest in the subject was maintained and advanced by Arab scholars after the seventh century. Like many other forms of knowledge, they were primarily responsible for importing it into Europe through works by authors like Jabir Ibn Hayyan, pseudo-Gerber, and Avincenna in the late 12th and 13th centuries.

Interest in alchemy started to wane rapidly in Europe after the early 17th century as new theories of matter and chemistry emerged. Little notice was taken of this subject until the 19th century. Due to the Romantic movement, popular interest in alchemy increased, and it became associated with magic and astrology, which were also very much in vogue at the time. These 19th-century interpreters of alchemy sought to preserve the art by transforming it from a mode of inquiry about the natural world into an esoteric spiritual practice. This move was erroneously accepted by later scholars who were primarily interested in the perceived psychological or mystic nature of alchemical symbols, rather than their ability to convey technical knowledge. Perhaps the two most well-known authors using alchemy in this way were Mircea Eliade and Carl Jung. While their work made important contributions to the fields of psychology and comparative religion, their portrayal of the underlying subject matter was flawed. Recently, historians have become sensitive to these issues and are attempting to restore our understanding of this important phenomenon to its proper context.

— *Benjamin N. Judkins*

Further Readings

Eliade, M. (1979). *The forge and the crucible: The origins and structure of alchemy.* Chicago: University of Chicago Press.

Jung, C. C. (1970). Mysterium coniunctionis: An inquiry into the separation and synthesis of psychic opposites in alchemy. *The Collected Works of C. G. Jung* (Vol. 14). Princeton: Princeton University Press.

Klossowski De Rola, S. (1997). *The golden game: Alchemical engravings of the seventeenth century.* New York: Thames & Hudson.

Linden, S. J. (2003). *The alchemy reader: From Hermes Trismegistus to Isaac Newton.* New York: Cambridge University Press.

Newman, W. R. (2004). *Promethean ambitions: Alchemy and the quest to perfect nature.* Chicago: University of Chicago Press.

Principe, L. M., & Newman, W. R. (2001). Some problems with the historiography of alchemy. In A. Grafton & W. Newman (Eds.), *Secrets of nature: Astrology and alchemy in early modern Europe.* Cambridge: MIT Press.

Aleuts

The Aleuts inhabit the Aleutian Archipelagos that span from the Alaska Peninsula to the Commander Islands in Russia. Their original name is *Unangan* and *Unangus,* meaning "the people." Their aboriginal

Aleut dancers

Source: Photo courtesy of the Aleut Corporation.

lifestyle was based on survival and developed in response to their environment in this land they called "the birthplace of the winds" and "the cradle of storms." They fashioned unique tools from the materials available on their barren islands and learned to utilize every valuable part of their prey or what they gathered. Claiming their hunting grounds in both the North Pacific and Bering Seas, they became expert hunters in boats fashioned from driftwood and skin. The first was their primary hunting vessel, the *iqax,* which became known as the *kayak* (the Russians called it a *baidarka*). The second was a vessel crafted large enough to transport their families in. The weather on these treeless, volcanic islands is nearly uniform in temperature, with high winds the Aleuts say can be "like a river." Their skill in reading the currents and navigating in the constant fog was key to their survival. Did the ancestors of the Aleuts cross the Bering land bridge and/or arrive via watercraft, hunting mammals along the edges of Beringia? Are they more closely related to the Eskimos or the Natives in the southeastern part of Alaska, the Tlingit and Haida? How have the changes since post-European contact affected the people known as the Aleuts?

The New World

During the last glacial maximum (formed between Asia and America), known as *Beringia,* also the *Bering land bridge,* it was first speculated that the ancestors of the Aleuts made their way by walking into the New World to settle in the circumpolar zone of the Aleutian Islands. Stronger support is forming for maritime entrance into the New World as more evidence surfaces, like the discovery of fossils of bears carbon-dated to more than 12,000 years ago and of a young man dating back more than 9,000 years ago, on Prince of Wales Island in southeast Alaska, which was thought to be glacially covered. Dr. Tim Heaton is doing the study of these fossils and the possibility of glacier-free areas, existing along what now are islands that border Alaska. This opens the possibility that Aleuts, as well as other Native Americans (either during or after other glaciating processes) could travel via waterway to the Americas.

Due to the location of the Aleuts and the various traits they exhibit, questions have developed as to what Native group the Aleuts originated from, either the Eskimos or the Tlingit. William S. Laughlin presented that the Aleuts came from the "proto-Eskimo-Aleut culture." Linguists like Swadesh, Hirsch, and Bergsland suggest that the Aleuts separated from a proto-Eskimo-Aleut Language around 4,000 years ago. Mitochondria DNA research by Dennis O'Rourke and Geoff Hayes reveals that the Aleuts became their own people about 6,000 years ago.

Did the Aleuts come by land or sea? Was the split prior to or after the linguistic Eskimo language? Within these equations is an Aleut myth, mentioned in *Baidarka as a Living Vessel: On the Mysteries of the Aleut Kayak Builders* (1988), which backs a theory that the Aleuts migrated from the east (the mainland, after arriving either easterly by land or westerly by water). In this account, the Aleuts moved after their "creation," from the overpopulated *Chilkak* (translation perhaps "Chilkat," a Haines, Alaska, area) so they could have their own land.

Lifestyle, Kayaks, and Feasts

The winter home construction was semi-subterranean, allowing several families to coexist, as each family had their section of the building. Being a paternal nonequalitarian society, the people lived in accordance

with their status in a hierarchy, with a chief at the top and slaves at the bottom. During the nomadic summer hunting seasons, a hole would be dug (at their choice of camp) for sleeping, and woven mats of grass would be used to cover the ground or for blankets. Their parkas would be laid on top of the mats for warmth and insulation. Parkas were made from the fur of walrus, seals, caribou, bear, and bird skins. Waterproof overshirts were made from sewn strips of walrus intestines. There was no campfire; to gain heat, a small smoldering fire was made from grasses, and then the person would stand over it, and then lower his or her parka.

Their main vessel, the kayak, was unique in design:

- It had a cleft bow to cut through the waves.
- It was stated to be so light, even "a child" could carry it.
- The original design was made with bone and stone joints for flexibility.
- This complex design was made from memory.
- It was clocked at 7 to 10 miles an hour.

Shumagin Islands of the Aleutian chain

Source: Photograph by Tony Ise.

Each season, the chief occupation within the settlement was survival, and all activities were geared to the preparation and productions of food, in hopes of accumulating an abundance to celebrate the numerous "potlatches" throughout the feasting fall and winter season. The months were named in accordance with the activities through the year, beginning in March, which was "a time of eating skin." Around this month, the food supply was spent, and the weather was so bad, the only option left was to forage for mollusks and perished sea mammals washed ashore, and when none could be found, then the skin obtained from the previous season became their meal.

Spring brought migrating birds, which were caught within whalebone nooses. Pinnipeds of large numbers made brief stops to the island chain en route to their nesting rookeries on the fringes of the Bering Sea. From spring to autumn, the rivers spawned three varieties of salmon. Also, from early spring to late autumn, migrating fur seals from as far as California were hunted with darts. Late spring to early summer, the sea otters arrived (the most coveted fur for clothing). Summer brought whales, walrus, berries, and edible roots, as well as grasses for basket weaving.

Winter was the season of celebration, a time of feasting, dancing, and masks. Aleut potlatches resembled those of the northwest coast Natives. The winter festivals included the distribution of gifts and performances of accessional reenactments in songs and dances. Many of the same themes and activities of northwest potlatches existed, such as the funeral potlatch, the killing or freeing of slaves during this time, games, and Raven (a common thread to the

Modern Aleut Dancers reenact their cultural history

Source: Photograph courtesy of the Aleut Corporation.

North Pacific Rim "First People," from Russia down to Washington); he is also a hero in their myths, and they likewise considered him their ancestor.

Enter the Europeans

During the second Kamchatka Expedition (1733–1743), Vitus Bering (commanding the *St. Peter*) and Aleksey Chirikov (the *St. Paul*), encountered island dwellers, who at that time were called the Unangan (the eastern dialect) and the Unangus (the western dialect), which means "the People," at Unga and Nagni Islands. It was after this trip that these people became known as the "Aleuts," though the origin of this name is unknown. The discovery of the wealth of fur available at the Aleutian Islands started a "fur rush" to Alaska. The Russians claimed a sovereignty over the land they called "Alyeshka," from 1741 to 1867. Skirmishes developed when the Russians began enforcing a dominant role in the Aleuts' lives, as well as killing entire villages. The world of these Arctic peoples, their culture and sustenance for thousands of years, disappeared in large part due to their adoption of the Russian Orthodox religion; their dependence on Europeans for clothes, food, other merchandise, and wage earning; and general assimilation to European culture. Parts of the Aleut culture were totally lost, as Shirley A. Hauck found in her study about how the aboriginal Aleut music became extinct due to European contact.

When the "sale" of Alaska was transacted, this also brought many changes to the Aleut community. For example, the original homes were semi-subterranean, but the Americans transported lumber to build houses on the island, and they were very drafty in comparison and brought sickness to elders and young children. A new language was enforced when a law passed in 1866 concerning public schools that only English could be spoken. Also, the Aleuts, especially those of the Pribilof Islands, were the only Alaskan Natives to become subjects of America in the service of fur companies. The Americans also indiscriminately overhunted the fur seals, so that by 1913, their extinction was feared and the United States declared a 5-year sealing holiday.

World War II

On June 7, 1942, a Japanese invasion came to the Island of Attu, resulting in 42 villagers, both Aleut and Caucasian, being taken as prisoners of war and relocated to Otaru, an island in Japan, for 3 years. The American government responded by ordering the evacuation of the Aleutian and Pribilof Islands, sending 881 Aleuts from nine villages to camps called "duration villages" in southeast Alaska for 2 years. The Aleuts left their islands with suitcases and blanket rolls and the memory of their villages burning. In 1944, the Aleuts were allowed to return to their homeland, but four of the villages were never to be inhabited again.

Aleuts Today

The Aleuts appear to have survived by becoming skilled in their ever-expanding environment. They are true children from "the cradle of the storms," having survived wind and cold, volcanoes and earthquakes, oppression by fur traders, World War II invasion and relocation, as well as other challenges as they evolved into modern life. Today, the Aleut language is being taught in schools, as well as the culture. A young

13-year-old Aleut, John Bell (Bennie) Benson, made his mark in history with the design of the Big Dipper for the Alaska State flag, in a contest prior to Alaska's statehood. An Aleut artist, Thomas Stream, from Kodiak, has become an abstract artist, blending Aleut subjects into his gouache paintings and playing a part in evolving Aleut art with colorful and playful themes. The Aleutian Chain has become a home to the tourist and fishing industry. With airports, computers, and other expanding luxuries, the present-day Aleuts have emerged as a modern people, reclaiming and honoring their ancestral culture and redefining what it means to be an Aleut, to be an Unangan.

Aleut dance group wearing traditional Aleut regalia

Source: Photograph courtesy of the Aleut Corportation.

— Pamela Rae Huteson

See also **Athabascan; Native Peoples of the United States**

Further Readings

Hauck, S. A. (1986). *Extinction and reconstruction of Aleut music and dance.* Doctoral dissertation, University of Pittsburg. Ann Arbor, MI: University Microfilms International.

Jochelson, W. (1966). *History, ethnology, and anthropology of the Aleut.* Oosterhout, The Netherlands: Anthropological Publications.

Kohlhoff, D. (1995). *When the wind was a river.* Seattle, WA: University of Washington Press in an association with Aleutian/Pribilof Islands Association, Anchorage, AK.

Liapunova, R. G. (1996). *Essays on the ethnography of the Aleuts: At the end of the eighteenth and the first half of the nineteenth century* (J. Shelest, Trans., W. B. Workman & L. T. Black, ed. assist.). Fairbanks: University of Alaska Press.

Lubischer, J. (1988). *Baidarka as a living vessel: On the mysteries of the Aleut kayak builders.* Port Moody, Canada: Baidarka Society.

Rubicz, R., Schurr, T. G., Babb, P. L., & Crawford, M. H. (2003). Mitochondrial DNA variation and the origins of the Aleuts. *Human Biology, 75,* 809–835.

ALFRED

ALFRED (the ALelle FREquency Database) is an Internet-accessible database designed to store and make available frequencies of alleles of DNA-based human polymorphisms for multiple populations, primarily for the population genetics and molecular anthropology communities. The emphasis remains on populations typed for multiple polymorphisms and polymorphisms typed on multiple populations. Allele frequencies at each site are linked to the specific populations and specific samples of those populations with descriptions. When available, haplotype frequencies are also included. Each polymorphism site is linked to molecular definitions and to molecular databases.

As of January 2005, ALFRED had data on 1,051 polymorphisms, 399 populations and 23,179 frequency tables (one population typed for one site). ALFRED is accessible from http://www.alfred.med.yale.edu. Data in ALFRED come from two sources: They are extracted from the literature, or they are submitted by researchers. From either source, data included in ALFRED are carefully curated and multiple links established, making it possible to retrieve data through many pathways. All of the data in ALFRED are considered to be in the public domain and available for use in research and teaching.

Populations are organized by geographic regions, and each population record is annotated with alternate names (synonyms), linguistic, geographical location information, and links to external databases. The population descriptions in ALFRED are meant to be helpful but not fully comprehensive. The ability to retrieve additional information on populations is provided by active links to linguistic and ethnographic databases. Population samples are organized by populations and annotated with sample information such as sample size and relation to other samples. Genetic polymorphisms are defined primarily by their locus and allele. Loci are organized by chromosome, and each locus record is annotated with alternate names (synonyms), chromosomal position, a valid locus symbol, and links to external databases. Polymorphisms and haplotypes are organized by locus, and each polymorphism record is annotated with dbSNP rs#, alternate names (synonyms), ancestral allele, and links to external databases for expanded molecular information. Thus, ALFRED provides links to both molecular and anthropologic databases. Each allele frequency record is linked to the population sample information, polymorphism information, typing method, and the publication the frequency was extracted from. All publication entries are linked to PubMed. Every record in ALFRED has a unique identifier (UID) that can be used in publications to reference specific data.

Flexible methods of querying ALFRED are available. The queries can start with loci, population, publication author, ALFRED UID, dbSNP ID (rs#, ss#), geographic region, or a combination of gene name and population name. The results of frequency searches can be viewed both in graphical and tabular format. The graphical stacked-bar format offers a quick visual display of the frequency variation among populations. On the other hand, the tabular format offers frequency values and related information, which can be used in analysis tools.

Several other means of retrieving data are being developed. One is a geographic interface that displays populations on maps and can also display graphics of data at the map location of the population.

Data in ALFRED are available for downloads in different user-friendly formats. Allele frequency data for individual polymorphisms can be downloaded in semicolon-delimited format. The entire database can be downloaded in XML format by following the link provided in the Web site (http://www.alfred.med.yale.edu/alfred/xmldatadump.asp). Depending on requirements, a researcher can download the entire database with or without the descriptions or have the tables separately downloaded in XML format. In addition, the allele frequencies, polymorphism, and population information tables in ALFRED are also provided in downloadable text files. Data in these files can be seamlessly imported into Excel spreadsheets for further analysis.

A Web page has been prepared for the purpose of providing guidelines to users for submitting data to ALFRED (http://www.alfred.med.yale.edu/alfred/AboutALFRED.asp#datasubmission). We are requesting that researchers help us by submitting their data using the Excel spreadsheet provided at this page.

Graphical overviews of the database contents can be viewed at the page (http://www.alfred.med.yale.edu/alfred/alfredsummary.asp). A "sites per population" Web page (http://www.alfred.med.yale.edu/alfred/sitesperpop_graph.asp) shows graphically (and numerically) the number of allele frequency tables for each population. A "populations per site" Web page (http://www.alfred.med.yale.edu/alfred/popspersite_graph.asp) similarly represents the number of allele frequency tables for each polymorphic site.

ALFRED has a page dedicated for user registration (http://www.alfred.med.yale.edu/alfred/registration.asp). The primary benefit of registering is to receive the ALFRED newsletter. The newsletter provides hints on how to efficiently use ALFRED for various purposes and will provide highlights and recent additions to ALFRED on a regular basis.

ALFRED is supported by the U.S. National Science Foundation.

— *Kenneth K. Kidd*

See also **Computers and Humankind; Genetics, Human; Genomics; Human Genome Project**

ALGONQUIANS

Algonquian is a linguistic term that describes the language family belonging specifically to a large number of North American Native nations. The Algonquian linguistic family is believed to have originated from a Proto-Algonquian parent language spoken as far back as 2,500 to 3,000 years ago. The area in which it originated is thought to have been located between Georgian Bay and Lake Ontario. The Proto-language has since then developed into many variations as a

consequence of migration patterns, historical relationships, European contact, and environmental changes.

Algonquian languages were spoken throughout North America, across the Great Plains to the eastern seaboard and north from the Canadian Subarctic to North Carolina in the south. We categorize Algonquian languages into three geographic areas that include

- the *Plains Algonquian* languages spoken in central and northern Great Plains
- the *Central Algonquian* languages spoken around the Great Lakes, north from eastern Quebec through Manitoba and from Labrador west to Hudson Bay and Alberta, and
- the *Eastern Algonquian* languages spoken from the Gulf of St. Lawrence south to coastal North Carolina.

The distribution of the Algonquian languages rests as one of the largest language expansions over North America. Due to their wide geographic distribution and location along a broad swath of the eastern North American coast, the Algonquian nations were the first with which Europeans had contact. Approximately half of the Algonquian languages were spoken in the Eastern Algonquian regions, while the others were concentrated within the eastern woodlands and northern plains. The Iroquoian nations neighbored the Algonquian nations in the eastern and southern areas, as the Siouan nations bordered on the south. The Algonquian nations were surrounded on the southwest and west by the Muskhogean and Siouan nations, on the northwest by the Kitunahan and the great Athapascan language families, and on the north, the coast of Labrador, and east of Hudson Bay by the Inuit. Although we recognize early relationships among Algonquian languages, these are difficult to confirm because some Algonquian languages vanished or disappeared before they could be studied. Some suggest that, when explorers first came in contact with Native American people in North America, there might have been as many as 300 Native American languages being spoken. By 1960, only around 80 of these languages were still being spoken but mainly by older generations, individuals over 50 years of age. Historically many Algonquian speakers could converse in more than one language and often, in several. Beginning in the 17th century, Christian missionaries and travelers formulated much of the histories of the Algonquian languages. Because the accumulation of research from the earliest ages is sparse, we see gaps within the chronological picture of the Algonquian history. As a consequence, the history includes bias and misunderstanding. By the 19th century, a number of scholars began research in Algonquian comparative studies.

Micmac (Mi'kmaq) is spoken in parts of Nova Scotia; Prince Edward Island; eastern New Brunswick; Gaspé, Québec; Labrador; and Boston. Maliseet-Passamaquoddy is spoken in western New Brunswick by the Maliseet and in eastern Maine by the Passamaquoddy. Etchemin was spoken between Kennebec and St. John Rivers. Some suggest that Etchemin originated from Maliseet-Passamaquoddy and Eastern Abenaki. Eastern Abenaki was primarily spoken in central and western Maine. Different from Eastern Abenaki, Western Abenaki was spoken in St. Francis, Québec; Massachusetts; Vermont; and Sokoki, New Hampshire. The English translation of the French word *loup* is wolf. Given this name by the French, it is speculated that Loup A was spoken in areas of central Massachusetts and the Connecticut Valley. Loup B has similar dialects to Western Abenaki and Mahican. Massachusett was spoken in southeastern Massachusetts, Cape Cod, the Elizabeth Islands, Martha's Vineyard. and Nantucket. Narragansett was spoken in Rhode Island. Mohegan-Pequot-Montauk was spoken in eastern Connecticut and the eastern portion of Long Island. There is not sufficient information on Quiripi and Naugatuck-Unquachog-Shinnecock, but some suggest that these were also spoken in western Connecticut and Long Island. Mahican lived in areas from Lake Champlain along the southern Hudson River to eastern New York, western Massachusetts, and northwestern Connecticut. One of the Delaware languages, Munsee, was spoken on western Long Island, southern New York, and in northern New Jersey. The Munsee was later found in areas within Ontario, such as Moraviantown, Munceytown, and Six Nations. Another Delaware language, Unami, was spoken in southern New Jersey, Pennsylvania, Delaware, and Oklahoma. Nanticoke was spoken in Maryland and, more specifically, Piscataway to the west of the Chesapeake. Powhatan was spoken in Virginia, from the Potomac south to the James River. Pamlico was spoken in northeastern North Carolina.

Central Algonquian

The Shawnee frequently relocated but lived mainly in Oklahoma. Sauk-Fox was spoken in central Oklahoma and on the Kansas-Nebraska boundary. Kickapoo was spoken in Kansas, Oklahoma, Texas, and Coahuila,

A list of Algonquian languages arranged within the three general North American locations.

Eastern Algonquian
- Micmac (Mi'kmaq)
- Maliseet (Malecite)
- Passamaquoddy
- Etchemin
- Eastern Abenaki (Penobscot)
  - Caniba, Aroosagunticook, Pigwacket
- Western Abenaki (Abnaki) (St. Francis)
- Loup A (Nipmuck)
- Loup B
- Massachusett (Natick)
  - North Shore, Natick, Wampanoag
- Narragansett
- Mohegan-Pequot
  - Mohegan, Pequot, Niantic, Montauk
- Montauk
- Quiripi (Quinnipak) (Connecticut)
  - Naugatuck-Unquachog-Shinnecock
- Mahican
  - Stockbridge, Moravian
- Munsee (Delaware)
  - Munsee, Wappinger
- Unami (Delaware) (Lenape)
  - Northern, Southern, Unalachtigo
- Nanticoke
  - Nanticoke, Choptank, Piscataway (Conoy)
- Powhatan (Virginia Algonquian)
- Pamlico (Carolina Algonquian) (Pamtico) (Pampticough)

Central Algonquian
- Cree
  - Eastern Cree dialects
    - East Cree, Naskapi, Montagnais
  - Western Cree dialects
    - Plains Cree, Woods Cree, Western Cree, Swampy Cree, Eastern Swampy Cree, Moose Cree, Mithchif, Atikamek
- Ojibwa (Ojibway) (Ojibwe) (Chippeway)
  - Saulteaux, Northwestern Ojibwa, Southwestern Ojibwa, Severn Ojibwa, Central Ojibwa, Ottawa (Odawa), Eastern Ojibwa, Algonquin
- Potawatomi
- Menominee (Menomini)
- Sauk-Fox-Kickapoo
- Miami-Illinois (Peoria)
- Shawnee

Plains Algonquian
- Blackfoot
- Cheyenne
  - Cheyenne, Sutaio
- Arapaho-Atsina-Nawathinehena
  - Arapaho, Atsina (Gros Ventre), Nawathinehena
- Eastern Algonquian

Mexico. Miami-Illinois was spoken in Indiana, Illinois, and in eastern Oklahoma. Potawatomi was spoken around Lake Michigan, and later spoken in Wisconsin, Kansas, Indiana, Michigan, Oklahoma, and possibly Ontario. Ojibwa languages are spoken from southwestern Québec through Ontario, Michigan, northern Wisconsin and Minnesota, southern Manitoba, and southern Saskatchewan. Algonquin language is spoken in Western Quebec and adjoining areas in Ontario. Cree is spoken across Canada, from Labrador westbound to Alberta. Menominee is spoken in northeastern Wisconsin.

Plains Algonquian

Blackfoot is spoken on the Blackfeet Reservation in northwestern Montana as well as on various reserves in Alberta. Cheyenne is spoken in southeastern Montana and western Oklahoma. Arapaho is spoken on the Wind River Reservation in Wyoming and in western Oklahoma. Atsina, also known as Gros Ventre, was spoken on the Fort Belknap reservation in northern Montana. Nawathinehena was last spoken in the early 20th century and is only known by a short wordlist.

Linguistics of the Algonquian Language

From the study and reconstruction of languages, linguists are able to theorize about the relationships among groups of individuals that use similar terminology within their language systems. One technique used to assist in discovering which Aboriginal nations were associated with a shared mother tongue within a certain area is the reconstruction of languages. This technique involves the reconstruction of words used to describe flora and fauna. The next step involves the search for a region in which all of these terms are associated. All Algonquian languages are different but they share similar features that enable them to be placed together within the same language family. Algonquian languages are moderately simple in association to features of tones, accent, and voicing. The Proto-Algonquian language consists of four vowels—*i, e, o,* and *a*—that have both long and short qualities. Semivowels include *y* and *w*. The Algonquian word is characterized as being overall slightly complex in reference to syntactics. Algonquian words are considered to have themes. These themes include a root and a suffix called a *final*. The final plays an important role in determining the part of speech. Themes also include

verbs, nouns, pronouns, or particles. Grammatical categories belonging to Algonquian languages are not distinguishable by gender-based terms. Instead, distinctions correspond on the basis of living and nonliving entities. These living and nonliving entities are defined as inanimate and animate categories. Edward Sapir, a linguist, characterizes Algonquian words as "tiny imagist poems." This may be a reflection of the use of grammatical categories corresponding with that of nature instead of being gender-based, as with many other languages. Examples of animate nouns include persons, animals, spirits, large trees, various fruit, and body parts.

There has been a constant concern over the possibility of losing more Native languages in North America. In the past, language loss has been primarily due to death and disease in which entire nations were extinguished. Beginning in the late 1800s, assimilations policies resulted in the prohibition of Native languages use in residential schools and the removal of Native American children from their families. This resulted in the erosion and loss of language by a break in the oral transmission of language to future generations. In the past, Native American communities were forced out of their traditional territories by encroachment of French and European settlers. One of the consequences of these relocations was, indeed, language loss, with the coastal languages as prime examples. The factors associated with the loss of Aboriginal languages in Canada today is migration, marriage, education, and employment. In a 1996 survey from Statistics Canada, only 26% of 800,000 Aboriginal people had an Aboriginal language as their mother tongue and even fewer claimed to speak it within their homes. Within the Algonquian language family, the languages that continue to remain in use include Arapaho, Blackfoot, Cheyenne, Cree-Montagnais-Naskapi, Ojibwa, Algonquin, Potawatomi, Menominee, Sauk-Fox-Kickapoo, Maliseet-Passamaquodda and Mi'kmaq. Many of these languages are on the verge of extinction, such as the Tuscarora language. In Canada, for example, only 3 of the 51 Aboriginal languages that exist today are thought to survive. Aboriginal and Native American communities are, however, struggling to revive and strengthen the use of their languages and cultures. Postsecondary schools throughout North America offer classes that concentrate on cultures and languages within their Native Studies programs. For example, Trent University in Ontario, Canada offers courses in Ojibwa. There has been an increase in Aboriginal media coverage, networks, and programming. Traditional stories, songs, and histories are being recorded and transmitted to Aboriginal and non-Aboriginal communities. The internet is also being used to teach languages, for example, the Kitigan Zibi Anishenabeg community teaches Algonquin on its website. There has been an increase in the number of conferences and events that are held to celebrate, teach, and express Native American culture, language, and art, all of which aids in strengthening a variety of Aboriginal cultures and languages.

Although Algonquian speakers vary in customs, beliefs, and environments, there are many shared qualities. For example, the Algonquian peoples share the belief in a Great Spirit, frequently referred to as *Manitou,* and other teachings and ceremonies common to their history and culture. Although these ceremonies have regional variations, ones common among the Algonquian peoples include the sweat lodge, healing circles, medicine wheels, and shaking tent. Some ceremonies are no longer practiced by some Algonquian speakers. North of the Great Lakes, wild rice was harvested, where it was plentiful. Members of most nations hunted bison, but they were most abundant within the Great Plains. Hunting, fishing, and gathering wild plants, seeds, and fruit were primary food sources, especially when agriculture was not a main focus. Throughout Algonquian-speaking territories, there is a renewal and revitalization of traditional language and culture to aid in healing the present generation from the scars of colonization and past assimilation policies.

— *Simon Brascoupé and Jenny Etmanskie*

Further Readings

Boas, F., & Powell, J. W. (1991). Introduction. In F. Boas, J. W. Powell, & P. Holder (Eds.), *The handbook of American Indian languages and Indian linguistic families of America north of Mexico.* Lincoln: University of Nebraska Press.

Flannery, R. (1939). *An analysis of coastal Algonquian culture.* Washington, DC: Catholic University of America Press.

Mithun, M. (1999). *The languages of native North America.* Cambridge: Cambridge University Press.

Silver, S., & Miller, W. R. (1997). *American Indian languages: Cultural and social contexts.* Tucson: University of Arizona Press.

Slawych, D. (1999). Aboriginal languages headed for extinction. *Wind Speaker, 16*, 9.

Alienation

Alienation refers to the process by which individuals become disconnected or divorced from their social worlds. It also operates on a broader societal level when the very forces created by human beings appear to be separate and alien from their creators. The concept is commonly used by economic and political anthropologists questioning the conditions of modernity.

Alienation is frequently used in anthropological analyses to describe the general state of estrangement that human beings may feel living in late-capitalist society. The following sample of research topics illustrates the diversity of contexts in which it is used. Ethnographic analyses have employed the concept in studies of the penetration of money-based economies into exchange/gift-based economies in African and Latin America, in acculturation studies of non-Western indigenous people, in studies of the effects of industrialization and the implementation factory regimes, in studies of consumption in Western and non-Western societies alike, and in studies of religious evangelization. Feminist critiques argue that the split between humanity and nature and the division of reproductive and productive labor serve to alienate masculine identity. Research on the commodification of human bodies, where buyers, sellers, and even the contributors consider their body parts commodities for sale and consumption, best illustrates how profoundly alienated humans are in the contemporary market-based society in which they live. Despite this wide use of the concept, very few studies have used alienation as a guiding theoretical perspective.

The first major discussion of alienation is by Hegel in *Phenomenology* (1808). He critiqued the notion that human consciousness was separate from the world of discrete objects. For him, all truth and reality is part of human thought. Even conceiving of a discrete objective, worlds of nature or culture are forms of alienation. The goal of humans is to uncover how they are connected to and how they construct these seemingly independent objects and reconceptualize them as part of their self-consciousness.

Most anthropologists draw on Karl Marx's concept of alienation. Marx criticized the Hegelian conception, because he argued that Hegel's notion that alienation would cease with the eradication of the external world was false. He contended that humans are part of the external world and must come to understand their relationship with it.

Marx's concept, alienation, is similar to that of Durkheim's concept, anomie. Both apply to the general estrangement an individual feels from their social world, but what distinguishes these terms from each other is that anomie relates to the loss of moral feelings of connectedness people experience when religious and secular rituals cease to function to reproduce the community. By comparison, Marx emphasizes the collective loss of control humans have over their material conditions. For example, workers are alienated because they lack control of production. The use of money furthermore alienates producers and consumers from the material conditions of production and obscures the real social relations that exist among individuals and individuals with the processes of productions.

For Marx, alienation within the domain of labor has four aspects: workers are alienated from the objects that are produced, from the very processes of production, from themselves, and from their community. All this occurs because workers cease to recognize their connections with the material world. What occurs, according to Marx, is that the alienated products of human labor, commodities, appear to take on a life of their own, become detached from human social relations, and seemingly dominate their creators. Marx describes this process as commodity fetishism. Through the related concepts of alienation and commodity fetishism, social relations are conceived as relations between things, which is the process of reification.

In contrast, Weber believed that Marx had erred. According to him, alienation is the result of bureaucracy and the rationalization of social life that comes with modernity. Workers become alienated when they sacrifice personal desires for those of a larger group. Losing control of the means of production is merely a consequence of large-scale rational production. Hence, because workers cut themselves off from their individual goals, they are necessarily alienated.

In general, anthropological treatments of alienation and the related concept of commodity fetishism have held sway over the Weberian conceptualization, in part because power relations between workers and capitalists are not recognized and, in addition,

because it does not acknowledge the seeming independence of commodities from their producers. For instance, anthropological research on the penetration of capitalist economies, in which money replaces local forms of exchange, has shown that commodities and money itself are perceived to attain mystical power.

Although the object of most anthropological research related to alienation has been on the effects of modernization or capitalism on non-Western tribal and peasant societies, recently anthropologists have applied the concept to the effects capitalism has on Western societies. The international adoption market estranges individuals from reproduction through the commodification of children. Online or cyberspace communities, where individuals communicate across vast distances, alienate individuals because they lose face-to-face contact with their peers and cease to regard them as fellow material beings.

As extensive as commodification has become, where all social relations are reduced to capitalistic market exchange, not all individuals have become alienated from their community, history, and means of production. Ethnic tourism research on craft reproduction has shown the opposite to happen, where the commodification of traditional handicrafts and practices have revitalized local culture and created niches within late-capitalist society to stay connected to core cultural values. In other words, these people are not alienated from the products they produce or from their history or community and family by the intense commodification of everything in the contemporary world.

— *Walter E. Little*

See also **Marxism; Political Economy**

Further Readings

Marx, K. (1973). *Grundrisse: Foundations of the critique of political economy* (Rough draft, M. Nicolaus, Trans). London: Penguin Books. (Original work published 1939)

Marx, K. (1976). *Capital: A critique of political economy.* New York: New Left Review Press. (Original work published 1867)

Taussig, M. (1980). *The devil and commodity fetishism in South America.* Chapel Hill: University of North Carolina Press.

ALIENATION

Within the field of sociocultural anthropology, those who study human behavior have devoted a good deal of attention to understanding the impact of alienation on individuals and society. Since the terrorist attacks of September 11, 2001, a number of scholars have turned their attention to trying to explain the growing alienation among young Islamic youths and its impact on terrorism. Alienation has played a major part in expanding the belief that any actions taken for the fundamentalist cause are justified and, therefore, approved by Allah. The target for this extremist hatred of all non-Muslims has been primarily anti-Western and particularly anti-American in nature. By definition, radicalism calls for extreme actions taken outside of the political system; therefore, this new generation of Islamic youths has been taught that traditional political actions are of no use to adherents of Islam because the democratic system has failed to meet their needs in the past.

Studies of the behavior of Islamic youths since the late 1990s have shown that alienated young people have become prime targets for Islamic leaders who have secretly established committed groups of followers that are willing to die without question for the cause. It is this kind of dedication, stemming from the belief that dying for the cause grants immediate entry into paradise, that leads to suicide bombings and other forms of terrorism in which the perpetrator has no thought for personal safety. The lack of caution increases the probability of success.

In order to understand why Islamic youth are so vulnerable to fundamentalist radicalism, some scholars have examined changes within the Middle East and North Africa that have altered traditional family structures. At the same time that Islamic families have lost influence, alcohol and criminal activity have increased, contributing to alienation from more traditional Islamic values. Western media has also played a part in the alienation process by illustrating the difference between Islamic youth and those who live in Western societies.

Some scholars have paid particular attention to Islamic youths whose families have immigrated

to Europe, where the youths have failed to become integrated into Western society. For instance, in Great Britain, the Islamic population has more than doubled in recent years. Several polls of Arab youth have found almost half of them willing to fight for Osama bin Laden but unwilling to bear arms for Great Britain. British security personnel are aware that several thousand Islamic youth traveled from Britain to Afghanistan during the 1990s to receive religious indoctrination and to be trained as terrorists. Records show that other European nationalities are also represented among those incarcerated as suspected terrorists at the U.S. Naval Station at Guantanamo Bay, Cuba.

Scholars who study the connection between the alienation experienced by young Islamic youths and terrorism believe the only way to end the threat to international peace is by identifying and dealing with the underlying causes of alienation that have created a fertile environment for Islamic fundamentalism and its insistence on radicalism, separatism, and terrorism.

— Elizabeth Purdy

Altamira Cave

Often called the "Sistine Chapel of Paleolithic Art," the prehistoric Altamira Cave contains paintings and artifacts dating from 18,000 to 13,000 years ago (BP). Located on Monte Vispieres in Cantabria, Northern Spain, it was first explored in 1879 by Don Marcelino Sanz de Santuola. Early controversy raged over the age of the site, as many doubted that prehistoric humans could produce such sophisticated art; however, its significance was recognized by the early 1900s, and Altamira Cave was listed as a World Heritage Site by UNESCO (United Nations Educational, Scientific, and Cultural Organization) in 1985.

Altamira Cave consists of an S-shaped series of rooms with a total length of 270 m (886 feet) and contains two rich occupation levels. The earlier, dated to the Solutrean (18,500 years BP), contains stone points, bone awls, and pendants. The second, dated to the Magdalenian (15,500–14,500 years BP), contains antler and bone points and leatherworking tools. Altamira is unusual because it contains both domestic artifacts and cave paintings; most cave art is located far from living areas.

Engraved and painted on the ceiling of the cave are images of wild animals such as bison, deer, horses, and wild boar; outlines of human hands; and abstract figures and shapes. Sometimes drawings are superimposed on earlier works. Bison are the most common animal depicted.

These Paleolithic artists were skilled at painting images on the ceiling that would accurately reflect the proportions of the animal as seen from the cave floor. The images at Altamira were painted in red, brown, yellow, and black pigments. The use of several colors allowed for subtle shadings and perspectives. The naturally rough texture of the walls was used to depict movement and a three-dimensional perspective for the viewer below. These details reflect a significant level of technical skill. On seeing them, Picasso reportedly exclaimed, "After Altamira, all is decadence." Indeed, many artists of the modern art movement claimed inspiration from Paleolithic cave paintings.

Creating these works of art required a considerable expenditure of effort. The artists needed scaffolding to reach the vaulted ceilings. Light must have been provided (and raised to the ceiling) via torches or bowls filled with animal fat. The four colors of pigment were produced by mixing ochre and manganese with a binder, such as blood or urine. The pigment was then applied with a brush or by blowing it onto a surface with a pipe or by mouth.

Why did our ancestors invest so much energy in cave art? While the thoughts of these artists will never be known, anthropologists have developed several hypotheses to explain why these paintings were created. Perhaps the artists performed sympathetic magic by ritually capturing the animal's soul prior to the hunt, improving their success. The images could represent hunting trophies or tell stories. Many of the nonanimal symbols seen in cave art have been interpreted as representations of male and female genitalia; maybe the art signals fertility magic, influencing future births. Some feel that many of the symbols are astronomical or calendrical, and used to mark seasons. Possibly, the images were created for aesthetic or nonpractical reasons. Like all art, the social context in which these paintings were made holds the key to what made these images meaningful to the artists and their

Source: © Gianni Dagli Orti/CORBIS.

contemporaries. In any case, the beauty of these Paleolithic paintings is unforgettable.

— *Cathy Willermet*

See also **Cave Art; Petroglyphs; Rock Art**

Further Readings

Bahn, P., & Vertut, J. (2001). *Journey through the Ice Age.* Berkeley: University of California Press.

Saura Ramos, P. A. (1999). *Cave of Altamira.* New York: Harry N. Abrams.

Servicio de Información Turística de Cantabria. *History and art: Caves.* http://www.turcantabria.com/Datos/Historia-Arte/cuevas-i.htm

Altruism

Altruism is the attitude that consists of according one's regards to the Other (*alter* in Latin), personally or globally, as a principle of one's choices and actions. Opposed to *egoism,* it implies sincere and unselfish concern for the well-being of others, expressed practically.

Its most current use is referred to interhuman relationships; in this sense, it can be attached to *humanism.* Altruism is indeed an extremely significant notion of great concrete consequences for the human societies.

There shouldn't be confusion between the principle of altruism and the one of simple respect of the Other: Being respectful doesn't necessarily imply taking under consideration the Other's welfare for the definition of one's behavior.

Another possible erroneous identification may occur between altruism and the ethical attitude founded on the principle of reciprocity, as expressed negatively already in the Hebraïc *Talmud of Babylon (Shabbat):* "Don't do to your fellow man what you would detest he did to you," and positively in the Christian *New Testament* (Luke 5:31; Matthew 7:12): "What you would like people do for you, do it in the same way for them."

Instead of these principles of "reasonable justice," Jean-Jacques Rousseau (1712–1778) thought that human actions should rather follow the principle of "natural goodness": "Do your own good with the least possible harm for the Other." However, this isn't altruism, either: Not to harm is just to respect; no active consideration for the Other's good is at play.

In fact, we may distinguish two sorts of altruism, to which we are giving here original appellations, for the sake of more clarity:

1. The "egalitarian" altruism, where one is concerned of the well-being of the Other at the same level one cares about one's own. This is the commonest way to conceive altruism. It is expressed paradigmatically by the capital Judeo-Christian command, present in the *Old* and the *New Testament:* "Love your neighbor as you love thyself" (Leviticus 18:18 and Matthew 22:39), as well as in the Islamic *Koran:* "Help ye one another in righteousness and piety" (Sourat 5:2).

2. The "absolute" altruism, where one puts the Other's good at a higher level than one's own in the scale of the values and principles defining one's actions. It is a more exceptional manifestation of altruism. Usually, it is considered as characterizing the ideal parent's love toward their children. In more rare circumstances, it may be addressed to persons with which some other kind of loving relationship occurs (family, lovers, friends) or other larger common link (compatriots, people sharing the same ideas or beliefs). In the latter category may belong the "guardians" of the ideal *Republic* of Plato (428–348 BC), who were asked to put

aside their personal happiness to occupy themselves with the welfare of the city, as well as some "national heroes" or "martyrs."

The most astonishing case is the one where no other relationship interferes than the common human status. Such an altruism becomes, for example, the motivation inspiring the actions of persons commonly called "heroes of humanity" (or even "saints," if they are attached at the same time to a religious belief): One's own life might be either literally sacrificed for the welfare of others or entirely dedicated to it (such as scientists choosing to work lifelong under hard conditions for discoveries that will help the concrete amelioration of others' lives, or persons embracing a life deprived of comfort and completely oriented toward works of charity, the defense of human rights, or even the Boddhishatvas of the Mahayana Buddhism).

The Other to Which Altruism Is Addressed

Altruism is manifest in interpersonal relations. We think that it is appropriate to first develop a little further the crucial notion of the "Other" toward whom one may behave altruistically.

According to evolutional psychology, the notion of "Other" (or "alterity") develops progressively for the human being as the latter defines more and more the limits of its own self (its "sameness").

It is through our relationship with the Other that we are able to survive physically in our youngest age and to learn everything necessary for our psychological and social growth up to adulthood and till the end of our days. The particular individuality of each person is thus formed in constant interaction with the Other.

The Greek philosophers (6th century BC–6th century AD), who lived in societies where interpersonal dialogue was a considerable and crucial part of everyday life for private, public and intellectual matters, present the Other as a mirror of our soul. They have particularly underlined the importance of the Other for the awakening of the self-consciousness and of self-knowledge. The Greeks in general defined themselves through an opposition to the other people, called "Barbarians" (this didn't imply any lack of culture accorded to them; on the contrary, we have many testimonies that there was a great esteem for the artistic and intellectual achievements of the neighboring Asian and Egyptian civilizations, toward which travels were made for the sake of learning: The term derives from the phonetical "bar-bar," which was the impression given of the sound of languages one didn't understand).

Georg Wilhelm Friedrich Hegel (1770–1831) places the exceptional moment of the realization of self-conscience at the meeting with the conscience of the Other, in a dramatic clash.

For Plato and the Judeo-Christian tradition, the Other is considered moreover as an image of the divine and therefore should be respected as such. Immanuel Kant (1724–1804) thinks that the respect for the Other is founded precisely on the fact that the Other is a "person," who should be seen as an "end in itself," not as a "mean" for something else, like a simple object. The other persons limit our absolute freedom of action, because they are objects of our respect. Thus, the interpersonal relation with the Other also becomes the reason for the foundation of moral conduct on the notion of obligation.

A different approach of the way to conceive the Other, that is, as a separate reality and not just as an object of the ego's conscience, is made by the phenomenologists, for example, Edmund Husserl (1859–1938) and Martin Heidegger (1889–1976). Emmanuel Levinas (1905–1995), who is at the same time inspired by this school and by Judeo-Christianity, accords a greater importance to the Other than to the Self, against the "egology" of the previous philosophical theories on the subject. The Other has a meaning by himself, before the attribution of any meaning to him by ourselves. He comes to us like a revelation by generosity. This "face" to which we can't escape represents an appeal to responsibility and justice and reveals us to ourselves. This philosopher has eminently analyzed abnegation and altruism.

To the antipodes of such a vision stands Jean-Paul Sartre (1905–1980), who accepts that the Other's vision of myself brings up my self-conscience, but the Other exists only for himself, as liberty. The Other "is an 'I' that I'm not, which creates nothingness as an element of definite separation between the Other and myself."

Is Altruism Natural?

In the interpersonal relation to the Other, is the human being naturally inclined to altruism or to egoism? This crucial question, from which depends largely the definition of the most appropriate ethical theory, has to be answered according to David Hume

(1711–1776), only after a systematic research on human nature, inspired by natural science.

The evolutionist thesis concerning human species expressed by Charles Darwin (1809–1882) has been used therefore as a foundation for the theories supporting as natural moral human thought and conduct, "socialized egoism," "utilitarianism," and "hedonism" (man's natural priority is the pursuit of what is more useful or pleasant for himself, though without harming the Others).

According to the utilitarians, even altruist behavior is following "egoist strategies" inscribed in the human genes. Altruism toward others who possess the same genes (family) or who may also be altruists in return is the naturally selected optimal way for the survival of the species. In consequence, moral conduct isn't the result of a personal free choice, but of a programmed natural reaction. According to Jeremy Bentham (1748–1832), the welfare of a whole human community may be calculated and chosen on the basis of the greatest quantity of good or pleasant things accompanied by the least possible unpleasant things that men may expect from a common life.

These theories may arouse, and have aroused, many objections, for example: Only material goods are "measurable," but there are many other things that are also considered as "good" by humans. All members of a society can't have the same opinion on what is better for themselves and the whole of the community. We could add here: Even if it is true that altruism in parental and social relations is met also in other natural species, this doesn't reduce such a behavior to a natural selection, as there are in human beings altruistic attitudes that don't enter this scheme. As for an "altruism" that expects a return, could it still be called "altruism"?

As a more moderate solution, Adam Smith (1723–1790) accepts also a natural "sympathy" of the human being for other humans with whom he is in interference, in the sense of sharing the others' passions.

Arthur Schopenhauer (1788–1860) believes, though, that there is more in the feeling of sympathy we have toward the members of our species: On one hand, we don't like to see the Other suffering, and therefore we avoid harming them; on the other hand, we take pleasure in doing good to the others.

Before him, Benedictus de Spinoza (1632–1677) had supported that the goodwill toward the Other is in fact a kind of "commiseration," or pity.

Pity, or the Buddhist "compassion," or the Christian "charity" (translation of the Greek word *agape,* which means "love"), is indeed the source of altruism (on the condition that it doesn't hide any feeling of "superiority" or of "self-satisfaction" for one's "goodness"). An excellent description of this quality of unselfish good will toward the Other is given in the first "Letter to the Corinthians" of St. Paul, in the *New Testament.*

True friendship (*philia* in Greek) in its best form is also expressed as an absolute good will, addressed to the Other for what he is as a person, as Aristotle (384–322 BC) notes in his ethical works. The spontaneous movement of the "self" toward the other person, who is asking to be loved, is called "solicitude" by Paul Ricoeur (1913–), who places this fundamental ethical intention before the moral action.

René Descartes (1596–1650), following Plato, underlines that caring for the other's well-being without any wish for return is the characteristic of love, clearly distinguishing it from desire, which includes an egoistic will for possession.

After all these considerations, we think we may affirm that altruism should be considered as naturally coexisting with egoism in human nature, without being limited to a simple result of "natural selection."

But altruism is preferable, even if this may sound like a paradox, as it is a "plus-nature," says Vladimir Jankelevitch (1903–1985). For Emmanuel Levinas, the only way for us to approach the Infinite and to arrive at the highest fulfilment is to submit our "I" to the "You," in an absolutely altruistic attitude.

New Contemporary Expressions of Altruism

We would like to conclude here by mentioning that during the last half of the 20th century, new expressions of altruism emerged. As communications and means of transfer have greatly developed, news about victims of natural disasters, diseases, transgressions of human rights, or armed conflicts travel around the globe quickly. We remark that many associations or individuals around the world show a great sensibility and eagerness to assist, in various ways, their fellow humans in need. We might call these altruistic attitudes at a global level concrete manifestations of a "universal altruism"—an unexpected aspect of the actual phenomenon of "globalization" and a supplementary argument for the innate altruism of the human species and its surprising greatness.

— *Aikaterini Lefka*

See also **Civil Disobedience; Critical Realism**

Further Readings

Hume, D. (2000). *A treatise on human nature: Being an attempt to introduce the experimental method of reasoning into moral subjects* (D. F. Norton & M. J. Norton, Eds.). Oxford/New York: Oxford University Press. (Original work published 1739–1740)

Ricoeur, P. (1992). *Oneself as another* (K. Blamey, Trans.). Chicago: University of Chicago Press.

Smith, A. (1984). *The Glasgow edition of the works and correspondence of Adam Smith: Vol. I. The theory of moral sentiments.* Glasgow: Liberty Fund. (Original work published 1759)

Amazonia

Amazonia. The name conjures western images of luxuriant vegetation, unbridled nature, and vast, unexplored lands. Whether envisioned as a tropical paradise or a "green hell," the salience of the naturalistic and idealistic features associated with Amazonia has implications for the perception of its human inhabitants. From its inception, Amazonian anthropology has been a highly contested and fractured intellectual field, partly resulting from the manner in which Amazonia was imagined as a cultural category of colonialism centuries before the advent of modern ethnographic exploration.

Early European encounters with indigenous Amazonians provoked debates about the nature of humanity in a manner that would inform subsequent centuries of colonial rule. Yet we can distinguish Amazonia from other colonized regions partly by the manner in which its native peoples were characterized as the prototypical primitive people. Long before ethnographic investigations of Amazonian societies, Westerners stereotyped Amazonians as savages, noble or otherwise, and considered them to be outside the domain of (Western) civilization and closer to nature.

The beginnings of anthropological investigation in the region remained infused with inherited stereotypes about the nature and culture of Amazonia. Ethnographic studies appeared relatively late in the region, which was still largely unexplored scientifically well into the 20th century. The diversity of societies encountered over five centuries of contact has contributed to the mosaic character of region, in which diversity itself remains an important hallmark, frustrating attempts at regional synthesis. The first regional synthesis provided in 1948 by Julian Steward in the *Handbook of South American Indians* inherited many of the presumptions of earlier periods. Revisions of the standard model provided by Steward have predominated the past few decades of Amazonian anthropology, during which time ethnographic studies of Amazonian peoples reached unprecedented growth. The search for a new synthesis in Amazonian anthropology remains an important goal in the field, yet is further complicated by the increasingly abundant and varied literature regarding Amazonia.

Geographic Definition

Amazonia as a geographic region is named for its major river, the Amazon, the world's largest river by water volume. The term *Amazon* refers to the female warriors of Greek mythology, who were associated with fabulous accounts of indigenous warriors along the banks of the named river. The river's headwaters are located in the Andean mountains, and the principal channel drains east into the Atlantic Ocean. The Amazon River is approximately the same length—6,400–6,800 kilometers—as the Nile and, due to yearly changes in the meandering channel, carries a fluctuating status as the world's longest river. Many tributaries of the Amazon also rank among the world's longest rivers and constitute an integral part of the region. In the strict sense of the term, Amazonia refers to the watershed of the Amazon River and its many tributaries.

Occupying approximately seven million square kilometers, roughly the size of the continental United States, the Amazon Basin is the largest river basin in the world. This vast region dominates the northern portion of the South American continent and contains the world's most extensive tract of humid tropics. Bounded to the north by the Orinoco River basin and to the south by the Brazilian shield escarpment, the Amazon Basin stretches eastward from the lower slopes of the Andes, where the 500 meter elevation contour is generally used to delimit the Amazon as a phytogeographic region. Over half of the basin encompasses two ancient upland shields, the Guiana Shield to the north of the river and the Brazilian Shield to the south, both of which predate the rise of the Andes. Remaining areas comprise a giant alluvial basin.

Several adjacent areas are not geographically part of the Amazon Basin but are considered part of greater Amazonia because they share many of its ecological and cultural features. These include the region to the southeast that is sometimes referred to as *pre-Amazonia* and incorporates the Araguaia and Tocantins River basins that drain into the Atlantic south of the mouth of the Amazon. The Orinoco River Basin, which drains north into the Caribbean, is also generally included in the definition of Amazonia, as are the tropical forested regions of the Guianas. Finally, the transition between the Central Brazilian Highlands and the Amazon Basin is gradual and includes the upper portions of the Xingú, Araguaia, and Tocantins Rivers.

We can also use the term Amazonia to mean the politically and economically defined boundaries maintained by contemporary nation states. Countries whose borders include portions of Amazonia include Brazil, French Guiana, Suriname, Guyana, Venezuela, Colombia, Ecuador, Peru, and Bolivia. As a result of historical geopolitical expansion in the region, more than two thirds of the Amazon Basin falls within Brazil's contemporary jurisdiction and generally receives proportionately more popular and scientific attention. The Andean nations of Bolivia, Peru, Ecuador, and Colombia also have sizeable portions of the Amazon Basin relative to country size. Even the smaller portions of Amazonia located within Venezuela and the Guianas have played an important role in the exploration of the region's biological and cultural diversity.

The Amazonian Environment

The environment is an important defining characteristic of Amazonia, and, as such, has figured prominently in anthropological accounts of the region. In particular, archaeologist Betty Meggers presented the Amazonian environment as a "counterfeit paradise," in which lush tropical flora is a deceptive indicator of underlying soil fertility because energy in tropical forests is recycled within the canopy structure of the forests rather than stored in the soil substrate. The ability of Amazonian soils and environments to support the development of complex societies emerged as a central debate in Amazonian ethnography and archaeology. These debates are grounded in assumptions of the Amazonian environment as pristine, static, nonproductive, and fundamentally limiting in its effect on indigenous societies. Recent advances in our understanding of the nature and culture of Amazonian environments are therefore relevant to Amazonian anthropology.

Located in the humid tropics, the Amazon is defined by tropical conditions that include year-round warm temperatures, high amounts of solar radiation, rainfall, humidity, and biodiversity. Tropical rain forests cover the majority of the Amazon Basin, which contains the largest expanse of the world's rain forests. Yet, while Amazonia may have come to symbolize the generic tropical forest—hot, humid, and teeming with vegetation—the region is far from homogonous. Biodiversity, an important hallmark of the Amazon, generally increases from east to west and is correlated with multiple factors such as latitude, rainfall, temperature, solar radiation, and soils that likewise vary across the region. While the *Pleistocene refugia* theory was once advanced as an explanation for the rich diversity of Amazonian flora, ecologists now suggest that a variety of natural disturbance processes, rather than long-term climatic stability, underlie speciation.

Another important advance in the scientific understanding of the Amazonian environment has been the documentation of the variety of ecosystems that characterize Amazonia. At the most basic level, a distinction can be made between the upland regions, or *terra firme,* and the floodplains of the major rivers, called the *várzea.* The *várzea* accounts for approximately 2% of the Amazon Basin, yet is considered disproportionately important to Amazonian societies because of the relatively rich alluvial soils. The *várzea* can be internally differentiated into three different habitats: the upper floodplain, the lower floodplain, and the estuary.

We can categorize Amazonian rivers into three main types that have important ecological impacts: whitewater rivers, clearwater rivers, and blackwater rivers. Whitewater rivers drain the eastern slopes of the Andes and carry geologically young sediments of high fertility that are deposited downstream during seasonal flooding events. These floods constitute the higher soil fertility found along the *várzea* floodplains of the Amazon River and its whitewater tributaries. In contrast, clearwater rivers drain the ancient leached bedrocks of the Guiana and Brazilian plateaus and therefore carry sediment loads of medium to low fertility. Blackwater rivers drain the white sandy soils of the northwest Amazon that are nutrient poor and extremely acidic.

Historical documents and archaeological evidence suggest that densely populated settlements once spanned the *várzea* regions—fostering ongoing debate over the nature of prehistoric and historic chiefdoms in the Amazon. The majority of contemporary indigenous societies, however, live within the upland regions of the Amazon. Emilio Moran's 1993 book *Through Amazonian Eyes: The Human Ecology of Amazonian Populations* carefully documents the internal variety of ecosystems in both the *várzea* and *terra firme* in an attempt to reach beyond this simple dichotomy and avoid condensing diverse habitats and societies under the generic rubric of "tropical forest adaptations." Moran describes the diversity of habitats within the *terra firme,* including lowland savannas, blackwater ecosystems, montaine forests, and upland forests, each of which is internally differentiated. Upland forests also exhibit what appear to be anthropogenic forest types, including liana, bamboo, Brazil nut, and certain palm forests.

Recent advances in ecological research challenge assumptions that Amazonian habitats are homeostatic or stable and increasingly recognize the dynamic role of human societies in the formation of anthropogenic environments. In addition to the large-scale landscape modifications produced by dense populations of the past, traditional subsistence activities practiced by contemporary indigenous societies likewise interact with and transform local ecosystems. Slash-and-burn horticulture efficiently converts tropical forest biomass and mimics processes of natural forest gap dynamics. The primary staple throughout much of the Amazon is manioc (*Manihot esculenta*), along with maize, bananas, plantains, papaya, sweet potatoes or yams, and beans. Cultigens are often interspersed to create multistoried swiddens or garden plots that, rather than being abruptly abandoned, are generally managed through succession. Old fallows function as agroforestry systems that may be used as the preferred hunting and gathering locations for many years. Anthropogenic forests that regenerate from old fallows may be just as biodiverse, if not more so, than adjacent old growth forests, as documented by William Balée among the Ka'apor.

Horticultural activities are generally complemented by hunting, fishing, and gathering activities. Amazonia lacks large pack animals, and game animals tend to be dispersed and cryptic. Hunting technologies such as blow darts, poisons, bows and arrows, and traps are employed and often embedded in local knowledge systems and cosmologies that stress the relationships between people and animals. Likewise, fishing activities use technologies such as nets, hooks, weirs, and fish poisons, and the catch provides important sources of protein. Finally, the gathering of wild and semidomesticated plants, particularly palms, is an important complementary activity that affects the diversity and distribution of these resources. Even still, the assumption that Amazonian environments are uniformly poor or that indigenous people have passively adapted to pristine environmental conditions once formed a part of the traditional definition of Amazonia.

Amazonia as a Culture Region

Definitions of Amazonia as a culture region have included implicit comparisons with other culture regions of South America, particularly the Andes. Early ethnographers sought to explain why the impressive state-level societies of the Andean region were not found in the adjacent tropical lowlands, where the ethnographic present was characterized by numerous small, autonomous horticultural or hunting-gathering tribes. Steward classified these groups respectively as *Tropical Forest Tribes* (swidden horticulturalists) and *Marginals* (hunter-gatherers) in the *Handbook of South American Indians.* Assumptions underlying cultural evolutionary typologies led to the search for conditions that prevented the development of complex societies in the Amazon. The environment was initially explored as a likely culprit. The characterization of Amazonia in terms of negative rather than positive traits has had a lasting impact on the anthropology of the region.

In positive terms, Amazonia is typified by its cultural and linguistic diversity, which makes regional generalizations difficult. The traditional unit of analysis within the region has been the tribe. The exact number of tribes or ethnic groups in the Amazon region is also difficult to estimate given the uncertain overlap between local and supralocal units of identification or that between language and ethnicity. Furthermore, ongoing processes of acculturation and ethnogenesis defy analysis of tribes as static, ahistorical units.

However defined, we usually classify tribal groups according to their subsistence strategies as hunter-gatherers, trekkers, or horticulturalists. While heuristic, this typology arbitrarily divides a continuum of nomadic and sedentary lifestyles and usually negates historical or contemporary inclusion in market

economies. Mixed subsistence strategies that combine some form of slash-and-burn horticulture with hunting, fishing, and gathering are most common throughout the region. We also traditionally characterize Amazonian tribes by autonomous villages, relatively small populations, and different degrees of egalitarianism. Other region-wide characteristics include the importance of reciprocity, ostracism as a form of social control, the existence of food taboos, belief in multiple souls, and shamanism. Peter Rivière suggests that dualism is a universal structural feature of Amazonian societies, including underlying two-section kinship terminologies, moieties, and a principle of direct exchange.

Source: © iStockphoto/Ana Pinto.

Linguistic Diversity and Language Groupings

Amazonia is also recognized as a linguistic area, with shared pan-Amazonian linguistic tendencies that differentiate the languages of the Amazon from those of the Andes. Unfortunately, the Amazon basin remains the least known linguistic region in the world, with a paucity of adequate grammars in relation to the diversity of languages evident. Furthermore, processes of assimilation and language loss continue to accelerate at an alarming rate. There are more than 300 extant indigenous Amazonian languages that belong to approximately 20 language families, and include over a dozen linguistic isolates.

The largest language families in terms of numbers of affiliated languages include Arawakan, Cariban, Tupian, Macro-Gê, Pano-Takanan, and Tucanoan. The major language families are also noted for their markedly discontinuous distributions, more so than in any other part of the world. The Tupi and Arawak families are the most dispersed, followed by the Carib languages. Other language families are more localized, including Panoan and Jivaroan languages in the montaña, Gê languages in Central Brazil, and Tucanoan languages in the Northwest.

Distinctive regional distributions and associated characteristics allow language groups to function as meaningful categories for organizing and comparing Amazonian societies. Languages are closely related to ethnic identity in the Amazon, and language families provide analytical units that allow for regional comparisons. Amazonian scholars often specialize as much according to language families as they do to geographic regions, and research directions and analysis are often informed by the different cultural regularities affiliated with these major groupings.

With the largest number of languages and a wide distribution, the Arawak family has been the focus of a substantial degree of scholarly research. Published in 2002, the edited volume *Comparative Arawakan Histories* by Jonathan Hill and Fernando Santos-Granero incorporates much of this research and demonstrates how linguistic groupings can provide a basis for meaningful dialogue and regional synthesis. Throughout their vast, fragmented distribution, Arawak-speaking groups are noted for their cultural proclivity to trade, forge alliances, and maintain widely dispersed fields of identification. As such, Arawak groups are implicated in the maintenance of contemporary and historical trade networks in Amazonia. According to Arawak scholars, cultural institutions that emphasize peaceful relationships with other Arawak groups enable them to integrate larger areas into such networks.

Cultural peculiarities of Arawak speakers include a diplomatic ethos, a prohibition of internal warfare codified in ritual greetings, and a characteristic willingness to incorporate other ethnic groups into Arawak communities. Even the kinship system of riverine Arawak groups extends classificatory siblings to encourage the establishment of allies beyond immediate kin. Apart from Arawak and Tukanoan groups, preoccupation with genealogy and extended kin categories are rare among Amazonian societies and are connected to the equally uncommon emphasis on social stratification and the ambition to incorporate, rather than confront, neighboring groups.

The *Arawak phenomenon* refers to the pervasive presence of Arawak groups throughout Amazonia that resulted from the hypothesized expansion out of the Orinoco and Rio Negro heartland during the second millennium BC. The distribution of Arawak languages suggests a pattern of expansion along major rivers, creating wedges that contributed to the geographic demarcation of more localized language families. Arawak cultural institutions, along with expertise in river navigation, trade, intensive agriculture, and hierarchical social organizations may have played a role in the emergence of a regional trade system in prehistoric Amazonia that emerged at this time. With access to fertile floodplains and major riverine trade routes, Arawakan societies may have been the most powerful and expansive polities in pre-Colombian Amazonia.

Studies of Tupi language families, particularly the Tupi-Guarani groups, likewise contribute to an understanding of historical processes in the region. In apparent contrast to the Arawak expansion through trade and incorporation, Tupi societies appear to have expanded through military conquest. Tupi societies originally migrated eastward from the southwestern Amazon to conquer vast territories south of the Amazon and southeastern Brazil. The famous Tupinambá chiefdom displaced Gê speakers along the Atlantic coast shortly prior to European arrival. A westward expansion was underway when the Europeans arrived in the 16th century, by which time Tupi societies controlled the southern shore of central and lower Amazon. Orellana's 1542 expedition encountered the powerful Omagua chiefdom in the upper Amazon, lending historical evidence to the existence of complex societies along the major tributaries. Archaeologist Michael Heckenberger suggests, however, that the Omagua may have been formerly Arawak-speakers who had recently adopted a Tupi lexicon, demonstrating the complex relationships between language and ethnicity in the region.

Although located outside of Amazonia, the prominence of the Tupinambá in the 16th century cemented their place in the Brazilian national heritage. The Tupinambá remain a point of reference for the interpretation of contemporary Tupi-Guarani societies in Amazonia, which are smaller horticultural or foraging groups, generally "regressed" horticulturalists. Furthermore, the major trade language or *lingua geral* of the Amazon evolved on the east coast of Brazil and combined a simplified morphology from the Tupinambá language with a syntax similar to Portuguese. The *lingual geral* spread up the Amazon basin, producing dialectical variants, some of which are still spoken in the Upper Rio Negro region.

Tupi-Guarani groups have received particular attention for their reputations as cannibals and their history of migrations throughout the region. Contemporary ethnographies continue to explore these enduring themes, demonstrating how they involve diverse aspects of culture such as subsistence, warfare, kinship, and cosmology. Although diverse, Tupi-Guarani societies tend to use Dravidian kinship terminologies and have oblique marriage rules. In other respects, however, Tupi-Guarani groups are more notable for their cultural diversity—a fact that has long frustrated comparative scholarly efforts.

In contrast to the loosely defined cultural similarities of the Tupi-Guaraní, we typify the Gê groups of central Brazil by strongly dualistic social structures that helped inspire the emergence of structural anthropology in the 1950s and 1960s. The Gê groups are most commonly associated with the seasonally dry closed savannas (*cerrado*) of Central Brazil, but are also found in the bordering closed-canopy forests of the lower Amazon and pre-Amazonia. Although the landscape was traditionally considered only marginally productive, the Gê groups maintained an abundant existence with occasionally dense populations through complementary strategies of limited agriculture and nomadism. Most contemporary Gê groups have reduced or stopped trekking altogether as a result of circumscription by cattle ranchers and industrial soy farmers.

The earliest scholars failed to recognize the complex social structures of the Gê groups, assuming from Steward's classification of them as generic hunter-gatherers that their societies and technologies

should be equally simple. Later scholars discovered that the Gê groups were neither pure hunter-gatherers nor socially simple. Rather, they were historically semi-nomadic trekkers with seasonal reliance on agriculture and highly developed social configurations. Striking among these groups is the prevalence of men's houses, cross-cutting moieties, and hierarchical age grades, which ensured from the start that analysis of social structure would dominate Gê studies.

Major Culture Regions

We can also subdivide Amazonia into the following cultural regions, each with its own distinctive characteristics: the northwest Amazon, northern Amazonia, Guianas, Montaña, Upper Amazon, Lower Amazon, Upper Xingú, and Central Brazil. Regional focuses have developed within the scholarship of the region and are informed by the particular characteristics of each culture area.

The northwest Amazon is exemplary of regional interactions. Unique blackwater ecosystems and *caatinga* vegetation mark the ecological distinctiveness of this region, which is characterized by an incredible diversity of bittern manioc cultivars. Geographically, the region extends from the Rio Negro westward into Colombia and Venezuela. The Vaupés and Içana river basins constitute a well-defined linguistic area with a number of characteristics shared among groups pertaining to the Arawak, Tukanoan, and Makú language families. Relationships between language and culture are particularly complex in this area. We can find material, social, and ideological commonalities among the diverse indigenous groups of the northwest Amazon, where bonds of kinship, marriage, and political alliances regularly cross linguistic boundaries.

Multilingualism and linguistic exogamy are characteristic of many groups of the region, as are specialized trade, complex cosmologies, and the shamanic use of hallucinogens. Linguistic exogamy is compulsory among East Tukano groups and Tariana in the Vaupés, where marriage practices emphasize nonendogamy rather than prescribed marriages. In these systems, language identity is assigned through patrilineal descent. Individuals also tend to know several other regional languages, including those of their mothers and spouses.

Specialized trade also unifies local groups in a regional trade network. Jean Jackson suggested the term *artificial scarcity* to define how groups "forget" to make or obtain items that other groups provide. Subsequent specialization reinforces peaceful relations in the region. Janet Chernela likewise concluded that the northwest Amazonian trade network is structured around the maintenance of social relations. Language and artifact manufacture are the most salient identifying features of northwest Amazonian groups. As such, locally manufactured goods always move toward "outsiders" and away from relatives. A particular form of specialized trade has developed between the horticultural tribes and the foraging Makú tribes, in which the Makú peoples provide game, weapons, and hallucinogenic plants in exchange for manioc and other garden products.

The existence of complex segmentary hierarchies among the Tukano groups also distinguishes this region. Local descent groups comprised of several nuclear families are organized into ranked sibs or corporate patrilineal descent groups. Sib ranking is based on prestige and used to allocate preferential territories along rivers. Lower-ranking sibs may be comprised of individuals who originally spoke non-Tucanoan languages such as Makú. The language group, or tribe, functions as a named political and ceremonial group, with all language groups belonging to one of five phratries that serve as unnamed exogamous groups.

Northern Amazonia is delimited by the Orinoco-Rio Branco area located near the Brazil-Venezuela-Guyana border. Despite the diverse languages groups from the Yanomaman, Arawakan, and Cariban language families, Galvão defined this culture area as exhibiting remarkable cultural homogeneity. Perhaps the most well-known Amazonian tribe, the Yanomami, was popularized by the work of Napoleon Chagnon and has come to form one of the foundational societies of the anthropological corpus.

In the adjacent Guianas, Cariban groups historically dominated the region, while Arawakan societies are presumed to represent more recent intrusions. In keeping with the cultural propensities of Arawakan societies, extensive trade networks once connected the savannas of Venezuela with the Guianas. Unlike the northwestern Amazonian trade network, with its focus on intergroup relations, the trade system of the Guianas distributes natural and cultural resources such as curare, pottery, dogs, and green stones. The symbolic systems of Guiana groups have played an important role in the development of British social anthropology in Amazonia, particularly through the work of Peter Rivière.

Marking the ecological and cultural transition between the Andes and the Amazon, the montaña region is characterized by specious forests that support complex swidden horticultural systems and subsistence economies that stress the importance of hunting. Bitter manioc is absent from the montaña, although sweet varieties (*yucca*) are present. The area is populated by numerous localized language families, such as Panoan and Jivaroan, as well as many linguistic isolates. The montaña region serves an ethnic interface between the different tribes of the Andean foothills and Upper Amazon and has long been involved in trade and cultural interaction between the Andes and the Amazon. The presence of jungle Quichua, a dialect of Quechua, is emblematic of these interactions.

Montaña groups such as the Jívaroan or Shuara peoples are most notorious for their practice of headhunting and have received much scholarly and popular attention. Instead of villages or communal houses, single-family dwellings and residential atomism define traditional settlement patterns in the region. Polygynous households that function as autonomous units may be organized into supralocal units that define an *endogamous nexus.* Marked gender division of labor and a system of resource allocation based on social categories of descent and affinity are common to indigenous peoples of the montaña. Basic concepts of symmetrical, delayed reciprocity define relationships within and across ethnic boundaries, including exchange of goods, help, refuge, and marriage partners. This concept permeates the worldviews and cosmologies of montaña peoples, whose systems of shamanic practices and hallucinogenic visions have been well studied. Shamanism may even play an important role in the extensive trade networks that are based, in part, on a system of craft specialization.

The adjacent Upper Amazonian region shares certain characteristics with the montaña, particularly the predominance of Panoan groups and the absence of bitter manioc. The contemporary city of Manaus marks the transition between the Upper Amazon and the Lower Amazon regions. The Lower Amazon, which extends to the river mouth, is characterized by the importance of bitter manioc cultivation and the universality of pottery.

Further to the south, the characteristics of the Upper Xingú river basin include remarkable linguistic diversity within a unified cultural area, where language serves as a group's main symbolic distinctive feature. This well-studied region is home to seventeen indigenous groups that belong to five language families: Arawak, Carib, Tupi, Gê, and Trumai, a linguistic isolate. Ten of these indigenous groups have lived in the region for more than one hundred years, while the remaining tribes were relocated after the creation of the Xingú National Park in 1961. A series of rapids separating the navigable lower Xingú River from the upper basin allowed this region to serve as a refuge area.

Shared cultural features include dependency on fish for protein and taboos on eating many large game animals. People eat only fish, birds, and monkeys and complement swidden horticultural practices. Furthermore, archaeological remains in the upper Xingú suggest that the circular village layout of contemporary settlements represents cultural continuity with large sedentary settlements of the past. A typical village includes haystack-shaped houses circularly arranged around a central plaza and the inclusion of men's houses. Individual households represent patrilineal extended families. Although there is a tendency toward village endogamy, intermarriage among different groups occurs and leads to multilingualism. Intertribal connections also are maintained through ceremonial events that include ceremonial ambassadors and a common song language, intertribal games such as spear-throwing and log racing, and specialized ceremonial trade. Jackson's concept of artificial scarcity has been applied to the intertribal exchange network of the Xingú region, in which each group specializes in different ceremonial or functional items.

In contrast to the linguistic diversity of the Xingú region, Central Brazil is characterized by the predominance of Gê-speaking groups and associated cultural features, such as circular settlements, men's houses, moieties, age grades, uxorial residence with bride service, sharp divisions of labor by gender, pervasive dualism, wrestling matches, strong leaders, and seminomadism. Scholarship with a culture area focus (Central Brazil) and a linguistic group focus (Gê societies) therefore overlap in these and other Amazonian regions in ways that are meaningful to an understanding of Amazonian anthropology.

History of Amazonia

Amazonia has a long and complex history that began well before the arrival of Europeans in the 16th century. Conceptualizations of Amazonians as representing generic stages of cultural evolution long prevented an

appreciation of the role of historical processes. Furthermore, these stereotypes led to a failure to recognize the past regional scale and supraethnic character of Amazonian societies at the time of European contact. Current interest in the history and historiography of the Amazon is beginning to flesh out a more complicated past.

The first inhabitants of Amazonia arrived very early, as evidenced by sites such as Pedra Pintada (11,000 BP), roughly contemporaneous with Clovis sites in North America. Contrary to North American patterns, Amazonian Paleo-Indians seem to have practiced a generalized hunter-gatherer strategy that focused on hunting small game, fishing, and collecting shellfish and forest products rather than big game, which is lacking in the Amazon.

There is ongoing academic tension between the notion that egalitarianism and social simplicity typify Amazonia and the idea that Amazonia is characterized by a greater range of social systems that developed over time, including societies with elaborated hierarchies and social complexity. This tension is especially apparent in archeology due to its greater attention to prehistoric cultures. Archaeological sites on Marajó Island at the mouth of the Amazon date back to 950 BC, with the emergence of Marajoara chiefdoms between AD 600 and 1000. Archaeologist Betty Meggers, however, suggests that the cultural complexity of these sites was ephemeral due to environmental limitations and may even have resulted from Andean intrusions.

Other archaeologists working in Amazonia reject this claim and continue to excavate archeological sites in far-flung locations, such as the Orinoco river drainage, middle Amazon, the Upper Xingú, and *llanos de Mojos* in eastern Bolivia—which attest to the emergence of densely populated settlements and regional interactions systems by around AD 1000. In addition to mound sites located in the *várzea,* extensive earthworks in the *llanos de Mojos* of eastern Bolivia suggest that wet savannas were likewise used for intensive agriculture and habitation. Earthen features such as moats, bridges, and causeways connecting ancient settlements in the Upper Xingú also document the emergence of complex societies along the southern periphery of the Amazon. Evidence for sociocultural complexity in the Amazon includes the appearance of dark anthrosols, or *terra preta,* that indicate past activities of large, sedentary settlements. The extremely high fertility of these soils makes them desirable by contemporary Amazonian peoples for the location of agricultural activities.

The earliest historical reports by 16th century European explorers corroborate the existence of dense settlements along the banks of the Amazon. For instance, Orellana's 1542 expedition down the Amazon documented huge, densely populated villages of the Omágua chiefdoms located along a 700 kilometer stretch of the river. Other historically recorded chiefdoms include the Lokono upland polity straddling the Amazon and Orinoco drainages, and the Aparia, Aisuari, and Yurimaguas. Early European chroniclers such as Pedro Teixeira (Acuña), Carvajal, Oveido, and Raleigh documented abundant natural resources, sophisticated productive technologies, demographic density, social stratification, centralized political power, political provinces, and interethnic economic relations, including specialized trade in elite items. These chroniclers also began to record the depopulation and disarticulation of Indian societies that occurred with the demographic collapse brought about by European diseases.

With the discovery of Brazil in 1500, the Portuguese began to explore and colonize the Amazon from the east, while the Spanish entered the Amazon from the Andean mountains to the west. The Spanish also competed with the Dutch, British, and French for control over the northerly regions of the South American continent beginning in the early 17th century. Initial European interests in Amazonia were economic and included the search for gold and forests products such as dyes and herbs. The initial impacts of the conquests are scarcely known, although chief among them was a devastating population reduction due to introduced diseases, genocide, and assimilation. As indigenous populations fled into the interior regions or perished, African slaves were brought in to meet the labor demands of the region. Refugee communities of African slaves, *quilombos,* also were established in Amazonia and contributed to the cultural heritage of the region. Peoples of African descent mixed with individuals of European and Amazonian descent in the creation of distinct *caboclo* societies that inhabit the *várzea* regions.

By the end of the 18th century, after waves of epidemics, slavery, and colonization, hardly a trace remained of the once populous floodplain chiefdoms. As a result of the extreme demographic collapse, European explorers of the 19th and early 20th centuries were inclined to perceive Amazonia as the antithesis of

culture. Natural scientists, such as Alexander von Humbolt and Alfred Russell Wallace, encountered depopulated, autonomous villages assumed to represent primordial rather than historical conditions. Instead, centuries of colonial occupation had already instigated immeasurable changes in the form of disease, warfare, slavery, religious conversion, language change, and involvement in the boom-and-bust extractive economies that linked the Amazon with the rest of the world. Postcolonial republics continued policies aimed to integrate and assimilate Amazonia's diverse societies and stimulate the economic development of the region. The environmental and social disruption caused by many of these development schemes has received growing scholarly and popular attention.

Development of Amazonian Anthropology

Descriptive accounts by amateur ethnographers such as Curt Ünkel (Nimuendaju) helped pioneer the field of Amazonian anthropology. German-born Nimuendaju became the leading Brazilian ethnographer during the first half of the 20th century, having lived among and published extensively about many Tupi-Guarani groups. His descriptive accounts, along with those furnished by other early ethnographers, comprised the corpus of materials from which the first regional synthesis was drawn. Swiss anthropologist Métraux and Swedish anthropologist Nordenskiöld, both of whom worked in Bolivia, initiated this first synthesis, completed by North American anthropologist Julian Steward after Nordenskiöld passed away. The monumental seven volume *Handbook of South American Indians* (1946–1950) that Steward edited marked the beginnings of scientific anthropology in the region. It also established what Eduardo Viveiros de Castro refers to as the standard model of Amazonian ethnography.

The image of indigenous Amazonia that emerged from the *Handbook* became deeply rooted in the ethnological tradition of the region. The model combines a schema of cultural areas, a typology of levels of sociocultural integration, and an explanatory theory of geographic or environmental determinism. Principles of unilineal social evolution are implicit in the organization of the volumes, which divides indigenous South Americans into foraging *marginals*, horticultural *Tropical Forest Tribes*, *Circum-Caribbean* chiefdoms, and the *Andes*. The four defined stages of unilineal evolution were mapped out across the South American continent and correlated with environmental features that either promoted or limited the development of societies along this teleological progression.

The Amazon region was defined by the presence of tropical forest tribes, considered to occupy an intermediate evolutionary position between the circum-Caribbean chiefdoms and the marginal foraging tribes of Patagonia and Central Brazil. The image presented of the typical tropical forest tribe is familiar—organized into small, autonomous, egalitarian villages; limited by an unproductive environment; and unable to produce the requisite economic surplus to develop forms of sociocultural complexity recognized elsewhere in the continent. Steward's field of cultural ecology proved influential among subsequent decades of Amazonian ethnographers and archaeologists that hotly debated which "limiting factors" were responsible for the region's sociopolitical landscape. Other topics explored by cultural ecologists included land use and subsistence patterns, material culture, and trade and exchange.

The first major alternative to Steward's paradigm emerged in the 1950s with Claude Lévi-Strauss's brand of French structuralism, which became increasingly popular in Amazonian studies with the publication of his *Mythologiques* volumes in the 1960s. Lévi-Strauss drew on the wealth of myths recorded among Amazonian tribes, particularly those of the Gê, to develop his structural analysis. Whereas scholars of the materialist tradition of Steward focused on the environmental and technological interface, French structuralists emphasized the cognitive and symbolic aspects of Amazonian societies. Furthermore, the evolutionary typologies employed by Steward contrasted with the synchronic analysis of particular groups favored by French structuralists. What both traditions had in common, however, was the presumption that Amazonian societies were intrinsically small, dispersed, autonomous, and egalitarian.

British social anthropologists began to conduct ethnographic research in Amazonia during the late 1960s, and challenged this view of Amazonian social organization. Ethnographic research in Central Brazil and the Guianas provided complementary materials to explore the intricacies of Amazonian sociopolitical organization—a theme largely absent from the *Handbook* synthesis. Amazonian anthropologists of this tradition focused on studies of warfare, leadership and factionalism, gender roles, kinship, and marriage. Peter Rivière's 1969 trail-breaking monograph on Amazonian kinship, *Marriage Among the Trio: A*

Principle of Social Organization, was influential in establishing the importance of affinal categories to Amazonian societies. The dialectical nature of Amazonian societies was also explored by David Maybury-Lewis in his 1979 edited volume, *Dialectical Societies: The Gê and Bororo of Central Brazil.*

North American anthropology was also influenced during the late 1970s by contemporary transformations in the Boasian tradition and the growing influence of European schools. Emphasis shifted away from cultural ecology to the new fields of ethnoscience and symbolic anthropology that focused on cognitive and cosmological systems. These approaches contrasted with the sociobiological approach practiced by Chagnon and other ethnographers and physical anthropologists in the Amazon, who viewed foraging societies as comparative to early man.

The popularity of Amazonia among all theoretical traditions increased during the last few decades of the twentieth century and coincided with significant revisions of the standard model. Reasons for the demise of the old synthesis included a historical turn in the understanding of pre-Colombian populations and revisions in the appreciation of contemporary indigenous social formations. The field of human ecology embraced these changes and shifted from an adaptationist paradigm that focused on limiting factors and optimal foraging theories to the documentation of indigenous resource management strategies. The research program of historical ecology further postulated that indigenous societies are not passively adapted to Amazonian environments, but actively transform these through the creation of anthropogenic landscapes.

Other new directions in Amazonian anthropology included a revision of descent and alliance theories and a greater attention to ideas of personhood, identity, performance, and representation. As traditionally defined categories of analysis are increasingly deconstructed, there is a shift in analysis away from the village to regional interactions and an appreciation of local, regional, and global scales of integration. Furthermore, there is a greater synthesis of historical, archaeological, linguistic, and ethnographic data to achieve these ends. Anna Roosevelt's 1994 book *Amazonian Indians from Prehistory to the Present* goes a long way toward achieving such a synthesis, which continues to prove elusive.

The recent controversy over Chagnon's work among the Yanomami, extensively covered in Borofsky's *Yanomami: The Fierce Controversy and What We Can Learn From It* has also drawn attention to the region and revolutionized debate about ethics within anthropology. At the same time, Amazonian anthropology is broadening to incorporate new themes that reflect these and other changing realities. As anthropologists pay more attention to issues of gender, power, and identity, the more they integrate the increasing activism of indigenous Amazonians into anthropological research and practice.

— Meredith Dudley and James Welch

Further Readings

Balée, W. (1994). *Footprints of the forest: Ka'apor Ethnobotany—the historical ecology of plant utilization by an Amazonian people.* New York: Columbia University Press.

Borofsky, R. (2005). *Yanomami: The fierce controversy and what we can learn from it.* Berkeley: University of California Press.

Hill, J. D., &. Santos-Granero, F. (Eds.). (2002). *Comparative Arawakan histories: Rethinking language family and culture area in Amazonia.* Urbana: University of Illinois Press.

Maybury-Lewis, D. (Ed.). (1979). *Dialectical societies: The Gê and Bororo of central Brazil.* Cambridge: Harvard University Press.

Meggers, B. J. (1971). *Amazonia: Man and culture in a counterfeit paradise.* Chicago: Aldine.

Moran, E. (1993). *Through Amazonian eyes: The human ecology of Amazonian populations.* Iowa City: University of Iowa Press.

Rival, L., & Whitehead, N. (Eds.). (2001). *Beyond the visible and the material: The Amerindianization of society in the work of Peter Rivière.* Oxford: Oxford University Press.

Rivière, P. (1969). *Marriage among the trio: A principle of social organization.* Oxford: Clarendon.

Roosevelt, A. (Ed.). (1994). *Amazonian Indians from prehistory to the present.* Tucson: University of Arizona Press.

Steward, J. (1948). *The handbook of South American Indians.* Washington, DC: Smithsonian Institution.

AMISH

The Amish are an Anabaptist religious isolate. There are currently over 180,000 Amish residing in the United States and Canada, with about two thirds

living in Ohio, Pennsylvania, and Indiana. The terminology Old Order Amish distinguishes them from Mennonites and New Order Amish, who are also Anabaptists but who follow a lifestyle that allows more contact with the outside world.

Historical Background

The Amish arose out of the Anabaptist (Swiss Brethren) movement in early 16th-century Europe. The Anabaptists believed in voluntary adult baptism, rather than state-sponsored infant baptism, and refused to bear arms, both of which resulted in their being severely persecuted. The *Martyr's Mirror*, a book still found in most contemporary Amish homes, documents how hundreds of Anabaptists were brutally tortured and executed for their religious beliefs.

The group now known as the Amish separated from the Mennonites, one of the early Anabaptist groups, in 1693, primarily because they believed in a stricter adherence to the doctrine of *meidung,* or a total shunning of excommunicated church members. Following this separation, the Amish migrated throughout the German-speaking parts of Europe, where they were persecuted for their beliefs. To escape this persecution, many Amish migrated to North America between about 1727 and 1860. There are no longer any Amish in Europe.

Language

The Amish speak a German dialect (Pennsylvania Dutch) within the group and use High German in their church services. With the exception of preschool children, who do not formally learn English until they enter school, all are generally fluent in English.

Organization

The primary unit of organization for the Amish is the congregation, or church district. There are approximately 1,300 Amish congregations. Each congregation consists of an average of 30 households and approximately 150 people and is led by a bishop, with the assistance of two to three ministers and one deacon. These religious leaders, who serve for life, are nominated by adult church members but chosen by lot. Thus, religious leadership is thought to be determined by God. Church districts are grouped geographically into settlements. There is no higher level of formal organization or authority above the church district.

Biweekly worship services are held in homes; there is no separate church building. Each church district has its own *Ordnung,* or the orally transmitted rules that govern the everyday behavior of the Amish. The *Ordnung* is reaffirmed twice a year during communion. The *Ordnung* consists both of rules that are common to all Amish and rules that are specific to each congregation. While distinctive patterns of dress and use of horse and buggy travel leads the outsider to assume homogeneity among the Amish, variability in the *Ordnung* across congregations results in substantial variability among the Amish.

Individuals are not considered full members of the church until they accept adult baptism. Adult baptism generally occurs between the ages of 17 and 24, depending on the individual's readiness to join the church and accept its rules. If a member consistently violates the rules of the *Ordnung,* a hierarchy of responses is initiated to try and assist the member to behave in accordance with the *Ordnung.* If the individual refuses to come into line, the highest level of response is excommunication in association with *meidung* (shunning). At the most extreme, *meidung* requires all members of the congregation (and by extension all Amish), to have absolutely no contact with the shunned individual. However, a shunned person who repents can be reincorporated into the community. The severity of the *meidung* has been decreasing in recent years in many congregations.

Key Beliefs

The core organizing principle for Amish society is their religion, which is embedded in every aspect of their lives. Amish behavior is guided by a number of key principles. Perhaps the most important of these is *Gelassenheit,* which roughly translates as acting with humility and simplicity at all times. The Amish believe that true grace can best be achieved by living in isolation from the temptations of the non-Amish world. Separation from the world is fostered by the utilization of symbols, such as distinctive clothing and horse-and-buggy travel. The Amish recognize they can best remain separated from the world if they maintain strong community ties and, in particular, freely provide each other with assistance when needed. A communal barn raising is one of the better-known examples of mutual aid, but mutual aid is actually involved in virtually all aspects of

daily life. Like all Anabaptists, the Amish believe in adult baptism. The Amish adhere to absolute nonviolence, separation from the rest of the world, and the belief that it is their duty to obey secular authorities unless those authorities interfere in religious matters.

Source: © iStockphoto/Diane Diederich.

Economic System and Change

The Amish have historically been small-scale and largely self-sufficient family farmers. However, they have been undergoing a transition over the past 50 to 60 years to an economic system based primarily on wage labor. Although there is considerable variability between settlements, the majority of Amish men now work in wage labor occupations. Some wage laborers work primarily with other Amish men, either in Amish-owned shops or in Amish construction crews, but an increasing number of men now work in factories where they have intensive contact with the non-Amish. This transition appears to be a response to the joint effects of a rapid rate of population increase and an increase in the cost of farmland. Although the Amish are often thought of as a static society, they have a history of selectively accepting changes they feel will not violate key religious beliefs but are essential for economic survival, and thus the persistence of their culture. Factory work would have resulted in excommunication 50 to 60 years ago, for example.

Health

Health among the Amish is generally associated with an ability to perform one's work and the ability to eat well. The Amish obtain health care from biomedical practitioners, from a variety of complementary and alternative health care providers, and through the use of home remedies. Amish families are very likely to accept biomedical treatments, regardless of cost, that restore normal functioning but are likely to strongly resist treatments primarily designed to simply extend life without restoring normal functioning. The Amish traditionally have relied on personal savings and various mechanisms of mutual assistance, rather than health insurance.

The Amish originated from a relatively small founding population, and each major settlement has remained largely genetically isolated from both other Amish settlements and the surrounding U.S. and Canadian populations for a little over 200 years. As a result, a number of distinctive recessive disorders have developed among the Amish. Other than these genetic disorders, the general pattern of illness and causes of mortality among the Amish are similar to those for the United States as a whole.

The Life Course

The Amish have very strong religious proscriptions against both birth control and abortion. Children are highly valued and considered gifts from God. As a result, Amish females tend to have high fertility rates, with an average completed fertility of 7 to 8 children.

Amish parents believe that raising their children to accept adult baptism and join the Amish church is their most important responsibility. Infants are viewed as not yet having the ability to distinguish between right and wrong, making it inappropriate for them to be punished. Amish infants are primarily cared for by their parents, but older children,

particularly older female children, will generally play an important role in child care, even in infancy. Once they leave infanthood, however, Amish parents believe that it is their moral obligation to firmly and consistently correct their children, sometimes including physical punishment (spanking). However, Amish culture emphasizes that any corrective behavior performed in anger will not be an effective learning event.

Because the Amish see work as central to both good health and being a good Christian, they assign Amish children age-appropriate chores from an early age. There were many useful and meaningful tasks for children of all ages when most Amish were farmers. The transition to wage labor has resulted in fewer meaningful chores for the young, a consequence that concerns many Amish.

Amish children attend school through the eighth grade, most often in an Amish school but sometimes in a public school. A Supreme Court decision exempted Amish from compulsory education through age 16 on the basis of religious freedom. All boys and many girls enter the workforce once they finish school. Boys with fathers who farm will often assist with farm work, but many boys now work in Amish shops or construction crews, or for non-Amish businesses. Girls generally work as domestics, in both Amish and non-Amish homes.

The period from the late teens to the early twenties is when youth must decide if they will make a lifelong commitment to join the Amish church (and thus reject non-Amish life). Because joining the church must be a conscious and voluntary decision, this is a period (called *rumspringa*) during which some Amish youth are allowed greater latitude about church rules. Some experiment with various aspects of non-Amish culture, listening to the radio, driving cars, or dressing in non-Amish clothing. Once they join the church, such behaviors will not be possible. A small proportion of Amish youth develop problems with alcohol, drugs, and tobacco during this period. However, most Amish youth move through *rumspringa* with little difficulty. This is seen in the fact that the majority of youth, varying from 80% to 95% in different settlements, join the Amish church. (Contrary to a recent television portrayal, Amish youth rarely actually leave their communities during *rumpsringa.*)

The Amish family is patriarchal, with the husband and father being the final authority in the household. Husbands and wives, however, are economically interdependent. Husbands are expected to provide for the family financially, and wives are expected to maintain the household and contribute economically by such tasks as food-producing gardens, canning, and making of clothing for the family. Divorce is strictly prohibited.

Amish elders are highly respected. Elders try to live as independently as possible, often moving into a small, but separate house connected to one of their children's homes (*grossdawdy* house). In the past, this move would occur when the parents turned over their farm to one of their children. Once the elderly person is no longer capable of living independently, he or she will generally either move in with one of her children, or her children will take turns providing care for the elder.

The Amish have well-established rituals associated with death, which is seen as an expected life transition and associated with eternal salvation. As a result, death appears to be associated with less stress than in many societies. Family members should be allowed, if at all possible, to die at home. If a hospital death is

unavoidable, the dying person will be surrounded by family and church members.

The Future

There has long been concern among both academics and the Amish for the ability of the Amish to maintain their cultural identity in the face of the economic transition from farming to wage labor. The fear is that this transition will ultimately affect core Amish values due to an increased contact with the non-Amish world, the fact that fathers are no longer as involved in child care, the increased income, benefits, and leisure time associated with wage labor, and the potential that this will lead to socioeconomic stratification. At the present time, however, all indications are that Amish culture is strong and resilient.

— *Jill E. Korbin and Lawrence P. Greksa*

Further Readings

Greksa, L. P. (2002). Population growth and fertility patterns in an Old Order Amish settlement. *Annals of Human Biology, 29,* 192–201.

Greksa, L. P., & Korbin, J. E. (2002). Key decisions in the lives of the Old Order Amish: Joining the church and migrating to another settlement. *Mennonite Quarterly Review, LXXVI,* 373–398.

Kraybill, D. B. (2001). *The riddle of Amish culture* (2nd ed.). Baltimore: Johns Hopkins University Press.

Kreps, G. M., Donnermeyer, J. F., & Kreps, M. W. (1994). The changing occupational structure of Amish males. *Rural Sociology, 59,* 708–719.

McKusick, V. A. (Ed.). (1978). *Medical genetic studies of the Amish.* Baltimore: Johns Hopkins University Press.

Nolt, S. M. (1992). *A history of the Amish.* Intercourse, PA: Good Books.

Anasazi

In the American Southwest, the four corners area of southern Utah, southwestern Colorado, northwestern New Mexico, and northern Arizona was home primarily to a culture typically referred to as the *Anasazi.* Now called *Ancestral Puebloan* (*Anasazi* is a Navajo word meaning "ancient enemy"), thoughts of this culture bring to mind the cliff dwellings scattered throughout the northern American Southwest. While these architectural features are impressive, they are only one aspect of the rich and varied history of this culture.

Culture History

Humans have inhabited the northern Southwest since Paleo-Indian times (ca. 11,000–7,000 BC). At approximately 7,000 BC, a shift to a warmer, drier climate resulted in a change in lifeways to what archaeologists refer to as a "broad-spectrum pattern of resource use." Essentially, populations no longer relied on large game animals such as mammoth as a primary means of subsistence; rather, the focus shifted to use of smaller game and an increased reliance on varied plant resources. This period of time is referred to as the "Archaic"; research has traced Ancestral Puebloan history to the Archaic peoples who occupied the northern region of the Southwest until 500 BC, when the distinctive Puebloan culture developed as people began to supplement hunting and gathering with maize horticulture.

Following the Archaic, visibly Ancestral Puebloan traits emerge in the northern Southwest during a time known as the "Basket Maker period." Archaeologists have summarized changes in Puebloan culture using a chronological system termed the *Pecos Classification.* The Pecos Classification was developed by A. V. Kidder and others at the first annual Pecos Conference (1927) in an attempt to organize these cultural changes in the northern Southwest. Originally intended to represent a series of developmental stages rather than time periods, it is the most widely accepted terminology in referring to temporal changes in the Ancestral Pueblo region of the Southwest. Although archaeologists no longer see the Pecos sequence as a reconstruction of adaptive change throughout the Southwest, it is still used to provide a general framework for dates and broad events within and affecting the Ancestral Puebloan region for each of the major time periods

Basket Maker II: 500 BC–AD 450

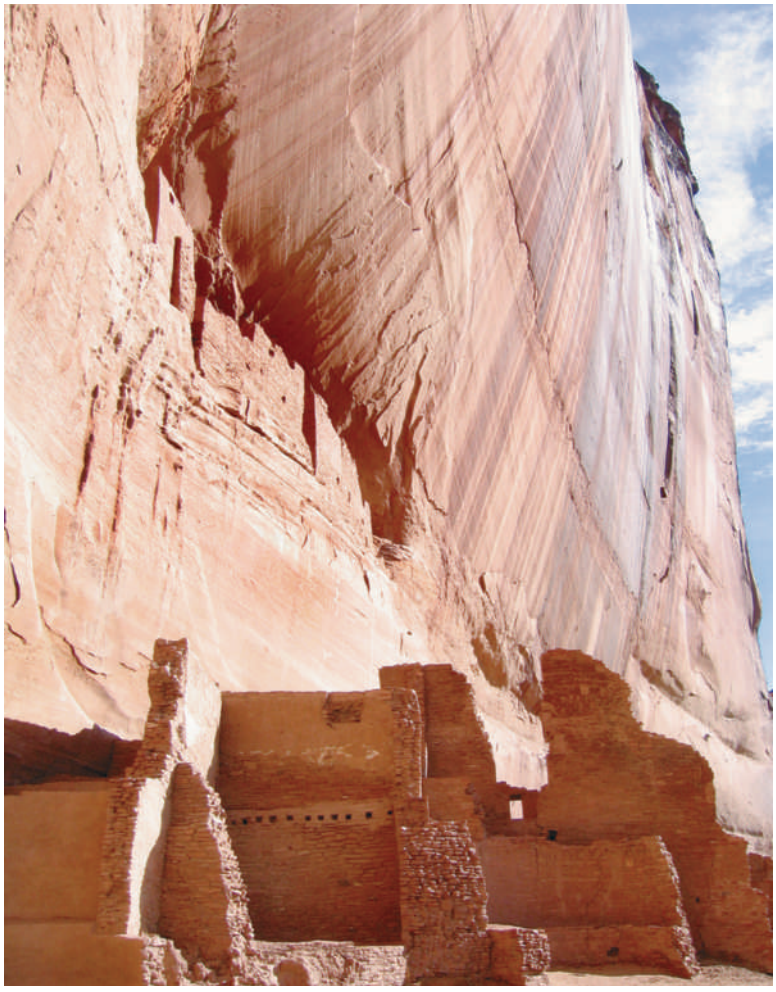
There are two competing theories pertaining to the origins of the Basket Maker culture. They are

that: (a) The Basket Makers descended from local Archaic populations and (b) the Basket Makers represent a migration of maize-dependent populations from an outside area. There is evidence to support both models, and there are inconsistencies in both. What is clear, however, is the persistence of a clearly Ancestral Puebloan culture following the Archaic.

Basket Maker II sites are documented throughout the Four Corners region. These sites certainly do not fit the stereotypical idea of the ancestral Puebloans as "cliff dwellers." Basket Maker II sites are characterized by caves or rock shelters often used for storage, small storage pits (some slab lined), shallow pithouses that were not occupied year-round, and evidence for squash and maize cultivation. Material culture of this period included coiled and plaited basketry (thus the name Basket Maker), spear throwers or atlatis, fairly large corner-and side-notched projectile points, one-handed manos and basin metates, and rabbit fur blankets. The presence of stockades at a number of these sites may suggest the early instances of warfare during ancestral Puebloan times. Certainly, the complexity of ancestral Puebloan culture is evident during this early period in their history.

Basket Maker III: AD 450–750

In general, the Basket Maker III phase represents the continuation of the Basket Maker II phase. According to Lipe, the start of the Basket Maker III tradition is clearly marked by the appearance of a plain gray (called "Lino Gray") ceramics in the archaeological record. In general, this pottery is fairly simple in decoration and form but marks an important shift in settlement and subsistence. Additional features of Basket Maker III appear to represent continued traditions that were first established during the preceding Basket Maker II tradition. The use of pithouses continued during Basket Maker III, although these pithouses were deeper and larger than before; many had antechambers. Surface storage structures increased in size from the preceding period, and the presence of these features, as well as ceramic vessels and increased use of trough metates, indicates a greater reliance on food processing and storage, although hunting and gathering still remained important to subsistence.



Source: © iStockphoto/Adrian Stapleton.

Pueblo I: AD 750–900

Pueblo I is best known for the area around Mesa Verde. This period is characterized by periods of aggregation and abandonment of short-lived villages; abandonments of these villages appear to occur with periods of extended drought, likely resulting in crop failure. Architecture is characterized by jacal construction and simple masonry surface rooms arranged in two rows, built as "modular units" and the continuation of pit structures used for habitation. Great kivas were first recognized at Chaco Canyon during this time period; these are large kivas that range from 40 to 60 feet in diameter in some settlements. Storage rooms were often located on the northern end of the modular units. Material culture and key characteristics of this tradition included the

practice of cradleboard deformation; ceramics included graywares in the form of neckbanded ceramic jars and trade redware jars and vessels. Small, temporally diagnostic stemmed projectile points are related to small-game hunting with bow and arrow.

Pueblo II: AD 900–1100

The Pueblo II period is characterized by the development of spalled stone masonry construction and the presence of fully developed kivas. In some areas, settlements are large and represent well-planned communities. This pattern was recognized first for Chaco Canyon (New Mexico), an area that seems to have been the center or capital of the ancestral Puebloan world during the Pueblo II period. These well-planned communities include massively built structures called "Great Houses," such as Pueblo Bonito at Chaco Canyon surrounded by the unit pueblos first identified for the Pueblo I period. These Great Houses are often referred to as "community houses"; they do not appear to have functioned as habitation structures. In Chaco Canyon, this pattern was concentrated, however, outside of Chaco Canyon; similar communities were constructed throughout the northern Southwest, on a smaller scale. Other architectural features included field houses (interpreted as temporary habitations/shelters used while agriculture fields were being tended) and water control features such as check dams and reservoirs. Material remains associated with the Puebloan II period are varied, ranging from seemingly simple corrugated jars, textiles, and relatively small corner-notched projectile points with convex bases and expanding stems to extensive trade goods reflecting a trade network that may have reached as far south as Mexico. The meaning of the "Chacoan" pattern is still debated; however, the influence of Chaco Canyon during this period is apparent.

Pueblo III: AD 1100–1300

The Pueblo III period is best known for the Mesa Verde area of the northern Southwest. Early archaeologists called this the "Great Pueblo period." This is the time during which the well-known cliff dwellings were constructed. Chaco Canyon seems to have lost its place of importance in the Puebloan world, and population increased in and around Mesa Verde. This phase is marked by architectural continuity in the form of modular room blocks; however, multistoried pueblos appeared at this time, and the use of shaped stone masonry became common. Bi- and triwalled towers similar to those found at Hovenweep appeared during the Pueblo III period; the function of these structures is unknown, although their use as a defensive feature has been postulated. It is the abandonment of the Mesa Verde region that has led to speculation about the "mysterious disappearance of the Anasazi." Research tells us, however, that while the region was abandoned, the Puebloan people did not disappear.

Pueblo IV (AD 1300–Contact)

By 1300, the entire Mesa Verde region was virtually abandoned. The explanations for the abandonment of this area often centers on environmental change. Following the abandonment of the Mesa Verde region, population size increased in the area around the Zuni and Rio Grande area of New Mexico. By the end of Pueblo III, people moved to essentially where they lived when the Spanish arrived. The aggregated villages that were inhabited at that time look like the pueblos of today.

While many fantastic theories speculate about the "disappearance of the Anasazi," it is clear that the people that inhabit the pueblos of Arizona and New Mexico are the descendants of the Puebloans of the past. The Ancestral Puebloan region of the Southwest was marked by a series of reorganizations, abandonments, and occupations. The "disappearance" that seemed to mark the end of the Ancestral Puebloan way of life was simply a new beginning.

— Caryn M. Berg

See also **Cannibalism; Native Peoples of the United States**

Further Readings

Adler, M. A. (Ed.). (1996). *The prehistoric pueblo world A.D. 1150–1350.* Tucson: University of Arizona Press.

Cassells, E. S. (1997). *The archaeology of Colorado* (Rev. ed.). Boulder, CO: Johnson Books.

Cordell, L. S. (1997). *Archaeology of the Southwest* (2nd ed.). San Diego, CA: Academic Press.

Lekson, S. H. (1999). *The Chaco meridian: Centers of political power in the ancient Southwest.* Walnut Creek, CA: Alta Mira Press.

Plog, S. (1997). *Ancient peoples of the American Southwest.* New York: Thames & Hudson.

Reed, P. F. (Ed.). (2000). *Foundations of Anasazi culture: The Basketmaker-Pueblo transition.* Salt Lake City: University of Utah Press.
Schlanger, S. H. (Ed.). (2002). *Traditions, transitions, and technologies: Themes in southwestern archaeology.* Boulder: University Press of Colorado.
Wills, W. H., & Leonard R. D. (Eds.). (1994). *The ancient southwestern community: Models and methods for the study of prehistoric social organization.* Albuquerque: University of New Mexico Press.

Ancestor Worship

Ancestor worship is often referred to as the *ancestral cult*, namely, a set of religious beliefs and ritual practices that commemorates the continued existence of the deceased ancestor beyond death. The rites of this cult are meant to cater to the needs of the diseased in the afterlife. The beliefs of this cult center on the ability of the dead to protect kinsmen in return for worship from them. Reciprocity between the living and the dead is the key to ancestor worship.

Two forms of ancestor worship can be identified in the anthropological literature. One is a domestic cult, which is observed by the family in dedication to its recent ancestors rather than remote ones. The other is observed by the descent group in dedication to its common ancestors in the remote past. As a cult of the descent group, ancestor worship functions to prescribe the principle of rights and obligations (jural authority) and the rules of conduct for the living, who form a property-holding corporate group. Not only are these rules and principles institutionalized in social structure and organization, but they also regulate individual access to the benefits of the corporate property. In short, they serve to keep up the social relations of the living world. Members of the descent group venerate their common ancestry communally, in addition to individual observance of ancestor worship as a domestic cult.

Aspects of Ancestor Worship

Conceptual Issues

Ancestor worship, or "the worship of the Manes," is no ordinary cult of the dead. It is, for example, not applicable to children who die young or to dead elders who belong to a different kin group, because neither qualify as ancestors. Demonstrative ancestry is the litmus test for such worship. The deceased must stand in a line of identified human progenitors to the living in order to receive ancestor worship from them. It follows that the mythical beings or animals revered as totemic forebears by the aboriginal clans in Australia are not receivers of "ancestor worship" in the proper sense of the term.

The concept of ancestor becomes more complicated when parenthood is not based on natural conception and gestation. In adoptions, ancestorhood is created by jural action where natural offspring are lacking. Chinese parents, for example, have the right to manipulate the filiation of their children jurally and put them up for adoption by either partner's patrilineage in case its continuity of succession and inheritance is tenuous or in danger of a breakdown. It enables close relatives without biological heirs to receive ancestor worship after death and avoid becoming "orphaned ghosts" that would harass the living. In all adoptions, ancestor worship is made to continue on the jural manipulation of filiation.

Marriage provides another way of manipulating ancestor worship. A case in point is in-married males in Japan and China. With offspring typically becoming members of mother's natal groups in a uxorilocal marriage, an in-married male can expect to receive worship only in the ancestral line of the wife's family. There is also the Chinese custom of ghost marriage, in which a never-married dead female is wedded to a living male ceremonially so that she can receive worship from the offspring of his future marriage and become an ancestress of the conjugal family. Last but not the least, ancestorhood is jurally sanctioned in many African societies where birth in legal wedlock is often a prerequisite for ancestor worship, but the father is not necessarily the true begetter. It is not unusual that in Asian and African cultures, descent is ultimately defined in the context of ancestor worship.

Ancestor veneration is often used interchangeably with ancestor worship. However, the term *worship* underscores a reverence of what is divine and supernatural, thus carrying a more religious undertone. Central to the rites and rituals of ancestor worship are sacrificial offerings. Offerings to ancestors may take the form of an informal family rite, a formal temple liturgy, or a community festival. All forms of offering involve purification and communication. Purity may

be inherent in the proper preparation of ritual objects, such as the masks used in African ancestor worship, which must stay out of touch by women. But water is the most common cleansing agent, hence the importance of bathing and sprinkling. Communication is typically through multiple channels, including gestures, music, recitations, and chanting.

Paradigmatic Issues

Since the mid-19th century, a number of paradigms have been proposed for the analysis of ancestor worship. Among them are the body-soul model, the psychoanalytical model, the Africanist model, the multifunctionalist model, and the divine ownership model.

The Body-Soul Model. The dichotomy of body and soul dominated the early studies of ancestor worship, as in *Ancient Law,* by Henry Sumner Maine (1861); *La cité antique,* by Fustel de Coulanges (1864); *Primitive Culture,* by Edward B. Taylor (1874); *The Principle of Sociology,* by Herbert Spencer (1875–1876); and so on.

The body-soul paradigm was built on what appeared to be a universal belief, namely, the belief that after the death of the body, the soul continued to exist, as evidenced by its appearance in dream or in an altered state of consciousness. The worship of the ancestral souls turned the family or *gens* (agnatic kinsmen) into a corporate group perpetuated by the system of collective property holding. With a legal fiction, ancestor worship invested in the patriarch the qualities of a corporation so that he enjoyed rights in governing the family, or gens, but stood under the duty to hold its collective possessions in trust for future generations. For Herbert Spencer, ancestor worship was the root of every religion.

The critics of this paradigm called attention to the fact that ancestor worship was a "family cult." Since the family was absent from the early stages of human society, this cult could not have spawned other types of religious institution. It paved the way for Émile Durkheim to introduce "the cult of the clan," namely, totemism as the most primitive form of religious life (1912). Before long, however, new study dispelled the myth of "primitive promiscuity" to establish the universality of marital institutions and family life.

The Psychoanalytic Model. The primacy of the family was reinstated in Sigmund Freud's psychoanalytic model (1913). Within its framework, ancestor worship is a ritual of atonement for the "original sin." Presumably driven by the Oedipus complex, the first sons committed the sin against their father for his wives. Then overcome by profound remorse and fear of a vengeful dead father, the sons held the first totemic sacrifice, identifying the animal with the dead ancestor and giving him the status of divinity. Thus, ancestor worship arose in response to deep emotional conflicts and weaknesses. Despite its sheer speculation about the original sin, the psychoanalytic model has been influential in the study of attitudes toward the dead ancestor cross-culturally.

According to Freud, ambivalence is characteristic of all human emotions, including love, behind which there is a repressed hostility. Ethnographic fieldwork has revealed that such ambivalence varies cross-culturally. Depending on the socialization patterns that are shaped culturally and historically, some societies express ambivalence in mixed attitudes to the dead, others in predominantly hostile attitudes with the benevolent aspects suppressed, and still others in predominantly benevolent attitudes with the hostile aspects suppressed.

The Africanist Model. This model is intellectually indebted to Radcliffe-Brown, for whom the social needs for continuity are *sui generis.* For society to maintain its existence and stability, there must be a formulation of rights over people and things that serves to regulate social relationships. Indeed, the Africanists saw social structure as a jural construction. Following Meyer Fortes's investigation of the Tallensi, several studies examined how ancestor worship provided a jural construction in the African polity. Their conclusion was that ancestor worship is a crucial unifying force in the African segmentary lineage system.

Drawing on his African data, Fortes also refined the analysis of Freudian ambivalence. Among the Tallensi, the father-son relations are affectionate because the patriarchal authority is perceived to operate on a commission from the ancestors, and a positive value is put on submission to the authority invested in the father and tribal elders. Consequently, the repressed or latent resentment that a son has does not surface as hostility toward the ancestors. An interesting twist is reported by Jack Good of the repressed hostility between the heir and property holder among the LoDagaba. This culture allows for duel descent systems. By farming for his own father, a man obtains

the right to the goods he needs for bridewealth payments, but not to the property accumulated by his father. In contrast, he stands to gain property (and possibly wives) from his maternal uncle. It is between these two that the hostility is considerable. Upon the uncle's death, however, guilt prevails, prompting the heir to sacrifice to the dead ancestor, who continues to be perceived as the property holder, capable of trouble making unless the ritual obligations are fulfilled.

The Multifunctionalist Model. With *The Common Descent Group in China and Its Functions* (1948), Hu Hsien-chin was the first to explore the multifunctionality of the Chinese descent group *zu* in sociological terms. By analyzing the *zu* in the context of ancestor worship, she aptly presented it as a descent-based kin group, a property-holding entity, and a body politic. One of Hu's most important conclusions is that historically, the development of the *zu* was the strongest where the government control was the weakest. But it was Maurice Freedman who proposed a coherent theory of the *zu* (now called a lineage) in addition to a unitary account of its multifarious functions. Theoretically, this paradigm represents a move away from the Africanist emphasis on descent toward the role of corporate land in a centralized polity.

The corporate nature of the Chinese lineage finds expression in its landholdings as ancestral estates rather than a territorial dominion. For Freedman, lineage property in the form of ancestral estates is built "from the ground up," that is, from the establishment of corporate land by the joint family. The size of lineage property is structurally deterministic. As a Chinese lineage's accumulation of land increases, so does its structural complexity. Using the functional role of corporate land as the fulcrum, Freedman unravels the multiple layers of the Chinese lineage—social structure, agnatic brotherhood, economic activities, power politics, ancestor worship, folk beliefs (geomancy), and so on. Admittedly, ancestor worship is what shapes the asymmetric segmentation of the Chinese lineage, but its observance depends on proceedings from the ancestral land endowments. It is the uneven distribution of ancestral estates that determines the patterns of lineage life, whether social, economic, or political.

The multifunctionalist paradigm has impacted the study of the Chinese lineage for decades. Nevertheless, implicit in its analysis is the idea that the significance of corporate land is to be interpreted in economic terms. This is likely to create serious problems for the investigation of ancestor worship. When lineage members are viewed as utilitarian individuals, each seeking to maximize his own gain at the cost of agnatic brothers, ancestor worship becomes merely a perfunctory product of ancestral estates. But such an analysis leaves many questions unanswered. In reality, most lineage members worship their ancestors in the absence of land inheritance. What makes them do so? How could the lineage property be sustained or grow if the descendants were all utilitarian creatures? Why did they agree to the establishment of ancestral estates against their utilitarian interests in the first place? What is so special about corporate land that it can hold agnatic brothers together despite the temptation to break it up? And so on and so forth.

The Divine Ownership Model. Allen Chun developed his model as a reaction to the Eurocentric utilitarianism of the multifunctionalist paradigm. In his view, the utilitarian analysis of Chinese lineage property betrays a total disregard of the native distinction between "ownership" and "possession" in the traditional Chinese property concepts. While the Western notion of property entails an integration of ownership and possession to some degree, they are conceptually distinct in Chinese. With respect to lineage property, its ownership is to be held collectively by the descendants in the name of ancestors, which makes it divine and inalienable. In contrast, its possession can be properly attributed to the most senior lineage member as the Corporation Sole, who manages the property in trust for future generations. Last but not the least, the Chinese terms used to describe the inheritance of property connote neither ownership nor possession, but rather productiveness, as in *chanye* ("productive enterprise") and *zuchan* ("lineage productive medium"). Because of divine ownership, corporate land has little intrinsic value in itself. What makes land indispensable is its capacity to serve as a means of sustaining production and procuring wealth for the survival of a kin group.

Land is evidently crucial to the existence of the Chinese *zu* or lineage. However, the assertion that corporate land is the raison d'être of ancestor worship is misguided. On the contrary, it is ancestor worship that gives rise to corporate land and establishes its inalienability in terms of divine ownership. Proceeding from the divine ownership of land, ancestor worship provides a coherent system of norms and values that

sanctions the proper transmission and management of lineage property. Among these norms and values are filial piety, agnatic obligations, and descent rules. Common descent, which is to be defined in the context of ancestor worship, is instrumental in securing and maintaining the continuity of corporate land. It brings about a sense of togetherness, enhances the awareness of a collective conscience, and provides the basis for a moral code of conduct. Owing to its adherence to ancestor worship, the Chinese *zu* is what Durkheim calls a "moral community."

Cross-Cultural Variation of Transition to Ancestorhood

Beliefs in an afterlife appear to be ubiquitous where ancestor worship is practiced. In Robert Hertz's view, such beliefs appear to be a response to the basic contradiction between the mortality of the human body and the immortality of the body politic. As a supplement to man's earthly span, a Land of the Dead is postulated vis-à-vis the Land of the Living. But how this afterlife is postulated varies from culture to culture.

The ancestral cult is widely practiced in West African societies, including the Ewe of Ghana, who have very definite ideas about life and death. The Ewe believe that human life is composed of two souls. At death, their union is dissolved, one returning to *Mawu,* the creator, and the other to *Tsiefe,* the spirit world. Rituals are performed to help the dead complete the journey to *Tsiefe.* It is not until after the performance of the final postburial ritual that the spirit of the dead soul is thought to have joined the ancestral family and invited to partake of the food offered in the ritual of ancestor worship. But the ritual is held irregularly by the lineage or clan and may entail a long wait. Again, the basis of Ewe ancestor worship is that in the afterlife, the dead ancestors continue to show active interest in the mundane affairs of the living. On all ceremonial occasions, the ancestors must be invoked through customary libations, and they are fed on the ceremonial stools that serve as their shrines. The continuity between life and death is made possible by the rebirth of the souls in *Tsiefe.*

As is obvious from Ewe ancestor worship, afterlife involves a gradual transformation of statuses. It is possible to identify the phases of this transformation with what Arnold van Gennep calls "rites of passage." The first phase is associated with rites of separation, whereby the dead soul is cut off from his earlier status as a living being. The second phase is associated with rites of transition, whereby the dead comes out of separation and starts the sojourn to ancestorhood in a capacity peripheral to the worlds of the living and the dead. The last phase is associated with rites of incorporation, whereby the dead becomes a member of the ancestral family. The rites of transition appear to show the greatest cross-cultural variation in terms of duration and complexity. This transitional phase is otherwise known as the stage of liminality. In the Ewe case, the liminal period lasts from the burial to the first ritual whenever it comes along.

Among the Merina of Madagascar, the duration of liminality for the dead is undetermined for a different reason. This culture requires that members of a descent group have their bones buried in ancestral tombs. Because the Merina do not live in the same place, a member is initially buried where he dies, and the burial is attended in grief and mourning. After the initial burial, at some point in time, the bones are exhumed and moved to the ancestral tomb for a secondary and final burial. The ritual for "regrouping" the body with the ancestors is joyful, for it initiates the dead into ancestorhood and kindles the hope for its expedient rebirth. Actually, birth is symbolized in the ritual by going into and emerging from the tomb as if it were a womb.

The stage of liminality may also be prolonged for concerns about the pollution of death. In Japan, a long liminal period is instituted so that death defilement can be cleansed. It takes the spirit of the dead *(shirei)* 49 days plus purification rituals to transform into an ancestral spirit *(sorei),* which is then represented by a permanent wooden tablet on the household Buddha altar *(butsudan).* But the transition will continue for another 33 or 50 years (depending on the region of Japan) before the ancestral spirit can be accepted into the body of family ancestors. That is to say, on condition that the dead soul has received worship dutifully ceremonially on the death anniversary each year and with additional memorial service on the 1st, 3rd, 7th, 13th, 17th, 23rd, 27th, and 33rd anniversaries if the liminal period is 33 years. The bottom line is that the dead must be purified in order to be accepted as an ancestor. The concern about death pollution is so great that in rural Japan, the grave receiving the body is located far away from the residential area and goes by the name of the "abandoned grave." A second "ritual grave" consisting only of a headstone may be built near the house so that worshippers can visit it without encountering the pollution of the dead body.

Robert Hertz maintains that the deceased's integration into the world of the dead is correlated with the survivors' reintegration into the world of the living. Consequently, the stage of liminality terminates for both at the same time. In his view, this says more about the values and institutions of the living than anything else. Although he makes the comment in connection with "double burial," the traditional Chinese system of *wufu* or "Five Mourning Grades" lends strong support to it.

Wufu actually means the five different types of mourning dresses prescribed by Confucian orthodoxy. Each type of dress was worn in mourning of certain consanguine or affinal relatives for a specific period of time. Grade 1 mourning, which was the severest, was for the death of a parent and lasted 3 years. Its mourning dress consisted of unhemmed sackcloth coat and skirt, hemp headdress, straw sandals, and mourning staff. As the principal mourner, the oldest surviving son lived in a hut built of branches against the house. He ate coarse rice for food, had water for his drinking, slept on a straw mat, and wailed twice a day. At the end of the first year, vegetables and fruits were added to the congee-only diet, and the hemp headdress was replaced by a raw-silk hat. No definite times were prescribed for his wailing. For the third year, the severity of mourning was further reduced so as to help the son's life return to normal.

Stipulated in the law, the *wufu* imposed a duty of mourning upon the people, sanctioned by punishment. An official must retire from office upon the death of his parent and observe the 3-year mourning. To keep the fact a secret and show no signs of distress would incur serious legal consequences as well as public disgrace. It is important to note that the *wufu* system heavily leaned toward patrilineal relatives, especially those in the senior generations. The mourning grade for patrilineal grandparents was 2 (1 year), but only 4 (5 months) for matrilineal grandparents and 3 (9 months) for grandchildren. Central to this mourning system was an emphasis on the cultivation of filial piety toward the patrilineal seniors. Filial piety or *xiao* was considered one of the most important virtues in Chinese society, where the father-son relationship was the cornerstone of the Confucian family system. It stressed that the son owed his life and achievements to his father's love and must attend to his memory after death as if he were alive. Ultimately, however, the *wufu* system served the living rather than the dead—the needs of Chinese society to strengthen its kinship system.

The Chinese mortuary rites did not necessarily involve double burial. But because of the prolonged mourning periods prescribed by the *wufu*, the only burial that happened in many cases actually provided what Hertz calls the "provisional ceremony." With the ending of the *wufu* mourning came what a secondary burial provides for the institution of double burial—the "final ceremony" that put closure on the chapter of liminality.

— Zhiming Zhao

See also **Religious Rituals**

Further Readings

Baker, H. D. R. (1979). *Chinese family and kinship.* New York: Columbia University Press.

Bloch, M., & Parry, J. (1982) *Death and regeneration of life.* Cambridge: Cambridge University Press.

Chun, A. (2000). *Unstructuring Chinese society.* Amsterdam: Harwood.

Fortes, M. (1949). *The web of kinship among the Tallensi.* London: Oxford University Press.

Freedman, M. (1966). *Chinese lineage and society.* London: Athlone.

Goody, J. (1962). *Death, property, and the ancestors.* Stanford, CA: Stanford University Press.

Hertz, R. (1960). A contribution to the study of the collective representation of death (R. & C. Needham, Trans.). In R. Needham (Ed.), *Death and the right hand.* Glencoe, IL: Free Press. (Original work published in French, 1907)

Newell, W. H. (1976), *Ancestors.* The Hague, the Netherlands: Mouton.

Van Gennep, A. (1960). *The rites of passage* (M. Vizedom & G. Caffe, Trans). Chicago: University of Chicago Press. (Original work published in French, 1908)

Angkor Wat

King Jayavarman II founded Angkor, the capital of the Khmer Empire, in the 9th century AD in northeastern Cambodia. Angkor reached its peak of

development in the 12th century under the rule of Kings Suryavarman II and Jayavarman VII. Angkor Wat is a temple dedicated to the Hindu god Vishnu and is the most well-known building in the complex despite the fact that it is only 1 of approximately 100 temples spread throughout 40 miles of jungle.

The city of Angkor was planned and constructed to serve as both an administrative and religious center. Angkor was a symbolic model of the universe from traditional Hindu cosmology. The city was oriented around a central pyramid temple. The outer walls of the temple represent the mountains that were believed to circle the edge of the world. A complicated system of canals, moats, and reservoirs, while symbolizing the waters in the cosmos, also conveniently provided water for irrigation.

Kings who worshipped different gods built many of the greatest temples at Angkor. Angkor Wat was built at the direction of King Suryavarman II in the 12th century as a funerary temple. Not only was it a place to worship Vishnu, but also upon his death, his ashes were to be interred there, solidifying his identity with Vishnu.

Angkor Wat is easily recognizable by its five central shrines. The tallest tower in the center rises 699 feet above the jungle. The towers are believed to represent the five peaks of Mount Meru—the Home of the Gods and center of the Hindu universe. The main entrance faces West, the direction associated with Vishnu. Earlier temples all faced East, associating with Siva. Three galleries and a moat surround the center shrines of Angkor Wat. It appears that every inch of the temple is carved. The outer gallery walls contain the longest continuous bas-relief in the world. It illustrates stories from Hindu mythology, including scenes from both the Mahabharata and the Ramayana, and scenes relating to Vishnu. In many other panels, King Suryavarman II is shown holding court.

The compound of Angkor Wat measures well over 4,000 feet on each side and is surrounded by a vast 590-foot-wide moat. The existence of the moat is the reason this particular temple has been well preserved. It helped to keep the jungle growth from encroaching on the structure. A long causeway leads to the enormous entrance gate. The central chamber believed to be King Suryavarman II's burial chamber is carved with many *apsaras,* mythical, heavenly dancers who entertain the gods and are a reward for kings who die bravely.

In the late 13th century, Angkor was still a large, thriving metropolis, but the frenzy of ornate, elaborate construction had come to an end. Theravada Buddhism was on the rise, and a restrained, simpler religious orientation became the norm. Meanwhile, off to the West, the Thai empire emerged as a major power in the region. The Thais encroached on the Cambodian kingdom by moving their capital to Ayudhya, in close proximity to Angkor. In 1389, the Thais attacked and claimed the city. The final abandonment of Angkor occurred in 1431, when the city was deserted and the capital was moved eastward to the area of the current capital, Phnom Penh.

During the four centuries between the demise of the ancient city and the late 19th century, most of the interest in Angkor was focused on Angkor Wat. Virtually all the other temples were abandoned to the jungle, but Theravada Buddhist monks claimed and maintained the temple for their own use.

In the 19th century, early European visitors to Cambodia were interested in the stories of a "lost city" deep in the jungle. When the French colonial regime was established in 1863, the whole area provoked interest in scholars. Intensive research and reconstruction followed well into the 20th century. Due to political and military upheavals in Cambodia in the late 20th century, there was some damage and thievery among Angkor temples. The greatest structural damage, however, was caused by neglect. Without constant maintenance, the structures were once again engulfed by jungle vegetation. In 1992, UNESCO (United Nations Educational, Scientific, and Cultural Organization) designated the Angkor complex a World Heritage Site, and added it to the List of World Heritage in Danger. This recognition has initiated international preservation efforts. Hopefully these fascinating cultural remnants will remain intact for future generations to appreciate.

— Jill M. Church

Further Readings

Freeman, M., & Jacques, C. (1999). *Ancient Angkor.* Trumbull, CT: Weatherhill.

Jacques, C. (1997). *Angkor: Cities and temples.* London: Thames & Hudson.

Laur, J. (2002). *Angkor: An illustrated guide to the monuments.* Paris: Flammarion.

Animals

Taxonomically, animals belong to the kingdom Animalia, which is one of several kingdoms of living beings. Although there is disagreement on how to best classify the various forms of life on Earth, other major groups of living beings include the bacteria, protists, fungi, and plants. The traits that define the kingdom Animalia are:

Mobility. With few exceptions, such as the sea lily (class Crinoidea), animals are able to freely move about their habitats and are not attached to a substrate.

Multicellularity. Animals begin their lives as a single fertilized ova that multiples into many cells, which differentiate into specialized cells and tissues. Animal body plans are the result of genes known as Hox genes.

Heterotrophism. Animals cannot produce their own source of energy and must consume organic material synthesized by plants.

Sexual reproduction. Reproduction in animals depends on meiosis, or the reduction division of the number of chromosomes from a double set in the adult to a single set in the ova in the female and sperm in the male. The ova and sperm merge to form a cell with the double set of chromosomes that eventually matures into an adult.

Eukaryotic cell. All animals are eukaryotes; that is, each cell has a membrane-enclosed nucleus that contains a double set of chromosomes, one set from each parent.

Death. Animals develop from an embryo that matures into an adult and eventually undergoes programmed death.

There are between 30 and 35 phyla of animals. There are an estimated 1 to 2 million species of animals, 98% of which are invertebrates, and more species are discovered every year. At least half of the invertebrates are insects. By contrast, there are about 4,500 species of mammals, 300 of which are primates. In addition to the animal phyla of insects, the Arthropoda, other examples include the Chordata, or vertebrates, such as mammals; Mollusca, such as clams; Cnidaria, such as corals, Echinodermata, such as sea stars; Platyhelminthes, such as flatworms; and Nematoda, such as round worms. Animals in their natural habitat lead well-ordered lives in the process of finding of adequate food and other resources, reproducing, and, in some cases such as mammals, raising their young.

In addition to the scientific and taxonomic definition of animals as discussed above, there is also the cultural discourse that concerns animality versus humanity. The basic dichotomy is between Western cultures that view the difference between animals and humans as a difference of kind and Eastern cultures that view this difference as one of degree. As a consequence of the attitude on the part of Westerners toward animals, a societal-wide consensus on questions of the value of animals, the extent of their suffering during biomedical experimentation, and animal consciousness and self-awareness are lacking. The debate concerning animal rights and related movements center on these questions of the value and suffering of animals. To be told you are "acting like an animal" does not really mean that one's actions are animal-like; the comment actually means that the person is acting outside of

the bounds of the moral behaviors expected of a person. The debate over the place of animals in our culturally defined worldview is a deeply emotional subject with religious implications for many people, East and West, and one that is unlikely to abate any time soon.

— *Linda D. Wolfe*

Further Readings

Gould, S. J. (Ed.). (2001). *The book of life.* New York: Norton.
http://www.sidwell.edu/us/science/vlb5/Labs/Classification_Lab/Eukarya/Animalia/
http://waynesword.palomar.edu/trnov01.htm
http://www.agen.ufl.edu/~chyn/age2062/lect/lect_19/phyla.htm
Ingold, T. (Ed.). (1988). *What is an animal?* London: Unwin & Hyman.
Margulis, L., & Sagan, D. (1995). *What is life?* Berkeley: University of California Press.
Mitchell, R. W., Thompson, N. S., & Miles, H. L. (Eds.). (1997). *Anthropomorphism, anecdotes, and animals.* Albany: State University of New York Press.
Strickberger, M. W. (2000). *Evolution* (3rd ed.). Boston: Jones & Bartlett.

Animatism

Animatism is the belief that inanimate, magical qualities exist in the natural world. Specifically, it is the attribution of consciousness, personality, and common life force, but not of individuality, to phenomena observable in the natural universe. The animatistic force can be an innate part of objects, such as trees or rocks, or embedded in observable phenomena, such as thunder, lightning, and earthquakes. To be animatistic, such forces need be both supernatural and, most important, impersonal. The term *animatism* was first coined by Robert Marett (1899) in response to E. B. Tylor's (1871) well-known description of *animism* as a form of religion used by early humans and their modern "primitive" counterparts to explain the universe by personifying all phenomena with animate power. Tylor's animism was a spiritual force, akin to a soul, both animate and with a distinctive personality, that embodied all things in the universe and was responsible for giving life to animate being. Both terms derive from the Latin *anima,* meaning "soul."

The concept of an animate yet impersonal supernatural force was first described in Melanesian by the missionary R. H. Codrington in 1891. Marett adopted this concept for anthropology, publishing it as animatism in 1909. Like Tylor, he viewed these types of belief systems as primitive forms of religion in which humans do not conceive of personal souls, but instead see external forces or phenomena as being responsible for animating the world in which humans live. He assumed, as did Tylor, that in the study of such beliefs rested clues as to the origins of religion. Drawing further distinctions between animatistic societies and the West, Marett considered practitioners of these "primitive" religions to be actors without the modern capacity of thought, saying that their religion developed under psychological and sociological conditions that favored emotional and motor processes, not ideation. Anthropologists have commonly used these early foundations to discriminate between spiritual beings with individual personalities (animism) and impersonal supernatural forces (animatism). In most animistic societies, however, there is no clear differentiation between personal spiritual beings and impersonal forces. More commonly, people perceive these powers existing side by side and interacting with each other. Spirits frequently possess practitioners of animistic beliefs or these practitioners receive information from spirits that indicate which spiritual powers are causing sickness or catastrophe.

— *Keith M. Prufer*

See also **Animism; Religion and Anthropology; Religious Rituals**

Further Readings

Codrington, R. H. (1891). *The Melanesians.* Oxford: Clarendon.
Marett, R. (1899). Preanimistic Religion. *Folk-Lore, 2,* 1–28.
Marett, R. (1909). *The threshold of religion.* Methuen: London.
Tylor, E. B. (1871). *Primitive culture.* London: J. Murray.

Animism

The ultimate source of the term *animism* is the Latin word, *anima,* meaning spirit, soul, or life force. In contemporary anthropology, animism is the generic term for numerous and diverse religions focused on the belief that nature includes spirits, sacred forces, and similar extraordinary phenomena. This is reflected in the classic minimal definition of religion, a belief in spiritual beings, that was originally formulated by the famous British anthropologist Sir Edward Burnett Tylor in his 1871 book *Primitive Cultures.* Tylor viewed animism as the basis of all religions and the earliest stage in the evolution of religion. Animism remains relevant to considerations regarding such elemental conceptual dualities as animal and human, nature and culture, natural and supernatural, inanimate and animate, body and mind, and life and death.

In general, animists believe that supernatural forces inhabit animals, plants, rocks, and other objects in nature. These forces are envisioned as spirits or souls. While they may or may not be personified, often they are categorized as male or female. They can influence human affairs for better or worse. In turn, humans may influence them to some degree through appropriate rituals and offerings, especially by ritual specialists such as shamans and priests.

Given its spatial and temporal extent, animism qualifies as the great, major, or world religion, as opposed to Buddhism, Christianity, Hinduism, Islam, or Judaism, even though it is often omitted from books on comparative religion. The antiquity of animism appears to extend back to the time of the Neandertals some 70,000 years ago. At a cave called Shanidar in northern Iraq, archaeologists found some of the earliest evidence of intentional burials, together with offerings such as red ocher and even flowers, the latter revealed by pollen remains. In sharp contrast, other religions are relatively recent, having developed within just the last few thousand years.

Geographically, animism is the most widespread of all religions. It was the religion of the hunter-gatherers, who inhabited most of the terrestrial surface of this planet until the advent of farming, around 10,000 years ago. To this day, animism persists as the only religion in many foraging, farming, and pastoral cultures. Furthermore, it also forms a substratum of popular religion in many other societies, even though they identify with one or more of the so-called great religions. For example, Asians often embrace elements of animism in their personal religion, along with mainstream religions such as Buddhism, Hinduism, or Islam. Thus, in Japan, Shintoism and Buddhism coexist and often commingle, and the former is a variety of animism. Neo-paganism in contemporary Europe, North America, and elsewhere is also a variant of animism. Some form of animism is still found in about half of the nearly 7,000 cultures in the world today.

Animism permeates much of human life and nature. As an illustration, rice is one of the most important food and cash crops in the world. However, in its Asian homelands, rice is not merely a material entity for nourishment, and it cannot be adequately understood only as such. In addition, it is associated with the spiritual dimension of life, and in particular, the so-called rice goddess, along with an elaborate complex of ritualistic, symbolic, and artistic expressions.

Another specific example of animism is the Thai belief in spirits that inhabit a place. Most homes and other buildings in Thailand have a separate little spirit house. It provides shelter for the spirit that was displaced by the construction of the human building. On a daily basis, offerings are placed in the spirit house, including water, fruit, candles, incense, and/or flowers. There are millions of such spirit houses throughout the country, where most people are otherwise to some degree Buddhist.

Beyond its prior antiquity, universality, and ubiquity, animism is also important because arguably it is far more natural than any other religion. Most indigenous societies that pursue animism are relatively sustainable ecologically, a point that should be obvious if one considers their existence for centuries, or even millennia, in the same region without causing resource depletion and environmental degradation to an irreversible degree. In these kinds of societies, nature is not merely a biophysical reality or economic resource, but more important, it is intrinsically spiritual. In other words, most indigenes do not rigidly segregate the natural and supernatural, but view spirits as part of the intricate and mysterious web of life. Probably the respect and reverence afforded nature because of its sacredness contributes significantly to the sustainability of these societies.

Given the temporal and spatial extent of animism, it is apparently an elemental part of human nature, and thus likely to persist indefinitely. Its ecological resonance may also contribute to its persistence.

As such, it deserves much more recognition and appreciation than it has been afforded in the past.

— *Leslie E. Sponsel*

See also **Animatism; Cosmology and Sacred Landscapes; Religion and Anthropology; Religious Rituals**

Further Readings

Albanese, C. L. (2002). *Reconsidering nature religion.* Harrisburg, PA: Trinity Press International.

Crosby, D. A. (2002). *A religion of nature.* Albany: State University of New York Press.

Formoso, B. (Ed.). (1996). *The link with nature and divine mediations in Asia.* Providence, RI: Berghahn Books.

Grim, J. A. (Ed.). (2001). *Indigenous traditions and ecology: The interconnections of cosmology and community.* Cambridge, MA: Harvard University Press.

Harvey, G. (1997). *Contemporary paganism.* Washington Square, NY: New York University Press.

Lane, B. C. (2001). *Landscapes of the sacred: Geography and narrative in American spirituality.* Baltimore, MD: Johns Hopkins Press.

McFadden, S. (1991). *Profiles in wisdom: Native elders speak about the earth.* Santa Fe, NM: Bear & Co.

Narby, J., & Francis Huxley, F. (Eds.). (2001). *Shamans through time: 500 Years on the path to knowledge.* New York: Tarcher/Putnam.

Anthropic Principle

The anthropic (or, literally, *human-centered*) principle entails several propositions, all focusing on the relationship, if any, between the natural physical universe and the existence of human beings in this universe. It grew out of discussions in astronomy and cosmology, where some argued that the existence of life in the universe automatically set constraints on how the universe could possibly exist and how it got to be this way since the Big Bang.

There are several versions of the argument. All are tied together, however, by the fact that the laws of physics and the physical constants as they stand now all allow for complex life to occur, or perhaps for a universe to even exist at all. For example (assuming all other forces remained the same), if the gravitational constant G—the strength of the pull of gravity of one object on another—were just a little more than it is, stars would burn out more quickly, fighting against the force of attraction trying to make them collapse. They might burn out even before there was enough time for intelligent life to evolve and notice them. Also, atoms could not form if electrons weighed a little more or protons a little less, and without atoms, nothing in the universe, alive or not, would be as we know it. The famous quantum physicist Paul Dirac was also puzzled by the apparent large number of coincidences that occur between the different dimensionless constants. Martin Rees, Britain's royal astronomer, argues that only a half-dozen numbers make the universe the way it is, and a difference in any one of them would not have allowed it to even come into existence.

These are all versions of the "weak anthropic principle," which claims that all the laws of the universe are not equally probable, but the fact that we are here to observe them implies that the laws that *are* in effect exist because we are here to observe them. What some have asserted as the "Goldilocks principle"—that is, the universal porridge is "just right" for us—asserts that the universe *must* have only those properties that allow life to develop, that is, the properties we see in the universe today. This is also called the "strong anthropic principle" by physical scientists. The strong anthropic principle allows for teleogical reasoning: The coincidences that allow life to exist must reflect evidence of an intelligent designer of some kind at work.

In anthropology, there have not been many attempts to address the anthropic principle directly, and those that have tried to do so have not been especially enlightening. Discussions of the anthropic principle come up in debates on evolution versus creationism or intelligent design, but once again, the anthropological contributions have been minimal. Perhaps linguistic anthropology might offer some future insights. There might be a language effect taking place in these discussions. Even if a strong Sapir-Whorf effect can never be demonstrated, it is impossible to address the universe in ways that are not already guided by our preconceptions of it—outlooks largely determined by the ways we talk and think about it. Thus, the whole issue of the anthropic principle might ultimately be an artifact of our perceptions—perceptions guided largely by language.

— *James Stanlaw*

See also **Big Bang Theory**

Further Readings

Barrow, J. (1990). *The world within the world.* Oxford: Oxford University Press.

Barrow, J., & Tipler, F. (1986). *The anthropic cosmological principle.* New York: Oxford University Press.

Bostrom, N. (2002). *Anthropic bias: Observation selection effects in science and philosophy.* London: Routledge.

Rees, M. (2000). *Just six numbers: The deep forces that shape the universe.* New York: Basic Books.

Santangelo, A. (2001). *The anthropic grounds to culture* (plus *Addendum,* 2002). Milan, Italy: Editrice Sabaini.

Anthropocentrism

The term *anthropocentrism* indicates a point of view that accords to the human being (*anthropos* in Greek) the central place, the one of the highest importance, around which everything else gravitates. This tendency, implying an overevaluation of the human race compared to other forms of life, is particularly manifest in two fields: cosmology and philosophy.

Cosmological Anthropocentrism

In the *Old Testament,* common sacred text for Judaism and Christianism, in the book of the Genesis, where is related the creation of the world by divine activity, the human being is the last one to see the light of life and the only one to come out of the Creator's hands as His own "image." Moreover, God gives Man the authority to "rule over" every other creature living in water, in the air or on the ground (Genesis 1:26–29). This fundamental belief of the natural superiority and domination accorded to the human beings from the very beginning by the divine Creator himself has lead to an anthropocentric vision of the world for the cultures following the abovementioned religions.

It is noteworthy that Man doesn't occupy such a privileged position in any other religious cosmogonical tradition. The modern scientific thesis of Charles Darwin (1809–1882), defending the evolution of all natural species, considers the human being as one animal among the others, which explains the harsh metaphysical opposition, which still goes on, between the evolutionists and the Christian theologists who interpret their sacred texts literally (although representatives of many official churches have declared since the end of the 19th century that they don't consider Darwin's theory as contradicting their own doctrines).

We would like to underline also that despite the diversity concerning the origins and the "natural place" of man in the world, both theories accept the actual final issue of the human condition: There are particularities in the human species (especially linked to handcraft abilities and to intellectual faculties) that gave us the possibility of an extraordinary expansion, often by chasing or by subjugating many other natural species.

In fact, the "privilege of domination" (be it accorded by a divine will or by a mechanical natural development) over the other living creatures of the Earth presented a negative side for a great part of human societies: the feeling of *difference* and *alienation* from the whole. Man, especially in the Western civilizations, became progressively a "stranger" for the natural environment. The opposition between the notions of "nature" and "culture" emerged. A certain nostalgia must have remained, expressed symbolically in many myths, traditions, and beliefs relating a lost original human condition of happy and unconscious unity with all parts of nature, inspiring a wish of "eternal return."

Concretely, the human attitude toward the other living species and the natural environment in general has largely followed during the last centuries a strict and ignorant anthropocentrism, which has led to inconsiderate destruction of the natural environment, in favor of the human profit. It is only during the last decades that human beings have recognized the great ecological problems they have created, a situation for which we may still suffer the consequences in the long term. Under the light of this new understanding, we may say that the necessity of certain changes in the anthropocentric way of behaving toward the other components of the planet has started to become an inescapable evidence.

Philosophical Anthropocentrism

It is in fact difficult to define among the philosophical theories those that may be qualified as properly

anthropocentric, as the limits between "anthropocentrism" and "humanism" become vague, according to the way one defines each notion. After making here an obligatory personal choice, let us keep the same general definition, already mentioned, for "anthropocentrism" and distinguish it from "humanism" by the following characteristic: We accept that "humanism" considers the value of human being as independent (a value "by itself") and is guided by the respect of this value; this doesn't necessarily imply the exclusive accordance of the highest importance to the human being compared with other beings or values, as is the case of the "anthropocentric" theories.

The Sophists were the first thinkers to put Man in the center of their world vision, during the 5th century BC. The most representative fragment of their anthropocentrism is the one attributed to Protagoras of Abdera (490–420 BC): "Man is the measure of all things." This principle legitimated pure subjectivity and relativity for all metaphysical, ethical, and political values.

Socrates (470–399 BC) and Plato (428–348 BC) firmly rejected the sophistic position, which covered a certain political opportunism, without any effort to further explore the human being himself and his relation to the world. This task was undertaken by Socrates himself, who is thus considered the founder of "philosophical anthropology."

In the history of occidental philosophy, there have been afterward various theories that have advanced subjectivism as the "anthropocentric" principle of human knowledge. We can't cite them here all in detail, but let us give only as representative examples the subjective idealism of Johann Gottlieb Fichte (1762–1814) and the existentialism of Jean-Paul Sartre (1905–1980).

— *Aikaterini Lefka*

Further Readings

Diels, H., & Kranz, W. (1996). Protagoras. *Die Fragmente der Vorsokratiker* (Vol. II, Sec. 80. pp. 253–271). Zurich: Weidmann.

Fichte, I. H. (Ed.). (1971). *Fichtes* werke (11 vols.). (Reprint of the 19th-century edition). Berlin: Walter de Gruyter.

Sartre, J.-P. (1996). *L'existentialisme est un humanisme* [Existentialism is a humanism]. Paris: Gallimard. (Original work published 1946)

Anthropology and Business

Business and industry are fundamental ways of organizing economic activity to meet basic human needs in modern market societies. *Business* means the buying and selling of goods and services in the marketplace (also known as commerce or trade), while *industry* refers to the organized production of goods and services on a large scale. When we use these terms in the anthropological context (for example, business or industrial anthropology), we may refer to one or more of the three major domains of anthropological research and practice in the private sector. These include

- anthropology related to the process of producing goods and services and to the corporate organizations in which production takes place
- ethnographically informed design of new products, services, and systems for consumers and businesses
- anthropology related to the behavior of consumers and the marketplace.

The term *business anthropology* came into usage in the 1980s, when anthropologists became full-time, nonacademic practitioners in niches related to consumer behavior and marketing. Prior to that time, we more frequently used the terms *industrial anthropology*, *anthropology of work*, or *applied anthropology in industry* to denote areas of research and practice that focused on business-related phenomenon. More recently, we have begun to more generically use the term *business anthropology* to mean any application of anthropology to business-oriented problems.

Part I: Historical Development of the Field

Early Colonial History

Anthropological roots that trace back to European colonial interests also connect, albeit indirectly, to the international trade of that era and the commercial activities associated with such trade. Early in the 19th century, for example, the Court of Directors of the East India Company made a formal decision to acquire anthropological knowledge of India, as such knowledge was deemed to be of great value in the administration of the country. Subsequently, Frances Buchanan was appointed by the Governor-General in

Council to undertake an ethnographic survey to inquire into the conditions of the inhabitants of Bengal and their religion. Likewise, in Nigeria, where the British government employed a National Anthropologist for research purposes, the journal *Africa* was established in 1928 to harmonize research policy and practice in the colonies "for the solution of pressing questions that are of concern to (among others) . . . traders working for the good of Africa," according to Lord Lugard, the first governor general of Nigeria in his article in the first issue of *Africa.* These traders included Lever Brothers and John Holts, companies that secured the produce of the colonies for British factories and in turn shipped the finished products to the colonies.

While the actual value of European anthropology to colonial interests has been called into question, there was, at least, sufficient potential there to justify the funding of a Colonial Social Science Research Council (CSSRC) in Great Britain from 1944 to 1962, an organization that advocated a practical research agenda for anthropology in the colonies. It is, perhaps, not a coincidence that during this same period—the 1950s—British industrialists, led by Israel Sieff (a cofounder of Marks and Spencer, a department store chain), requested support from British anthropologists to deal with quite different issues in England, for example, staff relationships and productivity in corporations. The industrialists were rebuffed, however, with the reply that anthropology was an exploratory discipline and thus could not be used for anything so concrete as recommendations to businesses. The relationship between anthropology and colonial interests is part of the world history of applied anthropology and is one of the reasons why European anthropologists were slow to adopt applied anthropology as a formal area of research and graduate training in the latter half of the 20th century. The kind of work supported by the CSSRC became tainted with political incorrectness as independence movements grew in force around the time of World War II, causing embarrassment for some anthropologists who found themselves linked to colonial purposes. As a result, many European anthropologists threw the "applied baby" out with the bathwater, and application simply was off-limits in many places until the last quarter of the 20th century. The mantle of leadership in application consequently "jumped the pond" to the United States—the home of pragmatic philosophy, with important implications for the relationship between business and American anthropology in the 20th century and beyond.

The American Context

On the other side of the Atlantic, the United States was experiencing its industrial revolution during the latter part of the 19th century, and, with it, the focus of applied anthropology shifted from studies of Native Americans to research based in industry. The rise of American industry was accompanied by a theory of organization known as *scientific management* developed by the engineer Frederick W. Taylor and implicitly in force in today's corporations. According to Taylor, the activities of both workers and managers should be determined by "scientific" methods—thorough investigation of the skills and actions needed to perform a given role, careful selection of individual workers and managers based on their ability to perform the role, and detailed instructions that would direct each employee's behavior so that maximum output could be achieved with minimum input. Taylor believed in the theory of "economic man"—that individual employees would respond rationally to economic rewards by increasing their productivity to maximize rewards to themselves. The trick was to find exactly the right kind and amount of incentive—sufficient to motivate the worker effectively but not so generous as to detract from profitability. This approach, he believed, would reduce labor-management strife, as all actors would be satisfied with their situations.

Taylor didn't have to worry about unions interfering with his plan to optimize the productivity of the workforce. Prior to the 1930s, manufacturing companies did not have industrial unions, as many did later on in the 20th century. American unions were organized along trade lines (for example, carpenters, glassblowers, shoemakers) rather than by industry (such as automobiles, steel, textiles). This reflected the craft-based organization of production common at that time in which skilled workers with deep knowledge and experience in all aspects of a particular craft made products by hand. This manual process yields high-quality products, but it is slow and not suited to mass production for large national markets. Craft workers used trade unions to maintain some measure of control over the conditions under which they worked—such as who could join the trade, how they would be trained, what they would be paid. Such trade unions were much like medieval guilds.

The less skilled production workers of the growing manufacturing firms were not permitted to join trade unions. As manufacturing companies expanded in scope and influence toward the end of the 19th and beginning of the 20th centuries, their managers very much wanted to keep unions from organizing the less skilled production workers. The 19th century had been a period of serious labor-management conflict in the United States, with members of trade unions regularly going on strike against their employers and violence sometimes breaking out. These strikes were not legal, and union members often clashed with private security guards, state militia, and even federal troops. People were sometimes killed in these struggles. Because American workers did not yet have a federal law ensuring the right to form a union, workers could be arrested and charged with crimes such as conspiracy.

As industrial technology began to replace the skills of the craft workers, managers looked forward to the day when the trade unions would decline in influence, which they soon did. Managers were still concerned, however, that the less skilled production workers, who were becoming more numerous as national markets for mass-produced goods expanded, would organize unions of their own, something they wanted to avoid at all costs.

One effective approach to avoiding unionization was a benign theory of management known as *welfare capitalism,* an ideology that became central to the future relationship of business and anthropology. The hypothesis was that if management treated the workers well and ensured that they were contented, labor strife would subside and unions would not grow stronger. This approach was especially prominent during the economic boom years of the 1920s, when employers spent money improving workers' quality of life. They built new housing for workers, created flower beds, parks, and libraries and set up elementary schools for the workers' children. Management also formed company unions that negotiated "sweetheart deals" (for example, union leaders were treated very well, and they agreed to whatever management wanted). As a result of these efforts by management, the union movement did not advance in the 1920s, and there was a reign of relative peace in the ranks of less skilled industrial workers up to the time of the stock market crash in 1929.

The Hawthorne Project

It is against this backdrop that the Western Electric Company (now part of Lucent Technologies) began in 1924 at its Hawthorne Works near Chicago a series of experiments aimed at increasing the productivity of the workforce. These experiments reflected both the influence of welfare capitalism and Frederick Taylor's scientific management movement. The company wanted to find out how to improve working conditions so that worker fatigue and dissatisfaction would be reduced (welfare capitalism), and they believed that a single variable (such as factory illumination) could be manipulated to make this happen (scientific management). In these particular experiments, however, the results did not make sense from the standpoint of scientific management theory. The experimenters found that worker productivity increased when the lights were made brighter (as expected), but productivity also increased or stayed the same when lighting was decreased, even to the dim level of moonlight. This result definitely was not expected, and could not be explained by the prevailing theory of the time.

Intrigued, the Hawthorne researchers instigated a further series of tests to explore the anomaly, one of which was called the Relay Assembly Test Room (RATR) experiment. In this test, a group of women were isolated in a laboratory where their conditions of work and output could be measured carefully. The experimenters then varied the working conditions, giving the women rest breaks, snacks, incentive pay, and then gradually withdrawing each of these, while they measured the number of relay assemblies each woman produced. Again, the same mysterious results emerged—productivity was sustained or increased no matter what the experimenters did to working conditions. We now know this phenomenon as the Hawthorne Effect, meaning that nonexperimental variables are affecting the experimental results, but at the time the outcome was inexplicable.

Hawthorne researchers called upon Harvard psychologist Elton Mayo to help them interpret the mysterious results of their experiments. With his help, they came to realize that they had inadvertently altered the working conditions of the women far beyond those of a normal work environment. For example, the researchers themselves had become the women's supervisors and had developed a congenial relationship with their research subjects. Two women who were not cooperative in the project had been replaced with two other women. Neither of these conditions paralleled those that might be experienced on the shop floor. Further, the women themselves had

developed an esprit de corps in which they worked together as a team, encouraging and helping one another if one fell behind. This is, at least, the official version of the research team after members settled internal disputes regarding the appropriate interpretation of the data. Richard Gillespie's 1991 *Manufacturing Knowledge: A History of the Hawthorne Experiments* illuminates the differing interpretations among Hawthorne researchers and explains how Mayo's views came to dominate the social science lore.

In Mayo's views, the women had developed a distinctive social system, and this system itself had become part of the production process and was no doubt contributing to the enhanced level of productivity that was being observed in the experiment. Now, rather than simply being interested in how one variable (illumination) influenced another (fatigue), the Hawthorne researchers started to become interested in understanding the relationships among variables in the social system and what their effects on production might be.

As discussed by Helen Schwartzman in *Ethnography in Organizations*, Hawthorne initiated in 1928 a massive interview project involving 20,000 employees, aimed at obtaining a better understanding of psychological factors that affected the workers. It was these interviews that uncovered the tendency of workers to band together as a means of defense against anything that might be perceived as a threat. This tendency produced a uniformity of behavior among individual workers, for example, reluctance to ask for a raise, which might create a rift within a work group. This tendency gradually came to be conceptualized as the worker's social system or social organization, and it was an interest in understanding this social system that prompted the next and final phase of the Hawthorne project.

It was at this point that anthropology entered the Hawthorne project. Elton Mayo had established a friendship with two prominent anthropologists, Bronislaw Malinowski and A. R. Radcliffe-Brown, and he therefore knew that anthropologists study natural social systems in the field. It was this very approach that Mayo wanted to adopt for the final phase of the Hawthorne study. Through his professional network, Mayo was introduced to one of Radcliffe-Brown's students, W. Lloyd Warner, who had just returned from fieldwork in Australia, studying the Murngin. Warner consulted with the Hawthorne researchers in designing and conducting the next phase of their experiment, and with this act he fathered industrial or organizational anthropology.

With W. Lloyd Warner as design consultant, the Hawthorne researchers conducted the final phase of the Hawthorne project, known as the Bank Wiring Observation Room (BWOR) experiment. This portion of the project was aimed at exploring what workers actually *did* on the job, in contrast with what they *said* during the interviews. For the BWOR, a replica of the shop floor at Western Electric was constructed, into which a typical work group (14 male bank wirers and their supervisors) was installed. The workers performed their tasks as usual while a trained observer watched them and recorded their interactions over a time period extending for several months during 1931 and 1932, the depths of the Great Depression. To gain a better understanding of the worker's point of view, a second researcher, not present in the observation room, conducted periodic interviews with the workers. Warner encouraged the researchers to read anthropological theory and to analyze their observational data much as an anthropologist would in studying a small society such as a band or tribe.

The BWOR study was the first to demonstrate empirically the starkly contrasting points of view separating management and the workers. Hawthorne management had accepted Frederick Taylor's concept of "economic man" (that is, workers are rational actors who respond to economic incentives), and therefore they had devised a complex piece rate incentive scheme that guaranteed a minimum hourly wage in exchange for a minimum daily standard of production (the "bogey"), plus an additional sum that was determined by the amount of output produced by the entire group in excess of that which was guaranteed by the minimum hourly wage. Management believed that this system would encourage workers to maximize their efforts up to the point at which fatigue and discomfort inhibited additional production. Part of this incentive scheme was the notion that slower workers would be spurred on by those in the group who worked faster (much as they witnessed in the earlier RATR experiment).

In reality, however, the piece rate system had exactly the opposite effect to what the managers envisioned. Workers had their own notion of a "fair day's work" that was considerably below that which management envisioned as desirable under the piece rate incentive system. The workers' informal standard was translated into a certain number of units to be produced

by each man during the day; this was basically the amount of labor required to produce the bogey. Anything produced in excess of this minimum was frowned upon and negatively sanctioned by the group. If a worker set a fast pace and produced more than the minimum standard, he was subjected to verbal abuse (for example, called a slave), "binging" (using the thumb to snap the third finger against the violator's arm), and eventually, the most dreaded punishment—ostracism or virtual banishment. Often the workers would produce their quota early in the day and then subtly scale back effort in the afternoon while enjoying one another's company (all the while keeping an eye out for management). This work culture arose from the workers' belief that a higher daily rate of production would prompt management to raise the bogey, cut the hourly rate, or lay off some of them. The Hawthorne project was conducted during the depths of the Great Depression, so it is not surprising that workers feared such actions from management.

The Hawthorne findings were in conflict with the existing management theory of the day. According to Taylor, the economic man was an individual, and incentive structures were set to encourage individuals to give their maximum effort and to push their peers to do the same. Yet in the BWOR, the workers did not respond as individuals but as a group, and they had developed their own informal theory of management that was based on distrust of managers, not on an interest in economic gain. Here was the first solid empirical evidence of *informal organization* (what we might call an occupational subculture or counterculture), defined as the actual patterns of social interaction and relationships among the members of an organization that are not determined by management. Researchers were able to map this informal organization by quantifying interactions among workers and to graphically depict networks of relationships between different work groups or cliques, much as network analysis today reveals informal patterns of communication and exchange among individuals. The informal organization that was depicted very much contrasted with the *formal organization* (interactions defined by the rules and policies of the corporation) that management had put in place to enable pursuit of the company's goals. The corporation thus was comprised of two kinds of organization that were not aligned with each other—one a rational organization designed for instrumental purposes, and the other a spontaneous, natural form of human social interaction that arose in response to inherent human interests and needs. These findings made clear that workers were not simply "factors" in production, much like machines, but were sentient beings who assigned their own meanings to phenomenon and who protected their interests through mechanisms of their own design. Although this insight seems obvious to us now, it was a startling breakthrough in the early 1930s, and it represented a severe critique of Taylor's scientific management theory.

One of the most significant findings to emerge from the Hawthorn project was that workers exert considerable influence over industrial productivity. As long as machines did not control the work process, as they did not in those days, workers could manipulate the pace of production in many subtle ways not easy to detect without an army of supervisors. Management was no longer fully in control of the corporation, as the theory of the day assumed, but had to deal with a powerful natural force that, from management's perspective, did not respond to the logic of economic incentives. From the worker's point of view, of course, the men of the BWOR were being quite logical, since any behavioral pattern other than that which they exhibited could end up costing them in the long run. Interestingly, this latter anthropological view is not the one adopted by the Hawthorne researchers, who accepted Mayo's interpretation of the findings, which held that the BWOR workers were acting in an irrational manner, based on psychological "maladjustment." A different industrial future may have unfolded if the alternative view had prevailed.

A new school of thought emerged in organizational theory as a result of the Hawthorne findings, and it held sway for the next two decades—the *Human Relations School.* This school of thought was based on *functional equilibrium theory,* a theory widespread in the social sciences at the time, which viewed human organizations as integrated social systems, with specific structures that interacted to maintain a smoothly operating whole. Each individual was seen as being tied to the whole yet still having his or her proper place and function in the system. Within the context of this theory, conflict between management and workers was seen as pathological, reflecting the disruption of an equilibrium state, and was to be ameliorated by making adjustments in the pattern of interaction among individuals and organizational structures. A disruption of the equilibrium state

would affect worker morale in a negative way, and this in turn would interfere with efficient production. The Human Relations School aimed at creating harmonious worker-manager relationships that would ensure optimal productivity in a company (some later called this "cow sociology"—contented workers give better work). Mayo argued that a work group's informal organization either could support management goals (as seen in the RATR) or work against them (as in the BWOR). Management needed to adjust its relationships with workers to ensure the former result, not the latter. This school of thought was prominent in American industry for the next 20 years and was highly influential in shaping the practices of the first generation of industrial anthropologists.

Not coincidentally, the Human Relations School often is associated with welfare capitalism and with a tendency in managerial thought and action to resist unionization of the workforce. The anthropologists who were prominent within the Human Relations movement appear not to have questioned the status quo ante assumptions upon which this movement was founded, and consequently they and their colleagues often have been judged as management-centric in their research and practice, a judgment that may not be completely fair, given the anthropologists' landmark efforts to understand the perspective of the Hawthorne workers.

The Human Relations Movement

Ironically, Warner and his colleagues did not have further opportunity to continue their studies at Hawthorne during the 1930s. This was the result of two developments. First, the Hawthorne researchers followed up on the BWOR study by initiating a program of psychological counseling with workers that they believed would contribute to industrial peace. No further studies of social interaction on the shop floor were conducted (while industrial psychology as a field expanded). Second, as the Great Depression unfolded in the 1930s, severe economic deprivation meant that companies did not have the resources needed to continue to support research of the Hawthorne type. Thus, little industrial anthropology was conducted in the United States during the remainder of the 1930s.

As the United States recovered from the Great Depression and then entered World War II, production pressure intensified and internecine "feuding" between workers and management erupted once again, becoming an increasingly serious threat to the economic welfare and security of the nation. Any effort to ameliorate this conflict was viewed as contributing to important national goals. Intellectuals were motivated to become involved in Mayo's Human Relations project primarily because of such critical national interests and not as a result of concern for the competitiveness or profitability of individual firms.

The group of anthropologists at Harvard during the time of the Hawthorne project also was influenced by a general interest in modern institutions, and they found many opportunities to conduct observational studies in large corporations and to apply their insights toward the goal of industrial harmony, from the 1940s through the 1950s. This generation of industrial anthropologists, including Conrad Arensberg, Elliot Chapple, Burleigh Gardner, Robert Guest, Solon Kimball, Frederick Richardson, Leonard Sayles, and William Foote Whyte (who was trained as a qualitative sociologist), undertook a series of important studies both of workers and managers, with the goal of discovering factors and forces that could be manipulated to achieve an equilibrium state in the organizational system (that is, the elimination of conflict).

Anthropologists who worked in industry during this period continued to be influenced by Elton Mayo's conception of social science as therapeutic or clinical practice. In keeping with functional equilibrium theory, Mayo believed that a key role of social science, including anthropology, was to gain a better understanding of human social systems in industry in order to permit the design of effective interventions that could alleviate pathologies such as labor-management conflict, resulting in more smoothly functioning organizational systems. If a social system was not in an equilibrium state, the anthropologists believed that they could contribute to restoring a healthy equilibrium by identifying sources of friction in the social system and recommending ways to transform adversarial or rebellious relations into productive collaboration. The anthropologists did not question the asymmetrical relations of power in a company as a key source of conflict; these were taken as given.

During the 1940s and 1950s, anthropologists were hired by management to work on problems in specific plants, such as high turnover, absenteeism, strikes, and poor worker-management cooperation. They studied various aspects of social structure and relations within the industrial enterprise, such as informal relationships among workers, actual work processes,

status hierarchies, relations between workers and managers, union-management interaction, and voluntary associations in the workplace. Many of these studies identified the small work group as a critical factor within the industrial system, thus opening a new area of study in the social sciences that has been highly productive from a theoretical standpoint.

Companies that hired anthropologists during this period included Sears, Roebuck & Company, the Container Corporation of America, International Business Machines (IBM), Inland Steel Container Company, Libby MacNeil and Libby, Bundy Tubing Company, and the Eastern Corporation. Some of the anthropological studies of such firms produced industrial ethnographies (case studies) of the entire company, with a focus on the factors and forces that influenced human relations within an integrated social system. For example, Warner and Low conducted their famous case study of a major industrial strike in Yankee City (Newbury, Massachusetts), explaining connections between the social system within the factory and larger economic, technological, and social forces that contributed to the strike. Yet the anthropologists saw themselves not as hired guns but as scientists, working to discover laws of human interaction that could establish the foundation for a science of human behavior. W. Lloyd Warner, the founder of industrial anthropology, had a larger theoretical agenda that he hoped to advance through the study of modern institutions, such as industrial organizations.

Methodologically, Eliot Chapple and other anthropologists aimed to obtain a detailed, quantitative record of interactions among workers and managers in industrial settings, much as a naturalist would record the behavior of an animal species in the field. Detailed measurement of actual behavioral interaction would help to pinpoint the sources of tension and conflict between different industrial roles. This knowledge could then be used to make precise adjustments in patterns of interaction that could contribute to a reduction in conflict. Chapple developed a new technological device, called the Interaction Chronograph, which helped to record quantitatively the interactions among individuals as they unfolded in real time. This device may be viewed as the precursor of modern videotape analysis of workplace interaction that was later pioneered by a second generation of industrial anthropologists.

Frederick Richardson's work provides an example of a key social variable—the human contact—discovered by the anthropologists through observational methods, and describes how this variable could be used to improve worker-manager relations. The contact pertains to the behavioral interaction that takes place between a supervisor and his or her subordinate in face-to-face meetings. Richardson suggests that it is possible to predict the performance of a work group solely by recording the supervisor's contacts that last 1 minute or more. High-performing units display "contact moderation" about 90% of the time. The anthropologists argued, based on studies of primates and other animals, that conflict between work groups is exacerbated by physical separation and a lack of ongoing contact. This behavior pattern is one in which a supervisor spends one half to three quarters of his or her time engaged in contacts with others. The contacts are well distributed across the group, with the average length being fairly short, but not curt. Typically, there are 15 to 30 contacts per day, with a good balance between group and pair contacts. Supervisors of high-performing groups also were found to be more talkative, more dominant (cannot be interrupted easily), more flexible in style, and less flappable. These supervisors over and underreact less to excessive talking or silence from others, maintaining their own rhythm of speech. This description was derived from close recording of behavioral interactions, and it was used to advise managers on ways to improve the productivity of their workers.

It is clear from the discussion above that industrial anthropologists of the time studied not only workers but managers as well, something Fredrick Taylor had difficulty doing, as managers resisted the application of his methods to their ranks. Being able to study both workers and managers meant that the anthropologists had to gain access to, and establish trust with, both of these groups, a feat that was quite difficult to do in times of industrial unrest. Anthropologists were virtually the only group of researchers capable of performing this feat, although later they were criticized for being too close to management in their assumptions and point of view.

After the Hawthorne project, W. Lloyd Warner shifted his focus to the contemporary community in his Yankee City studies. The focus of this project was the social stratification of a community using the anthropological techniques of direct observation and interviews. It was in this project that Warner uncovered the importance of both the voluntary association and the corporation as distinctive modes of social

integration in American life. Warner found that both of these forms of organization bring together and articulate diverse social elements, including individuals, families, and ethnic groups, in ways that are not typical in other societies. Anthropologists conducting studies of families, work, and corporations only now are beginning to follow up on these insights.

Especially important to our understanding of industrial anthropology in this period was Warner and Low's study of a major strike affecting several Yankee City shoemaking factories. The intensity and duration of the strike, which took place during the depths of the 1930s Depression, were a surprise to many observers, since the workers in the plant had never mounted any job action in the many decades of the factory's history. Warner and Low were able to trace the roots of the strike to changes in the technology, work process and social relations within the factory, and they also linked these microlevel changes to larger technological and economic transformations unfolding at the macrolevel of the nation. Over some decades before the strike, shoemaking production technology had gradually evolved, reducing once highly skilled craftsmen to less skilled and more interchangeable workers in a more heavily mechanized production process. The deskilling of the workforce had destroyed the traditional social system within the factory, which was based in a hierarchy of increasing levels of skill in the craft of shoemaking. Workers' identity and self-esteem were tied to their capacity to move up the skill hierarchy as they gained increasing experience and expertise. But technological changes destroyed the skill hierarchy, reducing once proud craftsmen to a more or less undifferentiated mass of deskilled workers. Such changes generated a sense of loss of control and autonomy among the workers, drawing them into a group with shared interests. At the same time, the ownership of the factories themselves had changed hands, shifting from local ownership to distant owners in New York City. The absenteeism of the factory owners removed social constraints against strikes that had been in place when the owners were integral members of the community. As a result, members of the community supported the strike in a way that would not have been possible before, and this support made a lengthy strike possible. As a result of the strike and its community support, the workers organized an industrial union and were successful in their demands against management, thereby reflecting similar changes that were taking place across the country. Through this study, Warner and Low showed that behavior inside a plant cannot be understood fully without also knowing the connections between the plant and its historical, social, economic, political, and technological contexts. The discovery of the open-systems nature of work organizations was an original theoretical contribution that predated Selznick's work on the Tennessee Valley Authority (TVA) that often is credited in the management literature as the first research to demonstrate organizational-environmental interactions.

In 1936, Warner left Harvard and went to the University of Chicago, where he founded the Committee on Human Relations in Industry. This group encouraged and supported the work of many industrial anthropologists and sociologists, such as William Foote Whyte, whose qualitative field studies of various industries have become classics of the organizational theory literature. Another significant event during this period was the founding of the Society for Applied Anthropology (SfAA) at Harvard in 1941. Several of the founders were industrial anthropologists who published their industrial research findings in the SfAA's journal *Applied Anthropology* (now *Human Organization*).

The Decline of Industrial Practice

Around 1960, a number of significant changes in the social, political, and economic context of the United States influenced the development of academia and with it the trajectory of industrial anthropology. Instead of continuing to establish itself as an important subfield of anthropology, as might have been projected from its promising start in the previous three decades, the anthropology of industrial organizations entered a prolonged period of decline from which it has only recently begun to emerge. This decline is related both to a waning interest in modern institutions within the mainstream of anthropology and to a scarcity of practitioners, that is, individuals who conduct the science and craft of anthropology—whether research or application—inside industrial and business organizations. Possible reasons for the decline might be a change in academic environments, a shift in social science theory, and political and ethical issues.

Change in Academic Environment

With the end of World War II and the Soviet Union's launch of *Sputnik* in the 1950s, major

changes swept over American higher education. Record numbers of baby boomers entered college, along with returning GIs, and the ranks of college students exploded in number. Simultaneously, the American government was eager to continue the technological advances that had helped the Allies to win the war, and toward that objective the National Science Foundation was established to fund academic research. These developments meant that academic anthropology, and federal funds for fieldwork in countries outside the United States, grew both in numbers and stature. American anthropologists now had growing numbers of academic employment posts and the means to travel abroad to conduct research. The academic discipline of anthropology emphasized the significance of fieldwork outside the United States as necessary to the creation of a "real anthropologist." Those conducting research in the United States (such as the industrial anthropologists) were relegated to a second-class citizen status, which ultimately pushed many of them out of anthropology and into the business world. Some became professors in business schools (for example, Frederick Richardson, William Foote Whyte, and Leonard Sayles), while others started businesses or became business consultants (for example, Burleigh Gardner and Eliot Chapple). This meant that they were not able to produce a new generation of industrial anthropologists.

Shift in Social Science Theory

The Human Relations School and functional equilibrium theory were incompatible with the emerging reality of labor relations in American industry, which was increasingly characterized by severe labor-management conflict and strife. During the Great Depression, unionism of all kinds declined as unemployment grew to unprecedented levels. The moral authority of business and its capacity to practice welfare capitalism were severely damaged, and when a slow recovery began in 1932, the previously harmonious labor relations disappeared. Labor agitation mounted as workers were called back to their jobs, and President Franklin D. Roosevelt, concerned that labor unrest could derail the fragile recovery, decided that the federal government would sponsor collective bargaining as part of a strategy to get the economy moving again. When this approach was ruled unconstitutional, the U.S. Congress passed the National Labor Relations Act in 1935, which, for the first time, gave workers the right to bargain collectively. Shortly afterward, the Council of Industrial Organization (CIO) was formed to organize less skilled workers on an industrywide basis. Now when the union called a work stoppage, such as that which took place during the Flint sit-down strikes of 1936–1937, the government no longer interfered, and the unions began to make serious headway toward their goals of improved wages and working conditions for unskilled workers. The modern union movement was born. Over the course of the next several decades, union bargaining succeeded in transferring approximately 16% of shareholder wealth into the pockets of working people.

As the organized labor movement grew in strength, collective bargaining and the "union contract" came to be the answer to labor-management relations on a daily basis, rather than the smooth equilibrium sought by the Human Relations clinicians. As a result, this movement and its practitioners gradually faded into obsolescence. The industrial anthropologists themselves appear not to have realized what was happening until it was too late. Historians of social science have criticized this generation of industrial anthropologists for being too management centric and not connected sufficiently to the working class to foresee the rising tide of unionization and its theoretical consequences. In the meantime, other disciplines such as industrial sociology were developing new theory to explain organizational behavior. The most prominent of these (and still dominant) is *contingency theory*, which explains what is happening in an organization through correlations among formal variables such as organizational structure, technology, and the environment. Studies conducted under this theoretical regime rely upon quantitative data drawn from large surveys of scores or hundreds of organizations and rigorous statistical modeling of survey results. Anthropological methods were sidelined as appropriate mainly for "case studies," which were suspect as unreliable and nongeneralizable to a large population of organizations.

Political and Ethical Issues

The era of academic expansion in the 1960s and early 1970s brought with it serious concerns on campuses regarding the ethical propriety of conducting research under the auspices of powerful sponsors such as governments or corporations. Just as anthropologists in Great Britain reacted negatively when their ties to colonial administrations became a subject

of public criticism, so American anthropologists reacted with distaste when they found out that certain agencies of the U.S. government had attempted to engage anthropologists in research that would become part of counterinsurgency programs in the developing world (for example, Project Camelot). Such revelations, together with a growing antiwar movement in the United States, turned anthropologists away from government service and fostered a suspicion of any powerful sponsor who could use anthropological research in ways that might injure those studied, and also injure anthropology in the process. In addition to government, multinational corporations also were identified as potentially dangerous sponsors. During the 1960s, American multinational corporations were dominant overseas, making inroads into foreign markets and setting up factories in developing countries to reduce the cost of production. Academic anthropologists who were conducting fieldwork in the very places that American business was investing often saw the negative consequences of industrialization, including increasing poverty, new disease threats, and the disintegration of traditional social supports.

One notorious example of such tragedies was the malnutrition and infant death that followed Nestle's introduction of infant formula in the developing world. Often, Third World women could not afford to continue to buy formula in the amounts recommended, nor could they ensure that bottles were sterile or that water to mix the formula was pure. Formula often was heavily diluted with contaminated water, leading to infant diarrhea, malnutrition, and outright starvation. Women who relied on formula instead of breastfeeding could not switch back to the breast, since their milk supply dried up when not used. Nestle was aware of these problems, yet would not withdraw the formula from countries where these problems were manifest, triggering a massive global boycott of Nestle products. Such instances of unethical corporate behavior further alienated anthropologists from industry and caused some to begin labeling any work for industry as "unethical." This label stuck as the American Anthropological Association (AAA) promulgated principles of professional responsibility in 1971 that prohibited any research that could not be freely disseminated to the public. Since industrial research sometimes is proprietary (owned by the company and not publishable without their permission), this code of ethics virtually banned industrial anthropology for the next two decades.

The Fragmentation of Industrial Anthropology in Academe: 1960–1980

After the demise of the Human Relations School, industrial anthropology splintered into several branches, the principal ones being (1) Marxist and neo-Marxist critiques of industry at home and abroad, (2) the ethnography of industrial occupations and professions, and (3) the study of industrialization processes outside the West. Academic anthropologists who did not practice inside corporations, but studied them from the outside, at a distance, were responsible for much of the research and conceptual development during this period.

Marxist Critique of Industry

For some anthropologists, a focus on the negative consequences of industrialization at home and abroad led to a radical critique of the existing industrial order and to a cultural analysis framed in terms of Marxist, neo-Marxist, and post-Marxist theory. Marxist criticism focuses on the mode and relations of production within capitalist economic systems—meaning the way in which economic value and surplus value are produced—and social relations between management and workers.

Marxism holds that capitalist economies are predicated on an immoral and unsustainable exploitation of working people due to the notion of profit, which Marxists view as surplus value, that is, value not required to cover costs, produced by workers but not fully returned to them through wages. Rather, management diverts a portion of the value to enrich itself and to enhance the enterprise. Marx believed that eventually capitalism would collapse because workers would not have sufficient income to absorb all of the goods that they were producing. Rather than waiting for the demise of capitalism, however, Marx advocated that workers rise up against the owners of private enterprise and create a new social order in which the proletariat, through a socialist state, would become the owners of the means of production and all of the economic value produced by it. Neo-Marxism and post-Marxism revise classical Marxist theory by addressing criticisms of classical Marxism. Capitalism has not collapsed, and neo-Marxism explains why this is so and what it means to those who reject capitalist economics.

The Marxist tradition was well suited to the conditions of modern industry after World War II. As collective bargaining gained strength in U.S. industry,

workers and management clearly came to see themselves as separate parties on opposite sides of a struggle for economic gain, much as they were portrayed in Marxist writings. In this environment, anthropologists focused on the ways in which management used its power to increase the productivity of the workforce, and how the workers responded. An especially prominent stream of research in this vein centered upon managerial strategies to reduce workers' skills and their jobs (and thus their wages, numbers, and power) through the process of technological innovations. The union movement had been successful in its efforts to improve wages and working conditions, but in the process unions had ceded control of technological change to management. Before World War II, workers had significant control over the work process, and in some industries they could virtually speed up or slow down the work process at will. Intent on gaining something in exchange for higher wages, American management generally insisted on the use of technology as a "managerial prerogative," meaning that management had the right to implement new technology whenever and however they saw fit. Managers used improvements in production technology and automation to wrest control over the work process away from the workers. Technology was used both to reduce the number of workers needed for a certain level of production and the level of skill workers needed to do their jobs. Machines increasingly did the work that previously had been the province of skilled craftspeople. The process by which workers lost skill over time became known as deskilling, and it was associated with the rise of tedious, repetitive industrial jobs that were demeaning, boring, and alienating. Once management had control of the work process, they could speed up the rate of production in order to increase output without increasing costs, thereby improving profitability. Workers often had little choice but to go along with this program if they wanted to keep their jobs. Many workers lost their jobs anyway as technological advance reduced the need for workers in many industries.

Industrial anthropologists in the Marxist and neo-Marxist traditions carefully documented the strategies workers used to cope with such adverse employment conditions. Anthropologists and qualitative sociologies were among the first to empirically demonstrate the informal working knowledge that people use on the job, both to get the work done and to protect their jobs, skills, and earnings. While management often assumed that less skilled workers did not have much need for intellect on the job in an age of automation, anthropologists found just the opposite—workers brought their intelligence with them and used it to solve work-related problems that management could not or would not address. Anthropologists conducted this research both in the United States and abroad, delving into numerous industries, including mining, automobile manufacturing, and garment production.

An example of an ethnographic study of industrial work that is Marxist in orientation is provided by Louise Lamphere's study of a New England apparel factory. She begins with a historical description of the development of the apparel industry in the United States, explaining why this particular industry has remained labor intensive, and exploring strategies managers use to maximize profit under conditions of intensive competition. The key managerial approach to ensuring a reasonable profit is maintenance of low wages. The hiring of marginalized workers (women and immigrants) and locating plants in low-wage areas are managerial tactics used to ensure low wages. Lamphere also documents the coping strategies of workers and their union as they struggle against a relentless drive by management to continuously reduce labor costs by "scientific" means, a process that also threatens jobs, wages, and skills.

Marxist and neo-Marxist anthropologists often highlight the special adversity faced by women workers in industry. Gender-related traits are used as reasons to bar women from the most lucrative jobs in industry while restricting them to low status or dead-end jobs that pay poorly. Women also serve as a "reserve army" of the unemployed (a Marxist concept), ready to go to work when needed (for example, during World War II), but then finding themselves removed from their jobs when male workers become available again. At the same time, women workers continue to be responsible for domestic production (housekeeping and child rearing), leading some writers to suggest they are "doubly exploited," as discussed by Carol Holzberg and Maureen Giovannini. Union organizations that take advantage of women's plight when attempting to organize groups of workers simultaneously deny women leadership roles within the organized labor movement, meaning that patriarchal practices are not restricted to the capitalists. Anthropologists have documented some cases in which women have overcome these barriers to participate in and even lead union movements.

Generally, anthropologists do not confine their analyses to what is going on at the shop floor level, but like W. Lloyd Warner, they trace lines of influence from the corporation to the nation-state and even the global economy. The Marxist anthropologist June Nash, for example, studied a multinational petrochemical company, including in her investigation the work of global middle managers with whom she conducted interviews. Nash's work is unusual in that most anthropologists working in the Marxist tradition do not study managers, only workers (a bias that has limited the impact of their analyses). Nash was surprised to find that the managers were just as alienated from their work as others who had no managerial authority. Her investigation is classic in showing how this company is connected to larger economic, political, and social forces. More recently, Nash (has examined the transformation of a mass production company into a technology-intensive defense producer (General Electric), focusing on the effect of these changes on communities and families in the local area (Pittsfield, Massachusetts). This work is important in showing that workers are not passive observers of such changes, but active participants in the change process.

Occupations and Professions

While many Marxist and neo-Marxist anthropologists followed the activities of industrial workers who were largely deskilled, other anthropologists in the decades between 1960 and 1980 focused their attention on members of industrial occupations or professions whose remaining or continuing skills afforded them a place of status and distinction within the work context. Members of occupations or professions often have characteristics that parallel those found in small-scale societies, such as a unique system of meanings, practices, and a language that distinguishes them from other work groups. It was Durkheim who noted that "occupational activity [is] the richest sort of material for a common life." Workers who cooperate together in the same activities and share similar experiences also tend to associate with one another and to form a collective identity.

The common life of occupational members gives rise to a *work culture,* which Herbert Applebaum defined as a system of knowledge, techniques, attitudes, and behaviors appropriate to the performance of work and social interactions in a particular work setting. The features of a given type of work promote certain patterns of behavior while suppressing others; these patterns are reinforced through selective hiring, formal training, and the informal enculturation of new recruits. Work cultures are not only influential on the job, but off the job as well, with traditions, beliefs, and behavioral standards extending themselves into the worker's general life and life style. Work cultures may be compared along several dimensions, including social relations among workers, time orientation (the extent to which time provides discipline in the work process), authority structures, relations with peers (for example, friendship), language (jargon that fosters a sense of identity), dress and demeanor, gendering (the sex typing of occupations), and roles and statuses.

A work culture lends itself well to application of the classical concept of culture that was prevalent during this period and the ethnographic method, and anthropologists have used ethnography to record the distinctive cultures of many different occupations and professions. For example, Herbert Applebaum studied construction workers, yielding insights on the relationship between the technological requirements of an industry and the nature of its work culture. Applebaum was himself a construction worker, and so he had firsthand knowledge of the craft through many years of participant observation. His ethnographic account of life as a construction worker depicts a world in which highly skilled craftspeople (carpenters, masons, electricians, cement finishers, ironworkers, sheet metal workers, plumbers, and others) often own their own tools, accessories, and trucks and in many cases have been in business for themselves at one time or another. They know their business better than anyone else, and they thus control the work process, with an emphasis on quality. If a general manager places too much emphasis on speed, the worker is likely to walk off the job. Workers gain the respect of others through the quality of their finished work, and highly respected journeypersons consider themselves to be the peers of the engineers and other overseers. It is the craftspeople and their supervisors who make most of the decisions at a work site, and since the latter have come from the ranks, they are usually on friendly terms with the workers. Hiring and firing happen on the job site, not in the home office. The personal networks of the supervisors and foremen and forewomen are the sources from which workers are selected, based on past experience. Workers also determine whether or not conditions are safe enough

to commence or continue working. These conditions create a work culture that is highly satisfying to its members, who take pride in work that they control.

Applebaum observed that the construction industry has not been affected by the increasing mechanization of work processes and specialization of tasks that has led to deskilling in many other industries. Rather, construction workers have maintained a high level of skill in which workers control much of the work process and trade unions have great strengths. These features, in turn, are related to the technological requirements of the industry, including the uniqueness of each building and site, the temporary duration of a given project, the variation in work processes due to changes in weather, and the inability to stockpile a product. All of these requirements have prevented the advance of mechanization and have enabled construction workers to maintain their independence and autonomy.

Over the years, anthropologists, sociologists, folklorists, and others working in the qualitative research tradition have contributed much to our knowledge of occupational and professional work cultures. Just as those in occupations, members of professions such as attorneys and accountants tend to form cultural patterns, but professions have relatively greater work autonomy and control compared with occupations. Descriptive studies of occupational and professional cultures in many different industries—accountants, high steel workers, locomotive engineers, longshoremen, medical school students, nightclub strippers, police, professional dance musicians, rodeo workers, social workers, timber loggers, underground miners, waiters, and others—created a foundation of knowledge that contributed to our understanding of cultural phenomena in organizations and set the stage for the concept of organizational or corporate culture during the 1980s.

Industrialization Processes Outside the West

During the 1960s and 1970s, the rise of fieldwork outside the United States was supported by federal agencies such as the National Science Foundation. Such support enabled anthropologists (and members of other disciplines, such as sociologists) to explore the changes taking place in nations that were just beginning to develop an industrial infrastructure. A prominent theory in the social sciences at the time, known as *convergence theory,* predicted that societies around the world would become ever more similar to one another in their ways of life, based on the technological imperative of industrialization. The convergence hypothesis holds that as national economies shift from traditional agriculture to modern industry (that is, large-scale mass production) as the primary mode of production, the technologies of industrialization would require parallel changes in society and life style across many different nations, including the breakdown of the extended family, migration from rural to urban areas, the congregation of populations in urban centers, the need for increasing discipline of the workforce, mandated formal education for children, and similar occupational structures. Many of these societal changes, it was argued, follow from the fact that industry organizes production on a mass scale at certain concentrated locations (for example, factories, mines, mills), and this tends to attract people who seek a livelihood, as well as smaller supplier firms, which provide products and services both to the primary industry and its workforce. The industrial requirements for literacy and regimented individual and group behavior were the reasons why societies increasingly required formal education for children, with schools also serving as a means to teach discipline to the future workforce.

Some theorists believed that every industrializing society, regardless of its history and culture, must follow the same evolutionary pathway as that taken by Western societies with respect to the development of its economic and sociocultural systems. (The one great exception to this was the Soviet Union, but it ended up supporting the convergence hypothesis when socialism collapsed at the end of the 1980s and early 1990s.) An ethnocentric implication of this assumption is that non-Western nations will be able to industrialize only to the extent that they emulate Western societies in their institutional structures, values, and behavioral patterns. From this point of view, traditional indigenous customs (kinship obligations, spiritual orientation) are thought to impede the transition to industrialization.

Anthropological studies of societies in the midst of industrial transitions provided a critique of convergence theory, based on historical specificity and cultural relativism. A thorough discussion of this literature is provided in Carol Holzberg and Maureen Giovannini's 1981 review, mentioned earlier. Anthropologists provided a more complex and nuanced view of preindustrial societies, demonstrating that various aspects of their traditional social structures and lifeways may complement industry. For example, Clifford

Geertz demonstrated that indigenous entrepreneurs can play a crucial role in economic development; Max Gluckman showed that dual economies, in which indigenous people straddle two economic worlds (the village and the urban center), can coexist effectively with industry and are necessary to the fulfillment of human needs; and June Nash's work explored the role of traditional cultural forms such as rituals in easing the transition to industrial life. Other contributions of anthropologists expanded our knowledge of industrialization processes in several related areas, including qualitative changes that take place in preexisting institutions, the emergence of new institutional forms, the role of ethnicity and race as factors in structuring social relations within and beyond the industrial workplace, the role of women in industrialization processes, and the relative costs and benefits of the shift to industrial production. The knowledge base accumulated through anthropological studies in the developing world also supported radical critiques of mainstream models of economic development models, including dependency theory, which holds that both industrial development (as seen in the West) and underdevelopment (witnessed in the so-called Third World) are interdependent parts of a single global system of modern capitalist production.

Through fieldwork outside the United States, anthropologists made significant contributions to diffusion theory, a multidisciplinary approach to understanding the adoption of innovations (that is, products or technologies new within their context) within populations, nations, and cultures. Anthropologists contributed to the expansion and increasing sophistication of diffusion theory, which is one of the principal theoretical frameworks underpinning the modern marketing discipline. Some of the most significant discoveries made by anthropologists have focused on the aftermath of new product diffusion into geographic regions where specific technology-based commodities previously were unknown. Often, unintended (and negative) consequences have been the result. For example, Pertti Pelto studied the introduction of snowmobiles to reindeer herders in Lapland. Families of herders that were able to afford to purchase and maintain a snowmobile also were able to increase their herds of reindeer as a result, since more reindeer could be herded with a snowmobile versus skis, which had been used traditionally. At the same time, however, the snowmobile itself frightened the reindeer, and this new stressor tended to deplete the herds overall. Consequently, a de facto class system of haves and have-nots emerged in a society that traditionally had been more egalitarian. Such studies were the forerunners of the modern emphasis on consumers and consumption processes.

In addition to the aforementioned literature, there are three other anthropologists whose work deserves special mention. Each studied business organizations in quite distinctive ways that do not fit into any of the categories described above and/or later applied theoretical constructs to business problems, and each was precocious or prescient in his vision of future developments in global economic and social systems. The work of these three scholars is relevant to the relationship of business and anthropology in the current era.

Thomas Rohlen wrote a classic ethnography focusing on a medium-size Japanese bank, explaining the cultural logic of Japanese organizational structures and practices just as these were becoming acutely interesting to business scholars and practitioners in the West. Rohlen's approach of entering the bank as a trainee, and participating in the full training program with a cohort of new recruits, provides numerous insights into Japanese management methods that would not be available otherwise. For example, he describes a training exercise called Roto, in which recruits are required to leave the training academy and not return until they have persuaded a stranger to allow them to perform some household chore free of charge, a very difficult task in a nation where favors from strangers create onerous obligations. Recruits who finally found someone willing to allow them to discharge this task were so grateful that they did any job gladly, no matter how dreadful (for example, cleaning an outhouse). Managers used this exercise to instill in trainees the notion that the nature of a task should not determine one's attitude toward it; rather, one's attitude should determine how a task is perceived. Such normative approaches to employee control are becoming more common in Western firms that have adopted the practice of consciously fashioning "corporate culture" as a means to instill values and norms that generate their own self-policing discipline.

Edward Hall, who is said to be the most frequently cited anthropologist among business authors, developed a novel theory of culture as a network of biologically based "primary message systems" that humans extend and enhance through social communication. Hall's interests ranged far beyond language and into the nonverbal and contextual aspects of communication. Much of his work was aimed at explicating the

role of space and time as contextual dimensions of communication; through this work he invented a number of constructs that have become standards in the world of international business, including the concepts of monochronic and polychronic time (time experienced as linear and segmented versus time experienced as cyclical and nonsegmented), and high-context and low-context cultures (cultures in which most of the informational content of a message is embedded in contextual variables versus cultures in which most of the information is explicit and encoded in language). These constructs were presented in *Beyond Culture* and *The Dance of Life*. Hall and his partner Mildred Reed Hall wrote a series of books applying Hall's theoretical work on intercultural communication to the field of international business, especially directed toward businesspeople in the United States, France, Germany, and Japan. The Halls' interests are in helping businesspeople to translate and interpret communication processes and events across cultural boundaries and to prevent cross-cultural misunderstandings. Hall's books have been translated into 16 languages, his work often is cited in business textbooks, and his ideas have been incorporated into the international business lexicon.

In the late 1970s, Alvin Wolfe developed the idea of a new level of sociocultural integration above the level of the nation-state. In his 1960s study of the African mineral extraction industry, Wolfe discovered a complex, global-level network of wealthy individuals, families, corporations, and states operating together to ensure that raw materials for the world's industrial plants are indeed produced. Nationality was not an issue; the supranational network operated regardless or in spite of the interests of individual nation-states or other actors. Indeed, the "supranational integration of the economic sphere," as Wolfe put it, tended to supersede political, international ties and cleavages. Wolfe postulated that the nation-state was not the highest or most complex level of sociocultural integration, as had been proposed by previous theorists (for example, Marshall Sahlins and Elman Service). Rather, supranational networks seemed capable of transcending individual nation-states in political and economic maneuvering. These observations still appear fresh and relevant to theorizing on globalization processes.

The themes developed by these anthropologists, particularly ethnographic exploration of corporate entities outside the United States, and communication within cross-cultural contexts, have continued to resonate in the millennial era that is described next. The next era is distinguished, however, by the reemergence of anthropological practice in the business world, that is, the application of anthropological knowledge to business-related problems by practitioners, rather than strictly academic interest in industry, which was the case from 1960 to 1980 (with a few exceptions, such as Edward Hall). The reasons for this important change, and its implications, are examined below.

Part II: The Contemporary Landscape

Globalization: 1980 to Present

The last two decades of the 20th century witnessed a transformation of capitalist economies, marked by increasing global flows of goods and services, worldwide deregulation, and the diffusion of converging information and telecommunications technologies; together, this is sometimes known as globalization. These factors have acted in concert with other important socioeconomic trends, including rising per capita incomes in industrialized and newly industrializing countries and shifts in the demographic composition of industrialized nations, to alter the competitive landscape for American corporations. New markets were opening around the world, and new competitors were rising in nearly every industry. American firms found that they could not maintain the economic hegemony they had enjoyed during the brief period following World War II and up to the 1960s and 1970s.

The term *Fordism* refers to structures and ideologies generated by mass production as an economic system, whereby the producer (à la Henry Ford) determined nearly everything about the products that were made and consumers had no choice but to buy what was put in front of them. In what became known as the "post-Fordist" world of the late 20th century, the producer was no longer king. Instead, consumers were recognized as the crucial actors under the rules of the "new economy," in which services often generated more revenue and employment than goods, and the knowledge content of a corporate asset often was more valuable than its tangible matter.

New and emerging markets in Asia, Eastern Europe, and certain parts of the developing world became lucrative targets for corporations, as consumers in these regions gained sufficient incomes to support purchases of services and goods offered by

multinational and transnational firms. Saturated consumer markets in the West fragmented into specialized niches, requiring companies to learn much more about the preferences of demographic groups that they previously had lumped together or simply taken for granted. Gradually, it dawned on American firms that they no longer understood (if, indeed, they ever did) their customers, whether these were in their own country or abroad. To understand and reach these consumers both at home and abroad, the firms themselves had to change their policies and practices, sometimes in fundamental ways. Yet the metamorphosis required to turn Western corporations away from the 20th century's producer domination, with its self-focused and functionalist perspective, and move them toward a more globally competitive, consumer-centric view of the world is no small matter. Who better to join this sort of millennial quest for renewal than an other-focused discipline such as anthropology?

Economic and technological turbulence in business environments opened new opportunities for relationships between anthropology and business in the post-Fordist era. The anthropological incentive to respond has been influenced by three developments.

First, there has been a significant gap between the production of new PhDs in anthropology and the rate of vacancies in academic employment openings since the late 1970s. In 1984, for the first time since the survey of new PhDs was conducted by the American Anthropological Association (AAA), nonacademic employment for new PhDs exceeded academic employment. At first, only a small trickle of these graduates moved into the private sector, an estimated 100 full-time business practitioners around 1990, but as word of their achievements grew, the trickle became a steady stream. Until the AAA conducts another survey, we must guess at the percentage of new PhDs entering business employment today.

Second, academic institutions have faced mounting pressure to seek external funding for research from federal agencies (to offset both direct and indirect costs), and these agencies (for example, the National Science Foundation) have been directing a greater share of grant monies toward strategic, interdisciplinary issues and problems (those that are of greatest concern to society versus individual disciplines). Such problems may involve private sector actors such as corporations (for example, knowledge and distributed intelligence, micromarkets in developing nations, disaster prevention and recovery). Working with corporations in such contexts no longer seems beyond the pale of appropriate anthropological involvement. Third, in response to its growing practitioner ranks, the AAA revised its principles of professional responsibility during this era, removing language that essentially forbade research that could not be publicly disseminated. The AAA also founded the National Association for the Practice of Anthropology (NAPA) in 1984, and several of this organization's officers have been full-time business practitioners or academic consultants. NAPA's first monograph encouraged relationships between business and anthropology (Marietta Baba, *Business and Industrial Anthropology: An Overview*). The stage was set for American anthropology's second major foray into the world of business practice.

Three interdisciplinary domains in which anthropologists have explored new opportunities through business-related research and practice include organizational behavior and management; ethnographically informed design of products, services, and systems; and consumer behavior and marketing. Each domain reflects an interdisciplinary field. Many of the anthropologists join established groups of colleagues from other disciplines, but some authors are "hybrids," remaining in anthropology and also joining other fields.

Each of the three domains is fairly well established, with some representation in academic departments of various kinds—including anthropology, business, and interdisciplinary research centers and institutes—a tradition in the scholarly literature, and an active community of practice, including positions in major corporate research laboratories and institutes (such as GM, IBM, Intel, Microsoft, Motorola, Xerox), business functions (for example, marketing) and consulting firms (at one point, Sapient employed more than 20 PhD anthropologists). Scholar-practitioners are not unusual, because corporations often grant access to scholars in exchange for some service such as strategic research. Each of the three domains operates at both national/regional and at international/global levels. Some scholars and practitioners specialize in the former, some in the latter, while others are competent at both levels.

Organizational Behavior and Management

Continuing the tradition established by W. Lloyd Warner and his colleagues in the 1930s, this line of

inquiry grows directly out of the producer orientation with its focus on the *interior* of the firm—describing and explaining the behaviors of people and groups inside the corporation and possibly trying to effect modifications in these behaviors. Anthropological interest in organizations continues to be inspired by a conception of formal organization as "society writ small," thus constituting a site for the production and reproduction of distinctive localized systems of meaning and practice (culture). Warner's encompassing vision of inquiry at multiple levels of analysis (for example, industry, enterprise, work group), as well as interactions among these levels, also is sustained. The substantive focus of the research has changed considerably, however. While Warner and company were interested in treating the problem of labor-management strife with functionalist theory, the post-Fordist anthropologists have other agendas.

Anthropologists studying businesses today are part of a larger universe that examines organizational phenomenon in general. Yet apart from the master concept of culture (and that, of course, is in disarray), the private sector literature does not reflect a coherent theoretical agenda or even a discourse organized around competing schools of thought. Rather, the literature may be clustered into three general areas that reflect enduring anthropological interests, as well as historical developments in the larger frame of post-Fordist capitalism: organizational cultures in technology-based firms, boundary-crossing in a global context, and regional perspectives on work and corporations. These three areas are interrelated, and distinctions between particular works assigned to each may be somewhat arbitrary.

In the review below, further developments in the anthropology of work and occupations, neo- and post-Marxism, and/or industrialization outside the United States that do not involve empirical research or practice *inside* a business organization (that is, with access to the business) are *not* considered (for example, research on academic-based scientists, engineers, or physicians; research on unions), unless such work has fairly clear implications for corporations or industry as a whole.

Organizational Cultures in Technology-Based Firms

In the 1980s, the business community was introduced to the concept of "corporate culture" via the consulting industry, yet there was considerable oversimplification of the construct as it diffused via this mechanism. Academic anthropologists were under pressure to bring more enlightened views to the management literature, but many were skeptical of the corporate agenda of "culture change." Within this context, a small number of anthropologists were able to gain access to corporations for basic research purposes via networks based at corporate research laboratories and research universities. The first wave of anthropologists to examine organizational behavior at this time were intent on demonstrating the subtlety and complexity of anthropological conceptions of cultural phenomenon in organizations and on introducing the "native's point of view" as a valid and powerful source of empirical data. This latter goal was meant to distinguish anthropological work from that of other academic disciplines that also claimed authority in the area of corporate culture (for example, psychology), yet sometimes represented culture as a monolithic phenomenon. The anthropologists also were influenced by previous literature on occupational and professional cultures. Their earliest efforts conceptualized corporations as complex configurations of interacting technical and managerial subcultures.

For example, Kathleen Gregory, in an oft-cited paper in the *Administrative Science Quarterly*, employed ethnoscience ethnography to uncover "native view paradigms," or ways that technical professionals inside Silicon Valley computer technology firms understand their social worlds. Gregory explained the use of ethnoscience methods to elicit native taxonomies or classification schemes that in turn signaled the existence of occupational boundaries within the firms. These taxonomies could be used to gain a deeper understanding of occupational identities and experiences that were most important to individuals affiliated with particular identities. Gregory was one of the first to identify "the project" as a critical activity for many computer professionals; this later proved to be a key insight for decoding the cultural logic and social practices of hackers (see below).

Later in the 1980s, Frank Dubinskas (who at one point in his career wrote cases for the Harvard Business School) studied a biotechnology start-up firm and deconstructed the conflict between executives and PhD molecular biologists, showing how differences in the temporal patterning of their activities created serious conflicts around the goals of research, how to make choices among projects, whether research direction should change, and which projects

should be dropped. Dubinskas found that managers and biologists possess fundamentally different images of the self that are related to their notions of developmental time, giving rise to stereotypical images of the other (for example, mature versus immature) and explaining why the two subcultures frequently conflicted in ways that thwarted the company's performance.

It was also during the late 1980s that Elizabeth Briody and Marietta Baba investigated General Motors's difficulty repatriating managers from overseas duty. Drawing on cultural materialism, they described two antithetical subcultures within the corporation, one pro-international and one anti-international, each dominating different organizational units within GM, based upon historical and economic factors. Depending on a repatriating manager's destination upon return, his (all were male) knowledge pertaining to overseas environments would be valued more or less highly by one of these subcultures, respectively, leading to significant differences in postrepatriation job assignments and job satisfaction. This discovery was enabled by statistically testing the validity of several different "native hypotheses" against a database of information about expatriate assignments and repatriation outcomes and modifying these hypotheses systematically until one hybrid model was found that explained most of the variance in the data set.

Around this same time, Julian Orr made significant contributions to our understanding of culturally constituted meanings and socially organized work practices among groups of technical workers who are not considered "professional" or "managerial." Orr was based at Xerox's Palo Alto Research Center (PARC), and while there he became known for his research on Xerox repair technicians. Once a service technician himself, Orr was interested in why service technicians were able to repair technologically advanced copiers in about 95% of all cases, usually without much or any resort to the company's expert help system, even though they had little if any knowledge of the physics or engineering underlying the machines. After following pairs of technicians for about 3 weeks, Orr discovered that they solved difficult machine repair problems by telling each other stories of past machine failures and finding in their stories diagnostic and procedural clues about how to proceed with the present case. Significantly, these stories were not only ones that the technicians themselves had experienced but ones they had learned from their colleagues through war story swap meets that took place whenever technicians gathered informally (for example, at training sessions). The company had no idea that this knowledge resource even existed. Xerox modified its practices based on Orr's findings by equipping all technicians with mobile radio phones so that they could communicate with one other and with roving "tiger teams" more readily. Orr's work also was innovative in conceptualizing the technicians' work practices as a triangular relationship between the technician, the customer, and the machine, such that the customers became a source of knowledge about machine misbehavior and technicians became a source of knowledge about customers. Technicians, Orr discovered, often needed to repair a customer relationship, as well as a machine. This research demonstrated the economic value of tacit knowledge possessed by employees who previously had not been considered "knowledge workers."

The entire corpus of research at Xerox PARC (to be discussed in greater depth later) was highly influential in placing anthropology at the center of a movement within American corporations known as "knowledge management." As demonstrated in Orr's studies, many different types of work groups develop tacit and/or embodied systems of local knowledge that are embedded within their work practices and represent intangible assets that may hold great value for the corporation. Knowledge management is a set of principles, practices, methods, and tools that enables firms to identify such assets and convert them to more explicit form so that they can be further developed and leveraged for the firm's benefit (for example, mobile radio phones). At Xerox PARC, and later at a spin-off organization called the Institute for Research on Learning (IRL), many of the core constructs associated with the knowledge management movement first were conceptualized. An especially important contribution emerged from the ethnographic research of anthropologist Jean Lave, who was involved in the early development of IRL, an institution founded in the late 1980s with a seed grant from the Xerox Foundation and dedicated to understanding the social context of learning. Lave's research on Liberian tailors revealed that learning is situated in a community of practice—an occupational network (such as Orr's repair technicians) that shares a set of work activities and a common identity. Lave found that learning takes place within a community of practice

through "legitimate peripheral participation," a process by which apprentices come to master increasingly more difficult and complex tasks as they gradually adopt the identity of the group. Lave collaborated with Etienne Wenger to adapt this concept for learning in various corporate work settings and to write a popular book on the subject. These developments coincided roughly with an explosion of interest in the emerging "knowledge economy" and (a bit later) with the Japanese management scholar Ikujiro Nonaka's research identifying tacit-explicit knowledge conversion as a new source of innovation for corporations. Communities of practice (or "CoPs," as they became known) were highlighted as one of the key loci that embed tacit knowledge, and this concept entered the business lexicon as the knowledge management movement diffused around the globe.

While the studies described maintain continuity with the previous era in their focus on occupational "subcultures" or communities, the very notion of "culture" and even "subculture" had become increasingly problematic by the 1990s. Anthropologists seemed more interested in the blurring and crossing of boundaries than in descriptions of what they might demarcate. Interestingly, American corporations also were working hard on the project of taking down functional boundaries that had been built up over a century of Fordist practice; walls dividing functional "silos" inside corporations were found to increase product development time (and thus product cost) and also were responsible for defects in product quality (for example, engineers didn't cooperate with manufacturing). The great transformation from the vertical to the horizontal corporation was under way, with a huge investment in information technology to force information and work to flow more efficiently *across* basic processes (for example, product development) instead of inefficiently up and down chains of command, as it had in the Fordist period.

Thus, rather than focusing on occupational subcultures within specific firms per se, anthropological research inside corporations after the early 1990s tended to reflect efforts by corporations, communities, or individuals to cross boundaries of various kinds, whether functional, national, or otherwise (as described here and in the next section). As it turned out, however, during the 1990s, the Fordist structures proved difficult to dislodge. For example, in the mid 1990s, Marietta Baba investigated a major corporation's effort to streamline its product development process by introducing a single "strategic" technology system that would replace hundreds of different systems then in operation across dozens of different technical groups. She mapped the cultural ecology of these groups, defining the ecological niches formed by their location in a two-dimensional product development environment. Baba was able to explain variance (for example, resistance, adoption, reinvention) in these work groups' responses to the corporation's strategy as "normal" extensions of adaptive patterns they had developed within the niches in which they were situated. Following this work, Baba separately explained why work groups resist electronic connections (for example, CAD/CAM, electronic data interchange) with other groups when there are preexisting relationships of distrust.

In the meantime, as the initial excitement surrounding the concept of corporate culture abated, American management departments gradually adjusted to its existence, generally in one of three ways. For some, "culture" became a variable or a set of variables in contingency models of the corporation, a system of constructs to be defined operationally and measured in surveys. For others who defined culture in ways that defied such modeling (for example, the interpretivist school), culture became a specialty niche or boutique practice in a handful of select business schools. Important contributions were made by management scholars working in both of these traditions; for example, Dan Denison modeled "cultural factors" that correlate with high performance in organizations; Joanne Martin and colleagues parsed the management literature on corporate culture into three streams (integration, differentiation, and fragmentation), corresponding roughly with developments in organizational theory; Gideon Kunda's ethnography of a high technology firm revealed the human cost of normative control in a high commitment culture (this is only a tiny sampling of many rich offerings that helped to establish the legitimacy of "corporate or organizational culture" as a field of study). More likely, however, corporate culture was simply dispensed with or ignored by faculty in management departments as too complex or difficult to change. Publishing cultural research conducted from a nonmodeling perspective in top management journals was problematic, unless accompanied by significant additional quantitative analysis.

Anthropology departments for the most part were not heavily influenced by the developments described

above, although faculty members in a few departments and some practitioners expressed interest in organizational research. Such interests were incorporated only very gradually as "'normal science" in anthropology via several mechanisms: individual faculty interest, course development, and funded research; student interest and the production of masters' theses and dissertations focused on corporations; and the placement of doctoral graduates in corporations where they maintained identities as anthropologists and began to produce literature on their own. The academic departments that have become seats of graduate-level teaching and/or research in the anthropology of private sector organizations included the College of William and Mary, Michigan State University, Northwestern University, Oregon State University, the University of North Texas, and Wayne State University (where the first undergraduate course on business anthropology was taught in 1984–1985 by Marietta Baba). A number of other universities have permitted doctoral students to conduct dissertation research in corporations or to focus on business-related phenomenon (for example, Chicago, Temple, Yale). As a result, the literature began to reflect more enduring and immediate anthropological interests.

Boundary Crossing in a Global Context

In the 1990s, research tended to focus more on cross-cultural phenomena in corporate settings, including studies of transplanted firms, firms based outside the United States, and firms whose globally distributed employees work virtually. The *Anthropology of Work Review* dedicated a special issue to these subjects. Over time, this stream of research has followed the currents of social science literature generally, shifting its attention to the construction of self, identity, and community in a world where traditional frames of reference are dissolving and new patterns emerge to startle and intrigue. In each of the works described below, anthropologists discover individuals and communities whose selves and lives are transformed through work in a multinational or transnational business, suggesting that such organizations are becoming one of the most powerful forces giving meaning and direction to human experience in postmodern society.

Tomoko Hamada, who is known for her writing on Japanese companies in the United States, describes a case of alleged (and ambiguous) sexual harassment within a Japanese-owned plant in the United States. In this case study, an American female factory worker first aligns with her Japanese bosses in preventing formation of a union at the plant, for which she is rewarded with promotion to supervisory status. The woman is put off, however, by Japanese methods for training junior members of the management team that she finds insulting, and she also is shunned by her former American peers who believe she has turned on them. In the end, the woman files a sexual harassment lawsuit against the Japanese plant manager, which is settled out of court, forcing the manager to return to Japan in humiliation. Hamada tells the story from multiple points of view over time, showing how different parties' perspectives form and evolve as they interact with one another, shifting individuals' self-representations in the process. The zone of cultural interaction is rife with paradox and inconsistency; new boundaries are constantly formed and re-formed along with new political alliances. Cultural identities are in flux and are created in situ; there are few static variables or invisible cultural assumptions that can be counted upon to create conflict (although American individualism seems to be a powerful theme in the case). People create multiple self-identities in the process of engagement with intra- and intersubjective dialogues in this fresh postmodern tale of cross-cultural encounter and betrayal in an American factory.

Douglas Caulkins sleuths the "unexpected" entrepreneurs found in the deindustrialized region of Wales and Northeast England, where government policies have encouraged the development of indigenous, high-tech start-up firms as a means of internal job creation. Generally speaking, high-tech entrepreneurs are not attracted to such "rust belt" areas, but surprisingly, a group of them have launched new firms in the deindustrialized peripheries of the United Kingdom outside Southeast England. The entrepreneurs were "unexpected" in a double sense—they neither intended to start their own firms nor did the region initially appear to possess the cultural or economic infrastructure to support them. Caulkins discovered that many of the entrepreneurs were highly trained engineers who only started their own firms after they encountered career obstacles at large corporations. He identified four distinct types of career paths that resulted in different types of social networks, each of which enabled the entrepreneurs in question to form a specific kind of successful start-up. Caulkins examines the cultural ecology of these

start-ups and their prospects for growth on the basis of the entrepreneurs' self-defined trajectories.

Carla Freeman describes the pink-collar female informatics workers of Barbados who have fashioned a quasiprofessional identity that distinguishes them from their blue-collar sisters toiling in nearby factories. A professional dress and demeanor complements the "cool" look and feel of their office environments while reflecting and reinforcing the disciplined habitus required by the informatics industry. Significantly, the production of their informatics work cannot be disentangled from the women's consumption practices; many of the women engage in regular global shopping trips to purchase materials that will be transformed into affordable articles of clothing to be purchased by their coworkers. The informal economy of trade in clothes supplements the low wages earned in the formal economy, while the low-priced fashions allow the women to stock their closets with an array of stylish outfits. The informal economy thus supports the formal one, and it appears that the latter could not be sustained without the former. Production and consumption processes also mutually reinforce one another while being enmeshed in global flows of goods, services, capital, and people. Freeman's engaging analysis is edged with criticism as she interrogates the relationship between the workers' clothing preferences and managerial intentions to discipline and control their female subordinates.

At the turn of the century, anthropologists also have been at the forefront of inquiries on distributed work, a hallmark of the global economy. Anthropologist Bonnie Nardi is known for her research on "information ecologies," a concept that situates mediated communication technologies within their contexts of use. Nardi's research has shown that human face-to-face communication has advantages that cannot be replicated or substituted by any of today's communications media (supporting touch, shared activities, attention management, and network development) but also has costs (disruption, expense, effort) that may not always be sustainable over the long term. The social linkages that are built and sustained by face-to-face communication are a necessary prerequisite for effective distributed work. Therefore, a firm must understand the ecological context of mediated communication so that effective choices can be made regarding the types of technologies selected and the appropriate sequencing of face-to-face and mediated communication events.

Marietta Baba, Julia Gluesing and their colleagues also study distributed work and provide an ethnographic account of an American-based global firm's attempt to transfer a marketing methodology to a French retailing company via a global virtual team. Internal conflict breaks out within the team regarding the cultural appropriateness (phronesis) of transferring certain aspects of the methodology, and this nearly brings about the team's destruction. Ironically, it was only when team members' interests shifted from factional conflict to more individualized self-interest that they were able to cooperate and collaborate. The resulting move toward virtual community was enabled by the corporation's global incentive system and strategy, which threatened to undo the careers of squabbling nationalists. This study challenged conventional management theory by demonstrating the mutable character of key variables over time (for example, interdependence), showing that agents' behavior causes variables to fluctuate, meaning that a variable cannot be set at one point and assumed to remain stable, as is the case in many theoretical models. The ethnographic account also revealed that the geographical distribution patterns of people and resources on the ground are relevant to the processes of distributed cognition and to the ways in which leaders exploit historical, cultural, and linguistic resources to further their own agendas.

The literature described above marches to the beat of many drummers. There are multiple audiences, with different research problems, goals, and languages, including cultural anthropology; science, technology, and society studies; the anthropology of work; organizational behavior; applied anthropology; and others. The result is a fragmented literature that is difficult to access and somewhat awkward to summarize or synthesize. Yet, understanding may be enhanced through the juxtaposition of diverse intellectual currents, and one approach that may provide a pathway toward such articulation is the recent (or renewed) tendency of anthropologists to study geographic regions in the United States that are characterized by distinctive industrial, corporate, and/or work behavior and then to join forces or at least read and reflect upon each other's work and compare what they have discovered and learned from each other. This stream of organizational behavior literature is described next.

Regional Perspectives on Work and Corporations

Another Warner legacy was the regional contextualization of industrial phenomena (for example, the

Yankee City studies). Anthropologists have continued this tradition but have modernized it by reflecting new themes of global integration (for example, via technology or immigration) that find expression in regional economic patterns. Of special interest are geographic areas that generate distinctive economic forms, such as Silicon Valley with its high-tech start-ups. Some anthropologists have invested a decade or more in their efforts to describe and explain such regions and the companies they create. Significantly, when individual anthropologists or groups collaborate in studying the same region, or compare their observations across regions, more significant discoveries are possible.

A prime example of collaboration in regional studies is the ongoing research focused on Silicon Valley. Anthropologists began studying Silicon Valley in the early 1980s with Kathleen Gregory's dissertation, titled *Signing Up: The Culture and Careers of Silicon Valley Computer People.* Eleanor Wynn, the first anthropology intern to study at Xerox Palo Alto Research Center, helped Gregory gain access to Silicon Valley firms for this landmark study. It was one of the first to depict in detail the social structures, processes, practices, and systems of meaning underlying the remarkable capacity of this unique region to generate large numbers of technology-based start-up firms, despite their high risk of failure. In her pioneering research, Gregory explained the importance of computer professionals' commitment to new technology "projects" rather than firms per se; it was this connection to a project that enabled people to move around from firm to firm, an essential element of the dynamism of the region. Gregory did not completely unpack the project; that was not her focus. Further insights into the substantive nature of these projects had to wait until later, and they turned out to be crucial.

Nearly 20 years after Gregory's study, in a special issue of the *Anthropology of Work Review,* several anthropologists took up the thesis that high-tech work, based in firms such as those found in Silicon Valley, may be framed in moral terms that relate to the social benefits technology promises to deliver to its producers and consumers. Based on long-term ethnographic research in the Silicon Valley region and on studies of specific firms such as Apple, a number of anthropologists have discovered that the language and culture of high-tech work is permeated with a sense of "doing good," a social construction with roots that connect Silicon Valley to notions of technical "progress" grounded in the Industrial Revolution. Authors contributing to the special issue illustrate various aspects of this construction. For example, Chuck Darrah's informants engage in emotion-laden descriptions of Silicon Valley as a future-oriented, progressive geographical locus whose power derives from the innovative potential that may be realized in cultural diversity. Or, maybe not—residents are just as likely to disagree with this premise and argue with each other over it. Darrah postulates that the zealotry bred by life in the Valley may be a reaction to the invisibility of most people's work (for example, making microprocessors for automobiles), the fragility of living on an earthquake fault at the edge of the Pacific Ocean, and/or the banality of spending much of one's day dealing with the logistical hassles of moving people around a region that is overcrowded with other people, highways, and automobiles.

In another piece appearing in the same issue, E. Gabriella Coleman writes about the practices of *hackers* (in this context, individuals who are experts and insiders in the occupational culture of computer programming), affiliated with Linux—many of whom presumably live in Silicon Valley and whose products are used by Silicon Valley companies. Linux is a firm whose productive output depends primarily upon the voluntary contributions of thousands of software developers working together over the Internet to generate technically excellent and economically competitive software that is used by major global corporations such as IBM. Linux-based products now are competing with Microsoft on the open market in a David versus Goliath-style drama that has thousands of computer industry watchers on the edge of their seats. Linux grew out of the open source code movement. Open source code makes the core computer programming of software products freely available over the Internet, as guaranteed by an ingenious legal instrument called the "copyleft." No one can copyright code that has been copylefted, so it remains free. Coleman compares the hackers' practices of production and moral notions of freedom to those of medieval guilds; both developed methods that are technical and aesthetic in nature. The hackers are motivated to high levels of performance because of their love of programming—for them it is a means of artistic expression and a means of technological innovation. Due to the copyleft and the Internet over which code is shared, there has been an explosion of free software projects, each of which is like a

miniguild. The *projects* turn out to be the central organizing mechanism through which the miniguilds are embodied—each has its own source code, technical documentation, organizational structure, technical emphasis, computer language preference, and style of development. Newcomers to a project must prove themselves through an apprenticeship in which they demonstrate their commitment and skill through collaborative learning. Coleman points out that with Linux, there is no commodification of software, yet the products still circulate in the market. Further, the technology does not set the moral or social aspects of work; these are shaped by the community of practice (that is, the hackers). She also argues that the hackers' high performance proves that intellectual property protection is not a requirement for the creation of cutting-edge technical products. The hackers are not in a crusade against capitalism, but neither are they reifying it. Rather, their work appears to represent a "qualified means" (perhaps an alternative) by which participation in the market can best be carried out.

The Silicon Valley work suggests that *some* organizations (for example, Linux) have found (or individuals within them have found) a means by which to enable or enhance a sense of moral purpose or mission in the experience of work, and that these organizations enjoy an increased level of effort, productivity, and/or innovation gains resulting from the motivation that derives from such moral enhancement. The moral sources of economic performance may be realizing an additional boost under late capitalism as a result of a process through which work becomes sacralized, much as some consumption experiences have experienced sacralization during the post-Fordist era (see discussion in next section on consumer behavior). Sacralization does not mean that work is somehow religious or spiritual, but rather that one's work and/or work products come to represent something that transcends ordinary experience, that they (by some process) have become more powerful and extraordinary than that which is merely the banal self of everyday life. If some individuals or groups regularly experience their work or work products in this way, there could be a payoff from which some corporations or other organizations may derive benefit.

On the darker side of regional studies, long-term investigations of older regions depict work that has become, perhaps, increasingly profane. Based on 10 years of research in the region, Donald Stull and Michael Broadway describe the modern meat and poultry industry as it has developed within the American central plains. The study takes an unflinching look at the process of meat production today, comparing it with the slaughterhouse experience described by Upton Sinclair 70 years ago. Many things remain unchanged, especially the rigidly organized, labor-intensive factories that turn cattle and chickens into human food on "disassembly lines." This is ugly, grueling, dangerous work, where getting product out the door counts more than workers' physical safety. Language and cultural differences between largely Anglo managers and primarily Asian and Mexican hourly workers mean that there are two different workforces in a plant, with very different views about the way in which a plant's ideals of safety, productivity, quality, and loyalty should be put into practice. These differences exacerbate the plants' productivity and safety problems.

Building on the corpus of Stull's work over much of the 1990s, Mark Grey takes a closer look at the experience of Mexican immigrants inside this same industry and region. Despite its low wages and poor working conditions, the meatpacking industry attracts significant numbers of immigrant workers. It also experiences some of the highest turnover rates in American industry, sometimes surpassing 120% per year. Turnover contributes to high accident rates and poor productivity, but management is not fully motivated to invest in strategies that would reduce turnover significantly, due to the steady flow of low-wage migrants from Mexico. Turnover is, in part, a reaction to poor working conditions and labor relations in the plant. The management does not allow individual workers to personally care for or improve the condition of their cutting tools, thus contributing to physical strain, injury, and accidents. These physical woes, in turn, contribute to turnover. Grey discovered, however, that turnover also is a strategy used by migrants for their own purposes. They work until they have saved a nest egg, then travel back to Mexico with these monies, where they reunite with their families, rest up from the hard work in the plants, and then travel north again, when they are sure to be rehired. This is a strategy that enables the immigrants to earn and save far more money than they would in Mexico while not being forced to remain completely trapped in low-wage, dead-end jobs. Anglo workers in the plant resent the immigrants' ability to escape managerial control and create a new kind of "seasonal work" for themselves.

While the Silicon Valley studies and that of Donald Stull are longitudinal inquiries that represent basic research funded from various sources over many years, the work of Mark Grey is more strategic in nature, focused on an underlying problem, and undertaken at the request of Hog Pride's management. It is important to note that strategic research may combine both "basic" and "applied" goals; it pushes the envelope of knowledge but also focuses on pressing problems or issues. Sometimes the corporation offers the invitation to begin a strategic study, and sometimes the anthropologist requests entry, with funding from federal agencies or an academic institution. In many strategic studies, anthropologists gain access to corporate field sites in exchange for providing recommendations to address the problem under investigation; most often, these recommendations are not published but are considered proprietary. University-based anthropologists retain the right to publish research results, although the companies usually have the right to review and comment on the publication draft, so that proprietary information is not released to the public.

As Grey himself explains, he had an opportunity to interview and observe the managers during his sojourn at the plant, and he discovered to his surprise that they were disinterested in making changes that would enable maximum reductions in worker turnover, although he still made recommendations along these lines. The managers did not want to invest the funds required to reduce turnover below 60% annually, since this would cut into profit margins; they would prefer to reduce turnover moderately and continue to rely on a steady stream of low-wage immigrants to "make their numbers."

Grey's research and that of others suggest that anthropologists are, at last, "studying up" (conducting research on individuals and groups whose social status and/or power in the context of the research site may be above that of the anthropologist). Grey's study raises issues, however, regarding the costs that accrue to this privilege. Management, as Grey suggests, is ubiquitous in problem-oriented research in corporations. They provide access to the company, informants, documents and archives, artifacts, and may review manuscripts for publication. A corporation may have many levels of management, and, in large corporations, there may be substantial differences in power and authority between levels. Higher levels of management generally have sufficient control over funds and the access required to grant entry to anthropologists for purposes of research, whether basic or strategic. Academic anthropologists cannot even get approval from their institutional review boards without management sign-off on studies, and without them, there are no publications. Management also may provide needed funds to support research in the form of grants, contracts, or consultancies. There are many risks inherent in such situations. Management may try to influence the project or its findings in subtle and not-so-subtle ways. Or they might cancel or redirect a project in midstream if they don't like the way it's going or the sponsor gets reassigned or fired. A key issue is that no matter what problem the anthropologist is investigating, there is a good chance that someone in management is going to be involved in the problem (one of the causal factors) and may be right at the heart of it. This is due to the fact that anthropologists typically do not take a management centric view of the situation, as observers from other disciplines might, and when such a view is abandoned, it turns out that serious problems often involve management in some way (how could it not be so, when management is in charge of the company?).

It is an obviously delicate matter to negotiate criticisms of management when management has so much power in the context of the anthropologist's work. Reactions to criticisms from management are unpredictable, depending upon the overall context and on the relationship between the management that is sponsoring the research and the management that is being criticized. It might be feasible to present the criticism in an ethically responsible manner (for example, without identifying individuals or subgroups, and only identifying policies) and with felicitous results. Or it might be that the anthropologist gets backed into a corner, where it is obvious that a particular individual is culpable in a particular case. Indeed, the management may "set up" the anthropologist for such a dilemma without the anthropologist's prior knowledge. Possibly, the management could become hostile toward the anthropologist and reject both her and her findings in a defensive backlash. More likely, the findings and recommendations will be ignored, as the recommendations are found to be too costly and/or infeasible for political and cultural reasons related to the self-interests of those in power. All of the factors mentioned above make this work difficult, frustrating, and risky, and *could help to explain why there is not more of it after all these years.*

Some anthropologists have concluded that strategic research on organizational behavior is impossible because of the contradictions just described; others have decided that it is too important not to take the risk.

Anthropologists have not been silent on these matters, and indeed these issues have been subjects of considerable angst in the literature for several years, as more anthropologists have ventured into the world of modern organizations. Tensions between anthropologists and powerful others in fact have prompted some highly respected corporate-based anthropologists to leave the field altogether (as discussed below). It is likely that the problems described above are *one reason why anthropological studies of organizational behavior have not flourished in the way that studies of consumer behavior and design have in recent years.* These latter areas also require encounters with management, but they are less likely to run headlong into criticisms of management since their focus is more squarely on products, services, and consumers.

Another reason for the difficulty anthropologists have had in studying organizational behavior and management over the years may relate to the lack of receptivity anthropology has experienced in management departments within business schools, in contrast to a more positive response in marketing departments. The difference may relate to the positivist nature of management as a field, compared with marketing that has made room for interpretive approaches that resonate with the more artistic and creative side of that discipline (for example, advertising). Management, after all, is about control, and anthropologists who have studied corporations never have agreed that "culture" can be controlled by management. Indeed, we have asserted the opposite—culturally constituted meanings and social practices are naturalistic phenomena that defy the rationalist grasp of managers. Also, the anthropologists themselves may be difficult to control (as described below in the discussion of Xerox PARC). Thus, the anthropological approach to corporations is countercultural to management, and has not been embraced by many management departments, nor is it embraced by many practicing managers in the United States (although there continue to be exceptions, and these may be growing in number in some places).

Returning to the question of boundary crossing, there is one other especially salient boundary that has been crossed in the literature on corporations—that which separates management and the worker. During much of the 20th century, anthropologists were more or less partisans in the continuing struggle between these two classes of employees that coexist in business organizations. In Warner's era, anthropologists often were management centric in their views, following Mayo's influence; Marxists held sway in the years between 1960 and 1980. The labor-management struggle has continued, as evidenced in some of the literature discussed above, but emphasis on it is muted, and anthropologists are no longer so polarized. The American workforce's participation in unions is at its lowest level in the past half-century or more, and almost by default, the focus of anthropologists who work inside businesses is not labor relations. What's more, theoretical developments in the social sciences have encouraged the representation of social actors (workers and managers) as agents with complex agendas, while methodological trends have encouraged research collaboration with these same social actors; this in turn has meant that more points of view are taken into account in the conduct of research. Thus, rather than focusing either on workers or managers and ignoring or caricaturizing the other, anthropologists have tended to talk to both groups and include their voices in published work. As a result, we see that worker/agents may take advantage of situations to their own gain (Grey, Hamada), derive pleasure from creative interactions with markets (Freeman, Coleman), and be capable of overriding management to assert their own interests (Baba). We also discover that management/agents can be pawns in their own (or others') game (Briody/Baba, Hamada), are constrained by forces beyond their control (Caulkins), and may be motivated by social goals that transcend the individual quest for money and power (English-Lueck, Darrah). In short, we have a more subtly textured view of the actors and relations among them, which is an indication of theoretical and intellectual maturity in this subfield.

Ethnographically Informed Design of Products, Services, and Systems

Another stream of research and practice that flowed from W. Lloyd Warner's original invention is sometimes known in the vernacular as "design ethnography," but may be more accurately described as ethnographically informed product, service, and system design (including work systems). The emphasis of research described in this section rests on the

notion of a marriage between ethnography and design, a novel concept often attributed to collaboration between anthropologist Lucy Suchman and Rick Robinson (the latter founded E Lab, later acquired by Sapient). Design is a profession in its own right, and it cannot be limited to the design of products, services, and systems. Many other things can be designed—work processes, organizations, cities, policies, anything that humans can make or imagine. Designers are "considered creatives" in that there is an artistic aspect to their work and their marriage with intellectuals and researchers (anthropologists) is an interdisciplinary challenge. The creation of "design ethnography" thus represents the birth of a new interdisciplinary subfield that joins together anthropology and/or other qualitatively oriented social sciences with the design profession.

While on the surface, design of products and services may seem far removed from the Hawthorne project, its roots can be traced back to the decades-earlier efforts of Frederick Taylor and Elton Mayo to improve interactions between people and equipment in the production process. These early streams of investigation on the "human factor" in production eventually gave rise to the subfield of "human factors" research, a multidisciplinary offshoot of psychology that identifies aspects of human psychology and its context that must be taken into account in the design and development of new products. Human factors is both a field of study and an area of research and development in corporations that produce advanced technology for the market.

In the 1970s, one company that was committed to pushing the envelope of knowledge on humans factors (broadly defined) surrounding advanced computing was Xerox's Palo Alto Research Center (PARC). PARC was interested especially in human-computer interaction and the development of artificial intelligence to support this interface; they also funded graduate student interns in this and other areas related to computing. The first anthropology graduate student intern to work at PARC in the late 1970s, Eleanor Wynn, focused her dissertation research on office communications, which aligned with Xerox's interests in office automation and the "paperless office" concept. Wynn subsequently helped Gregory make contacts in the Silicon Valley computer industry for her dissertation research and was followed by Lucy Suchman in 1979, an anthropology graduate student at University of California, Berkeley, who initially was interested in office work practices but later became intrigued with the idea of machine intelligence in a computing context. Suchman did not come to PARC to study human factors, but her work radically reconstituted the nature of the design industry nevertheless.

Suchman established her formidable reputation at PARC by videotaping pairs of users attempting to make copies of documents using an expert help system and then comparing the users' conversations and actions during this process with the machine's automated instructions. Suchman had been influenced by Garfinkle's ethnomethodology, which provided the methodological framework for this investigation. Contrasting the two points of view side by side (those of the users and the machine), Suchman portrayed communication breakdowns between them, as humans moved fluidly among several different levels of conversation (for example, simple requests for action, "meta" inquiries about the appropriateness of a procedure, and embedded requests for clarification of procedures) while the machine was severely limited to producing responses that its designer had programmed into it in anticipation of stereotypical responses that users "should" make. While these observations might not seem revolutionary now, they were a lightning bolt at Xerox PARC and led the corporation to change the design of its copiers to make them simpler to use. This research also gave Suchman a reputation for bold and fresh insight and enabled her to expand the role of anthropology at Xerox PARC.

Suchman attracted other anthropologists whose research further enhanced the reputation of PARC, including Jeanette Blomberg and Julian Orr (some of Orr's work was discussed in the previous section). Building on Suchman's research, Jeanette Blomberg initiated a series of studies investigating the use of technology in organizational context. Her research argued for the necessity of looking beyond the "human-machine dyad" in understanding how new technologies affect work and workers. This broader definition of the human-machine problematic suggested the need for a new technology design strategy that made visible the social, organizational, and interactional dynamics of the workplace. The approach Blomberg developed with her colleagues Randy Trigg and Lucy Suchman integrated techniques and perspectives from work-oriented or participatory design originating in Scandinavia with ethnographic studies of technologies-in-use. A central characteristic of

their approach involved cycling between ethnographically informed workplace studies and the development of design concepts and prototypes, with the active participation of both workers and technology designers. Hugh Beyers and Karen Holtzblatt commercialized many of the work-oriented design ideas pioneered by the Work Practice and Technology group at Xerox PARC and the participatory design movement more generally through their firm, InContext Enterprises.

The work of this cohort of anthropologists at Xerox PARC, together with several others who joined both PARC and the Institute for Research on Learning (for example, Susan Irwin Anderson, Melissa Cefkin, Francoise Brun-Cottan, Chuck and Candace Goodwin, Bridgett Jordan, Patricia Sachs) became known around the world for its innovative integration of anthropology and ethnography into the product and service development stream of a major corporation. A breakthrough came in 1989 when the Doblin Group of Chicago asked Xerox PARC to partner on a project for Steelcase, the office furniture manufacturer. Steelcase wanted to understand how the workplace of the future would evolve and what kinds of work environments and designs it should be thinking about over the long term. Jay Doblin was aware of Suchman's group at Xerox and wanted to bring ethnographic skills into the engagement. Xerox PARC agreed to co-fund the project, which became known as the Workplace Project. The project was situated in an airport, which was believed to have properties reflecting the workplace of the future (for example, high fluidity of people and information, workflow extending into multiple kinds of space via electronic means). Suchman served as lead on this project for several years, and through it she assembled a talented interdisciplinary group of social scientists (including several anthropologists) and designers whose work would revolutionize the design industry. One of the individuals involved was Rick Robinson, then at Doblin, who subsequently went on to co-found E Lab in Chicago, an entrepreneurial firm explicitly dedicated to the concept of equally balancing all product design projects with ethnographic research and design talent The notion that all new product and service concepts should emerge from a contextually rich understanding of the client's natural world, developed through ethnographic field research at client sites, captured on videotape, and analyzed using anthropological theory and methodology, was first conceptualized by Suchman's group in the Workplace Project, but it was Rick Robinson who took this concept to the market and made it profitable.

The research in question often is undertaken by interdisciplinary teams involving anthropologists and representatives of other disciplines (for example, psychologists, designers, engineers, even clients may be involved). Ideally, this research seeks to acquire deeply nuanced, visually based, contextualized knowledge of the consumer's or worker's world, and to secure an understanding of underlying factors that influence the consumer's behaviors (which assumes some knowledge of social and cultural contexts in which the behavior is situated). The goal is to know both *what* the consumer is doing and *why* he or she is doing it, and from this base of knowledge to create new ideas for product and service design concepts and improvements. This approach, or a paler facsimile of it, has been copied by scores of firms all over the world, not all of which take seriously the need to analyze data using anthropological theory and methodology, however. E Lab was purchased by Sapient in 1999, but the idea of "design ethnography" now belongs to the world.

Ironically, the researchers at Xerox PARC did not conceptualize themselves as "applied anthropologists," for the most part, even though they arguably had a greater impact on business than any other group of anthropologists since W. Lloyd Warner and his generation. The Xerox PARC group's view was that they were part of the community of scholars engaged in the anthropology of science, technology, and society studies, a field that was on the rise in anthropology during the 1980s and 1990s and is enjoying an academic renaissance at the present time. In those days, Xerox PARC was a relatively independent organization that permitted its scientists a great deal of intellectual autonomy. And indeed, perhaps it was that very autonomy that contributed so much to the wealth of creativity and high-value-added contributions this group made during its reign over the span of more than a decade. With increasing global competition, however, PARC and many other industrial labs came under increasing pressure to focus scientists' efforts more sharply on the company's critical priorities. Suchman's group was no exception. Although details remain to be written, reportedly tensions arose between Xerox PARC's management and Suchman's research group regarding its future direction and plans. When the issues could not be resolved to everyone's mutual satisfaction, the group

elected to disband itself, and the individual members went their separate ways, unleashing a diaspora of "creative destruction"—the diaspora both dismantled the greatest business anthropology resource known since the Human Relations School while simultaneously releasing the creative talent of many anthropologists (and their ideas) to engage in other pursuits.

Today, the notion of integrating ethnography (and, it is hoped, anthropologically informed analysis) into the design and development of new products, services, and workplaces or practices has become accepted practice in high-tech companies in the United States. Susan Squires, for example, describes work that represents the present form of design ethnography in new product development. Squires visits a family kitchen at 6:30 AM with her video camera partner to observe and interview a former focus group participant in her natural setting, with her two sons. Many discoveries are made: the boys do not eat the "wholesome breakfast" that Mom prepares; Mom eats it herself, apparently unaware of what she is doing; the boys actually eat other, not-so-wholesome food (purchased by Dad), or nothing at all. In the midst of it all, Mom-in-law calls up to check on what Mom is cooking. Later, at one of the boys' schools, Squires finds that the boy who ate nothing is consuming his lunch at 10:30 a.m. Squires provides a contextual analysis of this, plus other field data, relating her discoveries to structural strains in American society that pit working women's realities against older values regarding protection of family members. The outcome of the research is a new product, Go-Gurt, a yogurt-based snack that tastes good, is nutritious, and can be consumed on the go.

Direct observation of natural behavior in the field enables anthropologists such as Squires to gain access to a level of consumer behavior that is not reflected in focus group dialogue, where participants often share idealized representations of their activities and may not be able to report on behavior that is out of conscious awareness. Videotaping routines in the home or other natural settings for later analysis permits highly detailed analysis of behavior and comparison across numerous field sites. Especially valuable is the comparison of survey and focus group data with analysis of ethnographic material; theoretically grounded knowledge of the broader sociocultural context and its emerging trends is necessary to explain discrepancies between these sources and relate them to client needs. Ethnographic research places the consumer in a wider context that explains why people do what they do, not only what, and also provides a deeper understanding of the value of certain products and services in people's lives.

In a very different application, Patricia Sachs's work at Nynex illustrates the way in which an anthropological analysis of ethnographic data can inform the redesign of work systems. Customer repair work at Nynex became disjointed and inefficient when a new "trouble ticketing system" was introduced that broke down repair work into small pieces to be distributed to disassociated individual workers. If a worker did not complete a repair job by the end of his or her shift, the job was recycled to another worker, without an opportunity for the two workers to talk to one another. An activity analysis conducted by Sachs showed that the whole activity surrounding repair work, especially making sense of a problem through conversations among multiple workers, is crucial in solving a customer problem efficiently. The new information system disrupted the natural activity pattern and made the problem resolution process much less effective.

The value of incorporating ethnography into product development and work practices research has been widely recognized in the design industry, so much so that new firms have arisen that specialize in design research, and many of them explicitly include ethnography. To what extent these "ethnographers" are anthropologists is a point of contention. Sometimes it appears that being an ethnographer means a willingness and ability to go to a customer's location and observe, using a video camera. Contextual analysis of findings is strictly optional and not well understood or necessarily valued by the design firm or its clients.

Ethnography for new products, services, and systems or practices is generally focused on the individual or group level of analysis, that is, the user and his or her interaction with a product or service, or the work group, user group, or customer group in context. This focus may be distinguished from the research stream in the previous category (organizational behavior), which has been oriented toward an entire occupational category, or the enterprise or industry level of analysis (for example, computer professionals, a biotechnology firm, the meatpacking industry). There are both theoretical and methodological affinities between these two streams (for example, an occupation engages in a certain form of

work practice), but there also are points of distinction. One point of distinction is an emphasis on ethnographic methodology in design work; for example, a hallmark of Suchman's group was close analysis of videotapes and transcripts (for example, frame-by-frame analysis of video). This emphasis could have (inadvertently) made design research vulnerable to representation by some as a methodology, per se, which in turn could have had the unfortunate effect of turning it into a methodology in some minds, that is, "design ethnography" that can be done by anyone who has a video camera. This did not happen to research at the organizational level of analysis, which draws upon a wide range of methodological traditions from many different disciplines and also has been much slower to diffuse.

Consumer Behavior and Marketing

In the Fordist era, firms were dominated by a producer's view of the world. Consumers and the marketplace were viewed as territory *exterior* to the business, a place that products and services were sent outward *to*. Often, firms made products first and then looked for the consumers afterward, dictating what consumers would have to accept. Now, because of ever-intensifying competitive pressures, companies have been forced not only to listen to what consumers want but also have come to view consumers as potential sources of innovation that they must draw knowledge inward *from*. This new perspective on the value of consumers, and the need for creative exchanges with them, has transformed the way consumer behavior is conceptualized and acted upon as firms create new products and services and take them to market.

Marketing also has changed. In the past, this field was dedicated to the description of consumers' decisions to purchase products, who buys what, and what factors influence the purchasing decision. Statistical analysis of survey data related to consumer demographics was the predominant methodology. The consumer was a number on a spreadsheet. Firms seldom looked behind the numbers to understand *who* the customer really was or *why* consumers made their purchasing decisions. But the shift to a consumer orientation has encouraged new approaches that go beyond mere description of purchasing outcomes. Now, firms are interested in gaining a holistic understanding of consumers' lives in context and finding out what this may teach them about new opportunities to create or improve products or how to make new sales. There also has emerged a realization that the purchasing decision is but a single point in a much more complex and expansive cycle of consumption that includes many other aspects (for example, production, acquisition, actual consumption or use, disposal), all of which must be understood if products are to be improved for consumers' well-being (and the firms' as well). As a result, there is a growing receptivity to inductive, qualitative approaches to consumer behavior that permit exploration of new research questions and theory building. This means that anthropology and ethnography are in vogue. Top business schools are teaching future business leaders the value of participant observation, close reading, and interpretive summary, while the faculty are following modern consumers into cyberspace, adapting their methods as they go (for example, "netnography," "cyber-interviewing." One of the first movers in this new marketplace for consumer knowledge was the entrepreneur-anthropologist Steve Barnett, who began in the late 1970s and early 1980s to develop innovative uses for an anthropologist's window on consumer behavior. At a series of entrepreneurial firms where he directed teams of anthropologists (for example, the Cultural Analysis Group at Planmetrics, Research and Forecasts [a division of Ruder, Finn and Rotman], Holen North America), Barnett invented what were initially unorthodox ways of observing consumers and translating their behavior patterns for applications in marketing and advertising campaigns for major clients such as Campbell Soup, Procter & Gamble, Royal Dutch Shell, and Union Carbide. For example, in the early days, Barnett invented the "unfocus" group, in which a cross-section of a firm's market is placed in a video observation room with a collection of objects and then given a (usually bogus) task of some sort, for example, write a booklet for middle school students describing how electricity is generated, or build a "safe" nuclear reactor using kitchen gadgets. Analysis of the videotape rendered ideas to be turned into advertising images, for example, a campaign to raise electricity rates drew on consumers' lack of knowledge on the subject, or a campaign to gain approval for a new nuclear energy plant was based on consumers' desire to "lock" any radiation inside. Some academic anthropologists were quite uneasy with this kind of activity, believing that events of the type described above did not meet the proper standards of informed consent. However, Barnett was not doing "research" in the way this term

is generally defined, so it is not clear that such standards would be applicable. Barnett developed the technique of placing video cameras in consumers' homes and in shopping locations and interpreting thousands of hours of videotape with frames drawn from anthropological theory (for example, symbolic action and ritual). Such approaches are now standard in the industry. Drawing on the paper trail Barnett skillfully left behind as proof of his own marketing know-how, John Sherry describes numerous ethnographic projects undertaken by Barnett for various clients in the 1980s and 1990s. In the early 1990s, Barnett moved to Nissan Motor Company, where he became director of product strategy, helping Nissan to reconceptualize the automobile as a cultural artifact. Barnett's creative talent helped to transform anthropology from an academic discipline engaged with the theoretical significance of consumption to one of the most sought-after professions at the cutting edge of marketing and advertising. He blazed a trail that many other anthropologists were soon to follow.

That consumption is a thoroughly cultural phenomenon has been recognized by anthropological theorists for some time. American and European theorists have underscored the centrality of consumption in the production and reproduction of cultural patterns of meaning and practice. The British anthropologist Daniel Miller argues that this "turn" represented a metamorphosis of anthropology, from a less mature state in which mass consumption goods were viewed as threatening (that is, signifying both the loss of culture and a threat to the survival of anthropology) to a more enlightened outlook that frankly acknowledges consumption as the local idiom through which cultural forms express their creativity and diversity. This rather amazing about-face has permitted a confluence of interests between anthropology and the field of marketing, which in turn has shed new light on territory stretching far beyond the mere consumption of goods in context. Material goods and services in all phases of their life cycle (design, acquisition, maintenance, disposal) reflect cultural categories and principles, and their usage reflects cultural purposes.

Anthropologists have contributed much to an emerging interdisciplinary theory of consumer culture, which may be defined as a family of theoretical perspectives that define the relationships among consumer behavior, cultural meaning, and the market. This body of literature provides evidence of the role that material goods and services play in the definition of the self and the creation of a coherent sense of identity, even if one that is fragmented. Consumption is especially integral to cultural patterns in the advanced capitalist societies of the West, where individualism is prevalent and so much about the individual is ambiguous at birth. Consumption also is a generative source of new cultural patterns that can reconfigure blueprints for action and interpretation. Consumers are not passive adopters of products, but active innovators who also resist, mutilate, and reconfigure what they find in the market to suit their emerging interests. As active coproducers, consumers have powerful impacts upon products, services, and corporations. Anthropologists also have been intellectual leaders in explaining the ways in which institutional and social structures influence consumption (for example, ethnicity, gender, class, age). Their research has illuminated structures that channel consumer thought and action and the influence such structures have on consumer experience. Indeed, there is sufficient literature now to underpin the production of a fulsome textbook that skillfully fuses anthropology and marketing into a seamless whole. The confluence of anthropological and marketing interests was furthered especially by the work of anthropologist Grant McCracken, who developed a theory to explain the "manufacture and movement" of meaning in the world of goods, including mechanisms by which meanings are transferred from cultural contexts to consumers in a two-stage process. McCracken postulated that meanings initially reside in the culturally constituted world, from which they are first moved to consumer goods by way of a pair of mechanisms—the advertising system and the fashion system. In the advertising system, meanings are consciously attached to goods to differentiate them and enhance their attractiveness to consumers. The fashion system not only produces waves of new designs but also cohorts of opinion leaders (for example, experts, journalists) to comment on these designs and their meanings, so that consumers will have a respected source to legitimize the meanings. Once meaning is attached to a good through these mechanisms, the meaning is then transferred to consumers by several other mechanisms in the second stage of the process. McCracken describes the mechanisms at this stage in terms of symbolic action or ritual, including a possession ritual (for example, announcing one's inclusion or exclusion in a social group

through a purchase), an exchange ritual (for example, insinuating symbolic properties on to another person through a gift), a grooming ritual (for example, coaxing value out of a good through utilization, such as polishing one's car), and a divestment ritual (for example, erasing the aura of a former owner). This theoretical framework has been highly productive in explaining empirical phenomena and generating hypotheses for further research.

The emerging theory of consumer culture also was advanced by an important contribution from Russell Belk, Melanie Wallendorf, and John Sherry Jr. In their seminal piece, anthropologist John Sherry and his sociologist and psychologist colleagues report on a summer spent touring sites of consumption across the United States in an RV (the Consumer Behavior Odyssey). One of their significant observations was a purported shift in the boundary demarcating the sacred and the profane in American life, with certain consumer experiences being edged into what they defined and described empirically as "sacred" space. Their paper provides theoretical and empirical evidence of dual processes—a secularization of religion and a sacralization of the secular. As sacred institutions become less potent as a social force, consumers long to experience what they can only imagine. Consumption becomes an effort to obtain closure between reality and some imagined ideal state. Thus, in various cases, what appear on the surface to be ordinary consumption events turn out to be, for their participants, extraordinary and even transcendent moments that promise powerful new purposes and directions in life, at least for that instant. In McCracken's model, this paper contributes both to an understanding of the culturally constituted world in which consumer meanings are constructed and also helps us understand how those meanings may be moved to products by savvy marketers who can endow products with a sacred aura through creative advertising campaigns.

Another significant contribution of anthropology has been to critique and expand constructs underlying consumer behavior and marketing theory, based on empirical research in non-Western societies. For example, Eric Arnould was among the first anthropologists to interpret his extensive, long-term ethnographic studies in West Africa for marketing audiences. In an early paper, he problematized the notion of "preference formation" (that is, how a consumer develops likes and dislikes, an idea that is central to diffusion theory) by comparing the standard Western view of this construct with both a local construction that is compatible with premarket sociocentric values and an Islamic ethnonationalist view, in which individuals achieve status through innovations based on "Meccan" goods. Since then, Arnould has published an extended series of papers that draw upon ethnographic sources to shed new light on marketing concepts ranging from cross-border trade to relationship management, enabling an empirically based globalization of the marketing literature.

The British anthropologist Daniel Miller is an especially prolific scholar, with multiple volumes on various aspects of consumption, spanning the late 1980s to the present. Beginning with his important *Material Culture and Mass Consumption*, Miller has shown how commodities, as other material forms, are capable of acting as mythic structures, as classificatory systems that establish homologies among different models of sociality and as a means of objectifying moral values. For example, in *The Theory of Shopping*, Miller connects shopping to sacrificial ritual. He notes that sacrifice has two central features—it places the sanctifier in a relationship with a transcendent entity and thereby sanctifies the former, and it marks the transition from production to consumption (for example, firstfruits sacrifice). In shopping, which usually is carried out by women, the shopper is linked through bonds of love and devotion to a family, either an existing family or one that she hopes to have one day. It is the underlying relationship that guides the woman's purchases, which are thoughtful and thrifty. And as in sacrifice, purchase of the commodity transforms it from an object of production to an object of consumption. While consumer goods may be mechanisms of alienation, discrimination, or control, this case suggests that a mature anthropology does not make such judgments a priori.

Anthropologists also have produced literature exploring more explicitly the mechanisms by which advertising firms move cultural meanings from their context into the realm of goods and services. In a volume based on observations by anthropologists based in advertising firms, Steve Kemper enhances our understanding of the relationship between the global and the local by analyzing the presentation of goods by advertising firms to traditional populations in the developing world. He uses the case example of pressed powder and scents in Sri Lanka, where the widespread diffusion of television has

opened opportunities for marketers to offer modern products to villagers for the first time. As Kemper explains, the economic powers in the village (senior males) could interpret certain products (cosmetics for young women) negatively, and refuse to provide monies for purchase, unless their advertisements are culturally sensitive. The effective advertisement used neither the "global" image of a sophisticated urban woman nor the potentially condescending "local" image of a traditional village girl, but rather created something that captured both the "local idiom" while managing to be "generic" at the same time—the "sidevi look," which combined images that are modern enough to be attractive to a young woman but still innocent enough to avoid offending her father. Kemper explains that most advertising firms in the developing world end up creating such images that blend local and generic themes so that the end result is neither the global homogenization that is feared nor the local uniqueness that existed in the past. This explanation provides an organizational mechanism to account for the "globalization" phenomenon that anthropologists have reported in other contexts.

Anthropologist Barbara Olson provides an insider's story of the role an advertising agency can play in detecting cultural shifts taking place in the market and translating those shifts into changes in marketing technology that also moves products to the consumer and facilitates further cultural change. Olson has a unique vantage point as an account executive in an ad agency, one of whose clients was the brassiere manufacturer Warner. When Warner first came to Olson's agency in the 1960s, its image was that of a prudish, old-fashioned maker of "firm" products for older women. Because these were the days of women's liberation and bra burning, Warner was worried that their market was going to disappear. At her suggestion, Olson's agency began using anthropological techniques to gain a better understanding of the customer at the point of sale—inside the "upstairs" department stores (meaning, stores for upper-middle-class women). What they learned from fieldwork was that these stores had experienced staffing cutbacks, saleswomen were harried and fatigued and had little time to provide individual attention required to show customers brassieres. In those days, bras were kept in drawers, out of sight, and customers had to take them into dressing rooms privately to try them on. Olson's agency suggested that Warner put the bras on hangers and let the customers handle them without sales help—a somewhat radical self-service concept that was already in place at "downstairs" stores serving working-class women. But the idea was nixed out of hand by Warner's male hierarchy; they believed their upscale customers would never try on a bra that had already been tried on by another woman. Certain they had the right idea based on fieldwork, however, Olson's agency formed an alliance with a female department store buyer and persuaded Warner to try the idea in test markets. It was a sensation, and took off beyond all expectations, changing forever the way bras were marketed across the industry. After the Warner's campaign, it was commonplace for upstairs stores to show lingerie in public. Consumers wanted convenience more than they wanted privacy. Note the role played by the agency in changing the minds of Warner executives. In the past, it was not unusual for (male) corporate executives to make decisions for (female) consumers about whom they knew little or nothing (other than what their wives might say). Olson's agency (using anthropology, and a woman anthropologist too) stopped Warner from making this mistake. This example reveals the way in which anthropological approaches are changing business practice and how these practices in turn influence cultural patterns.

The literature in consumer behavior and marketing produced by anthropologists has been well received by marketing departments and corporations, with the result that anthropologists now hold positions in the marketing departments of several major business schools (for example, University of Pennsylvania, Northwestern University, University of Nebraska, University of Utah).

It would appear that anthropology now is a permanent addition to the disciplines that comprise the academic marketing field. Some of the ethical and political difficulties that confront anthropologists studying organizational behavior are avoided by those focusing on consumer behavior, as access to corporations may not be required (although this is less true if the anthropologist is a full-time practitioner). This is a distinct advantage that recommends this type of work. There are drawbacks, however. One relates to the uneasiness that some anthropologists sense in the use that may be made of their work in ethically questionable sales (for example, products that may cause harm). Yet, such risk is inherent in the production of all knowledge and its utilization, and this is no

different. A more troublesome issue concerns the prefabricated consumption "experiences" that are becoming almost a total institution in America. Not only do these threaten a numbing down that may mask social control; they also may encode sacralization messages that, in fact, are hollow. In truth, the idealized images that consumption seeks to quench can rarely be satisfied by the act of consumption alone. The desire to consume is insatiable. While this may be a place we have been before, anthropology has not been so entangled in the mechanisms by which consumption is produced, and for some anthropologists, it is not a comfortable place to be.

Convergence of the Domains

During much of the Cold War era, corporations and consumption were neglected subjects in anthropology, even though it was obvious to all that these forces powerfully shaped the lives of anthropologists and the peoples we studied. W. Lloyd Warner's discovery of the corporation as one of two distinctive American institutions was forgotten as anthropologists interested in modern societies aligned against capitalism, and many deemed research inside businesses "unethical." Consumption was at best esoteric exotica, for other reasons discussed previously. This rather strange state of affairs in which anthropologists seemed to disregard some of the most potent cultural forces of our age was bound to change sooner or later.

Over the course of the past 20 years, the relationship between business and anthropology has come of age. That is to say, a productive relationship has formed, yielding advances in the state of knowledge and practice. This has happened because of changes in the world and changes in anthropology. The opening of the post-Fordist era meant destruction of an older economic order and the birth of a new one, with the inclusion of Asia and other parts of the developing world as major economic and technological platforms of global production and consumption. Ever curious, and going where the action is, anthropologists have been true to the disciplinary mission—seeking the edge of the frontier and exploring the unknown. Our epistemological strengths enable us to go where few have gone before, and that is exactly where we are in the world of corporations, design, and consumers. The discipline has adjusted to admit observations from these field sites for a variety of reasons. There is, perhaps, less theoretical and philosophical polarization now, as the end of the Cold War and the rise of critical theory gradually have expanded the "zone of contact" between those who were aligned with Marxian ideology and those committed to other theoretical and philosophical frames. Management journals now publish critical theorists who "study down" in companies, while anthropology journals publish cultural materialists who "study up" in the same types of firms. Boundaries are permeable and lines between categories are blurred, inside anthropology as everywhere else. Another influence on the relationship between business and anthropology has been the diaspora of the so-called institutional anthropologies. Postmodernism and critical theory in other disciplines have had the interesting effect of making anthropology very attractive elsewhere (even as it sometimes appeared that anthropology itself was about to self-destruct). A centrifugal pull outward toward other fields has been in motion for the past two decades, leading many anthropologists to become hybrids, complete with graduate degrees in other fields (for example, medicine, law, social work, education). One kind of hybrid is the business type, but this is just a specialized instance of a much wider phenomenon that is in the process of remaking anthropology and has accompanied the rise of applied and practicing anthropology more generally. Hybrids admit external influences into anthropology, and if/when these reach a critical mass, hypothetically, there could be a tipping point at which anthropology changes in a qualitative way. A final force for change is the pragmatic need to place academia's graduates. If graduates cannot find jobs, then academia ultimately will shrink, so it is in the interests of academic anthropologists to gradually explore the new terrain of corporations, design, and consumption, and academic administrations will support this if it bears the right kind of fruit (stratified by institution, of course).

A look back over the long history of entanglements between business and anthropology shows many ironies. One is that the small world investigated by Warner and company (that is, labor-management relations in the context of Mayo's Human Relations movement) held the promise of leading them perhaps to a deeper understanding of modern institutions. Warner attempted to fulfill this vision in his Yankee City studies, but anthropology turned its back on these interests, abandoning them to sociology and the policy disciplines. It is ironic that the "turn" we

have seen in the past 20 years toward consumption studies, which did not even exist in Warner's time, now constitutes perhaps the most ambitious theoretical agenda for exploring modern American society that anthropology has yet produced. While there are a relatively small number of anthropology scholars at the forefront of modern consumption studies, their work has inspired a vast body of interdisciplinary research that enables us to better comprehend the mechanisms through which markets mediate the creation of meaning and social practice within a broader sociohistorical frame of globalization and market capitalism. This did not happen because anthropologists decided to study modern society, but because anthropologists finally acknowledged consumption as relevant to their interests. In America, it also must be acknowledged that it happened because anthropologists joined the fields of consumer behavior and marketing in business schools.

Another irony lies in a backward look at the Hawthorne studies. Anthropologists were not running the show in those days, and today we know that "the boss" was wrong. Mayo (the boss) saw the BWOR workers as "maladjusted," but he was misinformed. The workers knew what they were doing. The problem is, no one told American managers the truth. Most managers are not trained to grasp the idea of "cultural logic" on the shop floor or in the office, even though they are trained to grasp that same notion in relation to the marketplace. That is ironic. If alternative explanations of Hawthorne had been advanced in the 1930s and anthropology had played a more decisive role in shaping the theory of organizations over the next several decades, the workplace that we know might be very different today, and anthropologists who study organizational behavior might be thriving like their counterparts in marketing. We must ask ourselves about the long-term implications of an anthropology that is perpetually marginalized in studies of private sector organizations and management.

What seems clear from an overview of the literature is that the worlds of consumers and producers are not two separate things. Consumption and production are intertwined, perhaps most clearly in the design process, which brings the producer (designer) and consumer (user) together in a collaborative juxtaposition. The service economy also represents the joining of these worlds, as one conceptualization of service is the simultaneous production and consumption of an economic activity within the context of a relationship between a producer and a consumer (for example, teaching/taking a course). All of this suggests that the intersection of these two worlds is expected to become increasingly apparent as the 21st century evolves away from a Fordist producer orientation, with its mechanistic and functionalized view of the world, and toward a more integrated, holistic perspective encouraged by a consumer orientation. Thus, while the three domains described herein will continue as distinct subfields with their own literatures, increasing areas of interaction and overlap among them are predicted. Anthropology, as a holistic discipline, is in a good position to conceptualize the connections among the domains; indeed, they already were apparent in this entry. For example, both design and consumption are activities that often take place within organizational contexts. Understanding these contexts—the resources or opportunities, as well as the risks or constraints they pose—are significant considerations for anthropologists seeking an integrated assessment of human behavior in its natural setting. Furthermore, organizations themselves are human constructions that are objects of design, and they also are sites of consumption. With respect to their designed nature, the formal and informal structures and policies of organizations are continuously being formed and reformed. These unfolding processes could become sites of ethnographic research, toward the goal of improving outcomes in organizational decision making as it affects the design of new products and services and the offering of these outputs to market.

Consumption also should become increasingly relevant as a focus of anthropological and ethnographic inquiry within organizational settings. As corporations outsource their services to one another, each organization "consumes" their suppliers' services. While this may sound somewhat abstract and "business-to-business" in nature, on the ground it can become very individualistic and person-to-person—say, for example, someone in Chicago trying to obtain help over the telephone from someone else in Bangalore. This interaction represents the consumption of one organization's service by another organization. If we begin to conceptualize the convergence of consumption and production, we may be able to bring to our study of organizations the theoretical and methodological insights gained through the study of consumer behavior, a theoretical maneuver

that has not been optimally exploited in the study of organizations. An example of the potential of this kind of crossover was provided earlier in the notion of the sacralization of work in America. Carla Freeman's research provides another example of the potential of investigating consumption practices within a production context. Daniel Miller discussed many additional examples.

Since the broader context of our lives is connected, there should be resonance among the various facets of our experience. And if globalization indeed means that boundaries are blurring, then the boundaries between employees and consumers, between the interiors and the exteriors of the firm, are blurring as well, and anthropologists who are interested in organizational behavior, ethnographically informed design, and consumer behavior, may gain insights by spending more time talking together and reading each other's work.

— *Marietta L. Baba*

Further Readings

Arnould, E., Price, L., & Zinkhan, G. (2002). *Consumers.* Boston: McGraw-Hill.

Friedman, J. (Ed.). (2003). *Globalization, the state, and violence.* Walnut Creek, CA: AltaMira.

Jordan, A. (2003). *Business anthropology.* Prospect Heights, IL: Waveland.

Malefyt, T. D., & Moeran, B. (2003). *Advertising cultures.* New York: Berg.

Olson, B. (2003). The revolution in marketing apparel: A narrative ethnography. In T. Malefyt & B. Moeran (Eds.), *Advertising cultures.* Oxford, UK: Berg.

Schwartzman, H. (1993). *Ethnography in organizations.* Newbury Park, CA: Sage.

Sherry, J., Jr. (1995). *Contemporary marketing and consumer behavior: An anthropological sourcebook.* Thousand Oaks, CA: Sage.

Squires, S., & Byrne, B. (Eds.). (2002). *Creating breakthrough ideas: The collaboration of anthropologists and designers in the product development industry.* Westport, CT: Bergin & Garvey.

Stull, D., & Broadway, M. (2004). *Slaughterhouse blues: The meat and poultry industry in North America.* Belmont, CA: Thompson/Wadsworth.

Suchman, L. (1987). *Plans and situated actions: The problem of human-machine communication.* Cambridge, UK: Cambridge University Press.

Anthropology and Epistemology

Epistemology is that discipline of philosophy devoted to the nature of knowledge and how we acquire it. It is further divided into *prescriptive* and *descriptive* epistemology. Rules of how to proceed to acquire knowledge are called "methods," and hence a prescriptive epistemology is a "methodism." Descriptive epistemologies are sometimes referred to as "sociology of knowledge," although many descriptive epistemologies are not sociological.

The field derives from three main sources. One is the work of ethologist Konrad Lorenz, who wrote that the synthetic a priori judgments of Kant are the a posteriori results of evolution. That is to say, our "innate" ideas, which are not the basic theorems of logical necessity, are the outcome of selection on human cognition and that of our ancestors.

Another is the program begun by philosopher Willard Van Ormand Quine, to "naturalize" epistemology, based on the work of Carnap and the Pragmatists. Quine famously wrote that "creatures inveterately wrong in their inductions have a pathetic, but praiseworthy, tendency to die before reproducing their kind" (Quine, 1969 p. 126).

Under the influence of Karl Popper and Donald T. Campbell, a number of thinkers proposed to model epistemic, and especially scientific, change as a selection process. Early on, Popper presented a selection theory of theory change in which scientific theories are subjected to strong selection pressures through testing, so that the fittest theories survive. In later works, he repeated this view, which can arguably be traced back to comments in his 1934 edition of *Logik der Forschung.* He attempted to argue that biological mutations also follow a pattern of anticipatory behavioral change followed by genetic "hopeful monsters," in order to make a parallel with theory change. A conjecture, he said, is an anticipatory behavioral change, while the formalized and tested theory is the transmissible entity in conceptual evolution; so he had to show that biological evolution could anticipate the future. The "modern synthesis" rejected this hopeful monsterism, and recent research has backed that up. If biological evolution were purposive, then an explanation in terms of the underlying harmony or order of things might indeed suffice to confirm anticipatory change, and by analogy the same could be true of theory change.

Beginning largely in the 1970s, attempts were made to bring evolutionary models to broader epistemology, misleadingly called by Donald Campbell "evolutionary epistemology" (EE). The term misleads because, like evolutionary ethics before it, it is an oxymoron; where it is evolutionary, it is descriptive, and hence not classical epistemology, and when it is prescribing epistemic rules and heuristics, it is not (in the Darwinian sense) evolutionary, as what has worked in the past is not necessarily a guide to truth or what will work in the future. Moreover, the movement has two broad streams: one concerned with the evolution of cognitive processes (especially those dear to empiricists; vision and the other senses), the other an attempt to provide an evolutionary process model of the growth (or less prejudicially, the development) of knowledge. Bradie distinguished between *evolutionary evolution of mechanisms* (EEM) and *evolutionary epistemology of theories* (EET).

Epistemic evolutionists accept that there are a number of fundamental disanalogies between Darwinian biological evolution and theoretical evolution, especially in science, although there is considerable disagreement about the number and nature of these disanalogies. Some consider that the evolutionary development of our cognitive mechanisms is, at best, merely sufficient to ensure our survival (or that our more abstract cognitive faculties are pleiotropic upon those faculties required for survival) and that theoretical evolution is so decoupled from biological evolution that our biologically constrained intuition is repeatedly undermined by theories of science. For example: "solid objects" are mostly space, colors are wavelengths of light, and so forth. Hence, the reliability of our senses is not established by our (biological) evolutionary success. This decoupling of theoretical (and more broadly of cultural) evolution from biological evolution is further supported by the supposed Lamarckian nature of the former. To this extent, almost without exception, epistemic evolutionism is not Darwinian; that is to say, it posits non-Darwinian processes either of epistemic variation, selection, or hereditability or some mix of these.

Under the cultural Lamarckist model, either the variation is not random with respect to the selection processes (it is directed toward problem solving, and hypotheses act like Goldschmidt's now discredited "hopeful monsters," anticipating the selective processes either behaviorally or phenotypically) or the selection process is not blind (theories are chosen on endogenous rational grounds, not on exogenous and contingent considerations. That is, the optimum future theory is sought by the process rather than the currently merely adequate, as in biology, or theories are not causally determined in transmission (those receiving the theories are agents who may rationally reject or modify the information coded for by the cultural items passed on).

Some other major claimed disanalogies include (1) the fact that a single theoretician may entertain a sequence of theories over his or her lifetime, unlike an organism that has a specific phenotype; (2) that there is lateral as well as vertical transmission (we are influenced by our peers as well as earlier generations); and (3) that there are a lack of corollaries for "ecology," "resources," "competition," genes, and other fundamental concepts of the biological Darwinian view and that proposals for analogues are vague and involve a lot of hand-waving but very little rigor.

Many evolutionary epistemologists accept with Popper that guided cultural transmission underpins a directed evolution of science, and that it makes absolute progress, and that progress and its telic nature are the result of conscious rational decisions, in contrast to the undirected, unconscious, and blind workings of Darwinian biology. Given this basic difference of mechanism and process, it is difficult to see why these writers would want to call their epistemological evolution theories "Darwinian" at all. Each of them admits that the process involved is not blind, either in the *selection* or *generation* of variations.

In effect, these views fall within two of three increasingly more inclusive sets: they are *process* epistemologies, they are *selective* epistemologies, but they are not *Darwinian* epistemologies (in contrast to David Hull's account of science, perhaps the best example of a purely descriptive evolutionary epistemology. That is, the processes they posit as selection processes in science are not Darwinian processes. A process epistemology explains knowledge as the outcome of dynamic and historical (diachronic) processes: the historical and causal chains that have brought it about. Process epistemologies have a necessarily sociological character to them; knowledge is seen as the production of a community (an ecology), not of an individual, however brilliant. A selective epistemology is one in which epistemic change is the result of selective retention. A Darwinian epistemology is one that claims that variation and retention are not purposive with respect to the overall outcome of

change; that is, intentions do not determine the success of final product.

Evolutionary epistemology is basically an attempt to show that the Kantian a prioris are the phylogenetic a posterioris, as Lorenz expressed it. In other words, it seeks to legitimate Kantian categories (or some equivalent) as constraints brought about by severe selection processes, survivors of which are the most robust and probably the most reliable. In this way, EE attempts to avoid Humean difficulties with induction-like heuristic justifications: To justify your heuristic, merely establish its provenance and success rate to date. In this, there is a severe difficulty for epistemic evolutionism: In no organism that results from biological evolution is full cohesion or optimality achieved; why should even a Lamarckian process succeed in science? Why should directed evolution work any better (except in that it would be faster) than an undirected evolutionary process, unless, of course, the director is God or some such omniscient factor? Directed or undirected, the success of an evolutionary adaptation lies in the "solution" of problems similar to those for which the adaptation was first selected.

If an epistemology is a modeling of what an ideally or realistically successful heuristic looks like, and it makes prescriptions of the kind "in order to best achieve knowledge of kind *k*, use rules and methods *h*," then evolutionary epistemology is ill-founded, for such prescriptions simply cannot be drawn from Darwinian or any other biological theory. A case in point is the repeated insistence that sociocultural evolution must be Lamarckian. By this is usually meant that sociocultural change is a process of artificial selection, to the specifications of evolutionary "engineers" (scientists, social planners, economists, and shadowy controlling figures in industry). Yet artificial selection is a subset of "natural" selection processes, albeit rather more severe than the usual process of natural selection. A breeder may achieve quickly a certain coloring or ear length, but the resultant animal may also be fragile or disease ridden. To achieve a robust variation may still take a long time and much trial and error. Nothing about artificial selection gives us confidence that fitness will be more reliably gained than it would be through undirected selection. It is possible that sociocultural selection of rational variations is as random as natural selection is with respect to the selection forces operative. The selection process relevant to macroevolutionary trends in sociocultural systems is of a quite different order than for the selection involved at the individual level in generating and choosing beliefs. If intentionality in variation is decoupled from the success of the selection outcome—wishing a theory to be true (in any relevant sense) does not make it so—then even a Lamarckian epistemic evolutionism fails to establish how success to date underpins the warrant of any methodological morals drawn from the past. As philosopher Hilary Putnam has expressed it, it's not that evolutionary epistemology is false, but rather that it fails to answer the philosophically interesting questions (such as why we should believe our selected ideas or whether they are in fact correct, or merely help us survive). There are a number of critics of evolutionary epistemology, and a comprehensive bibliography can be found in Cziko and Campbell.

— *John S. Wilkins*

See also **Lorenz, Konrad; Popper, Karl**

Further Readings

Bradie, M. (1994). *The secret chain: evolution and ethics, SUNY series in philosophy and biology.* New York: *SUNY* Press.

Cziko, G. A., & Campbell, D. T. (1990). Comprehensive evolutionary epistemology bibliography. *Journal of Social and Biological Structures, 13*(1), 41–82.

Hull, D. L. (1988). *Science as a process: An evolutionary account of the social and conceptual development of science.* Chicago: University of Chicago Press.

Lorenz, K. (1965). *Evolution and modification of behavior.* Chicago: University of Chicago Press.

O'Hear, A. (1999). *After progress: Finding the old way forward.* London: Bloomsbury.

Plotkin, H. C. (1994). *The nature of knowledge: Concerning adaptations, instinct, and the evolution of intelligence.* Harmondsworth, UK: Allen Lane/Penguin.

Popper, K. R. (1972). *Objective knowledge: An evolutionary approach.* Oxford: Clarendon Press.

Radnitzky, G., & Bartley W. III. (Eds.). (1987). *Evolutionary epistemology, rationality, and the sociology of knowledge.* La Salle, IL: Open Court.

Wuketits, F. M. (1984). *Concepts and approaches in evolutionary epistemology: Towards an evolutionary theory of knowledge, theory, and decision library* (Vol. 36). Dordrecht, The Netherlands, Boston: D. Reidel.

Anthropology and the Third World

Origins and Evolution of the Concept "Third World"

The term *Third World* (*tiers etat)* was coined in 1952 by Alfred Sauvy, a French demographer, to describe the poor, marginalized, and powerless class of prerevolutionary France. Its meaning expanded rapidly to denote areas of the world that were distinct from the industrialized capitalist countries, the First World, and from communist bloc nations that formed the Second World. This new way of talking about disenfranchised peoples of the world caught on rapidly and was used by social scientists at the 1955 Conference of Afro-Asian Countries in Brandung, Indonesia. A new journal, *Le Tiers Monde,* launched in 1956, provided a forum to explore the conditions of impoverished peoples of the *tiers monde*—Africa, Asia, Oceania, and Latin America—who, much like the commoners of the French third estate, *le tiers etat,* lived under conditions of oppression while their labor supported the more affluent social classes.

Discussions about the state of the Third World amplified and quickly moved from a focus on economic and social issues to reflect the political tensions that characterized the Cold War era and pitted capitalist nations (Western Europe, the United States, Canada, Australia, and Japan) against their communist antagonists (Russia and other communist countries that formed the USSR). Some Third World countries, wishing to remain outside the sphere of influence of these "superpowers," came together as the Non-Aligned Nations, thus formalizing the division of the world into three distinct political arenas. The term *nonaligned*, used to indicate the political neutrality of these nations, was at best an ideal. Capitalist and communist countries vying for control of Third World politics and economies and looking to expand their sphere of influence formed often shifting alliances with poor countries in return for economic support. These rivalries continued until the collapse of the Soviet Union that began with *glasnost* and *perestroika* in 1986 and ended in 1989 with the fall of the Berlin Wall.

However, the First World/Third World distinctions and dynamics survived these changes and still influence contemporary geopolitical patterns.

Patterns That Characterize Third World Countries

Third World nations share some broad characteristics. Most were at one time European colonies and share a postcolonial legacy of political instability and repressive governments. They fall within a wide spectrum. While some of these countries are now stable, others are burgeoning democracies. A large number of Third World countries still struggle under dictatorial governments and lack well-organized political structures. Civil wars and ethnic conflicts are yet other legacies of both colonization and the arbitrary repartition of traditional lands. Weak political infrastructures are often associated with less engaged civil societies and a lack of national identity—pitting predatory states against exploited and voiceless masses. Most people in the Third World still do not have access to appropriate sanitation, clean water and electricity, good roads, and communication. They have experienced rapid shifts toward export production at the expense of production for local consumption and traditional methods that used to ensure sustainability. These changes inevitably lead to marginal economies characterized by high unemployment rates, low per capita income, and loss of productive potential. Furthermore, most people in Third World countries experience dire poverty and have little hope of improving their socioeconomic status; wealth and valuable resources are in the hands of small elites that also control politics, government, and trade. This uneven distribution of resources leads to social imbalance and a system reminiscent of colonialism.

Compared to Western countries, Third World countries tend to have high population density. Family planning methods to curb birth rates are not easily accepted in areas where large families are still preferred. Problems associated with the shift away from traditional patterns of production toward industrialization and export production also lead to demographic shifts from rural areas toward urban centers. As peasant farmers find it increasingly more difficult to support their families, they are drawn to cities and export zones in search of jobs in the manufacturing industries and assembly plants controlled by multinational corporations. Export-free manufacturing zones dot the landscape of many Third World countries. They employ predominantly low-skilled, poorly educated female workers at minimal wages

under generally unhealthy working conditions. Workers are not protected by labor laws and are strongly discouraged from forming bargaining units. In other words, multinational companies exploit a vulnerable labor force, and national governments offer little or no support to the workers. It is estimated that in Haiti, for example, close to 80% of the population are unemployed or marginally employed and live on less than $1 a day. These conditions set Third World countries at the margins of the world economy with little hope of improvement without outside aid.

The past 40 years have also witnessed the rapid, uncontrolled, and unplanned growth of several cities such as Mexico City, Calcutta, Lagos, and Cairo. Unemployment and underemployment as well as severe overcrowding in these hyperurbanized areas lead to social problems such as violence, ecological degradation, delinquency, and civil unrest. Poverty, hopelessness, and a search for a brighter future also contribute to migration toward more industrialized and developed areas of the world, where workers perceive that their chances at upward mobility, education, and freedom are much higher.

People of the Third World have limited access to Western medicine, and preventable diseases such as malaria and parasitic diseases, which have disappeared in industrialized nations, contribute to high mortality and short life expectancy. In some parts of the Third World, the majority of pregnant women do not receive prenatal care and give birth at home with the help of traditional birth attendants. In these areas, infant and maternal mortality rates are high when compared to those in industrialized nations. Other poor health indices mainly associated with poverty, ecological degradation, and poor infrastructures include high rates of infectious diseases such as HIV/AIDS, STIs, tuberculosis, cholera, and malnutrition. Treatment and medicines available in Western countries are far beyond the budgets of most poor nations, further pushing them at the periphery of the world system. Women in general suffer more from the consequences of these conditions than men and are also more vulnerable to violence and exploitation. In most of the Third World, women carry the brunt of child care while also responsible for production and household chores. They tend to suffer more from malnutrition than men, earn less than men, and have fewer rights than men.

While it is relatively simple to identify First World countries—they are few in number and most are located in Europe and the northern hemisphere, the Third World is more heterogeneous and diverse. Some of the countries that fall under this rubric are indeed very poor—Haiti, Tanzania, and Bolivia, for example—while some Gulf States nations are quite wealthy; some Third World countries are overpopulated and have high birth rates and others are small nations with low population densities.

By contrast, wealthier, industrialized nations such as the United States, Canada, Western Europe, Australia, and Japan are known as the First World. Nations in this group are considered established democracies, have stable economies, are industrialized, and have well-developed infrastructures. Medical care is available to the majority of people, and health prevention measures such as prenatal care and immunization against childhood and some contagious diseases contribute to higher life expectancy and low maternal and infant mortality rates. Unemployment in these areas is lower than in the Third World, and literacy rates are much higher.

The Second World dissolved with the fall of communism at the end of the 1980s, and the 1990s saw a realignment of strategic parts of the world. Allegiances to socialist principles as well as political and economic interests that united Soviet bloc countries and provided cohesion to this group were challenged. Former members of this group gradually claimed their independence from Russian domination and joined the ranks of democratizing countries. While some former Soviet nations with stronger economies are in transition toward First World status, many, especially in the autonomous regions of Asia and Eastern Europe, joined the ranks of Third World countries. Other communist countries like China and Cuba and some African countries that had strong ties to Russia chose to retain Marxist ideologies and socialist economies.

Some problems are becoming global and cut across the division between rich and poor nations. A 1999 report published by the International Forum on Globalization Studies shows that global consumption of water is doubling every 20 years, at more than twice the rate of human population growth. According to the United Nations, more than 1 billion people on Earth already lack access to fresh drinking water. At the current rate of use, it is estimated that by 2025 the demand for fresh water will rise by 56%. Regardless of their status, all the countries of the world are vulnerable to the predicted water shortage. It is a far more

serious threat to the world's health, agriculture, and industrial production than the current world dependency on oil. In Third World countries, people already spend a significant share of available resources to purchase drinking water or spend a great deal of time fetching water. As the water crisis intensifies, governments around the world—under pressure from multinational corporations—are advocating a radical solution: the commercialization and mass transport of water. This could have devastating impacts on already precarious small economies and on the health of poor people. Already, in the maquiladora zones of Mexico, water is so scarce that babies and children drink Coca-Cola and Pepsi instead. Already, more than 5 million people, most of them children, die every year from illnesses caused by drinking poor-quality water. Already, water shortages and the diversion of water from agriculture to industrial production threaten grain production in China.

The hegemonic influence of the First World is illustrated in the changes that are happening throughout Third World countries as traditional cultures and modes of production are abandoned in exchange for more valued Western practices. Westernization and globalization are changing the face of traditional cultures. The encroachment of Western cultural patterns and technology influence how Third World people view themselves and their cultures. They continue to adopt Western goods, technologies, and attitudes to the detriment of local customs. Trade and industrialization alter traditional forms of production, and small economies are forced into the world system, albeit at the margins of this system.

Theories of Underdevelopment

Why are some countries stable and wealthy while others are so poor? Perceptions of the Third World and explanations for its slower pace of development are strongly influenced by Western scholars, and not much attention is given to the voice and perspectives of Third World intellectuals. Anthropologists offer different interpretations of the dynamics between Western and non-Western countries, rich and poor nations. The language used to describe these dynamics is at best awkward and often creates more problems than it solves. Each set of terms used to characterize this dialectic reflects a particular discourse and a way of seeing the world. Each set of opposites is therefore value laden and biased. The term *Third World* stresses the hegemonic nature of the relationship between rich and poor countries and is often contested by people in Third World countries. However, alternative terms such as *underdeveloped* and *developed, developing* and *industrialized,* or *countries at the center* and *countries at the periphery* of the world system also highlight the hierarchical nature of First and Third World relationships. Anthropologists writing from the periphery of the world system have used a North-South opposition to critique the effects of postcolonial dynamics that perpetuate inequities and exploitation. In this scheme, countries of the North tend to be former colonial powers and have well-developed economies and geopolitical interests. Countries of the South are mostly former colonies, tend to have weak economies, and are more apt to rely on former colonial powers and Western countries for trade and financial assistance.

Rather than ranking societies according to how rich or poor they are, the nature of their political ideologies, or who their allies are, some anthropologists suggest discussing instead how the twin processes of colonization and industrialization differentially affect the ability of some countries to build the kinds of infrastructures that distinguish poor nations from rich ones. Others have noted the limitations of definitions that compare and rate countries in terms of economic indices and level of technological development; they note that such typologies tend to devalue culture and the human experience.

Since the end of World War II, relations between industrialized nations and Third World countries have been influenced and mediated by the discourse and practice of "development." Development is often associated with industrialization and modernity. Some current in anthropology sees development as "improvement in human well-being" and its counterpart, underdevelopment, as a state of mind. They question why some countries develop while others lag behind and suggest that specific cultural patterns and historical processes often determine, or at least influence, the economic success of Western societies. This kind of reasoning tends to imply an inability by poorer countries to measure up to some standards of excellence based on hegemonic perceptions of the relationship between developed and underdeveloped, between powerful and powerless, and between First and Third World people. Hobart notes that in this way of thinking, "being underdeveloped often implies, if not actually iniquity, at least stupidity, failure and sloth." These perceived deficiencies are

paradoxically articulated in rhetoric of altruistic concern for the less fortunate and then translated into development initiatives.

Anthropologists and other social scientists try to understand why poverty and underdevelopment continue to define life experiences and choices for most people in the world. Three main currents of thought dominate these discussions. The dominant school of thought, also known as modernization theory, stresses the deficiencies of poor countries, such as their inability to form democratic governments, their low level of education, and the absence of well-formed civil societies as the root of their underdevelopment. They gloss over the responsibilities of rich countries in the perpetuation of these problems and see Westernization as the only solution to the disparity.

The Marxist theory of underdevelopment proposes an analysis that highlights how mechanisms of exploitation and class struggle in Third World countries work to maintain patterns of inequality. They note that, through control of capital and production, the dominant classes continue to exploit the poor and build wealth and power.

Another school of thought, which subscribes to dependency theory, suggests that the industrialized world's quest for increased wealth creates poverty and underdevelopment. In this view, poverty in the Third World can only be understood within the larger context of the world economic system and the wealth of capitalist countries as dependant on the exploitation of poorer countries. This perspective is strongly supported by Third World social scientists.

Development is usually equated with Westernization instead of empowerment.

Even though some point to the dependency of the Third World on wealthier countries for trade and manufacturing jobs, others argue that dependency also goes the other way—that rich nations rely on the cheap labor force of Third World countries and also need to sell their products in Third World markets.

Development assistance was expected to alleviate poverty and narrow the gap between developed and underdeveloped countries. It has worked for some countries and for some people in places like New Zealand and Australia and some Latin American countries. Overall, however, the promises of development have not been fulfilled, and we see an increased dependency of poor countries on rich countries for economic support and trade at the same time that the gap between rich and poor countries is increasing. Structural adjustment measures and other fiscal policies required by international financial institutions as a condition for granting assistance stymie efforts of Third World countries to escape from the grip of poverty.

The interplay between development and power relations cannot he ignored. In *Reversed Realities,* Kabeer clarifies how these relationships work by suggesting that those involved in development assistance should pay close attention to the dynamics between "key" and "unofficial" actors. She suggests that abstract and highly formal modes of theorizing, which tend to silence or devalue the viewpoints of unofficial actors in development, have helped to generate top-down approaches that have become the hallmark of much of mainstream development policy. She notes that "key" actors are those in positions of authority and thus influence development discourse and initiatives, while "unofficial" actors, as subordinates, are those supposedly in need of development.

Jeffrey Sachs suggests that rich countries and international institutions have the capacity and the power to end poverty, if they really wanted to, and that it can be done relatively cheaply. He notes that the majority of the diseases that kill the poor such as malaria and diarrhea are easily preventable, that the extreme poverty that has become so prevalent in most of the Third World is avoidable if the powerful were to spread resources more evenly. In a 2005 address to the World Bank, Sachs noted that as long as wealthy nations and multinational corporations persist in selling things to people who have no money, poverty will continue and Third World debt will increase. He challenged the World Bank, and by extension Western countries and development practitioners, to step up to the plate and meet the challenge of the Millennium Development Goal to reduce global poverty in half by 2015 and "be done with poverty that kills" by 2025. To meet these challenges, the rich would have to put the needs of the poor ahead of increasing profits and controlling the powerless. It is important, however, to keep in mind that development is a big business for wealthy nations.

Anthropology and Development

How does development happen? What is the development encounter like? Who are the various players in this game? A look at these questions will shed light on the complexities of "doing development" and why

it is difficult to measure the outcome of development initiatives.

Applied anthropologists generally agree that development projects fall into two broad categories: top-down initiatives and bottom-up ones. Top-down development projects are usually designed outside the area of intervention. Critics of this form of development point out that such initiatives reflect Western ideas of how things should be done and offer Western solutions for Third World problems. They are usually designed by experts associated with multilateral organizations—aid organizations composed of several member or donor countries like the United Nations, the World Health Organization, or the World Bank. These organizations have large bureaucracies, are well funded, and finance projects through large grants and loans. They undertake projects with a broad scope, target problems that affect large numbers of people, and can become engaged in building infrastructures.

Like multilateral organizations, bilateral or governmental organizations (GOs) are also engaged in large-scale development projects. They are the international assistance arms of individual donor countries and have well-defined political agendas in addition to their humanitarian mission. Among the largest and most powerful GOs are the USAID (U.S. Agency for International Development) and the CIDA (Canadian International Development Agency).

Nongovernmental organizations (NGOs) refers to a number of private, nonprofit organizations working in developing countries. Contrary to larger development organizations, NGOs use a bottom-up approach to development that stresses empowerment as well as sharing of power and responsibilities. NGOs can be international or grassroots organizations located in Third World countries. Local NGOs can be village cooperatives, community-based groups, peasant organizations, or women's groups, while missionary groups and nonprofit or volunteer organizations fall under the label of international NGOs.

The relationship between donor/development organization and recipient/local communities is complex. Several issues need to be addressed, such as, Who sets the agenda? What type of organization is best suited to undertake specific projects? Who is responsible to make development "go," foreign agencies or local beneficiaries? Who are the beneficiaries of development assistance? How is community defined?

Some anthropologists suggest that development agencies and aid workers are often too concerned with short-term changes and lack the flexibility, the time, and the patience to become familiar with the local context and to really listen to what the poor need, and they end up designing development initiatives that do not address the real needs or desires of the intended beneficiaries. These anthropologists ask whether top-down approaches and cookie cutter solutions that are supposed to end poverty have delivered on their promises. The answer is not easy to sort out. While international and bilateral organizations can mobilize significant economic and technical resources, they are not well suited to support long-term interventions because they are burdened by top-heavy administrations and are too concerned with quick results. As development practitioners know, development that works takes time. Grassroots organizations, on the other hand, have the opportunity to develop a better understanding of local issues and form long-term working relationships in the communities where they work. They are limited, however, by their inability to mobilize enough resources and influence policymakers. It is important to keep in mind that while grassroots changes and collaborative approaches are critical in the struggle to alleviate poverty, infrastructures and nation-building efforts are also necessary. Thus, each type of organization plays a specific role in the process of development and can complement each other. The best results are achieved when large organizations and NGOs team up to address specific problems.

It is equally important to clarify who the intended beneficiaries of development projects are and have a clear idea about the area of intervention. While selecting a narrow focus and a small area of intervention may have advantages, it is also likely that restricting the scope of an intervention too tightly may limit the potential for change and for replication. When carefully planned, development initiatives can play a vital role in strengthening civil society and can serve as catalysts in encouraging nationalism. What is needed, and most difficult to achieve, is to establish respectful and collaborative relationships with all parties in the development process. While foreign organizations are critical players in development, their role is to assist local communities solve their own problems.

Ideas about the meaning of economic development have changed from an emphasis on GDP and creation of wealth to a focus on poverty and basic human needs, that is, human development. While

theoretically we are moving in the right direction, the application of these notions is difficult, slow, and not always along the lines of the ideologies. We experience difficulties linking practice to theory. Often, practice is just experimentation and the stakes are high. Or ideologies that make sense on paper are difficult to realize for a number of reasons.

Most people agree that development should be about improving human potential and not Westernizing Third World countries. Investment in human development calls for a focus on quality of life and, therefore, on improvements in education and health care, as well as on the social and political climate. Critiques of this type of development suggest that rather than safeguarding the interests of workers, human development could be construed as protection of the worker as a form of capital.

A variety of approaches inform the work of development practitioners and their choice of methods. Each approach reflects a particular construction of the relationship between donor and recipient, of the expectations of donor organizations and their perceptions of recipients of development assistance. In participatory development, project management and authority are shared between all parties. A participatory approach requires time and energy as well as accountability, respect of local values as guiding principles, and privileging local expertise over foreign ideas.

A great deal of attention is also given to sustainable development. In 1992, the World Bank outlined the salient aspects of sustainable development such as environmental preservation, reduction of population growth, attention to local problems, cost efficiency, and clear short-term and long-term goals. However, sustainability is often invoked to limit access to life-saving medicines and technologies. Some anthropologists, like Farmer, suggest that pragmatic solidarity is a more humane way of solving poverty. Pragmatic solidarity implies more than delivery of services; it addresses the broader goals of equality and justice for the poor. An example of this approach is demonstrated in the findings of the Global Anti-Poverty Summit held in Haiti in 2004. Participants in the summit concluded that in order for the extremely poor—those who live under $1 a day—to make good use of microcredit programs, they need other kinds of infrastructure and social investment such as education, access to health care, food, and security to prepare them to succeed. Multilateral organizations and financial institutions are too often reluctant to invest in such programs, which they find too costly and not sustainable. Grassroots organizations are more willing to undertake projects that address the needs of the very poor and to use a community development approach. This approach is a holistic approach and incorporates education and training as well as economic support for grassroots projects.

The participation of anthropologists in development work has been strongly contested among those in the discipline. Some critiques point to previous associations of anthropologists with colonialism and warn that development could be construed as a form of neocolonization. Others note that anthropologists' focus on culture, their research methods, and the approaches used in the discipline do position anthropologists to work well in Third World societies and especially with grassroots organizations. While academic anthropologists have been reluctant to do development work—engage power structures and step into the arena of policymaking—applied anthropologists have adapted theories and methods of their discipline to solve real-life problems and to advocate for the poor and marginalized.

— Rose-Marie Chierici

Further Readings

Escobar, A. (1995). *Encountering development: The making and unmaking of the Third World.* Princeton, NJ: Princeton University Press.

Farmer, P. E. (2003). *Pathology of power.* Berkeley: University of California Press.

Isbister, J. (2003). *Promises not kept.* Bloomfield, CO: Kumarian Press.

Jackson, E. T., & Kassam, Yusuf (Eds.). (1998). *Knowledge shared: Participatory evaluation in development cooperation.* West Hartford, CT: Kumarian Press.

Lewellen, T. C. (1995). *Dependency and development: An introduction to the Third World.* Westport, CT: Bergin & Garvey.

Lewellen, T. C. (2002). *The anthropology of globalization: Cultural anthropology enters the 21st century.* Westport, CT: Bergin & Garvey.

Trish, S. J., & Wallace, M. B. (1994). *Dilemmas of development assistance: The what, why, and who of foreign aid.* Boulder, CO: Westview.

Anthropology of Men

Prior to the advent of the women's movement, anthropological research tended to focus on men's lives, rituals, and interactions, but without articulated awareness or remark. The majority of early anthropologists were men; they had more access to men's than to women's lives, and gender had not yet emerged as a salient problem within anthropology. Early feminist writing within anthropology advocated for an anthropology of women to counteract this imbalance, and in the beginning, the anthropology of gender was a series of representations of women's daily lives. Later, the focus shifted to one of gendered studies (the study of women and men, transgenders, and gender-making social processes) and most recently has considered men's identities and masculinity as important topics in their own right. These studies define men and masculinity in a variety of ways, as thoughts, behaviors, or traits of men; thoughts or behaviors that make men into men; and that which is opposite of female and femininity.

The anthropology of men has started to look at the closely connected relationships between men's and women's identities; has focused on the particularities of men's daily lives; has continued to address issues surrounding male sexuality; has looked at the connections between gender and society; and has raised the question of a possible "crisis in masculinity."

Interconnections Between Men's and Women's Identities

The notion that gender is something that is created and negotiated within specific social spaces is widespread within anthropological studies of men. Some of men's most influential social situations arise through their interactions with women, and anthropologists now argue that gender is best understood as a relational construct, meaning that cultural understandings of what it means to be a male or female cannot be reached without taking the connections between men and women into account.

Anthropologists studying masculinity—Matthew Gutmann's research on men in Mexico City, Anne Allison's work on corporate masculinity in Japan, and Stanley Brandes's study of folklore and gendered relations in Spain, for example—all provide evidence that shows that men use women as points of reference as they develop and maintain masculine identities. Work that takes a relational view of gender, therefore, strives to show that the idea of completely separate men's and women's worlds is an idealized one.

Anthropologists have broadened their research to move beyond focusing on these connections between men and women and argue that one's social environment and interactions also impact the creation of gendered identities. This research emphasizes that there are ongoing negotiations present in men's lives as masculinity is constructed and transformed through everyday interactions, and it is clear that there are multiple meanings of masculinity from which men can choose based on the social situations, relationships, or contexts in which they find themselves.

Focusing on the Particulars

Across cultures, all men live and interact within contexts such as the family, household, and workplace, though the particular characteristics of these spaces vary in different cultural contexts. By focusing on these locations, the anthropology of men has also examined ideas such as men's and women's roles and the division of labor and resources within the family, the effects of work outside of the home on men's lives, and ideas about fatherhood and parenting.

The image of the male-headed household with a clearly delineated division of labor is one that many gender studies have promoted. Other research, such as sociologist Arlie Hochschild's *The Time Bind,* has begun to complicate and flesh out this supposed ideal, however. Hoschschild writes about family life among middle-class families in the United States and examines the ways in which traditionally held views about men's and women's roles are changing as a result of practical demands and personal desires of spouses in dual-career families. Anthropologist Irene Casique looks at similar questions in her studies of working-class Mexican families as she examines changes in the division of labor within families where women work outside of the home, noting that men's participation in housework continues to be rather low and sporadic.

Many anthropologists have also focused on the ways in which work itself—male and female, paid and unpaid, inside and outside of the home—impacts men's relationships with their wives, families, and other men in the community. With the powerful economic changes that started in the 1980s, studies such

as Elizabeth Brusco's *The Reformation of Machismo: Evangelical Conversion and Gender in Colombia* have highlighted the ways in which economic transformations and gendered relations are intertwined, and the connections between financial situations, social change, and how an increasing number of multi- and transnational employment opportunities affect men's lives.

With changes in ideas about men's and women's work, as well as in the types and availability of employment, come shifts in men's responsibilities, and studies have looked at the ways in which parenting and fatherhood play into the negotiation of masculine roles and responsibilities. For example, José Olavarría examines the deep transitions regarding notions of fatherhood in nuclear, working-class families in Chile, arguing that a hegemonic masculinity and patriarchal fatherhood still serve as reference points for fathers, but that the growing autonomy of women, changes in economy, and the requirements of a nuclear family create new demands and dilemmas for men that make it difficult to fit the standards of what he calls "modern fatherhood."

Men and Sexuality

A third focus within the anthropology of men is the connection between men and sexuality. In this context, sexuality can refer to the wide range of sexual practices, beliefs, and taboos, as well as the cultural values and meanings assigned to men's sexuality.

The importance of heterosexuality as a means of showing men's power and control (either over women or among one's peers) has been extensively documented. Part of Phillipe Bourgois's argument in *In Search of Respect* is that serial monogamy and blatant heterosexuality are ways in which the extremely poor, disenfranchised men in New York City with whom he works feel like they can exert dominance over others. In many studies of men in Latin America and the Mediterranean, the concept of machismo is also directly related to heterosexual practices and is a way in which men assert authority and control.

Works that focus on sexuality and eroticism between men have also been central to studies of men and masculinity. For instance, Gilbert Herdt's *Guardians of the Flutes* and *Ritualized Homosexuality in Melanasia* were two of the earliest works that focused on men's sexual practices as core to the ethnography, and examined how male youth in certain New Guinea societies engage in fellatio (generally, older youths inseminate or feed semen to younger youths) as a central and even necessary part of becoming masculine and adult. Other ethnographic studies on groups such as the "two-spirited ones" in Plains Indian societies; Lynn Stephen's work on "third gender" roles in Oaxaca, Mexico; Annick Prieur's *Mema's House: On Transvestites, Queens, and Machos,* about male transvestites in Mexico City; as well as Don Kulick's *Travesti: Sex, Gender, and Culture among Brazilian Transgendered Prostitutes* have all examined men's involvement in what their communities view as alternative sexualities and the complicated ways that masculinity can be challenged, transformed, and/or reaffirmed through same-sex sexual practices.

For example, the work of both Prieur and Kulick focuses on biologically defined men who in complex and varied ways strive to become socially defined women. In Prieur's work, the *vestidos* do not contest stereotypical gendered roles, but instead attempt to fit into them as closely as possible. They dress as women, get plastic surgery, inject their bodies with oil to create "womanly" curves, and prefer to take a passive role in sex. In Kulick's ethnography, however, though the *travestis* fit into many female-gendered roles, they also embrace their maleness and are disgusted by biological women. These are just two among a number of diverse ethnographic studies that reveal the varied ways in which masculine and transgendered identities are created through bodily appearance (such as dress, hormones, oil injections), anatomy, sexual practices (active versus passive roles), as well as social interactions and behaviors.

Gender and Society

Images of masculinity have also proved powerful at higher levels of sociocultural integration, such as the nation. In many cases, the nation itself is conceptualized as female, while national protagonists and ideal citizens are masculinized, and threats to the nation are seen both as acts that violate the national (female) body and appropriate forms of masculinity. These processes, of course, take diverse local forms.

Octavio Paz explicitly connects gender to the Mexican nation in *The Labyrinth of Solitude: Life and Thought in Mexico,* where he discusses the ideas of the "macho" Mexican man and Spanish colonization. The conquistadors, he argues, violated the "passive"

Mexican (female) nation through colonization, just as masculine "macho" Mexican men physically, sexually, and emotionally abuse weaker men and women. Eduardo Archetti also discusses the connections between masculinity and the nation. He describes the ways in which Argentinian (male) soccer players developed a different style of play from that of the British colonizers—a style of play that ultimately stood for both a model soccer player and an ideal, implicitly masculine, Argentine citizen who symbolized that which was opposite of the colonizer, as well as a faithful representation of the nation.

A Crisis in Masculinity?

Finally, following David Gilmore's *Manhood in the Making,* some anthropologists have argued that men are culturally "made" and therefore have to achieve masculinity through complex processes. These processes, including insemination rites and group circumcision, as well as individual achievements such as finding employment, marrying, and having children, allow boys to be seen as men by their communities. This becomes more difficult when there are significant changes in men's lives, leading to what some of the most recent gendered analyses of men label as a "crisis" in masculinity. These works use social factors such as declining economies, an increase in the percentage of women working outside of the home, a greater equality in the salaries of men and women, and an increase in education for women to provide background explanation for this "crisis" and the inability of men to achieve the socially acceptable and "appropriate" forms of masculinity and/or manliness.

The Importance of Men in Future Anthropological Research

The study of men in anthropology holds a complicated position. Whereas men were once the default focus of anthropological research and writing, gendered studies on the particularities of men's lives and masculinity have been overshadowed until recently by a focus on women's lives and femininity. As a result, the anthropology of men continues to be a key topic to explore further—especially taking into account the effects of factors such as globalization and migration, and the connected and dramatically shifting economic opportunities, social resources, and family relationships as men construct and negotiate their gendered identities.

— *Sara Withers*

See also **Anthropology of Women; Gender; Sex Roles**

Further Readings

Connell, R. W. (1995). *Masculinities.* Berkeley: University of California Press.

Cornwall, A., & Lindisfarne, N. (1994). *Dislocating masculinity: Comparative ethnographies.* London: Routledge.

Gutmann, M. (1997). Trafficking in men: The anthropology of masculinity. *Annual Review of Anthropology, 26,* 385–409.

Gutmann, M. (Ed.). (2003). *Changing men and masculinities in Latin America.* Durham, NC: Duke University Press.

Kimmel, M., & Messner, M. (1998). *Men's lives.* London: Allyn & Bacon.

Anthropology of Religion

Anthropological studies of religion had their beginnings in the late 19th century, with the seminal works of Max Muller, W. Robertson Smith, Edward B. Tylor, and James G. Frazer. These scholars, of course, were not the first to take an interest in the comparative study of religion, nor were they the first to speculate on the religions of preliterate and tribal peoples. What set these men apart is that they were among the first to suggest that tribal religions might be amenable to study following the rules of the scientific method and to posit specific methodological procedures for the comparative analysis of religious beliefs and practices. All four of these scholars have been characterized as "armchair theorists" and dilettantes (although Muller was an expert in Sanskrit; Robertson Smith had an excellent command of Semitic languages; Tylor had spent time studying the antiquities of Mexico; and Frazer had a strong background in classics). All four scholars conducted their research from the apex of a far-flung British Empire and thereby had access to a wider range of comparative data than had been available previously.

Muller, Robertson Smith, Tylor, and Frazer formulated theories that have been characterized as "intellectualistic." All four of these men were primarily interested in human thought. All sought to understand religious belief and practice at its most fundamental, elementary level. Frazer argued, for example, that human thought is best understood as a progression from magic, to religion, to science. Magic—which Frazer contended was based either on the principle of contagion or "sympathy" (the idea that if two objects are associated, they will continue to influence one another even after they are separated), or the notion of imitation (that idea that like influences like)—was said to be the earliest form. In more advanced societies, Frazer contended, magic eventually is replaced by religion and finally by science.

Nineteenth-century anthropologists—as was common among social scientists of their day—derived their assumptions about religion from their own experiences within the Christian tradition. While Muller and Frazer considered themselves agnostics, Tylor and Robertson Smith were devout Christians. Another source of bias is that "armchair anthropologists" like Tylor and Frazer tested their theories on the basis of the highly suspect reports provided by missionaries and European travelers. It was the rare Western observer who was able to report on non-Western religions objectively. Indeed, evolutionary models current at the time would have precluded such objective reportage. Given these substantial constraints, it is amazing that the 19th-century interpretations of tribal religions are as sympathetic and insightful as they sometimes are. Despite their evolutionary assumptions and their overwhelming Eurocentric and Judeo-Christian biases, Muller, Robertson Smith, Tylor, and Frazer ended up making valuable contributions to the study of religion and can profitably be read today.

It is not surprising that many of the leading minds of the 19th century would turn their attention to religion. It has never been difficult to make a case for the significance of religion in human life. Religion has been found in all societies studied by anthropologists. It is highly visible and in the words of Raymond T. Firth (1995) represents "a massive output of human enterprise." Religious beliefs and practices are an enduring tribute to humankind's nearly infinite resourcefulness and adaptability in coping with the problems of daily life. As William W. Howells (1948) astutely noted, "Man's life is hard, very hard. And he knows it, poor soul; that is the thing. He knows that he is forever confronted with the Four Horsemen—death, famine, disease, and the malice of other men."

Despite a keen and enduring interest in religion, there is no single, uniform anthropological theory of religion or a common methodology for the study of religious beliefs and practices. Researchers in the area cannot agree as to how exactly "religion" should be defined or what the term "religion" should encompass. Efforts at defining religion—ranging from Edward B. Tylor's 1871 definition of religion as "the belief in spirit beings" to the more complex definitions offered by Clifford Geertz and Melford Spirto—have met with considerable resistance. Nevertheless, Geertz's (1973) definition was far and away the most influential anthropological definition of religion for much of the 20th century: "(1) a system of symbols which acts to (2) establish powerful, pervasive, and long-lasting moods and motivations in men (and women) by (3) formulating conceptions of a general order of existence and (4) clothing these conceptions with such an aura of factuality that (5) the moods and motivations seem uniquely realistic."

While his definition may be useful in elaborating what religion is like conceptually and what it does psychologically and socially, Geertz has been criticized for failing to inform the budding researcher how he or she might identify religion when encountered in the field. A major stumbling block to all definitions of religion, of course, is that religion is not a "thing," but an abstraction.

Other 20th-century definitions of religion (for example, Melford E. Spiro and E. E. Evans-Pritchard) followed Émile Durkheim in positing a dichotomy between the so-called "supernatural" and "natural" orders. These alternative definitions have proved no more satisfactory than Geertz's, since distinctions between "supernatural" and "natural" are seldom obvious and may vary from individual to individual and from society to society.

In the early 21st century, debate has arisen concerning the scope of anthropology of religion. Do anthropologists of religion study religions only in tribal settings? Is it exclusively the study of non-Western religions? Is it to be limited to the study of religion among oppressed and marginalized people? The focus of anthropological study has shifted from the study of tribal to modern religions. A number of well-received studies have analyzed religion in developing societies, Europe, and in the United States. Many of the leading contemporary exponents of

anthropology of religion—John R. Bowen, Thomas J. Csordas, Tonya Luhrmann, Robert Hefner, Maurice Bloch, Jonathan Friedman, Vincent Crapanzano, Edith L. B. Turner, James W. Fernandez, Sherry B. Ortner, Mary Douglas, Jean Comaroff, Benson Saler, and Stanley J. Tambiah—have devoted the bulk of their attention to local variants of major world religions (Hinduism, Islam, Buddhism, and Christianity) and/or the impact of world religions in developing countries (Java, Indonesia, Morocco, Sri Lanka, South Africa, and Nepal) rather than the religions of isolated tribal groups. Contemporary ethnographers concentrate on examining religious diversity in complex societies instead of providing further documentation for uniformity in tribal religions.

An unresolved issue facing anthropology of religion is the nature and problem of religious belief itself. "Belief" (and conversion) is central within Protestant Christianity, but is clearly of less concern in tribal religions, where questions of orthodoxy seldom arise. There has been protracted debate among scholars as to whether it's possible for a nonbeliever to make definitive pronouncements concerning the religious beliefs of others. Can a religion be understood only from the perspective of a believer? While a number of leading psychologists and sociologists of religion are themselves adherents to the faiths they study, the overwhelming majority of anthropologists are skeptics. Most anthropological studies reduce religion to human terms, and many anthropologists would agree with Raymond Firth (1995), who concluded, "There is truth in every religion. But it is a human not a divine truth."

Belief presents special problems for anthropologists because conversion is seldom a viable option for outsiders studying tribal religions. Nevertheless, a number of anthropologists have insisted that religions can be grasped only from "within." This is especially true for ethnographers who conduct research among Pentecostals and Fundamentalists and the many contemporary anthropologists who specialize in new religious movements, such as neoshamanism and Wicca. In the last four decades, anthropologists have grappled with the dialectical relationship between the examination of cultures from the *emic,* or insider, perspective, or from the *etic,* or outsider, perspective. Nowhere is this creative tension more evident than in the anthropological study of religion. Questions of theory and method that can be addressed provisionally, hypothetically, or heuristically in other social or cultural arenas become fundamental and often impossible to ignore in the study of religion. While distinctions of belief versus nonbelief or inner versus outer realities may be bracketed and examined heuristically, the very nature of that heuristic—the discovery process itself—needs to be carefully defined and pursued.

The hallmark of 20th-century anthropology has been the advocacy of firsthand participant observation and/or fieldwork. This altered once-and-for-all the character and scope of research on religion and forced anthropologists to become more modest in their goals and less sweeping in their generalizations. Contemporary anthropological assertions are more likely to concern the manifestation of a particular belief in a particular place and time rather than speculate on "religion" in the abstract. Researchers focus on a single aspect of a religion (a specific myth, a specific ritual, or an aspect of a ritual such as divination, sacrifice, spirit possession, and so on) but refuse to examine an entire religious complex. This has had both positive and negative consequences for the anthropological study of religion. Twentieth-century anthropologists of religion have been left with the choice of "saying more with less authority" or "saying less with more authority." Most have chosen the latter path. This is a far cry from the imperial stance taken by Muller, Tylor, Robertson Smith, and Frazer and cannot help but have far-reaching consequences for the anthropological study of religion in the next century.

Theories developed in other subfields of anthropology (linguistics, economics, kinship, ecology) have been applied—with varying degrees of success—to the anthropological study of religion. As a result, religions have been analyzed from a variety of perspectives: functional, psychological, ecological, structural, cross-cultural, cognitive, and symbolic. Of these new perspectives, variants of functionalism have been the most enduring. But cognitive and symbolic studies are likely to dominate in the next century.

A number of promising studies have focused on ritual and ritual practice. From this perspective, rituals are seen as the fundamental unit of religious expression and the building blocks for all religions. Earlier studies underscore the role of ritual in mirroring defining central features of society and culture, worldviews, identities, political forms, and social arrangements. More recently, scholars have argued that ritual not only mirrors these defining features, but challenges them as well. Greater attention has

been given to so-called ritual inversions and what Max Gluckman has termed "rituals of rebellion."

In the 19th century, scholars like Lady Jane Harrison argued valiantly for the primacy of ritual over myth. All mythology, they argued, has its roots in ritual activity. The myth-ritual debate raged for over 60 years, until 1942, when Clyde Kluckhohn offered a satisfactory compromise by recounting multiple instances in which a myth clearly began as a ritual and other instances in which a ritual clearly began as a myth.

Anthropological studies of ritual distinguish between calendrical and crisis rituals and between individual and collective rites. For Durkheim, rituals both reflect and support the moral framework underlying social arrangements. Radcliffe-Brown improved on Durkheim's theory by attempting to explain why some rituals are chosen over others. Ultimately, Radcliffe-Brown suggested, rituals directly related to the collective and material well-being of a society are elevated to having spiritual "ritual value" as well.

Perhaps the most influential 19th-century study of ritual was provided by Arnold van Gennep in *The Rites of Passage* (1909/1960). Van Gennep argued for the significance of rites of transition, which he categorized as an immutable tripartite sequence: separation, liminality, and reaggregation. Victor Turner's *The Ritual Process* (1969) advanced van Gennep's concept of "liminality" by advocating its applicability for the study of ritual in both tribal (Ndembu) and modern European societies. Roy A. Rappaport's *Pigs for the Ancestors* (1968) adroitly demonstrated how rituals regulate environmental relations. Rappaport's is one of the best-known studies linking religious ritual and ecology.

Within the anthropological tradition, myth has been understood primarily as an encapsulation of sacred truth. Functional theorists like Bronislaw Malinowski have argued that myth promotes social cohesion and serves as a "charter" for human behavior. Myth, in short, legitimates human activities. Other theorists have treated mythology as separate from religion. The 20th-century study of mythology has received its greatest proponent in the seminal work of the French structural anthropologist Claude Lévi-Strauss, who finds in myth a key to the underlying structures of the human mind. Myth, for Lévi-Strauss, reveals how the mind functions.

Anthropologists have long noted that religions are highly dynamic, and the role of religion in fostering social change has been extensively explored. An interest in religious change is discernable in the evolutionary

Source: © iStockphoto/David Freund.

theories of Tylor and Frazer as well as the 20th-century diffusionist studies of Leslie Spier and Alfred L. Kroeber. Anthony F. C. Wallace identified a five-stage progression to account for attitudinal and organizational changes that occur within religious movements: prophetic, utopian, messianic, millennial, or millenarian. Wallace is best known for his conception of "revitalization movements" and his application of this concept to the Plains Indian Ghost Dance and cargo cults in Melanesia.

Much recent work in anthropology of religion focuses on symbols and cognition as exemplified in the writings of Clifford Geertz, Victor Turner, Edith L. B. Turner, James W. Fernandez, James Boon, Sherry B. Ortner, Mary Douglas, and others. Still other approaches focus on biological and experiential models of religion. Cognitive and neurological sciences have produced great insights into the biology of behavior,

and many of these insights have been extended to the study of religion. Organizations like the Society for the Anthropology of Religion and the Society for the Anthropology of Consciousness (both established sections of the American Anthropological Association) are devoted to the rigorous, scientific exploration of religious experiences, including the religious use of hallucinogens, categorization of altered states of consciousness, shamanism, trance states, and the cross-cultural study of spirit possession. Naturalistic theories of religion have experienced a revival in the writings of Stewart Elliott Guthrie and Pascal Boyer. In addition, a number of anthropology graduate programs have expanded their offerings in anthropology of religion, notably, the University of Chicago and the University of California-San Diego.

Other scholars have devoted attention to the reassessment of previous research. They have argued that contemporary anthropologists of religion are constrained by inadequate and outmoded categories and conceptions. Their frustration is eloquently expressed by Morton Klass (1995), who laments that anthropologists of religion continue to embrace "theoretical perceptions and assumptions that have long since been jettisoned in most other areas of anthropological concern and activity." Not all anthropologists would agree. Such critical assessments often fail to do justice to the tremendous amount that can be learned from the excellent earlier textbooks of Robert Lowie, Edward Norbeck, Anthony F. C. Wallace, Paul Radin, and Annemarie de Waal Malefijt as well as the recent texts by Fiona Bowie, John R. Bowen, and Stephen D. Glazier.

In conclusion, functional, cognitive, and symbolic approaches have dominated the anthropological study of religion in the late 20th century as researchers have become increasingly concerned with the concept of meaning. Doubtless, biological, neurological, and cognitive approaches will assume greater importance in the next century. Anthropology of religion is no longer focused on the study of religion in tribal societies. Since the late 1970s, a majority of anthropological studies have dealt with religion in the developed or developing world.

— Stephen D. Glazier

Portions of this entry have been adapted from *The Encyclopedia of Religion and Society*, edited by W. Swatos, AltaMira Press.

See also **Religion and Anthropology; Religious Rituals**

Further Readings

Bowen, J. R. (2004). *Religion in practice: An approach to the anthropology of religion* (2nd ed.). Needham, MA: Allyn & Bacon.

Bowie, F. (2000). *The anthropology of religion.* Oxford: Blackwell.

Buckser, A., & Glazier, S. D. (Eds.). (2003). *The anthropology of religious conversion.* Lanham, MD: Rowman & Littlefield.

Firth, R. T. (1995). *Religion: A humanist approach.* New York: Routledge.

Geertz, C. (1973). *The interpretation of cultures.* New York: Basic Books.

Glazier, S. D. (2005). *Anthropology of religion: A short introduction.* Oxford: One World.

Glazier, S. D., & Flowerday, C. A. (2003). *Selected readings in the anthropology of religion: Theoretical and methodological essays.* Westport, CT: Praeger.

Howells, W. W. (1948). *The heathens: Primitive man and his religion.* Garden City, NY: Doubleday. (Reprinted by Sheffield Publishing)

Klass, M. (1995). *Ordered universes: Approaches to the anthropology of religion.* Boulder, CO: Westview Press.

Anthropology of Women

There are two ways to interpret "the anthropology of women:" One is as the work of women anthropologists, and the other is as anthropology that focuses on women as its subject. This entry deals with the latter, although for many reasons, the two often go hand in hand. Feminist anthropology, the ethnography of women, and female anthropologists have all been historically associated together, as it was feminist anthropologists—most of them women—who were first interested in doing fieldwork with women, writing ethnography about women, researching anthropological questions about women, and writing theory about women and gender.

Many early ethnographies are notable for a distinct lack of women. Early male (and some female) ethnographers, speaking mostly or entirely to male informants, managed to create many ethnographic accounts that seemed to be entirely about men. A chapter in such an ethnography might be devoted to marriage and children (in which women would naturally figure

as indispensable to these activities), but women were largely absent from early depictions of traditional life. Likewise, gender and women's concerns were also largely absent from early theory. As women entered the field of anthropology—quite early—many of them noticed this oversight and began to take steps to amend it.

We can characterize the anthropology of women as falling into four categories so far: the study of women in relation to men and gender roles ("women and men"); large-scale cross-cultural theorizing about the position of women globally ("woman, culture, and society"); the study of women's activities as valuable in and of themselves ("filling the gap" left by prior anthropologists); and last, the more modern view of positioning studies of women within a framework of gender and other cultural forces, often foregrounding agency and practice ("positioned studies"—because of the different theories and views the anthropologist may bring to bear). While these categories follow a roughly chronological order in their development, they do not follow a chronological order in their use; for example, many anthropologists still do gender role studies today (as indeed we should, as our understanding of gender is very different now than it was 70 years ago).

Sex and Temperament, Women and Men

Margaret Mead, arguably one of the most famous early anthropologists, focused much of her work not only on women in society, but on questions of gender and gender roles. Her most famous work, *Coming of Age in Samoa: A Psychological Study of Primitive Youth for Western Civilisation* (1928), examines the lives of teenaged girls, a population mostly ignored by previous anthropologists. Much of her work focused on gender and the relations between men and women, and this focus meant that researchers and readers of her popular works alike were aware as never before of women as a worthy subject of study.

Mead's famous *Sex and Temperament in Three Primitive Societies* (1935) first raised the question of whether gender roles as they were conceived by Western culture were biological and thus unchangeable, or whether they were cultural and societal. In exploring three cultures in Papua New Guinea with distinctly different gender roles, Mead revealed that in the Arapesh culture, both sexes behaved in ways characterized by Western cultures as "feminine"; among the Mundugumor, both sexes behaved in aggressive ways that would be characterized in Western cultures as "masculine"; and the Tchambuli had gender roles that could be construed as reversed by Western standards. While the use of terms such as "masculine" and "feminine" was arguably problematic (as the gender roles were perfectly normal for men and women in those societies), the point that gender roles differ to a great extent across cultures was made very effectively. Mead was thus able to argue that gender roles were formed by culture rather than biology and were not only variable between cultures, but also possibly changeable over time. This study—and her elaboration on this theme, her book *Male and Female: A Study of the Sexes in a Changing World* (1949)—is often credited with inspiring anthropologists to pay more attention to women, gender roles, and the relations between men and women in the field.

What Do We Know About Women?

In 1974, the *Woman, Culture, and Society* collection was published by Michelle Zimbalist Rosaldo and Louise Lamphere, in response to a series of lectures at Stanford called "Women in Cross-Cultural Perspective." The collection was groundbreaking in that it addressed women as subjects for ethnographic study outside the usual bounds of marriage and child rearing and it served as a forum for cross-cultural theory. Sherry Ortner remarked in her later publication *Making Gender: The Politics and Erotics of Culture* (1996) that she protested that she didn't know anything about women when she was recruited to write an essay for the collection in 1971 but was told that no one else did either—it was an experimental publication, an exploration into unknown territory, the presentation of entirely new theories and new ethnographic material. It included essays on women in politics, women and language, women and family, and the myth of matriarchy, among other rich subjects.

While all the essays published in *Woman, Culture, and Society* are worthy of note, two in particular are often referenced today. These are Ortner's "Is Female to Male as Nature is to Culture" (first published in *Feminist Studies*) and Rosaldo's "Woman, Culture, and Society: A Theoretical Overview," both of which propose particular theories about gender roles. The subject was typical of the era: Why is male dominance universal? It is notable that theorists of the time assumed that male dominance was universal (something that

gender theorists no longer completely agree on; for one thing, the definition of *dominance* is much more complex, as we will explore below) and furthermore that they were interested in looking at the cultural (rather than at biological) reasons for this cross-cultural trend. We can see Mead's legacy here—if gender roles are cultural, then gender inequity is cultural as well.

Ortner's essay analyzes gender inequity in terms of cultural associations. She asserts that most cultures associate women with nature because of uncontrollable biological forces, such as menstruation and childbirth, and their association with unsocialized, "natural" infants and children. Men, she argues, are more associated with culture because their freedom from reproductive duties allows them more time for cultural activities. Furthermore, in most if not all cultures, culture is more highly valued than nature, because culture tames, "cooks" (to borrow from Lévi-Strauss), and civilizes raw nature into human culture. Therefore, because of these associations, women are less valued, their activities are less valued (even when these activities involve acculturating raw human infants into civilized human beings), and they accrue less status. Ortner argues that these symbolic values are cultural and therefore changeable and that women are equally cultural (human) as men and therefore not in reality "closer to nature."

Rosaldo's essay takes a different approach. Although she also links women's assumed lower position vis-à-vis men across cultures with female reproductive duties, she instead looks at the division between the domestic and the public. She argues that because of child rearing, women have been historically associated with the domestic in all societies and that the domestic sphere tends to be less valued than the public sphere, where men predominate. This analysis looks less at symbolic associations (as Ortner's essay does) and more at economic opportunities, although the relative values of the domestic and the public spheres are symbolic as well. Rosaldo argues, as Ortner does, that the values associated with the public and domestic spheres are arbitrary, as is the relative dominance of men in the public sphere and women in the domestic.

The *Toward an Anthropology of Women* collection in 1975 represents another milestone in the anthropology of women. This collection notes a strong bias in the field of anthropology of the time to assume a simplistic, direct correlation between biology and gender roles, and it calls for more direct fieldwork, as the wide range of gender roles already suggested a cultural origin for them. The introduction (by Rayna R. Reiter) also notes that anthropology tends to have a double male bias, as it is written from a male academic perspective and is often (although not always) done in male-dominant societies. And last, Reiter problematizes the term *dominance,* noting that we do not have a singular definition for what we mean by it and that the people on either side of the "dominant" relationship may have different interpretations of it.

The essays included in the collection range from many detailed ethnographic accounts about women in different settings—including the Kalahari, Papua New Guinea, the Iroquois nation, the South of France, a Spanish village, Italy, the Dominican Republic, rural Colombia, Niger, and rural China—but also many theoretical essays, covering subjects that range from the much-debated matriarchy, to forager society, to the origin of the family. It also contains the first printing of Gayle Rubin's much-cited essay on "The Traffic in Women: Notes on the 'Political Economy' of Sex."

Rubin introduces the concept of the "sex/gender system" into the theoretical discussions about women and society. She suggests that previous theories fall short of the mark in explaining why women are cross-culturally oppressed. (Like the previous theorists discussed in this section, she assumes global male dominance.) However, she proposes that these theories can be used to build a picture of current cross-cultural forces creating gender inequities.

The theories Rubin analyzes include Marxist theory, which she points out does not explain why women are oppressed in noncapitalist societies, and Lévi-Strauss's idea of the "exchange of women," which she sees as a confusion of the actual complex system of rights, social relationships, and statuses (one in which women do not have the same rights as men). Furthermore, she notes, the exchange of women is predicated on the family and the sexual division of labor (another analysis by Lévi-Strauss), and this arrangement therefore is predicated on the construction of gender, sex, and obligatory heterosexuality—all constructed by culture. Rubin then turns to Freud and Lacan, postulating a "phallic culture" in which women are exchanged (in kinship structures) for phallic symbols, and moreover asserting that Freud's analysis of feminine psychological development is an accurate picture of how this phallic culture domesticates and dominates women. She sees Lévi-Strauss's

analysis of kinship and Freud's analysis of the development of gender as fitting into one another like the pieces of a puzzle: Kinship depends on clearly defined sex roles, which depend on clearly defined genders, which develop out of familial structures that depend on kinship. This structure, she states clearly, is all dependent on removing rights, sexual pleasure, and opportunities from women. Furthermore, if one reintroduces Marx, one can see that the "exchange" of women in kinship structures has profound implications for economy, religion, and symbolic structures—it impacts many other aspects of social life. Therefore, it is not really possible to understand a culture without understanding the role and position of women in that culture.

Rubin concludes by noting that the sex/gender system, which is what she calls the interlocking leaves of the "traffic in women," is dependent on both halves of the system, the kinship and the sexual. If the sexual division of labor were not observed (if men as well as women cared for children), if heterosexuality were not compulsory, and if there were no "exchange of women," this system, which has already been stripped to its bones, sex/gender, in Western society, would break down. She calls for the elimination of the sex/gender system altogether, a system she feels is oppressive to both genders in that it prescribes extremely narrow roles.

All of these essays—and many more written during this era—represent the anthropological trend at the time toward "big-picture thinking:" attempts toward constructing cross-cultural explanations for trends and theorizing about human beings as a whole. The construction of male dominance as a global problem is also typical of Western feminist thinking of the 1970s. The topics of the essays were fueled by the second wave of feminism; indeed, it could be argued that this interest in the position of women and women themselves cross-culturally would not have emerged without feminism. These essays, however, present theories that are still used today as ways to explain why there is a trend toward male dominance (although one must be careful how one defines it) in many cultures across the globe.

Filling a Gap: Writing About the Unwritten

In addition to theoretical essays, the anthropology of women has also been concerned—and is still concerned—with simply writing ethnography about women. The peculiar absence of women in early ethnographies means that there is much yet to be learned about women's lives across the globe. And given that there are many more cultures than there are anthropologists, there is still much more to learn about women in many societies. "Filling the gap"—producing and exploring ethnographies about women—is done in many ways and for different reasons. Filling the gap may involve simply filling a gaping hole in ethnographic knowledge; trying to explore issues in Western culture; dealing with a sex-segregated society; dealing with a sex-segregated aspect of culture that impacts society; or remedying inattention to women's involvement in important cultural matters.

It is interesting that *ethnography* about women actually began early on in the history of anthropology—well before the second wave of feminism provoked global theorizing about women cross-culturally. However, feminism increased awareness and interest in women's lives and many more ethnographies focused on women began to be published in the 1970s. All the same, ethnographies on women do exist prior to the explosion of theory in the 1970s. Two excellent examples are Ruth Landes's *The Ojibwa Woman* (1938) and Ruth Underhill's *Papago Woman* (first published as *The Autobiography of a Papago Woman, Memoirs of the American Anthropological Association No. 46,* 1934). Both of these are biographies, or autobiographies, if you will, stories told to the (woman) ethnographer by the women involved.

Underhill's *Papago Woman* recounts the life of a woman of the Papago people, Native Americans living in the Arizona area. Underhill's interviews took place late in her informant's life and cover many aspects of Papago life as well as Maria Choma's own complex life story. Landes's *The Ojibwa Woman,* in contrast, presents the stories of a single woman, which are not about herself, but about other women of the tribe. Both ethnographies, as well as others published during this time, are intended to record information about the women of these peoples, who have been largely ignored in other ethnographies or conventional accounts.

This interesting trend of "biographical ethnography," established so early in the anthropology of women, continues to the present day. Although the focuses of such biographies of women change, ethnographies of particular women have always been a distinguishing feature of the anthropology of women.

The classic example of such an ethnography is Marjorie Shostak's *Nisa: The Life and Words of a !Kung Woman* (1981).

Shostak's ethnography is not only Nisa's life story; Shostak also provides chapter introductions that are intended to produce a larger ethnographic explanation of !Kung life. The ethnography is also intended, as Shostak explains in the introduction, not only to introduce the reader to a largely gender-egalitarian way of life but also to answer questions about Western culture and gender roles as well. The use of Nisa's life story in this way is a particular style of ethnography that owes much to the "big-picture" questions discussed in the previous section: Is male dominance universal? Shostak asks. What can Nisa's life tell us about our own society? (Later styles of biographical ethnography focus on very different things, as we shall see below.)

Not all ethnographies of women focus on particular women, of course. Elizabeth Warnock Fernea, originally a journalist, produced a series of remarkable ethnographies of women in the Middle East while traveling there with her anthropologist husband. Her *Guests of the Sheik: An Ethnography of An Iraqi Village* (1965), an account of living with Iraqi women in an isolated village, is an excellent ethnography of a group her husband could not possibly have had access to—the women in a highly sex-segregated society. Although cases like Fernea's are rarer today (we like to think that most anthropologists enter the field on their own account), the fact is that female anthropologists are more able to access female informants in many contexts, especially sex-segregated ones. Access to women in sex-segregated societies is one argument for using female anthropologists to fill the gap of information on these societies.

Another example of female access on the part of the anthropologist is Diane Bell's *Daughters of the Dreaming* (1993), an exploration of aboriginal women's ritual activity and religion at Warrabiri in Central Australia. While the people she worked with were not a sex-segregated society—far from it—her subject was a sex-segregated one, as magic, religion, and ritual often require sex segregation in this culture. Her ethnography covers the entire community of men and women, with a particular focus on the subject of women's ritual, religion, and magic and how it influences the community and the impact it has on gender and people's lives. Bell produced an important ethnography, for while we know a great deal about men's ritual, we know much less about the ritual of women and how it is intertwined into the lives of people in general.

Last, Annette Weiner's *Women of Value, Men of Renown: New Perspectives in Trobriand Exchange* (1976) should be mentioned as a final example. Published in the same era as *Woman, Culture, and Society* and *Toward an Anthropology of Women,* this volume represents an ambitious attempt to refigure exchange and value in the Trobriand Islands, the same area where Malinowski did his fieldwork. Focusing on exchange between women as well as the exchange between men made so famous by Malinowski, Wiener suggests that there are entire dimensions of Trobriand value and exchange that we simply did not know about, because women and their work and exchange systems were previously omitted from the analysis. Her version of filling the gap suggests that omitting women from the picture in the first place may have resulted in an inaccurate portrait of Trobriand exchange.

Positioning Ourselves: Writing About Women, Writing About Theory

Current work in the anthropology of women is extremely diverse. Although Kamala Visweswaran suggests in her "Histories of Feminist Ethnography" (1996) that the problematization of "woman" as a biological (and therefore universal) category has to some extent scattered work in the field, the anthropology of women is still very *active,* though it varies widely. This question, among others, has complicated the issue of doing fieldwork among women: How do we define *women* if anthropologists view sex as a social rather than as a purely biological category? That is, since we cannot experience our biology save through the lens of our culture, biology has cultural meaning. Given that cultural meanings can vary, is there really a single category of people called women?

How do we locate women in the web of race, ethnicity, sexuality, class, nation, and other relationships? What about the relationship of power between the anthropologist and the informant, especially considering that we're working in a world shaped by colonialism? And what is gender, and how does it work?

All of these questions and more are being posed by theorists and ethnographers today. Let's start with a familiar name, Sherry Ortner, who in the 1970s wrote a famous essay ("Is Female to Male as Nature is to

Culture," above) and has been writing ever since. Her essay "Making Gender: Toward a Feminist, Minority, Postcolonial, Subaltern, etc., Theory of Practice" introduces the problem of dealing with structural forces and agency. Too much emphasis on the former erases the ability of the individual to make decisions; too much emphasis on the latter often results in a blame-the-victim mentality. Ortner proposes using *practice theory* (sometimes called "praxis theory") to analyze how people negotiate their own agency and power within the constraints of structural forces. What does this have to do with gender? Practice theory allows one, Ortner argues, to look at motivations and constraints without being blinded by or ignoring gender, as well as seeing gender as a system in which people have a certain amount of agency while dealing with the constraints of their culture.

Lila Abu-Lughod suggests a different theory and a different method. Her theory is inextricably intertwined with her ethnography, and she engages a program of "writing against culture." In *Writing Women's Worlds: Bedouin Stories* (1993), Abu-Lughod suggests that anthropology uses ethnography and the concept of "the culture" as a form of division and difference, and she sets up her ethnography—the stories of individual women, told in their words (although chosen, arranged, and translated by Abu-Lughod)—to combat that. There is no commentary, no frame as there was with Shostak's *Nisa.* Abu-Lughod presents us with the lives of individual women (in a callback to the ethnographic biography), in order to let readers find their own commonalities with Bedouin women.

An excellent example of a positioned ethnographic biography is Ruth Behar's *Translated Woman: Crossing the Border With Esperanza's Story,* which deals with issues not only of translation and border crossings in her recounting of one Mexican woman's life but also with identity, both Esperanza's and her own. Behar, considered Cubana and a Spanish speaker in the United States, is a *gringa* in Mexico, and her dual identity is one of the things that she reflects on in the epilogue, as well as Esperanza's identity as a *mestitza* and a native of a country poorer than her own. Power struggles, poverty, language, and race all tie into Behar's and Esperanza's identities as women. This ethnographical biography examines the power relationship between the ethnographer and the informant as well as their more intimate relationship as two women who were friends and *comadres.*

Ruth Behar was also a coeditor, with Deborah A. Gordon, of the *Women Writing Culture* (1995) collection, a book that ambitiously looks beyond collecting ethnographies or theories to the creation of a feminist canon in the anthropology of women. The Introduction by Behar suggests the creation of such a canon of anthropological theory, and the volume's essays suggest an emphasis on a new vision of anthropology. While this book might be more firmly placed in "feminist anthropology" than in "the anthropology of women," it is telling that the ethnographies published in it—Smadar Lavie's work with third world women poets in Israel, for example, and Aiwha Ong's essay on views of Chinese women—are of women. Feminist anthropology is concerned not just with the anthropology of women, but it is definitely concerned with it, and that concern is reflected in this volume.

Both current concerns with gender theory and particular populations are reflected in Kath Weston's work. Weston researched gender and gender identity among lesbians in her book *Render Me, Gender Me: Lesbians Talk Class, Color, Nation, Studmuffins . . .* (1996). Both the idea that gender is not inextricably linked to the division between male and female and the identification of lesbians as a population that have historically not been well researched make Weston's work highly valuable in the anthropology of women.

Certain elements in the study of reproduction and motherhood have been a focus of researchers in the anthropology of women all along. Nancy Scheper-Hughes, in her classic ethnography *Death Without Weeping: The Violence of Everyday Life in Brazil* (1992), looked at maternity and child death among the poorest of the poor in Brazil, using a study of societal and political forces to show that the lives of poor women are both strategic and embedded in larger social forces that produce poverty.

All of these examples (taken from a much larger canon) of ethnography about women showcase the diversity of current writing about women and theorizing about women and anthropology. Despite—or perhaps because of—the many different theoretical approaches to the anthropology of women today, it is a flourishing and fascinating field.

— Keridwen N. Luis

See also **Anthropology of Men; Ethnographic Writing; Gender; Mead, Margaret; Sex Roles**

Further Readings

Reiter, R. R. (1975). *Toward an anthropology of women.* New York: Monthly Review Press.

Rosaldo, M. Z., & Louise L. (Eds.). (1974). *Woman, culture, and society.* Stanford, CA: Stanford University Press.

Anthropology, Careers in

In all their professional endeavors, anthropologists study human experience and behavior within a cultural context, which means that they can be employed in a wide array of settings. While the market for academic anthropologists has remained relatively limited, opportunities for nonacademic employment of anthropologists have expanded. The demand for those able to analyze and interpret the ever-increasing volume of data for government, business, and nonprofits is escalating. As a result, a new subfield, applied and practicing anthropology, is gaining ground within the discipline where anthropological knowledge, methodology, and theories are employed to initiate or facilitate action to address a community or organization's problems. This entry describes the variety of settings and roles in which anthropologists work, the training and skills required, the nature of institutional support, and typical work conditions for this profession.

Job Settings

Globalization has altered the nature of the anthropological job market, with government agencies, transnational and international corporations, nongovernmental organizations (NGOs), and nonprofits requiring a deeper understanding of diverse cultures and increased accountability and evaluation to compete for funds and sustainability as never before. With increasing migration and the resulting megaurbanization, the preservation of culture and traditional lifeways remains an ongoing concern. Clearly, anthropologists' training ideally suits them for this type of work. Anthropology is uniquely applicable to the 21st-century job market, which is increasingly global, diverse, and user oriented.

Anthropologists can pursue either the traditional academic arena or a career path as practitioners. Academic jobs are based at universities and colleges, where anthropologists teach and conduct research, occasionally supplemented with some outside applied work. However, over the last 30 years, the majority of anthropologists with master's and doctoral degrees have found employment in nonacademic settings, working as researchers, consultants, and advocates for communities, government agencies, organizations, and corporations. Practicing anthropologists most typically use their skills to facilitate action or to provide information for policymakers to better human conditions.

Anthropologists work in a variety of domains, including but not limited to agriculture, archeology, business and industry, criminal justice, cultural resources, development, education, energy development, environment, government, health care, human rights, museums, natural resources, law enforcement, nutrition, public housing, recreation, resettlement, substance abuse, transportation, urban development, and wildlife. Jobs vary greatly and often are not labeled as "anthropologist." Instead, their position may be called researcher, evaluator, impact assessor, consultant, mediator, program director, administrator, manager, management analyst, human resources specialist, curator, historic preservationist, marketing expert, housing director, international development officer, development or environmental consultant, diplomat or local government official, police specialist, substance abuse counselor, human ecologist, forensic specialist, fundraiser, or cross-cultural trainer. All these roles may not be directly related to anthropology, but there are multiple ways an anthropology background can enhance a person's job performance in these as well as other positions. According to a National Science Foundation survey, a majority of people earning sociology and anthropology degrees in 2000 in the United States found jobs only somewhat or not at all related to their field.

Some practicing roles may require technical knowledge of fields related to the job, such as familiarity with crop and livestock production, commodity markets, and related policy and regulation in the field of agricultural development. Typically, anthropologists also become educated in fields related to the domain in which they practice. For example, an agricultural anthropologist would most likely need to have a working knowledge of agricultural economics and plant biology related to food productivity. This interdisciplinary aspect often entails interaction among government agencies (at home and abroad)

and their constituents, translators, and medical personnel; other social scientists such as psychologists and sociologists; public policy officials, statisticians, and market researchers; and the community or individuals being studied. The intrinsic collaboration of applied work requires that the anthropologist be skilled in negotiating competing interests and stakes. Anthropologists working in the private sector often have additional administrative or managerial responsibilities, such as handling budgets and staff, negotiating contracts successfully, and meeting marketing needs. They also figure prominently in decisions regarding policy and programs, acting as change agents by scrutinizing a topic and providing recommendations based on findings.

Training and Skills

The skill set acquired by anthropology students results in much flexibility in the job market. According to the American Anthropological Association, such students are trained in "careful record-keeping, attention to details, analytical reading, . . . [s]ocial ease in strange situations, [and] critical thinking," to the more specific "range of social, behavioral, biological and other scientific research methods . . . supplement[ing] statistical findings with descriptive data gathered through participant observation, interviewing, and ethnographic study." However, a career in which one is specifically employed as an anthropologist, either within the academy or without, requires an advanced degree. A doctorate can involve extensive time commitment in fieldwork sometimes entailing inconvenient transportation and poor living conditions. Fieldwork culminates in the writing of a dissertation, which is often the basis of a first book. Those interested in an academic career in anthropology should be aware of the level of commitment required: the length of time to complete a doctorate in anthropology after the undergraduate degree can reach 8 to 9 years, with as much as 12 to 30 months spent on a field project as the subject of the dissertation. Still, the many rewards of an academic career in anthropology are reflected in the increasing number of students in masters' (from 297 in 1966 to 950 in 2000) and doctoral (from 109 in 1996 to 448 in 2000) anthropology programs in the United States.

A broad training in anthropology prepares a student equally for nonacademic and academic positions, as both roles require the same basic skills and knowledge grounded in ethnographic practices research, data collection, data analysis, secondary data use, and information dissemination. Since traditional long-term ethnography is still the cornerstone of anthropological work, data collection and evaluation methods require quantitative and qualitative skills such as interviewing and keen observation, data recording, transcribing, coding and analysis, and the ability to design research that quantitatively tests hypotheses. Quantitative skills, including facility with statistical analysis software such as SPSS or SAS, are critical for practicing or academic work. All anthropologists are expected to have a strong understanding of complex societies and anthropological theory and the ability to adapt to diverse settings and people.

Practicing jobs require more time-sensitive research, since those supplying the funding for research often set the deadlines. This means practitioners must be prepared to adapt to a chosen specialization at any time and learn new methodologies that incorporate more efficient practices such as rapid assessment procedures (RAP) and participation action research (PAR), which involve innovative forms of direct observation and participation by the study population using focus groups, streamlined surveys, aerial photographs, satellite imagery, GIS or spatial mapping, and role playing. In addition, students are encouraged to gain training or take coursework in a substantive field related to their career objectives, such as health, nutrition, agriculture, environment, administration, law, economics, education, technical writing, communications, computers, and public speaking. For example, an individual with interests in environmental justice would be better qualified with additional education in environmental science, or someone with an interest in health care could pursue additional training in public health.

Written and oral communication skills are equally essential to professionals in anthropology; however, many programs do not specifically teach these skills. While student teaching and preparation of term papers, theses, and dissertations, journal articles, and conference presentations can help build communication skills, these activities alone cannot teach proper proposal and report writing, which are crucial for obtaining funding and functioning as practicing anthropologists. Neither do they fully prepare professionals in training for producing the type of accessible exposition demanded for the dissemination of findings—bulletins, brochures, monographs, policy reports, press releases, formal letters, persuasive

reports, educational videos and informative radio, and so on. Most anthropologists are compelled to learn these skills on the job.

Finally, gaining applied experience helps students practice their skills in a real setting, obtain feedback on methodologies employed, and see the connections between research policy decisions and the impact of those actions on individuals and communities. Traditional anthropology is often characterized by extended trips to remote locations; however, the present-day reality of anthropological research frequently involves short-term research projects and consulting. Instead of face-to-face time being necessary for fieldwork, researchers can now use technologically advanced systems for survey and analysis and communication via Internet and telephone. Students can gain experience in such practical application through a number of venues: enrollment in a master's practicum; conducting research with faculty; securing paid or unpaid work with cooperative education programs, groups like the Peace Corps, or community or local human service agencies; or through finding relevant internships.

Institutional Support

Key sources for job listings vary, depending on subfield and area of interest. The primary means for finding employment as an anthropologist include online networking forums like AnthroTECH.com's AnthroDesign or on anthropological association Web sites such as those of the American Anthropological Association (AAA: aaanet.org), the Society for Applied Anthropology (SfAA: sfaa.net), the National Association of Practicing Anthropologists (NAPA: practicinganthropology.org), and the Washington Association of Professional Anthropologists (WAPA: smcm.edu/wapa); and in various publications, such as the AAA *Anthropology Newsletter*. Networking continues to be a significant source for locating career opportunities and enhancing skills.

Joining professional associations and attending and participating in meetings, forums, and conferences helps individuals entering the field gain recognition within the discipline and the latest information on emerging methodologies and technological innovations, all of which can aid in finding work or in advancing professionally. At the national level, such organizations include the AAA, SfAA, NAPA, WAPA, and the High Plains Society for Applied Anthropology (HPSfAA). At the local level, groups like the Northeastern Anthropological Association and field-specific groups like the Society for Medical Anthropology, the Political Ecology Society, and the Indo-Pacific Prehistory Association are often equally helpful. In August 1948, the International Union of Anthropological and Ethnological Sciences (IUAES) was founded to meet the need for a worldwide network. In 1993, anthropological groups from the United States, France, Great Britain, Mexico, Canada, and the former USSR, among others, developed the Commission on Anthropology in Policy and Practice within IUAES to develop a similar network among the exponentially growing applied and practicing fields. Reflecting the breadth of interests involved, the IUAES has 27 committees, several of which indicate the changes in anthropology over the last century and

Source: © Margaret Maples Gilliland.

include Aging and the Aged, AIDS, Documentation, Food and Food Problems, Cultural Dimensions of Global Change, Medical Anthropology and Epidemiology, Museums and Cultural Heritage, Tourism, Urban Anthropology, Indigenous Knowledge and Sustainable Development, Mathematics, Bioethics, and Human Rights and Primatology.

Work Conditions

Anthropologists commonly work with others outside their discipline. The intrinsic interdisciplinary nature of their nonacademic work demands collaboration and translates into competition for jobs not only from other anthropologists but also from those with whom anthropologists often work, including sociologists, psychologists, statisticians, market researchers. In terms of salaries, those who work in institutions of higher learning in the United States could expect a salary from mid-$30,000 to $70,000 or higher for an academic year, depending on the years of experience and institution of employment. According to the National Education Association, the average salary for anthropology faculty in 1999–2000 was $56,391 for public and $60,085 for independent 4-year institutions. Nonacademic work for government and private sectors offers slightly higher salaries in comparison, also dependent upon years of experience and employer. According to the AAA biennial survey of anthropology PhDs, 29% of 1997 U.S. PhD graduates took nonacademic jobs. Interestingly, respondents employed in nonacademic positions were slightly more satisfied with their employment situations than those who were academically employed.

Applied anthropologists sometimes experience problems in their roles relative to sponsors' demands and possible resulting ethical dilemmas, as well as incertitude when it comes to power or control. Occasionally, practitioners complain about not having enough power to ensure follow-through with recommendations for action or policy, but few seek positions of power. In 2000, the National Association for the Practice of Anthropology (NAPA) sponsored a survey of members with masters in applied anthropology, in which 22% identified their current roles as managers and about 10% as administrators. Anthropologists need to realize that they must take positions that enable them to make decisions without losing the dynamic that is at the heart of anthropology—the relationship with the study community or individuals. There are instances where anthropologists cannot simply make a scientific decision. They may feel constrained by client wishes and fall into the role of social technician or social engineer without much input from the study population. Alternatively, practitioners may choose to make moral judgments regarding their work by preselecting clients with similar ideologies.

Anthropologists must use existing ethical guidelines (especially from professional associations such as AAA, SfAA, and NAPA), laws, and policies to make sound professional judgments by relying upon a framework that can help balance the pulls between positivistic science, morality, and client needs. It is important that anthropologists understand that though ethical considerations must be part of any professional decision, they are not the sole determinant. Such a professional framework is an essential foundation to building sound judgment for pursuing a successful career in anthropology.

— *Satish Kedia*

See also **Anthropology, Practicing**

Further Readings

Baba, M. L. (1998). Creating a global community of practicing anthropologists. *Human Organization 57*(3), 315–318.

Baer, R. D., Bustillo, M., Lewis, H., Perry, W., Romeo, D., Slorah, P., & Willis, C. (1995). Applied anthropology: From the classroom to the community. *Human Organization 54*(3), 325–329.

Gwynne, M. A. (2003). *Anthropology career resources handbook.* Boston: Allyn & Bacon.

Kedia, S., & van Willigen, J. (Eds.). (in press). *Applied anthropology: Domains of application.* Westport, CT: Greenwood.

Omohundro, J. T. (1998). *Careers in anthropology.* Mountain View, CA: Mayfield.

Price, L. J. (2001). The mismatch between anthropology graduate training and the work lives of graduates. *Practicing Anthropology, 23*(1), 55–57.

Stephens, W. R. (2002). *Careers in anthropology: What an anthropology degree can do for you.* Boston: Allyn & Bacon.

Anthropology, Characteristics of

Anthropology is the study of people, society, and culture through all time and everywhere around the world. Three of its main characteristics are an ongoing debate between evolutionism and cultural relativism, the use of cross-culture comparison, and ethnographic research based on "participant observation."

Anthropology shares certain basic characteristics with her sister disciplines of biology, history, sociology, political science, and economics. These characteristics arise from a common Enlightenment heritage. One is an emphasis on collecting information by means of the human senses, rather than from revelation or authority. A second is the interplay between general understandings, usually labeled *theory,* and specific information, sometimes called *data,* used as evidence to support or to challenge a general understanding. And a third is the expectation that general understandings will change and improve as information becomes more complete.

These characteristics have not gone totally unchallenged in recent times. Influential thinkers sometimes come to be regarded as beyond criticism, their pronouncements deemed authoritative and not open to debate. In the anthropology of the 1970s, Karl Marx was deemed to be such an authority, and critics seemed to be worthy of excommunication. This phase passed with the fall of the Soviet Union. More recently, from the 1990s, the Enlightenment foundation has been attacked on philosophical grounds by postmodernism, which rejects knowledge gained through the senses and any formulations of general knowledge, and replaces them with analytic deconstruction and subjective expressionism and political commitment. This self-identified "experimental" phase has not as yet established a substantive alternative to Enlightenment anthropology, and so its offspring remains unknown.

With this background in mind, let us turn to the characteristics that distinguish anthropology from her sister disciplines. I will present this discussion in terms of three characteristics: first, the theoretical debate between evolutionism and cultural relativism; second, the analytical device of cross-cultural comparative analysis; and third, the methodological strategy of "participant observation."

Evolutionism and Relativism

During its emergence in the 19th century, anthropology was inspired by and absorbed the dominant "master discourse" of the time, evolutionism. The place was Great Britain, and the circumstance was imperial and colonial expansion, and contact and engagement with other peoples and other cultures. Models of evolution, originally conceived in geology and biology, which were being applied by foundation sociologists to the stunning, transformational social changes in Britain and Europe during the 18th century and continuing into the 19th, were applied by foundation anthropologists, in some cases the same scholars who were founding sociology, to cultural differences of peoples around the world.

As with biological evolutionism generally, anthropological evolutionism posited higher and lower levels of accomplishment, of development, of human and social existence. Particular societies and cultures around the world could be identified according to their level of achievement; in one scheme, the levels, each defined by technology and social arrangements, were labeled "savagery," "barbarism," or "civilization." Even the theoretical alternative of diffusionism, which stressed borrowing rather than internal development and identified centers of creations and secondary recipients, was consistent with the comparative spirit.

Evidence relevant to placing particular peoples and cultures was diverse: biological for racial differences, linguistic for language differences, archaeological for historical differences, literary for historical differences with classical and other literate societies, and cultural for current patterns. However, during the 19th century, most anthropologists were "armchair anthropologists," relying on first- or secondhand reports from others for their information or "data." The most prominent anthropologist of his time, Sir James Frazer, author of *The Golden Bough,* when asked if he had met any of the "savages" of whom he had spoken, famously (these days: incorrectly) replied "Heaven forbid, Madam."

The early 20th century brought with it a reaction against and shift away from evolutionism, particularly in sociocultural anthropology. This resulted (at least in part) from firsthand contact by anthropologists with the cultures under study by anthropologists, which led to three new emphases: first, the study of cultures in all (or at least more) of their great

complexity and richness, instead of as illustrations of a few general and abstract categories; second, the study of cultures as wholes, as opposed to the recording of one or two traits or characteristics; and, third, the study of cultures on their own terms, without applying external criteria of evaluation, which is what we mean by cultural relativism.

This development can be seen in the work of Bronislaw Malinowski and Alfred Reginald Radcliffe-Brown, who established British social anthropology, with its emphasis on social relations, and Boas, who established New World cultural anthropology, with its focus on conventional knowledge. These schools, in addition to sharing the points mentioned above, differed on some points: In Britain, social anthropology developed more or less independently of archaeology and prehistory, linguistics, and physical-biological anthropology, while in the New World, Boas championed "four-field" anthropology, the continuing association of archaeology, linguistics, physical anthropology, and cultural anthropology. And, while some British social anthropologists advocated and attempted comparison and generalization, Boas favored a more particularistic and relativisitic approach, emphasizing historical and descriptive accounts of particular cultures.

Subsequent theoretical developments in 20th- and 21st-century anthropology can be read, at least in part, as a debate between the cultural relativism established in early sociocultural anthropology and the evolutionism rooted in the 19th century. A constant side dialogue with prehistoric archaeology, which more consistently maintained the evolutionary approach (although some contemporary archaeologists disdain the term) kept the evolutionary tradition easily within reach. In New World cultural anthropology, the evolutionary approach was resuscitated twice in the mid-20th century, once by the influential University of Michigan evolutionary school and two decades later by the emergence of a major movement of Marxist anthropology, Marx of course having been a major 19th-century evolutionary thinker. Cultural relativism strode back with interpretive anthropology and more recently postmodernism, which extends cultural relativism to epistemological relativism and thus advocates particularity and subjectivity.

Thus, it appears that a central characteristic of anthropology is its ongoing, and apparently endless, debate between evolutionism and relativism.

Cross-Cultural Analysis

Comparison is a basic element in human thinking, whether in juxtaposing instances or cases for purposes of evaluation ("This tea is better than that") or in order to establish concomitant variations ("This color makes me look healthy"; "That color makes me look sick"). Anthropology's sister disciplines constantly engage in comparative analysis: "Members of the middle class are a, b, and c, while members of the working class are d, e, and f." "Businesses with a unionized labor force must do x, y, and z, while those without do m, n, and o."

What sets anthropology apart is its emphasis on cross-cultural comparison. Even particularists cannot avoid cross-cultural comparison, for even description requires categories that indicate similarity and difference. Whether explicit or implicit, cross-cultural comparison is always present in anthropology, for we can hardly avoid thinking of the cultures we study as similar to or different from our own and others we know of. Margaret Mead was quite explicit in *Coming of Age in Samoa,* comparing girls' puberty in Samoa with girls' adolescence in America. Bronislaw Malinowski in *Sex and Repression in Savage Society* compares the oedipal complex in patriarchal Europe with that in the matrilineal Trobriands. Ruth Benedict's *Patterns of Culture* is a paradigmatic example of particularistic comparison, which, while identifying general types, remains at the descriptive level, disdaining the search for concomitant variations.

Comparison is the main analytic tool of anthropology, because, unlike laboratory scientists, anthropologists cannot pursue their studies with experiments. Nor are the statistical exercises of the economist usually available to the anthropologist, who commonly works in or on societies in which systematic collection of economic data did not or do not exist. Nor are the surveys of the sociologist and political scientist usually feasible, and even if they were, they would simply add grist for the comparative mill. Cross-cultural comparison provides anthropologists with a wider field of view, both in space and time, than that of the sister disciplines, which commonly limit their studies to one or a few similar societies. The breadth of anthropology, thanks to cross-cultural comparison, is one of its main strengths.

Participant Observation

The primary methodological strategy of cultural anthropology is *participant observation,* immersion

among the people being studied and engagement with them through taking part in their activities and discussing with them their activities. Direct observation and face-to-face conversation with the people under examination are central elements in ethnographic *fieldwork,* which is the other label used for participant observation. This direct engagement is necessary because the first goal of ethnographic fieldwork is to understand the culture and society from the point of view of the people themselves—to understand it as they do.

Reconstructing from the past obviously precludes this strategy. Archaeologists and prehistorians must rely upon the remains from past cultures, whether material such as bones and buildings or documentary from written records, as sources of information for the inferences required for drawing a picture of the culture. And anthropology's sister disciplines prefer short-term, formal measures, with sociologists favoring questionnaire surveys, political scientists questionnaires or organizational charts, and economists aggregate statistical data.

Participant observation has both strengths and limitations. One limitation is that working face-to-face with a handful of people, whether in one community or in a "multiple site" study, makes it difficult to know how representative the people, and thus the information gleaned from and about them, is of any larger population and culture. Another limitation is that "contact" and "engagement" with the people under study are vague terms requiring no particular technique and no mandated precision. The result can easily be strong sentiments and vague impressions. On the other hand, participant observation can make possible an intimate knowledge based on repeated observation and on triangulation, the drawing on multiple sources of information to test and retest understanding. And careful attention to local perspectives can reduce misinterpretation, which is a great risk with formal measures predesigned by outsiders. In short, one of the great strengths of anthropology is that participant observation brings the researcher closest to the people, or rather, to some people.

The spirit and substance of anthropology have been formed and expressed in the pursuit of and the debate between evolutionism and cultural relativism, in the analytic exercise of cross-cultural comparison, and in the practice of fieldwork by means of participant observation.

— *Philip Carl Salzman*

See also **Anthropology, History of; Cross-Cultural Research; Cultural Relativism; Participant Observation**

Further Readings

Kuper, A. (1988). *The invention of primitive society.* London: Routledge.

Kuper, A. (1996). *Anthropology and anthropologists: The modern British school* (3rd ed.). London: Routledge.

Salzman, P. C. (2001). *Understanding culture: An introduction to anthropological theory.* Prospect Heights, IL: Waveland Press.

Anthropology, Clinical

The defining characteristic of clinically applied anthropology is that it is anthropology practiced in health care settings: hospitals, clinics, health professional schools, and health care delivery systems of all kinds. The health care arena is so wide ranging and complex that it almost requires the kind of complete immersion that comes from working within the system itself and with its practitioners in order to do relevant research, theory building, teaching, and consulting. Anthropologists working within this branch of anthropology apply data, theory, and methods that clarify specific clinical issues and suggest changes in patient care, health maintenance, and health care delivery.

Alternative names have been suggested for the subdiscipline: "clinical anthropology," "clinically applied anthropology," "clinically applied medical anthropology," and "applied medical anthropology." The critical issue in the choice of a name turns on the roles the anthropologist necessarily must assume in the health care setting. Early on, concerns were expressed about the title "clinical anthropologist," a title that was thought indirectly to imply that the anthropologist could perform patient interventions. With the exception of those anthropologists who have additional licensure in medicine, nursing, or therapy, there are legal/liability issues in their involvement in direct patient care beyond that of a consultant to licensed health care providers. This concept of a restricted role vis-à-vis patients is not shared by all: clinical anthropologist and naturopathic doctor John Rush argues for a hands-on therapeutic role for clinical

anthropologists. However, the roles assumed by anthropologists who apply their skills within clinical settings are, by and large, those of teacher, consultant, and researcher. Usually, the clinically applied anthropologist combines all three. The term "clinically applied anthropology" will be used in this entry.

The field began to be distinguished as a separate subdiscipline of medical anthropology in the late 1970s and early 1980s with the appearance of the writings and research activities of the following individuals: Arthur Kleinman, Leon Eisenberg, Byron Good, Noel Chrisman, Thomas Maretzki, Dimetri Shimkin, and Peggy Golde. The activities of these anthropologists and their colleagues announced a trend that was to run through the subdiscipline from that time to the current day: the close, interdisciplinary collaboration between health care professionals and anthropologists. Three early writings are illustrative of this collaboration, with the first being a seminal article, "Culture, Illness, and Care: Clinical Lessons from Anthropologic and Cross-Cultural Research," by physician anthropologist Kleinman, psychiatrist Eisenberg, and anthropologist Good. Both the edited books by Chrisman and Maretzki, *Clinically Applied Anthropology,* and Shimkin and Golde, *Clinical Anthropology,* are comprised of chapters written by anthropologists, physicians, psychologists, psychiatrists, and others working in direct patient care. At about this same time, anthropologist-nurses began to make their influence known in the work of Pamela Brink and Madeleine Leininger.

Biomedical Culture as a Focus of Research and Analysis in Clinically Applied Anthropology

Anthropologists who have centered their work in health care settings have, in a very real sense, entered a well-defined and pervasive culture, that of biomedicine, that is very different, sometimes antithetical to, the culture of the social sciences. In terms of time management, behavioral norms, vocabulary, values, and, especially epistemological perspective, biomedicine and anthropology are worlds apart. The tension between the positivist, empiricist worldview that suffuses biomedicine and its allied fields and the mostly interpretive, constructivist approaches to human sickness and suffering that characterize much of anthropological thought is broadly discussed in the writings of Fabrega, Kleinman, Hahn, and Good. What constitutes knowledge and knowledge claims in anthropological understandings of illness are often not considered central to the diagnosis and treatment of disease in biomedicine. This contrast has created obstacles, difficult but not at all insurmountable, for anthropologists who work in health care settings. In some degree, anthropologists have found significant subject matter for theoretical formulations and research about human sickness in the contrast between the traditional perspectives of anthropology and biomedicine.

For example, a major focus of research for anthropologists in clinical settings has been that of examining and describing the characteristics of the culture of biomedicine itself and the role of physicians as central actors in this hierarchical universe. The socialization into that culture of students as they become clinicians and acquire what Good has called the "medical gaze" has been another closely examined subject for anthropologists. This unique way of seeing the body and the world of disease permeates the world of health care as a particular and distilled expression of Western rational and object-centered thought. Clinically applied anthropologists generally see this narrowness of focus in biomedicine as a failure to treat suffering patients as whole persons within sociocultural contexts of meaning. They have taken the opportunity to build contrasting models of human suffering through mental and physical disorder that emphasize illness as experienced by patients within a wider experiential and symbolic world as described by Kleinman and Hahn.

Taking a somewhat different perspective in his examination of biomedical culture, critical medical anthropologist Merrill Singer, from his vantage as researcher at the Hartford Health Clinic, mounted a critique of medical anthropology in general and the role of anthropologists in health settings in particular. He and other anthropologist colleagues such as Hans Baer and Nancy Scheper-Hughes saw many clinically applied anthropologists as having "bought in" to the power structure that constitutes the biomedical system. The critical medical anthropologists pointed out that the distribution of illnesses suffered by patient populations, their access and response to care, and differential treatment outcomes were the result of macrolevel socioeconomic and political forces that were replicated and perpetuated in the biomedical system. Another allegation made by this critique was that anthropologists who do research and other work

in the health care system perpetuate the inequities within it by ignoring the structural and political factors that cause these disparities. Many clinical anthropologists disputed this allegation, calling attention to a long tradition in medical and clinically applied anthropology of examining these factors in the social production of disease and expressing an unwillingness to reduce illness and the interactions between patients and health care systems solely to the paradigm of class struggle.

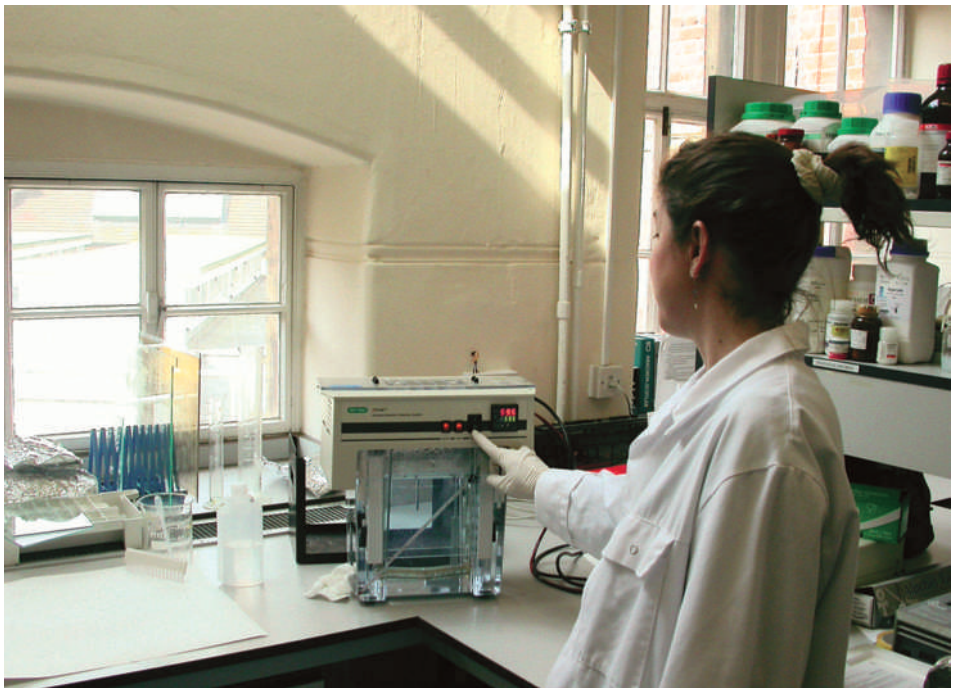
Clinical Anthropologists as Educators

Despite the differences in perspective between biomedicine and anthropology, or perhaps, ironically, because of them, clinically applied anthropologists have found important niches in medical and health care settings as teachers and consultants. Clinicians and others who design health care delivery systems are ultimately concerned with successful patient outcomes, and such outcomes are very inconsistently obtained despite the ongoing development of new diagnostic methods, medicines, and treatment modalities. The last two decades have seen a growing emphasis on patient-centered care and the importance for clinicians of building workable therapeutic alliances with their patients. Within this context, the "anthropological gaze" has come to be valued, particularly in medical and nursing schools.

In many schools, clinical anthropologists have made a contribution through teaching health care professionals anthropological techniques and concepts useful to their everyday practices. Teachers and trainers have concentrated their efforts most successfully in two areas: enhancing patient/provider communication and integrating patients' sociocultural context into diagnosis and treatment planning. For example, one of the most enduring and clinically useful techniques taught was Kleinman's method for eliciting a patient's explanatory model (EM) of his or her sickness through a set of several questions that might be used in taking a history or making a differential diagnosis. The questions served to help the clinician grasp the patient's understandings of the causes and characteristics of the illness problem and its effect on his or her life. Providing this context allowed the clinician to move from the narrow perspective of *disease,* which considered only the physical pathology, to a broader view that encompassed the patient's *illness,* the lived experience of the sickness from the patient's point of view. Based on this wider understanding, the clinician's communication with the patient was greatly improved, and negotiating a treatment plan that ensured acceptance was more probable. The concept of a patient's explanatory model or emic paradigm has been widely used in educational and training programs since Kleinman and his colleagues introduced it.

Early on, according to the writings of Noel Chrisman and Robert Ness, medical, dental, pharmacy, and nursing students, as well as other budding health professionals, were found to be initially resistant to the teachings of clinical anthropologists and questioned the relevance of this "soft" subject matter in the curriculum. This resistance persists to this day, though to a lesser degree, and is based on the strong scientific focus of clinical students and their lack of formal training or previous exposure to the social and behavioral sciences. Teaching clinically applied anthropologists has successfully overcome such resistance by concentrating on integrating anthropological materials into the teaching of specific skills required of clinicians: healing, educating, and planning. This is done by consistently integrating social and cultural factors surrounding disease processes alongside discussion of physiological processes, connecting the dots in the relationship of one to the other. The utility of understanding patients' perspectives and life circumstances is made essential to effective information transfer and treatment planning. Cultural elements are woven into case studies that students then analyze. In the study of epidemiology, concepts of social epidemiology, that is, the social and cultural factors involved in the distribution, symptom expression, onset, course, treatment, and outcome of illnesses, are made clear. Clinically applied anthropologists often serve alongside physicians and nurses as preceptors in community-based clinical rotations. Students are exposed to clinically applied anthropologists when they participate in hospital rounds and as consultants in case management discussions.

In the last 10 years, as a result of the drive for cultural competence/cultural responsiveness in health care, teaching of anthropological concepts to practicing clinicians working in health management organizations, community clinics, hospitals, and mental health facilities has been ongoing. Instead of classes and preceptorships, clinically applied anthropologists organize workshops and staff seminars as well as participate in grand rounds and resident training.



Source: © Robert Jurmain.

Innovative strategies geared to adult learning are used. Geri-Ann Galenti, for example, has written a very well-accepted book of cultural case studies organized around clinical themes that she uses as a basis for on-site workshops in hospitals and clinics. Jean Gilbert, in collaboration with physicians, nurses, and health educators at Kaiser Permanente, has created video vignettes that are case studies of clinical issues relating to pediatrics, obstetrics, internal medicine, geriatrics, and behavioral health. Chrisman has developed programs in community-based care and cultural medicine for hospital nurses, hospices, and community health practitioners. Other anthropologists have organized national conferences bringing together clinicians, anthropologists, and health care providers and managers from many fields to present and discuss issues in cultural medicine. In all of these endeavors, clinically applied anthropologists work closely with persons from many health care disciplines. This collaborative approach gives validity to and underscores the importance of anthropological data and approaches to quality patient care.

Dual Roles: The Clinically Applied Anthropologist Clinician

Doctors, nurses, and behavioral health therapists who are also anthropologists have been a part of this subdiscipline since its inception. Many do their work as faculty in medical and nursing schools and as practicing physicians. Anthropologist-physicians following in the footsteps of Kleinman and Eisenberg include Robert C. Like and Kathleen Culhane-Pera. Like, a family medicine physician, in collaboration with other physicians and fellow anthropologist Arthur Rubel, created a cultural curriculum for family practice medical students that has served as a model for numerous medical programs. Culhane-Pera, a family physician at Ramsey Family and Community Medicine Residency in Minnesota, has done extensive research among the Hmong community. *Healing by Heart,* written by Culhane-Pera in collaboration with other health care professionals and anthropologists (Peter Kundstadter, anthropologist epidemiologist, and Joseph Westermeyer, anthropologist psychiatrist), is an in-depth study of the Hmong culture's interactions with health care providers and the health care system. It includes a well-detailed model for providing culturally responsive care useful for curriculum design and practitioner training.

Persons exemplifying the dual roles of anthropologist/mental health professional include practicing psychiatrists Horatio Fabrega and Joseph Westermeyer and psychologist Richard Castillo. Fabrega has written extensively on the interaction of biological and symbolic and cultural factors in mental health as well as the role of culture in psychiatric diagnosis. Joseph Westermeyer has studied alcohol and drug use and substance-related disorders across several populations. Castillo has focused on cross-cultural psychopathology and psychotherapy. Both he and Fabrega were part of the Group on Culture and Diagnosis who served as cultural advisers on the cultural formulation in the fourth version of the *Diagnostic and Statistical Manuel (DSM-IV)* used in diagnosing patients throughout the mental health care field.

Nurses were among the first health care professionals to combine clinical and anthropology degrees, and they form a special unit within the American Anthropological Association. They have their own journal, the *Journal of Transcultural Nursing*. Examples of nurse anthropologists include Margie Kagawa-Singer, who is a professor in the School of Public Health, University of California, Los Angeles, with a research focus in oncology. Another is Fred Bloom, researching in the area of HIV/AIDs and community health care utilization at the Centers for Disease Control. Margarita Kay, well known for her research on folk and indigenous medical medicines and practices, is a clinical anthropologist working in Tucson, Arizona, clinics and at the University of Arizona. The list of clinically applied anthropologists in nursing is extensive, and it includes nurses specializing in every aspect of clinical medicine and health care from nutrition to chronic diseases, geriatrics and end-of-life care, genetics, and childbirth.

Clinically Applied Anthropologists as Policymakers, Advocates, and Consultants

In the three or so decades since medical anthropology began to be clinically applied, the structure of health care settings, the demographic characteristics of the patient population, and the politics of health care, all of which form the environment in which clinically applied anthropologists work, have undergone very significant changes. Due to immigration, refugee resettlement, and globalization, many patients entering the health care systems are linguistically and culturally different from members of the clinical professions. While the latter have certainly become more diverse as to race, ethnicity, and gender, this has only increased the probability that clinicians and their patients will not share basic cultural understandings about sickness and health. Furthermore, research begun in the 1980s and continuing into the present has demonstrated persistent inequalities in health status, treatment, and access to care across racial and ethnic populations. In an effort to address these issues, the cultural competency in the health care movement and field was born, a movement that was originally informed by the work of clinically applied anthropologists but that now has extended to a much wider health care base. As active participants, clinically applied anthropologists have increasingly become advocates, specialists in health care delivery to diverse populations, and designers of curricula and diverse forms of training for health care professionals, students, and practicing clinicians. As with most other work of clinically applied anthropologists, they have collaborated in multidisciplinary teams with health care providers and community advocates of many types. Following are some examples of this kind of involvement.

The creation of the National Standards for Culturally and Linguistically Appropriate Services in Healthcare (CLAS Standards) was begun in an advocacy group that included physician anthropologist Like and clinically applied anthropologist Gilbert, working with other health care providers and government officials. These standards, after national input from all health care sectors, were endorsed and published by the Department of Health and Human Services, Office of Minority Health. They provide guidance to health care organizations for enhancing the quality of care to diverse patient populations. These standards are now being used as benchmarks and guidelines by health care accreditation bodies as well as state and federal auditors of health-care-providing organizations.

In 2002, clinically applied anthropologists, including nurse and physician anthropologists, gathered with physicians, nurses, health educators, and health care and accreditation administrators from across the United States to formulate *The Principles and Recommended Standards for the Cultural Competence Education of Healthcare Professionals*. This document, the creation of which was underwritten by The California Endowment, sets out recommended content, skills development, pedagogical strategies, and evaluation techniques for ensuring that clinicians are educated to treat diverse patient populations in a culturally responsive manner. The principles and recommendations are being used in designing curricula by undergraduate and graduate programs of clinical education and in the accreditation of professional schools. It is anticipated that these materials will continue to be used in many ways as other states, following the lead of New Jersey, require training in cultural approaches to patient care as a condition of licensure for physicians, and cultural medicine is required in the curricula of medical schools.

Recently, clinically applied anthropologists such as Mary-Jo DelVecchio Good have turned their attention to determining the reasons behind differential treatment of minority patients, as studies, such as

those summarized in the Institute of Medicine report *Unequal Treatment,* have indicated that at least some of these patients receive less than adequate care as a probable result of clinician behavior and poor patient-clinician interaction. Both physician-patient communication and the structuring of health care delivery and access are being examined to determine how these statistically significant variations in treatment arise.

Anthropologists with research in clinical settings often provide consultation to private foundations. For example, Susan Scrimshaw has been involved as an advisory board member on the Robert Wood Johnson Foundation initiative, Hablamos Juntos, an effort to seek effective ways of providing language interpretation in health care to meet the needs of the now vast number of limited-English speakers in the patient population. Under grants on this initiative, other clinically applied anthropologists are studying methods of interpretation and translation in health care settings to determine the most effective methods of providing these language services in health care settings that provide care to linguistically diverse patients.

Clinical anthropologists consult in a number of capacities in the public and private sectors. For example, they are asked to provide information and advice to the National Institutes of Health on the direction of future research and to give help on developing requests for applications (RFAs), Many also sit on research review study panels. Clinically applied anthropologists are working with the Department of Health and Human Services Health Resources and Services Administration in designing curriculum guidance for the Centers of Excellence medical, nursing, pharmacy, and dental schools.

Anthropologists working in corporate health delivery organizations help set policy and advocate for and direct research and development programs and care delivery strategies to meet the needs of diverse patient populations. They consult to health care management and often develop ongoing staff and provider education programs in cultural medicine. In California, for example, Medicaid contracts specify that all contracting health care organizations, public and private, must provide for the cultural competence education of practitioners and support staff, as well as manage their health care delivery practices and linguistic services so as to meet the needs of diverse patients.

Clinically applied anthropologists' strong ethnographic research backgrounds in many areas of health care as well as their close familiarity with the clinical and care delivery environments equip them well for serving in a wide variety of research, teaching, consultant, and policymaking positions. Equally helpful is their experience in collaborating across health care disciplines and their flexibility in moving from clinical to teaching settings. As a result, the field of clinically applied anthropology is continuing to expand in the United States as the nation focuses more and more on the issues of health care in its diverse and aging population.

— *M. Jean Gilbert*

Further Readings

Brink, P. (1976). *Transcultural nursing: A book of readings.* Englewood Cliffs, NJ: Prentice Hall.

Chrisman, N. J., & Maretzki, T. W. (Eds.). (1982). *Clinically applied anthropology: Anthropologists in health science settings.* Dordrecht, Holland: D. Reidel.

Culhane-Pera, K., Vawter, D. E., Xiong, P., Babbitt, B., & Solberg, M. M. (Eds.). (2003). *Clinical and ethical case stories of Hmong families and Western providers.* Nashville, TN: Vanderbilt Press.

DelVecchio Good, C., James, M-J., Good, B., & Becker, A. E. (2002). The culture of medicine and racial, ethnic, and class disparities in health care. Supplement to Brian D. Smedley, Adriennne Y. Stith, & Alan Nelson (Eds.), *Unequal treatment: Confronting racial and ethnic disparities in health care.* Washington, DC: National Academies Press.

DeSantis, L. (2001). Culture reorientation of registered nurse students. *Journal of Transcultural Nursing, 12*(4), 310–318.

Galanti, G.-A. (2004). *Caring for patients from different cultures* (3rd ed.). Philadelphia: University of Pennsylvania Press.

Gilbert, M. J. (2002). *Principles and recommended standards for cultural competence education of health care professionals.* Los Angeles: California Endowment.

Hahn, R. A. (1995). *Sickness and healing. An anthropological perspective.* New Haven, CT: Yale University Press.

Mezzich, J. E., Kleinman, A., Fabrega, H., Jr., & Parron, D. L. (Eds.). (1996). *Culture & psychiatric diagnosis: A DSM-IV perspective.* Washington, DC: American Psychiatric Press.

Rush, J. A. (1996). Clinical anthropology: An application of anthropological concepts within clinical settings. Westport, CT: Prager.

Anthropology, Cultural

Defining Cultural Anthropology

Cultural anthropology is the study of human patterns of thought and behavior, and how and why these patterns differ, in contemporary societies. Cultural anthropology is sometimes called social anthropology, sociocultural anthropology, or ethnology. Cultural anthropology also includes pursuits such as ethnography, ethnohistory, and cross-cultural research.

Cultural anthropology is one of the four subdisciplines of anthropology. The other subdisciplines include biological anthropology, archaeology, and linguistic anthropology. Some anthropologists include a fifth subdiscipline, applied anthropology, although other anthropologists see applied anthropology as an approach that crosscuts traditional subdisciplinary boundaries rather than as a subdiscipline itself. In the United States, the subfields tend to be unified: Departments of anthropology include all of the subfields within their academic structures. In Europe, however, subdisciplines often reside in different academic departments. These differences between American and European anthropology are due more to historical than philosophical differences in how the discipline developed.

The central organizing concept of cultural anthropology is culture, which is ironic given that culture is largely an abstraction that is difficult to measure and even more difficult to define, given the high number of different definitions of the concept that populate anthropology textbooks. Despite over a century of anthropology, the most commonly used definition of anthropology is Edward Burnett Tylor's, who in 1871 defined *culture* as "that complex whole that includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by [humans] as members of a society."

Tylor's definition is resonant with contemporary anthropologists because it points to some important, universally agreed-upon aspects of culture, even though it does not satisfactorily define what culture is. Teachers of cultural anthropology often cite culture as a constellation of features that work together to guide the thoughts and behaviors of individuals and groups of humans. Aspects of culture often seen in introductory classes include: (1) Culture is commonly shared by a population or group of individuals; (2) cultural patterns of behavior are learned, acquired, and internalized during childhood; (3) culture is generally adaptive, enhancing survival and promoting successful reproduction; and (4) culture is integrated, meaning that the traits that make up a particular cultural are internally consistent with one another.

Nevertheless, anthropologists differ greatly in how they might refine their own definition of the culture concept. Anthropologists also differ in how they approach the study of culture. Some anthropologists begin with the observation that since culture is an abstraction that exists only in the minds of people in a particular society, which we cannot directly observe, culture must be studied through human behavior, which we can observe. Such an approach is often termed an *objective, empiricist,* or *scientific* approach and sometimes called an *etic perspective.* By etic, anthropologists mean that our understanding of culture is based upon the perspective of the observer, not those who are actually being studied.

Other anthropologists, while recognizing that culture is an abstraction and is difficult to measure, nevertheless hold that a worthy goal of anthropologists is to understand the structure of ideas and meanings as they exist in the minds of members of a particular culture. Such an approach is often labeled *subjective, rationalist,* or *humanistic,* and sometimes called an *emic approach.* By emic, anthropologists mean that the central goal of the anthropologist is to understand how culture is lived and experienced by its members.

Although these two approaches have quite different emphases, cultural anthropologists have traditionally recognized the importance of both styles of investigation as critical to the study of culture, although most anthropologists work only within one style.

How Cultural Anthropology Differs From Sociology

In many colleges and universities in the United States, sociology and anthropology are included under the same umbrella and exist as joint departments. This union is not without justification, as cultural anthropology and sociology share a similar theoretical and philosophical ancestry. In what ways is cultural anthropology different?

Cultural anthropology is unique because its history as a discipline lies in a focus on exploration of the "Other." That is, the anthropologists of the 19th century took a keen interest in the lives and customs of

people not descended from Europeans. The first anthropologists, E. B. Tylor and Sir James Frazer among them, relied mostly on the reports of explorers, missionaries, traders, and colonial officials and are commonly known as "armchair anthropologists." It was not long, however, before travel around the globe to directly engage in the investigation of other human societies became the norm. The development of cultural anthropology is directly tied to the colonial era of the late 19th and early 20th centuries.

The late 19th century was an era in which evolutionary theory dominated the nascent social sciences. The armchair anthropologists of the period were not immune from the dominant paradigm, and even scholars like Lewis Henry Morgan, who worked extensively and directly with American Indians, developed complicated typologies of cultural evolution, grading known cultures according to their technological accomplishments and the sophistication of their material culture. As is to be expected, Europeans were invariably civilized, with others categorized as being somewhat or extremely primitive in comparison. It was only as anthropologists began to investigate the presumably primitive societies that were known only through hearsay or incomplete reports that it was realized that such typologies were wildly inaccurate.

In the United States, the development of anthropology as a field-based discipline was driven largely by westward expansion. An important part of westward expansion was the pacification and extermination of the indigenous Native American cultures that once dominated the continent. By the late 1870s, the Bureau of American Ethnology was sponsoring trips by trained scholars, charged with recording the lifeways of American Indian tribes that were believed to be on the verge of extinction. This "salvage ethnology" formed the basis of American anthropology and led to important works such as James Mooney's *Ghost Dance Religion and the Sioux Outbreak of* 1890, published in 1896, and Edward Nelson's *The Eskimo about Bering Strait,* published in 1899.

In Britain, some of the earliest investigations of aboriginal peoples were conducted by W. H. R. Rivers, C. G. Seligmann, Alfred Haddon, and John Meyers, members of the 1898 expedition to the Torres Straits. The expedition was a voyage of exploration on behalf of the British government, and for the anthropologists it was an opportunity to document the lives of the indigenous peoples of the region. This work later inspired Rivers to return to the Torres Straits in 1901 to 1902 to conduct more extensive fieldwork with the Toda. By the 1920s, scientific expeditions to remote corners of the world to document the cultures of the inhabitants, geology, and ecology of the region were commonplace. Many of these expeditions, such as the Steffansson-Anderson Canadian Arctic Expedition of 1913 to 1918, have since proven invaluable, as they recorded the cultures of people only recently in contact with the European societies that would forever alter them.

Cultural anthropology, therefore, has its roots as a colonial enterprise, one of specializing in the study of small-scale, simple, "primitive" societies. This is, however, not an accurate description of contemporary cultural anthropology. Many anthropologists today work within complex societies. But the anthropology of complex societies is still much different than sociology. The history of working within small-scale, isolated cultural settings also led to the development of a particular methodology that is unique to cultural anthropology.

The fieldwork experiences of anthropologists of the late 19th and early 20th centuries were critical for the development of anthropology as a rigorous, scientific discipline. How does an outsider accurately describe cultural practices and an understanding of the significance of those practices for members of the culture studied? Achieving these goals meant living with and participating in the lives of the people in the study culture. It is this balance between careful observation and participation in the lives of a group of people that has become the cornerstone of modern cultural anthropology.

Called *participant observation,* the method is the means by which most of an anthropologist's information about a society is obtained. Anthropologists often use other methods of data collection, but participant observation is the sole means by which anthropologists can generate both emic and etic understandings of a culture.

There are, however, no straightforward guidelines about how one actually goes about doing participant observation. Cultural settings, personal idiosyncrasies, and personality characteristics all ensure that fieldwork and participant observation are unique experiences. All anthropologists agree that fieldwork is an intellectually and emotionally demanding exercise, especially considering that fieldwork traditionally lasts for a year, and often longer. Participant

observation is also fraught with problems. Finding the balance between detached observation and engaged participation can be extremely difficult. How does one balance the two at the funeral of a person who is both key informant and friend, for example? For these reasons, the fieldwork experience is an intense rite of passage for anthropologists starting out in the discipline. Not surprisingly, the intense nature of the fieldwork experience has generated a large literature about the nature of fieldwork itself.

Part of the reason for lengthy fieldwork stays was due to a number of factors, including the difficulty of reaching a field site and the need to acquire competence in the local language. However, as it has become possible to travel to the remotest corners of the globe with relative ease, and as anthropologists pursue opportunities to study obscure languages increasingly taught in large universities, and as it is more difficult to secure research funding, field experiences have generally become shorter. Some anthropologists have abandoned traditional participant observation in favor of highly focused research problems and archival research, made possible especially in areas where significant "traditional" ethnographic fieldwork has been done.

A second research strategy that separates cultural anthropology from other disciplines is holism. *Holism* is the search for systematic relationships between two or more phenomena. One of the advantages of lengthy periods of fieldwork and participant observation is that the anthropologist can begin to see interrelationships between different aspects of culture. One example might be the discovery of a relationship between ecological conditions, subsistence patterns, and social organization. The holistic approach allows for the documentation of systematic relationships between these variables, thus allowing for the eventual unraveling of the importance of various relationships within the system, and, ultimately, toward an understanding of general principles and the construction of theory.

In practical terms, holism also refers to a kind of multifaceted approach to the study of culture. Anthropologists working in a specific cultural setting typically acquire information about topics not necessarily of immediate importance, or even interest, for the research project at hand. Nevertheless, anthropologists, when describing the culture they are working with, will often include discussions of culture history, linguistics, political and economic systems, settlement patterns, and religious ideology. Just as anthropologists become proficient at balancing emic and etic approaches in their work, they also become experts about a particular theoretical problem, for which the culture provides a good testing ground, and they become experts about the cultural area, having been immersed in the politics, history, and social science of the region itself.

Research Traditions in Cultural Anthropology

Early Evolutionism

As noted above, anthropology as a discipline emerged in conjunction with the European and American colonial enterprise. Anthropology also emerged during a century in which ideas about biological and human evolution emerged and eventually dominated intellectual discourse.

Charles Darwin and Alfred Russel Wallace are perhaps the best known of the evolutionists of the period, but it was the British academic Herbert Spencer who introduced evolutionary thinking to the study of human society. Spencer, in fact, was publishing on some of these ideas even before Darwin's *On the Origin of Species* was published. Spencer, like other evolutionists, advocated the application of evolutionary principles to the study of humans—and went so far as to use the biological understanding of organisms as a metaphor for the study of human society. And Spencer clearly saw the advantage of a synthetic approach in understanding humanity's past as a means of understanding what humanity's future might be.

To modern anthropologists, Spencer is most closely equated with the terms "survival of the fittest," which he coined, and "social Darwinism." Over the course of years, these terms have become associated with the justification of classist and racist social policy, and it is for these associations that he is often regarded with either amusement or alarm: amusement, because (albeit with hindsight) of the obviously simplistic understanding of both evolutionary theory and human culture, and alarm, because of the chilling implications of pursuing policies based on such understandings.

Perhaps ironically, Spencer's influence on anthropology has been more profound in arenas other than evolutionism. Spencer's writings, in fact, are more similar to the writings of the structural functionalists

of the early and mid-20th century than they are to other evolutionists. It was Spencer who first coined terms like "superorganic" as a reference to culture (the culture concept had not yet been formulated), and it was Spencer who first used terms like *structure, function,* and *system* in reference to the "superorganic." The metaphor of culture as organism is certainly common to both functionalism and Spencer.

Spencer's thinking about evolution and human society was, however, armchair anthropology. His primary treatment of anthropological material, *Principles of Sociology,* published between 1877 and 1896, was compiled through the efforts of a research staff that worked from documentary sources, not firsthand experience.

In this sense, the other famed evolutionist of the late 19th century, Lewis Henry Morgan, was the complete opposite, as Morgan's contribution to anthropology was based on direct experience. Morgan is most commonly associated with work with the Seneca Nation: his legal efforts to defend the Seneca from predatory government policy, his subsequent adoption by the tribe in 1847, and, in 1851, the publication of *League of the Iroquois.* Beyond his association with Seneca, though, Morgan made visits to over 60 different Indian tribes in the United States and Canada.

Morgan's most important contribution to anthropology, however, is *Ancient Society,* his treatise on cultural evolution, published in 1877. In this work, Morgan presented an evolutionary sequence through which all human societies either had or, presumably, could progress, beginning with several different forms of "Savagery" and proceeding through all of the steps of the sequence to "Civilization," the apex of cultural evolution.

What is important about Morgan's scheme, now referred to as "unilineal evolution," is not that it was an accurate representation of reality, for it wasn't. Rather, the lasting influence of *Ancient Society* is that Morgan identified stages as corresponding to specific technological capabilities and material possessions, which, in turn, were accompanied by particular social forms, like subsistence strategies or forms of social organization. In addition, Morgan recognized that the discovery of new technologies and changes to material culture would necessitate the development of new social traits to accommodate those material changes.

Like Spencer, the misuse of Morgan's ideas, and the wildly inaccurate or nonexistent nature of anthropological data available for testing those ideas, meant that the reaction against unilineal evolution was swift and complete. By 1900, evolutionary perspectives had vanished from the discipline. It wasn't until the 1930s that anthropologists like Leslie White and Julian Steward began thinking about evolutionary issues, and it wasn't until the 1950s that the discipline again embraced the idea.

Also like Spencer, Morgan was an important figure for other reasons, not the least of which was his influence on dialectical materialism. Morgan's materialist approach, the desire to understand society through technology and subsistence, likewise inspired important figures of 20th century anthropology, among them Leslie White, V. Gordon Childe, and Marvin Harris.

Historical Particularism

The anthropology of Lewis Henry Morgan and others of the mid- to late 18th century was largely regarded as a hobby. That is, anthropology was viewed as an appropriate pastime for men of means and gentlemen of leisure. This gentlemanly pursuit certainly characterized the armchair approach of anthropologists like E. B. Tylor and others. And because anthropology was a hobby, it existed largely outside the bounds of the academy.

Franz Boas was responsible for moving anthropology away from a leisure pursuit to a full-time academic endeavor. A German immigrant to the United States, Boas was trained as a geographer, having written his dissertation about the color of seawater. In 1883, he traveled to Baffin Island, in the Eastern Canadian Arctic, to further these studies. Fortunately for anthropology, Boas found the local Eskimos much more interesting, and he subsequently shifted his studies to that of the customs of the Central Eskimo. His experience impressed upon him the importance of lengthy, highly detailed data collection in the field as critical to undertaking good ethnology, and he quickly realized how a limited understanding of another culture is begging the observer to misinterpret that data based on the observer's inherent biases.

In 1888, Boas founded the Department of Anthropology at Clark University, but he quickly moved to Columbia University, the institution with which he is most closely associated and from which he trained numerous students and established an American anthropology.

Boas's main contributions to the discipline stemmed from his rejection of unilineal evolution and the comparative method with which it was associated. Boas

and his students argued that the comparative method was problematic on two fronts. The biggest problem was that comparisons between cultures were based on too little data. Boas recognized that all primitive cultures have their own unique and particular histories, and he accused the evolutionists of equating contemporary primitives with our prehistoric ancestors, pointing out that contemporary primitives have been evolving too, which makes them very different from any prehistoric human. Further compounding the problem is that because there are so little extant data, how is it possible to compare two cultures if we do not know the circumstances under which those features arrived and developed in each society?

Second, Boas also felt that the value judgments associated with the various evolutionary schemes laid out by Morgan and others hindered our ability to understand cultural evolution at all. Boas argued that evolutionary schemes were full of implicit assumptions that certain stages, like "Civilization," were inherently better than stages like "Barbarism," but there was no objective means of making that assessment. For Boas, cultures must be understood on their own terms, not in relation to others.

This last point is a close approximation of cultural relativism, the notion that no culture is inherently superior to any other culture. All cultures are equal and comparable, and value judgments about cultural traits must be made only after understanding the context in which those traits occur.

Beyond the first formulation of cultural relativism, though, Boas is known for the development of his unique, holistic approach to cultural anthropology. As a means of combating loose speculation about culture, he advocated the meticulous collection of data through extensive fieldwork, arguing that theorizing and generalizing could be done only after the accumulation of detailed knowledge about a culture's history, its inventory of cultural traits, and its relationships with neighboring societies. This inductive approach has since been called "historical particularism," and it was the dominant approach in American anthropology until 1950.

Functionalism

Beginning in about 1910, British anthropology began to reject the evolutionary approach. The new paradigm, called "functionalism," eschewed the examination of cultures through the investigation of how cultural traits evolved (for evolutionists) or developed (for particularists). Instead, functionalists were concerned not with discrete traits but rather with social "institutions" and how these operated within bounded societies.

The functionalists relied on a concept of culture that was based on Spencer's concept of the superorganism. For functionalists, culture was believed to operate in much the same way that the human body functioned. Individual institutions, like social organization, religion, or economy, were like the organs of the body, working together to create something greater than the sum of their parts. This metaphor is so appealing that it has come to dominate the way that many anthropologists teach cultural anthropology. Almost all introductory textbooks in cultural anthropology, for example, begin with an explanation of the culture concept and the unique methodology and approach of cultural anthropology, followed by chapters that examine specific cultural institutions: environment, subsistence, and economic anthropology; kinship, marriage, and social organization; religion, the arts, and expressive culture; and applied anthropology and cultural survival.

British functionalism is known mostly through two actors, Bronislaw Malinowski and A. R. Radcliffe-Brown, both of whom are credited as the founders of functionalism in anthropology. Malinowski was born in Poland but enrolled in the graduate program in anthropology at the London School of Economics in 1910. In 1914, he began fieldwork in New Guinea, finally settling on working in the Trobriand Islands in 1915. While in the field, World War I broke out, and because he was a subject of the Austro-Hungarian Empire, he faced the possibility of incarceration. Luckily for him, British officials bent the rules and allowed him to continue his fieldwork.

His lengthy stay in the Torbriand Islands allowed him to formulate the method of participant observation, the method that is now the standard method of all anthropological fieldwork. He learned the language, recorded reams of data, and participated in the lives of the Trobrianders with whom he was living.

For Malinowski, work with the Trobriands was largely focused on how particular cultural institutions functioned to maintain individual psychology and provide coping strategies for dealing with stressful events. So, for example, the primary function of magic, ritual, and religious belief was to promote individual well-being in uncertain situations. Malinowski's discussion of the differences between magic use by

lagoon fisherman (who hardly resorted to magic at all) and open-ocean fisherman and long-distance voyagers (who relied heavily on magic to ensure success) is a classic example. Differences in magic use were clearly based on the differences between locales. Inshore, lagoon fishing was viewed as a safe and productive activity, whereas voyaging-fishing in unprotected waters was extremely risky and unpredictable. Magic, then, provided a sense of control in uncertain situations.

Andaman Islanders

Source: Courtesy of the Society for Andaman and Nicobar Ecology.

R. Radcliffe-Brown was trained at roughly the same time as Malinowski, conducting his field research in the Andaman Islands from 1906 to 1908, and then in Australia from 1910 to 1912. It was during his rewrite of his Andaman Islands fieldwork that he began to read the French sociologists Marcel Mauss and Émile Durkheim, and from these influences was born his own version of functionalism, called "structural functionalism." For Radcliffe-Brown, the individual was of almost no account. Social institutions were of primary interest: What is the relationship between social structure and social activity? In this sense, the concerns of Radcliffe-Brown and other structural functionalists centered around the ways in which social institutions functioned to maintain society as a whole.

Structural and Symbolic Anthropology

Radcliffe-Brown's version of functionalism was quite at odds with Malinowski's. Whereas Malinowski was more concerned with how social institutions served individual psychological and even biological needs, Radcliffe-Brown was more interested in understanding how cultural institutions worked together to satisfy the mechanical needs of society. For Radcliffe-Brown, society was best characterized as a system of institutions that exists independently of the individuals who comprise the system.

As noted above, structural functionalism, then, takes its intellectual cues more directly from the writings of Émile Durkheim and Marcel Mauss, French sociologists whose primary interests were, to paraphrase Edmund Leach, in the realm of "things said," the world of ideas, rather than with "things done," as Malinowski's were, and indeed most American anthropology. The British functionalists, however, still employed the concept of the biological organism as the metaphor for culture. It was Claude Lévi-Strauss who altered the meaning of "structure," as employed by Radcliffe-Brown, by replacing the metaphor. For Lévi-Strauss, language was the best metaphor for understanding culture.

Lévi-Strauss's entrée into professional anthropology began in 1934, when he took a position in the sociology department at the University of Sao Paolo, Brazil. The position provided an opportunity to travel into the Brazilian interior, where he conducted fieldwork for the first time. The experience had a lasting effect on him, for, having been trained in law, he was expecting to find individual social facts and instead discovered genuine human beings who lived quite sophisticated mental lives.

Lévi-Strauss remained in Sao Paolo until 1938, returned to Europe to serve a year in military service, and after the occupation, took a position at the New School in New York. It was there that he first met the linguist Roman Jakobsen, who introduced Lévi-Strauss to structural linguistics. It was from this intellectual crossbreeding that Lévi-Strauss developed his

version of structuralism, sometimes called "structural anthropology" but more commonly known as "French structuralism."

In using a linguistic metaphor for understanding culture, Lévi-Strauss was arguing that culture is a kind of language. Like language, culture is a series of rules that govern behavior and transmit messages to others. A commonly used example is that of breakfast. When we wake in the morning and are hungry, we reference deeply embedded cultural rules about what kinds of foods are appropriate for breakfast, how they may be prepared and consumed, and what meanings those foods carry, what they "say" about the meal itself, and what meanings they transmit to others observing the meal.

Human culture is therefore like language in the sense that all human cultures satisfy the same basic needs, like eating or reproducing, but they do so in different ways. For the structuralists, what is actually consumed at breakfast is, by itself, not very interesting, unless what is done at breakfast is contrasted with what is done at lunchtime and dinnertime. It is through the patterns as revealed through the contrasts that we begin to understand the grammatical rules of eating. Of even more interest is the attempt to tease out how the grammar of eating is similar to, say, the grammar of reproducing. "What is done," for the structuralist, is akin to the surface structure of a language, the actual utterances; the real interest is in the patterns and rules that lie under the surface structure, the "deep structure" of culture.

Lévi-Strauss and his followers often used the metaphor of the orchestra to explain how the structuralist sets about the task of decoding cultural meanings. In a musical score, separate instruments have distinct musical parts. The "message" of the symphony makes sense only when the parts are acting in unison. In addition, just as the symphony carries meaning in a left-to-right, melodic sequence, as the instruments play their parts from beginning to end, so does the musical score carry meaning at any given moment within the symphony, as the instruments operate in harmonic unison.

The metaphor of the orchestra sets up an opposition between syntagmatic and paradigmatic chains of meaning. For Lévi-Strauss, the nature of the differences between the two, the former as association by contiguity and sequence, the latter as association by metaphoric analogy, underscores an underlying binary nature of the human brain.

For most anthropologists, the application of binary oppositions to the study of myth is Lévi-Strauss's primary contribution to cultural anthropology. But his real contribution was the development of a new approach to anthropology that began to focus more extensively on uncovering meaning, an important attempt to approach culture emically rather than etically.

Despite this shift away from an objective approach to the study of culture, structuralism was criticized for focusing on meaning as generated through the examination of contrasts between aspects of culture and not through meaning as derived from the forms of the symbols themselves. Structuralists were also accused of placing undue emphasis upon actions rather than on the people performing those actions.

This different take on the examination of ideas in cultural anthropology has been labeled as *symbolic* or *interpretive anthropology,* and it has two main proponents, Clifford Geertz and Victor Turner.

Geertz is most often associated with interpretive anthropology. He believed that the key to understanding cultural meaning was through the examination of symbols, which he thought were the direct expression of worldview and ethos. For Geertz, culture wasn't necessarily simply locked away inside people's heads, but was most clearly expressed in the symbolic life of a group of people.

Victor Turner, most closely associated with symbolic anthropology, was more interested in process and the ways in which symbolism worked as an operator in that process. For Turner, like Geertz, symbols express shared meanings, but, unlike Geertz, they do so in ways that additionally serve to promote group solidarity. Turner's key concept was that of the social drama, a spontaneous unit of social process that occurs regularly in social life. Composed of four stages, the social drama is a sequence: The social fabric is ruptured, subsequently creates a crisis, and is resolved through the use of ritual to either reestablish or reformulate social relations. For Turner, the emphasis was on understanding how symbolism worked as a vehicle for expressing shared meanings, resolving conflict, promoting group solidarity, and recognizing changing social statuses.

Some cultural anthropologists would object to having interpretive and symbolic anthropology lumped together so, but the approaches of Geertz and Turner are important for understanding cultural anthropology because they both managed to turn cultural anthropology away from the "grand theory" traditions

of functionalism, materialism, and structuralism and toward a focus on cultures and how anthropologists can best interpret them. Furthermore, these anthropologists, Geertz especially, were influenced by scholars traditionally seen as existing outside of the bounds of anthropological scholarship. Cultural anthropology owes many of its intellectual roots to "nonanthropologists" like Spencer, Marx, Durkheim, and Freud, of course, but the interpretive and symbolic approaches were influenced by philosophers like Heidegger, Ricouer, and Wittgenstein.

The symbolic and interpretive approaches have been criticized by other anthropologists for being more literary criticism than anthropology, which underscores a growing debate in the subdiscipline: Is cultural anthropology a science or a humanity? The issue is critical: Geertz and other interpretive anthropologists were criticized because their research was impossible to replicate, making it difficult to verify whether a subjective symbolic interpretation of cultural behavior is an accurate representation of reality as it exists on the ground.

For the symbolic anthropologists, of course, that was precisely their point. A scientific approach in cultural anthropology, such as cultural ecology, misses the entire basis of a focus on emics. Since culture dominates all modes of human behavior, the symbolic approach is critical for our understanding of what culture is. The symbolic anthropologists also argued that just as Boas had hinted nearly a century before, the fieldwork experience is highly subjective, and the individual fieldworker must be careful that their own inherent cultural biases do not overwhelm the recording and interpretation of anthropological data.

This last point was seized upon by cultural anthropologists working under the influence of postmodernism, an eclectic movement that has its origins in philosophy but has become established in contemporary cultural anthropology. The postmodern perspective adopted by many cultural anthropologists questions whether we can accurately capture a cultural reality. For one thing, ethnographers engaging in fieldwork, by their mere presence, alter the cultural setting in which they are working. Second, the ethnographer's own conception of reality inherently colors the reconstruction of the culture when it is presented as ethnography.

The solution to this problem and the future of cultural anthropology are unclear. Some cultural anthropologists now see themselves not so much as anthropologists, but as practitioners of cultural studies. Others see themselves as a kind of literary critic, with the "text" being a particular society. Still others have rejected this criticism outright, observing that postmodernist perspectives, taken to their extreme, are both paralytic and detached from a reality that is positively observable, even if there remain some serious methodological concerns that cultural anthropologists must consider when engaging in fieldwork.

— *Peter Collings*

See also **Anthropology, Characteristics of; Anthropology, History of; Anthropology, Subdivisions of; Boas, Franz; Frazer, Sir James; Functionalism; Malinowski, Bronislaw; Radcliffe-Brown, A. R.; Spencer, Herbert; Tylor, Edward Burnett**

Further Readings

Boas, F. (1940). *Race, language, and culture.* New York: Free Press.

Geertz, C. (1973). *The interpretation of cultures.* New York: Basic Books.

Leach, E. (1973). Structuralism is social anthropology. In D. Robey (Ed.), *Structuralism: An introduction* (pp. 37–57). London: William Clowes.

Lévi-Strauss, C. (1974). *Structural anthropology, Vol. I.* (C. Jacobsen & B. G. Schoepf, Trans.). New York: Basic Books.

Malinowksi, B. (1994). *Argonauts of the Western Pacific.* Prospect Heights, IL: Waveland Press.

Marcus, G. E., & Fischer, M. J. (1986). *Anthropology as cultural critique: an Experimental moment in the human sciences.* Chicago: University of Chicago Press.

Morgan, L. H. (1994). *Ancient society.* Tucson: University of Arizona Press.

Radcliffe-Brown, A. R. (1952). *Structure and function in primitive societies.* New York: Free Press.

Turner, V. (1974). *Dramas, fields, and metaphors: Symbolic action in human society.* Ithaca, NY: Cornell University Press.

Anthropology, Economic

Economic anthropology includes the examination of the economic relationships found among precapitalist societies (nonmarket economies); this includes

band, village, and peasant societies. Economic anthropologists study the historical incorporation into the world market economy (capitalism) or state socialist economies of tribal peoples and peasant societies.

Formal Economics

Cross-disciplinary studies are both an admirable and a desired pursuit. Formal economics is designed to study the psychology of marginal utility, scarcity, price theory, economizing rationality, entrepreneurial skills, and buying and selling in a market economy. The question remains: To what degree are its concepts relevant to most of the economic history of the world, in which market either plays a minor role or no role at all in the everyday lives of the people? Formal economics uses individual behavior as its methodology to answer this question.

Cost under capitalism includes labor. Cost to a peasant farm is that drudgery is the major cost. In an economic slump, capitalists cut back on wage labor. A peasant farm must increase labor to maintain the standard of living. Cultural values are important in defining the standard of living, making drudgery any work not necessary in achieving that standard of living.

Chayanov in Today's Anthropology

Chayonov was a Russian agricultural economist who worked under both the Czars and the Bolsheviks. After he was arrested and killed by Stalin, his works were banned. When his writings were rediscovered in 1965, he became a major influence on American economic anthropology. Formal economics cannot work as a historical model because it assumes a stability of preferences. This change comes over time; formal economics as a theory is nonhistorical or at best has a very short historical scope. Formal economics theory lacks sociology, and thus is useless in explaining historical changes, such as changes in political domination, ideology, or culture.

The relationship between a capitalist world economy and local economies in which noncapitalist social relations prevail requires an understanding of the interaction between these noncapitalist social relations and a dominant capitalist economy. Purely economic categories cannot be used when studying this interaction. Much of the everyday life of any traditional people, even under capitalist domination, is based upon the nonwage family economic unit. The household economy lies outside the framework of an economic theory designed for studying capitalism. The key to understanding economic life in a fully developed capitalist economy is profitability based upon wage labor.

Without wage labor, there is no longer a purely capitalist economy. The domination of a larger capitalist economy clearly exists, but noncapitalist social relations alter its local details. Much of the economic activity is locally determined by the requirement of satisfying family needs. In a household economy, the family is both a production and consumption unit. Each economic activity meets specific family needs. Without wages, profit maximization is not the primary concern. Family economy moves toward equilibrium between two major factors: family demand satisfaction and the drudgery of the work. The primary economic decisions center around family needs.

Every economic system must equip labor power with a means of production. There is the possibility of increasing productivity, when the need arises, with increasing labor exertion, increasing division of labor, and alternative sources of income. Productivity, for the family, centers between an upper and a lower limit. The upper limit is the amount of work, which maximizes family labor to achieve family consumer expectation.

If families work to meet family demands and not for the profit of a capitalist employer, and if the conditions of life are not too harsh, the intensity of labor will remain below what it would be if family labor were fully utilized.

Polanyi, George Dalton, and the Substantivist Economists

The *substantivists,* using both economic history and anthropological data, openly dispute the theoretical relevance of formal concepts like "marginal utility" outside of a narrow historical view of industrial capitalism. Polanyi was the economic historian who launched the substantivist rebellion.

Polanyi claimed economic relationships are embedded in other social institutions of a society. Even the forced integration of isolated communities into a world market economy happens in a historical context of economic systems already established and

operating to various degrees on principles other than "free trade."

The differences between the various traditional economies require the researcher to abandon the use of economic categories developed to study industrial capitalism. Studying any economic system requires a truly holistic approach.

The substantivist uses empirical data rather than grand theory to create categories to study a specific economy. In the "real world," there are various types of interaction between household economy, community reciprocity, and redistribution or exchange to make each economic system culturally and historically specific. This requires the researcher to use particular conceptual categories when studying nonmarket economies.

Formal economics focuses on economic behavior and individual psychology in a market setting. Formal economics begins with choices of individuals acting as economic agents. Production, distribution, and consumption are considered as connected to calculations of costs versus benefits. Even under a fully developed capitalist system, many decisions are imposed by external concerns dictated by the effects of a market economy and not a matter of personal choice.

In most nonmarket economies, economic behaviors are based upon specific rules governing production and distribution. Social obligations, ecology, and technology determine the rules of the economy. In these economies, choice is not an obvious issue. These restrictions are firmly set by custom, social obligations, ecology, and technology. Choice as central to consumer-based capitalism is a minor part of a peripheral market, if it exists at all.

Within the economic setting, people share a common social identity and culture. The rules governing an economic course of action are required for survival.

The economy is expressed in kinship, religious, or political terms. There is generalized social control over production and subsistence. Access to land, labor, and emergency assistance is controlled by rules and is outside of purely market considerations. Economic systems are the structured transactions and rules of action overseeing production and distribution of goods and services in a reliable style. Within the community, access to land and other resources, division of labor, production goals, and types of technology used are guided by culturally specific rules. In traditional societies, the economy is not a separate institution. Traditionally, allocation of labor, organization of work, and distribution of goods and services are expressions of political, religious, or kinship obligations being defined as the moral responsibilities of group members.

Market economy is an economic system that is self-regulated by market prices and production for profit. Until modern times, markets, where they did exist, were a secondary part of the overall economy. Even local markets were peripheral to subsistence.

Social relations in any community are more central than profit to the economic concerns of the people. The economy everywhere is primarily submerged in the social relations of that society. Economic activity is motivated for the most part by concerns for social responsibility, social prestige, and social security. In tribal and peasant societies, the economy remains an adjunct of the sociology of the community. Production is not for profit in the majority of economic activity, and the distribution within society never reflects wealth for wealth's sake. Social interest of the whole must be used to justify the economy, including systems of production, distribution, or exchange. All social relations within the economic system reflect a person's moral position within the community. Social ties are social security. Social obligations are reciprocal in both the material and the moral concerns of all and affect each individual of the community. Economic self-interests threaten the community and the individuals within the community by undermining the collective identity and solidarity of the community.

In all peasant societies, there is a marketplace and a market day. Within peasant society, self-sufficiency is the major economic philosophy of the households. This is and must be supplemented by a symmetrical pattern of social organization called "reciprocity," centralization of redistribution, and a marketplace separated in time and space and importance from the rest of the economy. Without a market economy, barter can take only a secondary role in the overall economy. Within a market economy, both reciprocity and redistribution continue to exist in supplementary roles. The self-sufficiency of the household is also an institutionalized philosophy within a capitalist society and yet is very dependent on the market economy, with its necessity to sell labor power for a wage to support the household.

Before the market economy is established, the economy is only a minor part of the equilibrium of a larger sociological arrangement. Only a market economy makes production for economic gain a major

motive for economic activity. The market economy is based upon the historically specific philosophy of *production for profit* that creates the institution of a market freed from the market place. The universal market makes all other institutions subordinate, reversing the sociological relationship found between the economy and the rest of society in traditional societies. Instead of the economy being embedded in other social relations, all other social relations are now embedded in the economy of the market. Once the economy becomes separate from its sociological constraints, the rest of the society becomes reshaped to meet the needs of the economy.

Market exchanges developed to the degree where goods are bought and sold with money. Because each side wants to gain the advantage, economic exchange must become free of any and all social obligations. Money becomes all-purpose.

All-purpose money now replaces special purpose money. The laws of supply and demand set prices and not any other social agreements as before. All goods and services have a monetary price. Most people now make a living by selling something on the market. People who have no other resources sell their labor power for wages, because these workers do not have their own capital goods or raw materials to produce the goods sold. With a market economy, land, labor, and capital are all bought and sold. The economy follows no law other than the laws of supply and demand, thus it becomes self-regulating. The natural economy is founded upon the survival of the group. The individual's economic activity is to support social standing within the community. Because in all noncapitalist economies, the economy is integrated into noneconomic social concerns, the health and well being of the community and all its members take precedence over the personal economic gain of the individual.

Every step in the production process must meet some social claim to other members of the community. These social claims are the basis of the economic philosophy and the motivations around which people organize their labor. All social obligations are reciprocal in the long run. Within this system, economic self-interest is incomprehensible. Generosity and social prestige are very closely linked. Traditionally, the economy is immersed in other, more important social relations, and most people are concerned with larger issues in the community if they are to maintain their social standing. In times of extreme need, a welfare system is put in place. This welfare is always cloaked in terms other than economic aid. The maintenance of social ties is framed in terms of kinship concerns, religious obligation, and honor. All social obligation is reciprocal. There is always social pressure to eliminate open economic self-interest. Reciprocity protects the family, governing both the production and distribution needs. Sharing within the family goes without saying, but sharing with other closely related families is the benefactors' own social security.

Redistribution needs a broker of some sort who is a distinguished individual that others in the group trust; this individual receives, stores, and distributes the supplies as needed. The economy behind this system of storage and distribution is socially defined outside of any purely economic motives. The motivation is not defined as wealth in material affluence. Sharing and mutuality of reciprocity is further supplemented by the welfare of redistribution with any economic system of record keeping for the overall estimated expenditures. Through a social organization of unity and incorporation of all into a larger social entity with economic motives of cost versus benefits, material gain need not play an important role in the daily operations of the society. Interdependence between the exploited and the exploiter is a social arrangement based upon a moral and not an economic explanation of the relationship in peasant society.

Before capitalism of the free-market type, *stratification* was explained as a mutual relationship ordained by honor and obligation and was the noneconomic organization of redistribution. The approach is that all economic systems before a market economy of capitalism were some combination of a household economy producing for use, reciprocity, or redistribution, with the market a very minor and carefully controlled aspect. Even in the mercantile economy of Europe after 1500, markets were the main concern of government and were always carefully run by the government. Under mercantile capitalism, markets were too important not to be strictly controlled. The notion of a self-regulating market was not present.

The idea of a self-regulating economy controlled only by market processes would have been a very dangerous thing to even think about in the medieval European economy. The market was carefully regulated in all societies to either a very minor role or was prevented from controlling the necessary subsistence resources. The substantive environmental factor for survival remained under social control at all times. The economy was immersed in other social relations.

Production and distribution remained closely tied to the larger social ethic. The preservation of the social connections was acute. There was compelling pressure on individuals to get rid of their own economic self-interest. With the coming of the Industrial Revolution in the 1800s, tools of production were marvelously improved.

The farmer buys land to produce crops to sell on the market. Prices regulate themselves. The change to a market economy means a change in the psychology of the people of the society from being concerned with making a larger social obligation, social prestige, and social standing in the community to individual responsibility, individual merit, and personal gain in material items. All transactions are turned into money transactions. Mass production requires that the market can be reasonably understood only if all the factors going into production, like land, labor, and other needed resources, are sold on the market without any other social restrictions. The self-regulating market controlled by market prices is the central organization of a market society.

Marxist Anthropology

Economic anthropology is constantly asking why cross-cultural similarities and differences have occurred, making formal economics too cumbersome to work with beyond the most superficial level. Formal economics cannot work as a historical model because it assumes a stability of preferences. These change over time; the classical theories of formal economics are not historical, or at best have a very short historical scope. The primary flaw is that this model assumes institutional patterns and hierarchies of values, and what is assumed cannot be explained.

Human needs and basic human nature are socially fabricated or transformed; human nature is also, at its core, universal. Marxist anthropologists have come to believe that formal economic theory is next to useless in explaining historical transformation from precapitalist to capitalist economic systems, political domination, state formation, ideological systems that legitimize exploitation, or how dominant beliefs evolve jointly with changes in economic social relations of society. Over long periods of time, there are conflicts inherent within society, and because of these conflicts, all societies are changing.

Property relations are social relations and as such have socially defined rights. These rights are distributed among groups and individuals, and at the same time, these rights limit access to productive resources.

A social system also interacts with other social systems. The result is that the environment of a social system is altered because of the interaction between these two social systems. Expansion of the market economy of Europe until it consolidated the entire earth into an integrated world economy is such a case. The development of capitalism on a world scale brings even the most remote people under the control of a market economy, creating areas of relative wealth and other areas of increasing poverty.

Lenin's theory at first looks at the older form of capitalism when free competition prevailed and the export of manufactured goods was the core of Europe's economic relations with the less developed parts of the world. Then, Lenin examines modern capitalism, when monopolies dominate and the export of capital has become the typical feature.

According to Lenin, the competitive capitalism of the early 19th century became increasingly centralized (fewer competitive firms) and concentrated (larger firms). This centralization was accomplished through combines (the grouping together of related or dependent industries), cartels (large firms cooperating in the same industries and dividing up territories), and trusts (many firms operating as a single firm).

Monopoly capitalism, when a few highly centralized firms effectively dominate the economy, creates imperialism out of its own needs. To find continued profits in an already overly developed economy at home, investments flow to less developed areas of the world where the capitalist economy has not reached a saturation point, therefore making profits much higher. Export of capital is the fundamental principle of imperialism. The export of capital greatly influences and hastens the growth of capitalism in those countries to which it is exported. Monopoly capitalism and imperialism are a stage of capitalism, which reaches a point that is the beginning of a complete international socialization of production. Production becomes social, but the seizing of the profits remains the private property of the capitalists.

Luxemburg saw that capital had to be expanded outward to survive, until the whole world would become a single capitalist system. Lenin saw imperialism as a necessity only under the conditions of monopoly capitalism; the Luxemburg model shares the point in common with the dependency theorists,

that imperialism is as old as capitalism. According to Luxemburg, imperialism is the political manifestation of the accumulation of capital. The less developed parts of the world remain attractive sources of future profits, because accumulation in the earlier capitalist nations reached a point where profitable markets became saturated, and capital must move into the less developed regions in order to take advantage of greater profits. This movement of capital helps speed up capitalist development in the less developed areas. With the expanded economic development of the capitalist countries and their heightening of extreme competition in gaining control over noncapitalist areas, imperialism increases in its tone of strife and savageness. Capitalism grows both in its aggression toward the less developed areas of the world and in its continuous struggle among competing capitalist countries. The more violently, ruthlessly, and thoroughly imperialism brings about the disintegration of noncapitalist nations and peoples, the more speedily it undermines the very basis for capitalist accumulation. Imperialism is a major strategy for prolonging the life of international capitalism, but it also destroys the very foundation of capitalism. Capitalism needs noncapitalist social structures as a market for its surplus value, as a reservoir of supply of raw materials for its means of production, and as a source of labor power for its wage system. For each of these requirements, modes of production grounded in a natural economy are useless to capital. In all modes of production where natural economy predominates, relations of production are basically in reply to domestic necessity or production for use; therefore, there is very little desire for foreign goods and even less local production for market exchange.

A natural economy resists the demands of capitalism with uncompromising barriers. Capitalism must confront traditional modes of production with a struggle of subjugation, opposing any natural economy that it meets. The cardinal process in these conflicts remains political coercion. In Europe, there were revolutions opposing feudalism; in the non-European nations, this capitalist development presupposes the formula of colonial policy.

The second condition of importance for acquiring means of production and realizing the surplus value is that commodity exchange and the commodity economy become accustomed to economic activity in societies based on natural economy as soon as their independence have been abolished. In the course of this disruptive process of coming under the control of a world economy, natural economies become dominated by capitalism. Capital growth requires the ability to buy the products of and sell its commodities to all noncapitalist strata and societies.

To Andre Gunder Frank, the problem is *underdevelopment,* brought about by the export of capital from the poor countries to the rich ones, which allows for the economic overdevelopment of the rich and the increasing economic underdevelopment of the poor. Underdevelopment is the inevitable outcome of over 400 years of capitalist expansion and of the inherent contradictions of capitalism itself. The capitalist system is separated into a metropolitan core and peripheral satellites in the rest of the world. There is the perpetuation of the essential organization and inherent contradictions of the capitalist world economy throughout the history of the development of capitalism and its exaggerated growth. Capitalism's continuity is due to the reproduction of these contradictions throughout the world in modern history. These capitalist contradictions and the historical development of the capitalist system have given birth to underdevelopment in the peripheral satellites, whose economic surplus is expropriated and used to produce economic development in the metropolitan centers, which appropriate that surplus.

The first contradiction is what is called "the expropriation and appropriation of a poor country's economic surplus." This is an extension of Marx's labor theory of value, in which the capitalist expropriates the surplus that is created by the worker.

The capitalist of the rich metropolitan center expropriates the surplus from the poor peripheral satellite. In both Marx's and Frank's theories, the expropriated surplus is saved by the capitalist and reinvested, increasing the power and the wealth of the capitalist. Once established, this exploitative relation extends capitalist relations between the rest of the world and metropolitan centers, with regional centers being an intermediate position. There are firmly established international, national, and local capitalist relations who produce economic development for a small number at each level and underdevelopment for the masses.

Frank's second contradiction is based upon Marx's concept of the centralization of the capitalist system. Both are the necessary result of the contradictions that are central to the capitalist system worldwide.

Development and underdevelopment are the products of a single dialectically contradictory economic system of capitalism. The same historical movement of the development of capitalism throughout the world has concurrently created both economic development and underdevelopment.

The third capitalist contradiction is based on the mutual interrelationship of the first two contradictions throughout time. Once established, the capitalist system continues to reproduce itself based upon exploitation, which is the process of expropriation of economic surplus of the poor producers and the appropriation of this surplus by the owners of capital. Historically, what are created are the developed metropolitan centers and the underdeveloped peripheral satellites. This creates a continuity that runs throughout the entire history of capitalism.

Dependency theory sees the world as a single capitalist economy that has increasingly controlled the world since 1500, when Europe began colonizing the Americas and established direct trade routes to Eastern Asia. The dependency theorists claim capitalism is the production for profit maximization in the world market. Capitalism, even though it is a system of dependency, domination, and subordination, is a system of full integration into a worldwide capitalist system. The dominant nation is obliged to protect the markets upon which its internal economy is built. This leads to potential rivalry among capitalist nations and forces them to protect their markets either by annexation of territory or by obtaining economic and political influence over other countries.

This became the major debate between the orthodox Marxist-Leninist and the Marxist dependency theorist. Where Lenin and his followers saw capital flowing from the advanced capitalist nations to the areas now called third world, or less developed nations, and creating distorted capitalist social relations there, the dependency theorist sees capital flowing from the poorer nations to advanced centers of capitalism. Frank claims that what was created in the third world was not distorted capitalist relations, but underdevelopment within capitalism. The distinction between distorted capitalist social relations and underdevelopment is subtle, but important. Underdevelopment means the poor nations provide the surplus for the advanced nations to further their economic development (Frank, Wallerstein, Baran, and Sweezy are the major dependency theorists).

The world capitalist economy, with its own logic, eliminates the competing economic systems from the start, according to the dependency theorist. Profits are controlled by worldwide trends that are dominated by the center of world capitalism. The capitalist owns the means of production (the raw materials and tools necessary, as well as the labor power purchased from the worker). Capitalism becomes production for profits in a market economy.

This, as Fernandez and O'Campo claim, obscures the analysis of the development of social relations of free labor to capital. Dependency theory eliminates the transitional periods from precapitalist to capitalist eras, because they claim capitalism was fully developed at the end of the feudal period. In addition, Marx, as claimed by Fernandez, writes that social relations are the necessary definition of capitalism or any economic system. The worker must be free to sell labor power to the capitalist; also, the capitalist must be able to introduce the past labor of others in the form of the means of production. This is important because the surplus value or the profit created is the driving force of the capitalist economy.

The Leninists claimed that what is central to the Marxist definition of capitalism is the productive relationship of workers owning nothing but their own ability to labor or to sell labor power for a wage. What the worker creates above a wage goes to the capitalist in the form of surplus value. The capitalists control, if not own, the means of production. The means of production is past labor embodied in the raw materials of current production, including land and tools necessary in that production, as well as the labor purchased from the worker. Social relations in production are central to the relationships between people.

Dependency theory, by focusing on the flow of excess profit out of the third world, explains the lack of capital necessary for the poor countries to control their own industrial development directly. In dependency theory, far from being a sign of decadence, imperialism is a part of a market economy and is a sign of the vitality of the capitalist system. What the dependency theorists miss is that in point of fact, subsystems with their own logic exist; however, any subsystem remains dependent on the larger capitalist system. Both dependency theory and Marxist-Leninist theory can supplement each other in a more complete theory of imperialism.

The control over the economy rests with outside major corporations. Profits generated in the less

developed nations increase the wealth and power of the major corporations. Profits generated in these poor nations are reinvested anywhere in the world. There is clearly the export of capital from the dominant culture to the less developed nations, creating a strong money-based market economy that is highly stratified, and that affects the very fiber of the everyday life of all people. Traditional social relations, while still present, are weakened and continuously redefined over time.

Articulation of Modes of Production

The interrelationship between local modes of production and the dominant economic logic is an ongoing historical process, changing constantly in an interactive relationship. According to Rey's model, the first contact between capitalism and other modes of production begins with commercial exchange where the needs of the larger capitalist system reinforce the precapitalist modes of production. This is followed by capitalism becoming firmly established, subordinating the precapitalist modes but still making use of them. Finally, in Rey's model, there is total incorporation into the world capitalist system with the complete disappearance of all precapitalist modes of production. Rey closely follows Marx's study of British colonial relations over India. Marx claims that at the first stage, trade is in luxury items benefiting the capitalist of a richer country because of an unequal exchange. With industrialization in the advanced nation, the colonial nations serve as markets for the manufactured goods coming from the industrialized centers. This has a devastating effect on the local social structure and modes of production in the nonindustrialized areas. The precapitalist modes of production are then transformed to meet the needs of the capitalist centers. Up until now, in the nondeveloped areas of the world, exploitation has been primarily an unequal exchange, followed by unequal exchange and markets for manufactured goods. In the expansion of the Industrial Revolution, British investors controlled the extractive industries, which resulted in the beginning of a wage labor force to work in these industries, that is, the beginning of capitalist social relations.

Rey's first stage of incorporation into a worldwide capitalist system is the initial link with capitalism through commercial exchange. The second stage is the subordination of precapitalist modes of production to the needs of international capitalism, which have already happened in most third-world countries. The third stage is the total disappearance of all precapitalist modes.

Francisconi claims there is a constant restructuring of existing noncapitalist modes of production to meet the conditions of trade and to withstand the impact of direct capitalist investments. Corresponding to this restructuring of existing modes of production is a continual reinterpretation of local tradition. Through this restructuring and readjustment, there is a continuous adjustment and resistance to the expanding capitalist penetration into the local political economy. The reproduction of the noncapitalist modes of production is the result of capitalist expansion into local economies. The above is equally important in understanding the history of articulation of modes of production, as a functional explanation of capitalist exploitation as well as local resistance to capitalist expansion.

The incorporation of the world into a single world capitalist system develops through tensions and contradictions that are inherent in the logic of the capitalist system itself. Wars, conquest, imperialism, and neocolonialism are deadly necessities for the continuing expansion of industrial markets. All small nations come under the control of more powerful capitalist centers. The ruin of noncapitalist nations begins with the first contact of commercial trade. The carefully manipulated use of symbols of self-determination, by preserving precapitalist modes of production and traditional ideology, have been used by colonial administrations to continue the power of international capitalism.

The neo-Marxist modes of production theorists investigate the structure of economic relationships of local communities. The dependency theorists study the world economy of international power relations. In both these theories, social relations become something that is neither fully capitalist, nor are they traditional. Capitalist social relations remain underdeveloped.

The Nature of the Informal and Formal Economy

Because of the incomplete development of capitalist social relations in the less developed nations, there has developed a second economy called the "informal sector," unregulated and largely untaxed. This second economy is a mixture of advanced capitalism and

traditional kinship economies. Self-employment is growing faster than wage labor in many places in the world and is a result of increasingly restricted opportunities for wage labor. The rapid growth of the *informal economy* is a direct result of the independent self-employment on a world scale, which meets the needs of corporate capitalism.

The informal economy has grown rapidly with the increasing disenfranchisement of labor. With the decline of the power of organized labor and labor parties around the world, corporate capitalism actually benefits from this increase in the unregulated labor supply to provide needed goods and services.

The public sector, welfare organizations, and labor groups all have been dramatically weakened around the world. Flexibility of production has increased and the cost of production dramatically lowered.

By the 1990s, the informal economy had become an integral part of the total economic system. The close network that ties formal and informal frees the economic system from rigid controls, to the benefit of capitalism as a whole.

The main question that economic anthropologists struggle with is, how much can anthropologists borrow from formal academic economic theory in studying people in different historical and cultural settings? Marxist and substantivist anthropologists define *economic* as providing for the material necessities of life, while formal economics looks at economic choices in how societies and individuals invest their resources. Marxist economics concentrates on production, while formal and substantivist economics look at distribution as more central to their studies. Finally, how much of the precapitalist and noncapitalist behaviors survive in local communities dominated by a global capitalist economy? Thus, it must be asked, how much of price theory, marginal utility, and other major concepts is relevant to anthropology?

— *Michael Joseph Francisconi*

See also **Lenin, Vladimir I. U.; Marx, Karl; Marxism; Materialism, Cultural**

Further Readings

Chayanov, A. V. (1986). *The theory of peasant economy.* Madison: University of Wisconsin Press.

Dalton, G. (1969). Theoretical issues in economic anthropology. *Current Anthropologist, 10,* 63–102.

Donham, D. (1999). *History power, ideology: Central issues in Marxist anthropology.* Berkeley: University of California Press.

Francisconi, M. J. (1998). *Kinship, capitalism change: The informal economy of the Navajo, 1868–1995.* New York: Garland.

Frank, A. G. (1967). *Capitalism and the underdevelopment in Latin America.* New York: Monthly Review.

Halperian, R. (1994). *Cultural economics past and present.* Austin: University of Texas Press.

Polanyi, K. (1968). *Primitive, archaic, and modern economics.* Boston: Beacon Press.

Rees, M., & Smart, J. (2001). *Plural globalities in multiple localities.* Lanham, MD: Rowman & Littlefield.

Sahlins, M. (1974). *Stone Age economics.* New York: Aldine.

Szymanski, A. (1981). *Logic of imperialism.* New York: Praeger.

Anthropology, History of

Anthropology is the science of humans. If we take science in a broad sense as rigorous intellectual inquiry, anthropology has occurred in a number of times and places, whenever literate thinkers recorded observations and analyses of humanity, particularly those involving diverse cultures and physical forms. Anthropology also refers to a historically specific social formation: the product of university-trained scholars within the boundaries of a discipline of the same name. In this sense, it has existed only since the late 19th century. Whichever definition we use, a few basic lines of inquiry apply. Anthropologists are influenced by their surrounding social, cultural, and political settings. In this sense, each era has its own anthropology. At the same time, the technology of recording intellectual products in writing enables an element of progress, as scholars look back on the work of previous writers. One can thus put forward a narrative of successive schools of thought. In a third sense, however, anthropology is not the progress of ideas and information, but the endless repetition (often in perceptive ways) of human preoccupations (for example, progressivism versus primitivism or romanticism versus objectivism), because anthropology

involves humans considering humans, the subject studying itself.

Among the many anthropologies produced by premodern intellectuals (for example, Herodotus and other Greek scholars and Chinese bureaucrats and travelers), let us focus on one exemplary individual, Ibn Khaldun (1332–1406). An itinerant political specialist, he traveled through the western Islamic world (North Africa and Spain) and had reading knowledge of domains to the east. He concluded that history revolved around the interplay between cities and nomadic peoples, noting the forces of social cohesion in tribal formations and wider-scale religious movements. He described his analytical approach as "the science of culture." Of course, Ibn Khaldun's work depended on a dominant political-religious formation, Islam, as did subsequent European-based anthropology, but there is still much to learn from his work.

From the late 1400s on, Western Europeans attempted to conquer and proselytize the rest of the world. At the same time, European societies themselves underwent vast transformations, including mercantile and industrial capitalism, urbanization, commercial agriculture, and the rise of the nation-state. Modern anthropology emerged within this context. As Europeans catalogued the peoples that they drew into commercial slavery and estate agriculture, they developed a preoccupation with human bodies (heads, height, skin color, and so on). As they traded with, governed, and tried to convert diverse peoples from Indonesia to Greenland, they began to document vast differences in customs. And their own changes lead them to theorize about progressive, ranked sequences of social structure and beliefs.

Rich (if biased) descriptive anthropology came from the 16th- and 17th-century expansion, in particular the Catholic missionary orders' documentation of the cultures of their would-be converts. It was, however, during the late 17th- and 18th-century Enlightenment that the first flourishing of European anthropology took place. Intellectuals speculated about the fundamental nature of the human species, so-called philosophical anthropology. Likewise, classification of human cultures and physiques flourished, leaving an enduring concern with "race" in physical anthropology. Anthropology also began its move into what Michel-Rolph Trouillot calls the "savage slot," specialization in non-Western, "colored," and subordinated peoples, even though anthropology claimed to be the study of all humankind. Colonialism was a context for this, as well as the problematic assumption that "primitives" held the key to human nature, but the savage slot also provides anthropology a legacy of deep knowledge of, close association with, and members from among peoples who are otherwise ignored, despised, and badly stereotyped.

The Enlightenment and the beginning of 19th-century Romanticism also provided key concepts still used today in anthropology. The notion of civilization came from the hierarchical ranking of customs in centralizing absolutist-monarchical contexts, such as prerevolutionary France. Culture as a way of distinguishing peoples by their languages and customs emerged as a separatist reaction to civilization-setting centers (concretely, among nationalistic Germans reacting to French political and cultural domination). Society was a way of envisioning voluntaristic, person-to-person order amidst the rapid changes of industrialization, migration, urbanization, and the decline of previous hierarchical, ascribed feudal and absolutist orders. Other concepts, such as ideology, economy, classes, and race (as mentioned above), can also be traced to this era.

Evolution was a European preoccupation even before Darwin's theory of natural selection and gained enormous intellectual prestige with his work. But the natural selection model of evolution was less influential than its assumed progressiveness, so 19th-century anthropologists (Tylor, Morgan, Spencer, and others) elaborated schemes of ascending cultural stages. The example of enormous technological progress within industrial capitalism was before them and triumphant imperialism throughout the world. Their theories rested, on one hand, on the basic unity of humankind, rendering the anthropological preoccupation with "primitive" cultures relevant to the study of overall human history, and at the same time, they invariably placed the educated upper classes of Europe and Euro-America at the pinnacle of cultural development. Such approaches offer insights into the genuinely accumulative aspects of cultural history, such as technology and hierarchical political organization, while being deeply flawed by insisting on progress in domains such as art or morality. Anthropologists were often gentlemen scientists with nonprofessional incomes but recognized expertise. Their concept of research included secondary gathering of data (for example, lists of customs) as well as primary field collection, consistent with the intellectual framework of the progress of culture (note the singular) across all places and times.

Anthropology underwent a process of academic professionalization around 1900. For example, recognized scholarship usually required a PhD from a university department specialized in anthropology. This provided the social framework for tightening standards of evidence and analysis. In the United Kingdom, and somewhat later in parts of continental Europe and in British colonies (the quintessential figure was Bronislaw Malinowski, a Polish migrant to Britain), this movement raised the expectations for fieldwork, emphasizing long-term particpant observation, including use of the native language. This was facilitated by a context of governed colonies with a dominated but still active non-Western social life; hence, the British explored functionalist analyses of various kinds, emphasizing the coordination of ideas, behavioral norms, and activities within a positive social whole. The functionalists rejected speculative history, and they averted their eyes from some realities of colonialism (such as migratory wage labor), resulting in a characteristic blindness to questions of power and change.

Meanwhile, in the United States, and then Canada and Mexico, Franz Boas (a German immigrant to the U.S.) and his students sharply critiqued speculative histories and general evolutionary schemes and dedicated themselves to careful reconstructions of precontact Native American cultural traits. As they examined how traits cohered in local clusters, they emphasized learned patterns of ideas and activities, essentially our current culture concept. Notably, the Boasians shifted the question of culture from the singular—the cumulative trajectory of all human accomplishments—to the plural, the manifestation of culture in a local place and time. Boas also called for careful physical anthropology as he did battle with pseudoscientific "eugenics" (the speculative attribution of all human qualities to genetic inheritance). This formed part of broad struggles against racism and anti-immigrationism. In the United States, though not in Europe, anthropology thus came to include all inquiries into the human condition, from human biology through archaeology, to the total range of past and present human languages and cultures. However, the relationship of academic anthropologists to their "subjects" was ambivalent, vindicating their worth within a society inclined to disparage or ignore them but also treating them as almost collectible objects whose human rights were less important than the intellectual needs of science.

World War II, and the powerful national and global military and economic institutions that followed it, reshaped the organization and intellectual concerns of anthropology. Universities grew rapidly, and governments sponsored large volumes of research. The focus of U.S. anthropology shifted from its internal subjects, Native Americans, to international political and economic spheres of power, such as Latin America and Southeast Asia. Although anthropology did not abandon the study of small-scale societies, it increasingly addressed peasants, plantation workers, migrants, and cities. As a result, anthropological theories paid increasing attention to inequality, states, social change, and after global movements for democracy and justice started in the 1960s, power and resistance.

From the 1940s to the 1960s, perhaps influenced by the apogee of cold-war national and global bureaucracies, anthropologists strongly emphasized systems theories, examining, for example, human-environmental relations or the structure of ideas. From the late 1960s onward, scholars began to question the total perfection of systems (while retaining the insights of systems dynamics), including questioning the boundedness and coherence of cultures and the consensus and functional benefits of societies. Rather, cultures and societies were viewed as localized and temporally situated nexuses of fluid practices and ideas within endlessly mutating networks of worldwide relations.

Considerable progress was also made in biological anthropology and archaeology. In the former, the modern synthesis of genetics with Darwinian evolutionary theory finally arrived in anthropology, dismissing the fascination with racial body types in favor of models of complex variation and adaptive dynamics; at the same time, the empirical record of human paleontology became much better established, pointing to a series of origins in Africa. In the 20th century, archaeologists had established scientifically robust methods, such as the use of stratigraphic excavation and various relative and absolute dating techniques; by the middle of the century, they also began to treat their subjects as the study of past cultures and societies through material remains rather than the documentation of one phase of objects after another. As anthropology became increasingly specialized in large universities, it tended to fragment, and yet ironically the intellectual foundations of various branches of anthropology now spoke to each other much more effectively.

Anthropology contributed to and has been reshaped by the increasing intellectual and political equality of world peoples (in material terms, however, global inequality has continually worsened). National anthropologies flourished in India, China, South Africa, Brazil, Mexico, and elsewhere. Feminism reshaped anthropology, correctly insisting on the concerns and perspectives of half of humanity. And indigenous people's increased self-determination in intellectual as well as political terms inevitably challenged anthropology's science-for-science's-sake mission and its place in the "savage slot." Anthropologists at their best responded with greater self-awareness ("reflexivity") about ideas and politics. They engaged more openly in public issues and have begun collaboration with communities, seen as subjects and not just scientific objects. The application of anthropological knowledge and methods to practical problems became vital, both because of the trends identified above and because anti-intellectual, militarist, and capitalist employment and research funding priorities by post-1968 universities and governments resulted in a glut of academic PhDs.

Two important questions now loom on anthropology's horizon. In this would-be new world order, offering both possibilities of repression and liberation, how can anthropologists combine their political-ethical and objective scientific commitments? And as anthropological concepts such as "cultures" or "human nature" come to be part of the public lexicon and thus are infused with various ideological tendencies and manipulations, how can anthropologists promote their use in the most thoughtful and ethical manner?

— Josiah McC. Heyman

See also **Anthropology, Characteristics of; Anthropology, Cultural; Anthropology, Philosophical; Boas, Franz; Malinowski, Bronislaw**

Further Readings

Adams, W. Y. (1998). *The philosophical roots of anthropology.* Stanford, CA: CSLI.

di Leonardo, M. (1998). *Exotics at home: Anthropologies, others, American modernity.* Chicago: University of Chicago Press.

Kuper, A. (1983). *Anthropology and anthropologists* (Rev. ed.). London: Routledge.

Malefijt, A. de Waal. (1974). *Images of man: A history of anthropological thought.* New York: Knopf.

Stocking, G. W. Jr. (1982). *Race, culture, and evolution: Essays in the history of anthropology.* Chicago: University of Chicago Press.

Trigger, B. G. (1989). *A history of archaeological thought.* Cambridge and New York: Cambridge University Press.

Vincent, J. (1990). *Anthropology and politics: Visions, traditions, and trends.* Tucson: University of Arizona Press.

Wolf, E. R. (1999). *Envisioning power: Ideologies of dominance and crisis.* Berkeley and Los Angeles: University of California Press.

FUTURE OF ANTHROPOLOGY

Anthropology, which has always held that, as the poet said, "the proper study of mankind is man," has taught us much of what we know about ourselves as human beings living together in society. Whether it was Frank Hamilton Cushing's pioneering work among the Zuni Indians in New Mexico or Margaret Mead in American Samoa and New Guinea, anthropologists have held up a mirror in which to reveal much about what really makes us human. Now, 125 years after Cushing began his work among the Zunis, anthropology may be facing the most challenging chapter in its history.

When Cushing, Franz Boas, and the other pathfinders of anthropology began their work, most people still lived and died in the country of their birth. Even when, as with the great migrations to the United States, millions of immigrants arrived from Europe in the 19th century, they sought out people from their same ethnic backgrounds to recreate the cultural and ethnic communities of their homelands. Even today, in 2005, the Irish in Havertown, Pennsylvania, refer to their city as "Ireland's thirty-third county," because of their warm identification with their ancestral home. (Ireland itself is formed of 32 counties: 6 part of British Northern Ireland, and 26 in the Republic of Ireland to the south.) By the time large-scale immigration

ended around the time of World War I, America's population had been swelled by millions of immigrants, almost entirely from Europe.

Now, however, thanks to the long-distance travel made possible by commercial airlines, immigrants are arriving in countries far removed not only culturally and ethnically from the country in which they were born—but even from the continent. Indians are arriving in large numbers to work in the burgeoning computer industry in the United States. Turkish *gastarbeiters,* "guest workers," continue to come to Germany to take jobs left vacant because of the country's declining population. And Americans, in quest of oil business, migrate to the Middle East, Central Asia, and the oil fields of Southeast Asia.

The result of such immigration to totally alien environments can be unsettling and even lead to violence between the new arrivals and the resident populations. After Germany was reunited in 1989, neo-Nazi skinheads embarked on a reign of terror against the Turkish workers living in German cities. Today, Muslims newly arrived from North Africa have increased the anti-Semitism directed against Jews in France. And in 1981, after the fall of South Vietnam in 1975, Louis Beam and Ku Klux Klan extremists carried out a campaign of intimidation against Vietnamese fisherman in Galveston Bay, Texas.

If the past is any guide to the future, such incidents will not only continue, but may in fact increase. Faced with such a future, policy planners can look for help to those who have made the greatest contribution to studying the interaction of human societies in the past: anthropologists. Already, noted anthropologists have undertaken such cross-cultural work in the past. Two of these were students of Boaz at Columbia University, Margaret Mead and Ruth Benedict. In 1959, Mead published *People and Places,* while Benedict had published *Patterns of Culture* in 1934. The need to turn to anthropology to help build a global future for humankind is already critical. Between April and June 1994, some 800,000 members of the Tutsi tribe and opposition Hutus were slaughtered by the dominant Hutu population in the African country of Rwanda. While Rwanda descended into a nightmare of massacre, neighboring Kenya remained peaceful, despite the fact that its population also came from different tribes, Kikuyu (also Gikuyu), Masai, and smaller tribes like the Pokot. Perhaps one reason that Kenya had survived major tribal unrest since its independence in 1963 was that is first president, Jomo Kenyatta, had worked as an anthropologist, studying his own Kikuyu tribe in *Facing Mount Kenya* (1938). From the beginning, Kenyatta had led Kenya with the slogan of "Harrambee," Swahili for "all working together" (translations vary), a policy that embraced not only the native Africans, but the European settlers as well.

— John F. Murphy, Jr.

Anthropology, Humanistic

As Eric Wolf notes in "Anthropology," his 1964 essay, anthropology is "the most scientific of the humanities, the most humanist of the sciences." Anthropologists have commonly taken into consideration the human condition—that which makes us distinctly human. However, maintaining balance between anthropology as a science that is concerned with causation, structure, function, and the predictability of human and cultural variation and anthropology as a humanity that is concerned with the function of human minds and how humans create their social and cultural worlds has not been easy. Historically, this has created a tension within anthropology, as anthropologists tend to conduct research toward one of these poles. At the same time, this underlying dichotomy propels the discipline and makes it distinct from both the natural sciences and the humanities.

From the earlier research of Ruth Benedict and Robert Redfield to the more recent research of Ruth Behar and Edith Turner, cultural anthropologists have long advocated humanistic concerns and approaches to the understanding of human thought and creativity from a distinctly insider's perspective. As is noted in the Society for Humanistic Anthropology's charter, humanistic anthropology "celebrates that human reality is something upon which we creative primates have real feedback effects: We can change our social and natural environment." It takes the position, which is illustrated in the ethnographic and theoretical writing of the above anthropologists,

too, that anthropological inquiry includes "promoting multicultural understanding and revealing the social blockages that are deleterious to our social and physical environment." In essence, humanistic anthropological approaches reject blind positivistic scientific analyses, dogma in all manifestations, and extreme cultural relativism. Despite this long-standing position, humanistic anthropology did not become a concerted, self-consciously embraced approach until the early 1970s, which was due in large part to the efforts of Edith Turner.

Turner's humanistic orientation is rooted in symbolic, or interpretive, cultural analysis. The roots of this tradition can be seen in E. E. Evans-Pritchard's ethnographic writings on the Azande and the Nuer. Favoring interpretive analytical strategies, he rejected anthropology as a natural science and placed it within the humanities. His basic approach to the study of society, which is based on learning thought processes through the beliefs and opinions of members of the social group being studied, fits nicely with contemporary humanistic anthropological approaches to studying human cultural difference, because it emphasizes indigenous concepts and models of explanation.

As interpretive anthropology emerged from the margins of anthropological theory and practice in the early 1960s, humanistic approaches became even more central in cultural analyses. Although at that time, Mary Douglas, Victor Turner, and Clifford Geertz did not call themselves humanistic anthropologists, their theoretical and methodological practices have done much to shape humanistic anthropology today. In general, they contend that human culture is based on a system of symbols and meanings, which humans create and use to direct, organize, and give coherence to their lives. The emphasis is on meaning rather than on the materiality of human life or on innate structures of the mind. Each went in a distinctive direction with regard to symbolic analysis, while being anchored within a humanistic framework. Douglas combines Durkheimian functionalism with the ways that cultural symbols reflect social order, as best illustrated in her book *Purity and Danger* (1966). Through an exploration of beliefs about purity and pollution, she shows links between the human body and society. Turner, in contrast, focuses on ritual performance and practice but was less interested in symbols themselves, concentrating on what they mean to people as they use them and are inspired to action by them. By comparison, Geertz, drawing heavily from the sociologist Talcott Parsons and philosophers, such as Alfred Schutz, Gilbert Ryle, and Ludwig Wittgenstein, focuses on the interpretation of culture, which for him is a system of symbols and meanings that are publicly displayed in actions and objects created and made meaningful through human social interaction. In *Interpretation of Cultures,* Geertz seeks to understand culture in its own terms through a variety of analytical practices, not exclusively anthropological. Like Redfield before him, whose theories of Great and Little Traditions helped to democratize humanities scholarship, which focused on "high culture" rather than "low, mundane culture," Geertz's thesis that ethnographies should be understood as texts to be read alongside the local, indigenous-produced texts helped break down the divisions between outside researcher and local insider-subject. One tour-de-force example of this trend in interpretive analysis that is well-grounded in humanities scholarship is Turner and Bruner's 1986 volume, *The Anthropology of Experience,* which includes chapters by the leading interpretive and humanistic anthropologists of the time: Renato Rosaldo, Barbara Myerhoff, James Fernandez, Barbara Babcock, and Geertz. The book breaks even more from the tradition of structuralism rooted in Émile Durkheim and A. R. Radcliffe-Brown to embrace Wilhelm Dilthey's "concept of an experience, *Erlebnis,* or what has been 'lived through' . . . [where the contributors] focus . . . more on experience, pragmatics, practice, and performance."

Some themes raised in *The Anthropology of Experience,* such as ethnography as narrative, reflexivity, and authorship, are also treated in Clifford and Marcus's volume, *Writing Culture: The Poetics and Politics of Ethnography,* but it serves more as a critique of anthropological practice. Underlying it are Foucauldian concepts of power relations, which challenge the contributors to rethink their respective, as well as those of the discipline, positions vis-à-vis their subjects and the texts that they produce. The contributors clearly advocate humanities-based strategies to improve cultural analysis, as they argue for cultural anthropologists to take into consideration literary and philosophical concepts and methods (something that Ruth Benedict did in the 1934 book *Patterns of Culture*); to experiment with new forms of writing—especially those that include the subjects' voices; and, drawing on postmodernism, to recognize the arbitrariness of culture, the power/subject position of the

researcher, the resistance to master narratives, and the incompleteness of the ethnographic endeavor.

Although the main theses in *Writing Culture* generated debate within the discipline and were largely accepted by cultural anthropologists, the volume was criticized for its male, Eurocentric orientation, first by anthropologists of color in the 1991 volume, *Recapturing Anthropology,* and then by feminist anthropologists in the 1995 volume, *Women Writing Culture.* Both volumes argue that the driving forces behind anthropological practice, be they methodological or theoretical, need not be dominated by white men and Western ideological and historical paradigms. The contributors to *Recapturing Anthropology* in particular argue that scholars cannot control the historical conditions in which their representations are located or future readings of them. Moreover, the very location of anthropological research, the field, continues to be exoticized and mystified, often beyond anthropologists' control. In other words, the goal is to further democratize the discipline by demarginalizing the margins, recognizing the contributions of anthropology's internal others, and understanding the historical and cultural contexts of the anthropological endeavor, all the while drawing on the humanities as broadly conceived.

In the *Women Writing Culture* volume, the innovative contributions of female anthropologists are noted, particularly with respect to new forms of cultural description that are literary in form. This is best exemplified in Zora Neale Hurston's largely ignored ethnographic writings and novels, in Edith Turner's poignant personal ethnography, *Spirit and the Drum* (1987), and in Laura Bohannan's archetypical ethnographic novel, *Return to Laughter* (also noted in Wolf's essay "Anthropology"). Bohannan wrote her novel in 1954 under the nom de plume, Eleanor Smith Bowen, for fear of negative fallout from her anthropologist peers. Her novel has since inspired a whole genre of writing. From the writing of Stanley Diamond to Dennis Tedlock and others, poetry has also become a form of cultural representation/presentation of others by anthropologists. These literary forays have not been exclusively based on Western models, but have incorporated non-Western modes of thought, aesthetics, and themes that anthropologist-creative writers learn while doing fieldwork.

The Foucauldian question of power raised in *Writing Culture* and experimentations in writing styles have resulted in humanistic anthropologists rethinking the relationship between anthropologist and subject. The impersonal term, *informant,* is being replaced with *friend, colleague, expert, collaborator,* and others, as humanistic anthropologists recognize the intense, intersubjective relationships they and their subjects share. Furthermore, as native, local forms of knowledge and analysis are elevated on par with those of anthropologists and are incorporated into anthropological modes of method, theory, and analysis, the traditional anthropological "informant" becomes even more awkward to employ.

As the Society for Humanistic Anthropology states, "Humanism has historically made the human endeavor the subject of its concerns. Humanistic anthropology seeks to bring the intellectual resources of the discipline to bear upon this subject." Founded in 1974 at the American Anthropological Association's annual meeting, then held in Mexico City, the members of the Society for Humanistic Anthropology have deliberated over the methodological, theoretical, and topical concerns described above. The primary vehicle for this is the journal, *Anthropology and Humanism,* which is edited by Edith Turner. The journal takes a holistic approach to the understanding of "what it is to be human" by soliciting contributions from all fields of anthropology, the humanities, and the sciences. It publishes articles that help further humanistic anthropology via new trends in the humanities, illustrate the linkages between anthropological fields and humanistic anthropology, and explore the contradictory processes of life in other cultures and also those of the anthropologists. In addition, it embraces the creative cultural representations of anthropologists by regularly publishing essays, fiction, poetry, and other art forms.

Humanistic anthropology clearly has no easily delineated academic boundaries, as Edith Turner notes on her faculty Web page at University of Virginia:

> My theoretical interests have developed from [Victor] Turner's "anthropology of experience," a field that has been spreading in anthropology to narratology, humanistic anthropology, and the anthropology of consciousness. Good anthropology rests on humanism—that is, respect for the ideas and religions of other cultures and, where possible, the willingness to experience through the eyes of others. Analysis therefore has seriously to take into consideration local "exegesis'" (interpretation), and local statements of experience.

Humanistic anthropology's vitality rests on the ability of anthropologists to utilize new and alternative modes of knowledge drawn from both scientific and humanistic fields.

— *Walter E. Little*

See also **Anthropology of Women; Benedict, Ruth; Evans-Pritchard, Edward; Turner, Edith**

Further Readings

Behar, R., & Gordon, D. A. (1995). *Women writing culture.* Berkeley: University of California Press.

Clifford, J., & Marcus, G. E. (Eds.). (1986). *Writing culture: The poetics and politics of ethnography.* Berkeley: University of California Press.

Fox, R. G. (Ed.). (1991). *Recapturing anthropology: Working in the present.* Santa Fe, NM: School of American Research Press.

Geertz, C. (1973). *The interpretation of cultures.* New York: Basic Books.

Turner, V. W., & Bruner, E. M. (Eds.). (1986). *The anthropology of experience.* Urbana and Chicago: University of Illinois Press.

Anthropology, Philosophical

Anthropology, a discipline that encompasses five areas or subdisciplines, provides a comprehensive view of our species' origin, present state, and future. As a science, anthropology can be considered as a recent academic discipline; however, the fundamental inquiry into human origin, social structure, and human interaction has its roots in the tradition of philosophy. From the first materialists of Ionian (ca 585 BCE) to the metaphysics of Aristotle (384–322 BCE) and later the theology by Thomas Aquinas (1225–1274 CE), the geocentric and anthropocentric positions concerning our species' epistemology, ontology, and teleology has a directly impacted the conduct of science. As illustrated in foundational philosophic masterpieces (for example, Aristotle's *Physics* and *Metaphysics* and Aquinas's *Summa Theologica*), these metaphysical concepts directly influence the context by which both the evidence and interpretations are sought or derived. Given this established logical necessity of metaphysics, any modern theoretical reference must be able to sufficiently depict these metaphysical views based on current available scientific evidence. From these dialectics, science and metaphysics work in unison, via logic, to produce a coherent and accurate explanation concerning human existence within a dynamic universe.

As for anthropology, the influences of Charles Darwin (1809–1882) upon the metaphysics that govern science are profound. Darwin's theory of organic evolution had permanently refuted the fixity (eternal) of species as depicted by either Aristotle or Aquinas. Cosmologically, and theologically for Aquinas, the Great Chain of Being was reduced to mere conceptual links. The traditional views concerning our own species' epistemology, ontology, and teleology have been far removed from its previous dogmatic position. In its wake, an "arc of interpretations" of evolution and dynamic integrity, as postulated by H. James Birx, resulted in differing metaphysical views. However, not all metaphysical interpretations of evolution are correct. It is the duty of the philosopher of science, via philosophical anthropology, to construct and implement a theoretical framework that correctly reflects this metaphysical foundation; all of which is based on rational speculation based on current physical evidence.

It becomes obvious that the philosophical framework that stimulated this inquiry into human existence and its origin precedes the academic structure of anthropology that is known today. However, it becomes necessary to acknowledge that it is the evolutionary framework that both accounts for and is the sustaining factor in the philosophical cohesion of the scientific basis for anthropology; for without this evolutionary framework, what remains is incoherent, unsubstantiated conjecture that is sometimes accompanied with cosmological innuendo. When examining the plethora of theoretical constructs or paradigms, it becomes evident that the foundational structures of anthropology have become obscured from the original esprit de corps set forth by rational and critical inquiry based on this evolutionary approach. Ultimately, the lack of a philosophically sound grand theoretical framework has caused fracturing among the subdisciplines of anthropology. The greatest strength of anthropology stems from its multidisciplinary approach to the study of our species, and that approach is now in jeopardy. Though the theoretical construct for physical anthropology and forensic anthropology remains stable, philosophically speaking,

it is the subdisciplines of archaeology, linguistics, and to the greatest extent, cultural anthropology that have become subjected to the greatest risk.

Currently, there are three major perspectives within anthropology: diachronic, synchronic, and interactive. Each perspective, some compatible and some contradictory, contains several particular points of view that establish an integral ontology and teleology from which an epistemologically derived anthropological interpretation of the available evidence are based. Upon examination, it becomes evident that not only does anthropology need a grand theoretical framework but also which paradigm becomes philosophically sound.

Diachronic Perspectives

Diachronic perspectives, a perspective that traces relationships through time, include theories of evolutionism, diffusionism, cultural area synthesis, and Marxism. Though evolutionary theory had a profound influence on philosophy, the resulting philosophical traditions manifested themselves in four evolutionary perspectives: unilinear (stresses one line of evolution that passes through particular stages), universal (stresses generalized stages of evolution), multilinear (stresses both diversity and environmental factors), and neo-Darwinism (stresses a synthesized approach to evolutionary biology and behavior). Progressively, each evolutionary perspective attempts to add and contribute defining boundaries to the evolutionary process as proposed by Darwin.

As reflected in evolutionary theory, our species is considered one species with differences on the phenotypic level. Using this concept within a Darwinian framework, the unilinear view holds that all populations pass through the same stages of culture development at different rates—essentially one species; therefore, there is one line of development. The interdependency of various factors within each cultural stage will eventually propel the population into the next stage in their own cultural genesis. In responding to problems with the unilinear approach, universal evolutionism held a more generalized view concerning stages of development. The creation of generalized categories based on maximum criterion encompassing each category offers a greater advantage; yet the defining characteristic that may describe a given culture fails to offer a sense of accountability. The progression to multilinear evolutionism seems in itself an evolution of evolutionary theory. The strength of this perspective resides in the acknowledgement of the environmental factor that influences cultural development. Through regional mapping of culture, what emerges are patterns of adaptive responses to external factors. The most recent evolutionary perspective, neo-Darwinism, encompasses progressive theories from biology, genetics, sociobiology, psychology, and cognitive sciences. Though the evidence and philosophical (theoretical) underpinnings are in the process of being united, the ontological, teleological, and epistemological realities are grounded in materialist interpretation of the evidence within an evolutionary framework. Acknowledging yet disregarding the importance of evolution, diffusionism, and later cultural area, attempted to offer differing explanatory factors.

In contrast to evolutionism (any form), diffusionism, either the German-Austrian or British perspective, regards culture, including the development thereof, as expressions that originate and are transmitted from one population to another. In this regard, a cultural aspect may diffuse, but cultural complexes are due to migration or conquest. From this view, cultural similarities are prioritized by ethnocentric attitudes concerning advancements and thus accordingly are stigmatized. The readily available patterns of culture dictated by diffusionist theory created the concept of the cultural area, whereby each cultural area would be comprised of essential traits of that particular area. This process of compiling vast amounts of data resulted in the ability to compare and contrast traits among various cultures. Within these perspectives, the ontological perspective has a philosophical tinge that borders on predestination, whereby advancements are internalized ontologically, then expressed in a teleological manner. Epistemologically, it appears that all cultures are able to adaptively learn but few can create. This essentially creates a "natural order" by which social interaction is governed. Though the logistics for such judgments are illusive, these perspectives incorporate a latent form of the survival of the fittest. In these comparisons, a greater understanding of population interaction and cultural adaptation was made possible.

The remaining diachronic perspective is Marxism. Marxism, a perspective based on a segmented part of philosophy postulated by Karl Marx, focuses on the relationship between modes of production and power structure. Within this structure, distinction between

infrastructure and superstructure aid in the defining properties of the common conceptualization of the term *society*. From this process of analysis, power structure can be analyzed in terms of center and periphery. This perspective offers all the advantages inherited from the philosophy of Marx: historical outlook, the importance of economy and its role in politics, materialism, and evolution, all of which had great explanatory power. However, Marx's misunderstanding of both human evolution and psychology is reflected within this perspective. The resulting epistemology, ontology, and teleology become erroneous due to their skew and fixity.

Synchronic Perspectives

Synchronic perspectives, perspectives that trace relationships within the same time, includes theories of relativism, structuralism, functionalism, and structure functionalism. In relativism, the existence of cultural universals is denied in favor of particulars relevant to a particular culture. Relativism includes descriptive, normative, cognitive, moral, and epistemological. The primary philosophical position states that an individual's culture is the only standard known in itself, whereby objective statements or evaluation of another culture are not possible. Truth, morals, and perceived facts are contingent solely by the arbitrariness of birth. If this perspective is correct in its entirety, the philosophical implications are twofold: International regulation and dissemination of knowledge (for example, science), are not possible. In this same manner, the only ontology and teleology that can be epistemologically acquired is by the society by which an individual was exposed. Objectivity of science becomes irrelevant, and humanity itself becomes obscured. Unlike relativism, functionalism acknowledges both the capability and process by which cultures can be objectively studied.

In the functionalist perspective, focus is placed upon the functionality of organizations and their related practices for individuals in a society. Functionalism, in a philosophical sense, was always a point of inquiry. From this approach, an individual and social meaning are derived from and are dependent on the functions of the interrelating organizations and their particular customs or traditions. Although acknowledging but not stressing evolution, the adaptive process of culture signifies this functional aspect of evolution (need and cultural response). Philosophically, an individual's ontology and teleology are directly formed by the epistemological limitations set forth by the functional parameters of the organization. Though functionalism does have its strength, structural functionalism offers additional benefits.

Structural functionalism, a perspective that incorporates both structure and function, focuses upon the structural and functional order of organizations in respect to society. Accordingly, each structure and its related function interact in a cohesive fashion (organic model). Within an anthropological inquiry, structural functionalism primarily deals with the observed interaction among social institutions based upon current evidence. Once again, this approach acknowledges both evolution and the attainability of objective scientific knowledge but fails to concern itself with the origin of cultural particulars. In defining properties, this perspective allows human ontology and teleology to develop under the function and form of social institutions. Epistemologically, it is assumed or is latent that knowledge is acquired and advanced through the interactions of these institutions.

Structuralism, a perspective that focuses on structural relationships, states that any derived social meaning is derived from structure. The basis for this view is that structure of culture patterns parallels that of the human mind and can be expressed in language. The ability to recognize and express this structure as a universal, or in the terms of Lévi-Strauss, collective consciousness, results in dynamics between languages and culture that allow for examination on multiple levels. From this perspective, a culture could be understood in the same manner that an individual reads literature and more important, provide the ability to access the meaning of cultural expressions that may not be readily apparent. This relationship between thought and culture is essential to this perspective. The ontological aspect of this perspective appears to reflect the cognitive factor of society. In this manner, the definitive ontological assessment becomes indicative of the intellectual and psychological components of the social structure itself. Furthermore, teleology becomes reciprocal with this ontological assessment. Epistemologically, the transmission and advancement of knowledge becomes interred internally within the structure.

Interactive Perspectives

Interactive perspectives, perspectives that focus on action rather than form or function, include theories

from processualism, transactionalism, feminism, poststructuralism, and postmodernism. Processualism, a perspective that focuses on any social process and structural propensities for change, offers a degree of critical analysis concerning social process in regard to social structure. However ill-defining and erroneous, any ontological and teleological aspects inferred are drawn from changing social values, though active social processes within a dynamic structure are not metaphysically reflective. Yet the significance of interaction, especially in evaluating the inferences of philosophical implications, remains an important factor. This can be seen in the transactionalist perspective.

Transactionalism, a perspective that focuses on relationships between or among individuals, provides an adequate basis to expose human motives for anthropological analysis. Through this analysis, a clear indication of values, thought structure, and stability are depicted within this cost-benefit analysis of human interaction. The ontological and teleological implications, though latent, are inferred from the value system used during the process of decision making. Epistemology is unclear but remains in the tradition provided by the Enlightenment. Once again, the metaphysical basis is ambiguous at best.

Unlike the perspectives presented thus far, the remaining three perspectives of feminism, poststructuralism, and postmodernism are more a philosophical position than a method for science. Nevertheless, the influences of these perspectives on anthropology are profound. This is certainly the case with feminism. Feminism, a perspective that focuses on issues from the female perspective, offers an alternative point of view from the mainstream view. Distorted from its original philosophical state, this perspective shifts attention to the empathized function of the female sex in both society and the evolution of our species. Regardless of its original philosophical value and the contributions made regarding misconstrued or disregarded areas of study, its inability to definitively state a metaphysical claim eliminates any theoretical plausibility. However, this perspective has more of a potential that is compatible with science than the remaining two perspectives.

The perspectives of poststructuralism and postmodernism both indicate a breakdown of science and rational speculation. In this manner, poststructuralism rejects structuralist methodology in favor of deconstruction. This process attempts to illustrate that any structural concepts are negated during its construction; therefore, these independent structures of a social system, structurally expressed as subject/object become obscured and impossible to evaluate. These concepts are closely tied with postmodernism. The postmodern perspective, a perspective that rejects the validity of objectivity and scientific methods, stresses two points: the impossibility of an inclusive system of universals that would objectify the known world and, second, that social systems are reflexive. Therefore, the process of reflexivity becomes essential to the anthropological approach. Besides the blatant contradictions, fallacious reasoning, and mental processes that are indicative of a psychosis rather than a theoretical framework, there remains no tenable ontology, teleology, and epistemology that is relevant to either anthropology or philosophy.

When constructing or evaluating these theoretical paradigms, the philosophical implications for science concerning epistemology, ontology, and teleology become paramount. The perspectives given illustrate the theoretical problems that anthropology must, at all expense, solve in order to retain its comprehensive view. From the perspective given, the only solution is a diachronic paradigm based on evolutionary principles. The limitations of both synchronic and interactive categories become too restrictive in order to establish a coherent view of our species, though it does provide an adequate source for the recording of cultural information. However, interpretation is as important as the methodology. What is needed is the establishment of a new evolutionary paradigm, what this author terms *evolutional dynamics.*

Evolutional dynamics is active synthesized materialistic interpretation of evolution with some pragmatic features. This new theoretical synthesis should have open communication and incorporate the most recent advancements from biology (biological anthropology), genetics, chemistry, primatology, physics, sociobiology, psychology, cognitive sciences, and computer science into an evolutionary framework. With speculation based upon the evidence, an open-ended epistemology, ontology, and teleology would provide a united fundamental basis for all areas of anthropology. Though a complete detail of this theoretical concept is beyond the scope of this summary, it would be sufficient to state that this truly comprehensive view would not only explain our species' origin and present status but also provide an action base for the future. Concerning the perspectives that exist today, diffusionism, Marxism, structural functionalism,

processualism, and feminism perspectives must be modified in order to be grounded within this evolutionary perspective. Their particular focus would enrich the appreciation for the history of our species. As for the poststructionalism and postmodernism perspectives, unfortunately there is no hope. Their own inadequate and futile theory condemns their relationship with science. These theoretical malignancies must be removed from anthropology (science).

In adopting an active and pragmatic stance as depicted with evolutional dynamics, each of the traditional areas of anthropology would benefit. In the area of physical and applied anthropology, communication among biology, psychology, primatology, chemistry, and physics could procure advanced methodologies in the examination of physical evidence. Under these circumstances, the evidence given to science can not only construct our species' phylogenetic past but also aid in the pursuit of justice in the present day. As for archaeology, communication with physics (geology) and computer science (technology) could aid in new methods for the acquisition of new evidence for scientific evaluation. This evaluation of archaeological artifacts, based on psychological and sociobiological factors, could provide a solid processed view of our species' material history. Similar to this process, linguistics would also benefit. In the area of linguistics, communication with psychology, cognitive science, and computer science could open new grounds concerning the development and dynamics of human language. As for the *new biocultural anthropology,* the social arm of anthropology, communications among the areas of biology, psychology, cognitive science, sociobiology, and primatology could provide new and relevant sources of information concerning the development and developing factors of culture. Furthermore, the adopting posture of pragmatism could further benefit those anthropologists who want to promote social change. However, all these areas or subdisciplines must communicate with each other to provide a comprehensive view of our species.

In the final analysis, one of the greatest contributions from anthropology is the evolutionary framework proposed by Charles Darwin. With the procurement of scientific advancements (genetics), the genesis of the evolutionary theory must reflect future dynamic contributions. To secure a coherent grand theory, the metaphysics by which the discipline operates must be adequately responsible for answering the essential features of our own humanity. Currently, the evolutionary perspective offers the greatest advantage; however, a refinement and synthesis must take place. In this manner, philosophical anthropology becomes a necessary factor. Open to many possibilities, the advantages of evolutional dynamics serve to unite the field that would otherwise have to capitulate due to the improper implementing of metaphysical concepts. With such adaptation, the discipline of anthropology will survive and thrive, as does our species.

— David Alexander Lukaszek

See also **Biological Anthropology and Neo-Darwinism; Darwin, Charles; Evolution, Human; Evolutionary Epistemology; Functionalism; Postmodernism; Structuralism**

Further Readings

Bernard, A. (2000). *History and theory in anthropology.* New York: Cambridge University Press.

Birx, H. J. (1991). *Interpreting evolution: Darwin & Teilhard de Chardin.* Amherst, NY: Prometheus Books.

Flew, A. (1989). *An introduction to Western philosophy: Ideas and arguments from Plato to Popper.* London: Thames & Hudson.

Martin, M. (1990). *Atheism: A philosophical justification.* Philadelphia: Temple University Press.

Mayr, E. (1991). *One long argument: Charles Darwin and the genesis of modern evolutionary thought.* Cambridge, MA: Harvard University Press.

Wilson, E. O. (2000). *Sociobiology: The new synthesis.* Cambridge, MA: Harvard University Press.

Vitzthum, R. (1995). *Materialism.* Amherst, NY: Prometheus Books.

Anthropology, Practicing

Practicing anthropology primarily refers to anthropological work performed outside academia to address issues in areas such as community development, agriculture, health care, environment, resource management, housing, criminal justice, marketing, and technology. Although a majority of practicing anthropologists work in urban or other local settings, some work on international projects, especially in

development and health. Practicing anthropologists can be employed by a university, but most hold positions in public and private sectors where they study community-related problems, help develop programs and policies, and implement solutions.

Historical Context

In 1941, Margaret Mead, Eliot Chapple, and others founded the Society for Applied Anthropology (SfAA) in response to the growth of applied anthropology, which the SfAA defines as the application of anthropological perspectives through interdisciplinary scientific investigation of human relationships for solving practical problems. Originally a part of American Anthropological Association (AAA), SfAA became a separate entity to avoid traditional anthropology's undercurrent of bias against applied or practicing anthropology. By the 1950s, applied anthropology was generally regarded as an academic, research-based subfield of cultural anthropology intended to inform policy, program administration, intervention, and development. Practicing anthropology, conversely, did not burgeon until the 1970s, spurred by an extreme shortage in academic positions in the United States, and by recognition of the potential for anthropologists beyond basic research in applying anthropological knowledge to help solve humans' critical problems as practitioners of anthropology.

The National Association for the Practice of Anthropology (NAPA) was created in 1983 as a section of the AAA in acknowledgement of the growth of the practicing field. NAPA membership currently exceeds 700, and NAPA supports practicing anthropologists in public and private sectors, as well as those affiliated with academic institutions, whether or not in anthropology departments. It also promotes practice-oriented work by publishing the *NAPA Bulletin* and practitioner directories, sponsoring professional mentoring, networking opportunities, workshops, and interest groups around common themes, and assisting in the establishment of local practitioner organizations (LPOs) across the United States. Current LPOs include the Washington Association of Professional Anthropologists (founded in 1976), the High Plains Society for Applied Anthropology (founded in 1980), the Mid-South Association of Professional Anthropologists (founded in 1983), and the Southern California Applied Anthropology Network (founded in 1984). These associations have successfully advanced the position of nonacademic practitioners within the discipline and professionally as witnessed in the AAA's moving toward creating a new category for those members employed by organizations that would be similar to accommodations granted academic departments.

The actual term *practicing anthropologist* was not in common use until the appearance of the SfAA's journal *Practicing Anthropology* (*PA*) in 1978, a publication originally intended for individuals with nonacademic employment. Eventually *PA* sought to establish *practicing* as part of the anthropology discipline and to bridge the gap between practicing in nonacademic and academic settings. It is still debatable as to whether there is a difference between applied and practicing anthropology, since both employ anthropological means to study societal, organizational, or programmatic issues, and to help facilitate change by influencing policy and practice. Shirley Fiske considers *practicing* as virtually interchangeable with *applied* in that both serve as testing grounds for theory of traditional anthropology subfields. Others contend that *practicing* is broader than applied because it incorporates all nonacademic anthropological work, not only the policy research of applied significance. Still others make a distinction between the two by describing the applied work of those employed in business and agencies as *practicing* and similar work of academically employed as *applied*. Robert Hinshaw views *practicing* as primarily separated from *applied* by being collaborative, while Erve Chambers relegates *practicing* to an element of *applied*, distinct only in its explicit intent to make anthropology useful through collaborative inquiry, knowledge transfer, and decision making.

The blurring of the distinction between *applied* and *practicing* is evident in the fact that the memberships of the SfAA and the NAPA overlap substantially. NAPA is also a frequent co-sponsor of the annual meetings of the SfAA and has participated in a joint commission comprised of representatives from SfAA, AAA, and NAPA. If the discipline itself were to make a distinction, it would probably be that *applied* work is primarily concerned with producing knowledge that will be useful to others, while *practicing* work directly involves anthropologists' intervening beyond social-scientific inquiry, making their knowledge and skills useful and easily accessible. Despite the lack of consensus on a precise definition, *practicing* is a recognized area of anthropology, having become institutionalized

through its increased relevance in professional realms and the establishment of professional associations and affiliated publications.

Because the academic employment crisis of the 1970s has not yet abated, anthropology programs are aware that increasing numbers of graduates are being employed in positions outside of universities. The government and private sector now offer more job opportunities for anthropology graduates with a master or doctoral degree than academic institutions. It is now common for doctoral students to contemplate future applied or practicing work as well as an academic position while progressing through their studies. Simultaneously, graduate programs with applied anthropologists on faculty are becoming more attractive to prospective students. There are now at least 25 applied anthropology programs in the United States, several of which focus their graduate programs on training future anthropologists for nonacademic work, and many that offer a master's degree. In 2000, the Consortium of Practicing and Applied Anthropology Programs (COPAA) was established as a cohort of university departments involved in applied anthropology to foster professional exchange among faculty and to develop workshops for professionals and educators. It also assists students in finding professional opportunities in practicing domains through securing internships and practicums and supplying information on training for careers in applied and practicing anthropology.

Domains of Practice

One must look beyond job titles to find the roles taken by practicing anthropologists. Unless the position is academic, job announcements rarely use the term "anthropologist"; however, many nonacademic positions are well-executed by practicing anthropologists. At the same time, anthropologists may have to precisely define what they bring to the job, in contrast to professionals from other disciplines. A survey conducted by NAPA in 2000 of those with master's-level training in applied anthropology found that practicing job categories included (in descending order by number of responses) government, private, education, and other sectors, and archeology, medical, development, and environment substantive areas. The NAPA Web site offers a list of *Areas of Practice* that details even more settings in which practicing anthropologists work: agricultural development, environmental policy and regulation, product design and program management in business and industry, software and database design in computer science, human factors engineering in information technology, cultural resource management, curatorial activities in museums, forensics in law enforcement, and nonprofit and social service work, including management and policy implementation and grant writing.

Typical Roles

Practicing anthropologists often play multiple roles. The most common include researcher, research analyst, evaluator, impact assessor, needs assessor, planner, change agent, advocate, culture broker, information specialist, administrator, and manager. Therapist and expert witness roles are rare but have also been a part of practicing anthropology. Other roles include educator and consultant: anthropologists have long been involved in personnel training (for example, the cross-cultural training of administrators, managers, or other social scientists in anthropological techniques such as social impact assessment) and have frequently performed long- and short-term consulting.

According to the 2000 NAPA survey of master's-level graduates in applied anthropology, more than 30% of respondents reported having researcher occupational roles. Practicing anthropologists working as researchers use their training in data collection to supply information to analysts and decision makers, but they may also operate as research analysts and policy makers. In fact, contributing to analysis elevates the status of practicing anthropology and enables anthropologists to have an impact on decision-making. Thus, practicing anthropologists can participate in the entire policy-making process—research performance, data analysis, and finding-based decision making. Practicing anthropologists may also use their acumen as specialists involved in program implementation and evaluation. These roles require skills in research design, data collection, quantitative and qualitative analysis, personnel supervision, and writing. As evaluators, practitioners assess the outcomes of a project or program that has been implemented and determine its impact on a community. The 2000 NAPA survey showed that 31% of members used evaluation skills on the job, which indicates that the evaluator role is common among practicing anthropologists. Possible areas of employment for evaluators include education, health care, human services,

and community development. Impact assessors usually work on the front end of a project, researching ways a community might be affected by alterations in its surroundings (for example, zoning changes, new development projects, or highway construction). Areas such as energy development, fisheries and water resource management, and transportation may require research and impact assessment.

Practicing anthropologists also work as agents of change who attempt to transform a community, sometimes on behalf of a development agency and often through new technology introduction. This can be as simple as showing villagers in a remote area how to build a well for a ready supply of water, or as complicated as helping a community deal with relocation and resettlement because of dam construction. In many roles, an anthropologist may be considered a change agent or may become one after fruitful research leads to advocacy. Advocacy can be an anthropologist's only role or an important part of other roles, since it is often the impetus for anthropological participation. Anthropologists involved in advocacy serve as liaisons on behalf of a community or group because the latter are often not accustomed to dealing with the agencies that offer them services or have power over them.

Culture brokers also serve as liaisons between two diverse groups, but their communication is always two-way, from community to decision makers and vice versa. Because of the inherent capacity for conflict in such situations, anthropologists as culture brokers strive to act as neutral mediators, with allegiance to the solution of the present problem rather than the particular interests of one group over the other. This role may involve helping public health officials better understand a particular ethnic clientele while assisting community members in comprehending proposed health intervention. Culture brokers may favor one side, especially in situations in which loyalty is tied to a shared heritage with the particular group being served, but ultimately the anthropologist in this role is responsible for assisting both parties in making a transition.

Performing as culture broker is often not the sole position of a practicing anthropologist; it may arise concurrently with other roles, such as public participation specialist. These specialists provide expert input in the planning process to disseminate information to the public through town hall meetings or media outlets. For example, a culture broker may work as a liaison between Native American tribes and the federal government in handling policy or legal issues, tenure and land use negotiations, and program subsidies, while simultaneously informing locals about incentives or opportunities, and policy makers about needed programs or project adjustments.

Program services and planning are broad roles that may include media anthropologists, who may be public participation specialists working in broadcasting or media production as "translators" of cultural knowledge, informing media outlets on news stories from the expert perspective of an anthropologist. This is an example of the trend within anthropology of practitioners being called upon to communicate their knowledge and expertise in the public sphere more often. Such expanded roles require consideration of improving training of new practitioners.

As the employment opportunities for practicing anthropologists in new work settings increase, anthropologists are increasingly occupying positions of authority as administrators and managers, setting goals, supervising others, delegating tasks, and allocating resources. In many instances, practicing anthropologists have advanced in a natural progression from their research, evaluation, or planning policy roles to high-ranking positions as key decision makers in government and public administration or corporate executive ranks. Others work in academic settings in administrative rather than faculty roles, often directing applied or practicing units that serve universities in community outreach efforts. An evaluator of a hospital's nutrition program may easily slide into the role of liaison, media specialist, public relations representative, assessor, or administrator with all the working knowledge required for planning, policy decision making, and budgets and staff management, as well as clientele interaction. This advancement reflects the success of anthropological training, the effectiveness of its methods, and the relevance attributed to practicing anthropology.

Skills Required for Practice

Practicing anthropologists need substantial training in ethnographic research to be able to effectively collect community and group-level data. Quantitative skills, including statistical analysis, are invaluable for practicing and academic anthropologists. Similarly, grounding in social science research for fieldwork beyond ethnography, such as sampling, survey research, and computer-aided analysis, is essential.

In addition, globalization and the corollary emergence of transnational and international nongovernmental organizations , government agencies, and corporations, combined with the inherent collaborative and interdisciplinary nature of practicing anthropology, requires that practicing anthropologists have strong communication skills for information dissemination, collaboration, and funding requests through grant proposals.

Finding a mentor already working in a chosen field can help direct a student to the additional training needed for success in that realm. Informal and formal networking is of the utmost importance for practicing anthropologists on the job, and should also be a routine part of anthropology education. Networks can be formed or enhanced through professional associations, online forums, and other means used to connect with colleagues within, and outside of, anthropology. Developing professional relationships not only prepares students for finding employment and offers a knowledge base, but also engenders skills in the collaborative work one should expect in any practicing anthropology career. Collaboration should not be considered an innate ability, but one that requires practice and training through education and experience. Communication, networking, and collaboration are desirable components of graduate training in anthropology that can be garnered through practical experience. Faculty projects, various institutes and programs already in place, and contributing time to volunteer organizations such as the Peace Corps, UNICEF, the World Bank, and local grassroots groups or neighborhood associations are opportunities for such experience prior to graduation. As both students or working professionals, practicing anthropologists require field-specific knowledge, which can be achieved by keeping up with relevant books, journals, newsletters, and other trade publications; networking with practitioners from a particular field of interest; and studying domain-relevant laws, policies, and regulations.

Professional Conduct

An essential aspect of professionalism is ethical conduct. Practicing anthropologists must realize that anything they do or say may have positive or negative repercussions on people's lives. The ability to make professional judgments must be developed. Actions and words must be carefully scrutinized; choices must be informed. Anthropologists must be able to overcome potential conflicts in their roles, particularly when they feel compromised by client wishes and cannot base their decisions on science alone. To safeguard ethical decision making on the practitioner's behalf, a professional framework must be built to guide sound judgments and to help balance science, morality, and client interests. This framework should consider the ethical guidelines of professional associations (AAA, SfAA, and NAPA), and related laws and policies such as those provided by Institutional Review Boards, the U.S. National Research Act of 1974, and field-specific mandates such as the National Environmental Policy Act of 1969.

The direction of research and timelines of funded work are typically controlled by the sponsoring agency; likewise, findings and field notes are proprietary, rendering study subjects vulnerable to public disclosure. To reduce these risks, professional conduct demands incorporating informed consent and thoughtful consideration of the impact the research may have on the client, the study subjects, the anthropologist, and the discipline of anthropology. Adhering to ethical guidelines assures the reputation of anthropologists everywhere, while failure to do so can seriously undermine the discipline as a whole. This is the primary responsibility facing practicing anthropologists—to positively transform communities and individuals through anthropological means, ethically, with consideration for all parties involved.

— *Satish Kedia*

See also **Anthropology, Careers in**

Further Readings

Bushnell, J. (1976). The Art of Practicing Anthropology. In M. V. Argrosino (Ed.), *Do applied anthropologists apply anthropology?* (pp. 10–16). Athens: University of Georgia Press.

Chambers, E. (1996). Practicing anthropology. In D. Levinson & M. Ember (Eds.), *Encyclopedia of cultural anthropology* (pp. 1009–1014). New York: Henry Holt and Company.

Fiske, S., & Chambers, E. (1996). The inventions of practice. *Human Organization, 55*(1), 1–12.

Hinshaw, R. H. (1980). Anthropology, administration, and public policy. *Annual Review of Anthropology,* 9, 497–545.

Price, L. J. (2001). The mismatch between anthropology graduate training and the work lives of graduates. *Practicing Anthropology, 23*(1), 55–57.

Sabloff, P. L. W. (2000). *NAPA Bulletin 20-Careers in anthropology: Profiles of practitioner anthropologists.* Arlington, VA: American Anthropological Association.

van Willigen, J. (1987). *NAPA Bulletin 3-Becoming a practicing anthropologist: A guide to careers and training programs in applied anthropology.* Arlington, VA: American Anthropological Association.

Anthropology, Social

While anthropologists in the United States developed cultural anthropology, the British developed social anthropology. In the present, despite the fact that social anthropology departments still exist in Great Britain and in other parts of the world, social anthropology existed as a distinct discipline only from the early 1920s to the early 1970s. Historically, social anthropologists rejected evolutionary anthropology as speculative rather than scientific and tended to study a society at a particular moment in time. Social anthropologists focused on social organization, particularly on kinship. Until recently, they did not deal with history and psychology as much as cultural anthropologists did.

Bronislaw Malinowski (1884–1942) and A. R. Radcliffe-Brown (1881–1955) were the two main figures to develop social anthropology. Malinowski developed the functionalist approach, and Radcliffe-Brown developed structural functionalism. Influenced by French sociological thought, social anthropologists looked at social institutions. In particular, Émile Durkheim's (1858–1917) organic view of society influenced social anthropology. This approach described society as an organism, in which the different parts of the society work to maintain the society. This led to a holistic approach, which said that you could not look at any institution in society in isolation from any other institution. Social anthropology took hold in the British Empire. It also developed as a specialized discipline in parts of the United States, particularly at the University of Chicago.

Malinowski developed the method of social anthropology, ethnography, during World War I, when he did intensive field research in the Trobriand Islands of Melanesia for 2 years. Intensive fieldwork, where the anthropologist lives among an exotic people, became a hallmark of social anthropology. Malinowski's functionalism focused on human biological and social needs, ideas that followed those of W. H. R. Rivers (1864–1922). He said that people had primary needs for sex, shelter, and nutrition and that people produced culture to satisfy these needs and other needs that resulted from these primary needs. While his theory has lost popularity, his fieldwork method has become standard in anthropology. Malinowski wrote many books based on his fieldwork, the most famous of which is *Argonauts of the Western Pacific* (1922). Early works based on Malinowski's approach included Raymond Firth's *We the Tikopia* (1936) and Reo Fortune's *Sorcerer's of Dobu* (1937). Later scholars criticized such ethnographies because the better they explained a particular aspect of society in relation to the whole society, the harder it became to compare that aspect cross-culturally.

Radcliffe-Brown's structural functionalism used Durkheim's ideas to a greater degree than Malinowski, and Radcliffe-Brown suggested social anthropology should be called "comparative sociology." He got his ideas of social structure from Lewis Henry Morgan, Henry Maine, and his teacher W. H. R. Rivers. Radcliffe-Brown developed a more organic functionalism than Malinowski. He made the analogy that people of a society are like the parts of a human body. Social anthropologists who followed this analogy talked about kinship systems, political systems, economic systems, and other systems, which all worked to maintain a society's social structure. They wrote about how each of these systems influenced one another, and when one changed, the others would change as well. Thus, some social anthropologists talked about how witchcraft beliefs are linked to social control, and, as Durkheim said, what religion you belong to correlates with the chance you will commit suicide. Examples of ethnographies produced that combined Malinowski's fieldwork method with Radcliffe-Brown's theoretical approach include Gregory Bateson's *Naven* (1936) and E. E. Evans-Prichard's *Witchcraft, Magic, and Oracles Among the Azande* (1937).

Early social anthropologists focused on social relationships in terms of social statuses and social roles. Social statuses are the different positions a person holds in a society. Each society has different social statuses a person can hold in a society, and there are

behaviors associated with these statuses. Social roles are the behaviors associated with social statuses. They involve how people relate to each other in terms of their status, such as how a father relates to his children, a supervisor relates to her staff, or a chief relates to his followers. As people react together in relation to social roles, they define their social relationships. Social anthropologists discovered social relationships by looking at how people said they should relate to each other and observing how they related to each other in everyday life.

Henrika Kuklick points out another aspect of social anthropology; it was tied to colonial rule, and this influenced how people wrote ethnographies. Most social anthropologists described the societies they studied as harmonious and static. Social anthropologists for various reasons usually concentrated on egalitarian societies and wrote how in such societies consensus was the rule. She uses Evans-Pritchard's writings on the Nuer to make this point, noting that Evans-Pritchard's accounts show that some Nuer prophets had considerable power and leopard-skin chiefs also had power but Evans-Pritchard downplays this power. She says that the British anthropologists downplayed this inequality because they were also downplaying the oppression caused by their own rule.

In the 1940s and early 1950s, the focus of social anthropology changed to the study of social structure, the relationship between groups. Major works of this period were *The Nuer* (1940), by E. E. Evans-Pritchard, and *African Political Systems* (1940), which was influenced by classification systems by Lewis Henry Morgan and Henry Maine. In *The Nuer,* Evans-Prichard took a more cultural view than most earlier social anthropologists, since he said structures were cognitive maps of society, not actual social relationships. Then in the mid-1950s, some social anthropologists began to pay more attention to how society changed. This was reflected in the approach of Edmund Leach, who was influenced mostly by Malinowski, and in the conflict approach of Max Gluckman, who was influenced mostly by Radcliffe-Brown and Karl Marx. Major works that came out during this period were Edmund Leach's *Political Systems of Highland Burma* (1954), and the work of Gluckman's student, Victor Turner, *Schism and Continuity in African Society* (1957).

After this period, the influence of Malinowski and Radcliffe-Brown began to decline as social anthropologists turned to the structuralist ideas of Claude Lévi-Strauss, and later the ideas of Americans like David Schneider and Clifford Geertz, who looked more at culture than society. And Americans were exposed to ideas of social anthropology as social anthropologists like John Middleton, Victor Turner, and Mary Douglas all came to teach in universities in the United States. Finally, theorists like Foucault and Derrida influenced both social and cultural anthropologists. Today, many American universities say they teach sociocultural anthropology, and social anthropologists now deal with culture as much as society.

— Bruce R. Josephson

See also **Anthropology, Cultural; Ethnographic Writing; Evans-Pritchard, Edward; Functionalism; Malinowski, Bronislaw; Radcliffe-Brown, A. R.; Rivers, W. H. R.; Social Structures**

Further Readings

Beattie, J. (1964). *Other cultures.* New York: Free Press.
Bohannan, P. (1963). *Social anthropology.* Holt, Rinehart & Winston.
Erickson, P., & Murphy, L. (1998). *A history of anthropological theory.* Peterborough, Canada: Broadview Press.
Kuklick, H. (1991). The *savage within: The social history of British Anthropology: 1885–1945.* Cambridge: Cambridge University Press.
Kuper, A. (1996). *Anthropology and anthropologists: The modern British school* (3rd ed.). New York: Routledge.
Stocking, G. (1995). *After Tylor: British social anthropology 1888-1951.* Wisconsin: University of Wisconsin Press.

ANTHROPOLOGY AND SOCIOLOGY

Studies of anthropology and sociology have blended together as cultural anthropologists have attempted to draw comparisons among various societies and cultures. Identifying cultural characteristics became more difficult during the 20th century in response to two world wars. By the beginning of the 21st century, globalization had further blurred the once distinct lines between

particular cultures, as the affairs of nations became more intertwined with those of others.

One area where anthropology and sociology have joined forces is in the study of refugees. Approximately 140 million people entered the ranks of refugees in the 20th century. Many refugees left their homes because of war and political violence. Others relocated to escape nature's wrath as droughts, floods, tidal waves, and earthquakes ravaged their homelands. Studies have revealed that about 90% of all refugees remain in the first area of relocation. While large numbers of refugees, particularly those who leave voluntarily, will be assimilated into the cultures of their adopted lands, others will remain in refugee camps in tents or barracks, creating new cultures that blend elements of the old with the new.

After World War I, the newly formed League of Nations oversaw the relocation of refugees displaced by the war. The end of World War II witnessed a shift in this responsibility to the Displaced Persons Branch of the Supreme Headquarters Allied Expeditionary Forces. The lives, rights, and basic needs of refugees were thereafter protected by international law. In 1951, the responsibility for refugee oversight again shifted when the United Nations High Commission for Refugees (UNHCR) was created at the Geneva Refugee Convention. By the early 21st century, UNHCR was responsible for some 17 million refugees around the world, mostly from Africa and Asia. Many of the refugees under UNHCR protection are children unaccompanied by adults. These children present new challenges to cultural anthropologists who study them, as well as to the agencies responsible for their welfare.

After both World War I and World War II, a number of scholars in various disciplines turned their attention to refugee studies as they attempted to develop a framework of research that would affect policy decisions. In 1939, the publication of a special issue on refugees in the *Annals of the American Academy of Political and Social Science* served to focus attention on the legitimacy of refugee studies as a scholarly endeavor. In 1950, during the post–World War II years, the Association for the Study of the World Refugee Problem was founded in Liechtenstein, followed by the creation of UNHCR the following year.

In 1981, International Migration Review issued a call for comparative, interdisciplinary studies on refugees. Seven years later, the *Journal of Refugee Studies* was founded to provide a comprehensive forum for scholarly research in the field. Since its inception, 22.5% of the contributors to the *Journal of Refugee Studies* have been anthropologists, and 18% have been sociologists. That same year, in response to increased interest in refugee studies within anthropology, the American Archaeological Association established the Committee on Refugees and Immigrants as a subgroup of the General Antiquity Division. Over the next 6 years, the number of anthropologists involved in refugee studies increased significantly.

— Elizabeth Purdy

SOCIAL ANTHROPOLOGY

Originating in Bronislaw Malinowski's works, social (or cultural) anthropology studies the cultural lives of the diverse populations of the world in all their aspects, thus using figures, methods and theories from archaeology, folklore, ethnography, and linguistics in its analyses. Social anthropology is increasingly differentiating itself from physical anthropology, which focuses instead on biological characteristics and traits.

Social anthropology brings together different disciplines to analyze the cultural life of human beings and cultural differences between different peoples. The first focus of the discipline was on cultures and people that remained exotic and primitive to Western eyes. Early anthropologists were all Europeans or North Americans, thus the distance between the observer and the observed became a characteristic feature of the discipline. Because of the anthropologists' whiteness, anthropology has often been charged with ethnocentrism. Today, the focus of social anthropology has become more inclusive. Researchers study not only primitive peoples living in small villages but also urban groups and cultures.

Yet the first topic of anthropology has clearly influenced the way it relates to other disciplines and its ambition to be able to come to valid generalizations on cultural and social changes. The agenda of achieving a total description of a given society clearly derives from the small-scale observations of early anthropologists, who examined simpler societies where changes were slower. The inclusion of modern societies as an anthropological field of study has brought the discipline increasingly close to sociology.

During the second half of the 20th century, the expansion of anthropological objects of study has also coincided with the emergence of non-Western anthropologists. In addition, there has been a steady growth of anthropology institutes and university departments in Eastern countries, such as Japan and India, as well as in some Latin American nations. However, the establishment of new institutions has not always entailed appropriate funding, so that researchers have remained limited to the countries' own heritages. The status of cultural anthropology today, however, remains ambiguous. Different schools of social anthropology often coexist in the same country, and the discipline still has not attained that unity of languages and concept that would give it the status of the science of culture.

— Luca Prono

Anthropology, Subdivisions of

Anthropology may be best viewed as the comparative scientific study of human societies and cultures throughout the world and throughout time. This seems to appropriately summarize the nature of anthropology and the depth of the ability of this discipline to provide a holistic approach to the study of humankind. Anthropology is comparative in that it attempts to understand both similarities and differences among human societies today and in the past. We study our species from its beginning several million years ago right up to the present. This is possible because anthropology has taken a holistic approach, dividing into several subdisciplines, each unique in their ability to address aspects of humanity and each contributing to each other in order to create a more complete picture of humans throughout time.

There are four subdivisions, or subdisciplines, in anthropology: cultural anthropology, archaeology, physical (biological) anthropology, and linguistic anthropology. These four subdivisions allow anthropologists to study the total variety present in our species. As a discipline, anthropology studies everything about being human and therefore better enables us to understand the origins and development of who we are today. For humans, it is very important to us to understand where we come from. Many societies have origins myths, and for anthropologists, studying ourselves is like writing the story of our origins.

Cultural Anthropology

Cultural anthropology deals with the origins, history, and development of human culture. Cultural anthropologists often, although not always, tend to study groups that have different goals, values, views of reality, and environmental adaptations that are very different from those of themselves. Cultural anthropologists note that culture is learned and that it is through culture that people adapt to their environments; therefore, populations living in different places with different environments will have different cultures. Much of anthropological theory has been motivated by an appreciation of and interest in the tension between the local (particular cultures) and the global (a universal human nature or the web of connections between people in distant places).This allows us to develop a concept of human nature very different from the research other disciplines provide.

Also called ethnographers, cultural anthropologists are known for producing ethnographic works (or holistic descriptions of human culture, based on extensive fieldwork). These works traditionally have focused on the broad description of the knowledge, customs, and institutions of a particular culture group. More recently, however, cultural anthropologists have also examined the ways in which culture can affect the individual and his or her experience. Cultural anthropologists stress that even though the behavior of people in different cultures may seem silly or meaningless, it has an underlying logic that makes sense in that culture. The goals of cultural anthropology,

therefore, serve to make sense of seemingly bizarre behavior in terms of the people practicing the behavior. Cultural anthropologists are often thought of as studying people in faraway, exotic places. More often than not, cultural anthropologists tended to study non-Western groups, especially during the early development of this subdiscipline. Today, however, cultural anthropologists also focus on the subgroups (or subcultures) within Western culture. Each of these groups is a part of a larger culture and can help us to better understand the human condition. Even research on our own society attempts to uncover the logic behind how we behave.

Archaeology

Archaeology can be defined as the study and interpretation of past societies and cultures from the earliest of times to the present. By excavating sites created by humans in the past, archaeologists attempt to reconstruct the behavior of past cultures by collecting and studying the material culture remains of people in the past. Using these remains to understand the past can be a real challenge for archaeologists because they have to infer past lifeways from what is sometimes considered trash. Archaeologists have to look at what people left behind. Archaeologists are one step removed from people; they have access only to their "things." The advantage of archaeology is time depth; archaeologists can go back millions of years, often studying cultures that are long gone and have no analog in the modern era. Using this diachronic approach, archaeologists can look at how cultures change over time.

In addition to its value as a scientific subdiscipline in anthropology, the knowledge gained through archaeology is important to cultures and individuals. The past surrounds us; the past defines individuals, as well as cultures. For some, it may seem of little consequence; for others, it is their very identity as a people. Every culture has symbols that it uses to remind itself of the past, and archaeology is a critical way of knowing about that past.

Physical (Biological) Anthropology

Physical, or biological, anthropology focuses on the study of biological aspects of human beings, past and present. Physical anthropology is essentially a biological science; it often seems to have more in common with biology than with the other subdivisions of anthropology. The importance of this subdiscipline in anthropology, however, is its contribution to the holistic understanding of humans. Physical anthropologists focus on both the biological nature of, as well as the evolution of, humans. By studying primates, physical anthropologists are able to contribute to our knowledge about the evolution of our own behavior. Examining fossil hominids allows physical anthropologists to study and understand the evolution of humans as a distinct species. Human variability is another major focus of physical anthropology; physical anthropologists are concerned with human variation, such as the differences in hair and skin color, the differences in blood types, the relationship between behavior and health, as well as the distribution of genetic traits. Using knowledge gained through such studies contributes to increased health and the decreased spread of diseases.

Linguistic Anthropology, or Linguistics

Linguistics is the study of language. Although linguistics is classified as a subdiscipline of anthropology, it often tends to be a discipline of its own, especially at large universities. The task of linguists is to try to understand the structure or rules of a language. They look for different grammar systems and different ways for producing sounds as a way to understand the language, which potentially sheds insight on cultural behavior. Because language is often used as a way of categorizing people and as the primary way through which culture is learned, linguists can help trace relations between people in the present and past. Linguistics also contributes to archaeology by helping to decipher ancient text through the rules of the modern language. The contributions of linguistics to anthropology are undisputed.

Each of these unique subdisciplines in anthropology contributes different aspects to the understanding of humans in the past and present. Rather than focusing on a single aspect of being human, such as history or biology, anthropology is distinct in its holism. These subdisciplines provide the basis for this holistic approach.

— *Caryn M. Berg*

See also **Anthropology, Cultural; Archaeology; Biological Anthropology; Linguistics, Historical**

Further Readings

Angrosino, M. V. (2002). *Doing cultural anthropology: Projects for ethnographic data collection.* Prospect Heights, IL: Waveland Press.

Boyd, R., & Silk, J. B. (2005). *How humans evolved* (3rd ed.). New York: Norton.

Erickson, P. A., & Murphy, L. D. (2003). *A history of anthropological theory* (2nd ed.). Peterborough, Canada: Broadview Press.

Fagan, B. M. (1999). *Archaeology: A brief introduction* (7th ed.). Englewood Cliffs, NJ: Prentice Hall.

Feder, K. L. (2000). *The past in perspective: An introduction to human prehistory.* Mountain View, CA: Mayfield.

Nanda, S., & Warms, R. L. (2004). *Cultural anthropology* (8th ed.). Belmont, CA: Wadsworth.

Stein, P. L., & Rowe, B. M. (2003). *Physical anthropology* (8th ed.). New York: McGraw-Hill.

Anthropology, Theory in

As the science of humankind, anthropology strives to give a comprehensive and coherent view of our own species within material nature, organic evolution, and sociocultural development. Facts, concepts, and perspectives converge into a sweeping and detailed picture of human beings within earth history in general and the primate world in particular. To give meaning and purpose to both evidences and ideas, theoretical frameworks are offered.

Influenced by the critical thinkers of the Enlightenment and ongoing progress in the special sciences, especially the writings of Charles Darwin (1809–1882) and Karl Marx (1818–1883), the earliest anthropologists were evolutionists. Our biological species, past and present societies with their cultures, and languages were seen as the outcome of evolution.

In physical/biological anthropology, the human animal is compared to the prosimians, monkeys, and apes. Fossils and genes link our species to the four great apes (orangutan, gorilla, chimpanzee, and bonobo). DNA evidence substantiates our very close relationship to these pongids. Furthermore, human beings are seen as the result of hominid evolution in terms of emergent bipedality, implement making, and a complex brain capable of using symbolic language as articulate speech. Of course, interpretations of the hominid fossil record differ among anthropologists, as do the taxonomic classifications of the unearthed specimens and explanations for the success or extinction of hominid species and their activities.

Anthropologists have interpreted social behaviors and material cultures from different theoretical orientations: evolutionism, historical particularism, diffusionism, structuralism, functionalism, configurationalism, and relativism (among other theoretical approaches to understanding and appreciating societies and cultures). Cross-cultural studies reveal both the similarities and differences among human groups, resulting in important generalizations.

In the middle of the 20th century, two major anthropologists were instrumental in reviving the evolutionary perspective: Leslie A. White and Marvin Harris. If used correctly, then the evolutionary framework gives meaning and purpose to all the facts and concepts in anthropology. A dynamic interpretation of our species, societies, and cultures is in step with the scientific findings in modern geology, paleontology, biology, sociology, and psychology. Overcoming postmodernism and with a growing awareness of global convergence, the forthcoming neo-Enlightenment will return to science, reason, and critical realism.

Theories in anthropology deal with the origin of our species, the development of societies and their cultural elements (for example, technologies, kinship systems, and magico-religious beliefs and practices), and the emergence of symbolic language as articulate speech. New areas of specialization in applied anthropology include forensic anthropology, forensic psychology, multiculturalism, and action anthropology.

As a comprehensive discipline, anthropology has been and remains open to relevant facts, concepts, and theories from the other sciences, for example, ecology, climatology, social psychology, and natural philosophy. More discoveries of fossil hominid specimens and their artifacts, as well as more precise DNA analysis techniques, will set limits to the number of probable explanations for the evolution and diversity of humankind. No doubt, new light will be shed on prehistoric migrations and historic wars.

Combining scientific knowledge with philosophical reflection, anthropologists may even speculate on the future directions of human biosocial evolution. Until now, anthropologists have focused on our planet. However, in the years to come, new areas of

biosocial research will emerge as human beings adapt to life in outer space and on other worlds.

— *H. James Birx*

Further Readings

Barnard, Alan. (2000). *History and theory in anthropology.* New York: Cambridge University Press.

Boyd, Robert, and Richerson, Peter J. (2005). *The origin and evolution of cultures.* New York: Oxford University Press.

McGee, Jon, & Warms, Richard L. (Eds.). (2000). *Anthropological theory: An introduction* (2nd ed.). Mountain View, CA: Mayfield.

Moore, Jerry D. (2004). *Visions of culture: An introduction to anthropological theories and theorists* (2nd ed.). Walnut Creek, CA: AltaMira Press.

Perry, Richard L. (2003). *Five key concepts in anthropological thinking.* Upper Saddle River, NJ: Prentice Hall.

Anthropology, Visual

The Need for Visual Anthropology

Since the advent of modern photographic technology (still and moving), the use of visual methods for anthropological documentation and inquiry has been an integral part of the discipline, although it was not formally known as visual anthropology until after World War II. Visual anthropology has been used to document, preserve, compare, and illustrate culture manifested through behaviors and artifacts, such as dance, proxemics, and architecture. As well, archaeologists and primatologists have respectively employed visual methods in their research to capture images of elevations and excavations, and individuals and their behaviors. While critics of visual anthropology cite that it is unscientific in method, only serves to illustrate written ethnography, and does not propose theoretical positions, visual anthropology today is a means for seeing and presenting anthropological thinking in its own right. Over time, visual methods have evolved to foster new research questions and analysis, redefining how visual researchers approach the study of culture.

Visual anthropology, whether photographed, taped, filmed, or written, is a method of observation, but more important, it is a means for developing questions and analyzing data. Visual anthropologists provide their observations for other anthropologists and social scientists to consider in their own work, presenting an alternative way of seeing culture through the lens, which instigates only further inquiry, not certainty. By embracing collaboration between observer and observed and recognizing the relationship between the visual and textual, visual anthropologists have created theoretical objectives that redefine the boundaries of the subdiscipline, exploring new ways to study and understand culture, society, identity, and history. These are the characteristics that separate visual anthropology from documentary film, photography, and journalism; and these are the issues that will promote the use of visual methods in the anthropology of the future.

This entry will discuss several facets of visual anthropology, noting its origins, its significant influences, its current status, and given new innovations in technology, where it will be in the next decade. While important to the evolution of the subdiscipline, this entry will not discuss, analyze, or compare in detail ethnographic films, filmmakers, or their histories and instead will suggest a number of books dedicated to this subject at the end of the piece. Two examples from my own research serve to illustrate different types of photo-elicitation methods, recognizing that these techniques would be impossible to conduct without significant developments in technology and analysis. Inexpensive cameras, faster films, ubiquitous photo-minilabs, more powerful laptop computers, and the digital revolution have facilitated the use of photography and video in the field. Not only can researchers accomplish more, but they can place technology in the hands of the subjects themselves. Furthermore, with Internet access, researchers can immediately distribute data and edited material from the field to share with colleagues, students, and the mainstream public.

Visual Methods

In the late 19th century, anthropologists employed photography and filmmaking as tools to augment their research, as a means for illustration, description, and preservation of people they observed. Although rudimentary, bulky, clumsy, and sometime dangerous,

photographic equipment found its way to the field with the express purpose of quickly gathering accurate information about the local population. Baldwin Spencer, Alfred Cort Haddon, Félix-Louis Regnault, and the Lumière brothers were among the first ethnographers to employ photographic cameras in their research. From 1922 through 1939, government anthropologist Francis E. Williams made thousands of glass plates and negatives of the people in 18 different cultural groups in the Australian colony of Papua (New Guinea). Although Franz Boas had used a still camera since the 1890s, it was not until late in his career, 1930, that he employed filmmaking to capture various activities of the Kwakiutl for documenting body movements (dance, work, games) for his cross-cultural analysis of rhythm. Similarly, Margaret Mead and Gregory Bateson relied on photographs and film as visual tools in their research, because they felt that their images could explain behavior more clearly than they could describe it. Bateson shot hundreds of photographs and hours of film, which they analyzed and published, arguing that their anthropological understanding of the cultural context in which the images were made recognized the linkages between the action and the deep cultural meaning of the images.

Ethnographic film, video, and photography remain the primary methods of visual anthropology as a means to record visual phenomena and obtain visual data. Using qualitative methods, one may seek data to investigate a particular question or seek a question from a set of data. In visual anthropology, one may film a topic of interest or make images and discern patterns and questions from them. Today, visual anthropology spans the spectrum of inquiry and analysis, from materialistic perspectives and positivist analysis to symbolic interpretations and informant participation. The former is represented in ethnographic works capturing culture in situ. Like synchronic slices of life preserved on celluloid, the footage is later used for teaching, documentary, and scientific research. From this point of view, the lens is objective, capturing behavior for preservation, description, and accuracy. At the other end, the most humanistic level, visual anthropology questions the material, the subjects, and the investigators themselves, as an experiential nexus of culture and reflexivity. Moving away from a literal or textual description of visual expression requires a shift to thinking about culture through images themselves. In this case, the visual becomes a medium through which to enhance knowledge and develop questions that are not possible otherwise. To accomplish this task, the methodology extends beyond the researcher herself and invites the informants to participate in the work itself. Visual anthropology explores visual phenomena and visual systems in the process of cultural and social reproduction. With that in mind, the anthropologist must be open to all visual material, behaviors, and interactions and recognize that by capturing them on film, they inherently modify the content and context of the message and must question their own role in the process in which they are a part.

Within anthropology, ethnographic films are the most popular form of cultural description. Usually shown in classes as teaching aids, anthropologists have relied upon visual material to bring indigenous cultures and behaviors to the classroom so that students can glimpse "the other." In the 1950s and 1960s, the Peabody Museum at Harvard funded film projects to collect material on cultures from around the world, with the intent of having researchers view these films in lieu of traveling to the field. In this case, as well as others, the use of film to depict culture is laden with the biases emphasizing their interests rather than focusing on the subjects' priorities. For this and similar reasons, ethnographic film has been criticized for its colonial heritage, citing how filmmakers maintain power over what and who they represent. For example, governments with colonies in Africa and Asia sponsored filmmakers to depict the lives of natives in their colonies. These films were shown to their citizens in support of government programs to civilize the "savages" and bring them Western values and beliefs.

Filmer, Filmed, and Audience: The Triadic Relationship

The positivistic mode of making anthropological films and photographs requires researchers to position themselves as objectively as possible. Critics argue that such objectivity is nullified by subconscious cultural prejudices. When conducting research, one must recognize the inherent triadic relationship between the filmmaker (photographer), the filmed (subject) and the audience (viewer). Although as anthropologists, we want to be culturally relative when we enter another culture, our biases affect how we see the people we live with and the work we conduct. Reflexivity is the recognition of when and how

researchers apply their cultural filters to their observations and fieldwork. In turn, as anthropologists, we are influenced by our notions of who will review our work, that is, the audience (graduate committees, colleagues, popular media, informants, family, and so on). Who we have in mind as audience affects our approach to the final product. We must also consider the relationships between the anthropologist and the subject (observer/observed), as our biases will color the way we portray the subject in print or on screen. The final leg of the triad is the relationship between the subject and the audience. As informants, who do they expect to read the work or see the resulting images? As an audience member, the understanding we already have about the subject affects our perspective of the film. Because there is no direct interaction between audience and subject, the anthropologist becomes the mediator and wields significant responsibility.

However, with innovations in digital and film equipment, it has become easier to give or loan equipment to subjects and have them film their lives. Either means has validity, although it depends upon one's relationship with the subject and one's objectives for the research. Photo-elicitation has become a common method today because it pivots on the idea of participation. By removing the anthropologist from behind the camera and asking the informants to film their lives and events (or working with images people already have), it reassigns the roles of filmer and the filmed and actuates a dialogue between the two. Participant ethnography is an attempt to divert power to the subjects so they can represent themselves to an audience the way they feel is best. Photo-elicitation capitalizes on position and perspective to enhance ethnographic data while respecting the subject's position.

For example, during my early fieldwork in Bolivia, my informants occasionally asked me to photograph objects, people, or events for them, even though I believed these images did not fit into my scope of research. I neglected their perspectives because I was too influenced by what I thought made a "good" photograph as well as my own research initiatives. Eventually, I realized that by taking photos of their interests, I was tapping into information that explained more about them and respected their wish for photos. Later, I gave cameras to these same informants to take photos of their own subjects so we could discuss them. When reviewing their photos, they explained their lives in terms I would not have otherwise understood. Other times, they commented that they took a photo because they thought Americans would like to see certain aspects of their lives, illustrating their own preconceived ideas about my culture and their audience.

Photo-Elicitation

Social scientists conduct elicitation by showing their informants photographs or other visual media in order to obtain the informants' views of reality based upon their interpretation of the images. Such information may be new to the research or confirm what the researcher may already know. Photo-elicitation seeks to discover how cultural informants experience, label, and structure the world in which they live. However, this technique is affected by the photos the researcher presents, depending very much upon his or her own perspective when taking and editing the photos.

By recognizing the triadic relationship between the observer, the observed, and the audience, the visual anthropologist discovers how content and context affect the communication process. However, simply handing someone a camera, which he may never have used before, in order to express himself does not adequately remove the Western bias from the project. In some cultures, individuals' view of media may be quite different than the anthropologist's. Participation will also require the ethnographer to listen and understand the means through which their informants best express themselves (e.g., art, dance, theater, or oratory.)

There are minimally four types of photo-elicitation techniques that are employed by visual researchers:

1. Photo-elicitation directed at ascertaining the ethno-meanings and ethno-categories of subjects directed at their material cultural environments, and objects or things: photo surveys of homes, stores, parties, families, and others (see the following example of the Rutucha, first hair cutting).
2. Photo-elicitation directed at the examination of the meaning of behavior and/or social processes central to the lives of our subjects.
3. Photo-elicitation based on environmental portraiture, which explores the social conditions under which particular groups of individuals live and most often tries to explore the meaning of their membership in a community (see "24 Horas de Puno" following).

4. Photo-elicitation that more explicitly explores a subject's own *sense of social self* and *biography,* through either contemporary photographs and/or historical images that can be used to trace development of self and biography as perceived by the subject.

In the following ethnographic examples, I illustrate how different photo-elicitation techniques were employed to glean information about relationships, perspectives, customs, and beliefs.

The Andes: Examples of Visual Anthropology in Action

For the past 15 years, I have conducted visual ethnographic research in two urban centers in the Andean Altiplano (Peru and Bolivia). Photography is my primary means of gathering empirical data, which I also use for eliciting information from local residents about their lives as migrants. Specifically, I have focused on how migrants' health care decisions reflect their sense of community. In the early 1990s, I lived with Alvaro Quispe and his family in an impoverished, peripheral neighborhood (barrio) in the city of El Alto, Bolivia. El Alto sits above the capital of La Paz and sprawls across the Altiplano, as it is home for more than 500,000 people, many of whom are migrants who work in the capital below. Over the past two decades, Aymara migrants have moved to El Alto (and La Paz) to improve their economic well-being by seeking employment and education. Due to financial constraints brought about by agrarian reforms, collapse of the tin industry, and various government programs (military, health, and education) people have flocked to El Alto to make a better life for themselves, in hopes of improving their opportunities and better supporting their families.

In El Alto, my camera equipment and photographs became points of conversation and contention for myself and my neighbors. Some barrio residents vehemently requested that I not take their photos because I may misuse or sell them. However, several of the same individuals later asked me to make images of their families, as a *recuerdo* or keepsake. Taking photographs of family members (especially the elderly) became a means for learning more about family histories and their migration stories. Sometimes I made multiple copies so images could be sent back to the *campo* (countryside) to share, while they kept one for their wall at home. Others sought my photography as a means to document an event, specifically weddings, high school graduations, baptisms and *rutuchas* (first-hair-cutting ceremonies). Around the barrio, I became known as "the gringo who takes photos," which was a good moniker, because people knew I could give them something in return for the many questions I asked, and they understood the role of a photographer, much better than that of an anthropologist.

By taking photographs of events, I provided my neighbors a service that they could not otherwise afford. They invited me into their homes to make images of people or special events, and in return I gave them a stack of photographs, which I could do because of the minilabs in the city. I intentionally did not frequent churches or other venues with my cameras where local photographers made a living, but instead depended on word of mouth to be invited to photograph various events around the barrio.

My images created a wide variety of reactions from the families, most of which were positive. When returning photos to a family, everyone would gather around and pass the photos between themselves, laughing out loud and making comments about their appearance. I noted which images created the most discussion and further inquired as to what the photos meant to them. For the most part, residents enjoyed seeing themselves on paper, because "being photographed made them feel important." Frequently, I initiated informal interviews about the people and the subjects of the photos, to glean an understanding of how they interpreted the images, viewed the event, and were related to the people attending. As I discovered, migrants' sense of community was not defined by the geographical space they lived in, but rather the social contacts they maintained, often reflected in the images of those they invited to their parties and events. Two distinct occasions illustrate the method as well as the utility and serendipity of approaching research with a camera in hand.

Rutucha: The First Haircut

Within the first 2 months of my research in El Alto, Alvaro invited me to participate and photograph his 3-year-old daughter Cristina's baptism and rutucha. Although these two separate events do not always occur on the same day, the Andean rutucha incorporates the Christian baptism, reflecting the influence of

colonial traditions as they both serve to present the child to the society at large.

The baptism was held on a Saturday morning in the Rosario Catholic church in a considerably "middle-class" Aymara neighborhood down in La Paz. Immediately following the service, the rutucha took place at Alvaro's family's home up in El Alto. At this church, many baptisms are held on the same day, so after several other ceremonies were performed, Cristina's name was read aloud by the officiant. Alvaro, his wife, and their daughters, the godparents, Srs. Vallejo, and I walked to the baptismal font located at the crossing of the nave and transept. Acknowledging my presence, the Father nodded when I asked to take more than one photo. I documented the ceremony and the celebrants, fulfilling Alvaro's wish to capture the moment on celluloid. Afterward, both the godparents (fictive) and immediate (consanguinial) kin posed for photos on the church steps. However, once we reconvened at the family's house in El Alto, the number of guests multiplied fourfold, and my duties as photographer and anthropologist significantly increased as well.

In El Alto, guests announced their arrival at the rutucha by lighting small packets of firecrackers and tossing them to the ground. The loud, rapid bursts summoned Alvaro and his wife Silvia to answer the door and invite their guests inside. Upon entering, guests brought with them a case of beer and exchanged the customary greeting with the hosts, involving a friendly hug, a handshake, and another hug. Alvaro's nephew noted each guest's name and the number of cases given to his aunt and uncle, so they would later know how many cases to reciprocate at the next special occasion. The guests placed confetti on Alvaro and Silvia's heads, designating their position as sponsor of the festivity. Along with the baptized daughter, I too became the focus of guests' attention, having confetti thrown all over me and many comments made about my appearance, cameras, and ability to speak Aymara. Besides their inquiries and observations, I was frequently invited to partake in the free-flowing beer and hard alcohol, noting to always "ch'allar" or pour a bit on the ground before taking a sip. The *ch'alla* is a ritual offering of respect for and a sharing of the beverage with the *Pachamama,* or Mother Earth. Around the courtyard, the men stood while their wives and other women sat on wooden benches, both groups drinking, smoking, and talking. Lunch consisted of *sajta de pollo* (chicken picante) and a half-dozen different varieties of potatoes, which the guests readily devoured. After the nearly 50 guests were sated, the rutucha began.

Alvaro set a large wooden table in the middle of the courtyard and draped a colorful handwoven cloth *(manta)* on top. Still in her white baptismal dress, Christina's mother placed her on the table between a few bottles of beer and woven wool bags *(ch'uspa)*. Scared by everyone crowded around her, the child covered her face with a small stuffed animal she held in her hand and nibbled on a slice of orange with the other. Sr. Vallejo, her godfather, addressed the family, remarking on what fine parents she had and how honored he was to be associated with them for the rest of their lives. *Compadrazco* relationships, or godparenthood (fictive kin), are important for migrants' urban survival, as the godparent relationship solidifies access to resources the migrants may not have otherwise. Alvaro followed his *compadre's* speech by toasting his guests, who were seated and standing around him in the small dirt courtyard. After other guests toasted the child and her family, Alvaro handed me a large pair of scissors. "As the godfather of the rutucha," Alvaro pronounced, "it is your duty to invite these guests to cut Christina's hair. Their generosity will reflect their level of commitment to our family. As a foreign friend, you bring prestige to all of us here today." When originally asked to participate in the rutucha, I had assumed it would be only to take photos, not solicit the neighbors for cash on behalf of the daughter. I had not expected to become the sponsor or "padrino de la rutucha," but I was seen as a resource, and it was their way of formally establishing a relationship with me that would benefit them and their need to survive. Compadrazco ties solidify trust between the parties, which ultimately leads to relationships as strong as blood (consanguinial) ties.

In my capacity as "padrino" I cut a lock of hair from Christina's head and placed it and a Boliviano note in the ch'uspa behind her. Then, I offered the scissors to Alvaro's brother, Javier. The group scolded me for first asking a family member, and then suggested that I invite one of Alvaro's neighbors whom I had recently met. Ruben took the scissors and cut a larger patch of hair off of the child's scalp. Now Cristina began to cry and was comforted by her parents while everyone else chuckled. As the afternoon turned to evening, each guest had cut Christina's hair two or more times, resulting in a very disheveled coiffure,

and stuffed bags of money, which they said would go toward her education.

In the Andes, women take pride in their long, thick, black hair, usually braided in two long strands that hang down below their waist. Women's hair connotes their femininity, and their hair care and styling are important to their formal appearance. After her rutucha, Cristina had only short patches of hair, and although only 3 years-old, she understood what it meant to be without her hair. From that point onward for the following few months, Cristina was embarrassed to go outside with her boyish haircut and wore a floppy hat to cover her bald head.

Two days following the rutucha, I gave my photos to Alvaro and Salome. Immediately, they sat down and looked through them all, passing the images between themselves and the other family members present. Laughing and pointing, we relived the party together. At that time, I did not understand the value these images would develop for Alvaro as well as my research. For my friends, the images were more than simple keepsakes, but rather represented a tangible record of their hospitality and networks within the barrio. As for my research, the images both documented a cultural ritual and became keys for conversations with local residents, as I gave copies of the images to the neighborhood residents. The images stimulated discussions to verify names, explain relationships, compare occupations, identify political affiliations, and recall geographic locations. Women who looked at Christina's rutucha photos always commented on how her short hair made her appear like a boy. At subsequent rutuchas I attended while living in El Alto, I asked a friend to videotape the rituals, which we copied for the families and viewed together. Like the photos, the video elicited a great deal of information about the participants, their relationships with each other, and the ritual itself.

One afternoon 16 months later, Alvaro and I reviewed Christina's rutucha images, casually sifting through more than 100 photographs I had taken that day. I recognized everyone who had been there, because by that time I had had other experiences with several of them beyond this event. In retrospect, I understood why Alvaro had invited them to his home that day and how they fit into his life in El Alto. The images revealed his definition of "community," because he held those persons in confidence or shared similar political beliefs with them. After months of dissecting what community means to Aymara migrants by observing their health care decisions, the images made within the first few months of my stay illustrated how community manifested itself politically, socially, and locally, but it took me that long to recognize their underlying message. In reviewing the hundreds of images I made for people in El Alto, it became clear that the common denominator for community is trust, and while trust cannot be photographed, photographs do capture people's associations in their formal and informal environments.

A different experience illustrates how photo-elicitation can be an effective method when conducted by a group focused on one purpose.

24 Horas de Puno: A Participatory Photo Project

In 2003, I was teaching anthropology courses at the National University of the Altiplano in Puno, Peru, when I recognized a useful application of photo-elicitation. Resources being few, I had to figure out how the students in my visual anthropology course could afford to conduct their semester-long project and collect enough material to complete it by the end of the term. Since the class was populated with students from the city of Puno as well as other provincial villages, I modified the concept of *Photovoice,* a participatory photo-elicitation method, to create a project for the entire class. *Photovoice* promotes social change through photography by asking people to record and reflect on their community by using images to stimulate discussion within and beyond the group itself. My interest for the class, and for research, was to engage the students to think about the city of Puno from their own perspectives and experience. As a resident or migrant, what was important to them about the city? How could they make photos that expressed such a view? However, this would not be an ongoing process, because I placed a temporal as well as geographical limit on their exploration. They would only have 24 hours in which to take their photographs of Puno, and they could not venture beyond the city limits. These restrictions made them think about the mundane aspects of life in Puno, instead of recreating the popular image it holds as a tourist town.

The students spent a majority of the semester preparing themselves by studying photography, reading various anthropology texts, practicing their note-taking and interviewing skill, and viewing ethnographic films. As a class, they also began discussing

which places around the city would be best to photograph at various times of day, outlining strategies for covering as much of the city as possible. With a large map of Puno, they divided the urban region into 15 sectors. Students created groups of two and chose at least 4 sectors to explore on foot. The day we would conduct the project held little culturally significant meaning to anyone, so it represented "any day" in the life of Puno. Several other people besides the students were invited to participate, including several Aymara- and Quechua-speaking migrants, colleagues, and friends so they too could add their view of what Puno means to them.

Beginning at 6 a.m. one November day, the groups spread out across the city and photographed Puno for 24 hours. After spending two hours in their chosen sectors, the teams returned to our central headquarters and wrote notes about their observations and experiences. Upon completing their notes, teams returned to the streets but to different sectors to continue the process. Some participants chose to photograph in the afternoon and through the night, instead. As their instructor and the sponsor of the project, I provided the film, processing, and all meals.

Within the 24-hour period, 22 photographers shot more than 2,800 images. The rolls were collected, processed, and returned within a few hours of being shot so participants could edit their favorite images from each roll and augment their notes about the photos. In all, they wrote more than 100 pages of observations about their experiences in the sectors, which they could refer back to once the final edit occurred. From each roll, participants selected their best three images, noting the frame number on the envelope. Two days later, we placed the selected photos on tables by sector. Everyone voted on the photos by placing small stickers near the 25 images they thought best represented Puno. When all of the votes were cast, 46 photographs stood out as most representative of the groups' understanding of life in Puno. Their group decision abated individual bias about the images and instead became a reflection of how all of the participants envisioned life in Puno, a distribution that did not represent the "best" photos by my standards, but instead those images that participants identified with as being relevant in the discourse about life in their city.

The photographers whose images were selected were asked to write 8 to 10 sentences about each photo they took, referring back to their notes and including data about the time, place, and subject. More important, they described why they felt the image represented life in Puno and how they specifically related to the subject. After the selected photos were enlarged, matted, and framed, they were displayed with the appropriate text at the university, and later at the mayor's office in the city center.

The spontaneity of the photography was balanced by the participants' decisive organization and implementation on where, when, and how to visit each sector. Most revealing were the interpretations participants wrote about their images based upon their earlier notes and observations. As one may presume, there were fundamental differences in approaches toward the photographs themselves, as locals tended to document places or events and noted specific names and people. Migrants' photos and commentaries, on the other hand, presented a much more abstract perspective of the city. For example, one female resident took a photo of a man in a hospital bed with his son standing to the side. She described his illness, length of time in the hospital, his prognosis, and that it made her sad to see so many sick people in the hospital. On the other hand, a migrant made an image of a shoeshine boy working in an esplanade and explained how this vocation represents the bottom rung on the work ladder for boys who venture to the city to find a better life. He did not mention a name or place, but instead dictated/wrote (in Aymara and translated to Spanish) about the process of finding work in the city as a boy and the progressions migrants go through in order to maintain sources of income. He concluded by stating, "I took the photo to show what it takes to live in the city." The general pattern of the images demonstrated that migrant photographers drifted toward abstract subjects and explanations, while the urban residents focused on specific aspects of city life. Their perspectives reflected similar dichotomies in the urban/rural divide and surprised the participants when these were pointed out to them.

Overall, the participants embraced the project, taking ownership of the work and responsibility for how they presented their ideas to a larger audience. As a public exhibit, the participants interacted with the general populace by describing their visions of Puno and creating a discourse so others could also reflect on the city they live in. More important, the audience reacted to the contrast between locals' and migrants'

perspectives, noted in their visual expressions and comments as they browsed the exhibit. Soon after, I scanned the images and shared them with my students in the United States via the Internet, expanding the audience another degree.

The Value of Visual Anthropology

Although they share similar interests in people, visual anthropologists are neither journalists nor documentarians. The ethnographer is someone who establishes and maintains a unique relationship with informants and develops an understanding of the culture within which they live. Furthermore, while the resulting images may document and describe the people and cultures where they live, the anthropologist sees patterns and asks questions of the images themselves—not simply asking informants for commentaries, but seeking deeper meaning within the body of work to develop a theoretical understanding of human behavior. In this case, photos are data, and they are a record of life and people that can be reviewed and analyzed by the researcher, who understands the context in which they were taken and recognizes the content they illustrate. Moreover, they can be interpreted by many different people, to solicit various reactions. Perhaps the slippery nature of interpretation alienates visual anthropology from the more popular written discipline. While photojournalists may spend time with their subjects and broach meaningful and deliberate themes, telling a story and developing behavior theory are ultimately not the same endeavors.

Visual anthropology brings to the discipline a unique, sometimes difficult way of understanding culture. While written and filmic data are edited before distribution, only the researcher understands the context and content in which the notes and images were made. Unlike field notes, which few anthropologists publish, placing images in the public record invites others to criticize the analysis and conclusions, interpretations that the researcher may not necessarily agree with or desire. Because images are interpreted in multiple ways, anthropologists hesitate to make analysis of their meanings and instead prefer to use photos or film exclusively for description. At this point, visual anthropology must redefine itself by transcending the political nature of what it represents and establish new strategies for engaging with the world.

The value of the visual exercise lies in its ability to document and preserve, but most important, in its inherent character of combining knowledge with experience to ask questions of the information conveyed to reach a more profound understanding of the people involved with the research. As a scientific endeavor, visual anthropology continues to probe and explore the relationships between people, illustrating their behaviors and objects, which convey a sense of who they are and their worldviews, but such practice must also acknowledge its position in the process.

New Directions in Visual Anthropology

With the advent of new technologies and innovations that make the world "smaller," visual anthropology will lead the discipline to an image-based discourse. As more machines (for example, digital cameras, video and audio recorders, handheld computers and satellite phones) become available to capture movement, behaviors, environments, and objects, researchers will employ these technologies to facilitate their work. The World Wide Web, e-mail, instant messaging, Power Point presentations, and other interactive media will transform the one-way street of researcher to colleague/student/classroom—to a discussion between them as the research unfolds and analysis ensues. Internet technology will bring about classroom participation in research and teaching, making the "other" tangible by enabling subjects to be "online" and accessible even when anthropologists are not in the field. However, such a perspective unfortunately applies only to the most developed countries and ignores the people in the world who have never even used a phone, much less a computer. As more powerful, lighter, and inexpensive hardware becomes available, researchers will experiment with its offerings and produce work that expands the boundaries of what we consider visual anthropology.

As technology evolves, the use of the image will also change, not only in format but also in meaning. Images and content will become more arbitrary, blurring the lines between "truth" and observation, vision and experience. Knowledge gleaned from images will therefore be less reliable, but more available, and the potential for learning and experiencing culture increases, while its validity decreases. Visual anthropology will either become more of the language of

anthropology or continue being the subdiscipline that only other visual researchers take seriously. To overcome the inherent bias toward text-based anthropology, visual researchers must change the language of knowledge to one which emphasizes nonverbal levels of understanding and develop alternative objectives and methodologies that will benefit anthropology as a whole. In other words, visual anthropology must provide more than accompanying illustrations and sequence-style films, and develop theories not only obtainable through visual media, but applicable across the discipline. Technology accounts only for the tools to define visual anthropology's future; students and researchers alike must recognize that anthropological communication is founded in observation and that visual methods allow them to describe and discuss culture in ways that complement and expand our understanding of the human condition.

— *Jerome Crowder*

See also **Ethnographer; Ethnographic Writing; Fieldwork, Ethnographic; Participant Observation**

Further Readings

Banks, M., & Morphy, H. (Eds.). (1997). *Rethinking visual anthropology.* New Haven, CT: Yale University Press.

Crawford, P. I., & Turton, D. (1992). *Film as ethnography.* New York: Manchester University Press.

El Guindi, F. (2004). *Visual anthropology: Essential method and theory.* Walnut Creek, CA: Alta Mira Press.

Grimshaw, A. (2001). *The ethnographer's eye: Ways of seeing in anthropology.* Cambridge: Cambridge University Press.

Loizos, P. (1993). *Innovation in ethnographic film: From innocence to self-consciousness 1955–1985.* Chicago: University of Chicago Press.

MacDougall, D. (1998). *Transcultural cinema.* Princeton, NJ: Princeton University Press.

Pink, S. (2001). *Doing visual ethnography: Images, media, and representation in research.* Thousand Oaks, CA: Sage.

Ruby, J. (2000). *Picturing culture: Explorations of film and anthropology.* Chicago: University of Chicago Press.

VISUAL ANTHROPOLOGY

Visual anthropology is a growing branch of anthropology that has not yet achieved a fully institutionalized status. The union of visual and anthropological elements has so far produced a vast terrain of contested discourses and multiple histories that are so varied in content, method, and quality that they are not easy to reconcile under a single definition, or to encompass under a single theory. In general terms, visual anthropology promotes the use of visual materials such as film, video, photography, and computer-based multimedia for the description, analysis, communication, and interpretation of human behavior. It also examines visual representations of different cultural aspects and how images can be analyzed as artifacts of culture. Historical photographs, for example, are considered as a source of ethnographic data. These two areas of study have dominated the discipline. Other branches of visual anthropology also consider the study of native media and their personal, social, cultural, and ideological contexts and the display of anthropological productions in classrooms, museums, and television.

Much of the debate in visual anthropology has developed about the status of the image. In the past, social scientists considered images as objective evidence and have relied on the accuracy of the camera in recording the surrounding reality. Yet anthropologists have become increasingly critical of this supposed objectivity. Images, such as a photograph or photogram of a documentary film, are not simply transparent windows on the world, but are socially and politically constructed. Despite their social construction, however, images can still provide information on a given culture. They can be used to preserve cultural details and as a way of distancing the anthropologist from the object of study: Through them, the pictured reality is rendered anthropologically strange.

Visual anthropologists now argue that images are always concerned both with the culture of those represented and the culture of those who represent. Anthropologists use visual technology in a reflexive manner, challenging viewers' notions about the

reliability of the images and seeking the participation of those who are studied in constructing their representations. So, while the roots of visual anthropology are in the culture of positivism, its developments have departed from positivist assumptions.

Visual anthropologists have often found themselves working together with scholars from the related fields of visual sociology, film, and performance studies, visual culture, and architecture rather than with fellow anthropologists.

— **Luca Prono**

Anthropometry

Anthropometry is the measurement of the size and proportions of the human body. Anthropometric measurements include those of the whole body, such as weight and stature (standing height). Also, anthropometry assesses specific areas of the body, as with circumference measurements around a body part, like the arm or skull. Furthermore, specific body tissues can be estimated through anthropometry. For example, adipose tissue under the skin (subcutaneous fat) can be measured by collecting skinfold measurements, which consist of skin and fat existing above skeletal muscle. In addition, anthropometric data include various ratios and indices of body dimensions. Such calculated measurements can yield information about the relative size or shapes of the whole body or its parts. Anthropometry has a long history within anthropology, and it has been especially important in the biological and medical areas of the discipline.

Among the many possible anthropometric measurements are stature; weight; circumferences of the head, chest, abdomen, arm, forearm, wrist, buttocks, thigh, calf, and ankle; lengths of body segments such as the thigh and calf; breadths across body parts such as the elbow and hip bones; and skinfolds of various sites that may have subcutaneous fat, such as beneath the shoulder blade, next to the navel, at the top of the hip bone, at the back and front of the upper arm, and at the inner and outer sides of the thigh.

Some of the advantages of anthropometric measurements are that they are relatively easy to collect, can be performed with simple equipment, and are obtainable with minimal disruption to those being measured. Moreover, because the equipment needed for data collection is portable, anthropometric measurements can be obtained in a variety of settings, including laboratories, hospitals, private residences, community structures, and outdoor environments. Furthermore, as anthropometric data collection is relatively inexpensive, it is useful for gathering information from large samples of individuals and/or collecting data at repeated intervals. One of the drawbacks of anthropometric measurements is that they are less precise than more expensive, invasive techniques. For example, while the anthropometric measurement of circumference at the navel is an indication of abdominal size, a computed tomography (CT) scan of an individual at the navel can show the exact location and quantity of particular kinds of tissues, such as adipose, muscle, organ, connective, and bone.

Particular techniques have been developed to encourage standardization of anthropometric measurements. Such measurement guidelines help ensure that different data collectors are measuring the same aspects of the body in the same way and at the same reference points. In addition, specific equipment and particular features of equipment are recommended to facilitate accurate measurements. For example, the instrument for measuring weight should be a beam scale with movable weights or an electronic digital scale. The preferred equipment for measuring stature is a stadiometer, or a vertical, marked rod with a movable platform that contacts the head. For circumferences, the tape measure used should be narrow, flexible, and nonstretching, so that measurements are not exaggerated. Lengths and breadths of body parts or between reference points on the body require either an anthropometer, which is a marked rod with a movable, perpendicular attachment, or spreading or sliding calipers, which have movable elements along a marked straightedge.

The anthropometric measurements most technically demanding to collect are skinfolds. For accuracy of results, precise suggestions should be followed regarding how and where to lift the fold of tissue. The measurer also needs to know how and where to place the skinfold calipers, a measuring instrument with pressure-sensitive separating jaws that fit over the skinfold, as well as how to manage the exertion of pressure from the calipers to take an accurate reading.

Single anthropometric measurements can be combined into various ratios and indices to represent varied physical characteristics. For example, several indices reflecting aspects of the head have been developed. The cephalic index indicates head breadth as a percentage of head length, while the nasal index shows nasal breadth as a percentage of nasal length. Other indices reflect overall body proportions or shape. The skeletal index indicates sitting height as a percentage of stature, and the intermembral index denotes the length of the arms as a percentage of leg length.

Still other anthropometric indices are used to suggest overall body fatness or distribution of adipose tissue in the body. For example, the body mass index (BMI), which is the ratio of body weight to stature squared, is commonly interpreted as an indicator of total body adiposity. The ratio of waist-to-hip circumferences is frequently used to suggest relative upper-body (also termed *android*) obesity or lower-body (also termed *gynoid*) obesity. One indication of trunk fat relative to limb fat is the ratio of abdominal circumference to arm circumference.

Applications of anthropometry in the study of body composition illustrate one of the major uses of anthropometry within anthropology. In population studies, biological anthropologists have used anthropometric measurements and indices to assess adipose tissue distribution and overall adiposity. Anthropometric data can also be used in prediction equations to estimate more complex aspects of body composition, such as body density and percentage of body fat.

Anthropometric data are used in several other ways by biological and medical anthropologists. In studying patterns of disease and mortality, scientists have investigated connections between anthropometric data such as waist-hip ratio and BMI and risk of various infectious and chronic diseases and death. Furthermore, anthropologists have traced patterns in nutritive status of human groups over time through anthropometric data. Measurements of various body parts are valuable in interpretation of human activity habits, such as the use of certain limbs for a customary activity. In addition, anthropometry has been used in investigating population trends in growth, such as the changes in stature that have occurred with migrations between countries varying in affluence. Adaptation to a variety of environmental characteristics, such as the differences in stockiness between hot-adapted and cold-adapted groups, has been examined through anthropometry. Moreover, anthropometric data have important historical and future applications in the design of products such as vehicles, furniture, and clothing for businesses and the government.

— *Penelope A. McLorg*

See also **Biological Anthropology; Genetics, Population; Medical Genetics**

Further Readings

Gould, S. J. (1996). *The mismeasure of man, revised and expanded.* New York: Norton.

Lohman, T. G., Roche, A. F., & Martorell, R. (Eds.). (1988). *Anthropometric standardization reference manual.* Champaign, IL: Human Kinetics.

WHO Expert Committee on Physical Status. (1995). *Physical status: The use and interpretation of anthropometry.* Geneva: World Health Organization.

ANTHROPOMORPHISM

The term is composed of two words of Greek origin: *anthropos* (man) and *morphe* (form, aspect). It defines the attribution of properly human characteristics to nonhuman beings, that is, either divine entities or animals.

Anthropomorphism of Divinities

In many religions, polytheistic or monotheistic, the divine was or is believed to possess external or internal characteristics similar to the ones of humans, as it may be understood by the artistic representations and mythological or sacred books' tradition.

The first-known thinker who severely criticized this attitude was Xenophanes of Colophon (ca 570–480 BC). In some of the fragments of his works that have been saved, Xenophanes condemned famous poets like Homer and Hesiod, who were looked upon as authorities in mythology, because they had presented the Greek gods as full of unacceptable human weaknesses. He also denounces as purely subjective self-projections the current beliefs that men of his time had about the divine, giving as proof the fact that the Thracians represent their gods as being blue-eyed and red-haired like themselves,

whereas the Aethiopian divinities are Black. To illustrate even better the absurdness of these human beliefs, Xenophanes pointed out that if animals were able to create works of art like humans, they would also probably depict their divinities with bodies like theirs.

This critical position against current religious anthropomorphism was followed afterward by many Greek philosophers (especially by Heraclitus, Socrates, Plato, Aristotle, the Stoics and the Neoplatonists), who conceived the divine in a more abstract way.

Anthropomorphism of Animals

In the myths and fairytales of almost all the civilizations that have flourished in every continent, various species of animals have been used as symbolic representations of one or another typical human mental or intellectual character (for example, the lion is "the strong and fearless," the fox is "the cunning," the bee is "the industrious," and so on). These projections are founded on more or less evident equivalences between natural behaviors of these species and human attitudes. They were essentially used to give educative moral examples (such as the Aesopian myths). For some African tribes and for the Siberian shamans, the establishment of a personal connection between a human being and an animal believed to have some particular qualities may lead to the acquisition of these qualities by the human being.

This common way to project human characteristics to animal behaviors influenced many interpretations of animal ethology, which presented themselves as scientific approaches, from Plutarch (AD 50–125) up to the 18th century. Even the famous French entomologist Jean-Henri Fabre (1823–1915) didn't escape the attribution of such elements to animal species.

Of course, it is undeniable that humans share some common attitudes with the other animal species. But serious scientific analysis describes these elements in a neutral way, without wishing to use the human species as a "model" or a "measure" for the other forms of life and taking care not to make easy transfers of ethological interpretation from the humans to the rest of the animal world.

— Aikaterini Lefka

See also **Animism; Ethology**

Further Readings

Diels, H., & Kranz, W. (1996). Xenophanes. *Die Fragmente der Vorsokratiker* (Vol. I, Sec. 21, pp. 113–139). Zurich: Weidmann.

Eliade, M. (1952). Images et symboles. *Essais sur le symbolisme magico-religieux.* Paris: Gallimard Coll.

Eliade, M. (1974). *Le Chamanisme et les techniques archaïques de l'exstase.* Paris: Payot.

Fabre, J.-H. (1920). *Social Life in the insect world* (B. Miall, Trans.). London: T.F.U.

Aotearoa (New Zealand)

Unlike nearby Australia, Aotearoa/New Zealand is not a multicultural society, but rather, according to local terminology, a bicultural society. The two cultures referred to in this notion are those of the original indigenous people, the Māori, and an emerging indigenous people, the Pakeha. In *te reo Māori,* the Māori language, *pakeha* means stranger; the term is pejorative. In practice, Pakeha now refers not to strangers in general, but rather to New Zealand's native-born Caucasian majority. Not all members of this group use the term pakeha to identify themselves; some prefer the term "Europeans" while others use the words such as "New Zealander" or "Kiwi."

These broader terms New Zealander and Kiwi, however, may refer to all citizens or self-identifying long-term residents. As such, New Zealand and Kiwi may refer to Māori, Pakeha, Asians (for example, Chinese, Indians, Malays, and some others), Pacific Islanders (Cook Islanders, Samoans, Tongans, Fijians, and other Polynesians or Micronesians, but rather decidedly neither Māori nor Pakeha). Asians and Pacific Islanders and some others, whether citizens or self-identifying long-term residents, do not figure in the description of Aotearoa/New Zealand as a bicultural society.

Māori Figure Prominently in the Biculturalism of Aotearoa/New Zealand

According to Aotearoa/New Zealand's founding document, the Treaty of Waitangi, certain northern Māori nobles transferred what the English version

Source: © iStockphoto/Edward Tsang.

describes as "all the rights and powers of sovereignty over their land" to the British Crown; Māori versions generally gloss the English "sovereignty" as *te kawanatanga katoa,* in which *kato*a referred to the nobles, while *kawanatanga* was a neologism combining *kawana,* a transliteration of the English word "governor," and the Māori term *tang,* meaning approximately "ship," as in the English "governorship." Though first written in the treaty, *kawanatanga* had been developed by missionaries to describe the qualities of Christ transcendent and in heaven toward his church. The English version assumes not only the sovereignty of the chiefs but also their ownership and capacity to dispose of land as well as their right to allow strangers to reside upon the land. The legal right of non-Māori New Zealanders to reside in Aotearoa/New Zealand rests upon this provision of the treaty.

Current legal interpretations of the second article of the treaty reserve for Māori the right to practice traditional arts and occupations (for example, fishing) without license, as well as, subject to negotiations, rights in Crown lands, fisheries, waters, and lake bottoms. These rights are not held by Māori, either in general or as individuals. Rather, such rights in specified lands and waters are held by Māori considered as members of *iwi* and *hapu,* who are now being compensated for their loss of collectively held lands and waters during and following the colonial period. *Iwi* and *hapu* are often somewhat colloquially glossed as "tribe" and "clan" or "subtribe," respectively; *iwi* translates more literally as "bone."

In addition, the New Zealand electoral system recognizes two sorts of electorate, one for all New Zealanders and permanent residents regardless of ethnic background and a second set of five electorates reserved solely for Māori who chose to exercise their franchise therein.

While most public business takes place in English, *te reo Māori* remains the only language recognized in law as an official language. All public institutions are now formally identified in both English and Māori. In some formal public circumstances, both Western and Māori protocols receive recognition. The national anthem is now often sung with a version in Māori preceding the English original. Elements of Māori

ceremonial, for example, the *haka* dance/chant performed by the "All Blacks" rugby team before rugby test matches, have become emblematic to New Zealanders of Aotearoa/New Zealand. Most New Zealanders are familiar with and use at least a modest set of Māori words, for example, *Aotearoa,* meaning "the land of the long, white cloud," a term referring to the land of New Zealand.

In bicultural New Zealand, Māori are *tangata whenua,* the people of the land/placenta. The equation of land and placentas, both indicative of sources of life, also refers back in part to a still common Māori practice of burying placentas in the cemetery special to their *iwi* and *hapu,* in which the baby's dead ancestors will have been buried and in which eventually the baby should be buried as well. *Iwi* and *hapu,* further, gather for formal occasions on *marae* (yards) specific to each group; visitors as well as persons affiliated with the home group but arriving at the *marae* gate for the first time must be formally welcomed according to the proper protocols before they can come onto the *marae* and into the *whare* (house), which stands upon the *marae.*

Whare share a standard architecture and red color. The carvings depict significant ancestors of the people of the *marae.* Viewed from the inside, the roof beams are a woman's ribs; *whare* contain the spirit of their people.

While all significant activities in Māori life require both men and women, the protocols reserve formal speech at meetings on the *marae* for men. Notionally, Māori take collective decisions in such meetings with a concern for the effects of those decisions over a period of some seven generations. Any decision taken by an assembled group, however, applies only to the *iwi* and *hapu* represented at the gathering.

While Māori are indigenous, they are not autochthonous. Most Māori histories tell that Māori first arrived in Aotearoa from Hawaiki on one of several *waka* (canoes), *Tainui, Te Arawa, Aotea, Takitimu,* and *Tokomaru* prominently among them. Some Tuhoe tell of their ancestors already being resident in Aoetearoa when these *waka* arrived. The people of Whangara Marae on the east cape of the North Island tell of their founding ancestor, Kahuitia te Rangi, also known as Paikea, surviving after his *waka* sank, and then arriving in Aotearoa on the back of a whale; his carved figure can be seen on the ridgepole of the Marae, while his story has been more recently commemorated in Witi Ihimeara's novel *Whale Rider* and the film by the same title.

All Māori should be able to recount their ancestry and the significant events of important ancestors' lives (understood together as *whakapapa*) back not only to their ancestors' arrival in Aotearoa, but including, as appropriate, where on the *waka* those ancestors were seated. Knowledge of one's *whakapapa* establishes in part one's place in Māori society, for example, one's legitimate membership in *hapu* and *iwi* as well as one's relations with other *iwi* and *hapu.* Recently, there have been significant attempts to gather information on *whakapapa* into databases and to distribute this information over the World Wide Web.

In fact, many Māori cannot recount their *whakapapa* with such exactitude. The reasons for this are various. But the most important reasons can be traced to the Māori wars.

Following the signing of the Treaty of Waitangi in 1840, the British attempted to assert their sovereignty over portions of the North Island, notably the Waikato and Northland. To this end, they brought elements of their armed forces along with some of the most sophisticated armaments of the day from Australia to New Zealand. These British efforts failed as Māori leaders improvised solutions, including the first instances of trench warfare, to British strengths.

Despite these Māori successes in the northern regions of the North Island, the New Zealand Company, a private land company organized by the Wakefield brothers and certain of their associates, sought to control the purchase of Māori lands by Europeans. The company subsequently began to advertise land in New Zealand as being for sale, even though the company often did not have legal title to those lands. People from around the British Isles purchased, or thought they had purchased, lands and then immigrated to New Zealand. While Governor Grey sought to limit European migration to the South Island and to the relatively lightly populated portions of the southern North Island, tensions between Māori and Europeans over land grew, leading to wars in Taranaki and subsequently both the King Country and the Waikato. Māori were defeated; their populations were decimated; and effective Māori resistance to British rule ceased, although various revival movements would continue to form. British administration fostered attempts to suppress Māori language and custom; and colonial prejudices encouraged children of Māori-European marriages to take up European customs and in some cases to attempt to pass as Europeans. Particularly during the 20th century,

some Māori moved to larger cities and towns, relinquishing ties to relatives and later knowledge of their specific ancestry.

The transformation of Europeans into New Zealanders was not immediate; many Europeans continued to regard one or another portion of the British Isles as home, even as, in some cases, several generations were born in New Zealand. In the 1860s, prospectors found gold in Otago. The advent of refrigeration meant that New Zealanders could grow lamb for the British market rather than just for local consumption. The European population grew.

A colony and later a dominion of the British Empire, New Zealanders contributed troops to Britain's armies during the Boer and later World War I and II. Along with Australian soldiers, both European and Māori New Zealanders served in the ill-fated assault on Turkish forces at Gallipoli and, later on, Flanders field. Pakeha self-understanding of themselves as New Zealanders and not British began in response to these battles, especially Gallipoli. Dominion status gave New Zealand domestic self-government. Writers such as Frank Sargenson, Janet Frame, as well as later both Barry Crump and Maurice Gee, among many others, began producing short stories and novels about New Zealand subjects for New Zealand audiences; similar movements occurred amongst painters and later moviemakers, with Colin McCahon and Jane Campion being among the most prominent.

New Zealanders debated for many years the virtues of accepting independence in 1947 as part of the British Commonwealth. They understood that as members of the Commonwealth, New Zealand would have privileged access to British markets for its agricultural products, notably lamb. As such, Aotearoa/New Zealand was largely unprepared for the United Kingdom's entrance into the European Common Market in 1959; overnight, New Zealanders went from having among the world's highest per capita incomes to being citizens of an economically marginal country; Pakeha and Māori alike found themselves together.

New Zealand had joined with the United States and Australia in alliance after World War II. During David Lange's Labour government in the 1980s, New Zealand declared itself a nuclear-free zone, thus precipitating a conflict between the U.S. Navy's policy of neither confirming nor denying which ships were powered by nuclear reactors or carried nuclear weapons and New Zealand's refusal to allow such generators or weapons into its ports.

The Lange government also initiated a series of economic reforms, incorporating policies elsewhere associated with Margaret Thatcher and Ronald Reagan. Locally referred to as "Rogernomics," these reforms led to the sale of previously state-owned corporations, a move away from full employment, and an introduction of private health insurance in conjunction with the national health system. *Competition* and *efficiency* became the bywords; restructuring and redundancies became common as New Zealand experimented with giving market forces the greatest feasible influence, while simultaneously opening their market to international trade to a greater extent than any other advanced economy. In large measure, because of its relatively small but well-educated population, New Zealand has also provided international high technology, especially telecommunications, firms with a market for testing innovations prior to their introduction into the larger European and American markets.

Influenced to some degree by America's Black pride movement, against this general background and that of the deep divisions occasioned by the South African national rugby tour in 1981, Māori began a cultural and political revival that continues to this day. As a part of this revival, Māori have reasserted claims to land under the aforementioned terms of the Treaty of Waitangi; these claims and the Māori revival have also evoked ambiguous, sometimes negative, responses from Pakeha. Māori have also revived their language, many of their traditional arts, including carving and their martial arts. Furthermore, some Māori have sought to have Māori artifacts, for example *moko makai* or tattooed heads, returned to Aotearoa/New Zealand either for inclusion in the collections of Te Papa, Aotearoa/New Zealand's national museum, or to the appropriate *iwi* and *hapu.* Ihimeara, Alan Duff, and Keri Hulme, among others, have also added to Aotearoa/New Zealand's emerging national literature with novels and stories describing Māori life.

In late 2004, Prime Minister Helen Clark announced that she was poised to initiate a discussion within the Labour Party, and Aotearoa/New Zealand more broadly, concerning the to-date unwritten constitution, the place of the Treaty of Waitangi therein, and the possibility of Aotearoa/New Zealand's reestablishment as a republic.

— *Gerald Sullivan*

See also **Māori**

Further Readings

Best, E. (1996). *Tuhoe: The children of the mist* (2 vols.). Auckland, New Zealand: Reed Books. (Original work published 1925)

Duff, A. (1993). *Māori: The crisis and the challenge.* Auckland, New Zealand: HarperCollins.

Kelsey, J. (1995). *The New Zealand experiment: A world model for structural adjustment.* Auckland, New Zealand: Auckland University Press.

King, M. (1985). *Being Pakeha: An encounter with New Zealand and the Māori renaissance.* Auckland, New Zealand: Hodder & Stoughton.

King, M. (2003). *The Penguin history of New Zealand.* Auckland, New Zealand: Penguin Books.

Vaggioli, D. F. (2000). *History of New Zealand and its inhabitants.* Dunedin, New Zealand: University of Otago Press. (Original work published 1896)

Ape Biogeography

Evolutionary biogeography addresses the historical relationship between geographic space and the processes of biological differentiation, such as speciation and adaptation. Darwin observed that the evolution of related species in different locations required that they also share a common ancestral location he called the "center of origin." Darwin thought this requirement was so obvious that it constituted a self-evident truth and to call it into question was to appeal to the agency of a miracle. The occurrence of related species in different locations, especially those considered to be separated by geographic or environmental barriers, was explained as the result of their having migrated away from their original centers of origin according to their individual abilities to disperse (walking, flying, rafting, floating, and so on). Dispersal ability was seen to be the key to geographic distribution, and biogeographic evolution was simply a compendium of unique, individual, and unrelated dispersal events. This perspective justified each group being explored in isolation, whether upon the static geography of Darwin's time or the currently accepted plate tectonic theory of geological history.

Evolutionists following in Darwin's footsteps did not question his theory of evolution through centers of origin and dispersal. The science of biogeography was reduced to the practice of creating historical narratives or stories about imagined centers of origin and dispersal routes for each individual group of organisms. These stories were constructed according to prevailing beliefs about evolutionary age, dispersal ability, geological and ecological history, and most important, particular beliefs about how the center of origin could be identified. A variety of contradictory criteria were theorized to identify the center of origin, among the most popular being the location of the oldest fossil or the most primitive (and therefore oldest) member of the evolutionary group. Biogeographic narratives were always a product of prevailing beliefs and knowledge never advanced beyond what was already presumed to be known from geological or ecological history. In this role, biogeography is rendered, at best, a subdiscipline of ecology or systematics, and not a very informative one at that.

Darwin's theory of geographic evolution faced its first serious challenge from Leon Croizat, who was perhaps the first biogeographer to formally recognize geographic location as an independent source of historical information about the evolution and origin of species. Croizat's unique approach was first developed in the 1950s and became known as *panbiogeography.* His research program analyzed the geographic relationships between different taxa at different localities using line graphs or "tracks." Tracks are generally drawn to connect localities over the shortest geographic distance, since that provides the minimum amount of geographic space and therefore the minimum number of ad hoc geographic hypotheses required to explain the spatial relationships. The line graphs allow direct comparison of spatial geometry for groups of organisms and tectonic features (such as ocean basins and geosynclines) associated with earth history. These biological and geological components comprise the raw data of biogeography. Darwin's predication that dispersal ability would be the key to understanding the evolution of geographic distribution was not supported by this approach. When Croizat compared tracks, he found that supposedly "poor" dispersers could be as widely distributed as "good" dispersers. He also found that animal and plant distributions could be correlated with geomorphologic features, and this suggested that geological history had more to do with the evolution of a distribution than with dispersal ability.

The overlap between tectonic features and multiple distribution patterns suggested to Croizat that geological and biological patterns share a common

history. This shared history may be explained as the result of an ancestor occupying a widespread geographic range across the tectonic feature. Descendant taxa now occur in different localities because each evolved through local differentiation over different parts of the ancestral range, giving the appearance that each had moved to their respective locations. The spatial pattern linking the descendant species is still correlated with the tectonic feature involved with the ancestral dispersal.

Croizat referred to his differentiation model as "vicariant form-making." For each taxon (whether a species, genus, or family, and so on), the "center of origin" is, in effect, the combined range of the related taxa, rather than a localized part of the range as in Darwin's theory. With the panbiogeographic method, historical inference is the product of spatial comparisons between distributions, rather than prevailing beliefs about the age of taxa or historical events theorized from other historical disciplines such as geology or ecology. It is this spatial dimension of evolution that is missing from most historical accounts of primate biogeography and evolution.

The biogeography of primates is usually interpreted according to Darwin's theory of centers of origin, which are usually identified as the location of the oldest fossil. Migrations from the center of origin are then imagined according to the geological age of various fossil members, molecular clock theories, and theories about the sequence of continental connections or their absence. For primates as a whole, the center of origin is assigned to a location in the Old World, apparently because the primitive prosimians are absent in the New World. The presence of monkeys in South America is therefore explained by the theory that their common ancestor either hopped across former islands in the Atlantic or rafted across the sea. Prosimians, even though they represent an older lineage, were somehow unable to make the trip. The possibility that monkeys made the trip from Africa while it was adjacent to South America is usually discounted because it is assumed that the oldest monkey fossil, dated at 35 million years, shows that monkeys did not evolve until after the Atlantic formed earlier in the Cretaceous. Conversely, despite the geographic isolation of Madagascar in the Cretaceous, this was somehow not a barrier to prosimians, while monkeys were evidently unable to make the trip across the Mozambique Channel, even though Darwinian biogeographers frequently invoke island hopping to account for the presence of myriad other animals and plants on the island. It is this contradictory theorizing that exemplifies biogeographic reasoning that appeals to imaginary centers of origin and dispersal.

Anthropoid evolution is similarily portrayed, with the imagined center of origin swinging back and forth between Africa and Asia according to the fortunes of fossil discovery, sometimes with migrations both ways for monkeys, apes, and even hominids. The result is a biogeographic mess, with primates walking or rafting this way and that and making global migrations by crossing continents, land bridges, or enduring dramatic transoceanic voyages. All of these stories require an imaginary interpretation of fossils as migratory markers and presumptions about the location of older fossils or primitive lineages being at or near the imagined center of origin. Each time an older fossil or more primitive lineage turns up or a new molecular clock theory is produced, the current story will be supplanted by another with the caveat that somehow there has been scientific progress that is different from what was "previously thought."

A panbiogeographic approach to primate evolution requires only a consideration of how the geographic distribution of any one group compares with biogeographic patterns in general and how these patterns are spatially correlated with geomorphological features. Fossils provide information on the minimal age of fossilization localities currently not represented by extant forms. There is considerable debate over many aspects of primate phylogeny, and there is a great deal of uncertainty about the relationships between early primate fossils and living taxa. The evolution of hominids and apes emerges out of the common ancestor with Old World monkeys and, in turn, the common ancestor to both Old World and New World monkeys and primates in general. To provide this historical context, the spatial biogeography of apes begins with general biogeographic patterns for primates overall, with a focus on the extant primate groups.

The dispersal (in the sense of geographic differentiation) of extant primates involves three principal groupings: prosimians, tarsiers, and anthropoids (monkeys and hominoids). Prosimians show a pattern centered on the Indian Ocean (as a tectonic basin), with lemurs confined to Madagascar and lorises located in Africa, southern India, and Southeast Asia. Lorises include two families, the Galagonidae widespread in Africa, but absent from outside that

continent, and the Loridae in central western Africa, with an eastern boundary at the Rift Valley, India, and Southeast Asia. The spatial break between the western Rift Valley and Southeast Asia is a standard pattern found in other groups of plants and animals. Tarsiers are often seen as being phylogenetically enigmatic due to their many unique features, but they exhibit the unique toothcomb of prosimians and may therefore be seen as an eastern component of the prosimian distribution.

Prosimian biogeography is classic for its concentration in areas around the Indian Ocean, and in this respect, prosimian evolution is similar to many other plants and animals largely or wholly limited to landmasses in the immediate vicinity of the Indian Ocean basin while being largely absent from the Americas and the Pacific. The direct historical inference of this tectonic correlation is that prosimian ancestors were already widely distributed before the formation of the Indian Ocean in the Late Cretaceous and Early Tertiary time, even though the earliest recognized fossils with prosimian affinities (the omomyids) are only about 40 million years old. The biogeographic correlation suggests that the ancestors of lorises and lemurs each emphasized different geographic areas, so that their descendant now vicariate (occupy different areas) with respect to each other. Even the overlap between lorises and tarsiers indicates slightly different ancestral distributions for each group, with modern tarsiers being present in the Celebes and some Philippine islands where lorises are absent. This current biogeographic pattern for prosimians does not preclude fossil forms of each group occurring in other parts of the prosimian range (lemurs in Africa, for example), but such localities are seen as outside the main centers of evolution for each group as represented by their modern diversity.

Unlike prosimians, anthropoids (monkeys, apes, humans) are found in both the Old and New Worlds, with platyrrhine monkeys in the Americas and catarrhine monkeys and apes in the Old World. This trans-Atlantic range is also standard for plants and animals in general and may predict the origin of anthropoids in the Late Cretaceous even though their oldest fossil representatives are currently known no earlier than about 35 million years. The anthropoids share with prosimians a distribution range that is currently largely to the south of a major tectonic feature, the Tethyan geosyncline, which extends between Europe and Southeast Asia, with a Caribbean extension prior to the formation of the Atlantic. The geosyncline formed through the closure of the Tethys Sea in from Late Cretaceous and Early Tertiary time. Although living and fossil prosimians and anthropoids do occur north of Tethys, the predominant diversity to the south may reflect the geographic distribution of ancestral diversity that lay more to the south of Tethys than to the north. A contrasting pattern is represented by the Plesiadapiformes, a fossil group first appearing about 65 million years ago. These fossils may represent early primates or primate relatives of uncertain monophyly. As currently recognized, the Plesiadapiformes are distributed to the north of Tethys, over parts of eastern Asia and North America. They are, therefore, largely vicariant (spatially separate) with respect to prosimians and anthropoids. This separation may represent a more inclusive widespread common ancestor that ranged both north and south of Tethys in Mesozoic time.

Apes represent a sister group to the Old World monkeys, and as such they share the same evolutionary age, though they exhibit some highly derived features that separate them from all other primates. The earliest fossil for apes is represented by *Proconsul* at 18 million years, though the lineage must extend to at least the time of the earliest fossil representatives of catarrhine primates at 35 million years. Living apes comprise the small-bodied hominoids, or Hylobatidae, in Southeast Asia representing the sister group of the large-bodied hominoids in Africa *(Pan, Gorilla)* and Southeast Asia *(Pongo)*. The fossil record for the Hylobatidae may be represented by a late Miocene fossil in China. Neither *Pan* nor *Gorilla* have a recognized fossil record, although there have been suggestions that the putative hominid *Sahelanthropus* may actually be more closely related to gorillas. Only *Pongo* is represented by fossils as well as having recognized fossil relatives, such as *Sivapithecus,* extending the fossil record for this group at least 14 million years.

The biogeography of living and fossil great apes is problematic because of an unresolved conflict between alternative phylogenetic models developed from different lines of evidence. The almost universally accepted model links chimpanzees as the sister group of humans because they share the greatest similarity of DNA base sequence. This pattern of relationship is contradicted by the virtual absence of any uniquely shared morphological similarities between the two groups and by morphological evidence overwhelmingly supporting the orangutans as the closest living relative of humans. Most primate biologists consider the DNA sequence evidence to invalidate the morphological evidence, so the orangutan relationship is generally ignored. What cannot be ignored, however, is the fossil history of primates, which becomes insolvable and unscientific if morphology cannot provide an independently relative source of phylogenetic evidence because fossils lie beyond the reach of DNA analysis. Without morphology, the evolutionary relationships of living hominoids cannot be integrated with their fossil relatives, let alone know what fossils are hominoids (or even primates) in the first place.

As an independent source of evidence for evolutionary relationships among primates, the characters uniquely shared between orangutans and humans may have a dramatic impact on the interpretation of the fossil ape fauna. Of the 40 features uniquely shared between humans and orangutans, only 14 hard-tissue characters are applicable to fossils, and even less are widely comparable due to incomplete skeletal composition of most fossil apes. Only dental remains are broadly represented, and they also comprise a source of uniquely shared human orangutan characters in the form of thick dental enamel and low molar cusps. When these features are considered for fossil apes, it is possible to separate out a distinct clade allied with humans and orangutans that encompass a range of fossil apes previously seen as mostly peripheral to the evolution of modern apes and humans.

The presence of thick dental enamel and low molar cusps is found in a range of fossil apes that are either generally allied with orangutans or of uncertain status (see Figure 1). The fossil record of orangutans extends into the Pleistocene of Southeast Asia and southern China. Within this geographic range are also the closely related genera *Langsonia* in northern Vietnam (250–300,000 years), *Khoratpithecus* in Thailand (7–9 million years), and *Lufengpithecus* in southern China (9–8 million years). The distributions of these genera are complemented by the mostly vicariant range of *Gigantopithecus* in India and China (2–0.5 million years) and the related genus *Sivapithecus (Ramapithecus)* in India (14–10 million years). Other fossil apes with thick dental enamel and low molar cusps include *Ankarapithecus* in Turkey (11–10 million years), *Ouranopithecus* in Greece (9 million years), and *Hispanopithecus* in Spain (10–9 million years). The biogeographic track for these taxa shows a pattern closely conforming to the Tethyan geosyncline (see Figure 1). This correlation suggests an ancestral range along the coastlines of the former Tethys between Europe and Asia that was disrupted during the closure of Tethys by tectonic uplift and subduction. This geological process may have promoted local differentiation of each genus over the ancestral range, so that the "center of origin" of this great ape clade extends across both Europe and Asia, rather then being restricted to any one part of the range.

The Tethyan range of the orangutan clade may also apply to the origin of hominids in Africa. Recognized fossil hominid genera such as *Australopithecus* also exhibit features otherwise unique to orangutans and their fossil relatives, including broad cheekbones with forward facing anterior roots. These orangutan affinities are congruent with morphological evidence, with over 40 known synapomorphies supporting a sister

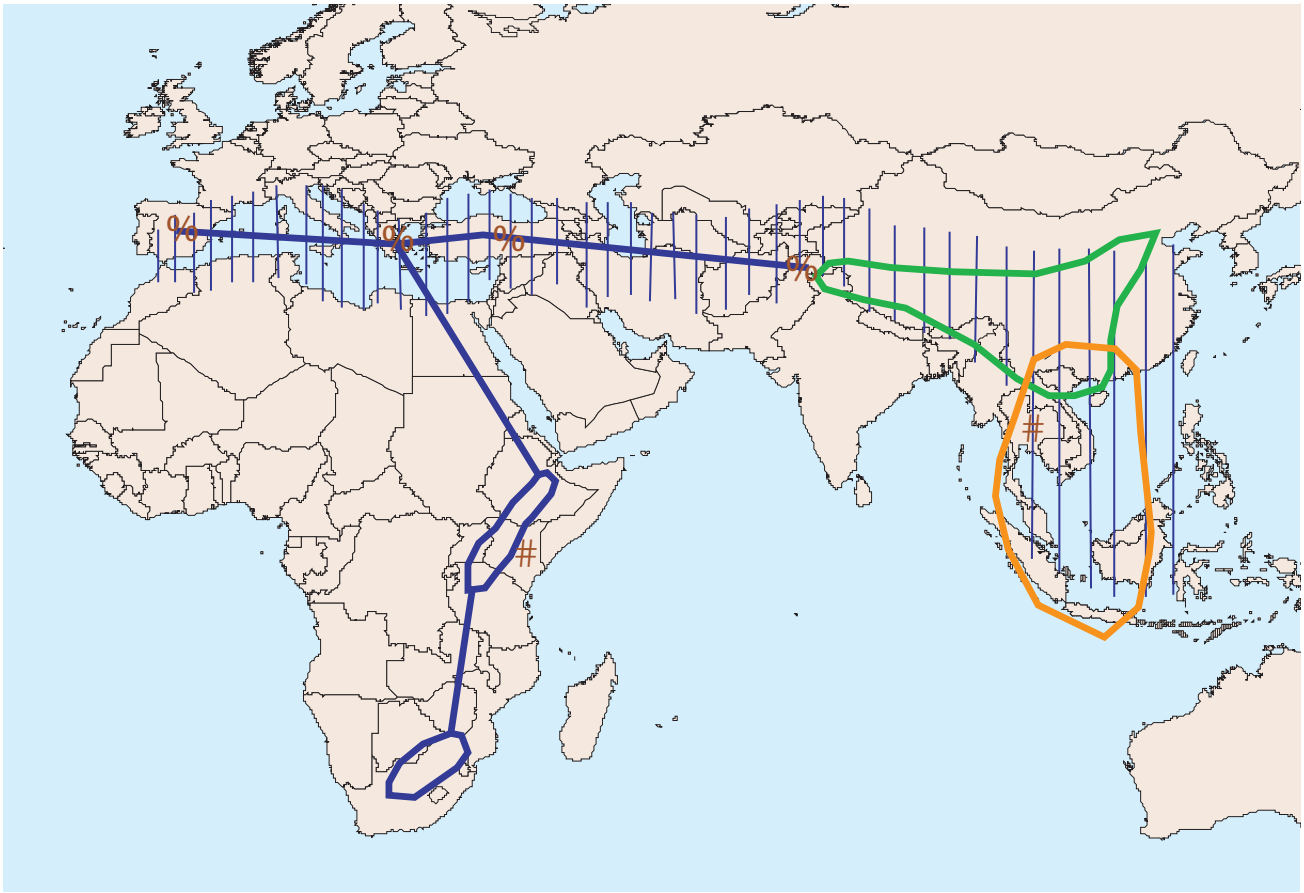


Figure 1 Biogeography of ancestral hominids (excluding Homo), orangutans, and their fossil relatives. Generalized localities and taxa distributed as follows: *Australopithecus*–black polygon (Africa), *Orrorin*–yellow circle (Kenya), *Hispanopithecus*–brown square (Spain), *Ouranopithecus*–crimson square (Greece), *Ankarapithecus*–blue square (Turkey), *Sivapithecus*–yellow square (India), *Gigantopithecus*–blue polygon (China, India), Pongo-red polygon (China-Southeast Asia), *Khoratpithecus*–black circle (Thailand), and *Langsonia*-red circle (Vietnam). The Chad locality for *Australopithecus* is not included due to lack of independent verification of the fossil as a member of the genus. Vertical lines-generalized geological range of the Tethyan geosyncline representing former Tertiary coastlines now largely obliterated, of which the Mediterranean Sea remains the largest surviving remnant.

group relationship between humans and orangutans. Fossil australopithecine records extend back only about 4.5 million years, whereas the orangutan lineage extends back at least 14 million years, as represented by its fossil relative *Sivapithecus*. Other fossil links may be represented by the proposed 6-million-year African hominid *Orrorin,* but the orangutan relationship for humans would appear to rule out the fossil genera *Ardipithecus* and *Sahelanthropus* being hominids at all.

Even with this very brief biogeographic overview, the evolutionary origins of humans may be seen as the western counterpart to the orangutan in the east, with the intervening geographic space occupied by now extinct members of the human-orangutan clade across the Tethyan geosyncline and its extension along the Rift Valley in Africa. The biogeographic and evolutionary resolution of the large-bodied hominoids extends the fossil history for the human lineage at least into the mid-Miocene, as indicated by the minimal age of fossilization for *Sivapithecus.* Conversely, the question of what became of large-bodied Miocene apes in Africa may now also be answered by the orangutan affinities of the australopiths. Isolated fossil teeth identified in the literature as *Australopithecus* conforming to the dental characteristics of orangutans suggest that the Miocene African apes did survive to become what are now

recognized as Plio-Pleistocene hominids. They are bipedal orangutan relatives by another place and another name.

— *John R. Grehan*

See also **Apes, Greater; Croizat, Leon; Hominid Taxonomy; Hominization, Issues in; Primate Morphology and Evolution; Primatology**

Further Readings

Cochion, R. L., & Fleagle, J. G. (1987). *Primate evolution and human origins.* New York: Aldine de Gruyter.

Craw, R. C., Grehan, J. R., & Heads, M. J. (1999). *Panbiogeography: Tracking the history of life.* New York: Oxford University Press.

Croizat, L. (1958). *Panbiogeography.* Caracas, Venezuela: Author.

Croizat, L. (1964). *Space, time, form: The biological synthesis.* Caracas, Venezuelas: Author.

Jones, S., Martin, R., & Pilbeam, D. (1992). *The Cambridge encyclopedia of human evolution.* Cambridge: Cambridge University Press.

Schwartz, J. H. (2004). *The red ape: Orangutans and human origins.* Boulder, CO: Westview Press.

Schwartz J. H., & Tattersall, I. (2005). *The human fossil record: Vol. 3. Craniodental morphology of early hominids.* New York: Wiley-Liss.

Ape Cognition

Biological anthropologists use the comparative perspective in their efforts to reconstruct human evolutionary history. As our closest living relatives, primates are often used to frame comparisons and to test hypotheses about various human features. A feature (behavioral, genetic, or anatomical) that appears in all primate species is at least initially assumed to also characterize the last common ancestor of those species; features present in only one form presumably evolved at some point after it diverged, and hypotheses explaining the features are developed in the context of unique aspects of the organism's ecology and anatomy. The large-bodied apes (orangutans, gorillas, chimpanzees, and bonobos) are most closely related to humans, so those species, particularly chimpanzees, are the preferred ones to compare to fossil and living humans. However, comparisons between humans and other more distantly related species are also informative and serve to demonstrate instances of evolutionary convergences (similar selective pressures lead to similar outcomes in distantly related forms) or features that evolved before the ape/human split as our primate or mammalian heritage.

Students of Darwin assume continuity between species, and they use a comparative approach to understand biology, behavior, and cognition of primates. These evolutionary anthropologists predict that few traits, including cognitive ones, will arise de novo—evolutionary precursors are the norm. In contrast, cultural anthropologists have sometimes focused on the uniqueness of the human mind, particularly with respect to language and culture, and assume gaps in the phylogenetic scale.

The dictionary defines cognition as "the act or process of knowing, including both awareness and judgment; also a product of this act." These constructs are impossible to observe in humans and nonhumans; thus researchers are left with studying behaviors and defining those behaviors as indicators of a particular cognitive function. The methods of observation and the definitions of behaviors should be used consistently across species to increase the validity of comparisons.

Primatologists are scientists who study the behavior, biology, and evolution of nonhuman primates. The field of primatology draws from individuals trained as psychologists, biologists, or anthropologists, and one's training has a profound impact on research questions asked. Traditionally, primatologists trained as anthropologists studied wild nonhuman primates and used resulting data to model hominids and to better understand modern humans. Primatologists trained as psychologists focused more heavily on cognitive processes, intelligence, and language and usually explored these topics using captive nonhuman primates where experimental conditions are more easily controlled.

Here we trace the quest to understand, however imperfectly, the ape mind. The study of ape cognitive abilities includes research conducted with captive individuals, where more precise control over experimental and rearing conditions are possible, and individuals living in the wild, where relationships

between particular cognitive abilities and aspects of the organism's environment can more readily be explored.

History of Primate Cognition

Studies of nonhuman primate cognition began in the Western intellectual tradition in the early 20th century and were conducted by psychologists. Nadie Kohts studied the perceptual and conceptual skills of a young chimpanzee, Joni, from 1913 to 1916, and compared them to those of her son, Roody. She published her observations in 1935 in Russian in the book *Infant Chimpanzee and Human Child,* which has recently been translated into English (2002). She used a comparative developmental approach and established a tradition of rearing the research subject in a home setting, which was to be revisited later in the century by other scientists. Wolfgang Kohler, a German psychologist, presented a variety of problems to captive chimpanzees. The chimpanzees had access to materials that, when assembled, could be used to obtain a reward, such as bananas. Kohler described his findings in his 1925 book *The Mentality of Apes.* The roots of American primatology can be traced to Kohler's contemporary, Robert M. Yerkes, a psychologist fascinated with the evolution of intelligence. Yerkes explored this subject in captive apes and established what eventually became known as Yerkes Regional Primate Center in Atlanta, Georgia. After Yerkes's pioneering research, primate cognition continued to be studied in laboratory settings by scientists such as William Mason, Emil Menzel Jr., Duane Rumbaugh, David Premack, and Allen and Beatrix Gardner, among others. The realization that cognition could also be examined in wild populations came slowly, in part as a consequence of the long-term ape research of Dian Fossey, Biruté Galdikas, and Jane Goodall. While their projects were not intended to focus on primate cognition, their work demonstrated apes' complex mental abilities, including long memory, tool manufacture and use, and the use of social stratagems. Sophisticated social and cognitive skills were also emerging from data collected from wild baboons by Barbara Smuts, Jeanne Altmann, Shirley Strum, and Joan Silk and from wild vervets by Dorothy Cheney and Robert Seyfarth. The shift to the study of cognition in wild populations offers exciting opportunities to explore relationships between particular cognitive abilities and aspects of the organism's environment—that is, to understand the evolutionary significance of a particular mental capacity.

Cross-Fostering

Ethologists use the procedure called "cross-fostering" to study the interaction between environmental and genetic factors by having parents of one species rear the young of a different species. Primate cross-fostering projects date to the 1930s, when Winthrop and Luella Kellog raised the infant chimpanzee Gua for a period of 9 months with their son. In the 1950s, Keith and Cathy Hayes cross-fostered the chimpanzee Viki while attempting to teach her to talk. After four years she was able to say four words, *mama, papa, cup,* and *up.* This research demonstrated that chimpanzees cannot speak, leading to the search for other means of testing language and other cognitive abilities of apes.

Allen and Beatrix Gardner cross-fostered the infant chimpanzee Washoe and immersed her in American Sign Language (ASL). In teaching ASL to Washoe, caregivers imitated human parents teaching human children in human homes. For example, they called attention to objects, expanded on fragmentary utterances, and molded Washoe's hands into the shape of new signs. In a second project, the Gardners cross-fostered four more chimpanzees, Moja, Pili, Tatu, and Dar. All of these cross-fosterlings acquired and used signs in ways that paralleled human children. The size of their vocabularies, appropriate use of sentence constituents, number of utterances, proportion of phrases, and inflection all grew robustly throughout the 5-year cross-fostering process.

In 1979, at the University of Oklahoma under the care of Roger and Deborah Fouts, Washoe adopted a 10-month-old chimpanzee son, Loulis. Human signing was restricted in Loulis's presence to test whether he could learn ASL from other chimpanzees rather than from humans. Loulis began to sign in 1 week, and at 73 months of age had a vocabulary of 51 signs. Washoe, Loulis, Tatu, and Dar now live together at the Chimpanzee and Human Communication Institute (CHCI) at Central Washington University in Ellensburg, Washington. Current research shows that they sign to each other and to themselves. The chimpanzees initiate conversations and maintain topics. When human interlocutors feign a misunderstanding, the chimpanzees adjust their responses appropriately. The chimpanzees' patterns of conversation with

human caregivers resemble patterns of conversation found in similar studies of human children.

Language Training

In 1979, Herb Terrace claimed to have replicated Allen and Beatrix Gardners's cross-fostering project with a chimpanzee named Nim. The young chimpanzee spent 6 hours each day in a classroom while a string of teachers drilled him with questions and demands for signing. If he wanted something, the teachers withheld it until he signed for it. Terrace found that Nim made few spontaneous utterances and often interrupted his teachers. This procedure differed greatly from the Gardners's cross-fostering project, in which the young chimpanzees were treated like children. Terrace's failure to create a comparable environment for language acquisition led to Nim's failures. Later studies showed that Nim made more spontaneous utterances and interrupted less in a conversational context.

In 1972, Francine Patterson began teaching signs to an infant gorilla, Koko, and later Michael. The gorillas acquired many signs and used them in all of their interactions with their caregivers. At the University of Tennessee at Chattanooga, Lyn Miles taught signs to a young orangutan, Chantek, in 1978. He produced signs spontaneously and combined them into phrases. In 1986, Chantek was returned to Yerkes Regional Primate Center where he was born, and the project continued on a modified basis.

Also in the 1970s, David Premack used plastic tokens and Duane Rumbaugh used Yerkish, both artificial systems to examine grammatical skills in chimpanzees. Later Sue Savage-Rumbaugh attempted to train a bonobo, Matata, to use lexigrams, the symbols of Yerkish. While Matata failed to use the lexigrams, her infant son, Kanzi, who was present during training, did use them. Devoid of face-to-face interaction, these studies reveal little about conversational behavior, but they do demonstrate apes' capacities to understand language and to respond appropriately to requests.

Knowledge of the Physical World

From studies of how primates interact with their physical world, scientists make inferences about primates' understandings of (1) object permanence, (2) cause and effect relationships, (3) spatial knowledge, and (4) quantitative abilities, among many other topics. These skills likely evolved as part of a suite of foraging behaviors that, among other functions, facilitate tracking, finding, and extracting food.

Object Permanence

Object permanence refers to how an individual responds to an object that an experimenter hides. In the 1950s, Jean Piaget devised a series of tests to show the development of object permanence in stages. In one test, the experimenter places an object under a cover while the child watches. If the child lifts the cover, he or she has achieved Stage 4 of object permanence. Later stages are tested by multiple and invisible displacements. Piaget claimed that Stage 6 required mental representation and is achieved by 18–24 months in humans. Chimpanzees and gorillas have been tested and demonstrated Stage 6 object permanence.

Cause and Effect

Ape tool manufacture and use gives us insight into apes' understandings of cause-and-effect relations because the tool is constructed or modified to achieve a particular goal. Gorillas, chimpanzees, bonobos, and orangutans use tools in captivity, but only the latter three have been observed using tools in the wild (presumably the gorilla's leafy diet and great strength renders tools useless in its natural environment). For example, orangutans use sticks to extract honey from bee nests and leaves as gloves to protect their hands from thorny branches. Chimpanzees put leaves on the ground as seats or crumple leaves to sponge water. They use large sticks as clubs and pestles. Furthermore, they use specific tools for specific tasks. For example, in the Tai Forest (Ivory Coast), they use stones to crack hard Panda nuts and wood to crack soft Coula nuts. Some stone anvils have depressions from years of repeated use. Chimpanzees use tool sets to obtain termites from a mound; the different tools are used in a particular sequence to first perforate the mound and then extract the termites. Apes that have had opportunities to observe humans use a tool will use the same tool in the same way. For example, an ex-pet orangutan living at Camp Leakey (Tanjung Puting, Borneo) built a fire with a flint and gasoline, following the tools and techniques used by humans at the camp.

Spatial Knowledge

Tests of spatial knowledge include analyses of how individuals navigate through, or "cognitively map,"

the environment. In the 1970s, Emil Menzel Jr. hid food in various locations in a 1-acre enclosure while a chimpanzee watched. When released into the enclosure, the chimpanzee foraged for the food in the most efficient pattern using a least distance strategy while moving from one item to the next. Researchers studying wild apes, including gibbons, have found that individuals move efficiently through the forest rather than in random patterns.

Quantitative Abilities

Apes' quantitative skills have been indexed in a variety of ways. They are able to distinguish groupings of more or fewer objects in a set. Some chimpanzees have learned to use Arabic numerals to represent numbers of objects in sets ("3" for three jelly beans) and to count the number of objects in a set. Some chimpanzees have learned to add the numbers in two sets to reach a sum (three jelly beans plus four jelly beans totals seven).

Artwork

Captive apes produce drawings and paintings using drawing implements, paints, and brushes. The signing chimpanzees at CHCI provide names for their artistic pieces, and their drawings or representations of a particular object are consistent in appearance from one illustration to the next. For example, pictures labeled as "bird" always have a V shape in them. When asked to draw a berry, chimpanzee Moja usually drew a small round object.

Social Intelligence

Intense sociality is one of the most distinctive characteristics of primates. Species living in large, complex groups might be expected to exhibit behaviors that enhance individuals' abilities to operate effectively in a variety of social arenas with considerable insight into the likely actions of group mates. A long period of dependence on parents' care and long lives contribute to this sociality, as individuals have lifelong relationships that may last 50 years or more. Social intelligence is the study of behaviors that occur in the realm of social interactions.

Learning

While controversial, it is apparent that primates learn by watching and imitating the behaviors of others in the social group. Young chimpanzees living in the wild spend years observing other chimpanzees cracking nuts with stones or dipping sticks into termite mounds. These foraging skills take years to master, and a chimpanzee may not be fully proficient at them until she or he is 8 years old or older. Field researchers have observed mothers actively teaching their offspring nutcracking skills by careful and slow demonstration. The cross-fostered chimpanzee Washoe modeled signs for her son Loulis, signed on his body, and demonstrated some signs to him, although he learned most of his signs by watching and imitating Washoe and others signing chimpanzees.

Coalitions

Primates form coalitions in which two individuals cooperate and support each other to compete with a third individual. Typically, support goes to a more dominant individual. In these cases, the dominant individual's high status is reinforced, while the lower-ranking supporter may gain status or improved access to resources. Primates also engage in more risky, tactical coalitions in which both coalition partners will benefit from their relationship *if* their coalition is strong enough to overturn (immediately or eventually) the dominant individual. If not, they both stand to lose. Among wild chimpanzees, grooming behaviors are sometimes directed strategically at an individual to obtain or maintain his support in future dominance contests. A dominant chimpanzee, Ntologi, consistently separated two less dominant males when they were together or grooming, apparently because their coalition threatened his status. In his study of captive chimpanzees, Frans de Waal described a dominant male's repeated attempts to break up coalitions between two males ranked below him. Eventually, one of these lower-ranked males displaced the dominant through the assistance of his coalition partner, whose rank was also elevated by the displacement.

In chimpanzee communities, high dominance is not always predicted by mere physical power, but instead is associated with social prowess and the ability to form and maintain coalitions. One chimpanzee at Gombe (Tanzania) famously obtained top rank through his intimidation displays using noisy, empty gas cans pilfered from Jane Goodall's camp. These examples indicate that strategic skills are important in determining one's status.

Chimpanzees of the Tai Forest (Ivory Coast) engage in hunting where individuals take cooperative and

complementary roles. For example, some individuals block the prey's escape route while others chase the prey. Again, such data reflect tactical and strategic skills of chimpanzees because they require an understanding of others' actions and the likely outcome of those actions.

Deception

Tactical deception is defined as "acts from the normal repertoire of the agent, deployed such that another individual is likely to misinterpret what the acts signify, to the advantage of the agent." Byrne and Whiten surveyed primatologists working with captive and wild populations. They obtained 132 descriptions of primate deception that they then categorized into three types. Examples of *active concealment* include a gorilla covering a playface and a chimpanzee covering an erection. *Active misleading* occurs when an individual provides misinformation. For example, as part of usual experimental procedures designed to test spatial knowledge, chimpanzee Belle alone saw the location of food hidden in the enclosure. Rock, a more dominant chimpanzee, often took the food from her when they later were released together in the foraging trial. On several occasions, Belle led her group mates to the wrong location and ran back to enjoy the true food source on her own. On other trials, the experimenters hid a single piece of food away from the main cache. Belle then led Rock to the single piece of food; then she alone rushed back to the main cache. In *counterdeception,* the deceiver is deceived by another. In an example of this, after Belle's misleading, Rock sometimes walked away from her and then suddenly spun around to watch her.

Theory of Mind

Theory of mind is defined as one individual having the ability to take the perspective of another. Tests of theory of mind in human children entail creating situations that show what children know about others' beliefs, knowledge, and attention. For example, in one experiment a child sat in a room with two adults. One adult placed an object in one of three containers and then left the room. The second adult and the child moved the object to another container. The adult asked the child, "When the absent adult returns will he look for the object in its original location, or the new location?" Autistic and very young children answered that he will look in the new location; older children responded that he will look in the original location.

Apes in captivity and in the wild demonstrate skills that fall under the heading of theory of mind. Apes, for example, gesture to others if the receiver is able to see the sender, but if the receiver is oriented so that his or her view is blocked, the sender instead uses auditory or tactile signals. In a test similar to the one given to children described above, an orangutan indicated an object's new location to an experimenter who did not know that the object had been moved during his absence. In another test, captive chimpanzees watched a human put food into a container. In the test phase, the chimpanzees could ask one of two humans to help: the human who hid the food or another human who did not know the food's location. Most chimpanzees chose the knowledgeable human.

Valid Comparisons

Many of these highly inferential studies of social intelligence have found that apes reared in cages perform poorly on tests when compared to home-reared human children or human-reared apes. When the apes demonstrate success, it is often attributed to "enculturation," or the human-rearing conditions, as if this endows the ape with new abilities rather than enabling the normal expression of capacities that are already present. Cage-reared chimpanzees have delays in motor development when compared to their wild counterparts. Likewise, human children reared in orphanages often show delays in motor development, especially when there is a high infant-to-caregiver ratio, as compared to home-reared children. Cognitive research comparing cage-reared apes to human children raised in stimulating environments probably tells us more about the effect of environment on cognitive development than about the cognitive capacities of the two species. We urge caution when interpreting results that claim that a cognitive ability is exclusively human when the comparison subjects include apes reared in restricted, unenriched environments.

Mirror Studies

Mirror studies were developed in the 1970s by Gordon G. Gallup Jr. as an experimental means of assessing an organism's sense of self. When presented with a mirror, many organisms either have no reaction to it or respond to what they see reflected in a social manner. A dog, for example, might ignore or bark at its mirror image. Large-bodied apes use their mirror images for self-inspection, as do human adults

and older children. Experimenters use the dye test to examine responses to mirror images. In this test, the experimenter secretly marks the subject. When the subject sees his or her mirror image, the experimental question is whether the subject touches or inspects the mark. If the subject touches it, he or she has demonstrated the use of the mirror for self-inspection. Researchers argue that apes and human children that inspect the mark have a sense of self.

Imaginary Play

Human children engage in imaginary play in a variety of ways. They use objects as though they are something else, treat inanimate objects as if alive, play roles, and create pretend scenarios. Apes also engage in pretend play. The cross-fostered chimpanzee Viki had an imaginary pull toy, and cross-fostered CHCI chimpanzee Dar played tickle games with a stuffed animal. Wild chimpanzees also engage in pretend play, such as carrying logs as if they were young chimpanzees. The gorilla Koko and the bonobo Kanzi have gone through the motions of eating imaginary objects. Similarly, wild chimpanzee Wanda dipped an imaginary stick into an imaginary termite mound.

Culture

Culture is a central concept of anthropology, and many scholars have devoted their careers to attempting to capture the tangible and intangible aspects of it. Culture is sometimes viewed by anthropologists as being exclusively human—"something humans do." Biologists, however, have developed their own definitions of culture that expand its possible existence to nonhuman and nonprimate forms. Fish biologists Laland and Hoppitt define cultures as "those group-typical behavior patterns shared by members of a community that rely on socially learned and transmitted information." More important than definitions, which exclude or include particular species, are descriptions of the behaviors.

Chimpanzees, orangutans, and humans use a variety of tools to extract foods, and the types of tools they use vary from one region to another. These tool-using traditions are socially transmitted. Monkeys, apes, and humans communicate visually and use various gestures, postures, and facial expression in their interactions with each other. Chimpanzees, bonobos, and orangutans in different regions use different gestures. For example, chimpanzees at Gombe Stream Reserve in Tanzania grasp an overhead branch during grooming, while just south in the Mahale Mountains the chimpanzees grasp each other's hands during grooming. Researchers working at nine different long-term chimpanzee field sites collaborated and developed a list of 65 behavior patterns. The behaviors were classified in terms of their local frequency of occurrence. There were 39 behaviors that the researchers determined were cultural variants, since they were absent in some communities and customary or habitual in others. The behaviors involved tool use and grooming and courtship behaviors. This same analysis has been applied to orangutans and bonobos, and cultural variants have been identified in both of these species. For example, orangutans in one location place a kiss squeak on a leaf, while in another location they place a kiss squeak on the back of the hand.

— Mary Lee Jensvold and Lori K. Sheeran

Further Readings

Bekoff, Marc, Allen, Colin, & Burghardt, Gordon M. (2002). *The cognitive animal.* Cambridge, MA: MIT Press.

Boesch, Christophe, & Boesch-Achermann, Hedwige. (2000). *The chimpanzees of the Tai Forest.* New York: Oxford University Press.

Byrne, Richard. (1995). *The thinking ape.* Oxford, UK: Oxford University Press.

Fouts, Roger, & Mills, Stephen. (1997). *Next of kin.* New York: William Morrow.

Gardner, R. Allen, Gardner, Beatrix T., & Van Cantfort, Thomas E. (Eds.). (1986). *Teaching sign language to chimpanzees.* Albany: State University of New York Press.

Goodall, Jane. (1986). *The chimpanzees of Gombe.* Cambridge, MA: Harvard University Press.

McGrew, William. (2004). *The cultured chimpanzees.* Cambridge, UK: Cambridge University Press.

Robbins, Martha M., Sicotte, Pascale, & Stewart, Kelly J. (Eds.). (2001). *Mountain gorillas.* Cambridge, UK: Cambridge University Press.

Russon, Anne E., & Begun, David R. (Eds.). (2004). *The evolution of thought.* Cambridge, UK: Cambridge University Press.

Tomasello, Michael, & Call, Josep. (1997). *Primate cognition.* New York: Oxford University Press.

Van Schaik, Carel. (2004). *Among orangutans.* Cambridge, MA: Harvard University Press.

Ape Language

Language is a collection of symbols that represents objects, actions, and thoughts. It is representational, allowing for the transmission and relocation of information between minds. It can be written, spoken, gestured, and/or signed for purposes of communication.

It is often debated whether or not humans are the only animal possessing language capabilities. In particular, some studies have revealed that great apes (chimpanzees, bonobos, gorillas, and orangutans) exhibit some languagelike qualities. Apes have a larger brain size to body size ratio than all other nonhuman primates. In addition, one of the apes, the chimpanzee (*Pan troglodytes*), shares 98.4% of their deoxyribonucleic acid (DNA) with humans.

Apes typically use scent markings, pilo (hair) erection, facial expressions, and vocalizations, as well as other verbal and visual means of communication. Apes also can communicate with humans, and chimpanzees are capable of forming infrequent human vocalizations in response to human speech. In addition, some apes make the complex hand movements used in American Sign Language (ASL).

Nonetheless, ape language is qualitatively different than human language. Apes do not have a vocal tract that allows them to speak the same way people do. Also, apes do not have the same level of intelligence as humans, which some believe is necessary for understanding and producing speech. Furthermore, ape language is not as complex or expressive as human language.

There have been many studies on the language abilities of the great apes. Research has been conducted on the evolution of language, the acquisition and production of language, as well as strategies for teaching language to humans. The results of some ape language studies have been beneficial to those working on language acquisition in mentally challenged children.

Manual signing, plastic "words," computer lexigrams, and simultaneous communication have been used in ape language studies. In fact, human curiosity with the language abilities of apes dates back to the 1930s. In 1933, Winthrop and Luella Kellogg raised Gua, a female chimpanzee, along with their infant son, Donald. Over a period of 9 months, Gua was able to understand and respond to about 70 verbal commands. In 1966, another chimpanzee, Sarah, participated in language research designed by David Premack. Sarah learned to form sentences by placing plastic tokens that symbolized words in a vertical line. Sarah was able to read and write with over 130 words.

In 1967, two psychologists, Beatrice and Allen Gardner, taught Washoe, an infant female chimpanzee, how to use ASL in the same way that parents teach deaf children to sign. After a period of about 3 years, Washoe learned to sign approximately 130 words. Lana, another female chimpanzee, participated in a language study beginning in 1971 at the Regional Centre of Primate Studies at Yerkes. Duane Rumbaugh and colleagues placed Lana in an experimental chamber, where she used a computer lexigram language system to "talk."

Beginning in 1972, Koko, a female gorilla (*Gorilla gorilla),* learned ASL through simultaneous communication with Penny Patterson. Koko responded to verbal questions and signed novel combinations of words. Researchers noted that at times, Koko even talked (signed) to herself and her dolls.

Nim Chimpsky, a chimpanzee, was raised and taught sign language as if he were human. In 1979, Herbert Terrace developed a language study at Columbia University in which Nim was a subject. In 44 months of training, Nim learned 125 words and was able to combine two- and three-word utterances. However, after reviewing years of data, Terrace concluded that most of the time Nim was not signing spontaneously. Rather, he appeared to be imitating his trainer's signs.

Chantek, an orangutan *(Pongo pygmaeus),* was taught ASL by Lyn Miles, who raised him as her child. As Chantek's vocabulary increased, the ideas that he expressed became more intricate. Chantek used signs in combinations and even invented his own signs (for example, "eye-drink" for contact lens solution). Chantek learned over 150 words from 1979 to 1986 and did not simply imitate his caregivers, but used signs to initiate communication. In addition, Chantek was able to comprehend spoken English.

Kanzi, a bonobo (*Pan paniscus*), learned to use language without specifically being trained or prompted to do so. Kanzi accompanied his mother, Matata, when she attended language-learning sessions in 1980 with Sue Savage-Rumbaugh. At the time, Matata was being taught a computer lexigram language. During Matata's language training, Kanzi often tried to interact with the researchers and sometimes touched the lexigrams on the keyboard. At first, Kanzi received little attention because his mother was the focus of the study. However, one day, Matata was absent and Kanzi used the lexigrams competently, to the amazement

of the researchers. To date, Kanzi has learned approximately 256 lexigram words and can understand 500 spoken English words.

In 1985, Kanzi's sister, Panbanisha, joined the language studies at the Language Research Center in Georgia. Panbanisha, a bonobo or "pygmy" chimpanzee, was co-reared with Panzee, a "common" chimpanzee, to see if there were any differences in language acquisition and production between the two species of chimps. Like Kanzi, Panbanisha and Panzee became linguistically competent without specific training. However, it was found that there were differences in the learning abilities of the two apes. Panbanisha learned symbols sooner and combined words in more novel ways than Panzee. Currently, Panbanisha understands over 3,000 words and uses a vocabulary of 250 words.

Although much has been learned from ape language studies regarding the ontogeny of language, there still is a substantial amount of controversy regarding how much apes' language abilities resemble that of humans. Some research shows that apes do not use language spontaneously (for example, Nim), while other research demonstrates that they do (Chantek). Another point of contention is whether or not apes can form grammatically ordered sentences. Although apes do construct sentences using multiple signs, the sentences are often random and/or repetitious. Notwithstanding, Kanzi does not repeat himself often and appears to understand the grammatical rules about lexigram order.

After Terrace's conclusions that Nim Chimpsky seemed to be mimicking the signs of his trainers and could not grasp syntax, funding for ape language research dwindled. Terrace's findings were a major disappointment to talking-ape enthusiasts. However, the work of Sue Savage-Rumbaugh and colleagues brings an encouraging perspective to those who believe that great apes can acquire and produce language.

— Lisa M. Paciulli and Jacqueline L. Hagen

See also **Apes, Greater; Koko (lowland gorilla); Language; Washoe**

Further Readings

Fouts, R., & Mills, S. T. (1998). *Next of kin: My conversations with chimpanzees.* New York: Perennial Currents.

Greenspan, S. I., & Shanker, S. G. (2004). *The first idea: How symbols, language, and intelligence evolved from our primate ancestors to modern humans.* New York: Da Capo Press.

King, B. (1999). *The origins of language.* Santa Fe, NM: School of American Research Press.

Patterson, F., & Cohn, R. H. (1988). *Koko's story.* New York: Scholastic.

Premack, D. (1976). *Intelligence in ape and man.* Hillsdale, NJ: Lawrence Erlbaum.

Savage-Rumbaugh, S., Shanker, S. G., & Taylor, T. J. (2001). *Apes, language, and the human mind.* Oxford: Oxford University Press.

Terrace, H. S. (1987). *Nim, a chimpanzee who learned sign language.* New York: Columbia University Press.

APE COMMUNICATION

Anthropologists and linguists have long debated the communication abilities of nonhuman primates. Linguists Noam Chomsky and Steven Pinker argue that it is impossible to teach primates how to "talk," while other researchers point to language skills demonstrated by a number of apes observed in language laboratories around the world. Most animal researchers acknowledge that the comprehension skills of nonhuman primates far outreach their ability to produce language. The most notable example of language skills in apes has been demonstrated by Sue Savage-Rumbaugh's work with Kanzi, a bonobo who spent almost 20 years at the Language Research Lab at Georgia State University in Atlanta, Georgia, before being relocated to the Iowa Primate Learning Center in Des Moines, Iowa, in 2004. Kanzi is able to recognize more than 1,000 complex sentences. Savage-Rumbaugh, an animal psychologist, maintains that language is innate to all animals. Studies of bonobos have also shown that they communicate with one another vocally, symbolically, and visually. Verbally, bonobos are able to convey threats, fear, or other emotions by their shrill calls. Symbolically, bonobos leave signs to guide one another toward sanctuary or away from danger.

Visual communication is portrayed through facial expressions and physical postures.

Chimpanzees, who share 99.4% of their genes with humans, have been instrumental in expanding knowledge of the ability of nonhuman primates to communicate with humans. Working with several chimpanzees, including Sarah who was born in 1960 and has since become a celebrity among those who are interested in animal research, animal psychologists David and Ann Premack have taught chimpanzees to comprehend sentences by first teaching them to recognize subjects and actions. The short sentences consisted of such combinations as "cut apple," "wash grapes," or "give banana." Initially, each plastic sign was presented along with its physical counterpart. Subsequent lessons taught the chimpanzees to differentiate between plastic signs of one object and a physical presentation of another. For example, chimpanzees were able to understand that a plastic sign of a banana did not match an actual apple.

To test the ability of chimpanzees to reverse roles in communication as speaker and listener humans automatically do, David and Ann Premack again used plastic signs to teach chimpanzees two distinct languages. One language consisted of words used in production, while the other was made up of words used only for comprehension. Employing the production signs, the chimpanzees were able to make up sentences. The researchers used the second language to produce sentences for the chimpanzees to read. While the chimpanzees understood the words when given to them in the proper context, they did not initially recognize production words offered in the context of comprehension, or vice versa. In subsequent tests, when only a few words were added to the opposite lexicon, with instructors teaching the chimpanzees that words formerly used only in comprehension could now be added to the production lexicon, all chimpanzees successfully accomplished the bidirectional task.

Researchers have repeatedly found that apes imitate the species that raise them. In the case of laboratory animals, apes are likely to imitate the humans who work with them. In fact, some researchers have found that such apes so closely associate themselves with human trainers that when asked to categorize humans and apes, they see themselves as humans rather than apes. Some researchers posit that the close relationship between researchers and trainers and their subjects makes cross-species communication possible.

– Elizabeth Purdy

APE INTELLIGENCE

Because of their close genetic link to human beings, apes have been closely examined by anthropologists and other scientists who are interested in establishing the evolution of intelligence. While most of the work on ape intelligence has been done with chimpanzees, biologist Robert Shumaker, director of the Orangutan Language Project of George Mason's Krasnow Institute, has spent years testing the intelligence of two orangutans at the National Zoo in Washington, D.C. Two orangutan siblings, 26-year-old Azy and his sister, 24-year-old Indah, relocated in September 2004 to the Great Ape Trust, the new primate sanctuary in Des Moines, Iowa, along with Shumaker. The orangutan is the rarest member of the great ape family. Only a few thousand are thought to exist in the Indonesian wild. All others are either in zoos or in research laboratories.

Through ongoing research, Shumaker and his colleagues contend that they have proved that orangutans have the ability to both use and understand abstract thought.

Communicating through symbolic language, Azy and Indah were taught to identify specific images on a computer screen. For instance, a square preceded all food words, and a circle came before all objects. In this way, Azy and Indah learned to ask researchers for food or to perform tasks such as opening containers. Neither of the orangutans knew how to count.

Shumaker and his colleagues also tested the ability of orangutans to perform quantity judgment tasks by teaching Azy and Indah to think beyond immediate food gratification. They offered the orangutans two food choices with one to six grapes

in each dish. The animals' natural instinct was to choose the dish containing the largest number of food items. During the test, researchers removed the orangutan's first choice and gave them the other as a reward. Ultimately, the orangutans learned that they gained more by choosing the dish containing the smaller amount of food.

Shumaker notes that chimpanzees, even though they are believed to be more intelligent than orangutans, have not mastered this level of abstract thought. In a 1995 study of two chimpanzees, consisting of 400 trials, Sarah T. Boysen and Gary G. Berntson failed to demonstrate this ability in two chimpanzees. Subsequent studies with chimpanzees reported similar results, with the chimpanzees continuously opting for the dish with the most candy. The ability of chimpanzees to act in their own interest is somewhat surprising considering the well-documented ability of chimpanzees to master the ability to count. Earlier studies by Boysen and Berntson, for example, demonstrated the ability of chimpanzees to add arrays of food placed in two or three possible sites. A number of researchers who study chimpanzees insist that Shumaker and his colleagues have not proved that orangutans are more intelligent than chimpanzees.

Overall, Shumaker and his colleagues speculate that an animal's mental ability is dependent on its social environment. Animals such as chimpanzees that must aggressively compete for food with others in their group are less likely to have the option of rational consideration of food choices than are orangutans, which are the least social species in the great ape family.

— Elizabeth Purdy

Apes, Fossil

Apes and humans, commonly referred to as hominoids, are a closely related group of primates classified together in their own superfamily, the Hominoidea. The living hominoids are subdivided into two families, the Hylobatidae and the Hominidae (see table). The hylobatids or lesser apes (belonging to a single genus, *Hylobates*) are represented by 11 or so species found throughout Southeast Asia. Humans and the great apes—the orangutan (*Pongo pygmaeus*), the gorilla (*Gorilla gorilla*), the common chimpanzee (*Pan troglodytes*), and the pygmy chimpanzee or bonobo (*Pan paniscus*)—are grouped together in the Hominidae. In the past, the great apes were included in a separate family, the Pongidae, but recent anatomical and molecular studies have shown that the African apes (*Gorilla* and *Pan*) are more closely related to humans than they are to the Asian orangutan. The revised taxonomy better reflects, therefore, the phylogenetic relationships among members of the Hominoidea.

The evolutionary history of the extant hominoids is poorly known, with the notable exception of humans, which have a relatively complete fossil record extending back to more than 4 million years ago. The earliest fossil apes that can be definitively linked to the living hylobatids are known from sites in China dated to less than 1.5 million years ago, while the fossil record for the African apes is restricted to a few possible fragmentary finds reported from the late Miocene and Pleistocene of East Africa, dating back to 6 million years ago. The evolution of the orangutan is, by comparison, much better documented. Fossil teeth from cave sites in Asia dating back to more than 1 million years ago show that orangutans in the past were considerably larger than they are today, and that unlike their living relatives, which are found only on Sumatra and Borneo, they once had a wider distribution in Southeast Asia that extended as far north as southern China. In contrast to the paucity of fossils available to trace the evolutionary history of hominoids over the past 5 million years, there is a wealth of evidence from the Miocene period (23–5 million years ago) to show that apes were once much more common and more diverse in the past than they are today.

The remains of the earliest apelike fossil primates, commonly known as proconsulids, have been recovered from sites in Kenya, Uganda, and Saudi Arabia dating to the late Oligocene and early Miocene (28–16 million years ago). There are a dozen species of proconsulids, ranging in size from the small *Nyanzapithecus harrisoni* (8 kg), which was about the size of a modern-day black-and-white colobus monkey, to *Proconsul major* (60–90 kg), which was the size of a female gorilla. Comparisons of their teeth, jaws, and skeletons indicate that proconsulids exhibited a wide diversity of dietary and locomotor behaviors,

Classification of Fossil and Living Hominoids

Superfamily Hominoidea

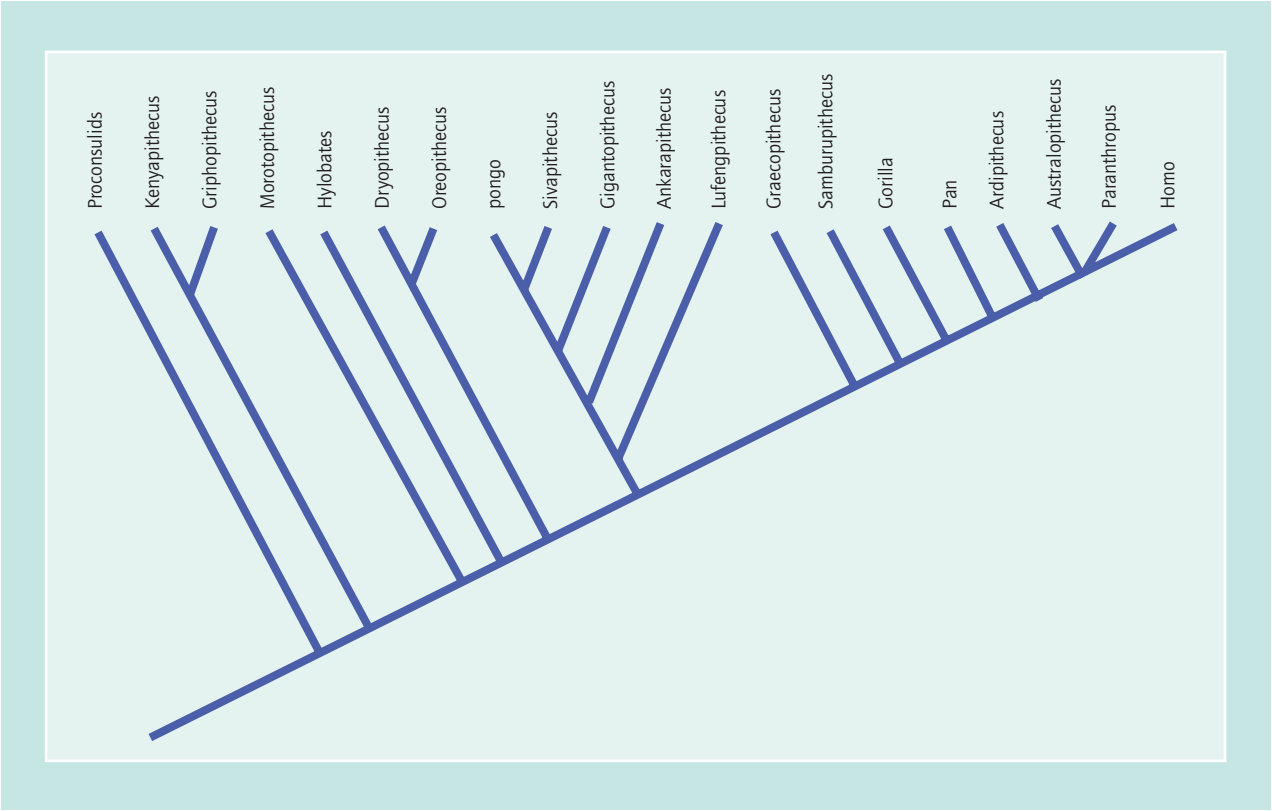
- Family Proconsulidae
  - *Afropithecus** (early Miocene, Kenya)
  - *Heliopithecus** (early Miocene, Saudi Arabia)
  - *Kamoyapithecus** (late Oligocene, Kenya)
  - *Mabokopithecus** (middle Miocene, Kenya)
  - *Nyanzapithecus** (early and middle Miocene, East Africa)
  - *Otavipithecus** (middle Miocene, Namibia)
  - *Proconsul** (early and middle Miocene, East Africa)
  - *Rangwapithecus** (early Miocene, East Africa)
  - *Turkanapithecus** (early Miocene, Kenya)
- Family Hylobatidae
  - *Hylobates* (Pleistocene to Recent, Southeast Asia)
- Family Hominidae
  - Subfamily Kenyapithecinae
    - *Equatorius** (middle Miocene, Kenya)
    - *Griphopithecus** (middle Miocene, Turkey and Central Europe)
    - *Kenyapithecus** (middle Miocene, Kenya)
    - *Nacholapithecus** (middle Miocene, Kenya)
  - Subfamily Oreopithecinae
    - *Pierolapithecus**
    - *Dryopithecus** (middle to late Miocene, Europe)
    - *Oreopithecus** (late Miocene, Italy)
  - Subfamily Ponginae
    - *Ankarapithecus** (late Miocene, Turkey)
    - *Gigantopithecus** (late Miocene to Pleistocene, Asia)
    - *Khoratpithecus** (late Miocene, Thailand)
    - *Lufengpithecus** (late Miocene, China)
    - *Pongo* (Pleistocene to Recent, Southeast Asia)
    - *Sivapithecus** (middle to late Miocene, Indo-Pakistan)
  - Subfamily Homininae
    - *Ardipithecus** (late Miocene to early Pliocene, Ethiopia)
    - *Australopithecus** (Pliocene, Africa)
    - *Gorilla* (Recent, Africa)
    - *Graecopithecus** (=*Ouranopithecus*)* (late Miocene, Greece)
    - *Homo* (late Pliocene to Recent, worldwide)
    - *Orrorin** (late Miocene, Kenya)
    - *Pan* (Recent, Africa)
    - *Paranthropus** (Pliocene to Pleistocene, Africa)
    - *Sahelanthropus** (late Miocene, Chad)
    - *Samburupithecus** (late Miocene, Kenya)
  - Uncertain taxonomic status
    - *Morotopithecus** (early Miocene, Uganda)

* Denotes extinct apes

but they were typically arboreal quadrupeds that ate various combinations of soft, ripe fruits and young leaves. The best known species are *Proconsul heseloni, Proconsul nyanzae, Turkanapithecus kalakolensis,* and *Afropithecus turkanensis.* Recent studies have shown that proconsulids represent either the earliest known hominoids or primitive stem catarrhines (the group that gave rise to both Old World monkeys and apes). They are certainly more primitive than any of the living apes, retaining generalized skulls and teeth, and monkeylike postcranial skeletons. However, during the early Miocene, there was at least one species of hominoid living in East Africa, *Morotopithecus bishopi,* which had already acquired some of the unique postcranial features of modern apes. This species, from Moroto in Uganda, dated to more than 20 million years ago, had specializations of the lumbar vertebrae and scapula, not found in the contemporary proconsulids, that indicate that it had developed the stiff-backed, partially upright posture and suspensory forelimbs that are characteristic of modern apes.

During the middle Miocene (16–10 million years ago), conditions in East Africa became drier, cooler, and more seasonal, and open woodland habitats replaced the humid tropical forests typical of the early Miocene. These ecological changes coincided with the appearance in East Africa of more advanced types of apes, including the earliest true hominoids, as well as stem hominids. The best known fossil apes from this time period are *Equatorius, Kenyapithecus* and *Nacholapithecus,* which are classified together as kenyapithecines. *Kenyapithecus* is known only from a handful of specimens from the locality of Fort Ternan in Kenya, whereas *Equatorius* and *Nacholapithecus* are represented by large samples of jaw fragments and isolated teeth, as well as partial skeletons, from several localities in Kenya. These apes are more derived than the proconsulids in having thickened enamel on their cheek teeth, more robust jaws, a simian shelf (a distinctive bony buttress on the internal inferior surface of the front of the mandible), and relatively larger upper premolars. Their limb bones indicate that they were probably more terrestrially adapted than proconsulids, and they exhibit a number of specialized features for forelimb-dominated climbing that link them more closely to modern hominoids. *Nacholapithecus,* at least, lacked a tail as in living apes. Another intriguing fossil ape from this time period is *Otavipithecus* from Namibia, dated to approximately 13 million years ago, and the only Miocene hominoid species recorded from southern Africa. Until recently, it was known only by a single lower jaw fragment, so its relationship to other fossil and extant hominoids has been difficult to establish. However, additional cranial and postcranial specimens of *Otavipithecus* have now been discovered, and these suggest that it was more closely related to earlier proconsulids than to contemporary apes from East Africa.

Up until the middle Miocene, hominoids were restricted to Africa, but during this period they migrated for the first time into Eurasia. The earliest Eurasian hominoid, dated to 16–14 million years ago, is *Griphopithecus,* which has been found in Turkey and central Europe. The teeth and jaws are similar to those of *Kenyapithecus* from East Africa, to which it is probably closely related. Once in Eurasia, hominoids became established over a wide geographical region, extending from Spain and France in Western Europe to eastern China, and they became increasingly diversified during the middle and late Miocene (16–5 million years ago). The best known fossil Eurasian hominoids are *Dryopithecus* (Western and Central Europe), *Pierolapithecus* (Spain), *Oreopithecus* (Italy), *Graecopithecus* or *Ouranopithecus* (Greece), *Ankarapithecus* (Turkey), *Sivapithecus* (Indo-Pakistan), and *Lufengpithecus* (China). Of these forms, *Sivapithecus* is clearly closely related to the living orangutan because it shares many unique specializations of its teeth and cranium with *Pongo,* including thick-enameled cheek teeth, reduced upper lateral incisors and large central incisors, orbits (eye sockets) oval in shape and taller than they are broad, narrow interorbital distance, lack of development of a distinctive bony bar above the orbits, a dished face in profile, and a tiny incisive foramen penetrating the palate. In contrast, the relationships of the other Eurasian Miocene hominoids to each other and to living apes remain contentious. A number of alternative hypotheses about the interrelationships of Eurasian Miocene hominoids has been proposed: (1) that they form a closely related group with the living orangutan, all being derived from a common ancestor that migrated into Europe from Africa sometime during the middle Miocene; (2) that some of the Eurasian hominoids, such as *Dryopithecus* and *Graecopithecus,* are more closely related to the African apes and humans than they are to *Sivapithecus* and the orangutan; and (3) that they represent a diverse group containing primitive hominoids, as well as forms belonging to the orangutan and African great ape lineages (see figure). The later Miocene apes



A cladogram illustrating the evolutionary relationships of some of the fossil and living apes

from Asia, such as *Ankarapithecus, Gigantopithecus,* and *Lufengpithecus,* are possibly related to *Pongo,* but if they are, they are certainly more distantly related than is *Sivapithecus* (see figure). The relationships of *Lufengpithecus* from the late Miocene (7–10 million years ago) from southern China are especially problematic, because although its teeth are remarkably similar to those of living orangutans, even when compared with *Sivapithecus* it lacks the specialized features of the cranium shared by *Sivapithecus* and *Pongo.* The recently described fossil ape from the late Miocene of Thailand, *Khoratpithecus,* may provide an important link between *Sivapithecus* and *Pongo.* The absence of a scar on the chin region of the mandible for the attachment of the anterior digastric muscle in *Khoratpithecus* is a peculiarity among hominoids that is found only in orangutans.

The skeletons of *Dryopithecus, Pierolapithecus,* and *Oreopithecus* are relatively well known, and they show that these Western European apes were specialized for stiff-backed, forelimb-dominated arboreal climbing, clambering, and suspension, quite similar to modern great apes, especially the orangutan. Although few postcranial remains of *Lufengpithecus* are known, they indicate a similar locomotor pattern. *Sivapithecus,* by contrast, living in the subtropical woodlands of northern India and Pakistan, was primarily adapted for arboreal quadrupedal running and walking along larger branches, but it also probably spent time feeding on the ground. This is quite different from the uniquely specialized quadrumanous climbing and clambering locomotor pattern characteristic of modern orangutans. Later Miocene Eurasian hominoids were specialized for a variety of different diets, ranging from leafy and fibrous foods in *Oreopithecus,* to hard seeds and nuts in *Graecopithecus,* to soft fruits and young leaves in *Dryopithecus* and *Sivapithecus.*

An ecological shift from moist temperate and subtropical woodlands to drier, more seasonal habitats during the later Miocene coincided with a sharp decline in the diversity of hominoids in Eurasia. This event, which is dated to 9.6 million years ago in Western Europe, has been dubbed the "Vallesian Crisis" (the Vallesian is the European Land Mammal

Age for this time period). The only survivor in Europe toward the end of the Miocene was *Oreopithecus,* a highly specialized relative of *Dryopithecus,* which was isolated on a group of islands in the northern Mediterranean that today form part of Italy. It survived in isolation until about 7 million years ago when the islands became connected to the European mainland and allowed an influx of more competitive mammals, including monkeys. *Lufengpithecus* and *Sivapithecus,* along with the aptly named *Gigantopithecus,* continue in the late Miocene of Asia. The latter ape was the largest known hominoid, with massive jaws and teeth specialized for eating tough, fibrous vegetation, such as bamboo, and an estimated body weight that may have exceeded 200 kg (living male gorillas, by comparison, average only 170 kg). All of these Eurasian hominoids became extinct by the close of the Miocene (5 million years ago) except for *Gigantopithecus,* whose remains have been recovered from Pleistocene cave sites in southern China dated to less than 1 million years ago.

Hominoids also became extremely rare in Africa during the late Miocene. A large fossil ape, *Samburupithecus,* known only by a single maxilla from Kenya (dated to 10–8 million years ago), may represent a close relative of the African apes and humans. Until recently, a few isolated teeth of fossil hominoids from the late Miocene sites of Lukeino and Lothagam (dating to 7–5 million years ago) in northern Kenya were all that were available to document the earliest known occurrence of the human lineage prior to 5 million years ago, but the remains were too scrappy to be confident about their affinities or tell us much about their anatomy. Then, beginning in the mid-1990s, paleontologists working in Ethiopia, Kenya, and Chad made some remarkable discoveries that have helped to fill this critical gap in the fossil record. The recently described *Ardipithecus, Orrorin,* and *Sahelanthropus,* dating from about 7 million years ago to 4.4 million years ago, are argued to be the earliest representatives of the human lineage. They each show a combination of features that indicate reduced canine size and bipedal locomotion, both of which are unique features of later human ancestors. Most researchers agree that these fossil hominoids are close to the ancestry of humans, although there has been some debate about the evidence presented in favor of this viewpoint. The earliest definitive record of fossil hominoids that are closely related to humans is known from the Pliocene with the appearance of *Australopithecus anamensis* from Kenya (4.2–3.9 million years ago) and *Australopithecus afarensis* from Ethiopia and Tanzania (4.0–3.0 million years ago).

— *Terry Harrison*

Further Readings

Begun, D. R., Ward, C. V., and Rose, M. D. (1997). *Function, phylogeny, and fossils: Miocene hominoid evolution and adaptations.* New York: Plenum Press.

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego, CA: Academic Press.

Hartwig, W. C. (Ed.). (2002). *The primate fossil record.* Cambridge, UK: Cambridge University Press.

Apes, Greater

Current nomenclature divides the apes into two distinct families: the greater apes and the lesser apes. Historically, apes were classified together in the family Pongidae, which excluded humans. Now there are two families, Hominidae and Hylobatidae. The greater apes comprise the family Hominidae, consisting of gorillas, chimpanzees and bonobos, orangutans, and humans. There has been much discussion on the nomenclature of the great ape. Current DNA evidence implies that humans share a common ancestor with the chimpanzee/bonobo line and that this ancestor is extinct. On the primate family tree, humans separated much more recently than the gorilla did. When looking at the family tree, the four African great apes shared a common ancestor between 8 and 10 million years ago, the orangutan and gorilla separating from the ancestral line prior to chimpanzees, bonobos, and humans.

With the advent of DNA analysis, a new understanding of primate genetic diversity has come about. Chimpanzees, gorillas, humans, and orangutans are all more closely related to one another than any of these four genera are to the gibbons. Humans, chimpanzees, and bonobos share 98.4% of the same DNA sequence. Gorillas share 97.7% of their DNA with humans, chimpanzees, and bonobos. Orangutans share 96.4% of their DNA with humans, chimpanzees and bonobos, and gorillas. One important difference between humans and great apes is humans' comparative low level of genetic variation. Just like cheetahs,

which have little variation in their genes, humans went through a population bottleneck of approximately 10,000 people, which greatly diminished genetic variability. Signs of past bottlenecks are also evident in the populations of western chimpanzees.

All living members of the family Hominidae have no tails and differ from the lesser apes by being larger in size, spending more time upright, having fewer young, and having a higher level of parental investment. Apes have five molars in the Y-5 pattern as compared to the Old World monkeys, which have four molars in a bilophodont pattern. Apes have a more mobile spine compared to Old World monkeys. These are all anatomical adaptations to the apes' vertical hanging and brachiation locomotion. Except for gorillas and humans, all true apes are agile climbers of trees. Their diets are best described as omnivorous, consisting of fruit, grass seeds, and in most cases small quantities of meat either hunted or scavenged, along with anything else available and easily digested. Gorillas, chimpanzees. and bonobos live in Africa, in complex social groups. Orangutans live as solitary individuals in the forests of Indonesia.

Apes' forward-pointing eyes were used to spot potential predators, prey, and social signals. An evolutionary adaptation to a life in socially complex groups gave way to a large, complex brain. Chimpanzees and orangutans are known to make simple tools to extract insects from holes and extract nuts from hard shells. Tool making involves a preconceived image of what the tool will look like. The capacity to visualize the scenario is possible only with an advanced brain. Orangutans have even been observed untying knots, unscrewing large bolts, working out for themselves the steps necessary to achieve a complex task. The hominids were able to master tool use and shape their environment. Great apes also have the capacity to understand and communicate using abstract symbols and gestures, such as American Sign Language.

All ape species, except humans, are rare or endangered. All great ape loss, whether it be caused by habitat destruction, the pet trade, or the bushmeat trade, is a consequence of humans overpopulating the globe at an alarming rate, resulting in social and environmental changes.

— *Gregory Scott Hamilton*

See also **Apes, Lesser; Bonobos; Chimpanzees; Gorillas; Orangutans**

Further Readings

Caccone A., & Powel, J. R. (1989). How closely are humans related to other primates? DNA divergence among hominids. *Evolution 43*, 925–942. The Great Ape Trust of Iowa, http://www.iowagreatapes.org/primates/

Fouts, R. (1997). *Next of kin.* New York: William Morrow.

Steen, F. S. (2004). Communication Studies, University of California, Los Angeles. *Ape diversity,* http://www.cogweb.ucla.edu/ep/ApeDiversity.html 2004; *Paleoanthropology,* http://cogweb.ucla.edu/ep/Paleoanthropology.html

Apes, Lesser

Apes, in the past, have been classified as a single group of primates. The current nomenclature divides apes into two distinct families: the greater apes and the lesser

apes. The lesser apes are in the family Hylobatidae, consisting of 11 species that are currently recognized in the family. *Hylobates,* the single genus of Hylobatidae, is divided into 4 subgenera: the Hoolock gibbon *(Bunopithecus),* the Lar gibbon *(Hylobates),* the Concolor gibbon *(Nomascus),* and the Siamang *(Symphalangus*). The term *lesser ape* implies that while the gibbons are apes, they did not pursue the same evolutionary line that gave rise to humans. While gibbons stayed in the trees, great apes engaged more time on the ground.

The English translation for Hylobatidae is "tree walker." Gibbons live in the forest canopy and infrequently descend to the ground. Because they are above everyone in the forest, they never battle with large predators or compete with other apes on the ground. This lifestyle has enabled them to remain petite and agile. Morphologically, their arms are the most exaggerated and the longest of all the primates. The arms end in long, slender hands, and the thumb is attached to the wrist instead of the palm. They use their hands like hooks to move through the forest. This type of locomotion is called *brachiation.* The arm-over-arm movement enables the gibbon to gain great speed in the trees. By using their weight like a pendulum, a gibbon can easily overtake a person running on the forest floor. They can cover over 3 m in a single swing. These lesser apes can also leap from a standstill from branch to branch, sometimes more than 9 m in a single leap. With their extremely long arms and their hooklike hands, gibbons are magnificent acrobats, perfectly adapted for a life in the forest canopy.

Lesser apes are similar to monkeys, with longer canines, slender bodies, and two hard buttock pads, called *ischial callosities.* They are similar to the great apes because they do not have a tail. Their skulls resemble those of hominids, with very short rostra, enlarged braincases, and large orbits that face forward. Their teeth are similar to hominids, as well, with similar grinding molars. The canines are prominent but not sexually dimorphic.

At night, the gibbon sleeps high up in the trees, sitting down on the ischial callosities or curled up on its side. It is the only ape that does not build a nest for sleeping. All gibbons are monogamous, and their social group is based on a mated pair and their offspring, averaging 3 to 4 members. A family may have up to 3 to 4 juveniles aged 2 to 3 years apart. All species of *Hylobates* are highly territorial. Defense rarely involves physical contact, but instead calling, chasing, and a whole host of theatrics, such as stick breaking and thrashing of vegetation. The spacing of different groups is accomplished by loud vocalizations that can carry for several kilometers. Siamangs call out about 30% of the day, and other gibbons 80% to 90% of the day.

— *Gregory Scott Hamilton*

See also **Apes, Greater; Gibbons; Siamangs**

Further Readings

Meyers, P. (2000). *Hylobatidae.* http://www.animaldiversity.ummz.umich.edu/site/accounts/information/Hylobatidae.html

Nowak, R. M. (1999). *Walkers mammals of the world* (6th ed. Vol. 1). Baltimore: Johns Hopkins University Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* East Hampton, New York: Pogonias Press.

Apollonian

Apollonian refers to something or someone presenting the main characteristics of Apollo. Apollo was one of the gods of the ancient Greeks, son of Zeus and Leto, and twin brother of Artemis. He was the divinity linked to sunlight but also to the punishment of impiety by the infliction of diseases, protecting health, music, and divination. His Oracle at Delphi was the most consulted one in the ancient world, by persons as well as by whole cities. Apollo was therefore considered as a "guide," in political and moral matters. At the 7th to 6th century BC, those who were called "the seven wise men" of Greece dedicated to the Delphic Oracle the quintessence of their wisdom, in the form of brief recommendations, which were supposed to illustrate the "apollonian" way of behaving in life. The most well-known of these "delphic precepts" are "Know Thyself," and "Do Nothing Excessive."

Inspired by some of the god's characteristics, the German philosopher and classicist Friedrich Nietzsche (1844–1900) presented his personal interpretation of what might be called "apollonian." In his book *The Birth of Tragedy from the Spirit of Music* (Die Geburt der Tragödie aus dem Geiste der Musik, 1871), Nietzsche considered Apollo as the divine representation of the perfectly plastic beauty (found in the arts of sculpture and epic poetry) of the principles of measure and "individuation." The "apollonian" way of being underlines the value of the individual and creates the cities.

Dionysus, son of Zeus and Semele, the god of wine, natural fertility, orgiastic festivals, and sacred frenzy, who officially occupied the Delphic Oracle during wintertime, while his brother Apollo was visiting the Hyperboreans, was used by the German philosopher as the symbolic counterpart of Apollo. Nietzsche qualified as "dionysian" the art of music, but also the will for life itself, the dynamic and explosive essence of nature, a whole to which man is integrated. Dionysian ecstasy delivers man from the limits of his own self and guides him to the original happy unity with the universe. The "dionysian" vision isn't bound to moral restrictions; it follows the eternal game of life, beyond the notions of good and evil. Nietzsche presented himself as "dionysian" in his way of thinking and being.

With reference to his teacher's Arthur Schopenhauer (1788–1860) categories, established in his work *The World as Will and as Representation* (Die Welt als Wille und als Vorstellung, 1819), the "will" of the world is "dionysian," whereas the "representation" is "apollonian."

For Nietzsche, the ancient Greek tragedy resulted from the harmonious meeting of the "apollonian" and the "dionysian" spirit. Its extraordinary aesthetic and metaphysical quality is due to the fact that the tragic poets (up to Euripides, who "destroys" tragedy, according to the philosopher, by introducing too much reasoning on the stage) realized the perfect equilibrium between myth and music, between the original natural passions and their idealized representation.

Nietzsche thought that all true art should be able to do the same. His aesthetic theories are directly connected to his metaphysics, as art, especially music, is for him one of the most important means of revealing the nature of the world and of the human condition.

— *Aikaterini Lefka*

Source: © iStockphoto/Yusuf Demirelli.

Further Readings

Goold, G. P. (Ed.). (1972). *Diogenes Laertius: Lives and opinions of eminent philosophers* (Rev. ed., R. D. Hicks, Trans.). Cambridge, MA: Harvard University Press.

Aquatic Ape Hypothesis

In 1960, Sir Alister Hardy, a marine biologist knighted for his contribution to the fisheries industry, gave a talk at the British Sub-Aqua Club (a scuba-diving club) and a month later published an article in *New Scientist* on that talk, called "Was Man More Aquatic in the Past?" Although the idea caught people's fancies and garnered some attention by the newspapers, it showed little sign of the long-lasting popular appeal it would eventually have.

It didn't happen overnight. Even with the original article and a follow-up transcript from a radio program, it was 7 years before Hardy's idea got much notice—this time with a two-page write-up by Desmond Morris in *The Naked Ape.*

Elaine Morgan, at the time an Oxford graduate in English and a TV scriptwriter, entered the scene in 1972 with the book *Descent of Women,* the idea for which she got from Desmond Morris's book. This book proved to be very popular, and in time Morgan followed it up with many articles as well as four more books on the subject (in 1982, 1990, 1994, and 1997).

During the 1980s, other proponents arrived on the scene, chief among them a medical doctor from Belgium, Marc Verhaegen. A 1987 conference on the subject resulted in a book presenting opposing views, *The Aquatic Ape: Fact or Fiction?*

The coming of age of the Internet in the 1990s brought the advent of the online venue for presentation and debate, and this subject proved popular. As with many subjects connected with humans and especially human evolution, much of the debate is rancorous and ill-informed. There are nuggets of gold in the online debate; however, just as with the mineral, finding these nuggets requires a lot of panning.

The Aquatic Ape Theory or Aquatic Ape Hypothesis (aka AAT or AAH—this entry will refer to it as the AAT/H) hypothesizes that humans went through an aquatic or semiaquatic stage in our evolution, generally said to have occurred during the transition from the last common ancestor we shared with apes (LCA) to hominids (some, like Marc Verhaegen, claim it continued on through virtually the entire span of human evolution). It claims that certain features are seen in human anatomy and physiology that are only seen in humans and aquatic animals and that these constitute conclusive evidence that our ancestors went through an semiaquatic phase in our evolution. Relying heavily on the principle of convergent evolution, it says that life in an aquatic environment explains these features and that a transition from ape to hominid in a nonaquatic environment cannot. The principle of convergence is used to explain these features, and the idea is said to be more parsimonious than other hypotheses.

Their use of the idea of convergence is generally accurate, but generally, they use parsimony to mean that only one cause explains many features (a more accurate term might be "prime mover" or "umbrella hypothesis," the latter being one that AAT/H critic John Langdon uses).

One problem with the idea is that most of the proponents have been rather vague about the degree of aquaticness to which they refer. One proponent, doctoral student Algis Kuliukas, has come up with an explanation apparently also now endorsed by Elaine Morgan, that water has acted as more of an agent of selection in human evolution than in the evolution of apes such that physical differences between the two may be at least partly explained as adaptations to more efficient movement through acquatic conditions. This definition is perhaps most notable for its vagueness, merely suggesting "more" water use by humans than by apes. Contrast that with the explanation set forth in by Bininda-Emonds, Gittleman, and Kelly: "We consider aquatic carnivores to be those species in which the aquatic habitat inevitably plays a key role in the life-cycle of an individual," which they then compare to definitions as given by others as they discuss the strengths and limitations of their own definition. The AAT/H definition suggested is not only so vague as to be virtually meaningless, it is notable that this is the first attempt at such an explicit definition, and it has taken over 40 years to show up. There has always been an implicit "how aquatic" definition, however, ascertained by the characteristics the proponents have used to build their case.

The proponents of the AAT/H have almost always been vague about just how aquatic our ancestors

supposedly were, and now tend to say simply those ancestors were "more aquatic" than apes, and often use Alister Hardy's suggestion that we were less aquatic than otters. Coupled with this, they are often coy about what animals are said to share our "aquatic" features, sometimes simply saying that these features are found in an aquatic setting or that we share these features with "aquatics." This produces a disconnect between how aquatic most AAT/H proponents claim our ancestors were and what the idea clearly implies on this vital aspect.

The human features said to be accounted for by a semiaquatic past can vary a great deal from one AAT/H account to another, but they form a large and eclectic list, far too large to deal with here (various proponents have suggested sweat, tears, sebaceous glands, the shape of our nose and our thorax, and even being able to cup our hands better than chimps). Probably the most commonly cited features are bipedalism, fat characteristics, and the distribution of human hair. AAT/H proponents concede that bipedalism is not found in any aquatic or semiaquatic mammal. They use a double standard here, as they commonly argue that the idea that hominids evolved bipedality in a terrestrial setting is badly damaged by the fact that no nonhuman terrestrial mammal is predominantly bipedal, yet the fact that no aquatic mammal is bipedal is brushed off as irrelevant.

The mammals with the fat features the AAT/H proponents say are similar to ours are seals, whales, and the sirenia (dugongs and manatees) and for lessened hair, only whales and sirenia and one species of wild pig, the babirusa, which has less hair than other wild pigs and is at home in water but also seems to be, like humans, an exception, since other wild pigs that are at home in the water have plenty of body hair; the babirusa seems to be, like other mammals with lessened body hair (such as some mole rats), an exception among related mammals with similar habits. The pachyderms also have little body hair, and although this is generally accepted as being due to their size and the need for heat loss, this well-established physiological principle concerning volume versus surface area is viewed with suspicion by many AAT/H proponents as they concentrate on water as a guiding factor in evolution. So, the aquatic mammals the proponents say we resemble have all been aquatic for tens of millions of years and are so highly specialized they are virtually, or completely, incapable of living a nonaquatic life. The AAT/H claim that these features arose in a mammal less aquatic than an otter rings hollow.

So, relative fattiness and body hair loss among aquatic species are actually restricted to only a very few highly specialized aquatic mammals. Even more damaging to the AAT/H is that these features in aquatic animals do not actually resemble those of humans in any but the most superficial manner. This has particular significance in light of the AAT/H claim to be more parsimonious than other theories.

Most humans are fatter than many wild mammals, and we have, on average, less body hair than apes and most other wild mammals. But the characteristics of human hair and fat—the differences between the sexes and during the individual's lifespan—are not like hair and fat features due to convergent evolution due to environment. Instead, those characteristics in humans seem to be classic cases of sexual selection. They differ considerably between the sexes, change dramatically at puberty, and then change again at the end of the reproductive period of life. (We are also unusual in having rather fat babies, but that seems to be connected to the fact that our infancy and accompanying brain growth is itself a highly unusual affair among primates, or any other mammal.) In aquatic mammals, these fat and hair characteristics either start out similar to adults of their species or become like adults of their species very rapidly after birth. This is also true of other features that AAT/H proponents use or have used as evidence, such as sweat and sebaceous glands.

The problem vis-à-vis parsimony is that if these were due to convergence during a semiaquatic past, the AAT/H requires two major changes to these features instead of one: first, ancestral, then similar to aquatic mammals, then sexually selected as in modern humans. Other hypotheses would require only one change, perhaps gradual: first ancestral, then sexually selected, albeit perhaps with some supporting advantages in natural selection (such as Wheeler's cooling hypothesis or the recent idea that elimination of some parasites had a hand in our present hair characteristics). So, the AAT/H claim to be a more parsimonious explanation for these features falls apart.

Explanations for these discrepancies have been offered. Sometimes proponents actually suggest that the degree of aquaticness in hominids varied between the sexes and during the lifespan, so as to match the characteristics we see today. Since both sebaceous glands and hair are used as evidence, the hypothesis

becomes internally inconsistent, since then females would have to be more aquatic than males to explain hair and body fat, while males would have to be more aquatic than females to explain sebaceous glands; babies would be aquatic to explain hair and body fat, but not very aquatic to explain sweat and sebaceous glands, while these same characteristics in children would mean they were relatively nonaquatic until puberty. These ad hoc explanations seem much more unlikely than the simple explanation of sexual selection.

There are other problems with AAT/H attempts to explain human hair as the result of some degree of aquaticness. The only reasonable suggestion as to why body hair would be reduced is to aid in swimming speed (some take the tack that it just is similar to aquatic mammals and offer no reason for the similarity—however, as mentioned already, it is not really similar). There is, however, conflicting evidence on body hair and swimming speed; it would seem that increasing body hair might work as well as eliminating it, but humans took neither course. We still have body hair, and many humans have quite a lot of it, often curly and just what we don't want for increased swimming speed. That is why competitive swimmers use one or both of two methods—they shave off body hair and recently many have adopted special body suits that increase boundary layer thickness and decrease drag by mimicking the effects of dermal ridges as seen in dolphins' skin or the hair of seals. The one thing competitive swimmers don't want is what we have now, yet what we have now is what AAT/H proponents say was due to adaptation for swimming speed. And then there is the hair on our heads, which is far longer, and often bushier, than that of apes. So, the AAT/H proponents are left with several ad hoc explanations They have suggested that head hair is explained by a swimming stroke, usually said to be the breast stroke, which leaves the long head hair (and beard in males) entirely out of the water—and this unlikely position is supposed to be one which allows for high swimming speeds creating selection for hair loss. Otherwise, they are faced with claiming that there was intense environmental selective pressure for reduction of body hair but not for head hair. The only other explanation would be that there were two major changes to hair instead of one as required for nonaquatic hypotheses, which destroys their claim of parsimony.

The problem of likely aquatic predators such as crocodiles and sharks being much faster swimmers than even the best human athletes today is met with the suggestion that we congregated in large groups and the aquatic predators would only catch the slower members. This is unlikely to have helped even if true, since aquatic predators are seldom seen before they strike and would not have to take the slowest swimmers even if the herding idea was true. Still, that is better than Morgan's first attempt to answer the problem of crocodiles, which was to label them "hypothetical." No credible suggestion of how these ancestors would meet the problem of aquatic predators has ever been produced. Another problem for the hypothesis is the fact that while terrestrially we can show how an animal of medium size with a low birthrate can, and still does, deal with predators, by studying chimpanzees, no aquatic or semiaquatic animal of medium size with a low birthrate exists.

A common argument for the AAT/H over the years has been the fact that many humans like to visit the seashore, and many humans like to swim for recreation. This race memory argument has been used by both Hardy and Morgan (Hardy in particular believed in the race memory idea as part of his long-held belief that race memories and telepathy had played a role in human evolution) and carries no more weight, and perhaps less, than Gordon Orians's idea that our liking for certain park settings is based on our evolutionary past on mixed savannas. Lately, the subject of fatty acids for brain growth, specifically DHA and LNA, have been promoted as support for the idea of an aquatic past, since marine fish, especially cold-water marine fish, are rich in DHA. This ignores the fact that these fatty acids are readily available in various plant sources as well as in wild game. Humans (except infants) can synthesize DHA from LNA found in plant foods; infants get it through breast milk.

Some evidence long used as support for the AAT/H has been dropped by its proponents, such as Morgan's contention that sweat and tears were analogous to salt excretion glands, as seen in marine and desert reptiles and birds. The problem here is that even when this notion was first put forward, it ran counter to basic physiological principles in osmoregulation, including the fact that such excretions are never hypertonic, as they would have to be to be part of such a system. When Morgan formally dropped this line of evidence, she claimed it was because new information had been discovered that wasn't available when she first proposed it, but in fact the contrary information was known well before she first brought it up, and some of

that information was in the references she used as the sources for her claims. This does not speak well of the reliability of AAT/H research, and is not unusual.

Morgan has used a passage about bradycardia in seals, the slowing of the heart, as evidence about breath holding before dives. Morgan has also incorrectly stated that hymens are only found in humans and aquatic mammals; that humans, bonobos, and aquatic mammals are the only ones that engage in ventro-ventro copulation; that seals sweat via eccrine glands; that the only nonhuman animals that have been reported—none confirmed—to cry emotional tears are aquatic ones (information to the contrary was in the same book and chapter Morgan used as a source); and that the predominate mode of terrestrial locomotion of proboscis monkeys is bipedal. Morgan also has proved to exhibit something of a free hand when it comes to quotes in some of her AAT/H accounts, leaving out words or context to change their meaning, often without indicating the words are absent.

Marc Verhaegen has a history of dubious research. For example, he has claimed that sea lions are, after humans, the mammals that use sweat cooling the most, but in fact sea lions' sweating mechanisms are not very efficient at all, unlike those of a variety of terrestrial mammals—that information was in sources that he referenced. Verhaegen has also suggested that Neandertal noses acted as snorkels and that ear canal exotoses, seen in a small number of Neandertal and erectus specimens, can only mean they were doing a great deal of swimming and diving. Problems with this are that such exotoses also result from exposure to cold air without swimming or diving, and it seems that a pathological condition would be weeded out in a species that was long adapted for swimming and diving. Other examples of the quality of his research include his description of the rhinoceros as "predominantly aquatic" and using the mountain beaver as an example of an aquatic mammal, apparently confused by the name (the mountain beaver often likes wet areas and burrows and succulent plants, but dampness does not make one aquatic in any realistic sense).

These are far from the only examples of poor AAT/H research, and unfortunately they typify the quality of research one sees when the idea is examined closely.

In recent years, proponents have paid a great deal of attention to the research on chimpanzees and gorillas that wade, along with any information about bonobos wading. This is an abrupt about-face, since as late as the mid-1990s, most were claiming as evidence the "fact" that common chimpanzees avoided water at all costs (a common misconception disproved well before that). The amount of bipedality in these situations is often wildly overstated by proponents, and another problem the AAT/H faces with these and other primate species that wade or swim regularly is that these species don't exhibit the other changes the AAT/H predicts—changes such as fat and lessened body hair—but this problem is either downplayed or ignored. It is interesting that bonobos and other apes sometimes use bipedality when wading, and it is certainly one of the items on the list of things that apes sometimes use bipedality while doing, but the AAT/H attempts to be far more than one item on a list.

In summary, the AAT/H has been in existence for well over 40 years now, and while it has certainly attracted a following, it hasn't been very convincing to most anthropologists who've looked at it closely. Its proponents tend to use to their advantage the fact that most people accept the proponents' accounts of the features mentioned and assume that the proponents have been somewhat rigorous and honest in testing their theory against the evidence. And few people are conversant with all the varied lines of evidence that its proponents use. Perhaps a greater problem is that most people accept the proponents' claim that they are doing no more than suggesting that humans used water somewhat more than apes during the evolution of our species—certainly a noncontroversial claim, but a disingenuous one as well when you see what features the AAT/H claims as evidence.

— Jim Moore

See also **Adaptations, Biological**

Further Readings

Bininda-Emonds, O. R. P., Gittleman, J. L., & Kelly, C. K. (2001). Flippers versus feet: Comparative trends in aquatic and non-aquatic carnivores. *Journal of Animal Ecology, 70,* 386–400.

Morgan, E. (1990). *The scars of evolution.* London: Souvenir Press.

Morgan, E. (1997). *The aquatic ape hypothesis.* London: Souvenir Press.

Roede, M., Wind, J., Patrick, J. M., & Reynolds, V. (Eds.). (1991). *The aquatic ape: Fact or fiction?* London: Souvenir Press.

Aquinas, Thomas (1225–1274)

Italian Dominican priest, philosopher, and theologian (Angelic Doctor of the Church), Thomas Aquinas was noted for systemizing theology by infusing ancient Greek philosophy, particularly Aristotle, with divine revelation as depicted by Judeo-Christian faith. Born at Roccasecca to nobleman Count Landulf and Countess Theodora (related to Emperor Fredrick II and Royalty in Spain and France), Aquinas received a classical education from the Benedictine monks at Monte Cassino and later received higher instruction (Trivium and Quadrivium) at the University of Naples. Aquinas, both educated and wealthy, rejected the rewards of the privileged class in favor of a humble and contemplative life associated with religious orders. Although the reasons for Aquinas wanting to join the Order of St. Dominic are a point of speculation, the news of Aquinas's entry into religious life was not well received by all; particularly by his mother Theodora, who imprisoned him for almost 2 years behind the walls of San Giovanni. As he was unrelenting in discerning his vocation, Theodora eventually released him to the Dominican Order.

After close inspection by Dominican superiors and Pope Innocent IV, Thomas Aquinas took his vows and continued his vocation to fulfillment. Among the administrative works, teaching, and ministry, Aquinas attended the University of Paris. Despite conflict between the university and religious Orders over an oath of loyalty, which ultimately caught the attention of both civil and papal authorities alike, Thomas Aquinas received a degree of Doctor of Theology in 1257. Before his death in 1274, Thomas Aquinas was known for his intelligence and reserved nature. Toward the end of his life, Aquinas was said to have had more frequent religious experiences (ecstasy) that would eventually lead him to quit writing in 1273. Aquinas's writings are profound and influential. Among these writings include two important writings: *Summa de veritate catholicae fidei contra gentiles* (1252–1259) and *Summa theologica* (1266–1273). Thomas Aquinas was canonized by Pope John XXII in 1323, and Pope Leo XIII declared Aquinas's written works as the true philosophy of the church in 1879.

Contributions and Perspectives

The influences of Thomas Aquinas upon philosophy (particularly in ethics), theology, and science are profound. Although his writings are directed toward infidels (Jews and Arabs), heretics, and schismatics, Aquinas infused basic Aristotelian principles with sacred scripture to establish a cogent basis for theology. As put forth by the philosophy of Aquinas (subsequently supported by ecclesiastical authorities), the foundations for Catholic theology are threefold: the existence of God, the existence of humankind (in relation to themselves and to God), and revelation (as per Christ). From the five proofs of God's existence (for example, an unmoved mover, first cause, necessary being, absolute perfection, and intelligence), God not only created humankind (fixed) in His image (intellect) but also instilled a directive, via eternal law, natural law, and revelation, for humankind's theologically justified ontology and teleology. Good (being) and evil (privation) are part of an indeterminable array of theistic determinates. Humankind's existence (as with all existence), from beginning to end (including the eternal soul), is an expression of His will and as the ultimate end in itself. This theological view provided both a geocentric and anthropocentric view of our species.

Thomism, though it has experienced deaths and revivals, remains the cornerstone of Catholic philosophy. Surviving philosophical attacks from Orthodox Greeks, Martin Luther, and the philosophies of rationalists and empiricists, the foundational assertions that provided Thomism its logical cohesion began to slowly erode away in light of critical evaluation and scientific advancements. Ironically, it was science, the same science that was considered in the realm of philosophy, which produced the greatest problem for Thomism. Challenges from Bruno, Copernicus, Kepler, and Galileo had contributed evidence in support of heretical views. However, it was Charles Darwin (1809–1882) who provided a cogent theory based on observations, that being the theory of organic evolution. Consisting of common descent, multiplication of species, gradualism, and natural selection, Darwin provided an explanation for diverse life forms on this planet. The metaphysical implications are evident; the evidence for a God (designer), the soul, and afterlife are rejected in light of evidence and rational explanation. Although the philosophies/theology of Fr. Pierre Teilhard de Chardin incorporates a mystical interpretation of evolution, Pope John Paul II (as with previous popes) reaffirmed Thomism as the foundational philosophy of the Church.

— *David Alexander Lukaszek*

See also **Religion and Anthropology**

Further Readings

O'Meara, T. F. (1997). *Thomas Aquinas theologian.* South Bend, IN: Notre Dame University Press.

Torrell, J.-P., & Royal, R. (1996). *Saint Thomas Aquinas: The person and his work.* Washington, DC: Catholic University of America Press.

Arboreal Hypothesis

Researchers in biology have often directed their efforts toward elucidating the origins of major phyla or classification groups. While we have paid the most attention to the larger questions of transitions between classes, we are also considerably interested in the origins of orders. Cladistic methodology demands that we identify synapomorphies that define different orders but, as Matt Cartmill pointed out in 1972, it has not always been easy to identify the adaptive shift that accompanied the origin of a new order. The class *Mammalia* has been particularly troublesome in this regard. The interpretation of primate origins is an especially good illustration of the relationship between the characters used to define the taxon and the adaptive zone reconstructed for the order.

Historically, we have considered the primates difficult to define. George Gaylord Simpson stated this explicitly when he wrote that no clear-cut diagnostic adaptation distinguishes primates from other "primitive" placental mammals. The problem is particularly well exemplified by the controversy between those who would assign the treeshrews to the primates, such as Sir Wilfrid E. Le Gros Clark, and those who would not, such as Robert D. Martin and Leigh Van Valen. Workers have sought to define the primates by a distinguishing complex of evolutionary trends instead of defining the order by a single anatomical feature. In *The Antecedents of Man,* Clark summarizes the evolutionary trends, including generalized limb structure with pentadactyly and retention of skeletal elements including the clavicle that are reduced or lost in other mammalian orders; mobile digits, especially the pollex and hallux, for grasping; presence of flat nails and sensitive tactile pads instead of compressed claws; reduction of the snout and olfactory apparatus; elaboration of the visual apparatus and development of binocular vision; and the enlargement and development of the brain, especially the cerebral cortex. John and Prue Napier suggested additional trends, including the development of truncal uprightness or orthogrady.

Arboreal Theory: Elliot Smith, Wood Jones, Clark

A major paradigm, the *arboreal theory* of primate origins, defines primates by a complex of characters that adapted them to arboreal life. Indeed, we can find virtually all of the trends listed in the preceding section in the writings of the first exponents of the arboreal theory. It was first formulated by Grafton Elliot Smith and his assistant, Frederic Wood Jones, in the early decades of the 20th century by the study of comparative anatomy.

Elliot Smith, a neuroanatomist, was interested in explaining the distinguishing features of primate brains. In his address at Dundee to the Anthropological Section of the British Association for the Advancement of Science, he stated that it was the evolution of the brain and the ability to learn that led to the origin of the mammals, and that we should pay particular attention to the development of the cerebral cortex in primate evolution. Elliot Smith observed that orders of mammals became successful specialists for modes of life that depended on flight, fast running, or aquatic existence. They lost, however, their *primitive simplicity* and *plasticity of structure.* In contrast, the primates did not become narrowly specialized. Elliot Smith considered treeshrews to be insectivores, but he began a tradition in physical anthropology by using them in reconstructing the adaptations that gave rise to the primates. He believed that olfaction was the dominant sense in early mammals, which were essentially terrestrial. Natural selection would favor reduction of the olfactory apparatus and increased development of the neocortex (neopallium) of the cerebrum in arboreal mammals. The arboreal existence favors the development of vision, touch, hearing, agility, and quickness of movement while limiting the utility of smell. Small arboreal early primates could maintain the plasticity of a generalized structure while their brains developed. Elliot Smith pointed to tarsiers as manifesting significant reduction in the size of the olfactory parts of the brain and an increase in the visual cortex of the neocortex. He argued that the entire neocortex was affected by the emphasis on vision rather than smell. The sense of touch also became enhanced, and this

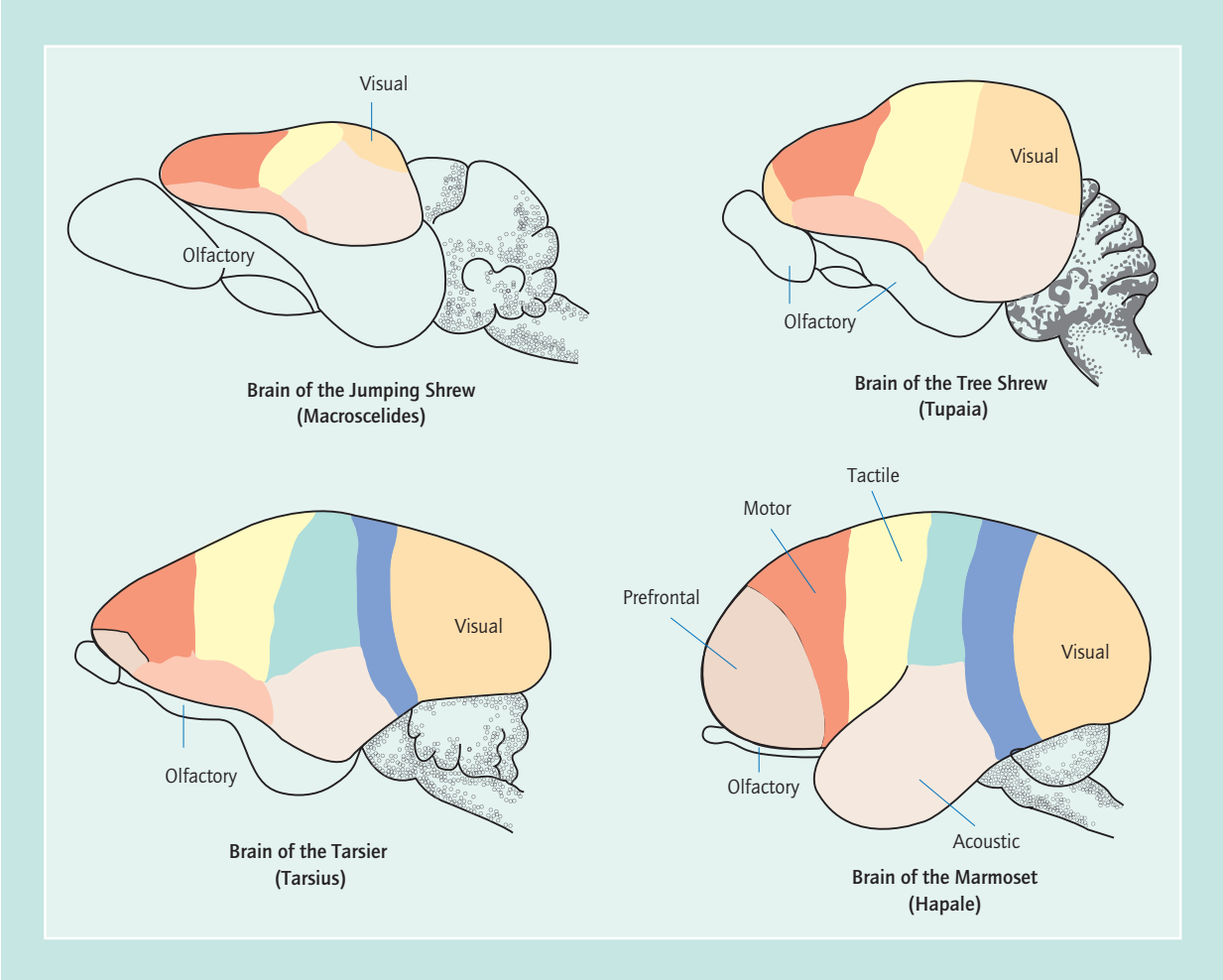


Figure 1 The left side of the brain of an elephant shrew (top left) compared with that of a treeshrew, tarsier, and marmoset

Source: Figure 2 (p. 3) from *The Evolution of Man* by Smith, Grafton (1924). By permission of Oxford University Press.

assisted vision in the conscious appreciation of the environment and in the performance of agile locomotor behaviors. Hearing increased in importance, and the corresponding portion of the cortex expanded. These changes, while increasing the size of the brain and increasing agility, would not modify the primitive characters of the limbs and body. Elliot Smith stated that the interaction of tactile and kinesthetic senses with vision developed the cortex and stimulated the process of specialization of a mechanism for regulating the action of the cerebral cortex (an *organ of attention* to efficiently manage the nervous centers controlling muscles of the body). He ultimately derived the hominin prefrontal area from reliance on vision rather than smell.

Elliot Smith used the figure reprinted here to support his thesis that the olfactory region became relatively reduced and the visual, tactile, motor, and auditory areas expanded during primate evolution. He related the expansion of the frontal ("prefrontal") region to learning to perform skilled movements and stereoscopic vision. He stated that the changes are the result of adoption of arboreal habits.

Wood Jones, in his landmark *Arboreal Man*, drew his evidence from a wider range of anatomical regions than did Elliot Smith. He discussed sensory and cerebral topics in the latter chapters of his book, but was also concerned with skeletal and muscular evidence. His elaboration of Elliot Smith's thesis reflected his interest in the anatomy of the limbs and emphasizes the functional differentiation of the fore- and hindlimbs. The ancestral primate was arboreal in the late Triassic, and its limbs had not become specialized for pronograde cursorial locomotion. Locomotion in the arboreal context favored use of the

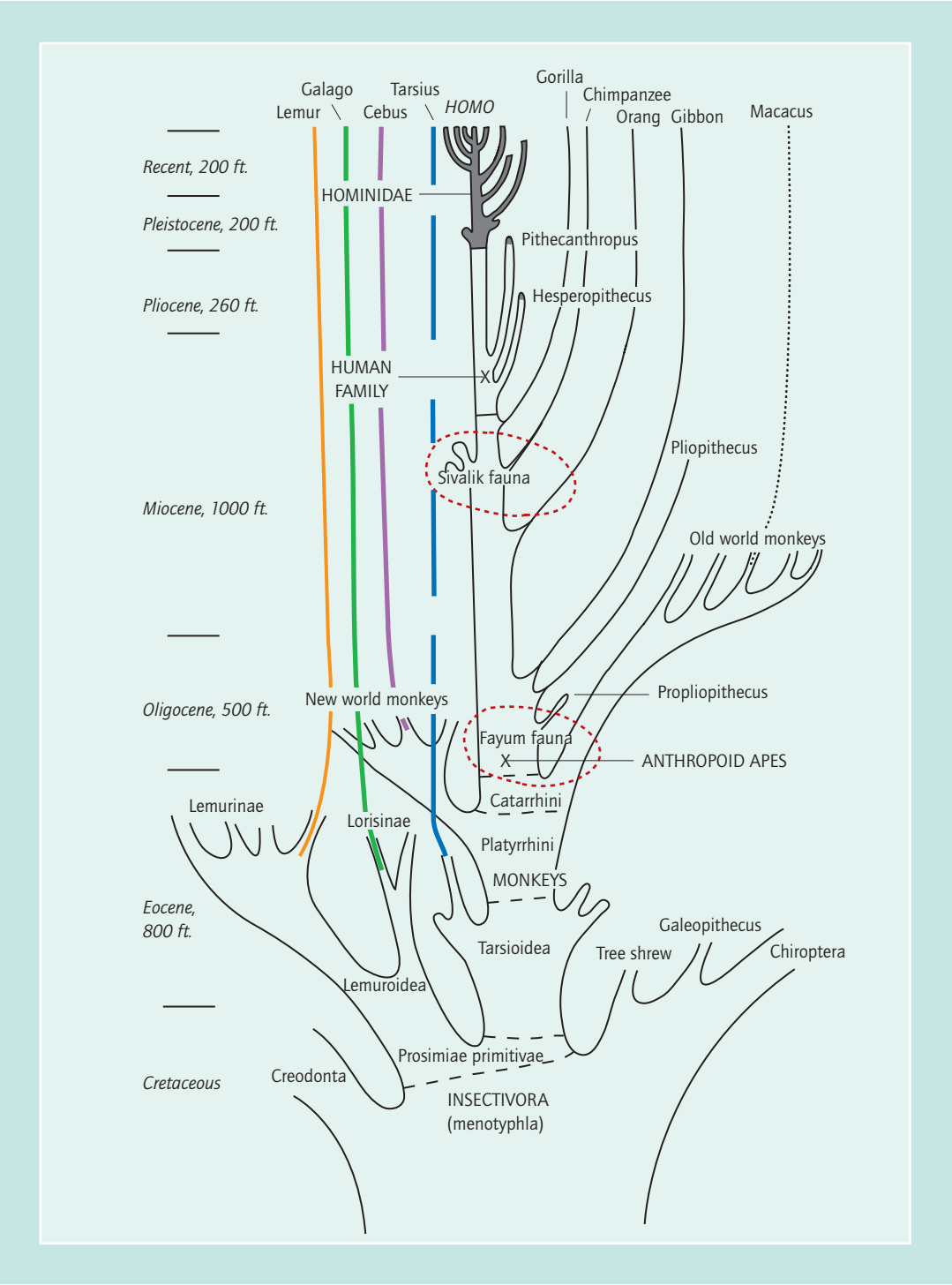


Figure 2 Elliot Smith derived the primates from a group of insectivores that included tree shrews and elephant shrews as Mentophyla. He derived New and Old World monkeys, apes, and hominins from a "tarsioid" ancestor; in a recent classification, Colin Groves assigned the Tarsiiformes as the sister group to the Simiiformes within the Haplorrhini. Elliot Smith used *Tarsius* as a model for the tarsioid stage, manifesting considerable development of the visual portion and reduction of the olfactory portion of the brain, reduction of the snout, orbital convergence, and binocular vision. He believed, however, that tarsiers are unable to perceive texture and the details of objects. Wood Jones strongly emphasized a tarsier-like, rather than an anthropoid ape, model in human evolution.

Source: Figure 15 (p. 141) from *The Evolution of Man* by Smith, Grafton (1924). By permission of Oxford University Press.

forelimb for grasping supports with the palm against the substrate, retention of a clavicle, and use of the hindlimb parallel to the axis of the vertebral column for supporting the animal. Wood Jones used the term *emancipation of the forelimb* to indicate that the forelimb was no longer used solely for support. Postulated reduction of olfaction, caused by arboreal habits, resulted in the reduction of the facial skeleton. The latter led to a drawing of the eyes toward the midline. The increased specialization of the limbs resulted in a more upright posture with associated changes in the gastrointestinal tract, reproductive organs, and axial skeleton. Indeed, Wood Jones considered arboreal uprightness to be basal to the development of human terrestrial uprightness: He explicitly stated that arboreal uprightness preceded terrestrial uprightness. In *Man's Place Among the Mammals,* he further proposed that hominins are descended from an orthograde tarsier-like ancestor. To counter the objection that other orders of mammals include arboreal forms, many of which are dissimilar to primates in their adaptations, Wood Jones used two arguments: The first was that arboreal representatives of other orders are secondarily arboreal, that is, their ancestors were terrestrial, pronograde quadrupeds; in his view, this was not true of the primates. Second, his *law of successful minimal specialization* stated that the specializations of other forms of arboreal mammals (such as sloths) imperil their further "evolutionary progress"; in contrast, the primates show the "maximum of possibilities." With his emphasis on the importance of a mobile, grasping forelimb, Wood Jones viewed the use of suspensory postures by the feet as a "pitfall of specialization" and stated that the evolution of a prehensile tail in some New World monkeys has prevented "real [evolutionary] progress."

In the 1971 *The Antecedents of Man,* the influential anatomist Wilfred LeGros Clark advocates both the arboreal theory and the inclusion of treeshrews within the primates; these two topics are intimately related within Clark's framework of primate evolution. He portrays the origin of the primates in the form of arboreal mammals similar to treeshrews during the late Cretaceous or Paleocene. Reflecting earlier arguments by Elliot Smith and Wood Jones, Clark develops the argument that primates are distinguished by *increased complexity of general organization,* especially in the brain, rather than the elaboration of specializations. The latter was the route taken by more terrestrial mammalian orders in contrast to primates. Clark views primitive insectivores as tree-climbing animals with claws, nonprehensile hands and feet, small eyes and brains, and a well-developed olfactory apparatus. The hindlimbs and (especially) the forelimbs of primates preserve an *ancient simplicity of structure and function,* although the ability to cling and grasp has been increased by a wider range of movement possible at the shoulder, greater rotatory movements between the radius and ulna, a flexible ankle joint, increased mobility of the digits, and development of digital friction pads. Orbital convergence is considered to be advantageous in the arboreal milieu because it produces overlap of the two visual fields and therefore stereoscopic estimation of distance. Clark also points to the incomplete decussation of optic nerve fivers at the optic chiasm as important in primate stereoscopic vision. He differs from Wood Jones because the latter considers orbital convergence to be a secondary result of snout reduction rather than a feature that would be directly subject to selection. Emphasis on the selective advantage of orbital convergence was consistent with the reconstruction of early primate genera, such as *Hemiacodon, Adapis, Notharctus* and *Nannopithex* as vertical clingers and leapers and the conclusion that VCL was the dominant locomotor type in Eocene to Oligocene "prosimians" by John Napier and Alan Walker in the 1970s. Clark relates the evolution of flat nails to increased functional importance of terminal friction pads and believes that pads are more efficeint for grasping than are claws.

Visual Predation Hypothesis: A Challenge to the Theory

A major challenge to the arboreal theory is the *visual predation hypothesis,* explicated in the doctoral dissertation and series of papers by Matt Cartmill. Cartmill develops the hypothesis by comparing extant arboreal mammals with regard to limb morphology and locomotion, orbital convergence, and olfactory regression. He believes that it is unclear that primate-like morphology is the most advantageous to arboreal life and states that it may be disadvantageous in certain contexts. He argues, for example, that the degree of orbital convergence manifested in certain primates decreases parallax and would not be valuable in leaping between branches; the slow-climbing, insectivorous slender loris and slow loris actually have more closely approximated orbits than the leaping galagos.

Cartmill observes that we find primate-like character states in marsupial taxa that hunt and manually

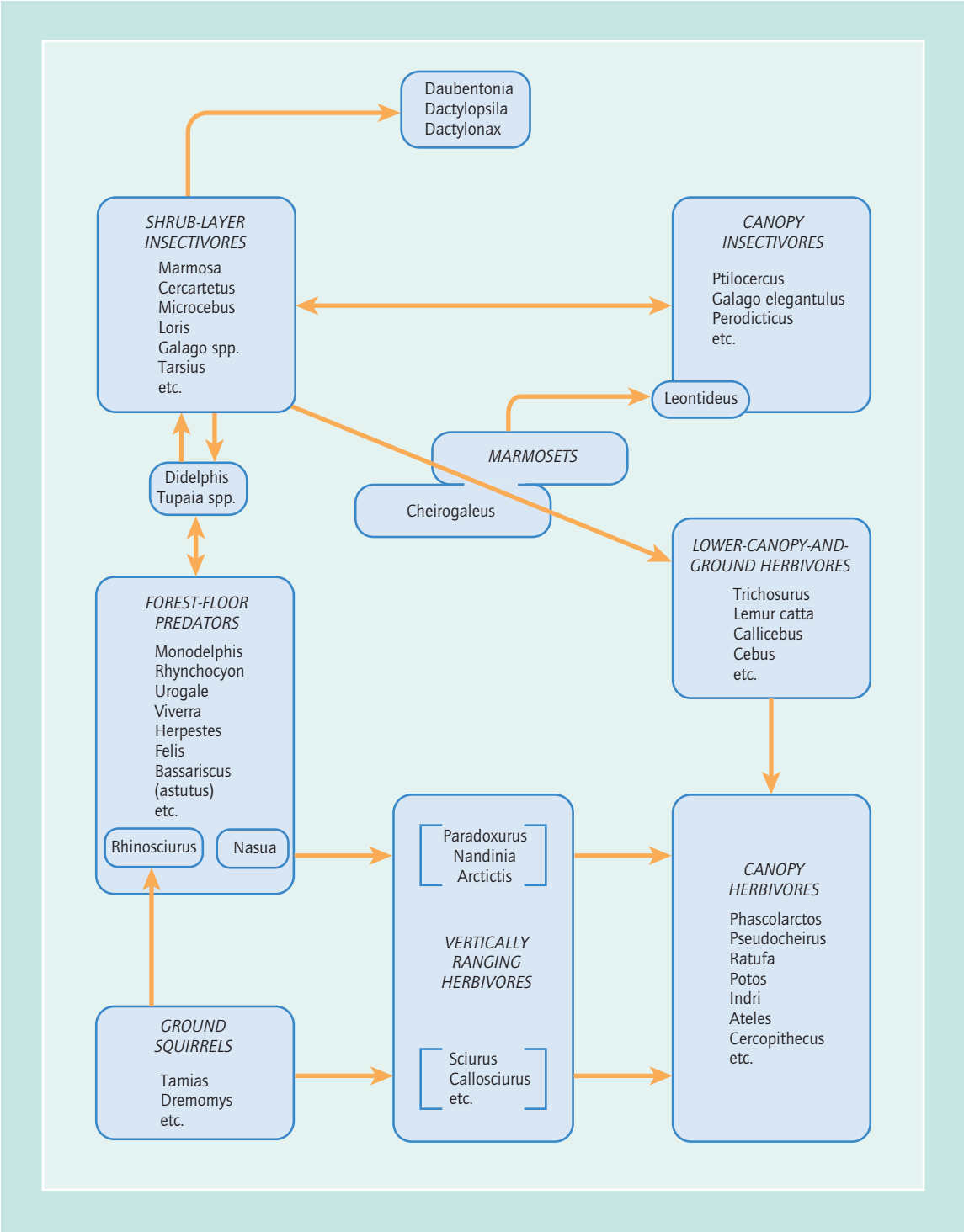


Figure 3 Cartmill excluded taxa such as flying lemurs, bats, and sloths from his analysis. He recognized eight categories in his comparisons of primate adaptations with those of other mammals. The category that contains *Daubentonia* is termed "woodpecker avatars." Cartmill then discussed grasping extremities, orbital convergence, and olfactory regression. He concluded that primate-like morphology is not necessarily superior in the arboreal context; instead, primate-like morphology is adapted to nocturnal, visually-directed predation on insects in terminal branches.

Source: Adapted from Matt Cartmill (1972), Fig. 4-1. Copyright © 1972 by Aldine Publishers. Reprinted by permission of AldineTransaction, a division of Transaction Publishers.

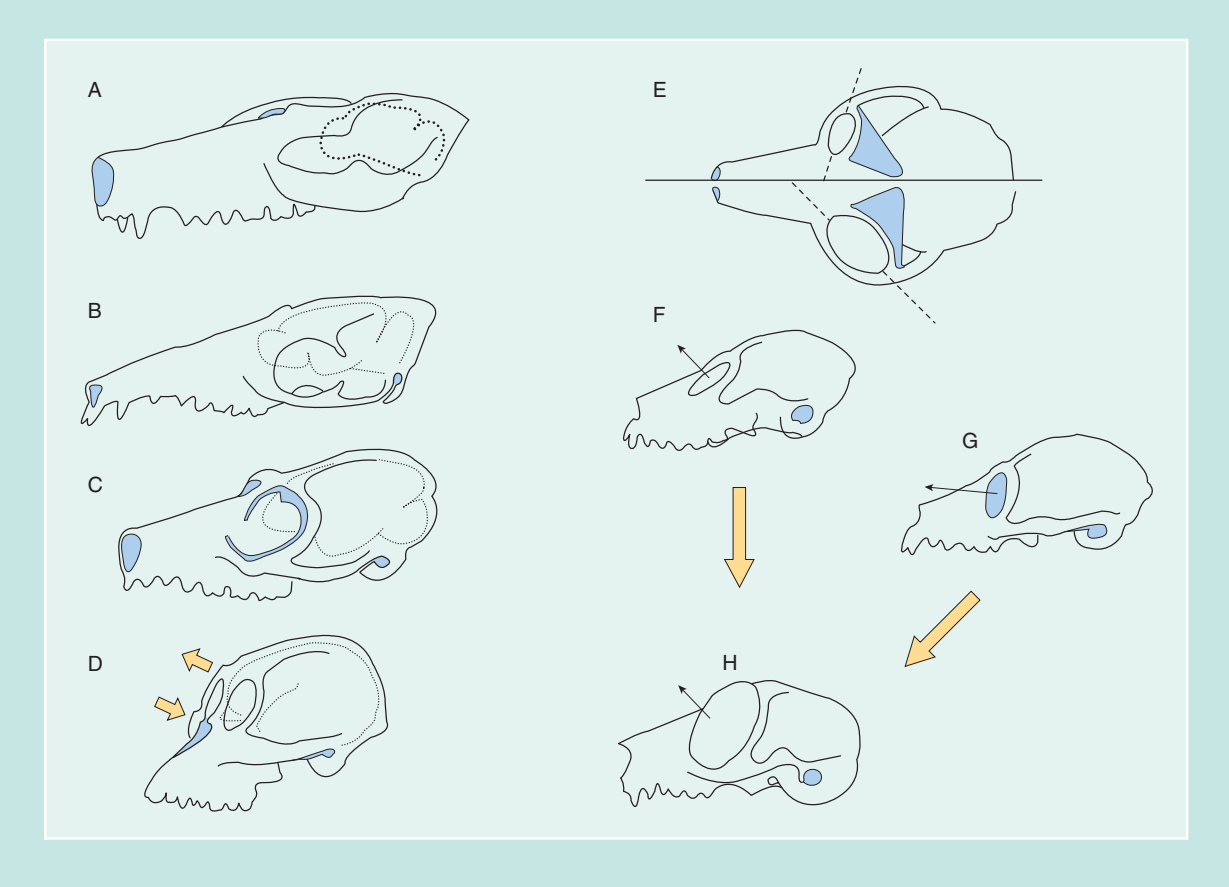


Figure 4 Cartmill's comparison of orbital orientation in the American opossum (A), treeshrew and squirrel (B), "prosimian" (C), and "anthropoid" (D). Drawing E represents a mammal with moderate frontation and approximation of periorbital cones to demonstrate an inverse relationship between relative eyeball size and convergence. Drawings F (for example, *Nycticebus*), G (*Lepilemur*), and H (*G. senegalensis*) compare degrees of convergence and frontation in a discussion of allometric influence on frontation.

Source: Adapted from Matt Cartmill (1972), Fig. 4-2. Copyright © 1972 by Aldine Publishers. Reprinted by permission of AldineTransaction, a division of Transaction Publishers.

capture insects among slender branches. He advocates a primate common ancestor that resembled the extant marsupial "dormouse" possum, mountain pygmy possum, and mouse opposum foraging in forest understory. Major components of his model are the deductions that the prehensile hindfoot is the only shared locomotor specialization in primates and the functional differentiation of the fore- and hindlimbs in arboreal mammals often works in the opposite direction than that postulated by Wood Jones. Cartmill then argues that prehensile ability in the hindfoot allows well-controlled and judicious movements on slender branches during hunting. Visual convergence and correlated neurological specializations are predatory adaptations and are similar to adaptations seen in felids and owls, allowing the predators to gauge distance to the prey without moving their heads. Cartmill considers claws to be a hindrance to a bush animal that grasps thin supports by opposition of preaxial and postaxial digits and infrequently climbs on larger surfaces. Simplification of the olfactory apparatus is the result of the approximation of the medial walls of the two orbits; this conclusion is more similar to that of Elliot Smith and Wood Jones than it is to that of Clark. He states that other lineages of visually oriented predators have acquired comparable visual field overlap without significant olfactory reduction.

Both the classic arboreal hypothesis and the visual predation hypothesis examine two basic ideas: that "arboreality" is the niche of early primates and that primate morphology is *the* best morphology for an

arboreal mammal—ideally and uniquely suiting primates for arboreal existence. Elliot Smith and Wood Jones conclude that these statements are true, but Cartmill determines that primate morphology is not the best morphology for an arboreal mammal and therefore seeks to present an alternative explanation for the suite of primate features. Both schools appear to show a limited concept of *niche*. As G. Evelyn Hutchinson argued in 1958, the niche of an organism is multidimensional. A single tree presents a number of niches for animals depending on factors such as their body size, mobility, and dietary requirements. There is, therefore, no single arboreal niche, and different morphologies may be equally successful in the arboreal milieu and reflect different specific niches. In this context, the visual predation hypothesis may be considered a modification of the classic arboreal theory rather than a completely distinct paradigm. Martin has asserted that a more inclusive answer for primate adaptations is the occupation of a *fine-branch niche* by small- to medium-bodied, nocturnal, and actively foraging early primates. Robert Sussman also advocates a terminal branch setting for early primates in his *mixed diet theory:* well developed visual acuity and color vision and grasping feet and hands would be favorable adaptations for primates foraging in the terminal branches of the successful and active radiation of angiosperms.

Many of the fossil undoubted primates that had earlier been identified as vertical clingers and leapers have more recently been reconstructed as quadrupedal (for example, subfamily Adapinae): Although quadrupedal primates often leap between branches, there is not the emphasis on recurrent leaping that would be found in dedicated VCL forms. Selection for leaping ability per se would not figure as prominently in the interpretation of morphological characters.

An important question is whether ancestral primates and other fine-branch mammals (particularly, the ancestors of *marsupial taxa* discussed by Cartmill) converged in their locomotor adaptations or whether the niche was occupied by their common Jurassic ancestor. Cartmill concludes that there is no evidence that primate-like adaptations were present in *Triassic mammalian* ancestors. South Africa has produced a complete skeleton of the late *Triassic Megazostrodon,* interpreted as shrew-like in habits and with a grasping hindlimb. The recent description by Qiang Ji and colleagues of *Eomaia scansoria* is that of a 125-million-year-old eutherian adapted for climbing. As John Wible and his collaborators point out, *Cretaceous eutherians* have usually been reconstructed as plantigrade, terrestrial, or scansorial quadrupeds. Based on features of the hands, feet, scapula, wrist, vertebral column, and claws, *Eomaia* is capable of grasping and branch walking. Ji and colleagues conclude that *Eomaia* was scansorial (similar to tree shrew *Tupaia*) or fully arboreal (similar to tree shrew *Ptilocercus*), that most basal metatherians were scansorial, and that scansorial skeletal factors are primitive for the earliest known eutherians. There is data that primitive marsupials were also climbers. Homoplasy is a persistent problem; for example, there is evidence that the *Paleocene multituberculate Ptilodus* may have been arboreal with a prehensile tail, but the status of multituberculates as Mesozoic mammals is controversial, and Ji and colleagues maintain there was a lot of convergent evolution in the postcrania of early mammals.

A major concern with the models is that the morphological comparisons are often large-scale, that is, between representatives of different genera or orders, rather than between closely related species or populations that differ in anatomical character states and in substrate preference. Even more crucially, the behavioral/ecological information used in formulating models was often anecdotal. Clear understanding of the behavioral/ecological significance of morphological features is best attained by planned behavioral and experimental study that is driven by the goal of testing specific hypotheses. For example, experimental work by B. Demes and colleagues at the State University of New York at Stony Brook on the issue of "hindlimb drive" (recall that Wood Jones emphasized the functional differentiation of the forelimbs and hindlimbs) indicates that primates are variable in their use of hindlimbs for propulsion and that several varieties of nonprimate mammals are "hindlimb driven." In fact, they conclude that quadrupedal species generally have equal forces on the fore- and hindlimbs.

— Paul F. Whitehead

Further Readings

Cartmill, M. (1972). Arboreal adaptations and the origin of the order primates. In R. Tuttle (Ed.), *Functional and evolutionary biology of primates,* pp. 97–122. Chicago: Aldine-Atherton.

Cartmill, M. (1974). Pads and claws in arboreal locomotion. In F. A. Jenkins (Ed.), *Primate locomotion,* pp. 45–83. New York: Academic Press.

Cartmill, M. (1974). Rethinking primate origins. *Science, 184,* 436–443.

Clark, W. E. L. G. (1971). *The antecedents of man,* 3rd edition. Chicago: Quadrangle Books.
Jones, F. W. (1918). *Arboreal man.* London: Arnold.
Jones, F. W. (1929). *Man's place among the mammals.* London: Arnold.
Martin, R. D. (1990). *Primate origins and evolution: A phylogenetic reconstruction.* Princeton, NJ: Princeton University Press.
Smith, G. E. (1924). *Evolution of man: Essays.* London: Milford.
Sussman, R. (1991). Primate origins and the evolution of angiosperms. *Journal of Primatology, 23,* 209–223.

Archaeology

Archaeology is one of the four subdisciplines of anthropology and is the scientific study of past human culture through ancient material remains. Detailed analyses of these material remains help archaeologists reconstruct and interpret the lifeways of ancient groups. Research themes relating to regional settlement patterns, the evolution of agriculture, the spatial arrangement of large city-states, and the collapse of large empires are often pursued alongside more regionally oriented questions, such as group migration and interaction patterns within a specific valley corridor.

What Is Archaeology, and What Do Archaeologists Study?

Archaeologists are anthropologists who study the material objects, or artifacts, left by past human groups. Artifacts are the tangible portions of culture left by past populations. Examples of artifacts include but are not limited to ancient tools (projectile points, pottery fragments, stone knives, scrapers, bone awls, and fish hooks); food remains and food-processing equipment (animal bones, carbonized seeds, grinding stones, pestles); personal artifacts (buttons, buckles, coins, jewelry, clothing fragments, bone combs); architectural debris (nails, mortar, window glass, bricks, foundation remains); as well as objects used for leisure activities (gaming pieces, clay and stone smoking pipe fragments, musical instruments, writing utensils).

In addition to artifacts, archaeologists study the organic residues, or features, left by past groups. Unlike artifacts, features cannot be removed whole, but are often destroyed during excavation. For this reason, archaeologists keep detailed notes, drawings, and photographs during the excavation of features. Soil samples, designed to recover ancient plant remains, microfossils, pollen, and phytoliths, are also often collected from features. Features include the remains of prehistoric hearths, postmolds from ancient structures, midden debris from garbage dumps, privies, as well as artifact concentrations from work and resource-processing areas.

Artifacts and features are commonly found at sites. Sites are locations containing evidence of human activity. Sites range in size from small resource-processing stations measuring a few meters in diameter, to more elaborate residential sites measuring an acre in size, to large multifamily complexes, which cover dozens of acres. The features of these sites vary with the amount of activity and complexity of the culture group. By example, the complexity of Copan, a large Mayan community, contained an extensive grouping of temples, residences, and specialized procurement stations many acres in size. By comparison, the settlement patterns of the seasonally occupied Schoharie Creek II camp in the Schoharie Valley of eastern New York covered less than a fifth of an acre in size and produced evidence of less than a dozen features. None of these features were elaborate building remains, but rather consisted of the residues of small-hearth, midden, and postmold features.

The Development of Archaeological Theory and Methodology

The history of archaeology dates back centuries and can't be accurately pinpointed to a single event or point in time. Many archaeologists attribute some of the earliest archaeological writings to what has become known as the "Speculative" or "Antiquarian" period dating between 1400 and 1860. This period is largely characterized by local inquiries about the human past. Interest in the past was characterized by an attempt to explain local "finds" and regional differences, often through the natural sciences. Studies centering on the ancient inhabitants of Greece and Rome were popular along with studies designed to confirm the events depicted in the Bible. Discoveries during this period would set the stage for future

scientific studies at the end of the 19th century.

Included among these inquiries was Thomas Jefferson's excavation of an ancient burial mound near his residence in Virginia. Of particular importance was the meticulous record keeping of the various soil layers employed by Jefferson. Jefferson's methodology differs from other 18th-century scholars who merely removed artifacts without consideration to its provenience or context. For this reason, many archaeologists consider this to be one of the earliest professional excavations.

Source: © Christine B. Rieth.

Charles Lyell's *Principles of Geology* was published in 1830 and immediately had a profound impact on archaeology. Lyell's work underscored the importance of stratigraphy and the fact that the same geological processes that were in existence in the past can still be found in present times. This was a departure from previous theories, such as catastrophism, which argued that major catastrophes, such as floods, wiped out past populations and animal species, giving rise to extant species.

During the first quarter of the 19th century, Danish archaeologists C. J. Thomsen and Jan Worsaae constructed a three-age system to explain artifact variation observed in the archaeological collections of the Danish National Museum. The system was characterized by three successive cultural periods, known as the Stone Age, the Bronze Age, and the Iron Age. Specific tool types, behaviors, and technological innovations that coincided with a chronological period of development characterized each period. In North America and Europe, similar evolutionary sequences would be developed to explain local variations in artifacts and would become an important part of archaeological research.

Other important volumes, including Charles Darwin's discussion of evolution in *On the Origin of Species* and Alexander von Humbolt's survey of indigenous populations in *Views of the Mountains and Monuments of the Indigenous People of America,* were also written during this period. Both publications attempted to incorporate the natural sciences when explaining past cultural changes.

Archaeology was developing into a scientific field devoted to the study of the past by the mid-19th century. From approximately 1860 to 1920, archaeologists working in the United States and Europe were concerned with the development of trait lists that could be used to describe the important characteristics of an archaeological culture. Traits lists included the culture group's tools, marriage patterns, political and economic systems, food gathering, and writing systems. The ultimate goal of the construction of these trait lists was to develop a scheme of evolution that could be used to compare and determine the cultural complexity of past groups.

Lewis Henry Morgan's study of the Iroquois of New York is an example of this approach. In *The League of the Iroquois,* Morgan outlined the cultural traits of this group, describing their tools, ceremonies, political organization, and lineage. This information was used to place the society within a unilinear scheme of evolution. Under this scheme, the presence or absence of certain characteristics, such as certain types of tools and the society's ability to participate in certain types of food procurement tasks, formed the basis for its placement. Under this scheme, all cultures processed along the same sequence of evolutionary stages, with some groups being more advanced than others. Unilineal evolution characterized much of the archaeological work of the late 19th and early 20th centuries. Unilineal evolution would influence neoevolutionary anthropological and archaeological theory of the late 20th century.

Source: © Christine B. Rieth.

Only after all facets of the society were documented could meaningful comparisons be constructed. Such ideas would influence archaeology during the first half of the 20th century.

Between 1920 and 1960, archaeologists were primarily concerned with creating historical relationships between culture groups. The creation of such relationships, commonly referred to as the "direct historical approach," assumes that similar traits found between groups living in a particular area can be traced back in time to reveal interrelationships between archaeological cultures. In some instances, a common ancestry between groups was also proposed.

The trait lists developed by early archaeologists also helped to formulate new classificatory schemes based on the similarities between artifacts and their relationships to the larger environment. William Flinders Petrie's seriation (or ordering) of pottery in Egypt during the last two decades of the 19th century is one example of how the careful analysis of the attributes of artifacts was used by archaeologists to study changes in tool manufacture over time. Later seriations of pottery and lithic tools would become important forms of relative dating within archaeology.

In addition to trait lists, the range of archaeological cultures studied continued to be diverse. Excavations by Heinrich Schliemann in search of Homer's Troy, Frederick Ward Putnam's excavations at Great Serpent Mound in Ohio, Alfred Kidder's excavations at the Pecos site in New Mexico, Hiram Bingham's excavations at Machu Picchu in Peru, Manuel Gamio's excavations in the Basin of Mexico, and Theodore Bent's excavations at Great Zimbabwe in the Far East are among the projects carried out during this period.

By the end of the period, Americanist archaeology was beginning to shift away from an evolutionary viewpoint toward one centered on cultural relativism. As introduced by Franz Boas, cultural relativism proposed that individual cultures should be studied in their own terms with limited comparison to other societies. Boas proposed that the behavioral practices and material culture of existing societies should be extensively documented before they disappeared.

Important advances in field and artifact analysis techniques were implemented during the 20th century. Included among these techniques was the introduction of dendrochronology and radiocarbon dating within archaeology. The use of dendrochronology to date archaeological sites was first introduced during the early 20th century, providing the first chronometric dates for the past. The technique was developed by A. E. Douglas, and uses tree rings to date carbonized and noncarbonized wood to calendar years. In the American Southwest, where wood preservation is good, this technique has been widely used to date sites several thousand years in age. In other areas, such as the Northeastern United States and northern Europe, where wood preservation is poor, tree ring sequences have been developed for shorter periods of time.

William Libby first introduced radiocarbon (C^{14}) dating as a technique for determining the chronometric occupation of sites in 1949. Radiocarbon dating measures the amount or rate of decay of the radioactive element carbon. The technique had a profound effect on the field of archaeology and provided important chronological information about the human past. Other absolute dating techniques, including potassium-argon, thermoluminescence, and obsidian hydration dating, soon followed and were integrated into archaeometric analyses.

Advances in archaeological field techniques were also developed during this period. Included among these techniques were new developments in field survey and recording. Among the most important techniques was the Wheeler-Kenyon method. The Wheeler-Kenyon method, named after archaeologists Mortimer Wheeler and Kathleen Kenyon, was a field technique whereby large excavation areas were divided into smaller units separated by unexcavated balks, which remained as control samples. Within these smaller units, archaeologists removed soils along cultural and stratigraphic layers with careful recording of the exposed soils occurring. This technique was widely adopted and is commonly used today.

Finally, any discussion of this period would not be complete without mentioning two important archaeological discoveries. Howard Carter excavated the tomb of Tutankhamen in Egypt between 1922 and 1923. In addition to the mummified remains of the king, excavation of the burial chamber produced spectacular goods, including gilded chariots, statues, decorated jars, food remains, ornaments, and personal items needed in the afterworld. Excavations conducted by Leonard Woolley at the royal tombs of Ur in 1926 produced equally impressive goods, including a wooden lyre, inscribed tablets, and remnants of woven mat that lined the burial chamber. As a result of these excavations, public attention was focused on archaeology and the spectacular artifact collections housed in museums.

Archaeology was developing into a highly scientific discipline, which made use of techniques employed in the natural sciences by the 1960s. Coinciding with this change was an attitude away from the direct historical approach toward a new type of archaeology focused on reconstructing human behavior and the cultural processes that guided these behaviors. Led by Lewis Binford, the "New" or "Processual Archaeology" stressed the use of scientific methods to understand past cultural processes. As a result, multiyear projects related to the settlement and subsistence patterns of larger regions were undertaken in areas such as the Basin of Mexico, the Northeastern United States, and the American Southwest.

Federal legislation was enacted to protect archaeological sites threatened by public construction projects in the 1970s. The result was the development of cultural resource management (CRM) as an important venue for archaeological research and advancement within the discipline. Also known as salvage or contract archaeology, CRM involves "research, conservation, and management of cultural resources within a regulatory framework." CRM archaeology currently employs nearly half of the archaeologists working in the United States, and each year hundreds of millions of dollars are set aside for the excavation and interpretation of archaeological sites, which cannot be avoided, as a result of state and federally funded construction projects.

Postprocessual archaeology became a leading school of thought during the 1980s. Often associated with British archaeologist Ian Hodder, postprocessualists argue that the scientific study of the past omits important ideological tenants of the human decision-making process by focusing too heavily on the processes that are inherent in the environment. Furthermore, it dismisses individual choice in the creation of the past, focusing solely on the evolutionary processes of the group.

Today, archaeology is a very specialized discipline, with the analysis of archaeological materials often being completed by specialists in such varied disciplines as archaeometric, lithic, ceramic, ethnobotanical, faunal, phytolith, and pollen analysis. In addition to a particular research specialty, most archaeologists also specialize in a particular culture area and/or time period, creating individual experts in such varied topics as Early Iroquoian settlement, Roman pottery, or Mayan Post-Classic subsistence.

Archaeological Methods

The methods used by archaeologists are highly specialized and are dependant upon the project's research design. A research design is most simply described as a research plan that is used to guide a field excavation. Research designs generally follow the scientific method, with research hypotheses being formulated at the onset of the project. The hypothesis is then tested through archaeological or ethnographic fieldwork and is confirmed, rejected, or refined based on the collected data. Most research designs contain the following items: list of research questions/hypothesis being addressed; the specific methods used to identify and excavate the site; the lab techniques that will be employed to process, conserve, and interpret the site's remains; and information about the long-term curation, or storage, of the generated materials.

The primary goal of the research design is to identify a research question or hypothesis that will be

investigated as part of the project. Research questions are not haphazardly generated, but result from background research on the prehistory and history of the area, the local environmental and topographic conditions, the sensitivity for artifacts and materials to be preserved after centuries of land use, as well as previous studies on the archaeology of the area. Research questions can be as complex as investigating the settlement systems of a specific valley to something more specific such as defining the date for the earliest appearance of a particular group at a particular site.

Once a research question is formulated, it is important that the archaeologist learn as much about the project area as possible through background research. Often this will include consulting specialists in other disciplines, such as geology to learn about the soils of the region or with botanists to learn about the plant life of the region. In addition, historic maps and other documents should be consulted to assess changes in landscape use, hydrology, and ecology in the area. This information is important and will help the researcher when interpreting the collected data.

One of the primary activities of the archaeologist is to identify and sample archaeological sites. Identifying archaeological sites is a complex process that is based as much on experience as technique. The most common means of finding archaeological sites is by identifying patterns of artifacts or cultural materials on the ground surface. Often, these isolated finds provide clues to the range and type of materials that are located below the ground surface. In other instances, historic maps, deed records, photographs, and oral histories also provide clues to the location of building foundations, privies, and wells. Other noninvasive techniques, including aerial photography, remote sensing, and ground-penetrating radar, have also been employed to locate larger features, such as burials, mounds, and fortifications, associated with sites. Notes, photographs, and maps showing the spatial distribution of the artifacts are usually created and kept as an initial record of the site.

Once a site has been identified, intrusive methods are employed to examine the site. Excavation is a destructive technique that displaces the remains of human activity destroying the spatial arrangement of artifacts in relationship to each other. Once the site is excavated, it can never been replaced or returned to its original state. For this reason, excavation should be completed only under the supervision of a trained archaeologist. Notes about each phase of the excavation should be kept so that data about the provenience (or three-dimensional placement of the artifact) of each object can be determined in relationship to other site materials.

Before excavating, archaeologists establish a grid system that is tied into a fixed point, or datum, on the landscape. Within the grid system, smaller excavation units, consisting of meterwide squares or rectangular trenches, are designated. The grid system is used to record the horizontal and vertical provenience of each artifact, feature, and excavation unit identified at the site. Since excavation destroys the site, the grid system provides another means of recording the context in which materials are found. After the excavation is over, the locations of artifact recovery can be entered into a computer so that a base map of the site can be generated.

Archaeological excavation can occur in many forms, including vertical excavation, horizontal excavation, or a combination thereof. Vertical excavation consists of uncovering a limited portion of a site so that detailed chronological sequences and successive stratigraphic layers can be exposed. This is in contrast to horizontal excavations, which are designed to expose a limited number of stratigraphic layers across a much wider area of the site. Unlike vertical excavations, horizontal excavations are less concerned with exposing deep stratigraphic sequences. Most archaeologists use a combination of these two excavation strategies depending upon the tested hypothesis and the collection needs of the project.

Dirt and artifacts are carefully removed from excavation units using shovels and trowels. Each stratigraphic layer is removed separately, and the artifacts recovered from each cultural layer are screened through mesh hardware cloth to separate the dirt from the artifacts. The artifacts recovered from each excavation unit and stratigraphic levels are bagged separately. Photographs and plan and profile drawings of important artifacts and features are often made before removal. Once the artifacts are removed, they are returned to the laboratory for cleaning and analysis.

In addition to artifacts, flotation and soil samples may be collected to recover microplant and fossil specimens that might help interpret the site. Flotation is a specialized screening technique that is used to separate organic and inorganic materials. Organic materials, such as seeds, roots, wood charcoal, animal bone, and fish scales, will float and are collected separately for identification. Inorganic materials,

such as lithic projectile points, ceramic vessel shards, fire-cracked rock, heavier bone, and shell will settle to the bottom of the screen, where they can be collected. Flotation is most commonly used to collect very small artifacts that might otherwise be lost during normal screening.

Once the excavation is completed, the recovered artifacts and field data are taken to a laboratory to be washed, catalogued, analyzed, and rebagged for storage. The conducted analyses are dependent upon the research hypotheses being tested. However, most studies start by classifying artifacts by material type, age, decorative attributes, and/or function. Comparisons with regional typological sequences are also conducted to determine how the artifacts fit within larger regional sequences.

Specialized analyses such as radiocarbon dating, ceramic residue analysis, trace element analysis, or lithic use-wear analysis may also be conducted on a sample of artifacts. Specialized analyses often provide more detailed information about how the artifact was used, under what conditions, and how it was manufactured. Since few labs are equipped to complete such analyses, specialists are often hired to analyze objects. Specialists become part of the research team, and their analyses are considered when verifying or rejecting the research hypothesis.

Source: © Christine B. Rieth.

Finally, conservation treatments may be applied to fragile artifacts before they are packed for storage. Often, conservation treatments prolong the life of the artifact, preserving it for use by future researchers. For example, fragile textiles if not properly dried and preserved may rapidly deteriorate once removed from the soil matrix. Insect damage and other types of fungal inclusions may also contribute to the artifact's deterioration. Extensive deterioration undoubtedly limits the research value of the piece and limits the amount of information that can be recovered about its past use.

Some conservation treatments, including the refitting of ceramic artifacts and the treatment of corrosion, may also enhance the artifact's research value and reveal important clues about its past use. For example, conservation of the corroding 1812 *Confiance* anchor from Lake Champlain in upstate New York revealed detailed maker's marks and original paint along the upper portion of the shank. These clues were important, allowing archaeologists to determine the object's origin and date of manufacturer of the larger shipwreck.

Once the archaeological site has been excavated and the artifacts have been analyzed, archaeologists are ready to interpret the site. This phase of the project is designed to pull together all of the information collected during the project so that the research hypothesis can be confirmed or rejected. Often, the data are entered into elaborate database and statistical programs so that significance of hypotheses and relationships between artifacts can be confirmed. For larger, regional projects, data manipulation using

geographic information systems (GIS) and CADD technology may be employed. GIS and CADD programs have become an important component in modern archaeological research, since they allow the site to be viewed as a three-dimensional plot, making comparisons of individual stratigraphic layers possible across a large site.

Archaeological sites are generally interpreted against existing cultural models and explanatory frameworks. Archaeological models are subject to change as new data are introduced and we refine our understanding of past cultural behavioral processes. Throughout the history of archaeology, theoretical frameworks related to historical particularism, cultural ecology, structural functionism, unilinear and multilinear evolution, and cognitive archaeology have all been employed to interpret archaeological remains.

Once the archaeologist interprets the site, the results are generally written up either as a research report or other peer review publication. Since archaeology is a destructive science, the field and laboratory records along with the artifacts are often the only remaining evidence of the site. Publication and dissemination of research results to a professional and nonprofessional audience is considered an obligation of the archaeologist, since public funds are directed toward many archaeology projects. In fact, in some cultural resource management projects, a commitment to produce a research report or product revealing the results to the public is written into the project's contract.

While most excavations result in a detailed excavation report complete with details about soil strata, excavation methodology, and raw counts of artifacts, many of these reports are not widely distributed and are largely relegated to the "gray literature" used by other professional archaeologists. Popular articles written for regional journals and national science magazines are also generated as brief summaries of research results. These publications are much more appealing to the public since they are free of the technical jargon and detailed information contained in the more extensive site report.

Archaeology in the 21st Century

In the 21st century, archaeologists have and will continue to face new challenges when reconstructing the past. Included among these challenges are the involvement of Native American groups in reconstructing their own past history, the increasing destruction of sites at the hands of human and nonhuman factors, and the increasing importance of heritage tourism in promoting the historic resources of a region.

One of the major issues facing American archaeologists in the 21st century involves the relationship between archaeologists and Native Americans over ownership of the past. At the heart of this issue is the debate over the curation of human remains and funerary objects recovered from archaeological sites. The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 has actively sought to involve Native Americans in the protection, interpretation, and curation of sacred or funerary objects. Under NAGPRA, archaeological materials from mortuary contexts are subject to return and reburial if they can be culturally affiliated with a known tribe.

Many archaeologists argue that NAGPRA is not beneficial to archaeology, stating that human remains should be preserved and studied to inform us about the effects of cultural and environmental factors on past human societies. They also argue that if these remains are turned over to Native Americans, access to these remains will be controlled by a few who may not have legitimate ownership over these objects. Native Americans argue that these remains are the descendents of ancestors who resided in North America prior to the arrival of Europeans. NAGPRA is a means of "righting" centuries of wrongful behavior levied against Native Americans following the colonization of the New World. In addition, they argue that they know everything there is to know about their past and do not need to know more through archaeology. These differences invoke spirited exchanges between anthropologists and Native Americans, often resulting in multiyear court cases over the ownership of remains.

Other activities on the part of state and federal governments have also sought to give indigenous groups a role in reconstructing their own heritage. Under the National Historic Preservation Act, acknowledgment of the significance of Traditional Cultural Places (TCPs) has given Native groups an important voice in defining the significance of cultural places and their preservation in relation to the group's cultural beliefs. The establishment of Tribal Historic Preservation Offices (THPOs) to oversee Section 106 compliance on federally funded projects has also allowed Native Americans to have input through review and comment on projects that may

affect cultural resources on reservations or within tribal territories.

Destruction of archaeological sites in the face of human and nonhuman agents will continue to plague archaeology in the 21st century. Common threats to the preservation of sites include damage by development projects, agricultural damage, and looting. The increasing rate of development in North America and Europe has resulted in the destruction of hundreds of archaeological sites at the hands of developers. The United States government enacted Section 106 of the National Historic Preservation Act to protect archaeological sites discovered on federally funded projects and on federally owned lands. This legislation requires developers and federal land managers to take into consideration the impacts of a construction project on cultural resources within the project area. In instances where archaeological sites are identified, the agency, in coordination with the developer, is responsible for either avoiding the site through project redesign or mitigating the adverse effects to the site through archaeological investigation.

Cultural resource management studies, designed to mitigate the adverse effects of these projects, have made significant contributions to our understanding of the past by increasing our knowledge about sites that may not have been considered as a result of academic projects. There are unfortunately few laws and regulations designed to protect archaeological resources encountered through state and privately funded projects. In the future, cooperation between archaeologists and developers is needed to ensure that cultural resources are protected and preserved for future generations.

Natural and cultural factors associated with daily farming activities also pose threats to archaeological site preservation. Repeated plowing often impacts and disperses cultural remains across a wide area. Deep mechanical plowing can damage delicate artifacts and destroy intact cultural deposits that may be critical to site interpretation. As discussed below, plowing also often brings artifacts to the surface, where they are exposed to collectors eager to enhance existing collections. Other natural factors, including forest clearing and erosion, often expose buried remains, making them susceptible to looting and destruction through environmental conditions.

Destruction of archaeological sites as a result of looting and the antiquities trade continues to plague archaeology. The recovery of artifacts using metal detectors and other techniques, such as probing, result in the destruction of archaeological materials and destruction of the archaeological provenience from which the artifact was recovered. The intent of looters, to recover objects that could be resold online and in private auction houses, often results in important collections being disassembled and scattered across many different institutions, quite often with little provenience information attached.

Although many states have laws preventing the recovery of archaeological remains on state-owned land without written permission, looters often consider historic sites such as battlefields, historic farmsteads, military sites, and submerged shipwrecks as veritable treasure chests for recovering artifacts. Attempts to stop looting on these sites vary by agency and state, with enforcement being difficult when looters often

work in teams equipped with two-way radios and other gear used to signal approaching land managers. Federal and state governments have sought to prosecute looters in extreme cases; however, many looters are never caught, making careers out of destroying archaeological sites.

Recent interest in heritage tourism has helped to fuel the public's interest in archaeology. The National Trust for Historic Preservation defines heritage tourism as "traveling to experience the places, artifacts and activities that authentically represent the stories and people of the past and present." In many countries, including the United States, Canada, and Great Britain, heritage tourism is an important means of strengthening indigenous cultural identity and generating revenue to support preservation projects. Without such funding, preservation of these sites is often not possible. Venues such as St. Mary's City, Crow Canyon Archaeological Center, and Jamestown, which allow the public to visit archaeological sites and participate in excavations under the supervision of professional archaeologists, also serve to educate the public about our common cultural heritage. Only with public support can archaeologists hope to preserve the past for future generations.

— *Christina B. Rieth*

See also **Binford, Lewis Roberts; Carter, Howard; Dating Techniques; Dendrochronology; Excavation; Fagan, Brian M.**

Further Readings

Bahn, P. G. (1996). *The Cambridge illustrated history of archaeology.* Cambridge: Cambridge University Press.

Fagan, B. M. (1996). *The Oxford companion to archaeology.* Oxford: Oxford University Press.

Hargrove, C. M. (2002). Heritage tourism. *CRM, 1,* 10–11.

Newman, T. W., & Sanford, R. M. (2001). *Cultural resources archaeology: An introduction* (U.S. Department of the Interior, National Park Service, Washington, DC). Walnut Creek, CA: Alta Mira Press.

Renfrew, C., & Bahn, P. (1991). *Archaeology: Theories, methods, and practice.* London: Thames & Hudson.

Ritchie, W. A. (1993). *The archaeology of New York State.* Garden City, NJ: Purple Mountain Press.

Archaeology and Gender Studies

Deconstructing Gender and Sex

Issues of gender presence and interrelations for the past have increasingly been focused upon in the last two decades in the English-speaking archaeological community. Conkey and Spector are widely credited with the first paper to systematically examine the application of feminist approaches and insights to archaeological practice and theory. Studies were published during the 1970s in Scandinavia, which went largely unnoticed due to the comparatively few archaeologists who understand the Nordic languages, exploring archaeological issues using an explicitly feminist perspective. In 1979, Norway hosted a workshop discussing the androcentric element in archaeological interpretation; however, the proceedings remained unpublished until 1987, when they were distributed in English. The proceedings have largely remained uncited in the literature on the history of gender archaeology, resulting in the incorrect attribution of a late date for the inception of its beginnings.

Fundamental terminology such as *theory, gender,* and *sex* requires working definitions, and Hill has identified four core concepts that are being used inconsistently:

1. The methods by which gender studies are incorporated into investigative frameworks
2. The inappropriate, ahistorical usage of ethnographic analogies with prehistoric data
3. An overemphasis upon one line of inquiry and verification
4. The conflation of gender studies with feminist politicking

This is a consequence of gender archaeology's failure to produce significant alternative methodological advances on issues like household organization, ideology, labor division, and production by comparison with traditional processual and postprocessual frameworks.

Hill defines theory as "a conceptual framework that provides the foundation for explanation." With no inclusive, programmatic "feminist theory" having been proposed and taken up as an investigative framework for prehistoric archaeology, a focus point

has been feminist-inspired critiques of androcentrism within archaeology. The critiques of the explicit and implicit androcentrism in existing archaeological theoretical frameworks have contributed in particular to clarifying categories of gender and sex as organizing principles.

It has been argued that gender is not genetically inherited, but a process of structuring subjectivities, whereas sex is biologically determinate and static. However, not all feminists and anthropologists concur with this strict separation. These philosophies, whereby sex is a social construct formed by discursive practices, implicate Western biological anthropology in denying that the same physical characteristics can be used in a cross-cultural capacity to characterize sexual identity. This approach of sexual fluidity has been undermined by the application of DNA analysis to skeletal remains.

Despite the conclusions drawn from molecular results, it must be recognized that the investigations were conceived and the DNA findings interpreted through a culturally mediated Western concept of biology. While a sex-gender divide remains useful, the underlying construct is a distinction between Western scientific views on anatomy and how biology and culture interact from birth through concepts of appropriate role plays, dress code, diet, and occupational activity. This can serve as a useful analytical tool, provided it is recognized the division is not rigid.

Aside from the distinction made between anatomy and the cultural conceptualization of gender, gender studies are concerned with analyzing both males and females. Fieldwork has challenged the notion of a distinct male-female dichotomy, through expanding the categories to include a third or fourth gender in some non-Western societies. Furthermore, ideology of gender is also expressed through various objects, activities, and spatial arrangements in the landscape. Gender is therefore an important social variable, which must not be directly assumed, but rather is interwoven with the social values of the society being studied.

Feminism and Gender Archaeology

Wylie has given three reasons why it has been claimed gender cannot be studied, namely, that women and gender are inaccessible in archaeological contexts, the methodology is too limited to sustain such research, and since identifying women and their activities is inherently problematic, any reconstructions must be drawn from enigmatic data. In rejecting these objections, Wylie has stated that the sophisticated understanding of gender during the third wave of feminism made women and gender a possible object of study in archaeology. This fails to account for historical differences in the development and impact of feminism in America and Europe. While there was a concern in America with studying the sexual division of labor in historical and prehistoric contexts, gender archaeology in Europe focused more on the symbolic and cultural manifestations of gender. While this development has been attributed to the greater impact of second-wave feminism on American than European academia, Sørensen has noted that the existence of women has always been acknowledged; it is how their presence is understood that has changed.

Gender is socially constructed, with archaeological manifestations varying spatially and temporally. As the social construct of sex class and the learned behavior of being masculine or feminine, activities, behaviors, and role plays are expected of different gender groups. Feminism has highlighted the composition of archaeology's substantive body of knowledge and demonstrated how gendered research is interwoven implicitly into specific theoretical and practical constructs. It shares in common with postprocessualism the rejection of dispassionate objectivity and the separateness of subject and object, favoring nuanced approaches over categorical thinking. Spector has demonstrated how Western classificatory schemes impose foreign values, distorting the original categories and biasing interpretation.

The task of recognizing the inherent bias and developing a more gender-friendly discipline through challenging the status quo rests in integrating gender studies into mainstream archaeological practice. The dangers of adopting an androcentric approach have been highlighted through examining past and current literature on human origins, whereas a gynocentric approach can lead to extremes such as exclusive Mother Goddess interpretations for the Upper Palaeolithic and Neolithic figurines in Europe, the Near East and North Africa. Parkington has highlighted aspects of Bushmen rights of passage portrayed in Western Cape rock art. Such examples reflect both the advantage and disadvantages of a feminist approach.

Part of the process toward recognizing that gender archaeology is not feminist archaeology is an understanding that whereas feminism is inherently political

with a focus on power relations, gender archaeology concerns social theory, which can be adapted by both feminist and nonfeminist frameworks: Gender is another tool to further analyze the structuring principles and practices of past cultures.

— *Michael Brass*

See also **Gender; Sex Roles; Sexuality**

Further Readings

Falk, D. (1997). Brain evolution in females: An answer to Mr. Lovejoy. In L. Hager (Ed.), *Women in human evolution.* London: Routledge, 114–136.

Gilchrist, R. (1999). *Gender and archaeology: Contesting the past.* London and New York: Routledge.

Hollimon, S. (1997). The third gender in native California: Two-spirit undertakers among the Chumash and their neighbors. In C. Claassen & R. Joyce (Eds.), *Women in prehistory: North America and Mesoamerica* (pp. 173–188). Philadelphia: University of Pennsylvania Press,

Kent, S. (Ed.). (1998). *Gender in African prehistory.* Walnut Creek, CA: Alta Mira Press.

Nelson, S. (1997). *Gender in archaeology: Analyzing power and prestige.* Walnut Creek, CA: Alta Mira Press.

Sørensen, M. (1998). Rescue and recovery: On historiographies of female archaeologists. In M. Diaz-Andreu & M. Sørensen (Eds.), *Excavating women: A history of women in European archaeology* (pp. 31–60). London: Routledge.

Sørensen, M. (2000). *Gender archaeology.* Cambridge: Polity Press.

Whitehouse, R. (Ed.). (1998). *Introduction: Gender and Italian archaeology: Challenging the stereotypes.* London: Accordia Research Centre and Institute of Archaeology.

Zihlman, A. (1997). The Paleolithic glass ceiling: Women in human evolution. In L. Hager (Ed.), *Women in human evolution* (pp. 91–113). London: Routledge.

Archaeology, Biblical

Biblical or Near Eastern archaeology reconstructs the histories and societies of the Near East from human ancestors' first migrations out of Africa 1.5 million years ago to the end of the Ottoman Empire in 1918 CE through archaeological evidence and historical documents.

Geography and Climate

Although the archaic geographic term *Near East* has been largely replaced by *Middle East* in popular and political language, the Near East remains an operative term in archaeological research, alongside *Anatolian, Arabian, Levantine, Mesopotamian, southwest Asia,* and *Syro-Palestinian.* The geographic term Near East encompasses the modern countries of Bahrain, Cyprus, Jordan, Iran, Iraq, Israel, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, and Yemen.

Geography and climate play important roles in shaping Near Eastern life, dictating how and where populations subsist as well as the daily and seasonal measure of time. The 6 million km area is an amalgamation of mountains, plains, rivers, coasts, and deserts that, together, create a dynamic setting for the cultural landscape. Primary mountain ranges begin in the Armenian region, with the Taurus and Pontic ranges extending westward across Anatolia while the Zagros and Elburz Ranges extend eastward into Iraq and Iran. Crossing the Straits of Hormuz, the Hajar Range makes up a large portion of modern Oman. Running along either side of the Rift Valley's extension into the Middle East is a series of mountain ranges: the Lebanon, Anti-Lebanon, and Jabal Ansariye. Along the southern portion of this series is the Hejaz Range, which extends to the tip of the Arabian Peninsula. These features separate and sometimes surround several plains and plateaus of varying shapes and sizes, including the Anatolian and Iranian Plateaus in the west and east, respectively. From north to south, the Zagros and Taurus Ranges give way to the Mesopotamian Rise, the Syrian Steppe, Upper Mesopotamia, and Lower Mesopotamia. There is a similar condition in the Arabian Peninsula: moving west to east from the Hijaz Range is the Arabian Shield, followed by a series of escarpments, plateaus, and deserts until reaching the Persian Gulf.

Access to persistent water sources places a constraint on Near Eastern society, determining the level at which communities can thrive and subsist. Major rivers such as the Nile, Tigris, and Euphrates and minor rivers such as the Orontes, Jordan, Balikh, and Khabur originate in higher elevations and travel

down to the plains, providing water for crops either through flooding or irrigation. Maritime transportation is possible on the larger bodies of water, including the Eastern Mediterranean; the Black, Caspian, and Red Seas; and the Persian Gulf.

The region's climate is characterized by extreme conditions and dictates, as does geography, the distribution of settlements and subsistence practices. The climate is a dry "continental" variant of the Mediterranean climate with wet winters and hot summers. The amount of moisture is often contingent on proximity to coastlines as well as altitude. Rainfall is higher and temperatures lower in the winter months, when colder weather patterns from Eurasia move south and east. The intensity of rainfall and the duration of the rainy season generally decrease from west to east and north to south. Annual rainfall on the Mediterranean Coastal Plain exceeds 600 mm while further south and east, the semidesert zones see 350–600 mm, and the deserts, 0–150 mm.

Disciplinary Methods

Near Eastern archaeologists have traditionally concentrated on the excavation of the region's ancient settlements that range in size from large urban centers and villages to single family homes and temporary encampments. Because natural resources in the region are limited in their distribution, people habitually reoccupied the same location, using the building materials from previously abandoned settlements to construct new settlements. This palimpsest of human occupational activities resulted in deeply stratified artificial mounds easily visible across the region's landscape and known in Arabic as *tall*, in Hebrew as *tell*, in Persian as *tal*, and in Turkish as *höyük*.

Excavation methods of ancient Near Eastern settlements vary from region to region, but almost all rely on horizontal and vertical stratigraphic relationships to understand a site's multiple occupations. Archeologists use both absolute and relative dating techniques to assign dates to architectural and cultural phases. Examples of absolute dating techniques include Carbon-14 and dendrochronology. Relative dating techniques include the seriation of artifact assemblages, especially ceramic vessels, which permit the archaeologist to date strata based on the artifacts they contain.

Landscape survey has played a critical role in the discipline since its days when the early European explorers in the region first identified ancient settlements. Today, survey is a commonplace practice in archaeological research, not only of settlements but also the myriad features of human construction, such as roads, water wheels, dams, and hunting stations. Survey is also useful in providing relative dates for a site's occupations based on the artifacts that continuously erode from its soil.

Chronology

In charting Near Eastern cultural periods, archeologists have developed subchronologies specific to the region. A sketch of Near Eastern history follows, divided into seven parts.

Paleolithic

The earliest evidence of human occupation in the Near East dates to 1.5 million years ago during the Lower Paleolithic period at Ubeidiya where *Homo erectus* tool assemblages were excavated. Middle Paleolithic (250,000 to 45,000 years ago) settlements of Neandertals and *Homo sapiens* and Upper Paleolithic settlements of *Homo sapiens* were concentrated in caves such as Tabun and Skhul in Israel and now-extinct lakebeds. Paleolithic societies consisted of small nomadic bands depending on hunter-gather subsistence practices and stone tool technologies.

Neolithic

Toward the end of the Paleolithic and throughout the Neolithic period (c. 8,500–5,000 BCE), societies gradually adopted more sedentary lifestyles, building villages and domesticating plants and animals at sites such as Abu Hureyra, Jarmo, Jericho, and Chatal Höyük and Hajji Firuz. Midway through the Neolithic period, ceramic technology was introduced into the region. Village population grew, and along with it, disease increased in Neolithic societies.

Chalcolithic (Copper)

Toward the end of the Neolithic and the beginning of the Chalcolithic Period (c. 5000–3000 BCE), archaeological evidence for social stratification suggests the complexity of political and economic institutions increased. Important Chalcolithic settlements include Chogha Mish, Tulaylat al-Ghassul, and Hacilar.

Bronze

Urbanism, writing, and the introduction of bronze technology mark the Near Eastern Bronze Age

(c. 3000–1200 BCE). Cites such as Megiddo, Ebla, Ur, Mari, Ugarit, Hattusas, and Susa are examples of cities demonstrating monumental architecture and complex political, religious, and economic institutions. Expansive political polities with far-reaching trade networks, such as the Akkadian, Old Babylonian, Hittite, and Elamite Dynasties rise and fall during this period.

Iron

Iron is introduced alongside bronze, ushering in the Iron Age (1200–333 BCE), a period divided between independent states during the first half and vast empires such as the Assyrians, Babylonians, and Persian (Achaemenid) Empires in the second half of the period. Imperial capitals such as Nineveh, Babylon, and Persepolis, as well as smaller cities like Carchemish and Jerusalem are examples of Iron Age urban centers.

Classical

The Classical Period (333 BCE–633 CE) begins with the conquests of Alexander the Great. In the region's western half, the Hellenistic, Roman, and Byzantine Empires dominate and integrate the region with their expansive Mediterranean trade networks. Many of the hallmarks of Classical civilization. such as civic institutions, city planning, and religion are introduced at this time. Examples such as Palmyra in Syria, Petra and Jerash in Jordan, Caesarea in Israel, and Antioch in Turkey reflect this Classical influence. In the region's eastern half, first the Parthian and later, the Sassanid Empires dominated much of modern Iran, Mesopotamia, and Eastern Turkey, with their capital at Ctesiphon on the Tigris River. Both clashed often with the Roman and Byzantine Empires, as both sides attempted to expand their borders.

Islamic

The Islamic Period begins in 633 CE with the spread of the Muslim faith across the region and ends with the Ottoman Empire's collapse following the end of World War I in 1918. In the 7th century, the Umayyad, and later, the 'Abbasid Empires replace the weakened Byzantine and Sassanid Empires and establish their capitals, first in Damascus, and later in Baghdad and Cairo. At the end of the 11th century, the European Crusades retake Jerusalem and the Holy Land succeeded in occupying the Mediterranean coastline, leaving the Fatamids and Saljuqs divided between Egypt and Iran, respectively. With the expulsion of the Crusaders in 1291, the Mamluk Empire expanded out of Egypt to control the area formerly under European occupation and often clashed with the neighboring Timurids to the east. From 1516 until 1918, the Ottoman Empire ruled Turkey, North Africa, and the Arabian Peninsula from its capital in Istanbul and from regional capitals such as Damascus and Cairo. The Ottoman Empire declines in the 19th century and is dismantled in World War One. The 20th century sees the division of the region between French and British colonial powers, the establishment of an independent Iran and Turkey, and the eventual founding of the modern nation-states that persist today.

History of Exploration

We can divide Near Eastern archaeology's disciplinary history into five periods: Antiquarian (1500–1798 CE), Imperial (1798–1914), Colonial (1914–1948),

Nationalist (1948–present), and Scientific (1970–present). The Antiquarian period was an era of armchair speculation. Scholars rarely visited the region, then under the Ottoman Empire's control, and instead relied on indirect evidence, such as the Bible and a limited number of antiquities brought to Europe. The Imperial period began with Napoleon's 1798 campaign to Egypt, an event that the European powers interpreted as the beginning of the Ottoman Empire's decline. In response, European countries established consulates in the region's major cities such as Beirut, Damascus, Baghdad, and Jerusalem, and commissioned explorers to investigate the region's ancient remains. With government as well as private funds, research centers were established to host scholars in Jerusalem, Baghdad, and Beirut. A limited number of excavations took place during the Imperial period, such as W. F. Petrie's work at Tell el-Hesi in Palestine, E. Robinson in Jerusalem, A. H. Layard at Nineveh in Iraq, and J. de Morgan at Susa in Iran.

The defeat of the Ottoman Empire in World War I launched the Colonial period when the British and French dominated Syria, Lebanon, Iraq, Jordan, and Palestine. Largely considered a golden age by many scholars, the period between 1918 and 1948 saw an explosion of archaeological activity in the Near East. Now in full control of the region's archaeological resources, archaeologists could organize large multi-year projects with guaranteed security and large indigenous work crews. Examples include the University of Chicago's excavations at Megiddo in Palestine, Khorsabad in Iraq, and Persepolis in Iran; the University of Pennsylvania's excavations at Beth Shean in Palestine and Ur in Iraq; and the Danish government's excavations at Hama in Syria. The Colonial period also saw the development of excavation techniques. Scholars such as the American W. F. Albright and the British K. Kenyon paid greater attention to stratigraphic relationships and developed a system of ceramic seriation, where ceramic forms and styles helped assign a date to the contexts with which they were associated.

The Nationalist period commenced with the establishment of the region's current political entities and continues to the current day. Now given complete sovereignty over the antiquities within their border, each country established government agencies that managed excavation and preservation projects. Foreign archaeologists continued their work, although now with the permission of national governments. Departments of archaeology offering degrees in archaeology and sponsoring their own excavations became commonplace in the region's universities. Hebrew University's excavations at Hazor in Israel, the University of Jordan's excavations at Tall Mazar in Jordan, and the Turkish Historical Society's excavations at Alacahöyük are only a few examples.

Near Eastern archaeology has undergone a period of increased scientific rigor since 1970. While, in previous periods, archeologists focused on reconstructing the histories of ancient Near Eastern societies, they now seek to understand the structure and evolution of the region's political, economic, and social institutions. Specialists concentrating on, for instance, palaeoenvironment, diet and ancient technologies are now a necessary part of an excavation's research design. Emerging technologies such as Global Information Systems (GIS) and materials science techniques continue to push the field in new directions and increase scholars' abilities to understand the region's dynamic ancient societies.

Contributions to Anthropology

The contributions of Near Eastern archaeology to anthropology are multiple. The region serves as home to many of humanity's earliest accomplishments and, because of this, anthropological inquiry has proven fruitful here. As the beginning to some of the world's first sedentary communities, the Near East witnessed agriculture and urbanism's first moments. Near Eastern societies were among the first to experiment with ceramic, copper, bronze, iron, and glass technologies. Sumerian, an ancient Mesopotamian language, was among the world's first attempts to compose a systematic writing system using wedge-shaped cuneiform letters. This writing system persisted and was later transmitted to the Greeks, resulting in the invention of the Western alphabet commonly used today. The Near East is the birthplace of three world religions–Judaism, Christianity, and Islam—and the region contains many of their most sacred sites: Mecca, Medina, Jerusalem, Hebron, and Damascus.

— Benjamin W. Porter

See also **Archaeology; Carbon-14 Dating**

Further Readings

Akkermans, P., & Schwartz, G. (2004). *The archaeology of Syria: From complex Hunter-gatherers to early urban societies (c. 16,000–300 BC).* Cambridge: Cambridge University Press.

Hole, F. (Ed.). (1987). *The archaeology of Western Iran: Settlement and society from prehistory to the Islamic conquest.* Washington, DC: Smithsonian Institution.

Hourani, A. (1991). *A history of the Arab peoples.* Cambridge: Harvard University Press.

Inalcik, H., & Quataert, D. (1994). *An economic and social history of the Ottoman Empire, 1300–1914.* Cambridge: Cambridge University Press.

Joukowsky, M. S. (1996). *Early Turkey : An introduction to the archaeology of Anatolia from prehistory through the Lydian Period.* Dubuque, IA: Kendall/Hunt.

Khurt, A. (1995). *The ancient near east.* London: Routledge.

Levy, T. (Ed.). (1995). *The archaeology of society in the holy land.* New York: Facts on File.

Meyers, E. (Ed.). (1997). *The Oxford encyclopedia of archaeology in the near east.* New York: Oxford University Press.

Sasson, J. (Ed.). (1995). *Civilizations of the ancient near east.* New York: Schribner.

Archaeology, Environmental

With a varied and lengthy pedigree, environmental archaeology has grown in importance in recent decades. What was once seen just as a loose collection of techniques devoted to sampling past environments has developed into an important theoretical and methodological research perspective. Quite simply, environmental archaeology is the study of past human economic, political, and ritual behavior through the collection and analysis of environmental remains (for example, animal bones, soils, and botanical remains).

Historical Background

Environmental remains did not figure very prominently in the early history of modern archaeology. Researchers and antiquarians of the 18th and 19th centuries primarily focused on architectural remains and their associated material objects. Highly prized precious metals, ceramics, and other cultural crafts were collected both systematically and quite haphazardly by various individuals, museums, and universities throughout this time period. The remains of mundane meal refuse such as fragmented animal bones and botanicals received little if any research attention and were usually discarded on the spot.

The Danish archaeologist Daniel Bruun was one of the first archaeologists on record to systematically recover animal bones from an excavation. As part of his 1896 Norse excavations in Greenland and his later work in Iceland, Bruun consistently collected the animal bones that were found as part of his research digs. Bruun believed in the possibility of having animal bones identified to species level for the purposes of simple economic and dietary reconstructions. Bruun solicited the advice and skill of Herluf Winge, the head zoologist at the Royal Zoological Museum in Copenhagen, Denmark. Winge's early cross-disciplinary work in zoology and archaeology at the beginning of the 20th century marked an early influence for modern environmental archaeology.

By the mid 20th century, archaeology both in Europe and the Americas was still largely the domain of avocationalists operating with a wide range of methods and with little interest in moving beyond artifact classification. With the writings of the English archaeologist Grahame Clark, archaeology began to interest itself in the economic and ecological aspects of past cultural systems. Clark's 1942 *Antiquity* article "Bees in Antiquity" was the official beginning of his pioneering work in environmental archaeology. From 1949 to 1951, Grahame Clark supervised the excavations of Star Carr in northeastern Yorkshire. Star Carr, with its moist, peaty conditions, revealed a wide range of faunal and botanical material that allowed Clarke the first views of early Mesolithic diet, economy, and ecology. Although Star Carr has been reevaluated more than once in the preceding years as technologies have improved, it remains as the premier example of early integrative archaeology.

Educated in the methods of Grahame Clark and influenced by the ecological theories of Julian Steward and Leslie White, the next generation of environmental archaeologists ushered in a period in which ecological theory reigned supreme. The 1960s and 1970s also witnessed a period during which university programs began to create specific environmental methodologies, such as zooarchaeology, paleoethnobotany, and geoarchaeology. With time,

the ecological approaches and the more economic perspectives were incorporated into the processual theory of Lewis Binford. Throughout the 1970s and 1980s, processual archaeologists made use of the newer specialties such as zooarchaeology and paleobotany in studying past environments and the people that inhabited them. During this period, environmental archaeology was seen more as a collection of various sampling techniques than a coherent theoretical approach.

The postprocessual critiques of the 1980s and 1990s called for a reevaluation of theories and techniques both within archaeology and cultural anthropology. Environmental archaeology has ultimately benefited from the critiques that questioned the overly deterministic systems modeling of processual archaeology. Humans are not passive actors within the social and ecological realms. Rather, humans are active participants in their environment as they create, sustain, and change their cultural adaptations. The physical environment can be seen as a record of present and past human decision making (such as in economies, our social systems, and other decisions), a record that itself is always changing. Out of this period of self-assessment emerged historical ecology. Historical ecology is credited to Carole Crumley, who saw the importance of a theoretical perspective that privileged the physical landscape as the intersection between social and ecological systems. Within historical ecology, this intersection (that is, landscape) could be studied through time as it is a historical record not only of past environment but of past human decision making as well.

Methods

Current research in environmental archaeology makes use of a wide range of techniques and specialties from the natural sciences. The three most commonly studied lines of evidence include soil science, paleobotany, and zooarchaeology. Each of these sciences offers valuable insight concerning prehistoric societies and their ecological interactions. Specialists in these areas can operate both as principal investigators with diverse research goals and technicians providing specific data for a number of ongoing projects.

Soil Science

The study of soils and sediments (pedology) is critical to the understanding of all archaeological sites. With respect to archaeological sites, the study of soils and sediments involves gaining an understanding of the predepositional (that is, before the site was formed), depositional, and postdepositional (after the site was abandoned) environments. Soil science can provide details on the exact nature of ancient sites. For example, pedology can identify whether a site was near the edge of an ancient lake or river. It can also provide details concerning the vegetation of the immediate site area (heavily wooded) and the climate at the time the site was in use. Landscape and climatic changes can also be tracked after the site has been abandoned with the use of pedological sampling and laboratory techniques.

Soil is sampled using a variety of techniques. Bulk soil is commonly collected from excavated surfaces in liter or larger samples that then undergo chemical testing. Soil can also be collected from archaeological sites in situ in the form of profile samples taken from vertical, excavated surfaces. Profile samples allow soil researchers to study the individual strata or layers of archaeological sites and their relationships to each other. Chemical measures such as pH provide valuable information about the potential survivorship of various artifact classes. More advanced measures can help assess the degrees to which humans have modified their immediate environment (as in field fertilizing). Soil profile studies help researchers understand the duration of site occupation as well as landscape changes after abandonment.

Zooarchaeology

The study of animal remains from archaeological sites (zooarchaeology) is one of the earliest environmental archaeology specialties. Because of more widely available training, zooarchaeology is more commonly used than either pedology or paleobotany. Originally, only the more interesting animal bones were hand selected from archaeological sites for study. Modern excavation methods now include sieve strategies that ensure all excavated material is screened for small bone fragments and other materials.

In the laboratory, with the aid of comparative skeletal collections, attempts are made to identify the element (for example, femur), species, age, and sex of the animals represented in a specific archaeological site. A study of the species present can provide important information concerning the general ecology of the surrounding area, diet, and overall economy of cultural groups. Hunted animals can be taken in the immediate area of the site, or they can be transported

and/or traded over significant distances. In addition, domesticated animals were often a supplement to both hunted species and botanical foodstuffs. Using zooarchaeological techniques, researchers can often clarify these issues and add much to the general understanding of an archaeological site.

Paleobotany

When preservation allows, the recovery and analysis of plant remains can provide some of the most detailed information of all of the environmental archaeology specialties. Plant materials were not only a common source of nutrition but also helped provide shelter, storage, and clothing. In addition, the domestication of certain plants and trees is seen as one of the primary transformative events in human prehistory.

Plant materials are commonly recovered from archaeological sites as part of bulk soil samples. The soil is taken to the laboratory, and the soil undergoes a flotation process, by which plant remains are separated from other less buoyant particles. The recovered plant materials are then separated into two major size classes, macrofossils and microfossils. Macrofossils are remains that can be seen without aid of magnification, while the microfossils have to be studied with various levels of magnification. Seeds and plant fibers are examples of macrofossils. Microfossils include pollen, plant crystals (phytoliths), and fungi.

The recovery and interpretation of plant remains commonly include samples from both within and beyond the limits of the archaeological site. Samples from beyond the site limits allow for the reconstruction of prehistoric vegetation communities. Plant samples from within the site limits aid in the study of food ways and economy.

Environmental Archaeology: Case Examples

As modern computer, mapping, and excavation techniques have continued to improve within archaeology, environmental archaeology has increasingly been seen as necessary to the more complete study of sites and the complex data they contain. The methods of environmental archaeology are commonly used together whenever possible, and they provide the most complete information in these situations. Interdisciplinary research of this sort is logistically difficult and often much more expensive than traditional artifact-focused research. Often, projects of this scale are cooperative agreements between several universities and research centers, each with their own focus.

While still not utilized in many regions of the world, environmental archaeology has a strong history in both the North Atlantic and the South Pacific. Researchers in these two areas have engaged in international, interdisciplinary projects that have demonstrated the powerful insights of environmental archaeology.

The North Atlantic (Iceland)

Iceland is developing as one of the key research areas within the North Atlantic for several universities participating in environmental archaeology. Iceland provides the rare opportunity of a clear-cut, well-dated dichotomy between prehuman landscape development and progressive human impact in near historic times. As Dave Burney has convincingly argued with reference to Madagascar, Caribbean, and Pacific cases of "human island biogeography," a key issue for all such attempts to use islands as model laboratories for investigation of global human ecodynamics is both an accurate and clearly delineated arrival date for the human actors and a detailed chronology of subsequent proposed human landscape interactions to sort out causality and allow effective scale matching in modeling. The Icelandic case has not only the usual advantages provided by a documentary record over completely prehistoric cases but also probably the best current potential for such tight cross-sample chronological control of any island on earth via the study of volcanic ash layers or tephras.

Near the close of the 8th century AD, Nordic pirates, traders, and settlers began the expansion from their Scandinavian homelands that gave the Viking Age its name and permanently changed the development and history of Northern Europe. In the North Atlantic, Viking Age settlers colonized the islands of the eastern North Atlantic (Faeroes, Shetland, Orkney, Hebrides, Man, Ireland) by circa AD 800. Iceland was traditionally settled circa AD 874, Greenland circa AD 985, and the short-lived Vinland colony survived a few years, around AD 1000, in the Newfoundland/Gulf of St. Lawrence region. Prior to the 1970s, most scholars of the Viking period were philologists, medieval archaeologists, and documentary historians, and the uneven written record for Viking depredations in Europe and the colorful and diverse saga literature of Iceland tended to dominate discussion of the period. Since the mid-1970s, research has shifted,

as multiple projects combining archaeology, ecology, and history have been carried out all across the region, producing a richer understanding of the Norse migrations and placing them in an environmental and economic context. The value of the diverse cases provided by the Norse North Atlantic (initial spread of a homogeneous population into different island ecosystems, subsequent economic and social diversification, total extinction of the Vinland and Greenland colonies) has been increasingly appreciated by environmental historians, natural scientists, and anthropological archaeologists.

Frequent volcanic tephra (ash) layers within soil profiles can be used to define isochrones, or time horizon markers. The three-dimensional reconstructions that can be created by mapping a series of tephra layers allow detailed data on spatial patterns. Each tephra layer marks a land surface at a "moment in time," and multiple tephra layers constrain the passage of time and define the rate at which change has happened across a landscape. Tephras can be used to correlate precisely between cultural deposits in middens, archaeological structures, and distant landscape elements such as boundary walls, geomorphic features, and paleoecological sample sites. Furthermore, as tephra are formed within hours or days, the distribution of any one tephra through soil or in contexts that are not contemporaneous with the initial eruption can be used to identify the pathways taken by sediment through the environment, including temporary sediment stores, reworking of sediments, and movements of sediments within profiles. Tephra (in many areas falling at least once a decade) provide isochrones covering hundreds of square kilometers but require expert long-term study for effective geochemical characterization and conclusive identification. While radiocarbon dates are regularly employed in combination with tephra (and with artifact analyses provide independent dating that has generally supported the tephra chronology), Icelandic tephrachronologies are a key integrative resource for fieldworkers.

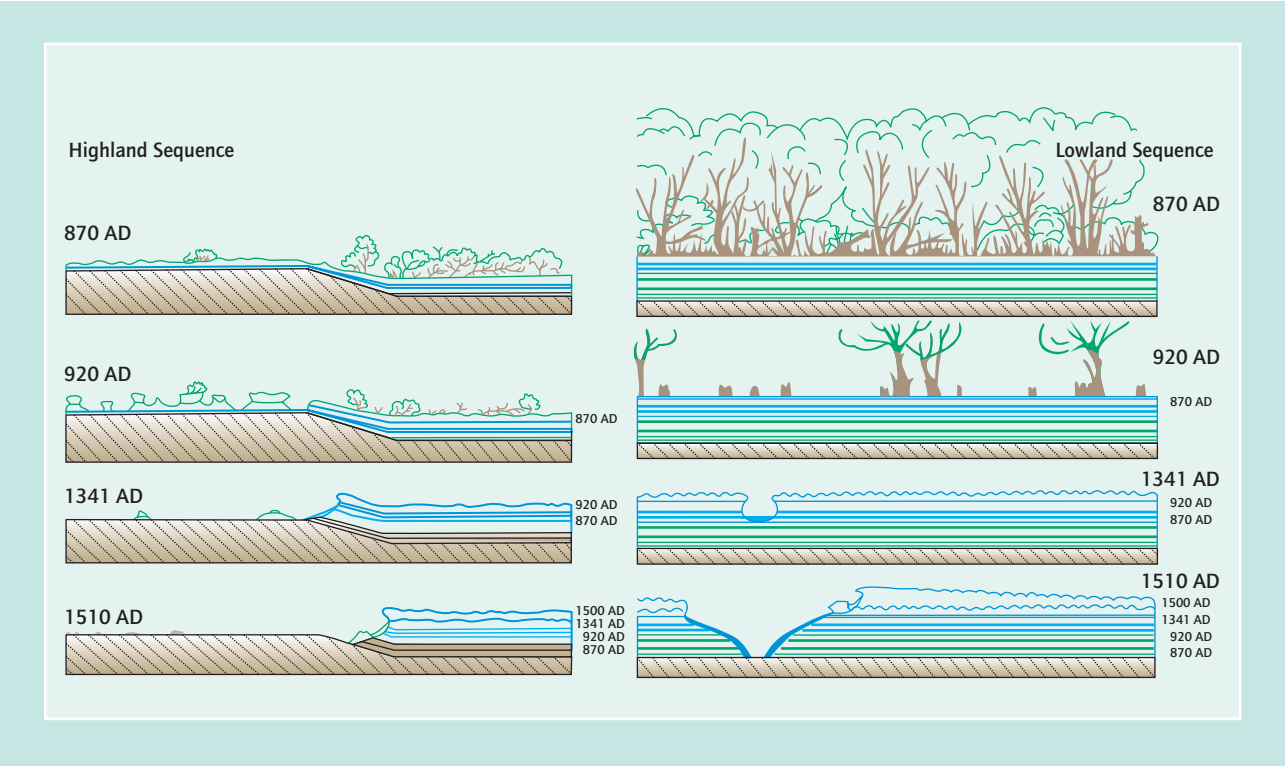
Iceland's documentary record (sagas, law codes, annals) provides rich evidence for a socially complex nonstate society that has been employed by historians and anthropologists for studies of Iceland and the development of general theories of chieftainship. Medieval and early-modern documentary sources require critical handling but provide a rich record of landholding patterns, legal codes, stock raising, demography, conflict and competition, and invaluable access to internal worldview. Later records produced after the transition to statehood in AD 1264 have provided the basis for historical climatology documenting the impacts of sea ice and early medieval climate fluctuations. A particularly detailed farm-by-farm stock and census record (1703–1712) provides an invaluable synchronic picture of the early 18th century and has been used as a baseline for regional landscape analyses. Icelandic soils, forestry, and agricultural scientists have actively participated in these historical land use projects, and their further collaboration is being aided by special American and Icelandic research agreements.

Since the early 1980s, genuinely interdisciplinary field research by Icelandic, United States, and United Kingdom scholars has provided a mass of new ecological and archaeological data, covering most portions of the country but with special focus on the South and the North. In zooarchaeology, known animal bone collections increased from 4 to over 65, including massive 50,000 to 100,000 identifiable fragment samples spanning the period from first settlement down to the later 19th century. The formation of the FSI (Institute of Archaeology Iceland) in 1995 by a group of Icelandic scholars has further stimulated survey and excavation work and direct cooperation.

Iceland was first settled during the Viking Age, and human impact on local animal, vegetation, soils, and drainage patterns was rapid and profound. By AD 950, 80% of the native woodlands had been cleared, and soil erosion had begun in higher elevations. By the Middle Ages, this loss of ground cover led to more widespread erosion of approximately 40% of the topsoil present before human settlement (see Figure 1). Iceland thus represents an extreme case of preindustrial human impact on the environment increasingly well documented by archaeology, history, and natural science. How the early Icelandic political economy interacted with and was shaped by the natural environment is of considerable relevance to modern societies in the developed and developing world subject to some of the same interactions of economy and landscape, with some of the same long-term results for genuinely sustainable development.

The Pacific (Hawaii)

Although still not fully understood, successive migrations out of Southeast Asia into the Pacific islands fueled the development of a Polynesian culture. By the first half of the second millennium AD,



Human-Induced Land Degradation Profiles From Iceland (AD 870–1510)

Polynesian voyagers had made their way to the Hawaiian archipelago, which had until then been free of human habitation. The Hawaiian Islands are fertile, high islands, and they were ideal for the intensive agricultural methods utilized by Polynesians settlers. Until recently, it was widely accepted that Hawaii's "pristine" presettlement environment was little affected by the Polynesians. Multinational, interdisciplinary research throughout the Pacific has begun to reveal a more complex history of human/environmental interaction. The Hawaiian Islands are among the most intensively studied in this respect as paleobotany, soil science, and zooarchaeology continue to shed new light on the environmental effects of both the Polynesian and later European settlement.

Modern environmentally focused research in Hawaii is first credited to Roger Green and his introduction of the "settlement pattern" approach in the 1960s. The "settlement" approach was primarily concerned with how the first human settlers adapted to specific island habitats. However, after the excavation of the limestone sinkholes at Barber's Point, Oahu, researchers began to question the idea of Polynesians adapting to a static and unchanging environment. Barber's Point revealed evidence of bird and snail extinctions immediately after the arrival of the first settlers. While the bird remains were evidence of predation, the extinct snails represented changes in the general ecology of the island. In the early 1980s, Patrick Kirch and a team of environmental specialists began a comprehensive research program to fully investigate the ecological impact of Polynesian settlement. Using historical records, pollen, soil, and faunal samples, researchers working in Hawaii have been able to detail the progression of human/environmental interactions since Polynesian settlement.

Accounts from early Hawaiian missionaries and travelers made note of the fern and grasslands throughout the lowland regions of the islands. Pollen diagrams taken from lowland swamp areas of Oahu indicate presettlement vegetation characterized by various palm species, including Pritchardia, which is now quite rare. Pollen diagrams showing declines in Pritchardia and other now rare lowland shrubs began by AD 800 and advanced thereafter. Researchers suspect that palm forests were cleared to make space for agricultural purposes. These areas never regained their presettlement forest cover, but remained the domain of grasses,

shrubs, and ferns. Additional botanical analyses of charcoal from archaeological sites in Hawaii indicate the initial burning of many dry-land tree species that are now much less represented in the landscape.

The study of various land snail species (terrestrial gastropods) has also helped reveal the changing ecology of early Polynesian Hawaii. Terrestrial gastropods were able to naturally colonize the Hawaiian Islands before human arrival and were represented by over 800 species. These small snails were of little economic importance to early Hawaiians, but their adaptation to very specific ecological habitats make them ideal for recreating the immediate environment of archaeological site areas and their transformation over time. A common gastropod sequence for Hawaiian sites shows closed-canopy forest-adapted snails being replaced with more open-area species.

Zooarchaeology within Hawaiian research has also shown the rather dramatic impact of Polynesian settlement on native bird life. To date, 55 species of birds are known to be native to the Hawaiian archipelago. According to archaeological research, 35 of these species were exterminated between early Polynesian settlement and the first arrival of Europeans. This list of now extinct birds includes flightless geese, a hawk and eagle, as well as several rail species. Researchers believe that the reasons for these bird extinctions are multiple and often intertwined. Many of the bird species were used as food as well as a source of decorative feathers. Polynesian-introduced animals (dog, pig, and rat) were also responsible for the destruction of many bird habitats. Further habitat destruction on the part of Polynesian farmers led to the demise of still other bird species.

Geological and soil research in the Hawaiian Islands has been able to show the tandem effect of a growing population and its increasing demands on the agricultural production of an island environment. From an estimated settlement population of hundreds in the first half of the second millennium AD, Hawaii's estimated population had bloomed to several hundred thousand by the time of European contact in 1778. The demand for more agricultural area is reflected in a general archaeological pattern seen throughout the Pacific. During the initial settlement period, deforestation is prominent as land is cleared for farming and building materials. Due to excessive ground cover removal, highland areas begin to erode. This erosion and associated deposition in lowland valleys is noted in soil profiles throughout Hawaii.

Human Ecology, Past, Present, and Future

The bounded ecosystems of island archipelagos like Hawaii and Iceland provide ideal research laboratories for studying the complex multifaceted interactions of humans and their environment. The interactions between prehistoric political economic systems and the natural environment in which they are intricately imbedded are not fully understood. What has become clear in recent decades is the importance of interdisciplinary research drawing from wide areas of expertise. Individually, researchers cannot fully explore or understand the complex dynamics of human decisions regarding the natural environment in which we all live. With such issues as climate change and global warming receiving more and more attention in recent years, the call for a more thorough understanding of human/environmental dynamics has increased within the United States and Europe. Environmental archaeology provides an anthropologically informed understanding of human ecology with a time depth not available to other perspectives. A well-understood past is important to any discussion of present and future human/environmental conditions.

— *Clayton M. Tinsley*

See also **Anthropology, Economic; Ecology and Anthropology; Paleoecology; Political Economy; Vikings; Zooarcheology**

Further Readings

Albarella, U. (Ed.). (2001). *Environmental archaeology: Meaning and purpose.* London: Kluwer.

Dincauze, D. (2000). *Environmental archaeology: Principles and practice.* Cambridge: Cambridge University Press.

Housley, R. A., & Coles, G. (Eds.). (2004). *Atlantic connections and adaptations: Economies, environments, and subsistence in lands bordering the North Atlantic.* Oxford: Oxbow Monographs.

Kirch, P., & Hunt, T. (Eds.). (1997). *Historical ecology in the Pacific Islands.* New Haven, CT: Yale University Press.

Redman, C., James, S., Fish, P., & Rogers, D. (Eds.). (2004). *The archaeology of global change: The impact of humans on their environment.* Washington, DC: Smithsonian Institution Press.

Archaeology, maritime

Maritime archaeology is a subdiscipline of archaeology dedicated to examining prehistoric and historic sites related to aquatic environments. This can include shipwreck sites in an ocean, coastal ports, underwater archaeological remains, or any submerged land structures. The terms used to describe this field of study usually refer to the location of the sites, although shipwrecks found out of water may still be classified as maritime or nautical in nature.

Maritime archaeological sites differ from those found on land in several ways. One is that sites on land tend to include a complex series of occupation by humans over a long span of time, as well as a record of natural occurrences during or between periods of human settlement. This requires that the archaeologist carefully recover the remains within each layer of earth and determine how they are related. On the other hand, underwater sites such as shipwrecks basically represent a brief moment in time. They contain lots of objects that were on board when the ship sank and will usually include those things of everyday use such as dishes and utensils and not necessarily treasure, as typically thought by most people.

When researching underwater or coastal sites, maritime archaeologists are particularly interested in answering questions related to how humans adapted to aquatic environments, where seafaring developed in different parts of the world, methods for shipbuilding, and navigational techniques. For example, where and when were the earliest boats built and what methods were employed in their construction? How have coastlines served as physical or social boundaries and in what ways have they facilitated human expansion, population growth, and the rise of social complexity? How did maritime adaptations develop in different parts of the world and what kinds of watercraft were built as a result?

The field of maritime archaeology is a relatively new discipline. In the mid-20th century, historians and archaeologists who worked in marine (ocean), lacustrine (lake), riverine (river), estuarine (estuary), and other aquatic ecosystems felt the need to better focus their research and move away from the paradigms constructed and used in terrestrial environments. Early work in maritime archaeology often involved locating and recording underwater shipwrecks, but today we would consider the methods used to investigate and preserve these sites to be quite primitive. As a result, some professional archaeologists initially argued that these expeditions were no more than treasure hunts that did little to advance our understanding of history or archaeology.

The field has advanced beyond this stage and has now incorporated a slew of advanced techniques, such as Global Positioning Systems (GPS), Geographic Information Systems (GIS), Side-Scan Sonars, and Echo Sounders to locate and record shipwrecks and other underwater features. Although similar methods and tools may be used for surveying and excavating both submerged and terrestrial sites, the use of these underwater requires special modification to existing equipment (such as waterproof casings for cameras) and trained divers skilled in archaeological techniques.

Although maritime archaeologists can use a plethora of new technologies to learn about shipwrecks, not everyone agrees that shipwreck sites should be excavated unless the objects found can be properly preserved and undergo conservation. Some argue that important information will surely be lost or taken by looters unless it is recovered quickly and recorded. True treasure hunters have countered that many sites would never be found without their initiative and expertise and that archaeologists are trying to take away their livelihood.

Archaeologists are interested in aquatic environments because they are particularly rich in resources such as mollusks, pinnipeds (such as seals), cetaceans (whales), sea mammals, fish, crustaceans, birds, amphibians, and other animals. As a result, they are habitats that would have been extremely attractive to humans over time and stimulated human groups to exploit and travel on them using watercraft. Coastlines are also quite susceptible to the effects of global and regional shifts in climate, sea level changes, and natural catastrophes. How human beings responded to these changes can tell maritime archaeologists how quickly our species rebounded from such events, the behaviors that resulted from the alteration of these environments (did we continue to live on landscapes that were previously devastated?), and how we developed new technologies to accommodate these changes.

As maritime archaeology has grown from a relatively obscure field of study to one highly specialized and technologically advanced, our understanding of human-water relationships has been greatly illuminated. Archaeologists are no longer interested only in excavating sites and conducting pure research; they

are concerned with protecting and preserving those sites. We have learned investigative techniques that are less intrusive or destructive to the archaeological record. In recent years, many countries have passed laws declaring these sites public monuments and thus protecting them from looting and desecration.

Due to the rise in popularity of this field, many institutions now offer courses and degrees in maritime archaeology. The number of museums that house objects from shipwrecks and other maritime-related archaeological sites has grown significantly and added to the human fascination with and adaptation to aquatic environments.

— *Scott M. Fitzpatrick*

Further Readings

Gould, R. A. (2000). *Archaeology and the social history of ships.* Cambridge: Cambridge University Press.

Green, J. (2004). *Maritime Archaeology: A technical handbook,* 2nd ed. Amsterdam: Elsevier.

McGrail, S. (2003). The sea and archaeology. *Historical Research, 76*(191), 1–17.

Archaeology, Medieval

Defining Medieval Archaeology

The European Middle Ages or Medieval period begins with the collapse of the Western Roman Empire in the 5th century CE and ends with the European voyages of discovery in the 15th century CE. The millennium-long era starts with the Migration period (ca. 400–600 CE), sometimes known as the "Dark Ages" due to the paucity of written historical sources from this time. During the Migration period, barbarian Germanic tribes overran much of the Western Roman Empire. Roman towns and cities declined, and many Roman industries, such as the pottery industry in Britain, ceased to function. Roman imperial rule was replaced by a series of smaller successor kingdoms. These early successor kingdoms should probably be viewed as chiefdoms rather than small states. Outside the former Western Roman Empire, in regions such as Poland and Scandinavia, an Iron Age way of life continued until about 800 CE. Beginning around the 8th century CE, many regions of medieval Europe underwent substantial social, political, and economic transformations. Both local and long-distance trade networks expanded; new towns and cities were established; and by about 1000 CE, early states were founded in many parts of northern Europe. The study of these processes is of particular interest to anthropologists, since they parallel the processes by which complex societies developed in other parts of the Eastern and Western Hemispheres.

The History of Medieval Archaeology

Unlike European prehistory, whose roots can be traced back to the early antiquarians of the 17th and 18th centuries, the modern discipline of European medieval archaeology did not develop until the years immediately following World War II. Many European cities, including London, England, and Cologne, Germany, are built on medieval foundations. The destruction caused by bombing during the Second World War made it possible to explore the medieval cores of many modern cities for the first time.

Medieval archaeology in Europe developed from two very distinct and different scholarly traditions. Early medieval archaeologists who worked on the Migration period and other early medieval sites were generally trained as prehistorians. Since written records for the early Middle Ages are often quite limited, Dark Age archaeologists rely almost exclusively on the analysis of material remains, such as artifacts, ecofacts, and features, to reconstruct the lifeways and culture history of the early medieval inhabitants of Europe. For example, the early medieval (ca. 420–650 CE) village of West Stow in eastern England was discovered by a local archaeologist in 1940. The site does not appear in any historical records. Large-scale excavations, which were carried out at the site by Stanley West between 1965 and 1972, were designed to reconstruct the settlement patterns, subsistence practices, and day-to-day lives of the early post-Roman inhabitants of southeastern Britain. Spatial analysis of the houses, outbuildings, ditches, and pits was used to reconstruct the settlement pattern of the village, and studies of the agricultural and animal husbandry practices carried out there were based on detailed analyses of the floral and faunal remains. The methods and techniques used in the excavation and analysis of the West Stow village were those of European prehistory.

By contrast, the early archaeologists who worked in the later Middle Ages were often trained as historians

or art historians. In the 1950s and 1960s, archaeologists working in the later Middle Ages sought to use archaeological data to answer what were essentially historical questions. For example, the initial studies of deserted medieval villages (DMVs) tried to determine whether these villages were depopulated as a result of the Black Death (bubonic plague) in the 14th century or whether their desertion was the result of other late medieval economic and agricultural changes. These questions led Maurice Beresford, an economic historian, to begin excavation of the deserted medieval village of Wharram Percy in northern England. Excavations at the site were conducted over a period of 40 years, and the goals of the project changed through time. Today, studies of DMVs, including Wharram Percy, have moved beyond their historical origins. Studies of deserted medieval villages have examined the evolution of the medieval village landscape through time, drawing on archaeological, historical, and ecological data.

Modern medieval archaeologists try to integrate both historical and archaeological methods to address multidisciplinary questions of urban origins, state formation, and the transformation of the agrarian landscape through time. However, the position of medieval archaeology in the academy reflects its historical roots. Only a few European universities have stand-alone programs in medieval archaeology. In Europe, most medieval archaeologists are attached either to departments of history or to archaeology programs. A similar situation exists in North America. Medieval archaeologists, especially those working in the Migration period and the early Middle Ages, are generally attached to archaeology faculties within anthropology departments. However, some North American medieval archaeologists can also be found in departments of history and art history.

Medieval Archaeology Today

Medieval archaeologists are playing an increasingly important role in modern anthropology. Anthropologically trained archaeologists recognize that the rich archaeological and historical records from the European Middle Ages can be used to address important questions about the processes of cultural change. Large-scale, long-term excavation projects conducted in a number of European cities have traced the origins and growth of urbanism in the European Middle Ages. The 1961 to 1971 excavations at Winchester in southern England paved the way for many other urban excavation projects. Working with volunteer excavators from British and American universities, Martin Biddle, the director of the Winchester Excavations, explored the history of the city from pre-Roman to postmedieval times. Until the 1960s, scholars thought that modern Winchester retained a Roman street plan. Biddle and his colleagues were able to use archaeological data from a number of sites throughout the town to demonstrate conclusively that Winchester was replanned in the late 9th century in response to the Viking control of much of eastern England. Similar 9th- and 10th-century planned towns have since been identified from other parts of southern Britain. This systematic town planning can be related to the political consolidation of the Anglo-Saxon state under Kind Alfred the Great.

Since the beginnings of the Winchester project, major excavation projects have been carried out at a number of other important medieval cities throughout northern Europe. Excavations at Novgorod in Russia have revealed a corpus of previously unknown documents written on birchbark, as well as many musical instruments and other examples of fine woodworking. The documents contribute to our understanding of the linguistic history of the Slavic languages, and the instruments shed new light on craft specialization in medieval Russia. Excavations at Trondheim in Norway and Lübeck in eastern Germany have provided new information on the day-to-day lives of the inhabitants of medieval cities, as well as shedding light on the roles played by trade, craft specialization, and political consolidation in the growth of medieval towns and cities. Archaeologists working at sites such as Ipswich, in England, and Dorstad, in the Netherlands, have also examined the role that long-distance and regional trade may have played in the reestablishment of towns in northern Europe between 750 and 1050 CE. Ipswich and Dorstad were two of a number of emporia or trading towns along the North Sea and the Baltic that served as centers of both manufacturing and trade in the time of Charlemagne.

Long-term survey and excavation projects have also examined the process of state formation in many parts of northern Europe. Archaeological and historical data indicate that beginning in the 8th century CE, early Danish kings began to accumulate a social surplus through tax collection. These early kings minted coins and used their accumulated wealth to support the construction of large public works

projects, such as the massive earthwork known as the Danevirke that served as a boundary between Denmark and Germany. Through a comprehensive project of archaeological survey and selected excavations, Tina Thurston of Binghamton University is currently examining the techniques used by the nascent Danish state to incorporate the region of Thy in northern Jutland. Similar projects have been carried out in Scotland and Poland.

One of the most interesting areas of contemporary archaeological research is the study of the Viking colonization of the North Atlantic, beginning about 800 CE. Major excavation projects in York, England, and Dublin, Ireland have uncovered the towns that were established by the Vikings in the British Isles. While the town of Dublin was established by the Vikings, York was a Roman and Anglo-Saxon town that fell to the Viking army in 866 CE. Long-term excavations at the site of Coppergate in York have shown that York's Viking inhabitants were engaged in a number of crafts including woodworking, metalsmithing, and textile production. Detailed environmental studies have also shed light on diet and disease in Viking York. The results of these excavations are presented to the public at the Yorvik Viking Center, which uses archaeological information to re-create York's Viking past.

Archaeologists have also studied the Viking colonization of Iceland and Greenland. Before the 1970s, research on the Viking colonization of these islands was based primarily on the study of the sagas, a series of documents that were written in the mid-12th century and later, long after the initial Viking settlement of Iceland around 874 CE and Greenland about 975 CE. Archaeological research has identified many early sites in Iceland. These sites are located along the north and south coasts of the island, as well as in the northern interior of Iceland. These initial settlements led to massive deforestation in Iceland, as woodlands were cleared for animal pastures and for firewood. In many regions of Iceland, the deforestation was followed by substantial soil erosion, rendering many parts of the interior unsuitable for animal husbandry and agriculture.

Archaeological survey and excavation in Greenland have shown that two Viking settlements were established in the late 10th century CE, a larger eastern settlement and a smaller western settlement. Norse settlers in Greenland combined animal husbandry based on herding cattle, sheep, and goats with seal and caribou hunting. The Norse in Greenland were unable to grow grain, and they relied on trade with Europe for both staples and luxury goods. The Norse settlements in Greenland were ultimately unsuccessful; the smaller, western settlement appears to have been abandoned by 1350 CE, and the eastern settlement failed by the middle of the 15th century. These studies are important because they reveal the limits of the northern European patterns of animal husbandry and agriculture. Farming practices that were established in northern Europe for millennia proved unsustainable in the more fragile, arctic environments of Iceland and Greenland. This research shows how archaeological and environmental data can be combined to provide a well-rounded picture of medieval settlement and subsistence.

— *Pam J. Crabtree*

See also **Vikings**

Further Readings

Beresford, M. W., & Hurst, J. (1991). *Wharram Percy: Deserted medieval village.* New Haven, CT: Yale University Press.

Biddle, M. (2004). Winchester. In P. Bogucki & P. J. Crabtree (Eds.), *Ancient Europe 8000 B.C.-A.D. 1000: Encyclopedia of the barbarian world* (Vol. 2, pp. 501–507). New York: Scribners.

Crabtree, P. J. (Ed.). (2000). *Medieval archaeology: An encyclopedia.* New York: Garland.

McGovern, T. H., & Perdikaris, S. (2000, October). The Vikings' silent saga: What went wrong with the Scandinavian westward expansion. *Natural History, 109,* 50–56.

Thurston, T. L. (2001). *Landscapes of power, landscapes of conflict: State formation in the South Scandinavian Iron Age.* New York: Kluwer Academic/Plenum.

Archaeology, Salvage

Salvage (or compliance) archaeology is performed in response to local, state, and federal historic preservation mandates. Compliance archaeology ensures that cultural resources that are likely to be impacted by construction are properly managed through documentation and excavation before they are destroyed.

Over half of the archaeologists working in the United States today are employed in salvage archaeology. Compliance projects comprise a growing segment of archaeological research, with millions of dollars allotted to projects annually.

Salvage Archaeology in the United States

In the United States, archaeological salvage projects are completed in response to a variety of state and federal laws, including the National Historic Preservation Act (NHPA), National Environmental Policy Act (NEPA), and the Archaeological Resources Protection Act (ARPA). The NHPA is the most important of these laws and establishes a State Historic Preservation Office (SHPO) and officer in each state. The State Historic Preservation officer is responsible for overseeing implementation of the NHPA within that particular state. NHPA also establishes guidelines requiring that state and federal agencies take into account the effect of any undertaking on any archaeological site, building, or property that is within or is eligible for the National Register of Historic Places.

Salvage archaeology has traditionally received involvement from state and federal land managers, highway departments, the Army Corps of Engineers, and SHPOs. Some Native American groups have also become involved in salvage archaeology through the establishment of Tribal Historic Preservation Offices (THPO). Each THPO has a preservation officer who oversees NHPA compliance activities within that tribe's aboriginal territory. The Tribal Historic Preservation Officer usually oversees salvage projects completed on Native American reservations with limited involvement from the State Historic Preservation Officer.

Types of Salvage Projects

There are three types of salvage projects. Phase I (or reconnaissance) surveys are the initial stage and are designed to locate sites within a particular project area. These types of surveys are often completed in two parts. The first part (or Phase IA) involves gathering background information about the project area. Background information is gathered from a variety of sources, including state site files, historic maps, photographs, topographic and soil maps, and oral histories. The second part (often known as Phase IB) involves the identification of archaeological sites through surface survey and subsurface testing. Subsurface testing often involves the excavation of small shovel tests across the project area to determine whether cultural deposits are located within the project limits. If a site is located and appears to possess much of its original integrity, a Phase II excavation may be recommended.

Phase II (or site examinations) excavations are designed to determine whether the site meets the criteria for eligibility on the National Register of Historic Places. During Phase II excavations, larger square test units and trenches are typically excavated to determine the horizontal and vertical boundaries of the site and assess its chronology. Analyses at the Phase II level are more detailed than those at the Phase I level and include not only an assessment of what was found but also how the resource fits within the local history of the project area.

At the end of a Phase II excavation, a recommendation is made concerning the site's eligibility for the National Register of Historic Places. To be eligible for the National Register, a site must possess one or more of the following characteristics: (a) association with the events that have made a significant contribution to the broad patterns of our history, (b) association with the lives of persons significant to our past, (c) embody the distinctive characteristics of a type, period, or method of construction, or (d) have yielded, or may be likely to yield, information important in prehistory or history.

If a site is determined to be eligible for the National Register and cannot be avoided during construction, a Phase III excavation is initiated. Phase III (or data recovery) excavations are designed to mitigate (or salvage) cultural materials and features within the project area before they are destroyed by construction. Phase III excavations are usually initiated through the preparation of a data recovery plan. A data recovery plan outlines the steps that will be taken to excavate the site, what research questions will be addressed during the excavation, and what types of analyses will be undertaken.

Like Phase II excavations, Phase III excavations are usually accomplished through the excavation of large test units and trenches as well as through archaeological monitoring. These excavations often produce large quantities of artifacts and data that are synthesized to form the basis for the site's interpretation. Unlike Phase I and II excavations, Phase III excavations often have a public outreach component and require that information about the excavation be

disseminated to the public through oral presentations, peer review articles, site tours, Web sites, and/or public displays.

Once a salvage project is completed, the artifacts, field records, and reports generated by the project are processed for curation. The curation, or long-term storage of artifacts, is an important step in any salvage project. The curation of artifacts not only ensures that they are cared for indefinitely, but proper curation allows them to be used by future researchers.

Curation facilities occur in both local and regional settings and may include local historical societies, museums, state and county repositories, and university centers. Curation facilities housing federal collections are required to abide by more stringent rules than those with nonfederal collections. Repositories with federal collections are required to maintain long-term cataloging and conservation systems that meet standard museum and archival practices. In addition, facilities housing federal collections need to keep main collections storage areas that meet local building, safety, health, and fire codes. Failure to comply with these regulations can put important collections in jeopardy causing the data contained within them to be lost to future generations.

— *Christina B. Rieth*

See also **Excavation**

Further Readings

King, T. F. (1998). *Cultural resource laws and practice: An introductory guide.* Walnut Creek, CA: Alta Mira Press.

King, T. F. (2002). *Thinking about cultural resource management: Essays from the edge.* Walnut Creek, CA: Alta Mira Press.

Newman, T. W., & Sanford, R. M. (2001). *Practicing archaeology: A training manual for cultural resources archaeology.* Walnut Creek, CA: Alta Mira Press.

Architectural Anthropology

The built environment in which we live as humans is an important matter. The architectural landscape deeply structures our lives. On the other hand, architecture, as it is produced today in our urbanized environments, is based on too restricted knowledge. Postmodern "theory of architecture" is determined by the conventional history of art. Its narrow concept of aesthetic values prevents scientific research and reasoning by judgments of subjective taste. The wider human condition is not integrated. Humanity appears only marginally as user and is represented by standardized functional needs. Consequently, architectural anthropology maintains that theoretical horizons have to be widened. The term *architecture* is defined in new ways by integrating it into anthropological dimensions, including primatological and paleanthropological considerations. Thus the term *architecture* implies: all what humans and their biological relatives built and build.

In the late 1960s, modern architecture was maneuvered into a crisis. Using the dynamite destruction of a modern habitat district (Pruitt-Igoe) as key incident, Charles Jencks declared the "Death of Modernism" and proposed a new era of "Postmodernism." Pruitt-Igoe had won an architectural award before but had finally ended up as a slum. However, Jencks's declaration was felt as a regress into the 19th century's history of styles by many young architects. The postmodern architectural theory, based on written history related to architecture (e.g., Vitruvianism) now imposed by art historians, was critically questioned as a historism inadequate for the "anthropological depth" of architecture. The origins of architecture cannot be found in ancient texts.

In the same period, a considerable interest developed for the achievements of traditional "architecture without architects" as proposed by Bernard Rudofsky. Vernacular architecture now was perceived by many as a new domain of research. Books published by Paul Oliver and others made it evident that ethnology had neglected this field considerably. Particularly architects became active in this direction of research. A worldwide movement emerged with numerous international associations that focused on the study of traditional environments (IASTE, University of California, Berkeley). The most important result of these efforts can be seen in the *Encyclopaedia of Vernacular Architecture of the World* edited by Paul Oliver. It is a three-volumed oeuvre in folio size, with about 2,000 contributors worldwide. The basic goal was to globally document traditional architecture and to classify it according to anthropological criteria. The encyclopaedia is a milestone in global house

research. It shows the great variety of house forms in various cultures of the world. It documents traditional aesthetics and the very special structural conditions of related ways of life and social orders often still felt as exotic today.

However, theoretically, the *Encyclopaedia* is not without problems. It rests largely on the level of an anthropology of the house and uses its patterns of explanation from disciplinary anthropology without being conscious of the Eurocentric origins of these interpretations. Many characteristics of house traditions cannot be explained in this framework.

Furthermore, something very important becomes clear if, in regard to materials used, we concentrate our interest on the traditional or ethnological domain of architecture. Besides durable materials, we also find materials of limited durability like wood or even very ephemeral fibrous materials. Evidently, they have the advantage that they can be easily worked merely by the hand. The hand as the primary tool? Binding, weaving, and so on can be seen as very ancient techniques technologically or anthropologically. We find many types of roofs, walls and floors, mats for sleeping, and so on. Furthermore, there are containers, means of transportation, and cages for animals and the like. All these are important products of this fibrous type.

In the framework of history and prehistory of architecture, such ephemeral equipments are absent. Time has destroyed them. We must either put aside our intentions or change our methods. In the latter case, material culture has to be defined anthropologically. The Viennese school of ethnology, and in particular Karl R. Wernhart, has developed a new method called "structural history" or "ethno-prehistory," which can be used for questioning the historism separating the three temporally different disciplines in regard to material culture. Did fibrous materials and fibroconstructive

processes play an important role in prehistory? Was the evolution of culture closely related to objects that were not durable? Were such objects representative for systems of ontologically high values? Such questions can be taken as a good reason to hypothetically introduce a new period into the periodic system of prehistory: (prelithic) fibroconstructive industries. We will have to support this hypothesis more clearly below.

There is a further important point. Architectural anthropology is closely related to Otto F. Bollnow's anthropology of space. In his book *Man and Space,* Bollnow maintained that, in contrast to the homogeneous concept of universal space, essentially a discovery of the 14th century, cultural, or human, space is closely related to the evolution of human dwelling and settlement. This implies, first, that human space perception and space conception originally were formed in small, local settlement units, in which architecture provided the semantic systems for spatial organization. Second, we have to assume a long extension process of spatial perception and conception. In addition, tectonic elements imply vertical and horizontal axial systems (e.g., "access-place scheme" or "vertical polarity scheme"). In the framework of a new "habitat anthropology," we gain new and objective instruments for the reconstruction of basic spatiocultural patterns with often surprising continuities.

These prerequisites allow a new view on the anthropologically defined concept of architecture. It works with five classes: subhuman, semantic, domestic, sedentary, and urban/imperial architecture. These five classes are relatively independent fields of research. Combined with the results of conventional physical and cultural anthropology, they can be taken as a new field of stimulating discussions. This shall be outlined in the following.

Subhuman Architecture

In their book *The Great Apes,* the American primatologist couple Robert W. and Ada W. Yerkes for the first time had systematically collected and studied observations focused on the nest-building behavior of the pongids. They considered nest building as a daily practiced and routined constructive behavior that produced definitive alterations of the natural conditions of the environment. And they postulated pongid nest building as the beginning of an "evolution of constructivity."

The work of the Yerkeses was of great influence on the following pongid research. Numerous primatologists, who studied animals in their natural environment, contributed important observations regarding nest-building behavior. Today we have a fairly good view of the enormous protocultural significance of the nest. Particularly women like Jane Goodall, Biruté Galdikas, and Dian Fossey contributed important studies due to their unprejudiced spontaneity and capacity of observation.

However, theories of hominization in general today are dominated by tool-using and tool-making behavior. In a recent book of McGrew, it even circulates as "culture." It is supported mainly by observations of the use of stones for nut cracking or the use of defoliated twigs for ant fishing. However, in the natural environment, these types of tool use are rarely observed. They are not part of a daily routine. But why the tool use dominates is clear. It is considered to be supported by the archaeologically established line of tools.

If, on the other hand, the suggestion of the Yerkeses is taken seriously and the protocultural artifact character of the nest is emphasized, nest-building behavior is much more convincing as protocultural activity.

- It is intimately connected to the life of the pongids. Infants spend about 4 years in the nest of their mother until they can build their own nest. Nest building is learned. The young play with nests. The completed nest produces identification of the producer with his artifact. The nest is also used in case of sickness and imminent death.
- Nest building is a daily routine. Quantitatively too, nests are overwhelming. During its life an individual builds a virtual tower of about a height of 11 times the height of the Eiffel Tower in Paris.
- Construction implies specific physical conditions characteristic for humans: extensive rotation of arms, precision grip, and precise stereoscopic view while controlling constructive processes.
- It has important protocultural characteristics. It requests judgment of constructive conditions, static quality, and so on.
- One can even speak of the psychology of the nest: several observers noted animals expressing coziness when in their nests.

- Night camps are an eminently social arrangement. Furthermore, the night camp of a group shows a strategic organization with a secured inside and a controlled outside, which is spatially not much different from the principles of a human apartment.

Most important is the differentiation of tree and ground nests. Whether tree or ground nests are built depends on various factors. Weight and age of the individuals are important, but also environmental conditions play a decisive role. Tree nests gain their stability from the structural condition of the tree top in which they are built. Ground nests are usually made with rooted plant materials—bamboo stalks in a bamboo grove, for instance. Roots act as natural foundations. On a height of 3 to 4 meters, the stalks are bent, broken, and knotted into stable triangles, thus forming a perfectly stable type of tower. On its top, the nest proper is made with thin and thoroughly interwoven twigs to form a smooth upholstery. Finally, the often heavy animals climb up, position themselves with their body into the central depression of the nest, and spend the night sleeping.

Evidently, the ground nest is a full-fledged work of architecture. But the ground nest is not only a primordial type of architecture. With its material and technical conditions, it provides the ideal environmental setting to plausibly explain another important subject of hominization: the erection of the body and the permanent bipedal locomotion of humans. It is generally assumed that, due to climatic changes in a temporal period between 16 and 11 million years ago, tropical rain forests increasingly vanished and were replaced by open savannahs and this process influenced hominization. Evidently, the loose vegetation at the edge of savannahs is the ideal environment in which this type of tectonic ground nest could be built. Produced routinely by groups, the night camp must also have been of advantage selectively in regard to securely passing the night, also protected in view of nocturnal predators.

But this complex system of constructing behavior and its intimate relations with the life of pongids raises a further complex of questions related to processes of hominization: What were the factors of brain development? What was the main cause for the increase of brain size? Was it language, was it tool behavior, was it due to social interactions? From the position of architectural anthropology, these parameters—seen also in mutual connection—are not apt to explain the considerable increase of brain size of about 300% between *Homo habilis* and *Homo sapiens sapiens*. Particularly the tool behavior as it is described today with its monotonous processes cannot explain the expansion of the brain.

If, on the other hand, the routined nest building is put into the foreground, the use of early tools as cutters for fibrous materials might have produced the "first architectural revolution." It was mentioned above that the building of the pongid ground nest is bound to the corresponding biotope (rooted materials). Consequently, tools of the pebble tool type must have freed constructive work from this fixation to biotopic conditions. Materials could now be "harvested" where they grew and could be carried to the "construction site," where they could be combined with other materials. Signs could now be set up freely, for example, in regard to intensified food control. Material combinations of constructions could be extended. Stable and flexible materials could be integrated at the same place into the same construction. A process of structural differentiation is initiated that might have led to an elementary material culture of the fibrous or fibroconstructive type. Maybe the "traffic signs" made among the bonobo subgroups while on daily migration, as described recently by Sue Savage Rumbaugh, might give some impressions on the level of communication by fibrous signs.

Semantic Architecture

In their important ethnological study on traditional technology, Walter Hirschberg and Alfred Janata showed that fibroconstructive industries are the main part of material culture in traditional societies. They also play an important role in the field of building and dwelling. The ephemera character of the materials and also historistic fixations have obstructed the view on the anthropological significance of techniques with fibrous materials. Tools are rarely used; the hand is the primary tool. The autonomy of the processes guaranteed by the ubiquity of the materials hints, too, to temporal depth. But evidently, the conditions of fibrous material culture can only be researched in the ethnographic field.

An example: the material culture of the Ainu as it is presented by Shigeru Kayano with precise technical drawings is of great importance here. Kayano's book presents about 250 tools and instruments that an archaeologist never finds. A great part of the material

culture of the Ainu reflects their paleo-Siberian roots: simply constructed traps, nets, cages, fish traps, baskets and bags for transport, boats, weapons, tools for various purposes. Toys for children and status symbols are there too, as well as small temporary hunting huts. These objects can easily be retroprojected into Mesolithic times, maybe even into the Upper and Middle Paleolithic. It seems that material culture was much richer than the image archaeology maintains.

Furthermore, the Ainu have an extraordinary topo-semantic sign system: their *inau.* John Batchelor, who was considered an authority on the Ainu, described these signs under the Eurocentric concept of "primitive religion." But earlier, Willy Kremp discovered the territorial implications of the Ainu signs in the framework of a systematic survey. They are primarily related to dwelling, but in an extensive sense they are also used to control economical "incomes." The altar behind the Ainu house functions as a coordination point for gift exchange for what all comes in from the wilderness to the house through the distinguished domains of hunting, fishing, collecting, and small gardening. Hitoshi Watanabe has described the river system with mountain- and ocean-oriented contrasts and as it serves as orientation system in this local cosmos. Emiko Ohnuki-Tierney too has contributed important data for the understanding of these environmental orders controlled by signs, but she interpreted the Ainu microcosm macrocosmologically, following Mircea Eliade's Eurotheological concept.

Japanese agrarian culture too contains numerous indicators of autonomous local cultures with fibroconstructive industries. With the title *Straw (wara),* Kiyoshi Miyazaki has described this rural straw culture of Japan in a beautiful two-volume study. There are not only coats, bags, shoes, and other practical things but also objects of ontologically high values related to the worldview of Japanese farmers. This fibroconstructive culture is doubtless more ancient than what we know from the Yayoi period of Japanese object culture. Without doubt, it was carried along as vital tradition by the early agrarian settlers. The autonomy of the tradition might have been helpful for local integration.

However, most surprising in Japan are the traditions that have been preserved in the framework of traditional village Shinto: a fibroconstructive topo-semantic system that traditionally survived until today in a surprising density. The elementary technological characteristics appear combined with highest ontological values (sacrality). The signs are considered as deities or as temporary seats of local gods and are completely integrated into historical Shinto. In the framework of architectural anthropology, the traditions can be considered as archives of local village history. In the framework of cyclic renewal cults, the signs document the early residence of ancient families or of the settlement founder line represented by one or several houses. Since these houses express a moderate hegemony in the villages, the cult supports also the political and social structure of the settlement. Thus what the Western perspective considers as religion appears to a great extent as a traditional local constitution. The fibrous nuclear border demarcation set up at the occasion of the settlement foundation is renewed.

In the case of Japan, we become aware that such fibrous topo-semantic demarcations must have been an important structural characteristic of prehistorical agrarian settlements. Guenther Kapfhammer's book on alpine traditions of Central Europe shows such demarcations also as maypoles and the like within European folklore. We find them as "fetishes" and "idols" in many traditional cultures of the world. And we find them historically in the framework of the so-called lower mythology of Sir James George Frazer and Wilhelm Mannhardt. Archaeologically, they are known as life-trees in many forms (Bronze Age). Very likely many of the rock-art "tectiformes" had similar functions. Semantic architecture can thus be taken as a universally spread architectural type of predomestic significance. Very likely semantic architecture was the experimental field of architectural form and corresponding symbolic meanings.

We have often mentioned "high ontological values," that is, high values related to local worldviews. This is an important point, which should be outlined here. The most important results of ethnological research focused on semantic architecture can be seen in the fact that a cognitive principle of autonomous origins could be described. It is expressed with most elementary forms and is produced autonomously by the constructive process, without any preconceived idea of the producer. The expression can be characterized as "categorical polarity" or "coincidence of opposites." In the tradition of 100 villages researched by the present author, it is clearly shown how the primary geometrical form, essentially as column- or hutlike type, following a trend of local differentiation, enters into dialogue with natural forms via the coincidence

of opposites embedded in the same form as "general principle." Most strikingly, this happens with a tree form in some villages but also with birds, with mountains, or with a certain type of fish. There are also male-female contrasts, two-headed snakes, fire-spitting dragons, and so on. Somehow a primordial metaphorical world, which, however, has its clear objective background. The convergence of artifact and natural form happens through the categorical polarity of the topo-semantic system, respectively, through the "polar analogy" of both forms. The artificial forms remain dominantly characterized by structural conditions, technically and geometrically.

Regarding the prehistorical question of how humanity discovered natural forms, this can provide models of how the environment was organized by conscious perception. Landscape too seems to be structured according to this principle of polarity. Time can be perceived in polar relations and similarly elementary social hierarchy. The dialogue between semantic architecture and natural form can be used as a model for the cultural perception of nature on the level of categorically polar analogies. Very likely polarity, as a cognitive system, has produced an elementary aesthetic revolution that can still be observed in many traditional societies. And in fact, it structurally survives into many aspects of modern perceptions. Its origins could be assumed in the Middle Paleolithic, that is, between *Homo sapiens* and *Homo sapiens sapiens*. This process of cognition might also have contributed considerably to the increase of brain capacity.

Domestic Architecture

By assuming a primary topo-semantic stratum in the architectural evolution outlined, we gain new indicators for the development of domestic architecture. The so-called shelter theory, that is, the assumption that humanity invented protective roofs or windbreaks against excessive climatic influences, reveals as functional retroprojection. Huts and houses have to be interpreted as composite developments. We discover basic architectural schemes like the "access place scheme" in which semantic architecture defines the elementary plan with "place- and gate-markers" combined with other elements derived from semantic architecture. House altars and house gods reveal as place markers and sacred doorposts as gate markers. Consequently, as Gustav Ränk has shown, traditional house plans are often extremely conservative in spite of changing materials and flexible outer form of the houses. The ontologically high ranking demarcations appear fixed by cyclic cults, which were originally focused on their renewal. The fire in the open hearth reveals as an independent construction, which entered the house or the hut while preserving its own ontological autonomy. Similarly the roof. It can be derived as independent development of hutlike signs.

This program was essentially derived from two traditions studied in depth, that is, from various house types of the Ainu and from farmhouses of Japan. Both house traditions, with all variations, are not developed according to functional principles. Both correspond to accumulations of relatively independent elements derived from a predomestic topo-semantic layer, which defined living space with cyclically renewed topo-semantic demarcations. This creates a central and important requisite for the research of houses: related cults must be included into research.

Sedentary Architecture

In the following we discuss an important insight of the approach: the evolution of territorial control and sedentary life. In the Mesolithic, a cultural dimension comes up that can be understood from its developed form but cannot be reconstructed archaeologically with its factual conditions. Here too the ethno-prehistorical method shows a new potential to better understand the phenomenon of the increasing capacity for territorial control and, finally, of permanent sedentarity from its institutional conditions.

We can assume that processes related to territorial control like broad spectrum food collection (Mesolithic), permanent sedentary village cultures (Neolithic), and formations of cities and states with social hierarchy (Bronze Age) were not isolated events but were structurally coherent parts of a wider development.

An earlier study of the present author hinted to sources that support the thesis that topo-semantic territorial demarcations of the fibroconstructive type had been an important equipment of the Middle and Late Paleolithic (grave flowers of Shanidar, tectiformes and female figures in rock art).

The Mesolithic, then, is characterized by increasingly sedentary communities and by the capacity to collect a broad spectrum of food. However, the conditions of

the new level are not clear. On the other hand, comparison with the ethnological situation clearly shows the importance of topo-semantic systems. In the case of the Ainu, it is evident that broad spectrum food gathering is controlled by a fibroconstructive topo-semantic system. In the framework of a categorically polar system, the topo-semantic signs relate the antithetic categories of inside and outside. The fibroconstructive signs form the threshold points of gift exchange between humans and wilderness. Rooted in the intimate space of dwelling, they extend into wider zones of hunting and collecting within the valley as home range of the Ainu. A complex system of categorical polarity also controls time, social role, and communal cooperation. In short, the comparison with the ethnological situation gives us very clear ideas about the structural conditions and ontological principles according to which extended territorial control systems could have evolved.

The Neolithic is prehistorically characterized by permanent agrarian settlements and domestication. More or less permanent occupation of a territory became important with pastoralism and agriculture. However, the question of how settlements were institutionally organized remains open. Architectural anthropology assumes that topo-semantic demarcation systems present already in the Mesolithic period became dominant in Neolithic times. They proved highly efficient in the protection of sedentary life and consequently produced high ontological values among local populations. Crucial are the terms *nuclear border* and *settlement core complex*.

Nuclear border demarcations were set up in the middle of settlements. The fibrous demarcation remains within the controlled zone of the settlement. The categorically polar structure of "semantic architecture" is projected spatially toward the outside, producing village plans with complementary surfaces, functional and nonfunctional domains. First, this must have been effective within regional settlement systems. It developed also a system of ontological values that further protected the settlement. Polarity had become an established ontological value related to the signs. They were used as models of the harmonious organization of space, time, and social organization. This implied also a primary type of aesthetics, which provided value to the settlement as a whole.

The cyclic renewal of the same fibroconstructive demarcations introduced temporal depth into the settlement's consciousness. Furthermore, an elementary social hierarchy developed within agrarian villages. Through cyclic cultic renewal, the demarcation system remained related to the foundation of the settlement, an aspect that is locally shown in the founder house line. The founder house develops hegemonic claims. In the renewal cult, its representantive appears with dominant functions. He is priest and chief or ruler of the settlement. Thus, the topo-semantic system had the function of a traditional local constitution. What we defined as semantic architecture can be taken as a scriptless archive of settlement history, very likely a basic institution of Neolithic village cultures.

Urban and Imperial Architecture

Bronze Age formation of early civilizations is the field where architectural anthropology clearly shows its validity. Due to rich archaeological sources, the anthropological method outlined provides considerable new insights into institutional processes, due to the ontological values related to architecture and also due to the constitutional institutions it came to form in Neolithic times.

Conventional archaeology and history organize the rich Bronze Age finds as the beginning of early high culture. They admire the wealth of forms and attribute these surprising phenomena to the great power of early civilizational invention. For the causes of the enormous social and institutional changes, well-founded explanations are lacking. Some consider new irrigation systems as the main cause, others emphasize new population densities or new market developments.

However, the archaeological interpretation of sources has neglected an important point. The larger part of sources shows obvious indicators of fibroconstructive prototypes in texture and formal structure. This is valid for temples, temple columns, innermost sanctuaries, temple gates, stelae, imperial or regional symbols on thrones, pillars, life trees, and so on.

Walter Andrae was a prominent figure of the German architecturo-archaeological research, which was active in Mesopotamia and ancient Egypt in the 1930s. Andrae has strongly emphasized this aspect of "metabolism" between ephemeral and durable materials in this domain. In his book *The Ionian Column, Built Form or Symbol?* he presented a great quantity of archaeological sources supporting the thesis of a fibroconstructive substrate among predynastic village cultures of the ancient Near East and Egypt. Based on

ontology became superseded by complex divine genealogies, with their origins projected into imaginary time depths (myths). As Hermann Kees has clearly described, hegemonic processes then developed on the regional district level as well as on the imperial level with corresponding cults and temples. The originally autonomous agricultural settlement was subdued to centralized control by means of the monumentalized cult system. Theocracy appeared as political form.

Architecture defined in an anthropologically wider framework reveals new aspects of the human condition with regard to territorial organization and sedentarization as well as in view of the formation of early civilizations. Based primarily on "constructivity," architecture appears closely related to the subhuman and human existence. But architecture cannot simply be considered as a part of the Eurocentric artist-art scheme, nor can it be reconceived in its conventional circles. The methods have to be extended toward global horizons introducing perspectives of anthropological temporal depths.

— Nold Egenter

this substrate, he interprets the Greek columns of the Ionian or Corinthian orders as bundled fibrous plant columns "metabolized" into stone. They are thus placed close to the plant columns of the Egyptian temples.

In other words, what archaeology describes as a highly creative level of "early civilization" reveals basically as a metabolized reproduction of fibroconstructive architecture and material culture of predynastic village cultures, including corresponding sociopolitical structures. The prototypes did not show with the archaeological method.

This leads to an entirely new evaluation of early civilization. Innovations were essentially of technological character. The first cities and empires owed their existence mainly to the "monumentalization" of cyclically renewed fibrous "documents" of the constitutional archives of predynastic villages. They were copied into durable materials, which allowed the spatial extension of empires. Villages could be controlled from impressively built cult centers as the top institution of a monumental theocratic system of territorial control. The material expenditures of the cyclic village cults were centralized on the higher level as taxes and labor. This allowed the accumulation of wealth in the centers. The cyclic time concept of the villages was superseded by linear time, expressed by "eternal" buildings. The evident causality of the cults in the foundation of the villages and the corresponding local

Further Readings

Egenter, N. (1986, September). Software for a soft prehistory; Structural history and structural ergology as applied to a type of universally distributed "soft industry": Sacred territorial demarcation signs made of nondurable organic materials. In *Archaeological "objectivity" in interpretation* (Vol. 2). [Precirculated papers].The World Archaeological Congress, Southampton and London. Southampton, UK: Allen & Unwin.

Egenter, N. (1990). Evolutionary architecture: Nestbuilding among higher apes. *International semiotic spectrum of the Toronto semiotic circle, 14* (September), 1–4.

Egenter, N. (1992). *Architectural anthropology—Research Series: vol. 1. The present relevance of the primitive in architecture* (trilingual ed.: English-French-German). Lausanne, Switzerland: Editions Structura Mundi.

Egenter, N. (1994). *Architectural anthropology—Semantic and symbolic architecture: An architectural-ethnological survey of one hundred villages of Central Japan.* Lausanne, Switzerland: Editions Structura Mundi.

Egenter, N. (1994). Semantic architecture and the interpretation of prehistoric rock art: An ethno-(pre-)historical approach. *Semiotica, 100,* 2/4, 201–266.

Egenter, N. (2001). The deep structure of architecture: Constructivity and human evolution. In Mari-Jose Amerlinck (Ed)., *Architectural anthropology* (pp. 43–91). Westport CT: Bergin & Garvey.

Implosion Research Series Online. (1996). Retrieved from http://home.worldcom.ch/~negenter/005_ResSerOnline.html

Kayano, S. (1978). *Ainu no Mingu* [The tools and instruments of the Ainu]. Tokyo: Ainu no Mingu Kanko Rendo Iinkai.

Savage-Rumbaugh, E. S., Williams, S. L., Furuichi, T., & and Kano, T. (1996). Language perceived: Paniscus branches out. In W. C. McGrew and T. Nishida (Eds.), *Great apes societies* (pp. 173–195). Cambridge, UK: Cambridge University Press.

Wernhart, K. R. (1981). Kulturgeschichte und Ethnohistorie als Strukturgeschichte. In W. Schmied-Kowarzik & J. Stagl (Eds.), *Grundfragen der Ethnologie. Beiträge zur gegenwärtigen Theorien-Diskussion* (pp. 233–252). Berlin, Germany: Dietrich Reimer Verlag.

Arctic

The Arctic is the region of Earth where the sun never rises for one 24-hour period in the winter and never sets for one 24-hour period in the summer. This area has been demarcated as north of the 66.5° north latitude and includes the northern parts of Alaska, Canada, Greenland, Siberia, and the Svalbard archipelago, which lies 700 km north of Norway. In the summer, the air temperature reaches 22°C (71.6°F), and in the winter, the temperature stays around –50°C (–58°F). In some regions, temperatures have been recorded as low as –70°C (–94°F).

Because of the frigid conditions, the Arctic has long been thought of as uninhabitable and as a border to the edge of the Earth. Notwithstanding, curiosity fueled the desires of some to investigate this little-known territory. The first Arctic explorer was Pytheas, a Greek navigator from the colony of Massilia, around 325 BC. Pytheas christened his discovery *Ultima Thule,* which means "the outermost land." The present-day location of Pytheas's "outermost land" is debated, but theories of its location range from Iceland to Norway. After Pytheas came, more explorers, notably, the Norsemen, in the 9th century AD. One of the more famous of the Norsemen to travel to the Arctic was the Viking, Eric the Red, who was banished from Iceland to later discover the territory he named Greenland.

Arctic exploration really flourished toward the end of the 15th century when John Cabot, a Venetian, proposed the idea of a Northwest passage to India. This spurred many attempts to find other trade routes. However, it was not until the early 19th century that the incentive for Arctic exploration changed from commercial to scientific. Much of the outer regions of the Arctic were known at the time, but the interior was still unexplored.

William Parry was the first to attempt the rigorous trek to the interior of the Arctic in 1827. His journey to the North Pole was unsuccessful, but he paved the way for future explorers, including the German Captain Karl Koldeway, the American Charles Francis Hall, and British Captain Sir George Nares. The North Pole was finally reached in 1909 by American explorer Lieutenant Robert Edwin Peary.

With the advent of flight, the Arctic became much more accessible and opened up to research in many areas, such as natural resources, pollution, and climate. Natural resources of the Arctic include oil, petroleum, minerals, and wildlife. In addition, the Arctic is unique and ideal for studies on pollution and climate because of the cold weather, prolonged periods of light and dark, and the virtual absence of anthropogenic sources of pollution.

The first people credited with mastering the extreme Arctic environment were hunters from northeastern Siberia who lived about 40,000 years ago. Some of these hunters crossed the Bering Strait and expanded across Arctic North America. Archaeologists refer to these people as Paleo-Eskimos. (Note: The term *Eskimo* is no longer used and has been replaced by the term *Inuit.*). Arctic dwellers are compactly built, having a

Source: © iStockphoto/Tomasz Resiak.

barrel-shaped torso and short arms and legs, which minimize heat loss. Today, there are almost 120,000 Inuit still living in the far north. Many live with modern comforts to varying degrees in towns or small settlements throughout the Arctic. Through the combined efforts of these local communities, the early explorers, and contemporary researchers, we now know much more about a part of our planet that was once believed to be uninhabitable and partly unknowable.

— *Kathleen C. Smith and Lisa M. Paciulli*

See also **Aleuts; Eskimos; Inuit**

Further Readings

Bottenheim, J. W. (2002). An introduction to the ALERT 2000 and SUMMIT 2000 Arctic research studies. *Atmospheric Environment 36*, 2467–2469.

Liversidge, D. (1970). *Arctic exploration.* New York: Franklin Watts.

Sugden, D. (1982). *Arctic and Antarctic: A modern geographical synthesis.* Totowa, NJ: Barnes & Noble Books.

Ardrey, Robert (1908–1980)

American anthropologist, author, and playwright, Robert Ardrey was known for his contributions to anthropology, the gilded stage, and silver screen. Born in Chicago, Illinois, Ardrey's interest in science and writing were sustained after attaining a PhD from the University of Chicago (1930). Though performing numerous jobs to support his first wife and two children (Ardrey was married twice: Johnson in 1938 and Grunewald in 1960), Ardrey's efforts resulted in numerous plays and screenplays; among the popularized were *The Three Musketeers* (1947), *Madame Bovary* (1948), *The Secret Garden* (1949), *The Adventures of Quentin Durand* (1955), *The Power and the Prize* (1956), *The Wonderful Country* (1959), *The Four Horseman of the Apocalypse* (1962), *Khartoum* (1966), and *Thunder Rock* (1939, 1943, and 1985). However, Ardrey's contribution and popularizing of science stemmed from his major works: *African Genesis: A Personal Investigation into the Animal Origins and Nature of Man* (1961), *The Territorial Imperative: A Personal Inquiry into the Animal Origins*

of Property and Nations (1966), *The Social Contract: A Personal Inquiry into the Evolutionary Sources of Order and Disorder* (1970), and *The Hunting Hypothesis* (1976). Interested in both human origin and human behavior, the discovery of *Australopithecus* in Africa influenced Ardrey's scientific perspective for the remainder of his life; he died in Cape Providence in South Africa.

Contributions and Perspectives

Robert Ardrey's contributions to the anthropological perspective regarding our species can be considered both iconoclastic and intellectually provocative. Drawing upon the observations of paleontologists, zoologists, psychologists, and work in sociobiology, Ardrey attempted to explain our species behavior, primarily in terms of aggression, within a naturalistic framework. The basis for his speculation regarding human behavior is not grounded in myth, theology, mysticism or unrealistic metaphysics; rather, his view was drawn from scientific speculation based on scientific evidence. As an anthropologist, Ardrey was grounded within an evolutionary structure.

The influence of Charles Darwin (1809–1882) upon science cannot be understated. Darwin's theory of organic evolution created a scientific framework for our species' existence and behavior. Regarding our species' evolution, speculation as to the place where our species evolved varied; for Darwin, our species' origin was in Africa. For others, Asia became the point of constructive speculation. Although Darwin's critique of human behavior falls short of contributions given by sociobiology, the significance of culture and derived behavior was put into an evolutionary framework. However, the physical evidence needed to refine plausible speculations was lacking. Although discoveries of fossil hominids would increase scientific awareness of human origin, it would be the discovery of *Australopithecus* by Raymond Dart that would influence Ardrey's depiction of human behavior.

Based upon the work of Dart and contributions of primatology, Ardrey stated that our primal behavior, similar to that of other primates, is rooted in our evolutionary past (whereas any differences are due to the evolution of the human brain). As depicted by the evidence regarded by Dart, Ardrey supported the belief that our hominid ancestor, *Australopithecus africanus,* was aggressive, skillful (use of tools), and a "culturally advanced" Pliocene killer (killer apes).

Source: © David Lees/CORBIS.

Consequently, human behavior that became romanticized and supported an anthropocentric view was reevaluated as being deeply instinctual primate behavior. Behavior derived from the need of sustenance, reproduction, and territory, closely linked by the complexity of the human brain, modified this instinctual aggressiveness that was depicted by Dart's specimens (evidence). In Ardrey's opinion, unlike earlier evolutionists', our species' moral nature was no different than any other animal's moral nature. This is due to the *territorial imperative,* whereby territory is the principal stimulus in this natural morality. In an evolutionary process, Ardrey depicted that the "moral" life is played and identified within these territories or arenas. The drama and interconnectedness of life, via territorial periphery, creates the probability for instinctual aggression; albeit aggression may not be fatal. Behavior, inter- and intragroup populations, is regulated by what Ardrey terms the "amity-enmity complex" (prompted by external and internal threats), which provides an individual a means for identity, stimulation, and security.

Although Ardrey's portrait of human behavior is devoid of any romanticism or metaphysical autonomy, the truth of the underlying biological factors does not detract from the human experience. Humanity, for all its virtues and vices, is greater than the sum of its biological parts, though the former is solely derived and dependent on the latter. Yet, Ardrey's convincing explanation of human aggression, as with all animal aggression, does not bode well for the human animal that is capable of destruction on a massive scale. Perhaps it was the close affinity with other primates (social, biological, and behavioral) and modern technological advancements that stimulated Ardrey's interests in the present human condition. This is particularly troublesome when considering ourselves progeny of our ancestral "killer apes." Though critics had pointed out cracks and fissures in Ardrey's theoretical framework, Ardrey never wavered from Darwin's sentiments regarding our species in relation to the great apes: We differ only in degree and not in kind.

— *David Alexander Lukaszek*

See also **Australopithecines; Dart, Raymond A.; Evolution, Human; Missing Link**

Further Readings

Ardrey, R. (1963). *African genesis: A personal investigation into the animal origins and nature of man.* New York: Delta Books.

Ardrey, R. (1966). *The territorial imperative.* New York: Atheneum.

Ardrey, R. (1970). *The social contract: A personal inquiry into the evolutionary sources of order and disorder.* New York: Atheneum.

Dart, R. (1982). *Adventures with the missing link.* Philadelphia: Institutes for the Achievement of Human Potential.

Dawkins, R. (1999). *The extended phenotype.* Oxford: Oxford University Press.

ARGENTINA

Argentina is the second largest country in South America with a population of 39,144,753. Although the official language is Spanish, Italian culture influences the food, music, and traditions of Argentina, making it unique from other South American countries. Significant numbers of Spanish, Basque, Irish, German, British, mestizo, and other ethnic groups also influence Argentina's cosmopolitan and multicultural society.

Argentina is a republic, declaring its independence from Spain's dominion in 1816. A bright yellow sun with a human face sits in the center of the light blue and white stripes of equal width that make up its flag. Argentina's native population was greatly diminished after 1502 when the Europeans imposed their class system of guaranteed privilege to the rich. With only 1% of the population controlling 70% of the land, the Argentinean economy relied heavily on export of grain and beef. The political system was also controlled by the rich, led by a succession of presidential, military, and civilian governments.

In 1943, a member of the military, which was in power at the time, staged a coup against his own generals to become one of the most memorable presidents for the common people. Juan Peron took leadership among the labor unions of Argentina and was the champion of the working-class people, as was his second wife, Eva. A member of the working class, Eva (affectionately called "Evita") was known for her flamboyant style as well as her extreme generosity and service to the general public. The Peron legacy ended when the economy went sour, Evita died of cancer, and the military again took power.

In the 1960s, the military leadership gripped Argentina with a rule of political violence, responding to armed leftist guerrilla challenges. Ernesto "Che" Gueverra, a martyred leftist revolutionary, emerged as a prominent figure in Argentinean history and folklore during this time. Gueverra was a comrade of Fidel Castro and fought to spread Marxist ideas in Argentina. In response to political opposition, the military declared a state of internal war, known the world over as the "Dirty War," in which approximately 6,000 citizens disappeared between 1976 and 1982. Suspected leftists and members of their families were tortured, raped, and brutally murdered. This had the effect of all but destroying labor unions and any other forms of political organization, that is, except for the Madres (mothers) of the Plaza de Mayo, who met every week in front of the capital in Buenos Aires to protest the kidnapping of their family members and to demand their release. As a result of the actions of the Madres and other human right's groups, Argentines have effectively pressured

Source: © Photo by Philip Douglis, The Douglis Visual Workshops.

the government to reform its structure. And while its torrid past generates little confidence in democratic processes, Argentina now has a democratically elected president. Elected in 2003, Nestor Kirchner addressed the corruption of the supreme court and the federal police. Members were impeached, dismissed, or retired.

Argentina's economy has long suffered from rising inflation and a skyrocketing deficit. Argentina owes over $21 billion to multilateral institutions. In opposition to dominant global economic influences, including the United States, Kirchner refuses to refinance the debt in terms defined by the International Monetary Fund. Priorities are focused on stabilizing the Argentine peso, reducing the high rates of unemployment, investing in agricultural productivity, stabilizing internal markets, addressing high crime rates, reducing inflation, and securing trade relationships with Brazil.

Argentina makes up most of the southern cone of the continent. The environment is highly varied, consisting of the Andes in the west, highlands in the northeast, the pampas in the east, the Gran Chaco in the north, and the arid plateaus of Patagonia in the south. The fertile grassland plain of the pampas is home to the capital city of Buenos Aires, built on the wealth of cattle ranching. Here roamed the infamous symbol of Argentina's heritage, the *gaucho.* These nomadic cowboys lived on horseback and off the land. Gauchos dressed in *bombacha* pants and tall leather boots, using *boleadoras* (lassos with three metal balls at the end) to rope cattle. Gauchos played the guitar and demonstrated a wide range of technical capabilities in their performance of the *milonga,* an instrumental solo. They are credited with the growth of Argentina's leather industry and method of barbequing beef, the *asado.* The gaucho also introduced *yerba mate,* an herbal tea made inside a hollowed gourd, to Argentine culture. Yerba mate is now sipped from gourds coated with silver, often through a silver straw.

The Patagonia region of Argentina contrasts starkly with the bustling pampas region. Frigid temperatures and high winds, due to its extreme southern latitude, make Patagonia barely habitable. The few people who live there are mostly highly adapted indigenous populations, who herd sheep and guanaco. The southernmost point on the continent of South America is located in Argentina and Chile at

Tierra del Fuego, or "land of fire." It was named thus by the first European sailing explorers, who saw the lights of native campfires on the shore. Another amazing destination for ecotourists from all over the world is Iguazu Falls, located in Iguazu National Park on the border of Argentina and Brazil. The waterfall, consisting of around 275 individual falls, is about 2.5 miles long and drops about 269 feet.

Argentines are religiously devoted to their favorite sport, futbol (soccer). They are always serious contenders for the World Cup soccer tournament, which they won in 1978 and 1986. Argentineans are proud of Diego Armando Marodona, considered by many to be the best soccer player in the world. In addition to the Argentine national team, there are many popular teams in Buenos Aires. The Rio Plate team and Boca Juniors have an ongoing rivalry that creates much excitement in Argentina. Polo is another popular sport. The game consists of a ball and mallet and is played on horseback. It was traditionally played by the gauchos and resembled a game of tag on horseback. Initially, a duck was the intended object to be retrieved from the other team.

Argentines are equally passionate about the tango. Originally considered a statement of social protest by the poor, the tango is a highly intimate and almost obscene dance. It emerged as a sarcastic expression against European wealth and social dominance in the 1880s, representing the sexual relations between prostitutes and their upper-class patrons. During a military takeover of Argentina in 1955, the tango was outlawed for a time in the country because it expressed both social and political freedom for the working class and the people of the slums. *Tango Argentino,* a stage spectacle, was a hit on Broadway and in Paris during the 1980s. The highly technical and musically sophisticated dance form is now the source of much national pride and a major tourist draw in Argentina.

Argentina's political history has been the subject of many literary and theatrical works. Poet Jorge Luis Borges is internationally famous. The musical production *Evita,* dramatizing the life of Evita Peron and featuring the hit song, "Don't Cry for Me Argentina" received international acclaim and was followed by an award-winning film. Lawrence Thornton's novel, *Imagining Argentina,* the story of the "disappeared" of the 1970s, was also released as an international film.

— *Elizabeth A. Dyer*

See also **Tierra del Fuego**

Further Readings

Borges, J. L. (1999). *Everything and nothing* (D. A. Yates, Trans.). New York: New Directions.

Feijoo, M. del C., & Gogna, M. (2002). Women in the transition to democracy: Argentina's mothers of the Plaza de Mayo. In D. B. Heath (Ed.), *Contemporary cultures and societies of Latin America* (3rd ed., pp. 375–383). Prospect Heights, IL: Waveland Press.

Lewis, P. H. (2002). *Guerillas and generals: The dirty war.* New York: Praeger.

Aristotle (384–322 BC)

Aristotle was an ancient Greek philosopher and scientist, one of the key intellectual figures in the history of Western philosophy and culture. He was for centuries authoritatively known as "the Philosopher," because his philosophy as well as his science dominated Western civilization for about four centuries, after they were resurrected for the European culture in the 12th century. Aristotle's understanding of a human being as naturally rational and sociopolitical animal makes him a forerunner of naturalistic conceptions of human nature that can be studied empirically.

Life

Aristotle was born at Stagira (known also as the "Stagirite") in Northern Greece, to the family of physicians at the royal court of Macedon. At the age of 17, he moved to Athens in order to study at Plato's Academy, where he remained for 20 years until Plato's death (347 BC). Then, he moved to Assos on the coast of Asia Minor. He was welcomed there by the local tyrant Hermias, whose niece he married later. After Hermias's execution by the Persians in 345 BC, Aristotle moved to Mytilene on the island of Lesbos, where he met his most famous pupil and associate, Theophrastus. It is thought that there, Aristotle devoted a lot of his time to his empirical studies of marine biology. In 343 BC, he was invited to the royal court at Mieza by Philip II, King of Macedon, in order to become a tutor of his 13-year-old son Alexander. After 3 years of tutorship, Aristotle left his pupil, who became very soon the conqueror of the world, known

as Alexander the Great. In 335 BC, Aristotle was back in Athens, where he set up his own school, the Lyceum. After the death of Alexander the Great in 323 BC, he was forced to leave Athens. He returned to a family estate on the island Euboea, where he died the next year, at the age of 62.

Works

It is estimated (based on book catalogues in Aristotle's ancient bibliographies) that he wrote an unbelievable 550 books, the equivalent of about 6,000 modern pages. But even more impressive than the volume is the range of topics he covered: from philosophy, logic, and natural sciences to psychology, ethics, politics, and aesthetics. Unfortunately, the majority of these works were lost, and among those are all his published texts (which had a form of Platonic dialogues). What has been available for the last 2,000 years, known as *Corpus Aristotelicum,* consists of about 2,000 modern pages, and it is a collection of various Aristotle's lecture notes, esoteric texts for his students, which were not intended for publication. Arrangements of these texts and titles of collections were done by the editor Andronicus of Rhodos, about 250 years after Aristotle's death. This explains various inconsistencies, contradictions, and general inelegance of many of Aristotle's surviving texts, including *Metaphysics.* This is the main reason why we cannot study Aristotle like the majority of other philosophers, such as Descartes or Kant, who have written compact philosophical treatises. Surprisingly enough, these later compilations of Aristotle's working drafts have had some of the most profound effects on the development of philosophy, science, and the whole European culture.

Philosophy and Science

For Aristotle, the universe, furnished with material objects, is a true reality that can be investigated and truly known, and it is not just a shadow of the "other reality," which is more real because it is unchangeable, like a world of eternal Platonic forms or Pythagorean numbers. Aristotle agreed with Plato, that true knowledge (*epistémé*) has to correspond to some unchangeable reality, but he was convinced that such reality is within this permanently changing material world. Of course, it is hidden, and it has to be revealed by a new scientific method, which

Source: Copyright © Kathleen Cohen.

he developed. This method is a combination of empirical observations with rational analysis based on induction and deduction. But first of all, language, the medium of all knowledge, had to be transformed into a scientific tool *(organon)* and Aristotle, having done this, established a new scientific discipline: logic.

Paradigmatic fundamental entities of reality for Aristotle were organisms: plants, animals, and humans. This is the reason why Aristotle devoted so much interest to their studies (one quarter of all Aristotle's surviving works are biological) and did it in a such systematic way, setting up biology as a scientific discipline. They are integrated wholes, composites of material stuff and internal principle, which Aristotle called form *(eidos),* nature *(physis),* or essence. This internal principle is a cause of the existence of individual and a cause of what the individual looks like and to which natural kind he or she belongs. Forms/natures/essences are eternal and unchangeable, but

they do not exist (as Platonic forms do) separately from individuals. And they are at the same time integrating principles of composite individuals; they are responsible for goals of individual developments and their functionality. Aristotle believed that essences could be and had to be recognized by his scientific approach, and then finally described in words as definitions. Definitions are combinations of *genus proximum* and *differentia specifica,* and in this way, they reflect a real internal and eternal structure of the world, built up from natural kinds and relationships between them.

Human Nature

According to Aristotle (*Politics,* Book 1), the "human *(anthrôpos)* is by its nature a sociopolitical *(politikon)* animal *(zôion).*" The Greek word *politikos* is usually translated as a political and sometimes as a social, but it is neither of these terms as we understand them today, and therefore it is better to render it by the sociopolitical. Aristotle pointed out that it is human nature to become an integral part of a community, and he believed that the Greek city-state *(polis)* was such a community. Polis is not an artificial structure, set up by human individuals for some pragmatic reasons, but a natural entity like a colony of bees, wasps, ants, or cranes. But Aristotle was quick to stress that the "human is a social animal in a sense in which a bee is not, or any other gregarious animal," because the human is "alone among the animals, rational" (literally, animals "which have *logos*"). Humans alone have an ethical perception of what is good and what is bad, what is just and what is unjust, and thanks to logic, humans can communicate and share a common view on these and similar matters. The human is a fully realized being, a citizen *(polites),* which means participation in judicial functions and in political offices of a city-state (unfortunately, according to Aristotle, women and slaves were naturally excluded from this). A city-state is a final stage of natural social development, which starts from pair-bonding and household, then goes further, to a larger community of village, and finally ends with the city-state. In Aristotle's view, human sociality is continually turning to politics as its natural goal.

— *Peter Sykora*

See also **Scientific Method**

Further Readings

Ackril, J. L. (1981). *Aristotle, the philosopher.* Oxford: Oxford University Press.

Barnes, J. (1995). *The Cambridge companion to Aristotle.* Cambridge: Cambridge University Press.

Gotthelf, A., & Lennox, J. G. (Eds.). (1987). *Philosophical issues in Aristotle's biology.* Cambridge: Cambridge University Press.

ARSUAGA, J. L. (1954–)

At present, the codirector of the Atapuerca project, Juan Luis Arsuaga Ferreras (1954–) is one of the two most outstanding Spanish paleoanthropologists. Full professor of human paleontology at University Complutense of Madrid, he has been a member of the research team of Atapuerca site since 1982, when Emiliano Aguirre organized a multidisciplinary group to study this hominid site. In 1991, he became codirector of the Atapuerca research team, which was awarded in 1997 with the Principe of Asturias prize, the most important scientific research award in the Hispanic world. Furthermore, Arsuaga became a member of the National Academy of Sciences of the United States.

Arsuaga is famous worldwide for his finding at Sima de los Huesos, which is a small cavity at the end of a ramp, accessed by a 13-meter vertical shaft, at Cueva Mayor, Atapuerca. The Sima de los Huesos is one of the most productive paleanthropological sites in the world, because at least 28 different individuals had been identified. Several very well-preserved and almost complete craniums, mandibles, pelvis, femurs, hands, and feet have a mixture of ancient and modern characteristics. Some are similar to their Neandertal descendants and others to their ancestors, the first Europeans. These findings allowed Arsuaga and his colleagues to publish many papers in the most prestigious scientific journals.

In the field of anthropology, Arsuaga is specialist in human skeletal morphology, biomechanics, sexual dimorphism, taphonomy, paleoetology, paleopathology and phylogeny of hominids. His discoveries of several skeletons of *Homo heidelbergensis* in Sima de los Huesos allowed him to propose a new phylogeny for the *Homo sapiens* lineage. Apart from his main research in Atapuerca, he has participated in the

excavations of other hominids sites in Spain and in the Early Pliocene Middle Awash site in Ethiopia.

Several of Arsuaga's books are best sellers in Spain and have been translated to other languages, including English, for example, *The Neanderthal's Necklace: In Search of the First Thinkers* (2002) and *The Chosen Species: The Long March of Human Evolution* (2005). Nevertheless, his most notable book is *El Enigma de la Esfinge* (2001), which is a metaphor to explain the mechanisms and the enigma of the purpose of evolution. His writings are excellent popularizations of his findings in the Atapuerca site, explaining very clearly and rigorously his evolutionary theories regarding the origin of humankind.

— *Eustoquio Molina*

See also **Atapuerca; Bermúdez de Castro, J. M.; Creationism Versus Geology; Homo Antecessor; Orce**

Further Readings

Arsuaga, J. L. (2002). *The Neanderthal's necklace: In search of the first thinkers.* New York: Four Walls Eight Windows.

Arsuaga, J. L., & Martínez, I. (2005). *The chosen species: The long march of human evolution.* Malden, MA: Blackwell.

Arsuaga, J. L., Carretero, J. M., Lorenzo, C., Garcia, A., Martínez, I., & Bermúdez de Castro, E. (1997). Size variation in Middle Pleistocene Humans. *Science,* 2777, 1086–1088.

Art, Universals in

From a strict anthropological point of view, informed by the recent self-critical turn of the research, it is a debatable issue whether we should admit universals in art. It is equally an open question as to whether art is indeed a universal form of expression and communication. In what follows, we will attempt to lay down the conditions of the possibility of admission of universals in art as well as of considering art itself as one of these universals.

Anthropology has been formed as a social science in the course of 19th century and in the context of the great European colonial states. The European need to understand the non-Western world was concomitant with the desire to maximize the benefits acquired by the exploitation of the colonies. As a result, for a very long time, anthropology was based on empirical data and fieldwork, without really being concerned for its epistemological status as a science or with questioning its approaches to other cultures. This situation has radically changed in the course of the last 50 years, and anthropologists have systematically criticized the colonial, ethnocentric approach to other cultures as well as the epistemological basis and object of anthropology as a science. The term *reflexive anthropology* indicates that a scientific approach to non-Western societies is difficult and complex and, furthermore, requires both relentless critique and uncompromising alertness as far as questions of method are concerned. There is an increased awareness today of the perils and problems associated with central concepts like *primitive art* for example, which manifest a derogatory attitude to creative aspects of the material culture of non-Western societies, even when accompanied by the best intentions, as in the case of Franz Boas. This is the reason why the adjective *primitive* has almost unanimously been replaced by the term *non-Western* or *small-scale.* Apart from carefully scrutinizing terminology, anthropologists have recently turned their attention to their own society. In cooperation with the rest of human sciences and by implementing in their own society the approach reserved for non-Western societies, anthropologists have often generated impressive results of acute, hermeneutic analysis of Western institutions, customs, attitudes, and modes of behavior. One may here indicatively mention the pioneering work of Mary Douglas, or more recently of Jonathan Culler. If anthropologists tend to criticize the most intimate conventions of their own cultures, it is likely that they will be reluctant to accept unconditionally universals, which are conventions with cross-cultural application.

Art is a universal term that has been employed in the anthropological study of other cultures as an extension of its conventional use in the Western world. There are two interrelated problems concerning this employment: First, there is a serious problem of definition of art, even within European aesthetics, let alone in cultures that lack terms that even approximately translate as art, and second, the notion of art is an instrument of value if it remains undistinguished from *fine art,* a pervasive term in European culture with relatively recent origins in the 18th century, as Goehr indicates. To render a concept of art

Source: © iStockphoto/Dan Brandenburg.

relatively functional in anthropology, it ought not be an instrument of value, restricted to fine art, but should rather be open and meant in the broadest way possible, to allow the analysis of objects from other cultures in their own terms. This is the reason why Anderson attempts to define art via skill and Layton via aesthetic factors, expressive considerations, and communication. However, anthropologists of art should not be limited by the objects included in any of the Western categories of art or by the Western aesthetic categories. Should art serve as a category of cultural differentiation, it needs to be a very accepting category and should indeed arise out of a thorough and careful consideration of all related contexts, attributes, and conditions as they apply to each and every unique case studied.

In the Western world, by "art," we mostly mean painting and sculpture. In few cases, anthropologists are able to transfer this concept intact to other cultures without making any adjustments. In most cases, they are obliged to adopt a concept that encompasses craft, folk art, the ethnographic artifact, as well as music, dance, architecture, and literary arts, such as myths, proverbs, stories, songs, and the like. The European distinctions between high and low arts or between fine and practical arts are not operative in most of the small-scale societies. Provided that the material culture of each small-scale society comes first and that the anthropologist is willing to respect this priority, we can find recourse to a great number of definitions for art that anthropologists have furnished us with in the course of their research. Such definitions are interesting not solely for analyzing objects of small-scale societies but also for European culture too. For the study of non-European art has always been intrinsically connected with the interests and research in Western art history and aesthetics.

Art is thus defined through the institutions of society, by recourse to the intention of the artist, to the attributes of the objects, and in connection with the reception of these objects. There is always a complex interrelation between individual intention, interpretative context, and institutional or attributive definitions that ultimately depends on additional parameters, such as the time and place of the object creation, tradition and the general circumstance of creation, and presentation and reception of the object. Skill, function, religious or ritual meanings, ideas, and aesthetic and expressive factors are attributes, which help understand and delimit artistic objects. We usually find recourse to the category of art when it is impossible to include material objects in more narrowly defined categories. In such circumstances, we have had several definitions of art professed by the field experts: Morphy claims that artistic objects have semantic and/or aesthetic properties used for presentational or representational purposes and that art in general is a system of meaning and communication. Gell has defined art as the technology of enchantment. Lévi-Strauss defines art as an ordering system of signs and communication, like language. Anderson maintains that all cultures recognize as artworks certain human-made, material artifacts of significant cultural meaning and of exceptional mental or manual skill, produced in media that make sensuous effects, and sharing stylistic conventions with objects of proximate

geographical and temporal origin. Finally, Layton considers artwork as a ritualistic symbol.

The role of the artist varies significantly from one culture to the other. The artist may incarnate a genius, an idea that is still popular in Europe due to the legacy of romanticism, or may simply be an artisan who knows how to apply the conventions inherited by a cultural tradition, performs a social function, and is indistinguishable from his or her audience. In some societies, the artists are among the privileged classes, and in others they enjoy no distinction whatever. In most cases, however, the artist is that person who has a certain technical aptitude, a capacity of doing or fabricating something that reproduces and propagates the values of the society in which he or she lives. Very often, the artist must conform to certain typologies and rules governing the fabrication of objects and is therefore judged in accordance with them and not by recourse to the intention of producing something. On the other hand, the Eskimo woodcarver works without any intention whatever and in the process accidentally "discovers" a form out of this aimless carving.

When it comes to the category of artwork, the research interests of European and American art history that have placed the emphasis either on form or on meaning and function have always conditioned it. Until the 1960s, the analyses of artworks and culturally significant objects aimed at (a) integrating them in evolutionary or diffusionist hypotheses, (b) revealing their formal properties, or (c) creating types associated with culture areas, tribes, or schools. Since the 1960s, the increasing interest in meaning formation and symbolism has generated a lot of studies of artworks and elements of material culture, often from an interdisciplinary vantage point that combined anthropology, archaeology, art history, and aesthetics and aimed at exploring both meaning and form. The most revealing approach to form is usually through function. What an object does and what it is used for better discloses details of its construction and shape, although there are many cases of practical objects, like weapons and other quotidian, highly decorated tools, whose function is independent from its artistic decoration and only appropriated by it. Artworks and other significant cultural objects perform a number of functions: Biebuyck reports how such objects are used in male initiation ceremonies among the Lega of Central Africa, and Morphy demonstrates the association of art with the sacred and with images of ancestral power in Yolngu, an Australian Aboriginal people. Often possessing artworks is a sign of power and prestige and secures the status, rank, and control of leaders like in the Tiv, the people of North Nigeria. This is the reason why access by the public to such artworks is either limited or prohibited and, in any case, remains strictly regulated by those who possess or safeguard them. Artworks supplement the social rituals, help maintain the traditions and reproduce the existent hierarchies, become emblems that reflect the unity of social groups, and at times, house the spirits and therefore bring health and success in the endeavors of those that carry them. Form captures semantic, aesthetic, and functional properties of the object; how a formal trait is encoded influences its meaning and effect to others. Artworks and other significant objects generate meaning in an immense variety of ways, which depend on form, function, context, and reception. In any case, understanding this meaning by cultural outsiders requires a careful acknowledgement of all the previously mentioned parameters as well as their integration in large-scale social and cultural settings.

Cultural outsiders always face the temptation and challenge to group things under the heading of style. Style, according to Morphy, denotes the way an object formally communicates meaning and concerns the properties of the work considered as symbol. But style also refers to the formal ways in which different artifacts are similar to each other and may ultimately lead to structural distinctions and properties of the social or cultural system. In his 1962 authoritative study of style, the art historian Meyer Schapiro defined style as a system of forms with quality and meaningful expression, revealing the artist and his world. He even stated how modern artists feel a spiritual kinship with those of primitive societies due to their frank and intense expression and their effective participation in collective life. However, he still called for an adequate theory of style that would thoroughly meet the historical problems and address, at a deeper level, the principles of form construction, the problems of expression, and the processes of social life and emotional behavior. Schapiro had probably sensed the limitations of his theory, which basically point to the problems of the concept of style itself, stemming from its neat separation between form and meaning, between decorative and semantic elements, and from its strong presupposition of creative agency and motivation, behind the form. However, the separation of

form and meaning cannot be absolute, let alone the fact that in many cases of European as well as non-European art, this binary opposition hardly makes any sense.

Style may be a useful concept to the extent that it leads to summoning structural aspects of art and culture, such as principles of representation. Tracing such principles of representation does not mean deciphering whether the evolution of motifs in visual arts works from figurative icons to abstract, noniconic patterns or vice versa, although for a very long time and until Boas's radical criticism of cultural evolutionism, anthropologists were extremely preoccupied with such concerns. Boas authoritatively established that abstract and figurative designs have a long and ancient history that reaches back almost 30,000 years; they emerge independently in different contexts but may also coexist or succeed each other within the same civilization. Thus, style concerns more than questions of technique and method, since it has been noted that civilizations with relatively similar technical methods and apparatuses produce different styles.

Style may also be conscious or unconscious depending on whether it is based or not on explicit motivation. Stylistic conventions like color signification are arbitrary no matter whether they denote likeness or stylization. The concept of style can be studied as a vessel for the crystallization of religious, moral, and social values and for communicating them via the emotional impact of forms. These functions of style allow art objects to be evaluated: In the case of figurative designs, objects are valued in relation to the extent to which they comply with the original represented, whereas in cases of abstract or geometrical patterns, objects have to comply to definite rules passed on by tradition. The process of evaluation is usually reserved for powerful people, who are familiar with stylistic conventions, object placement, context, and how such objects integrate in the larger socioeconomic and religious issues. In cases of geometrical or abstract stylistic conventions of small-scale societies, Western anthropologists must make an extra effort to familiarize themselves with the traditions of such societies if they ever hope to decipher meanings and worldviews.

Still, however, familiarization with tradition and stylistic conventions vitally depends on the worldviews of the observer. A case in point is the issue of split representation, which has drawn attention by many anthropologists. Split representation refers to a design technique in the art of the North American, northwest coast that Boas was among the first to study. However, Lévi-Strauss remarks the analogies of this design technique in areas such as China, Siberia, and New Zealand, which are incompatible geographically and historically. Split representation refers to the painted figure of an animal, divided in half all across its body and open in its interior, in an elaborative, symmetrical manner, representing one individual in front view with two profiles. Split representation is employed for decorative purposes of quotidian objects, like globes, boxes, and columns. For Layton, the motivation behind split representation is the desire to represent well, accurately, and from all possible points of view the elements of the animal figure. For Lévi-Strauss, the recurrence of this specific representational method among different cultures so widely separated in time and space denotes a deeper meaning, namely, a deeper and more fundamental splitting between the dumb biological individual and the social person whom he must embody. Split representation thus denotes the personality split, the contrast between the actor and his or her role, and the societal request of strict conformity between this actor and his or her role, a favorite motif in French philosophy and psychoanalysis at the time of Lévi-Strauss's texts. The difference between the two views is relative to the difference between two conceptions of anthropology: on one hand, anthropology as a social science of fieldwork, data, empirical analysis, and a limited number of general conclusions and on the other hand, anthropology as a social science that uses fieldwork to extract general principles and universals concerning kinship, social organization, religion, mythology, art, and the like and to establish those key motifs that may explain the vast syncretism of life forms.

The example of split representation makes clear how the approach to non-Western, representational techniques becomes an occasion that brings on surface our own differences, in values, thought, writing, and methods. The recent shift of interest in anthropology toward the study and understanding of presently existing societies probably has to do with the realization that we Westerners, who seek to know the other, are fundamentally unknown to ourselves. The anthropological attitudes of uncompromising thinking, critical alertness, and careful reflection ought now to be also directed to our world in order not only to explain the differences that Westerners

have between them but also to learn from them. Art can indeed be a bridge between Western and non-Western worlds, but has recently been revealed as also a means to better appreciate and safeguard the diversity of Western world.

— *Constantinos V. Proimos*

See also **Aesthetic Appreciation; Cave Art; Cultural Constraints; Rock Art**

Further Readings

Anderson, R. L., & Field, K. L. (Eds.). (1993). *Art in small-scale societies: Contemporary readings.* Englewood Cliffs, NJ: Prentice Hall.

Coote J., & Shelton, A. (Eds.). (1992). *Anthropology, art, and aesthetics.* Oxford: Oxford University Press.

Layton, R. (1991). *The anthropology of art.* Cambridge: Cambridge University Press.

Morphy, H. (1991). *Ancestral connections: Art and an aboriginal system of knowledge.* Chicago: University of Chicago Press.

Schapiro, M. (1994). *Theory and philosophy of art: Style, artist, and society.* New York: Braziller.

Artificial Intelligence

Artificial intelligence (AI) is the capability of devices or mechanisms and machinery to perform functions usually associated with human intelligence, including scientific systems, reasoning, optimization through experience, and automated motor systems. The American Association for Artificial Intelligence (AAAI) is dedicated "to advancing the scientific understanding of the mechanisms underlying thought and intelligent behavior and their embodiment in machines," and it aims "to increase public understanding of artificial intelligence, improve the teaching and training of AI practitioners, and provide guidance for research planners and funders concerning the importance and potential of current AI developments and future directions." It publishes the *Journal of Artificial Intelligence Research.*

What had been the imaginative machines of intelligence in science fiction of the 20th century (from the writings of Jules Verne, Arthur C. Clarke, and Isaac Asimov to the motion pictures *Forbidden Planet* and *2001: A Space Odyssey*) is now the reality of the 21st century, featuring computers, neural networks, machines, robots, and humanoid robots. Spurred by the technological necessities of outer space explorations by satellites and human missions, gigantic gains in computers and high-efficiency smart technology were made in the latter half of the 20th century.

AI is widely employed in machine tool automation, where artificial neural networks are applied to sophisticated operations by using fuzzy logic and genetic algorithms so that system ranges can be identified, problem solving by conceptualization can occur, and search algorithms can adapt and evolve. Development of AI in machine tool automation has taken place in the study and application of AI systems in science through the computer modeling of a progression of natural systems. Examples of applications are the ATM bank card and PIN, photographic cameras, vending machines, computer chess playing, financial portfolio computer banks, automobile parts systems, speech-responsive computers, sophisticated medical technologies, such as hearing aids and heart chips, computer-designed patterns on textiles, electronic music, and educational and recreational computer games.

In the field of cognitive science, neuroscientists have employed sophisticated computer-driven imaging techniques including CAT, PET, MRI, CST, and other techniques to view and analyze the brain, with insights into the human mind. Their findings suggest that discoveries of the relationship between technology and thoughts and emotions, stress and brain function, and new paradigms of thought and genotypes and disorders are forthcoming. The brain or intranet will be more fully understood, enhanced, and developed.

The Internet has evolved. Intelligent systems have been developed by connecting computer intelligence and the Internet, enabling people to talk to smart computers and build a global communication system, referred to as the "Intelligent Internet" by William E. Halal. Halal described the UCLA Cultural Virtual Reality Laboratory Web site that recreates ancient Rome, Amtrak's speech recognition software, the Waldorf Astoria Hotel's video-conferencing system, IBM's Super Speech Recognition Program, MIT's Project Oxygen, Wells Fargo's Speech Recognition

System, Internet Search Engines Voice Recognition Systems, General Motors OnStar driver assistance program, Sprint's voice dialing, AI use to guide human action figures in computer games, Internet avatars or virtual robots, digital TV monitors, and a talking, seeing, listening and learning computer, as examples of the Intelligent Internet.

Humanlike robots such as ASIMO, Honda's humanoid robot, can simulate the walk of a human and can use its arms, walk down stairs, sideways, backward, and around objects. Robots are likely to be used in the same environments as humans, especially in space settlement.

Space settlement includes exploration of outer space, utilization of space materials, and construction of and habitation in space colonies. Prototypical colonies including Biosphere II and NASA's Bioplex Complex employ vast AI technological systems to maintain life support. Space missions to the International Space Station and the planned manned missions to the Moon and Mars necessitate sophisticated AI systems of geographical control, life support, and social\psychological well-being to meet the exigencies and dangers faced by astronauts isolated in an extreme environment. Construction of industrial sites and habitats for humans who migrate from Earth will require advanced AI systems, where life, direction, and functioning are shaped by AI telecommunications more advanced than NASA's Mission to Planet Earth and Earth Observation System, which provides air, water, land, glacier, and pollution data.

— *Stewart B. Whitney*

See also **Computers and Humankind**

Further Readings

American Association for Artificial Intelligence. (2005). http//www.aaai.org/

Halal, W. E. (2004, March–April). The intelligent Internet. *The Futurist, 38*. http://www.wfs.org/futcontma04.htm

Negnevitsky, M. (2002). *Artificial intelligence: A guide to intelligent systems.* New York: Addison-Wesley.

Whitby, B. (2003). *Artificial intelligence: A beginner's guide.* Oxford: OneWorld.

ARTIFICIAL INTELLIGENCE

The subfield of synthetic anthropology is concerned with examining the ways in which scientific advances, including artificial intelligence, may be used to expand human knowledge and understanding of the cultures in which humans live. At the beginning of the 21st century, one of the most intriguing advances in artificial intelligence has been the development of Project Halo, designed to create a system known as Digital Aristotle (DA), named after Aristotle (384–322 BCE), the Greek philosopher who was thought to possess much of the world's knowledge as it existed in his time. Project Halo is a multistage project undertaken by Vulcan, Inc., that will place the world's scientific and philosophical knowledge into a highly advanced computer system that will ultimately be able to reproduce and explain that knowledge, answer questions based on that knowledge, and generate solutions to problems using the knowledge it possesses. Once the project is completed, scientists with narrow, specialized fields of knowledge will be able to use Digital Aristotle to place their own knowledge into a broader context and identify possible ramifications of an action or solution to a problem. In addition, Digital Aristotle is perceived as a significant advance for teaching science in the nation's schools. The moving force behind the project is Microsoft cofounder Paul Allen.

The 6-month-long Phase I of Digital Aristotle, which was completed in May 2003, consisted of three teams of experts from the fields of chemistry, biology, and physics. Each team entered 70 pages of chemistry textbooks containing all knowledge needed to pass the Chemistry Advanced Placement Examination. Team One was made up of members from SRI International, with assistance from Boeing Phantom Works and the University of Texas at Austin. Teams Two and Three were Cycrop and Ontoprise, respectively. Each team was charged with developing the technology that would allow Digital Aristotle to formulate knowledge, answer questions, and generate explanations using its inputted knowledge. At a cost of approximately $10,000 per page, Phase I was only partially successful in

achieving its goals of developing the technology needed for the project. Even though all three teams scored only three out of a possible five points, the teams did succeed in identifying problems and suggesting steps to take in subsequent stages.

On February 12, 2004, Vulcan, Inc., announced that Phase II would be completed in three steps. Step One was identified as a six-month design stage, followed by a 15-month stage dealing with implementation of Digital Aristotle. Using the knowledge and technology gained in the first two stages, the proposed 9-month-long Step Three was scheduled to employ three teams that would input chemistry and physics textbooks, which contained the knowledge needed to pass the Chemistry and Physics Advanced Placement Examinations. The three teams were charged with developing the necessary technologies in five fields aimed at making Digital Aristotle a reality: knowledge representation and reasoning (KR and R), knowledge acquisition, understanding of natural language, usability, and system integration. The three teams for Phase II are SRI International, with members from Boeing Phantom Works, the University of Texas at Austin, and the University of Massachusetts at Lowell and Krake; Team Ontoprise, with members from Carnegie Mellon University; and Team ISX, with members from iSoco, Stanford Medical Informatics, the University of Southern California's Information Science Institute, KS Ventures, and Klein Associates.

— Elizabeth Purdy

Asante

The Asante (or Ashanti) are a Ghanaian people numbering about 1.5 million (about 15% of the population of Ghana) and centered in the city of Kumasi but also occupying the entire Ashanti region, which is bordered by Brong-Ahafo, western, central, and eastern regions. The Asante are members of the Akan language and cultural group (about 45% of the population of Ghana) which occupies much of central and southern Ghana and includes, in addition to the Asante, the Adansi, the Agnyi, the Agona, Akim, the Akwamu, the Akwapem, the Bono, the Denkyira, the Fante, the Kwahu (all in Ghana), and the Baoulé of Côte d'Ivoire. Although these peoples have dialectic differences and some cultural differences, their strong cultural and linguistic similarities (Twi, of the Kwa language family) point to common ethnic origins, which have been strengthened by occasional political unities over the centuries.

Asante territory is primarily rain forest, lying just beyond the coastal region. Toward the south, the forest is lush and dense where it is not farmed; north of Kumasi, the forest gradually gives way to savannah. The major rains fall from May until October, with a brief break in late July or August; humidity is constant and high. In December and January, the harmattan winds blow down from the Sahara, and the air becomes parched and dusty. Rivers and streams are abundant; the soil is red laterite, which provides a good building material. Gold, bauxite, and timber are major natural resources for export; cocoa the major cash crop; and yams, cocoyams, maize, and cassava major consumer crops.

History and Political Structure

While their Akan ancestors were probably in the area of central and southern Ghana for several thousand years, the modern Asante are the descendants of the Asante empire, which was at its at peak during the 17th through the 19th centuries and was the largest and most powerful kingdom of the Guinea Coast, at one point controlling most of modern-day Ghana from the coast to Yendi, and including parts of what is now Côte d'Ivoire and Togo.

Although iron and agriculture were undoubtedly important factors in the development of civilizations in this region, iron probably becoming common by about 300 AD, it was surely the trade in gold to the Sudanic empires of Ghana, Mali, and Songhai, beginning in the first millennium AD, which led to the eventual wealth and power of the Akan states. Asante gold was traded across the Sahara by these empires, along with kola nuts and ivory from the rain forest region.

Sometime during the 12th or 13th centuries, Akan-speaking people began to enter the region of modern Ghana. Some historians explain this as a migration from the disintegration of the Sudanic kingdoms to the north and from encroaching Islamic

rule, though linguistics suggests a shared ancestry with other southern forest groups such as the Yoruba. In either case, independent villages, perhaps seeking control over the gold mining or the long distance trade (which came to include trade in slaves), began to combine into small states. By the 17th century, the Denkyera (or Denkyira) and Akwamu emerged as the most powerful of these, and after the wars of 1650 to 1670, the Denkyera reigned supreme. Osei Tutu, a nephew of the chief of Kumasi, was sent to Denkyera as a hostage along with regular annual tributes of gold and slaves. Osei Tutu became a general in the Denkyera army, but eventually revolted and fled back to Kumasi, where he succeeded to the Kumasi stool upon the death of the chief, about 1697. Kumasi and other subject kingdoms were being exhausted by their annual payments to Denkyera, and Osei Tutu determined to put an end to this. Sending the Denkyera tax collectors home without their hands, a declaration of war, he defeated the Denkyera army, captured and beheaded their king, and, with the advice and wisdom of his chief counselor and friend, the priest Okomfo Anokye, put together a loose confederation of kingdoms.

It is undoubtedly due to the brilliance of Okomfo Anokye that this loose confederation became such a powerful nation. As recorded in oral history, Anokye had Osei Tutu call together a great durbar of all the chiefs and royalty of the confederation. As the sky turned black and thunder rolled, a golden stool came floating down from the heavens and settled upon the lap of Osei Tutu. Anokye explained that this stool would now contain the soul of their nation and directed that everyone sacrifice to the stool. A medicine was made containing their hair and fingernail clippings, which they poured upon the stool and also drank, thus pledging their allegiance not to the Asantehene himself, but to this stool, the Golden Stool, which came to be the symbol of the new nation.

The Golden Stool is more than a mere symbol, however. To this day, it is kept in secrecy, only being brought out for the most sacred of occasions, such as at the enstoolment of a new king. No one sits on it; instead, it rests on its own stool. It never touches the ground, and Asantes believe that if the stool were ever to be harmed or taken, the nation would cease to exist.

Osei Tutu expanded the army, introduced a more formal organization which better protected the generals, and developed customs of integrating conquered states and their chiefs, gathering them annually at Kumasi to renew their allegiance to the Golden Stool and to celebrate the unity of the empire, a ceremony known as Odwira. Osei Tutu and his successor, Opoku Ware I, were responsible for further expansion, annexing the northern states of Bono, Gonja, and Dagomba. By 1750, at the death of Opoku Ware, the Asante controlled about 100,000 square miles and a population of two to three million. Osei Kwadwo, the fourth Asantehene, expanded Asante a bit further to the north, thus bringing many Moslems into the kingdom and instituting a period of religious tolerance, even appointing some Moslems to the court. Successive Asantehenes developed a large bureaucracy of professional administrators and craftspeople, as well as well-trained police and soldiers. The *Kotoko* was the highest council of elders, mostly local, and below them was a council of 200 *omanhene,* representatives and chiefs from throughout the federation.

Being inland, the Asante were not as directly affected by British living among them as were the coastal peoples, but they were certainly indirectly affected by their own involvement in the slave trade (both selling and buying; some scholars have attributed Asante power and wealth to their wide use of slave labor) and also by the influx of European goods throughout the 17th, 18th, and 19th centuries. However, the first British to actually visit Kumasi were Thomas Bowdich and a British merchant-governor, John Smith. Bowdich was impressed by the Asante and their capital and wrote glowingly of the broad clean streets and the splendor of the royal palace and the Asantehene's entourage. Nevertheless, the Asantehene, Osei Bonsu, rejected the idea of a resident British governor or missionaries. Smith's successor, Charles McCarthy, and the next Asantehene, Osei Yaw, developed a far more militant relationship, resulting in 5 years of war, but the following British merchant-governor, George Maclean, again initiated a period of peaceful diplomacy, trade, and mutual respect.

The Dutch eventually left Cape Coast, amid some forged documents regarding the rights to Elmina, and the British, under the particularly racist Garnet Wolseley, established occupation of the coast and decided to invade Kumasi. The Asantehene, Kofi Kakari, wanted to take the war to the coast, rather than risk destruction of Kumasi, but the Queen Mother and many of the inner council advised peace. When Wolseley eventually demanded a payment of $6 million worth of gold plus the imprisonment of the Queen Mother and several others as hostages, the

Asantes could not avoid war, but they were soundly defeated, and Wolseley's army marched into Kumasi, looting and torching the entire city and the royal palace. When the Asantehene finally agreed to the British demand for gold, the shocked population demanded his resignation. With British encouragement, there were several attempted coups in Kumasi, and rivalries developed among the various states. By 1885, the Asante confederacy was a shambles, and only slowly rebuilt after 1894 by Osei Agyeman Prempeh I, perhaps aided by the introduction of rubber and cocoa production.

Despite Prempeh's promises to accept a resident British governor in Kumasi and to submit to British authority, the British were determined to invade. In January of 1896, the British military marched into Kumasi and took captive the Asantehene, Agyeman Prempeh, the Queen Mother, and several other officials. They were imprisoned first at Elmina, then to Sierra Leone, and eventually to the Seychelles, where Prempeh stayed until 1924. The Golden Stool, however, had been carefully hidden and thus escaped the looting and destruction by the British soldiers that followed. British companies poured into the Asante region to mine gold and to extract lumber and rubber, all with the use of forced labor. When the British governor, Frederick Hodgson, finally visited Kumasi and demanded that the Golden Stool be brought out of hiding and that he be seated upon it, the Asantes had had enough. They began preparing for war at the urging of Yaa Asantewaa, the Queen Mother of Edweso. Although the Asante managed to imprison the British for quite some time in their own fort in Kumasi, British forces from the coast eventually retook the fort and destroyed Kumasi once again. Still, the Golden Stool remained unharmed.

There followed a time of relative peace, and eventually, in 1924, Prempeh I was returned to Kumasi, at first only as an ordinary citizen but ultimately ruling Asante until his death. His successor, Nana Osei Agyeman Prempeh II, was enstooled in 1935 and reigned until 1970, his funeral celebrated in the documentary film *A Great Tree Has Fallen,* by Roy Sieber. He was succeeded by Opoku Ware II, who reigned until his death in 1999, when the current Asantehene, Otumfuo Osei Tutu II, was enstooled.

Queen mothers, queen sisters, and other women in this matrilineal society have always had important roles in Asante politics, including specific offices in the royal court and the right to nominate the successor to the king. Other women, such as wives and consorts of the king and other ambitious women, have acted as advisors to the king and are expected to speak out in times of crisis or dissent.

The role of *okyeame,* sometimes translated as "linguist," is also very important and carries much power. His task is more to present an artistic interpretation of the chief's speech, and thus he can insert his own ideas and thoughts into his elaborations. Even beyond that, in speaking on behalf of the king, he can take liberties in guiding discussion. The Akan prefer indirectness in speech and thus avoid face-to-face encounters across social class lines, particularly in interaction with a chief. Consequently, the okyeame is often interpreting for both parties. He also often serves as a chief's advisor and sometimes as a prosecutor or lawyer.

Economics

Traditional Asante economics have been based on three sources: farming, marketing, and craft production. Although these have shifted somewhat over time, all three remain important today. Subsistence swidden horticulture has been the mainstay of the Asante economy for many hundreds of years. The major staples are yams of various kinds, cocoyams, maize, cassava (manioc), oil palm, and plantains; and bananas, oranges, pineapples, beans, onions, tomatoes, okra, egusi, peppers, groundnuts, sweet potatoes, and many other fruits, vegetables, herbs, and medicinal plants are grown widely. Since about 1900, cocoa has become the major export crop.

Many of these crops are interplanted, so that an outsider will not readily recognize an Asante farm. This promotes a balanced use of soil nutrients and allows tall plants, such as plantains, to shelter smaller, younger plants from the blazing sun and pounding rain. Most families have at least two plots of land, so that some can lie fallow while another is under cultivation. Nevertheless, the land is rich enough that fallow periods need not be long, and villages are therefore permanent. The traditional iron machete and short-handled hoe remain the major farm implements, though today they are seldom locally forged. Fishing has also long been important, and fresh and dried fish are a major source of protein. Goats, sheep, chickens, and guineas are also raised; cattle are rare because of tsetse. Traditionally, women did most of the farmwork; men helped clear land, but women did

the planting, weeding, harvesting, and transporting. Still today, most women are farmers, but they also involve themselves in other enterprises, such as crafts or marketing, if they possibly can.

Asante markets are among the largest and most colorful in Africa, and many Asante also engage in long-distance trade. Although women have traditionally been the main farmers in West Africa, Asante women also excel as market traders. Most villages have weekly markets, and towns and cities have daily markets that provide occupations for women who have eschewed farming or who have no access to land. Markets in Asante always have a wealth of fresh fruits and vegetables for sale, as well as products made from local crops, such as cassava flour and gari, jars of rich red-orange palm oil, and jars of hand- or machine-ground nuts. Women also sell live chickens, eggs, and fresh fish; cooked food, such as kenkey and banku, fresh bread, and smoked fish; and packaged foods, which may be Ghanaian made or imported, such as cookies, gum, candy, yogurt, and dried plantain chips. Imported snacks, such as cookies, candy, and chips, have proliferated over the past few years, and along with soft drinks, Milo, powdered instant coffee, and dry cereal seem to be the most common foods in city supermarkets.

Other than food, the most visible products sold at Asante markets are cloth and clothing. Large markets, like Central Market in Kumasi, have lanes and lanes of cloth, locally tie-dyed and batiked, imported lace and synthetic cloth, but mostly the brilliant and infinitely patterned manufactured wax prints for which Ghanaians and other West Africans are famous. Traditional kente and adinkara are generally not sold in ordinary markets, but from individual producers in Bonwire, Ntonso, and elsewhere or in specialized crafts markets catering to tourists and exporters. Manufactured clothing such as men's slacks and shirts, women's blouses, underwear, and shoes, both new and used, are found in and around large markets. Markets are also a venue for other crafts, such as pottery, calabashes, and leather goods, and other production and services; for example, one can have a shirt made, a letter typed, or hair braided.

Market selling is hard work. The items women sell are large and heavy for their monetary value, and women generally must bring them to market in the dark hours of very early morning. They must sit or stand long hours, sometimes in the baking sun if they are not rich enough to pay rent on a covered stall. Sometimes, they have daughters to send out into the market fringes or lanes to hawk small headloads of goods, but they also have infants or toddlers who must be tended while they work. They must bargain wisely and have good math skills, and they must calculate how much they are likely to sell in a day without having to haul too much home in the evening. Nevertheless, most women prefer trade to farm labor. It gets them into town where they encounter new products and new ideas; it provides them female companions to chat with away from the ears of family members; it affords them a freedom of movement and a privacy they are unlikely to have at home in their village; and it provides an income over which they have full control.

Men also participate in the markets, although in a less central way. They are often the means by which women bring goods to market, as haulers of handcarts and headloads and as drivers of trotros, taxis, and trucks. Traditionally, men sold gold, slaves, kola, and ivory, but these are not major items today. Men do sell other items in the markets, particularly traditional medicines, beads, fresh meat, metal items, furniture and other large wooden items, leather goods, sandals, and all manner of imported goods, such as cassettes, radios, wallets, watches, and new and used clothing.

A third economic activity very important to the Asante is their craft production. Much of this is for ordinary home use, such as axes, hoes, adzes, knives, and machetes; baskets and calabashes for carrying of ordinary goods; pottery for cooking, eating, and water storage; woodcarving for stools and household implements and furniture; and traditionally, bark cloth and simple weaving for ordinary cloth. Other items, however, are made for religious, festive, and political purposes, such as kente and adinkra cloths, gold jewelry and ornaments for royalty, drums, ceremonial stools, and the like. As in much of Africa, many crafts are traditionally gender specific. Gold, silver, bronze (or brass), and ironsmithing, as well as woodcarving, adinkra stamping, and kente weaving are done by men. Pottery is made by women, and women do much of the sewing, some contemporary dyeing, and some beadmaking. These and other arts will be discussed below.

The Asante are also active participants in local, regional, and international economic enterprises. Kumasi streets are lined with banks, communications centers, airline offices, restaurants, hotels, travel

agencies, and supermarkets, and the Ashanti region is at the heart of the two major mainstays of the Ghanaian economy, gold mining and cocoa production. Cultural tourism also has the potential to become a significant enterprise. Although the coastal cities draw heritage tourists from the United States because of their slave fortresses, Kumasi is surrounded by villages and towns producing traditional arts, which have become emblematic of African culture throughout the diaspora, and those who venture inland to Kumasi find artistic vitality and warm hospitality.

Kinship

The Asante, like other Akan peoples, are famously and proudly matrilineal. Although this does not translate to matriarchy, Asante men and women speak openly of the important roles women play in family life, the economy, and in the political structure, both presently and in the past.

The matrilineage has been one of the most important units of society in Asante, influencing social, religious, and political life. The inheritance of land and other property is traditionally through the matrilineal line, from a woman to her brother or sister or daughter, or from a man to his sister's sons, as are the determination of social and political status. The *abusua,* or clan, thus form the core of a village, and its members hold rights to specific offices in village organization. As ancestors are a major focus of religious belief, matrilineages also become the locus of religious activity. The matrilineage also provides the foundation for strong family ties. Everyone remains close to their mothers, brothers and sisters are great confidants, and men, even when married, retain strong ties to their natal families and in the past carried much responsibility for their sisters and their sisters' children.

Matrilineality may sometimes be accompanied by somewhat more equality for women than is found in patrilineal societies, and this seems to be true of the Asante. Although men's and women's realms are quite distinct, as is typical in Africa, women are important economically, politically, and religiously. Upon marriage, a woman expects to be given land from her husband's lineage, and that land is to be used for growing food for the family. However, women also have rights to their own lineage land, the profits of which are at their own disposal, as are profits from raising chickens, craft production, and so on. Although today men are seen as "heads of households" in their conjugal families, mothers are generally closer to their children than are fathers, and mothers' brothers may still play an important role in the education of their sisters' children. Married women are expected to be faithful to their husbands, but married men are given considerably more leeway. Polygyny is still practiced to some extent, though often unofficially, since it is not seen as compatible with Christianity or with urban life. The law does not forbid polygyny, but neither does it recognize it in legal matters. When a husband dies, the wife who has been married legally (with a signed marriage certificate) is recognized as the inheritor.

Patrilineality also has its place in Asante culture: a child's spirit comes from the father and his *ntoro,* a named patrilineal kin group, although the rites practiced by these groups seem to have waned. In contemporary society, perhaps because of the British school system, many or most people carry the surname of their father, and today land and material wealth are often passed along from fathers to their sons and daughters. It may also be that with increased mobility and the spreading prevalence of the nuclear family, men's ties to their matrilineages are becoming less important and less effective than in the past.

Religion and Spiritual Life

Asante traditional religion includes a supreme creator, *Nyame* or *Onyankopon,* and a hierarchy of lesser spirits: *atano, abosom,* and *mmoatia.* Nearly all prayers begin with the invocation of Nyame, and his name is in many proverbs. Today, his name is used constantly when people express hopes or aspirations, "If God wills it," and in proverbs, which today are used on textiles and pottery, as logos for stores or brands, such as *Gye Nyame* (literally "except God," but meaning that nothing can be accomplished without God's help), and in names of popular restaurants and shops, such as "God's Love Refrigeration" or "God's Grace Fast Food and Catering." *Asaase Yaa,* or Mother Earth, is also frequently invoked in prayer and petitions.

The atano and abosom are lesser gods who reside in shrines throughout Asante. The shrines usually consist of a brass pan (of European origin) or a clay pot containing animal and plant materials and sacrificial materials, such as chicken blood and raw eggs, and the pan may rest on its own stool within a shrine house or temple or may be placed under or in the forks of a tree. Other items may accumulate in the

shrine room, such as valuable family possessions or personal items of dead priests, and occasionally *akua'ba* (see below), but figures are not made of the deities themselves, nor is figurative art an important part of the shrine. A home may have a special shrine room within the compound, with a white cloth over the door to warn away menstruating women.

The deities reveal themselves by possessing priests or priestesses, mediums through which people can approach the spirits for advice, curing, or other assistance. The priests and priestesses live at the fringes of society so that their interaction with supernatural beings would not interfere with ordinary people's lives, and they are distinctive in their dress: raffia or white cloth skirts, bare feet, and long matted hair (also associated with insane people or, today, drug users). They also have a small group of followers who function as drummers, cooks, and general caretakers of the shrine.

Traditional priests had important and sometimes politically powerful relationships with chiefs. In some states, new deities could not be introduced without the approval of the chief, and priests judged to be charlatans could be killed at the command of the Asantehene. Priests and deities were consulted before military campaigns, often accompanied armies, and were rewarded with land, captives, and emblems of royalty, such as gold and umbrellas. Priests also accompanied chiefs and others on diplomatic missions. Although traditional priests don't seem to serve in this capacity today, some of these important leadership roles may be being filled by important Christian religious leaders, such as Dr. Peter Kwasi Sarpong, the Archbishop of Kumasi and an anthropologist, who wields substantial political and cultural influence today, not just within Ghana but in the international sphere.

The ancestors are also important and revered, and they continue to influence life on earth. They are venerated, not worshipped, and respond to supplication in the form of prayer and libation. To become an ancestor, one must have led an exemplary life and had children, and one must have lived to an old age and died a natural death, rather than from suicide or certain dread diseases, such as smallpox, AIDS, or insanity.

Most ceremonies call for prayer and libation as means to establish a link or communication with God, ancestors, and other spirits. Prayers may include praise, thanks, and petitions for specific personal needs and for general community well-being. Minimally, a libation may be just a few drops of water or a bit of food dropped on the ground before a meal, but it might also be any kind of drinkable liquid, such as palm wine, soda, or schnapps; more substantially, a sacrifice may include eggs or chickens, or very rarely, sheep. Apparently, even human sacrifices were made in the past, particularly in situations such as the death of a chief, who must be accompanied by servants into the next world. Any adult, man or woman, can offer prayers, libations, or sacrifices, although for major occasions, these are led by a chief, a priest, or the head of a household or lineage. Similarly, while simple prayers and libations may be offered anywhere, major prayers and sacrifices are made on stools, in shrines, or under sacred trees.

Two ceremonies merit special mention: the *Adae* and *Odwera.* Adae, held every 21 days, celebrates the ancestors of chiefs and other royalty. The more serious part of the ceremony is held in the sacred stool house of the palace, where the chief priest offers food and drinks to each ancestor at his or her stool and asks their blessings for the community, while the public gathers outside for music, dancing, and recitation of the oral history of the royal family. Odwera, an annual celebration perhaps instituted by Osei Tutu I, is celebrated in September for community purification. Prayers for forgiveness are made, shrines are cleaned and purified, a black hen is sacrificed, and the entire community, living and dead, shares a feast to begin the new year cleansed.

Asante religion underwent rapid change in the early days of colonialism. With the government weakened, people turned to new cults, priests, and protective talismans adopted from neighboring cultures, perhaps as a response to the failed government of Kofi Kakari, the fall of Kumasi, the exile of Asantehene Prempeh I, and the eventual annexation of Asante by the British. Some of the new priests had spiritual powers, which they could place in talismans, or *asuman,* which can be hung in doorways as protection from theft or wrapped in leather (and sometimes gold foil) and sewn on *batakari,* cotton smocks imported from the north. Although often called "warrior shirts" or "hunter shirts," as they are believed to protect warriors from injury in battle, they were also worn by chiefs and even the Asantehene.

Today, most Asantes are Christians, and Sunday mornings find cities and villages filled with congregants heading to churches of every major and minor Christian denomination as well as to nondenominational

churches. Many are also Muslim, but neither religion necessarily replaces traditional beliefs. Asante religion has always been dynamic, as suggested by the influx of new deities in the precolonial and early colonial times, and it remains so today, so that people may be devout Catholics in their ordinary thought, speech, and practice and yet may still deeply adhere to the religious beliefs that are inherent to Asante tradition and culture.

The Life Cycle

Asante life begins with a naming ceremony, which marks the beginning of personhood. All Asante and other Akan are named for the day on which they are born (for example, Kwasi or Akosua for Sunday, Kwabena or Abena for Tuesday, Kofi or Afua for Friday, and so on). The father also chooses a name for an infant, usually the name of someone he wishes to honor, and on the eighth day, the father's sister bestows this name on the child with prayers, asking for health, wisdom, and a long life and admonishing the child to be truthful and hardworking. Today, Christian ministers often take over this role. The naming ceremony marks entrance into society, and the child is given a symbol of their gender role in life, for example, a basket for a girl or a machete for a boy. Other names are given that refer to circumstances of birth (twins, for example, or birth order) or to events occurring near the time of birth (a festival day, for example, or a death). Individuals can also add names later in life, for example, a person becoming Christian or Moslem may wish to take a name denoting that a new chief can take the stool name of some predecessor, and today a woman may take up her husband's surname upon marriage.

Puberty rites were celebrated only for girls. The onset of menstruation was celebrated with a week of feasting, singing, and dancing. The girl was seated formally in a public place and received gifts from her parents and the community, and the elderly women counseled her about sexual matters and other wifely responsibilities. From this time forward, she was expected to spend her menstrual periods in a special menstrual house at the fringe of the village and follow many taboos, such as not visiting stool houses, not selling cooked food, and not cooking for her husband. Both these customs and the nubility ceremony itself seem to have been discarded, at least among more educated families. Girls object to being publicly displayed with their breasts exposed, but as elsewhere where puberty customs are fading, many elders feel this has led to promiscuity and adolescent pregnancy. As a consequence, some Christian churches have instituted a blessing ceremony for girls, which may include Bible lessons, gift giving by their congregations, and special blessings and prayers.

Formerly, girls were expected to marry soon after puberty, and marriages were and are considered a union not just of two individuals but also of two families. Cross-cousin marriages were encouraged, parallel-cousin marriages forbidden, and polygyny and the levirate were practiced. Girls could be betrothed in infancy or even before their birth, and twin girls were promised to chiefs, but none of these are common practices today. The marriage ceremony itself consists of a series of gifts to members of the bride's family, including money, gold, cloth, underwear, drinks, and, today, a Bible. The first is the "knocking" fee, which is followed by the bride price itself, then special gifts to the bride's father, her mother, and her brothers; the women of the family; the girl's church or household deity; and finally, a special gift to the bride herself, in order to buy items for their married life. Today, many people also have court weddings and Christian church weddings, neither of which permit polygyny. Church weddings are usually followed by a large dinner party the next day.

Another religious ceremony practiced by Asante is soul-washing. A person's soul sometimes needs to be pacified after being offended or following some crisis, such as recovery from a terrible illness or escape from a dangerous accident. The celebrant bathes, cuts and cleans his or her nails, dresses in perfumed white cloth, sits before a brass pan with water and white clay, and with offerings of mashed yam, eggs, and liver from a sheep or fowl, apologizes to the personal spirit, asks forgiveness, and asks for blessings for himself, his family, and his people. Finally, the celebrant dips *adwera* leaves in the clay water and sprinkles it on the gathered family to show that their souls are also purified.

Funerals are the most elaborate of Asante ceremonies. Upon death, the in-laws provide items needed for cleansing the body and burial, such as soap, white cloth and clothing, white beads (for a woman), and a pillow and blanket. Traditionally the dead were buried within 3 days of death, though today bodies may be kept at a mortuary until the time of the funeral. During the procession to the cemetery,

the widow or widower would be given a clay pot to throw, indicating that he or she was no longer married. Neither a widow nor a widower were permitted to sleep alone for 6 weeks, and they followed various food restrictions. A widow and her children were looked after by her husband's successor for a year; at the end of the year, she could choose to marry him and remain with the family or she was also free to marry someone else. A widower was free to marry at the end of the 6-week period.

The funeral itself takes place quite some time after the death, because the funeral requires much preparation. Palm wine must be gathered, the funeral grounds prepared, and guests informed. On the day of the funeral, friends and family members gather from noon on, wearing black or other dark colors. The chief female mourners wear red or red and black. They dance up and down the street or funeral grounds several times before being seated to receive the mourners. It is common for there to be hundreds of mourners, and each of them will greet the family (single file, counterclockwise, extending only the right hand, as in all Asante formal greeting). They will be offered drinks and will themselves send up donations of money to the family to help defray the expenses. These gifts are announced, and someone from the bereaved family will thank the donor. At the climax of the celebration, in-law families of the deceased display huge trays of special goods, such as kente cloth, red-and-black cloth, beads, traditional sandals, and silk. These trays of goods are danced up to the family with the accompaniment of drummers. Male relatives may be expected to provide a ram, parts of which become food for the ancestors and are buried in the grave and parts of which may be burned to create soot for the blackening of the deceased's stool if he or she were an officeholder.

Arts in the Life of Asante

In addition to their intriguing political history, the Asante are also celebrated for the splendor and variety of their arts, many of which are becoming popular in the diaspora even as their traditional religious importance may sometimes seem to be diminishing.

As in all West African cultures, the arts serve at least three overlapping functions: religious, royal, and mundane. Religious arts include shrine houses, shrine figures, stools, akua'ba, and funerary items, such as adinkra (or adinkara) cloth. Shrine figures are rarely seen by outsiders today, except in museums, as shrines themselves are small and private. A few traditional shrines have been preserved by the government and have been rebuilt according to old drawings and photographs, but most old shrines have fallen into decay, and newer shrines are small, secluded, and not welcoming of visitors.

Stools may be ordinary, religious, or political. At one level, an Asante stool is simply something that a person sits upon and is especially brought out for elders or guests. Such stools have small lugs at the sides for easy carrying, and people can carry their stools along when visiting nearby. This mundane use, however, is being replaced by the ubiquitous plastic stacking chair in villages near cities. Stools have a rectangular base and a rectangular seat curving up at the sides. The important design is in the center, and it may be a carved geometric symbol, an animal, or a simple design.

The akua'ba (Wednesday's child) may also be considered a religious item, as its original purpose was to appeal to the deities to promote pregnancy in the woman who is carrying it. The story is that there was a woman, Akua, who badly wanted a child, as do all Akan women. A priest instructed her to have a small image carved and to carry that image and care for it as she would a child. Akua did so and, despite teasing, became pregnant. Today, many women still use the figure, sometimes adorned with beads and earrings, either to cure barrenness or to ensure the safe birth, health, and beauty of the child. Akua'ba are also sometimes used as shrine figures or as memorials for a dead child. Typically, the akua'ba has a flat disk-shaped head, arched eyebrows, small facial features, a ringed neck, a small cylindrical body with tiny breasts and navel, and short, plain, horizontal arms. In the past, terra-cotta figures and heads of both male and female royalty were used for funeral purposes (not burial), but these do not seem to be made any longer.

Adinkra cloth is visible at any festival and has become popularized in the West, perhaps because of the appeal of the symbols. Traditional black adinkra cloth is still made by dyeing the cloth with wood and then inking it with small stamps carved from calabash shells. The black cloth is spread on a board and divided into sections with a four- to six-toothed comb dipped in ink. Each section is then stamped with a single design, but the sections may all have the same design, or the designs may vary from section to section. These designs, used in other Asante arts and

especially popular now on factory cloth and flowerpots, for business signs and stationery, generally represent proverbs, such as "Look back to your ancestors" *(Sankofa)* or "Two brothers should not argue over food" (two crocodiles crossed, sharing the same stomach). These proverbs, as symbols or words, appear in many other Asante arts. While all black or black-and-red cloth is used for most funerals, white cloth with black designs may be used for festive occasions and for funerals of elders.

One must also acknowledge the adaptation of traditional art forms to Christian contexts. Churches are decorated with traditional Asante symbols and cloth, and people wear kente and adinkra cloth to church. Dr. Peter Sarpong has been a powerful advocate for traditional arts and culture and a pioneer in integrating traditional music, dance, and libation into Catholic life, ceremony, and worship.

All African kingdoms and states have engaged the arts for political purposes, but the Asante have excelled in the variety and high visibility of their royal arts. The Golden Stool, discussed above, is certainly the most revered aesthetic symbol of the Asante nation, but there are many other emblems of state in Asante, both of The State and of the member states of the Asante federation. Every chief and high-ranking official has a ceremonial stool of carved wood embellished with silver and gold, bells, amulets, and sometimes a central gold or silver "soul disk." The basic designs of ceremonial stools carry messages, which may be particular to the chief or chiefdom or may have broader use. For example, a circular shape, the "circular rainbow," represents the unity of all Asante peoples under the Asantehene; the "wisdom knot" indicates that the chief will rule through wisdom rather than force; and a two-level design indicates variously that a paramount chief has authority over other chiefs or that chiefly power rests upon the power of the people's will.

In addition to royal stools, chiefs at various levels carry state swords and flywhisks, appear under ornate cloth umbrellas and large fans, may be carried in palanquins, are accompanied by linguists (okyeame) carrying staffs topped with golden emblems, wear kente cloth, sandals, and crowns with golden ornaments and a prodigious amount of gold jewelry. The Asantehene is said to wear so many gold bracelets that he cannot lift his arms and so must be accompanied by aides on each side carrying his arms. All of these items are not only splendid in themselves—the glitter of the gold and the brilliant colors and patterns of kente cloth—but all of them bear symbols that are immediately recognizable to every citizen. The symbols may be simple human or animal figures, such as crossed crocodiles, or may be geometric, but they represent proverbs and other words of wisdom relating to the behavior of the chief or the citizenry. All of these arts are made by specialists, and all of them are men who generally inherit the right and the training matrilineally.

Each of these arts is worthy of an entry in itself, but kente cloth may be the most familiar to Westerners and has indeed been the subject of much research by artists and anthropologists. The origins of kente are obscured in distant history, but one legend is that men were taught to weave by Ananse the spider, a culture hero who is probably the ancestor of America's Br'er Rabbit. Kente is a very complex and tightly woven fabric made on a typical West African men's narrow horizontal loom. Early cloths were of indigo and white cotton, but imported silks and eventually rayon in every color have been incorporated and are now considered traditional. Each 4"-wide kente strip consists of a series of patterns, each usually about 3" to 4" long, and usually, today, alternating. When many dozens of these strips are sewn together at the selvages, the effect is a checkerboard of patterns, with the ends usually having more and perhaps more complex designs. Each color carries meaning, and each of hundreds of individual patterns also has meanings, often relating to proverbs or having other political references. Even the way the wearer wraps the cloth around his body carries meaning, such as humility or arrogance or the bearing of a gift. In earlier times, chiefs and kings reserved certain patterns for their own use, and indeed kente was used only by royals or given by them as gifts. Today, however, most people who can afford to purchase a cloth do, and wear them for special occasions, such as religious festivals, weddings, or simply fancy parties. To the chagrin of many elders, kente strips are now exported to decorate American graduation robes or baseball caps, and kente-like designs are machine printed on cheap commercial cloth and made into bags, shirts, and other tourist items.

Perhaps no arts can properly be called "ordinary," but the Asante make many arts or crafts for every day use. Women make pottery in a huge variety of shapes for various purposes, such as grinding spices, carrying and storing water, and steaming gari, as well as

for cooking and eating. Many villages still fire pots on open wood fires, but others use charcoal-fired kilns instead of or in addition to them. Men carve wooden drums, thumb pianos, and other instruments; bowls and tool handles; and a multitude of tourist items, such as *awari* games, inventive nontraditional masks, and salad bowls. Tie-dye and batik, using beeswax and candle stubs, hand-carved wooden or foam stamps, and commercial dyes have become popular arts encouraged by government and nongovernmental agencies, and people in remote villages wear and sell beautiful hand-dyed fabric.

Bronze and brass, generally cast but also hammered, were traditionally used for *forowa* and *kuduo,* containers used for gold dust, money, pomades, and other valuables and also, famously, for "gold-weights," tiny figures and symbols made of brass but used to weigh gold. Today, these weights have evolved into a variety of objects, such as hollow beads modeled after earlier gold beads worn by chiefs, bracelets, pendants, bottle openers, nativity scenes, and sometimes quite remarkable sculpture. These items are made by lost-wax casting, a process that can take many days, as the item is first modeled of beeswax, and then an investiture must be built up of many layers, first of a charcoal slip and then of clay mixed with palm nut fiber. When the mold is finally dry, the firing is done on an open-air "kiln" enclosed only on three sides, and the mold must be shattered to remove the cast piece, so that each piece is unique. Like other metal arts in Africa and the world, bronze casting has been traditionally restricted to men, though there is at least one young woman presently casting.

Bead making is another art elevated in recent years to great popularity, both for local use and for broad export. Although most "African trade beads" were actually Italian imports (such as the millefiori beads from Murano), Asantes today pulverize old bottle glass, color it with dyes, and bake it in molds to produce beads of many shapes, colors, and patterns. Traditionally and still used as waist beads by women and seen only by their husbands, these beads have caught the fancy of Westerners and are now sold widely, strung on raffia or cotton string, at bead markets in Kumasi, Koforidua, and Accra.

Asante dancing and music, particularly drumming, are other ancient arts that remain popular today in both traditional and contemporary settings as well as in the diaspora. The same drums played in traditional villages for ceremonies are now found in Christian churches and at national political events, and young people learn traditional dancing in schools and universities. Highlife (or earlier, "palm wine guitar") music, which had its origin in late 19th-century Ghana, and is sometimes considered a form of jazz, became enormously popular throughout urban West Africa in the 1920s into the 1970s, and it remains influential in the 21st century in forms such as hip-hop and reggae.

With their wealth of art forms, it may be surprising that the Asante have no history of mask making, even though many of their close neighbors make them and perhaps especially since their very close relatives, the Baoulé in Côte d'Ivoire, are renowned for the beauty and variety of their mask forms. It may be that in Asante, masks were avoided because masked figures could have been viewed as discordant with the power and prestige of royalty, or that the priests and priestesses were so powerful that deities did not need masked impersonators, or that the Asante lacked the initiation societies and secret societies that so often use masks and masquerades in other African cultures.

The Asante have entered the 21st century a proud and flourishing people. They have maintained many of their traditional beliefs and values, and they are proud of their rich history. Though they suffered under the years of colonialism, they emerged at the heart of the nation that led Africa into independence. Their magnificent arts, sought by collectors and major museums the world over, have become symbols of the nation of Ghana and sometimes as symbols of unity for diasporic Africans everywhere. Their warm hospitality, their proud history, their flourishing arts, and the economic and political stability of the region are beacons to business people, visitors, and scholars from around the world.

— *Mary Carol Hopkins*

See also **African Thinkers; African American Thought**

Further Readings

Adler, P., & Barnard, N. (1992). *African majesty: The textile art of the Ashanti and Ewe.* London: Thames & Hudson.

Allman, J., & Victoria Tashjian, V. (2000). *"I will not eat stone": A women's history of colonial Asante.* Portsmouth, NH: Heinemann.

Berry, S. S. (2000). *Chiefs know their boundaries: Essays on property, power, and the past in Asante, 1896–1996.*
Kwadwo, O. (2002). *A handbook on Asante culture.* Kumasi, Ghana: Cita Press.
McCaskie, T. C. (2000). *Asante identities: History and modernity in an African village, 1850–1950.* Bloomington: Indiana University Press.
Mendonsa, E. L. (2002). *West Africa: An introduction to its history, civilization, and contemporary situation.* Durham, NC: Carolina Academic Press.
Yankah, K. (1995). *Speaking for the chief: Okyeame and the politics of Akan royal oratory.* Bloomington, IN: Indiana University Press.

Assimilation

Assimilation refers to that result of culture change whereby the members of one society modify their behavior and values to become very similar to, or identical with, those of another society possessing a different culture. It is to be distinguished from the potentially rapid processes of culture change due to internal innovation and invention and external borrowing through intermittent diffusion of culture elements from outside the society, and the very gradual process by the absence of exact replication by a younger generation of the beliefs and behavior of an older generation. Innovation and diffusion are ongoing features of human life, and their effects are usually gradual (over many generations), limited to distinct subsets of a cultural system, and, more important, typically greatly modified in turn to mesh with the existing culture.

The process of change giving rise to assimilation, however, is acculturation. Acculturation is the complex and dynamic set of processes resulting from close, prolonged contact between two societies, one of them dominant. This imbalance of power is necessary for assimilative change, since the drastic and total character of assimilation requires that the dominant society monopolize prestige, resources, and force and possess an ideology that rewards and/or demands corresponding change in the subordinate society. There are modifications to both societies in the acculturative situation, the dominant as well as the subordinate. While there have been many studies of contributions by conquered societies to Western cultures during the extent of European conquest and colonial control (in particular new domesticates), the focus in anthropology has been on what occurs in the subordinate group. Other than physical extinction, assimilation is an extreme result because it consists of a total process of adjustment whereby the subordinate group abandons its cultural forms by adopting those of the dominant society. Assimilation is cultural extinction—language, kinship and family organization, ethos, aesthetics, community organization, religion, technology, and systems of leadership and authority disappear to be replaced by the corresponding culture elements of the dominant society.

Assimilation is a theoretical end point along a continuum of reactions to acculturation. Often, the term is used to refer to a process that is incomplete, for example, "Society B is assimilating," or "The "elites of society B are highly assimilated." It is not irreversible, or even unidirectional. Cultural modifications may occur that suggest that a particular society is undergoing this kind of modification only to have it terminated in a nativistic movement. It is, in fact, often difficult to determine whether a society is proceeding through assimilation or achieving a dynamic balance of culture traits from the dominant culture and traditional traits from the subordinate culture.

Several questions can be developed employing a process model: How long is the assimilation process? Assimilation studies have been a staple of sociological approaches toward the immigrant experience in America, with a time span of three generations such that grandchildren have acquired the dominant culture while their grandparents have not. Margaret Mead's description of the change in Manus society (Admiralty Islands) from a "Stone Age" culture to modernity occurred within a generation. Traditional children she had known in 1928 had apparently in 1953 become Westernized, valuing and practicing Western forms of marriage, government, and religion. Intragenerational transformation would seem probable for individuals, but it would be more likely that societal assimilation would not be complete until members of older generations had passed away.

What drives assimilation? One popularized explanation, especially for the dominant culture (and often adopted by the assimilating subordinate culture), is that the dominant culture is absolutely superior and thus overwhelmingly compelling and attractive. Mead's account of Manus assimilation attributed the rapidity of the transformation to the much greater

effectiveness of Western political and social forms and the consequent laudable desire by Manus to emulate these. However, it is more likely that the realities of the acculturative setting, with the presence of enforced planned changes (or at least planned prohibitions of traditional ways) by the dominant culture, present subordinate peoples with few choices other than attempts at assimilation. Other strategies to acculturation, such as biculturalism or marginality, active revitalization, and nativism may not be successful. Contrary to a view of subordinate societies as passive victims, anthropologists have usually sought to show that members of subordinate societies have been creative opportunists, actively taking charge of their own response to acculturation, including the adoption of the dominant culture. However, a distinction may be made between internal and external assimilation. *Internal* is an ideological transformation involving the adoption of the values, beliefs, and worldview of the dominant culture, while *external* involves the manifestations of the dominant culture: clothing, dwellings, work schedules, farming practices, and so on. It is difficult to consider that these could be mutually distinct and unrelated processes. The dominant culture typically enforces only external assimilation. Moreover, people's responses in change often are focused on items of material culture that either show promise of material advantage or are viewed as observable markers of prestige. Still, it is the purposeful interest in acquiring ideology, values, and beliefs that drives continuing assimilation, and consequently most studies explaining people's interest in assimilation have looked at such ideological arenas as religious conversion and education.

What is the result? The end product of assimilation would be members of the former subordinate society merging with and becoming indistinguishable from members of the dominant society. However, there is the issue of acceptance by the dominant society, especially when physiological attributes are used to reject former members of the subordinate society regardless of their capability at assimilation. This rejection has become a source of much concern in Western social science, for example, in the study of racism. Many American social scientists have looked at assimilation much more favorably than anthropology has. They view the immigrant experience in America as one in which successful assimilation was desirable, and therefore it was important to determine those social factors that enable it. Anthropology, on the other hand, views it as destructive (especially in regard to Native Americans) and therefore sought to determine those social factors that held it in check and would enable non-Western groups to maintain their own distinctive cultures and languages.

— *John Rhoades*

See also **Migrations; Social Change**

Further Readings

Mead, M. (1956). *New lives for old: Cultural transformation–Manus, 1928–1953.* New York: Morrow.

Simpson, G. E. (1968). Assimilation. In D. Sills (Ed.), *International encyclopedia of the social sciences* (pp. 438–444). New York: Macmillan.

ATAPUERCA

Atapuerca is a World Heritage Site located in Burgos province, Spain. The construction of a railroad at the end of the 19th century, cutting through the foothills of the Sierra de Atapuerca, led to the discovery of several hominid sites. In 1910, the archaeologist Jesús Carballo discovered the Bronze Age site and paintings in the Cueva Mayor, known as the Portalón. In 1964 and 1966, Francisco Jordá carried out excavations, which led to the first estimation of the antiquity of the sites in the Trinchera. Based on the faunal analysis done by Juan F. Villalta, an age of 500,000 years ago was estimated. In 1976, Trinidad Torres undertook an excavation and entered in the Sima de los Huesos in search of bear remains. Among the bones removed were human fossils: mandible, teeth, and cranial fragments. Torres took the human fossils to his doctoral advisor, the paleontologist Emiliano Aguirre, and based on the bears' remains placed the site within the Middle Pleistocene.

Due to the importance of the human remains, Aguirre organized a multidisciplinary group to excavate the main sites, and after he retired, the studies were codirected by Juan L. Arsuaga, José M. Bermúdez de Castro, and Eudald Carbonell. Since 1978, very relevant human remains have been found by this multidisciplinary group in the main sites: Trinchera Dolina, Trinchera Galería, Sima de los

Huesos, Portalón de Cueva Mayor, Trinchera Elefante, and Mirador.

Trinchera Dolina excavations in 1990 yielded a lot of vertebrate bones and in 1993 intensive excavations began of an area of 6 sq m. In 1994, several human fossils were discovered: a handful of upper and lower teeth, a large cranial fragment, and a mandible with a molar wisdom tooth in the process of erupting. Furthermore, 36 human fragments were recovered of at least six individuals. Based on micromammals and magnetostratigraphy, the level was dated of 780,000 years ago. In 1997, a new human species was defined: *Homo antecessor,* the species that discovered Europe.

Sima de los Huesos is the other most important site of Atapuerca. It is a small cavity at the end of a ramp, which is accessed by a 13-meter vertical shaft, after traversing half a kilometer of difficult passages from the current entrance to Cueva Mayor. The Sima de los Huesos is one of the most productive paleanthropological sites in the world. Since 1987, at least 28 different individuals had been identified as *Homo heidelbergensis.* Several very well preserved and almost complete craniums, mandibles, pelvises, femurs, hands, and feet have a mixture of ancient and modern characteristics. Some are similar to their Neandertal descendants and others to their ancestors the first Europeans.

— *Eustoquio Molina*

See also **Arsuaga, J. L.; Bermúdez de Castro, J. M.; Homo Antecessor; Orce; Paleoanthropology**

Further Readings

Arsuaga, J. L., Martínez, I., Gracia, A., Carretero, J. M., & Carbonell, E. (1993). Three new human skulls from the Sima de los Huesos Middle Pleistocene site in Sierra de Atapuerca, Spain. *Nature, 362,* 534–537.

Bermúdez de Castro, J. M., Arsuaga, J. L., Carbonell, E., Rosas, A., Martínez, I., & Mosquera, M. (1997). A hominid from the Lower Pleistocene of Atapuerca, Spain: Possible ancestor to Neandertals and modern humans. *Science, 276,* 1392–1395.

Carbonell, E., Bermúdez de Castro, J. M., Arsuaga, J. L., Díez, J. C., Rosas, A., Cuenca-Bescós, G., Sala, R., et al. (1995). Lower Pleistocene Hominids and artifacts from Atapuerca-TD6 (Spain). *Science, 269,* 826–830.

Athabascan

It is theorized the Athabascan were the last Native American group to cross Beringia 10,000 years ago. Their territory (after crossing Beringia) would have started in the subarctic terrain from the Yukon or interior of Alaska, to northwestern Canada. These sturdy peoples of the North not only survived the tundra and nomadic lifestyle of Athabascan antiquity, following the caribou and other game, but expanded and became many nations. The three main subfamilies are the Northern Athabascan, Pacific Athabascan, and Apachean.

The name *Athabascan* evolved from the Cree word *Athapuscow,* meaning "There are reeds one after another" or "a place where there is grass everywhere," and originated from the Peace-Athabasca Delta in Canada. Athabascan has several other spellings; *Athapaskan, Athapascan,* and *Athabaskan.* These people have descended from the Na-Dene, the largest phylum of North America, from which the Tlingit and Eyak are also distantly related. *Dene* is an Athabascan word for "the people," and the Chipewyan and Navajo groups also call themselves the "Dene."

Glass beads received in trade in exchange for fur pelts became much treasured by the Athabascan People, who expressed great artistry and ingenuity in dramatically transforming the appearance of their clothing and accessories with beautiful floral and totemic patterns. Products made with beads became instantly popular trade and tourist items.

Lifestyles

When traveling, the Athabascan constructed temporary conical dwellings; they covered the structure of leaning poles with bark, brush, or hides. Their permanent habitation consisted of semi-subterranean dwellings. Birch bark served as a durable and ever-available raw material to form and create essential baskets for carrying and cooking (for example, boiling meat in water with hot stones) and especially for crafting canoes. There were two sizes of sleds used by the northern Athabascan people, the larger to transport heavy loads and the smaller for personal use. Clothing and accessories (including knives and arrow sheaths) were adorned with porcupine quillwork, especially the men's clothing. Quillwork was a time-consuming project, requiring hunting of the animal, careful removal and preparation of the quills, and the difficult sewing required to stitch through the thick moose hides, transforming them into works of art with elaborate and intricate floral and woodland motifs.

The potlatch was actively practiced and was a central societal theme for the Athabascan People. Surplus foods were stored in family caches and birch bark boxes for the various winter feasts, taking place from late fall to early spring. This was the season to put love into action, as William E. Simeone was told concerning the northern Athabascan potlatches. For instance, to give a blanket was to "wrap them in love." The Athabascan did not hold competitive potlatches to the extent practiced by some of the coastal tribes, such as the Haida and Kwakiutls. As with other northwest coastal tribes, it was important for a chief to know his connections to all of the attendants of the

Salmon catch on the Kuskokwim River

Source: Photograph by Rachel Klein, the Kuskokwim Corporation.

potlatch, to what capacity they would participate, and how they would be either assisted or honored. Potlatches were also times for unmarried clan members to meet other available persons. Since the Athabascan are a matriarchal people, who follow their mother's moiety, it was important for all Athabascan to know the other clan members' moiety, and how they were derived. The Upper Tanana, for instance, have two moieties. The first are the Crow People, or Star People, or the Ones Who Came from the Sky. The second moiety is the Seagull People. It was strictly forbidden for the Upper Tanana to marry within the same moiety.

From the very antiquity of Athabascan people, feasts were held after a successful hunt, especially with bear or caribou. Spiritual observances within a moral universe belief are demonstrated by showing respect for all things, for each other, for all animals, and for all plants, truly a kinship with all life. There were strict ceremonial practices followed for disposing of animal remains, for example, among the Koyukon Athabascan People in Alaska, who lived in close proximity to the Inupiat, their dwellings and lifestyles were very similar; yet archeologists could decipher which cultural group resided there based on the contents of the excavated kitchen midden. If there were remains of an animal the Koyukon held sacred either within or near the dwelling then it was an Inupiat lodge. The Koyukon would return the bones of water creatures to the water, in contrast, to indiscriminately dispose of the fauna. In the videos of *Make Prayers to the Raven*, an elder wonders if the "bad luck" they were experiencing that day was due to going away from the rules (respect for all that is) from "a distant time."

Strict etiquette was observed for bear meat. The women were not allowed to eat certain parts of bear meat until after entering menopause; it was also stated in *Make Prayers to the Raven* that the Koyukon women had not seen certain parts of that video (the women do not attend the "Bear Feast" in the woods). Other restrictions observed were that only men could cook it, certain parts could not be eaten or even given to dogs, and the "best parts" were to be saved and served as an integral part of the spiritual aspects of the potlatch.

As the Athabascan integrated into other surrounding Native groups, there would be a blending of cultures and even mythology. The Athabascan situated close to the Tlingits have nearly identical stories yet different hero names; for example, the Tlingits have "Raven," and the Athabascan have "Crow." These similarities are very evident in the stories of Raven/Crow and Whale and Raven/Crow and Brown Bear. There are also parallels between the two cultural groups in the stories of Land Otter Men, or *Kush-da-ka,* as the Tlingits call them. These creatures transform themselves from land otters into men to trick humans to come to live with them and are still believed to exist by the traditional Tlingits.

One-Who-Was-Saved-By-The-Land-Otter totem in Klawock, Alaska. The land otters on various places of the body, represent the person turning into a land otter.

Source: Photograph by Pamela Rae Huteson.

Divisions

The Northern Athabascan in the Alaskan/Canadian regions was to be divided into approximately 27 language groups. However, due to the intricacy and multifaceted nature of the Athabascan language, it is still being subdivided. It was thought the Eyak also separated from the Athabascan, but through linguistic research, it has been fairly well established that they separated prior to the proto-Athabascan.

Northern Athabascan:

- Alaska: Koyukon, Tanana, Ahtena, Tanaina, Upper Kuskokwim, Holikachuk, Ingalik, and Tanacross
- Northeastern Alaska and Northwestern Canada: Han (Moosehide), and Gwich'in
- Canada: Northern Tutchone, Southern Tutchone, Tagish, Tahltan, Kaska, Mountain, Bear Lake, Dogrib, Yellowknife, Sekani, Carrier, Chilcotin, Nicola, Sarsi, Slave Lake, Beaver, and Kawchottine (Hare)

Around 1,600 years ago, a portion of the Athabascan people migrated from the north to colonize the Pacific Northwest and northern California regions and became the Pacific Athabascan.

Pacific Athabascan:

- Oregon: Coquille
- Oregon and California: Upper Umpqua, Tututni-Shasta Costa, Galice-Applegate and Cheto-Tolowa
- California: Hupa, Mattole, Sinkyone-Wailaki, and Cah

Six to seven hundred years ago, the Pre-Apachean group journeyed to Southwest America, to the regions of New Mexico and Arizona, where their culture and technical survival skills morphed and integrated with the local residents, to become the Apaches and Navajo *(Dineh)*. This division of the Athabascan kept a "core trait" of the conical dwellings and created several styles of the hogan.

Apachean:

- Puebloan: Apache (Western), Chiricahua, Jicarilla, Mescalero, and Navajo (Dineh)
- Plains: Apache (Kiowa) and Lipan

European Introductions

Prior to European contact, the Athabascan had settled into a seminomadic lifestyle. They were already traders by occupation and were ready for fur trade with the Europeans. Beadwork taught to the eastern Athabascan spread quickly to the west and south, as each band created their own significant style. Although quillwork was still crafted, the beads were easy to obtain in any array of sizes and colors, which made them an instant favorite with Athabascan artisans. The legacy of Athabascan beadwork can be found in many major museums around the world.

Ollie Peterson and Glenn (Tiny) Fredricks cutting salmon in traditional manner, for winter provisions

Source: Photograph by Rachel Klein, the Kuskokwim Corporation.

Present Day

Much work is being done to save the Athabascan language; for example, every spring, an Athabascan Conference is held in a different Athabascan area,

where linguists and other educators meet with the Athabascan communities to discuss ways to preserve their valuable language. Many curriculums have been developed to instruct school students and adults how to carry on their traditional Athabascan cultural heritage. Athabascan authors are also making themselves known in the literary world, for example, Velma Wallis, author of *Two Old Women* (1993), and Jan Harper-Haines, author of *Cold River Spirits* (2000).

Today's Athabascan have integrated modern technology and traditional subsistence; the Coquille People are raising and marketing organic cranberries, and Alaskan Athabascan are participating in the Alaskan fishing industry. Also, building on gambling "games," casinos have also become a way for some Athabascan groups to become self-sufficient. The Athabascan may be a diverse group, but there is a bond that goes very deep, as historically, they have assisted each other in various territorial disputes with other encroaching Native groups, for example. Today, they continue to assist each other to preserve their language and culture, by keeping it viable and relevant for the present and future use for not only their families, but for the family of man as a whole.

— *Pamela Rae Huteson*

See also **Aleuts; Native Peoples of the United States**

Further Readings

Clark, A. M. (1996). *Who lived in this house? A study of Koyukuk River semi subterranean houses.* Hull, Quebec: Canadian Museum of Civilization.

Ives, John W. (1990). *A theory of Northern Athapaskan prehistory.* Boulder, CO: Westview Press; Calgary: University of Calgary Press.

Nelson, R., & Badger, M. O. (1987). *Make prayers to the raven.* [Video recording]. Fairbanks: KUAC. (Produced in collaboration with the people of the Koyukuk River, KUAC-TV, University of Alaska)

Simeone, W. E. (1995). *Rifles, blankets, and beads: Identity, history, and the Northern Athapaskan potlatch.* Norman, OK: University of Oklahoma Press.

Auel, Jean Marie (1936–)

Jean Marie Auel, born on February 18, 1936, in Chicago, Illinois, is the author of the series, *Earth's Children,* a collection of novels revolving around the interactions of Cro-Magnon people with Neandertals. Auel did not come to her chosen craft as a trained writer. Rather, after raising five children and earning an MBA from the University of Portland, she was in a self-described "free-floating state" that left her open to new ideas: She was drawn ultimately to writing the stories of Ice Age ancestors that modern science helped her tell. Auel joins the ranks of writers like J.R.R. Tolkien and J. K. Rowling, who have written epic stories drenched in fictitious history and find large audiences due to their works' imaginative and historical values. While Tolkien and Rowling focus on the magical, Auel's books draw their richness from her study and explorations of the worlds of anthropology and archeology.

Through her fiction, Auel enables readers to discover cultural patterns in ways similar to those of anthropologists in the field. She immersed herself in learning stone tool making, preparing food from caribou brain, processing animal skins, making cordage, and digging roots to guarantee the authenticity of her books. She acknowledges that a bibliography of published material she has read on archeological and anthropological subjects would approach 4,000 entries. She has established working relationships with many professionals and has traveled to Western and Eastern Europe to visit actual sites and caves to enrich her stories.

Auel uses the Stone Age setting to explore gender roles and draws remarkable parallels between the cave society of which she writes and our more contemporary social structures. In Auel's series, the protagonist Ayla comes of age in a Neandertal community ruled by traditions and taboos. She is a feminist from matriarchal prehistory, a resourceful innovator whose solutions to daily living are a source of astonishment for cave men. Ayla's intelligence separates her from other tribe members. Auel's books have also been commended for the ethnobotanical accuracy as well as their anthropological accuracy. They remind us to take nothing for granted, such as the bountiful but limited resources of the earth.

Some historians and anthropologists, however, maintain that Auel's assumptions about Neandertal life are not realistic. They claim that she bases her

view of the Neandertal on the racially motivated science of late 19th-century French anthropology, and many anthropologists have denounced the novels as containing "bad" science and overt racism.

Nonetheless, Auel has received numerous awards for her writing, including an American Book Award nomination for the best first novel and Friends of Literature Award for *The Clan of the Cave Bear* (1981). She is also the recipient of the Scandinavian Kaleidoscope of Art Life Award, Golden Plate Award, American Academy of Achievement, Silver Trowel Award, National Zoo Award, Waldo Award (Waldenbooks), and Persie Award from WIN.

— *Judith A. Dompkowski*

See also **Neandertals**

Further Readings

Auel, J. M. (1980). *Clan of the cave bear.* New York: Crown.

Auel, J. M. (1983). *The valley of horses.* New York: Crown Publishers.

Auel, J. M. (1985). *The mammoth hunters.* New York: Crown Publishers.

Auel, J. M. (1990). *Plains of passage.* New York: Crown Publishers.

Auel, J. M. (2002). *The shelters of stone.* New York: Crown Publishers.

Aurignacian Culture

The Aurignacian is an early Upper Paleolithic, or Late Stone Age, culture dating to between 34,000 and 27,000 years before the present (BP). Aurignacian artifacts have long been considered representative of the culture of the first anatomically modern humans (*Homo sapiens sapiens*) to migrate into continental Europe. This is currently an issue of intense debate, as some archaeologists argue that Aurignacian artifacts may actually be the result of acculturation whereby migrating populations of anatomically modern humans were interacting with indigenous Neandertal populations and producing what archaeologists recognize as the Aurignacian culture.

Aurignacian artifacts consist mainly of stone and bone tools and reflect the technological capacity to produce parallel-sided stone blades and the ability to transform organic materials into tools. The average Aurignacian stone artifact assemblage includes a variety of tools, like burins, end scrapers, resharpened flakes, and blades with marginal resharpening. Compared with earlier Paleolithic cultures, Aurignacian stone tools reflect (a) an increase in the number of end scrapers, (b) an overall reduction of resharpened blades, and (c) the emergence of carinated and Dufour-type bladelets. Aurignacian stone tools are often made on nonlocal stone, especially in early assemblages, which were obtained from sources as far as 45 km from where they were found by archaeologists. Understanding of the chronological development of Aurignacian stone tools is hampered by the fact that most Aurignacian assemblages have comparatively low diversity indices and overall small sample sizes. Consequently, the shape of the base of bone projectile points is often used as primary chronological markers instead. For example, Aurignacian Phases I-V are characterized by split, forked, beveled, and unmodifed bases, respectively.

The geographic distribution of Aurignacian Culture ranges from "classic" manifestations in continental Europe, particularly southwestern France, to perhaps pre- and proto-Aurignacian in the Levant, the Zagros, the Caucasus, and Central Asia. Far from an in situ European development, archaeologists now think that Aurignacian culture most likely descends from one of these eastern core areas and appeared in Europe through relatively late population movements.

Aurignacian populations were organized into small, nomadic hunting-and-gathering bands that probably occupied a territory of less than 200 sq km. Settlement patterns, at least for the classic Aurignacian, were focused on river valleys in both open and rockshelter sites. Internal site patterning was documented at a series of open sites on the Hornad River in the former Czechoslovakia and consisted of multiple, variably shaped features and postholes. It has been hypothesized that these are the remains of structures with internal hearths.

Paleoenvironmental data indicate the early Aurignacian was marked by a cold, dry, and open steppelike environment, whereas the late Aurignacian saw a warm, wet, and forested environment. This environmental shift is corroborated by changes in Aurignacian stone tool technology and economy. For example, in the Vézère Valley of southwestern France,

the number of burins and thick scrapers increases in later assemblages, which is argued to reflect adaptations to changes in the type and distribution of plants and animals. Early Aurignacian artifact assemblages are dominated by the combination of reindeer and high proportions of nonlocal stone, while later ones contain greater animal diversity (seasonally available small mammals and fish) and a lower proportion of nonlocal stone. Taken collectively, the environmental and archaeological data are consistent with a pattern of highly specialized hunting and gathering for the early Aurignacian, presumably associated with the acquisition of highly mobile animals, and a more generalized food-getting strategy for later Aurignacian, as an array of diverse, less mobile fauna became locally available.

Artistic expression also begins to take on more importance during the Aurignacian. Examples of decorated bone, antler, and stone blocks have been found at Aurignacian sites in Spain and southwestern France. Some French caves contain geometric configurations such as chevrons, crosses, and parallel lines. Animal figurines, and a possible human form, are known from the German site of Vogelherd. These data are often taken as evidence of an Aurignacian symbolic system, though their actual meaning remains enigmatic. Perhaps stronger, yet no less enigmatic, evidence for an Aurignacian symbolic system comes from the site of Cueva Morin in Spain, where a complex burial ritual was documented. This site is unique because it contains four burials, of which Morin I is the best preserved, and instead of skeletal remains, natural casts of the bodies were found. Careful excavation of Morin I showed that the individual was buried on his back in an extended position. The body appeared to have been mutilated, with the head and feet completely removed. A quartzite blade was found undisturbed near the head, and a large animal was placed on top of the torso, while a smaller animal was placed over the legs. The burial pit was then filled and mounded with earth, sprinkled with red ochre (a natural mineral pigment) and set afire. It is postulated that these burial practices persisted for some time, because they were not disturbed by later occupations at Cueva Morin.

The Aurignacian culture began to diminish around 27,000 BP and eventually disappeared completely as local varieties were replaced by the Gravettian culture during the Middle Upper Paleolithic.

— *Phillip R. Hodge*

Further Readings

Blades, B. S. (1999). Aurignacian settlement patterns in the Vézère Valley. *Current Anthropology 40,* 712–719.

Blades, B. S. (2001). *Aurignacian lithic economy: Ecological perspectives from southwestern France.* New York: Kluwer Academic/Plenum.

Kozlowski, J. K., & Otte, M. (1999). The formation of the Aurignacian in Europe. *Journal of Anthropological Research, 56,* 513–534.

Phillips, P. (1980). *The prehistory of Europe.* Bloomington: Indiana University Press.

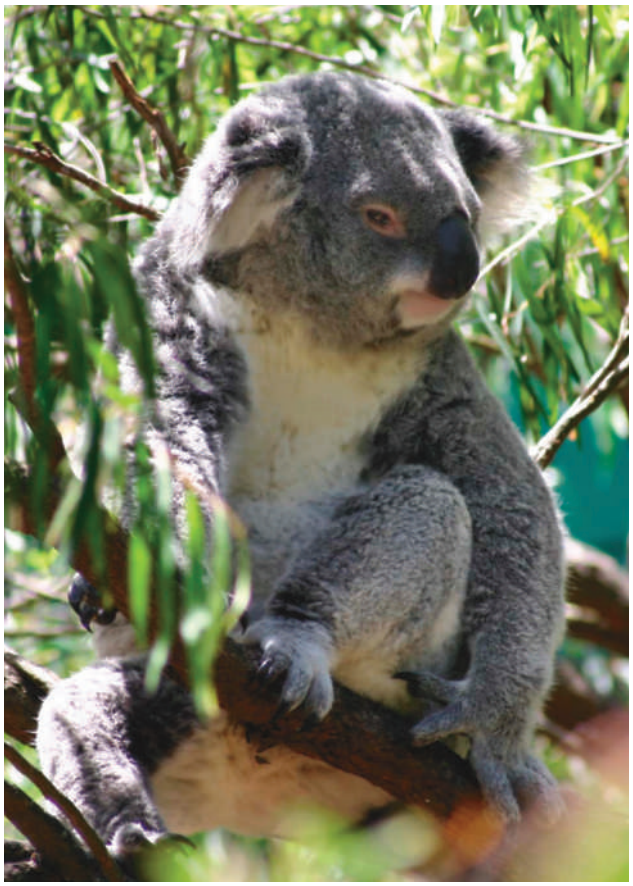
AUSTRALIA

The Commonwealth of Australia is a country, a continent, and an island. It lies completely in the southern hemisphere, southeast of the Asian landmass, between the Indian and Pacific Oceans. The name *Australia* is derived from the Latin *australis,* meaning "southern." As far back as the second century AD, legends hinted at the existence of an "unknown southern land" or *terra australis incognita.* While maps from the late 1400s show parts of the coastline, the land was not "officially" discovered by Europeans until the 17th century, when a series of expeditions were led by Dutch and Portuguese explorers.

Australia has been separated from other landmasses for millions of years. It is also the lowest, flattest, and aside from Antarctica, the driest of the continents. This long period of isolation combined with unusual terrain has enabled many unique geologic features, environments, plants, and animals to develop.

The Land

For millions of years, Australia was part of the supercontinent of Pangea. As the continent broke apart and began drifting on the surface of the planet, Australia was part of the southern segment of Gondwana. Since severing its last connections with Antarctica and the island of Tasmania in the mid-Cenozoic (about 35 million years ago), Australia has been drifting toward southeast Asia at the rate of about 2 inches per year. Geologically speaking, Australia's life span as a free-standing continent will be relatively brief.



Source: ©iStockphoto/Kim Meagher.

Australia has been free of volcanoes, earthquakes, and other mountain-building forces longer than any other continent. Wind and rain have been eroding the surface for about 100 million years, making Australia's dominant feature its flatness. The extreme state of erosion in Western Australia has exposed some of the Earth's oldest rocks, dating back 4.3 billion years.

Unique Geologic Features

Uluru, the world's largest single rock, is the most visited landmark in central Australia. *Uluru* is an Aboriginal word meaning "great pebble." It is the largest of a group of about 30 similar dome-shaped rocks rising from the desert floor. These rocks are the remains of a buried mountain range and are collectively known as the Olgas. The Aboriginal name of the Olga Rocks is *Kata Tjuta,* which means "many heads." Uluru's size and color attract visitors from around the world. As the sun travels across the sky, the rock changes from brilliant red to a deep blue color. The Olgas are sacred to the Aborigines. Rock art found in caves on Uluru is thousands of years old. Sacred areas of the rock are off limits to all visitors, and one must ask permission before climbing marked trails. Kata Tjuta lies within Uluru National Park, which the government returned to its Aboriginal owners, the Anangu people, in 1985. Uluru was formerly called "Ayers Rock," after Sir Henry Ayers, a former leader of South Australia, but the Aboriginal people prefer the original names for these sites be used.

The Great Barrier Reef is a 1,200-mile long coral reef running along the Queensland coast of northeast Australia. Coral is created from masses of small marine animals called polyps. As polyps die, they leave their skeletons behind, which form the mass of the reef. New polyps grow on the old, creating a rainbow of colors. The Great Barrier Reef is the largest structure created by living organisms in the world. Parts of it are millions of years old. The reef is home to hundreds of species of fish, mollusks, and other marine life.

Stromatolites are the oldest known fossils in the world, dating back more than 3 billion years. They are even more unusual in that the fossil form was found years before scientists found live specimens still developing. Stromatolites are formed by photosynthesizing cyannobacteria and other microbes that build "reefs" in the same way that coral grows. It is believed that cyannobacteria were most likely responsible for creating our oxygen atmosphere billions of years ago. These bacteria were the dominant life form on the planet for over 2 billion years. Today, they are almost extinct and live in very few locations around the world. One place living stromatolites can be found currently is in the Shark Bay World Heritage Area on Australia's west coast. The extreme salinity of the seawater, limited water circulation, warm temperatures, and presence of calcium carbonate create an environment ideal for the growth of stromatolites. Predators of the microbes cannot survive in this environment, because it has twice the salinity of regular seawater, so the cyannobacteria can grow unchecked.

The Climate

Australia is divided into three major zones. The Western Plateau covers almost two thirds of the continent and is mainly desert, with a few low mountains around the edge. The Central Lowlands are a monotonous, harsh area where most of the rivers and lakes are often dry. The Eastern Highlands is a narrow,

fertile strip of land along the Eastern Coast divided from the rest of the country by the Great Dividing Range. Most of Australia's population lives in this zone of good farming land, with a moderate climate and adequate rainfall.

Recent evidence suggests that the first settlers arriving in Australia 50,000 years ago set fires to clear the land for farming. These burning practices were widespread and could have triggered a cataclysmic change in the weather. The interior of Australia was much wetter 125,000 years ago. The last Ice Age changed the world's weather, but when the glaciers retreated 12,000 years ago, monsoons returned, except for the Australian monsoon. While the Australian monsoon currently brings about 40 inches of rain to the rain forests of the north coast, only about 13 inches of rain annually reach the interior. This suggests that those large fires in the past eliminated the plant population, which decreased the exchange of water vapor with the atmosphere and greatly reduced cloud formation in the interior, resulting in far less rainfall. Fossil evidence indicates that animals living in the interior used to graze on grasses, bushes, and trees that could not survive there under current conditions. The fossil record also displays large charcoal deposits that were most likely caused by widespread fires, also conveniently dated to the time those early settlers arrived.

The Flora

Australia has no large densely forested areas. Plant growth generally consists of grasslands, shrubs, or open forests. Many plants are drought resistant to survive in the harsh, hot climate. Trees tend to have deep taproots to reach water far below the surface. Plant leaves and stems are often light colored or shiny to reflect the sun's rays.

Vegetation in Australia is dominated by two groups of plants. Eucalypts (gum trees) and acacias (wattles) together have more than 1,000 species. Eucalyptus is an evergreen hardwood with tough, thick leaves that retain water. The tree is oily, which feeds wildfires. Lightning strikes frequently cause fires in such an arid environment. Acacias are economically valuable for their timber, their gum, and their edible seeds.

The Eastern Highlands have temperate and tropical rain forests. The temperate zones have seasonal fluctuations, and the tropical areas are always hot. The tropical rain forest areas are along the northern coast, close to the equator. The Central Lowlands and Western Plateau are desert or semidesert. The temperatures get extremely high during the day and cool very rapidly at night. Rainfall is almost nonexistent. The grasslands and savannas on the borders of the deserts are known as "the bush." The central and western portions together are known as the "outback," because they are "out back of" the Great Dividing Range.

Since European colonization, Australia has lost 70% of its native vegetation, 45% of its forest, and 75% of its rain forests. Loss of this native plant growth has resulted in the endangerment or extinction of dozens of animal species.

The Fauna

Australia is the home of many unique animals. Monotremes can only be found in Australia, and New Guinea to the immediate north. Monotremes are mammals that lay eggs but nurse their young with milk after hatching. The platypus and the echidna are currently the only monotremes in the world. The platypus is about 2 feet long, has dark brown fur, a bill like a duck, and webbed feet and a tail to help it swim. Plates on its bill help it crush worms, mollusks, crustaceans, and plants for food. They usually live near riverbanks in Eastern Australia. While they can move on land, they move awkwardly on their knuckles. The females lay eggs that hatch within 10 days and nurse their young for about 5 months. Echidnas are spiny anteaters. They have strong bodies with short legs and relatively large feet and claws. They dig up worms, ants, and termites to eat. The females also lay eggs that hatch within 10 days, but when the young hatch, they climb into their mother's pouch for 6 to 8 more weeks. They nurse during that time. The echidna life span is over 50 years. Humans are the only mammals that live longer.

Marsupials are the animals most commonly associated with Australia. A few species of marsupial can be found in South America, but most make their homes only in Australia and Tasmania. Marsupials are mammals that give birth to underdeveloped young, which must then climb into a pouch on the mother to continue growing. Kangaroos, wallabies (small kangaroos), koala bears, wombats, possums, and bandicoots are the best-recognized plant-eating marsupials. Some marsupials are carnivorous. The Tasmanian tiger, a small, fierce hunter, is now believed to be extinct. The

Tasmanian devil is an aggressive black badger-sized creature with a white stripe on its chest. It hunts small mammals and birds at night.

The dingo, considered the native dog of Australia, originated with dogs brought to the continent by traders 3000 to 4000 years ago and abandoned. Dingos were domesticated by Aboriginal people. They were used for hunting and guarding homes. Dingos do not bark, but communicate by howling.

Australia is home to over 700 species of bird. More than half of those are native. The largest birds, the emu and cassowary, are flightless. The emu is the second-largest bird in the world, after the African ostrich. One of the best-known Australian birds is the kookaburra. It is a member of the kingfisher family and has a distinctive loud cackling laugh.

Being an island nation, Australia has close contact with marine life. The Great Barrier Reef off the northeast coast is the largest coral reef in the world and is home to hundreds of exotic and colorful species. Australia is known for its sharks, especially Great Whites, but its coastal waters are also home to whales, giant sea turtles, dugongs (a type of seacow), and dolphins.

Reptiles can be found widely across Australia, including crocodiles, snakes, lizards, turtles, and tortoises. Australia has no alligators, but crocodiles are the largest living reptile in the country. They can be found only in the north. Saltwater crocodiles are the most dangerous to humans, while freshwater crocodiles are mostly harmless. There are about 110 species of snakes in Australia, and about half of them are venomous. The taipan and tiger snake are deadliest, but death adders, copperheads, and brown snakes can all be dangerous to humans. Goannas are lizards that can grow over 6 feet long and can be aggressive if disturbed. Australia is also home to some of the world's deadliest spiders. The funnel-web spider's bite can be fatal to humans, and these large, aggressive spiders will actually chase their prey (including humans) if disturbed.

The People

Native Australians are called Aborigines. *Aborigine* comes from the Latin *ab origine,* which means "from the beginning." Australian natives do not call themselves Aborigines. Europeans coined the name upon arriving on the continent and finding it inhabited. Aborigines refer to themselves by their tribal names.

There are two groups of indigenous people in Australia; Australian Aborigines and Torres Straight Islanders. The Torres Straight Islanders were seafarers who inhabited the small islands in the Torres Straight, which separates Australia from Papua New Guinea to the north. In recent decades, migration from the Torres Straight has been extensive, and most Torres Straight Islanders now live in Australia.

The first Australians appear to have traveled to the continent by raft or boat from Asia at least 40,000 years ago, during the last Ice Age. At that time, the sea level was much lower, leaving far narrower bands of water to cross. While the water was narrower, it was still too far across to see land. It has been speculated that smoke from large brush fires may have encouraged those first settlers to explore.

Nomadic tribes of hunters and gatherers roamed the continent freely, each group having its own language and customs. As the Ice Age ended, the ice melted, the seas rose, and Australia became isolated. The inland lakes dried up, the temperatures rose, and the deserts formed. As the land grew increasingly inhospitable over thousands of years, the Aboriginal people adapted and learned to thrive. They hunted and fished, and gathered fruits, nuts, roots, fungi, and insects. They grew skilled at finding water where there appeared to be none. They were also traders, with trade routes crossing the country. They traded ochre, which is a pigment for painting, boomerangs, shells, stones, tools, and more.

There are approximately 500 recorded tribes of Aborigines. They lived in clans, or family groups. Each clan also incorporated several species of animal, one of which was selected as the totem for that tribe. Each clan had a territory, which included a sacred location where their spirits would return after they die. These places were carefully protected so they wouldn't anger their ancestors. Myths and rituals played a strong role in Aboriginal culture. A rich oral history derives from the Dreaming, or Dreamtime. The Dreaming tells of the creation of the land and people, and stories told today still involve mythic creatures from the Dreaming. Aspects of the Dreamtime are depicted in art found on rock walls dating back thousands of years. The paintings are abstract, incorporating many codes and symbols understood by Aborigines to relate ancestral stories.

The British were the first Europeans to colonize Australia. In 1770, Captain James Cook claimed the land for Great Britain. The first settlement, Port

Jackson, was established in a promising harbor called Sydney Harbor, on the southeast coast. This settlement grew into the city of Sydney. From 1788 to 1852, England used Australia as a penal colony to free space in overcrowded British prisons. More than 160,000 men, women, and children were sent to New South Wales as convicts. After release, few prisoners returned to England. Most established themselves in Australia as farmers or tradesmen.

Australia, if thought about at all in the West, was portrayed as a wild land suitable only for convicts or adventurers. This attitude would change. On January 12, 1836, Charles Darwin sailed into Sydney Cove on the Beagle. He was concluding his 5-year study of natural history around the globe and developing his theories about natural selection and its evolutionary role. Darwin made brief forays into New South Wales, sailed on to the island of Tasmania, and concluded his visit on King George's Sound on the southwest shore. He sailed onward from Australia on March 14, 1836. Although he made a brief 2-month visit and remained on the southern coast, Darwin's work stimulated scholarly interest in Australia. To honor his work, the city of Palmerston on the "Top End" (the coast of the Northern Territory) was renamed "Darwin" in 1911.

The Future

As the British colonized Australia, they did not recognize Aboriginal ownership of the land. As Aborigines began to resist the settlers moving into their territory, colonists simply massacred native groups. Tribes were forced to live on reservations in the most hostile areas of the country or on religious missions.

In recent years, the Australian government has begun to acknowledge many decades of mistreatment. A department was established within the government to address Aboriginal affairs. Laws have been passed to return land to its original owners. Aboriginal art is now recognized and in demand worldwide. Painting, storytelling, and folk music are increasingly appreciated. Despite these gains, however, Aborigines are still the most disadvantaged citizens economically.

A history of egalitarianism has made an increasingly diverse population grow with a minimal amount of tension or conflict. Today, Australia is one of the most culturally diverse nations on the planet. Trade and tourism have been a boon to the economy. Australia is a vibrant young nation that has adapted well to rapid change. The country's greatest challenge, perhaps, will be to meet the demands of the future without losing the traditions that built the nation.

— *Jill M. Church*

See also **Aborigines; Australian Aborigines; Darwin, Charles**

Further Readings

Cosgrove, P. (2001). *Australia: The complete encyclopedia.* Buffalo, NY: Firefly Books.

Cowan, J. G. (1997). *Elements of the Aborigine tradition.* London: Thorsons/Element.

Davison, G., Hirst, J., & MacIntyre, S. (2001). *The Oxford companion to Australian history.* Oxford: Oxford University Press.

Flannery, T. (2002). *The future eaters: An ecological history of the Australian lands and people.* Berkeley, CA: Grove Press.

Menkhorst, P., & Knight, F. (2001). *A field guide to the mammals of Australia.* Oxford: Oxford University Press.

Mulvaney, J., & Kamminga, J. (1999). *Prehistory of Australia.* Washington DC: Smithsonian Books.

Smitz, P., Bain, C., & Bedford, N. (2004). *Australia.* Oakland, CA: Lonely Planet.

AUSTRALIA

In 1993, Australian anthropologist Julie Marcus edited a slim volume of essays on Australian women anthropologists. The essays were derived from papers presented at two conferences on women's issues. The first conference, "When the Voice of the Turtle Shall Be Heard in the Land," took place in Glenelg, Adelaide, in 1990. The second meeting occurred as a workshop at the 1991 session of the Academy of the Humanities. Marcus and the other women who contributed to the volume highlighted the contributions of pioneer Australian anthropologists such as Isobel White, Catherine Berndt, Mary Ellen Murray-Prior, Daisy Bates, and Olive Pink. These women had enormous impact on contemporary female Australian anthropologists.

Australian feminist anthropologists maintain that males have continued to dominate the field of anthropology in large part because of the settler mentality in which Australia was founded. They believe that in the past, women anthropologists often worked without identifying themselves as feminists in order to bypass the prejudices against women academicians. Nevertheless, these women continued to study the anthropology of Australian women, and many of those studies, such as those conducted by Olive Pink and Phyllis Kaberry, have centered on the lives and issues of Aboriginal women who continue to face an entrenched dichotomy of racism and sexism.

The issue of domestic violence among Aboriginal women has been receiving increasing attention in Australia since the 1990s, because it has reached what some consider to be epidemic proportions. Aboriginal women, to a much greater degree than other Australian females, have been marginalized by the colonial traits that linger in Australian culture. High rates of domestic violence are due in part to the Aboriginal practice of men flogging their wives with hammers, knives, sticks, stones, or pickets. This practice frequently leads to murder, rape, incest, and severe physical and mental injuries. As members of a minority population, Aboriginal women often lack the resources to combat violence without outside intervention. However, most scholars feel that the subject of Aboriginal domestic violence has been cloaked in a veil of secrecy because the victims have no desire to expose themselves to community scrutiny. Nor do they wish to face the possibility of being stereotyped by white Australians. While anthropologists Diane Bell and Katherine Burbank have noted that Aboriginal women may sometimes initiate violence, particularly verbal abuse, males instigate most of the violence in Aboriginal communities. Such violence may be a result of the alcoholism rampant in many Aborigine communities, or it may simply be the result of an Aboriginal male exercising what he perceives as his natural right to dominate Aboriginal women. One 1995 study estimated that as many as 46.9% of all Aboriginal women are attacked at some point in their lives compared with 11.4% of the white female population who will be attacked.

In response to a request for information on the status of women in Australia regarding the implementation of the 1995 Beijing Platform for Action, the Australian government stated in 2000 that it had classified domestic violence as an issue worthy of "national importance." In conjunction with governments in Australian states and territories, as well as with businesses and local communities, the Australian government pledged $50 million from 2001 to 2005 to support its Partnerships Against Domestic Violence initiative, which included more than 230 separate projects. One of those initiatives included the Australian Domestic Violence Clearinghouse, which was designed to integrate scholarly work on domestic violence with government policies.

— Elizabeth Purdy

Australian Aborigines

The societies and cultures of Australian Aborigines have captured the interest of anthropologists for a variety of reasons. In the evolutionist anthropology of the 19th century, they were thought to represent survivals of "Stone Age man." For the French sociologist Émile Durkheim, their religions represented the "earliest" and most pure type of religion. By the beginning of the 20th century, with the demise of evolutionist anthropology, anthropologists became interested in Aboriginal cultures and societies for their intrinsic qualities and in some cases out of a concern for social justice.

A series of ethnographic studies appeared from the late 19th century and through the 20th century, resulting from research among communities living on missions and government stations or on the fringes of country towns such as Alice Springs but largely treating their ways of life as pristine systems. From the mid-20th century, a number of ethnographies dealt with Aboriginal communities living on the fringes of country towns and within larger towns and cities. Anthropological interests shifted in the late 20th century toward studies of the relationships between Aboriginal people and the missions, their position in Australian society, and the history of that relationship.

Prehistory

Archaeologists date the first arrival of modern humans into Australia and New Guinea at about 50,000 years ago. Until the British colonization of Australia, which began in 1788, Australia and its peoples remained relatively isolated. The Australian landmass was periodically joined to the islands of New Guinea at times of low sea level to form the continent of Sahul. Following the end of the last such glacial period about 12,000 years ago, rising sea levels separated Australia from New Guinea, and Tasmania (and other smaller islands) from the mainland. Nevertheless, social intercourse continued, at least sporadically, across the Torres Strait, and in recent centuries, Macassan visitors voyaged on the summer monsoon winds from what is now Sulawesi, to the north coast of Australia, to gather bêche-de-mer. Despite these northerly contacts, Aboriginal people across the continent retained a hunting, gathering, and fishing mode of subsistence across the continent, although it can be argued that they practiced a form of "cultivation" through various kinds of interventions in the reproduction of food species, particularly through the use of fire to burn off the understory. Aborigines developed complex cosmologies, rituals, and forms of kinship and social organization and were linguistically very diverse; and their forms of society and culture were also quite diverse.

Population

The first systematic attempt at estimating the precolonial population was that of A. R. Radcliffe-Brown, who arrived at a minimum population of 300,000. This estimate has recently been revised upwards on the grounds that the early estimates neglected the effects of smallpox, which ravaged the populations of many areas ahead of the British frontier. Archaeologists now consider a figure between 500,000 and a million to be plausible. Population densities probably ranged from about one person per 200 sq km in the arid zone to perhaps one person per 2 to 3 sq km on coasts with rich marine and terrestrial resources, and along the lower Murray River.

Ecology

In the 1920s and 1930s, Norman Tindale and Donald Thomson carried out pioneering studies of Aboriginal relations to the environment. The systematic study of relationships between Aboriginal communities, territories, and resources in remote regions did not begin until the late 1950s, however, fostered by developments in cultural ecology and by archaeological interest in ethnography. The best of the later research took place in the Western Desert and northeast Arnhem Land, for example, in the research of Richard Gould and Nicolas Peterson.

Overall, Australia is the most arid of continents, but Australian environments are nonetheless very varied, from the monsoon climate of the tropical north, through the low and unreliable rainfall of the arid zones with their sandy and stony deserts, to the temperate climate of the southeast with its year-round rainfall; and vegetation varied from the rain forests of the east and north coasts to the deserts of the arid zone.

The richer resources on some of the coasts and the major Murray-Darling River system enabled some Aboriginal peoples to live a relatively sedentary life. Conditions elsewhere, however, required higher degrees of mobility. But people everywhere, even the least mobile, combined living in a home base with "logistical mobility"; that is, people made food-collecting and hunting forays out from the home base, usually traveling no further than could be accommodated within a day. People moved home base a few times a year on the rich coasts of eastern Cape York Peninsula, but (in a study by Richard Gould) nine times in 3 months in the Western Desert, where the search for water in particular dictated movement. The size of the foraging range was in the vicinity of 30 to 100 sq km in northeast Arnhem Land and 3,000 sq km in the Western Desert.

The average size of the home base varied from about 20 to 50 people in the tropical north but about half this range in the Western Desert. People came together in larger numbers from time to time, around seasonally rich resources or permanent water sources, using the opportunity to conduct major ceremonies such as male initiation. Movement in some regions exhibited a markedly seasonal pattern. In the tropical north, for example, people were very mobile in the dry season but constrained by summer rains to remain in larger camps on high ground.

Technologies

Some of the very early amateur ethnographers, such as K. Langloh Parker, exhibited a keen interest in

Source: ©Royalty-free/CORBIS.

Aboriginal technologies, a concern that became pushed into the background with the development of structural functional anthropology. The basic technology was similar everywhere, with men using spears (and harpoons on the coast), throwing sticks, and using facilities including fish traps, while women deployed the hardwood digging stick and various kinds of containers. The use of larger facilities such as nets and fish traps varied greatly according to region, as did the use of watercraft. Fire was the main instrument for converting the physical properties of raw materials and foods, and the main motive power remained human muscle power, except for limited use of wind power for watercraft in Arnhem Land in recent centuries. Some notable regional variants included the use of a wide variety of fish traps in Arnhem Land, the extensive use of nets in the grassland and woodland of New South Wales, and the double-layered raft of the west Kimberley coast.

Organization of Production

Anthropologists did not theorize Aboriginal "economy" adequately until the 1980s, with the work of scholars such as Jon Altman. The ethnographic record is therefore patchy. The organization of production appears to have been similar in all regions. There was a marked division of labor along gender lines, with women usually hunting small game, gathering vegetable foods, and in some regions fishing. Men hunted larger game, including marine mammals and reptiles on the coast, and fished. In all regions, the size of work teams varied from working solo, through small single- and mixed-gender teams (two-five people) and larger teams of mixed or single gender (six or more people). The organization of work varied with the task, from working in parallel to a simple division of labor around one or more items of equipment. Cooperative teams drew both on single-hearth groups and across several-hearth groups of the home base residence group ("band"). Men were probably the more mobile, especially where watercraft were involved.

Identities

In the classical models of Aboriginal social organization synthesized by A. R. Radcliffe-Brown, Aborigines were organized into "tribes," "hordes," "clans," and family groups. Research conducted from the 1970s has changed anthropological views and led to the reinterpretation of early ethnography. What were regarded as endogamous tribes are predominantly language identities. Commonly, people related named languages to specific areas of land (and waters), though not always with clear boundaries, so that a person belonged both to a language and its territory, even if he or she did not speak the language. Some individuals had dual- or multiple-language identities (one from each parent). Language varieties in the Western Desert had a context-dependent, "shifting" character, while in some areas, such as Gippsland, regional identities dominated, so that people identified as "northerners," "people of the sandy islands," and so on.

According to the classic models, "tribes" were everywhere divided into patrilineal "clans." Again, recent research has shown Aboriginal social organization to have been more diverse than this model suggests. In the Western Desert, groups of mixed composition owned clusters of totemic ancestral sites (most commonly waterholes) and adjacent areas, on

the basis of place of birth, place of conception, place of male initiation, depth of knowledge, and other grounds, so that membership of these groups overlapped considerably. Place of birth seems to have been the main basis of attachment to country in north central New South Wales, but in many regions, patrifilial groups were the dominant form of landholding groups. Individuals enjoyed a variety of complementary connections and associated rights, for example, in a person's mother's country, spouse's country, through adoption, links to a grandparent's country, and so on. These connections formed the basis for preferences about where to reside, hunt, and gather. Residence groups formed around a variety of attachments to areas of land and waters defined by totemic ancestral sites, but with a bias toward patrifilial ties in regions where land was held by patrilineal groups.

Religion and Cosmology

Early studies such as those of K. Langloh Parker and W. E. H. Howitt wrote of Aboriginal ceremonies, myths, and magic but did not classify doctrines and practices as "religion." The concept of "totemism" played a central role in syntheses such as those of Sir James Frazer. Durkheim, however, saw Aboriginal doctrines and practices as those of a primal "religion," and that view was taken up in the writings of W. E. H. Stanner. More recently, the concept of "Dreamtime" or "the Dreaming" has become a popular way of representing Aboriginal cosmology, ritual, and ancestral "law."

Myths about totemic ancestors who took the identities and some of the characteristics of natural phenomena and species appear in all regions. Mythologies speak of a creative period in which totemic ancestors traveled and left their substance, powers, and traces of their activities in land and waters. Some regions, such as the Western Desert and the Kimberley, emphasize long, cross-cutting journeys across the land. Others, notably the southeast, give some emphasis to the sky, the final domain of a single ancestral figure, pair, or family. Many localities related to the "sky-being" as well as having local totemic identities. In some regions, such as eastern Cape York Peninsula, ancestral journeys are minimal, and localities are highly differentiated by their totemic associations.

Ceremonies reenact ancestral events, and participants identify with totemic ancestors through body decoration, song, and mimetic dances. But people draw on this basic pattern to achieve many social ends; ceremonies include female puberty rites, male initiation, the revelation of secret objects and dances, exchange, mortuary rites, and dispute settlement.

Many approaches to Aboriginal religions neglect their "magical" instrumental aspect. In many regions, men combined the role of magician, sorcery, rainmaker, and healer. These "clever men" were also leaders of totemic ancestral ceremonies. Furthermore, in many regions, including the Western Desert, eastern Cape York Peninsula and the Kimberley, totemic ancestral sites were places where the enactment of rituals was believed to ensure the supply of rain, plant and animal resources, and human fertility. In some regions, people believed that ancestral powers could be drawn on to harm one's enemies, as with sorcery practices, and people of a number of regions enacted rituals associated with so-called love magic.

Kinship and Marriage

The analysis of the structure of Aboriginal systems of kinship and marriage became something of a minor industry in structural functionalist and structuralist anthropology, where kinship was taken to be more or less synonymous with social structure. Their elaboration is due to their relationship in a variety of ways with marriage bestowal, moiety, semimoiety, section and subsection systems, and patrigroup and matrigroup membership. Potential spouses are defined in terms of kin relatedness, usually some kind of cross-cousin. As Claude Lévi-Strauss has shown, modes of kin classification reflect patterns of exchange relations and marriage networks. And as a number of scholars have demonstrated, marriage occupied a central place in Aboriginal political economy and was related to varying levels of polygyny.

Exchange

Claude Lévi-Strauss represented Aboriginal marriage systems as systems of exchange of rights in women. However, marriage in which people exchanged rights in a person as a spouse for goods and services formed part of wider networks of distribution and exchange of goods and services. Broad patterns of distribution appear to have been similar across Australia, with women's product (small game, vegetable foods, and so on) being distributed primarily within their own hearth group and men's product (including larger

game) being distributed more widely within a residence group, partly according to customary obligations, such as to one's wife's parents. Wider networks of exchange, so-called trade, were composed partly of chains of hand-to-hand exchanges, partly of barter at certain locations and partly of long-distance travel to acquire goods (such as *pituri,* native tobacco). Some exchange items such as pearl shell travelled vast distances from their places of origin. The form of marriage networks and exchange networks varied from the asymmetrical chains of the western Kimberly *wurnan* system to diffuse networks of dispersed affinal alliance.

Governance

Unlike Africa, where British colonial administration involved indirect rule, fostering anthropological research on indigenous politics and law, the anthropology of these subjects in Australia remained relatively undeveloped, with some exceptions such as the research of Nancy Williams. Debates centered around the nature of authority and the existence or otherwise of "chiefs" and "councils" of elders. The neo-Marxist analyses of the late 1970s extended the focus to gender relations.

Relations of power and authority were shaped along age and gender lines, and there were no chiefly offices or specialized governmental institutions. "Ancestral law" was framed through more or less shared doctrines about totemic ancestors, enacted in regional ceremonies, and male initiation and revelatory rites worked in part as formal modes of socialization. Networks of kin enforced norms and took redressive action through a pattern of what Ronald Berndt called "self-help." Within these similarities, resources of power and the degree of inequality varied from region to region.

Aborigines and Australian Society

Anthropologists such as the Berndts, Marie Reay, and Jeremy Beckett made studies of Aboriginal communities in southern towns and cities in the mid-20th century. From the early 1980s, younger scholars began to move toward studies of the relationship between Aborigines and the missions, the history of Aboriginal relations to the state, the economy of Aboriginal townships, race relations, and the social life of Aboriginal people of mixed descent living in or on the fringes of southern towns and cities.

Following the initial penal settlements, colonization proceeded rapidly in the southeast and southwest of the continent from the early 1800s, spurred by the gold rushes. This process had devastating effects on Aboriginal populations as the result of violence and introduced diseases. The frontier moved across the northern and central parts of the continent rather later, as farming spread north along the east coast and the pastoral frontier moved north and west. Only in the remote north and in parts of the arid zone less suited to cattle did Aboriginal communities escape large-scale disruption and destruction. In most parts of the continent, Aboriginal people were moved onto missions and government stations under protectionist policies. By the 1930s, the enumerated Aboriginal population was reduced to some 60,000.

The result of the varied history of colonization and of the varying forms of agriculture, mining, industry, and urban development was that Aboriginal people came to live in a wide variety of relations with non-Aboriginal communities. Some Aboriginal communities had formed on missions and government stations in remote regions. Aboriginal people who became the labor force for the pastoral industry were able to maintain their relations to land, their social organization, and their religious life to a considerable extent. In some regions, Aboriginal groups attached themselves to small-scale producers such as miners and buffalo hunters. In the southeast, Aboriginal people of mixed descent, after being ejected from the missions, formed a mobile labor force, working as pickers in the farms and orchards. After the mechanization of farm production and the introduction of award wages, levels of employment fell, and Aboriginal people migrated in increasing numbers to towns and cities.

By the early 1970s, race-based legislation such as the protectionist policies of the late 19th and early 20th centuries and the assimilationist policies of mid-century had largely ended. Aboriginal people were accorded both the rights of non-Aboriginal citizens, such as the right to vote and access to mainstream welfare provisions and special rights. The Whitlam Labor government (1972–1975) ushered in a federal policy of "self-determination" and introduced the Aboriginal Land Rights (Northern Territory) Bill, enacted by the government of Malcolm Fraser. Some states followed with various forms of land rights legislation. In 1992, the finding of the High Court in the Mabo case overturned the legal doctrine of *terra nullius* and opened the way for Aboriginal communities

to make native title claims to vacant Crown land and some pastoral leases. The formation of the Aboriginal and Torres Strait Islander Commission transformed the administration of indigenous affairs, with the establishment of a separate arm of government and a structure of local representatives, regional councils, and the commission. The scope of the commission's powers were limited, however, and the commission was dismantled by the conservative government of Prime Minister John Howard. The reelection of this government in 2004 promises a further transformation of the administration of indigenous affairs, rolling back special rights and access to welfare provision and increasing incentives to engage in mainstream economic activities. Aboriginal people continue, however, to suffer from poverty, be overrepresented in prisons, and have lower life expectancy than the non-Aboriginal population of Australia.

— *Ian Keen*

See also **Aborigines; Australia; Durkheim, Émile; Radcliffe-Brown, A. R.; Totemism**

Further Readings

Broome, R. (2002). *Aboriginal Australians: Black responses to white dominance, 1788–2001.* St. Leonards, Australia: Allen & Unwin.

Cowlishaw, G. (2004). *Blackfellas, whitefellas, and the hidden injuries of race.* Malden, MA: Blackwell.

Keen, I. (2004). *Aboriginal economy and society: Australia at the threshold of colonisation.* Melbourne, NY: Oxford University Press.

Mulvaney, J., & Johann, K. (1999). *Prehistory of Australia.* St. Leonards, Australia: Allen & Unwin.

Rose, D. B. (1992). *Dingo makes us human: Life and land in an aboriginal Australian culture.* Cambridge, Melbourne: Cambridge University Press.

AUSTRALOPITHECINES

Australopithecine is the informal adjective designating members of the taxonomic subfamily Australopithecinae, which with the Homininae constitute the family Hominidae. The Hominidae are humans, human ancestors and collateral species after the lineage branched from that leading to chimpanzees. Recently, paleontologists, influenced by evidence from genetics that apes and humans are more closely related than traditional taxonomy reflected, have pulled African apes into the Hominidae, with repercussions right down the taxonomic scale. Under the new scheme, gorillas are in the subfamily Gorillinae and chimpanzees and humans are in the Homininae. The Homininae is divided into two tribes, the Panini for chimpanzees and Hominini for our own lineage. Our tribe, the Hominini, is divided into two subtribes, the Australopithecina (less formally "australopiths") and the Hominina, which contains only the genus *Homo.*

Except for specialists, the new taxonomy hardly affects the australopithecines. There is but a single difference: "australopithecines" are now referred to as "australopiths." The old and new schemes are given in the table. Taxa in bold are discussed in this entry.

Australopiths as a group differ from chimpanzees and other apes in possessing more robust, less protruding (i.e., more orthognathic) faces. Australopith mandibles lack a "simian shelf" (a ridge of bone behind the chin that joins the two sides of the jaw) and are more robust. Australopiths have a shallower supratoral sulcus (groove behind the browridge) and a more caudally oriented nuchal plane (that is, the attachment of the neck muscles faces downward, reflecting a vertical spine). Australopith incisors are slightly smaller to much smaller than chimpanzees, molars and premolars are larger, dental enamel thicker to much thicker, and canine less projecting though still roughly triangular. Whereas ape lower first premolars have a sloping face that sharpens the back of the upper canine when the individual closes its mouth, australopith first premolars start out a little more molarlike in early species and have lost all evidence of this honing shape by 2.5 million years ago (Ma). Australopith canines typically wear from the tip, rather than along a knife-like rear edge, as in apes. The robusticity of the skull is thought by many to reflect an adaptation to chewing more fibrous foods. Fruits in open habitats are less succulent and more fibrous than the fruits chimpanzees eat, and australopiths likely also included fibrous underground storage organs in their diet.

Australopith skulls differ from those of *Homo* in having cranial capacities of less than 700 cc and usually < 600 cc. Australopiths have more prognathic (protruding) faces. All australopiths lack a true external

Traditional and Revised Ape and Human Taxonomy

Traditional Taxonomy

- Superfamily Hominoidea (apes and humans; informally "hominoids")
  - Family Hylobatidae
    - Genus *Hylobates*
  - Family Pongidae (great apes; informally "pongids")
    - Genus *Pongo*
    - Genus *Gorilla*
    - Genus *Pan*
  - Family Hominidae (humans and relatives; informally "hominids")
- Subfamily Australopithecinae (informally "australopithecines")
  - *Sahelanthropus, Orrorin, Ardipithecus,* and *Australopithecus* (see below)
  - Subfamily Homininae (informally "hominines," but rarely used)
  - Members of the genus *Homo* (more detail below)

Revised taxonomy

- Superfamily Hominoidea (apes and humans; informally "hominoids")
  - Family Hylobatidae
- Genus *Hylobates*
  - Family Hominidae (great apes and humans; informally "hominids")
    - Subfamily Ponginae
      - *Pongo pygmaeus* (orangutan)
    - Subfamily Gorillinae
      - *Gorilla gorilla* (gorilla)
    - Subfamily Homininae (chimpanzees and humans, "hominines")
      - Tribe Panini (chimpanzees and bonobos; informally "panins")
        - *Pan paniscus*
        - *Pan troglodytes*
      - Tribe Hominini (hominids in the old scheme; informally "hominins")
        - Subtribe Australopithecina (informally "australopiths")

Genus and Species	*Dates*
Sahelanthropus tschadensis	(6.5 Ma [6–7 Ma])
Orrorin tugenensis	(~6 Ma)
Ardipithecus kadabba	(5.8–5.2 Ma)
Ardipithecus ramidus	(4.4–4.2 Ma)
Australopithecus anamensis	(4.2–3.9 Ma)
Australopithecus afarensis	(3.6–2.9 Ma)
synonym: Kenyanthropus platyops	
synonym: Australopithecus bahrelghazali	
Australopithecus aethiopicus	(2.3–2.7 Ma)
Australopithecus boisei	(1.4–2.3 Ma)
Australopithecus africanus	(2.5 Ma [2–3 Ma])
Australopithecus garhi	(~2.5 Ma)
Australopithecus robustus	(~1.9–1.5 Ma)
Australopithecus "habilis"	(1.9–1.4 Ma)

- Subtribe Hominina (informally "homins")
  - *Homo habilis* (OH 7 and ER 1470 e.g.)
  - *Homo erectus* (including "ergaster" and "antecessor")
  - *Homo sapiens* (including "heidelbergensis" and "neanderthalensis")

nose, but rather they quite resemble chimpanzees in this feature. Aside from cranial capacity, the skulls of earliest *Homo, Homo habilis,* as exemplified by ER 1470 and OH 7, are quite like those of South African australopiths.

Postcranially, australopiths differ from chimpanzees and vary in the direction of modern humans in having a large calcaneus (heel bone), a robust tibial platform, a valgus femur, a quite humanlike pelvis, a long lower back, short fingers, and longer, more powerful thumbs.

Postcranially, australopiths differ from *Homo* and vary in the direction of chimpanzees in possessing body weights of 25–60 kg, with males at the high end, females at the low. That is, australopiths were sexually dimorphic, with females somewhere between one half and three quarters of male body weight, versus 85% in humans. The long bones of australopiths were more robust, that is, they have thicker walls than those of chimpanzees, which are in turn more robust than humans. Australopiths had long curved toes, some gripping capacity of the big toe (perhaps with the exception of *A. robustus*), the absence of the a ball of the foot (swelling at the base of the big toe), a robust peroneal groove of the fibula (suggesting a gripping great toe), short legs, small femoral heads, small knee joints surface that are particularly small from front to back, long arms with particularly long forearms, a robust lateral epicondylar crest on the humerus (suggesting powerful elbow flexing), topographically distinct elbows suggesting greater stability, curved robust fingers with concavities on the inner surface to accommodate large tendons to flex the fingers, scapula or shoulder blade with tilted-up joint surfaces, large joint surfaces above the waist and small joint surfaces below the waist, cone-shaped rib cages, ribs that are round in profile, and small vertebrae. These features suggest that australopiths were bipedal when walking on the ground but bore weight with their arms more often during their daily routine than do modern humans, presumably in trees. Australopith knee joints are less stable and have greater flexibility than modern human knees. Human knee joints are designed more for stability than mobility; to accomplish this they are shaped so that the joint surfaces of the femur and tibia conform closely. The round surface of the femoral joint surface has a concave or cup-shaped complement on the tibia. The knee of *A. afarensis* is more apelike, with the tibial joint flat or even convex, so that it conforms less closely to the round femoral joint surface, allowing more mobility.

A number of australopith features are neither chimpanzeelike nor humanlike. All the specimens we possess show evidence of having six lumbar vertebrae, versus five in humans and four in great apes. The base of the great toe, far back in the foot, is unique. In humans, this joint is flat, making the big toe a relatively rigid strut. In chimpanzees, the joint is a modified ball-and-socket joint that allows mobility in all planes—the great toe joint has the mobility of the human thumb. In *A. afarensis* the joint has a hingelike function, allowing the toe to swing side to side so as to allow the gripping of moderate-sized objects. As with a hinge, it is rigid in all other planes so that the great toe was as stiff in toe-off as that of humans. The pelvis, while human-shaped, is extraordinarily broad, with a birth canal that is quite wide from side to side, not only broader than necessary to give birth but far broader than that. The femoral necks are longer than those of humans or chimpanzees and more highly angled. The femur is valgus; that is, the femora angle inward, giving australopiths a distinct knock-kneed appearance, whereas ape femora have no such angle, yielding a rather bowlegged appearance. The australopith femur is not just valgus, it is even more valgus than that of humans, a hyperhuman condition.

The wide pelvis and short femur have been interpreted by Kevin Hunt as having evolved to lower the center of gravity, thereby increasing balance on unstable substrates. The wide pelvis allows internal organs to ride lower in the body cavity, and short legs lower the center of mass still more. With short femora and long femoral necks, the knees must angle in more to reach the center of the body. Owen Lovejoy suggested that long femoral necks increase the mechanical advantage of muscles that stabilize the pelvis. These long necks are needed because the wide and unwieldy pelvis of australopiths requires more force to stabilize, and long femoral necks give hip musculature better leverage. The smaller angle of the femoral neck and the more valgus femur are insignificant consequences of short legs. Imagine the letter *Z* as a rather tall character. The upper horizontal represents the femoral neck, the lower the knee. If the *Z* is shorter, as the femur is in australopiths, the angle the top horizontal makes with the descending line is tighter, and the descending line makes a greater angle with the lower horizontal. The *Z* is more valgus.

All australopith features considered together suggest a small robust-jawed, bipedal ape with considerable arboreal competence. Curved robust fingers function to reduce stress on the fingers during arm hanging, and inferred large flexor tendons are required to grip branches during arm hanging. Short fingers are an adaptation to foraging among small branches. Wide hips and short legs make balancing in trees easier. Tilted-up shoulder joints give chimpanzees and australopiths a cranial set to the shoulder, meaning that they are more comfortable with their arms above their heads than at their sides, stressing the shoulder joint less during arm hanging. Cone-shaped torsos evenly distribute stress on the rib cage during arm hanging. Long, curved lateral toes are used for gripping branches while collecting fruits in trees bipedally. A large calcaneus, dual-function great toe, valgus femur, humanlike hips, and long femoral necks suggest considerable terrestrial bipedal competence. Their adaptation was likely that of eating fruits in trees, supplemented with leaves and blossoms, and falling back on underground storage organs (like carrots or potatoes) during times of fruit scarcity. Given their small size and inferred arboreal competence, they likely slept in trees.

While these traits are rather consistent right through the lineage, each species has its peculiar adaptations.

Sahelanthropus Tschadensis (6.5 Ma [6–7 Ma])

Sahelanthropus is represented by a well-preserved skull and fragments from at least six individuals. Not surprisingly, this earliest (purported) hominin has the smallest australopith cranial capacity, 350 cc. The brow ridge is similar in shape to that of later australopiths in lacking a chimpanzeelike depression or groove behind the browridge, but the brow is unusually thick. The zygomatics or cheek bones of *Sahelanthropus* recede from the face so that the center of the face is more prominent than the sides. Most other australopiths have laterally prominent zygomatics; in the more robust species, as one traces the zygomatics from the nasal opening toward the side of the face, they project ever farther forward, leaving the nose as the most depressed area on the face and the outer margins of the zygomatics the most prominent. *Sahelanthropus* lacks this dish-shaped face and has more receding but still robust zygomatics. The face is less prognathic than chimpanzees or later australopiths, more like that of later australopithlike habilines such as ER 1813. Molars are smaller and tooth enamel thinner than in *A. afarensis* and later australopiths, intermediate between them and chimpanzees. The foramen magnum, the opening for the spinal cord, is placed forward, and the neck muscles were oriented downward, both evidence of bipedality. Though more apelike than later australopiths, unlike apes the canines wear at the tip, have only minor honing morphology on the lower premolar, and lack a space between the canine and premolar. Some canines have shoulders or basal tubercles, resembling the later *A. anamensis.*

Orrorin Tugenensis (~6 Ma)

There is no braincase or face for this species. There are, however, teeth from both the upper and lower jaws and fragments of mandible. As with *Sahelanthropus,* the cheek teeth are smaller than later australopiths. Dental enamel is thicker than that in either *Sahelanthropus* or the later *Ardipithecus.* A humerus is unremarkable and like other australopiths. A finger bone is curved, or typical for an australopith. Most remarkable is the femur, for which there are two specimens, one rather complete. The femoral head is small and the femoral neck long compared to humans, but both are more humanlike than they are in *A. afarensis.* The angle of the femoral neck is great, though this trait is ambiguous since it is shared by humans and chimpanzees. This upward orientation reduces the effective femoral neck length. Long femoral necks offset the stresses of a very wide pelvis, and low shaft-neck angles in most australopiths are interpreted as related to more valgus femora, which is in turn a consequence of short legs. Chimpanzees have short legs, but because they do not walk upright, they have neither the valgus femur, the tight angle of the neck, nor the long femoral neck of australopiths. The morphology of *Orrorin* therefore suggests that if it is a biped, its pelvis is narrow, its legs are long, or both. Although other features are humanlike, interpretation is complicated by short femoral necks and upward-angled necks in chimpanzees. Although unlikely, it is possible *Orrorin* is not a biped.

Ardipithecus Kadabba (5.2–5.8 Ma)

The species is defined by fragments of a mandible, clavicle, ulna, and humerus. All are quite similar to earlier and later hominins. A complete toe bone and fragments of hand phalanges are curved, robust, and indistinguishable from other australopiths. Loose teeth include incisors, canines, premolars, and molars.

Canines differ in some minor details from other early hominins and retain some elements of a canine/P3 honing complex that sharpens the back side of ape upper canines. This feature is variable in early hominins, leaving the *A. kadabba* similar to other species. The cheek teeth are the size of other early hominins, if not slightly larger. The cheek teeth have slightly thicker enamel than *Sahelanthropus, Orrorin,* and the later *A. ramidus.*

Ardipithecus Ramidus (4.2–4.4 Ma)

The cheek teeth of *A. ramidus* are small—as are other early australopiths—but are largely within the range of the later *A. afarensis.* The enamel is intermediate between chimpanzees and *A. afarensis.* The canines are similar to *A. afarensis* but slightly more chimpanzeelike. Postcrania have not yet been described, but are said to differ in significant ways from *A. afarensis.* Perhaps they resemble *Orrorin.*

Australopithecus Anamensis (3.9–4.2 Ma)

This species has many more specimens than earlier australopiths. The canines, though within the range of *A. afarensis,* can be placed between *Ardipithecus* and *A. afarensis* in a graded series from slightly chimpanzeelike to less chimpanzeelike. As in *Sahelanthropus,* some canines have shoulders or basal tubercles that are uncommon in *A. afarensis.* The mandible is quite robust, but the left and right cheek teeth rows are parallel to one another, as is the case in chimpanzees, whereas *A. afarensis* has slightly divergent tooth rows. In profile the chin is straighter and more receding than that of *A. afarensis* or the earlier *Sahelanthropus.* Cheek teeth are the size of *A. afarensis,* but the deciduous molars and premolars are distinctly smaller and more apelike. That is, adults are like later species, juveniles like earlier species. Specimens discovered earlier had more vertically implanted upper canines than *A. afarensis,* but later finds differ less. This species has a smaller and therefore more apelike ear opening than later hominins, though this feature likely varies more than appreciated at first. The postcranial skeletal elements are indistinguishable from *A. afarensis.*

Australopithecus Afarensis (2.9–3.6 Ma)

A. afarensis is the exemplar of early hominins, as described above. Its zygomatics protrude forward laterally more than *Sahelanthropus* but less than the later *A. africanus.* Cranial capacity is near 400 cc, the slightest of increases from 350 cc in *Sahelanthropus.* Canines and first lower premolars are more apelike characters than later australopiths, but the trait varies, with some individuals apelike, and others not at all. Incisors are smaller and cheek teeth larger than early australopiths. Enamel is thick. This species alone of the early hominins discussed so far gives us information on rib cage shape, base of great toe morphology, pelvic shape, arm-to-leg-length comparisons, calcaneus (heel) shape, scapula shape, and sexual dimorphism.

Australopithecus Aethiopicus (2.7–2.3 Ma)

This robust australopith was a shock when it was discovered in the mid-1980s. It combines enormous cheek teeth with incisors and canines that are unreduced from the presumably ancestral *A. afarensis* condition. Although the lateral zygomatics are so prominent the face is dished, the face is as prognathic (protruding) as any previous australopith, if not more so, and is quite apelike. The preserved skull has a crest on the top, a condition present when chewing muscles are larger than the area of the braincase can accommodate. Previously, large cheek teeth had been expected in species that specialized on grinding, which meant small incisors and retracted faces. In life, the species presumably subsisted on piths, roots, and seeds. Its cranial capacity is 400 cc, the same as *A. afarensis.* Large incisors and prognathic faces are interpreted as adaptations to stripping or pulling the hard outer layer off piths. Postcrania are unknown.

Australopithecus Boisei (2.3–1.4 Ma)

The most classic of robust australopithecines has, compared to its presumed ancestor *A. aethiopicus,* smaller incisors and canines, a bizarrely robust mandible, and a considerably more orthognathic (pulled-back) face. The main chewing muscle, temporalis, is more vertical and larger anteriorly, presumably oriented to maximize chewing power and endurance. The small incisors suggest that stripping was not significant, that food items were small, or at least small before they entered the mouth. There are no known postcranial bones.

Australopithecus Africanus (2.5 Ma [2–3 Ma])

Long the prototype for australopiths, this species from South Africa was first named by Raymond Dart in 1925. It varies from *A. afarensis* in some of the same ways *A. boisei* varies from *A. aethiopicus.*

Compared to *A. afarensis,* its incisors are smaller and its cheek teeth larger. The canine has lost nearly all ape features, and resembles the incisors. Studies of wear on the teeth suggest that *A. africanus* was a fruit eater that supplemented its diet with pith, leaves, and seeds. Cranial capacity is 450 cc, or still quite apelike. The face is more dished than *A. afarensis,* and exhibits canine pillars, ridges that pass from the canines up to either side of the nose, and are believed to reinforce the face from the forces of chewing. Whatever their function, such reinforcements are not found in *A. afarensis,* despite its robust mandible and large cheek teeth. Postcranially, *A. africanus* has longer arms and shorter legs than *A. afarensis,* and a scapula that is quite apelike, probably more apelike than Lucy. The pelvis is broad but not quite as broad as that of Lucy. *A. africanus* retains all other features of the hand, arm, legs, and feet found in *A. afarensis.* That is, it is a terrestrial biped and an arboreal arm hanger/biped.

Australopithecus Garhi (~2.5 Ma)

A. garhi has a robust face like that of other non-robust australopiths, a more projecting jaw than typical. Molars and premolars are huge, of *A. boisei* proportions. Canines are very broad and appear to function as premolars. An associated femur fragment is suggested by the discoverers to suggest the hind limbs are long for an australopith, though not humanlike. The claim is controversial because the forearm is also extraordinarily long (perhaps indicating that the individual is merely large, rather than possessing humanlike limb proportions), the femur is incomplete and its length therefore uncertain, and there is no comparable male complete femur for *A. afarensis* to compare. Other postcrania are similar to those of other australopiths. Cranial capacity is estimated at 450 cc, or at the *A. africanus* mean. Its discoverers argue that nearby tools and cut marked animal bone belong to *A. garhi,* suggesting it is in the *Homo* lineage. Others argue it is a unique offshoot unrelated to later hominins.

Australopithecus Robustus (~1.5–1.9 Ma)

This South African species appears to have evolved from *A. africanus,* and it differs from it as *A. boisei* differs from *A. afarensis.* Despite facial similarity to *A. boisei,* studies suggest it had a different growth pattern, and its teeth are dramatically smaller. Its closest relative was more likely *A. africanus* than *A. boisei.* Compared to *A. africanus,* it has a more dished face, smaller incisors, larger molars, more vertical chewing muscles, a more robust face, larger zygomatics, and the presence of a sagittal crest to anchor huge chewing muscles. Cranial capacity is reported at 475 cc. Since *Homo* also occurs at the same site, postcranial attributions are difficult. However, most craniodental fossils are *A. robustus,* meaning postcranials probably are too. The femoral head and neck and pelvic fragments are much like *A. afarensis* and *A. africanus.* Fingers are straight, less robust, and fingertips are broad, all as in humans; the elbow joint is not topographically distinct, suggesting it less often bore body weight. The toes are much more humanlike than *A. afarensis* and *A. africanus.*

Australopithecus "Habilis" (1.4–1.9 Ma)

A number of specimens in East Africa are too small to be *Homo* but have been pooled with *Homo habilis* for want of a better solution. The type specimen of *H. habilis* is OH 7, which has a cranial capacity of 700–750 cc, or similar to that of ER 1470 at 780 cc. If ER 1470 is the same species as OH 7, which the cranial capacity and other features suggest, *H. habilis* retained the large teeth and flat face of its australopith forebears. Often associated with ER 1470 is a long ER 1472 femur, as long as that of later humans. These large-bodied, robust-faced, large-brained hominins may have evolved into *Homo erectus.* Persisting during the time of both *H. habilis* and *H. erectus* are fossils of a smaller-brained, smaller-toothed, often more delicate-faced species. Some skulls are quite similar to *A. africanus,* particularly OH 24 with its distinct canine pillars and flat face. Others, for example, ER 1813, have reduced zygomatics and the first hint of an external nose. Their cranial capacities range from 500 to 600 cc. Similar to these is another small specimen, OH 62. This specimen has postcrania that display the classic australopith features associated with a partly arboreal lifeway. Because most paleontologists placed these fossils in *H. habilis,* they have no official species name of their own. All are too small to be in the genus *Homo,* but they are different enough that they may ultimately be placed in more than one species. For now, they are left as the still-australopith-like last hangers-on of the glorious australopith tradition that began 6.5 Ma and ends with the extinction of *A.* "habilis" and *A. boisei* at 1.4 Ma.

To simplify, australopiths can be divided into roughly seven groups based on current knowledge. *Sahelanthropus, Orrorin,* and early *Ardipithecus* are all fragmentary, all share somewhat small cheek teeth, somewhat large incisors, somewhat thin enamel, and more apelike canine/lower premolar honing complex than later australopiths. They may be all closely related, and in fact one describer of *Ardipithecus kadabba* has suggested that they all belong to a single species. If so, all were bipedal in a way that is significantly different from the bipedalism of later hominins. We can add *Ardipithecus ramidus* to this group and label them Poorly Known Early Probable australopiths (PKEPs).

PKEPs likely gave rise to a second group, the *A. anamensis* and *A. afarensis* lineage, which are similar enough to one another to suggest they are a single, evolving lineage. Compared to PKEPs, they have larger cheek teeth, thicker enamel, smaller incisors, and less apelike canines.

Presumably branching off the *A. anamensis/afarensis* lineage was an East African lineage that evolved a more robust face, more muscular jaws, and much larger cheek teeth very rapidly, and then slowly evolved smaller incisors and a more retracted face. This group began with *A. aethiopicus* at 2.7 Ma, evolved into *A. boisei* near 2.3 Ma, and persisted well into the reign of *Homo erectus,* going extinct only at 1.4 Ma and perhaps even later.

In South Africa a descendent of *A. afarensis* evolved slightly larger cheek teeth, slightly smaller incisors, and slightly more reinforced faces. *A. africanus* not only retained all the apelike characters of Lucy, but likely even converged on apes slightly, evolving longer arms and shorter legs. *A. africanus* had a South African robust offshoot, *A. robustus,* that evolved even more robust faces. Despite a superficial resemblance to *A. boisei,* evidence suggests it grew differently than *A. boisei,* and its molars are considerably smaller, suggesting it is not related to the East African robusts.

In East Africa at 2.5 Ma, *A. garhi* shows only equivocal evidence of more humanlike postcrania, and its specialized teeth leave its role in human evolution ambiguous. The last hanger-on among the australopiths was the variable *A.* "habilis." It retained small brains and more apelike bodies and persisted until 1.4 million years ago.

— *Kevin D. Hunt*

Further Readings

Conroy, G. C. (2005). *Reconstructing human origins.* New York: W. W. Norton.

Johanson, D. C., & Edey, M. (1981). *Lucy: The beginnings of humankind.* New York: Simon & Schuster.

Johanson, D., & Edgar, B. (1996). *From Lucy to language.* New York: Simon & Schuster.

Meier, R. J. (2003). *The complete idiot's guide to human prehistory.* New York: Alpha Books.

Wood, B. (2005). *Human evolution: A very short introduction.* Oxford, UK: Oxford University Press.

AXES, HAND

Hand axes are an artifact type most frequently associated with the Acheulean culture of the Lower Paleolithic or the Early Stone Age. Hand axes are large, bifacially flaked cores. Typically, they are ovate, tear-drop shaped, almandine, or circular, and range from 10 cm to 20 cm in length. Rarely, specimens may reach significantly larger size ranges. Another frequent variant of the hand axe is the so-called cleaver. This variant is also bifacial flaked but is shaped in order to form a squared edge on at least one end. Hand axes are frequently made on large flakes, such as those removed from boulder cores in various regions. In addition, they are often manufactured from large cobbles or nodules of raw material.

The presence of this unique and distinctive artifact type is used almost exclusively as a marker of the Acheulean culture, which dates from around 1.6 my to 200 ky. Despite this, basic bifaces with aggressive hard hammer flaking are also present in the Oldowan industry and may be as old as the earliest stone tool assemblages. In addition, hand axes persist in some stone tool traditions significantly after the end of the Acheulean time range. For example, hand axes persist deep into the Middle Paleolithic of Europe.

John Frere is credited as the first author to formally discuss the archaeology of hand axes, writing in 1797 concerning the English site of Hoxne. For early archaeologists, the distinctive appearance facilitated the recognition of these stone tools as human-made artifacts. Jacques Boucher de Perthes, while excavating at the Acheulean type-site of Saint-Acheul on the Somme River of France, was the first to coin the term

"hand axe," and recognize them as a formal category of stone tools. In addition, Boucher de Perthes's recognition of hand axes in association with extinct animal species was instrumental in establishing the antiquity of humans as a species. The recognition of hand axes as human-made stone tools was vital for the recognition of the archaeological remains of the rest of the Paleolithic and matched archaeology with the rapid pace of paleontological discovery. Subsequent discoveries of hand axes in Africa and Asia showed both their spatial and temporal ubiquity.

Hand axes are found in almost all of the temperate Old World, with the possible exception of tropical forest zones and hyperarid regions. Until recently, hand axes were not thought to be present in Southeast Asia, which was instead thought to be divided from Europe and the Near East by the so-called Movius Line, named for Harvard prehistorian Hallam Movius. Recent discoveries in Southeast Asia have called this conventional understanding into question.

The most noteworthy and debated feature of hand axes is their persistence over almost the entire course of the Pleistocene. Over the course of the Achuelean culture, hand axes gradually become thinner and more refined, incorporating technological advances such as soft hammer flake removal and core platform preparation. However, the general shape of hand axes remains extremely constant over time. This is the case both within individual sites that contain records of long periods of time and more generally across the Old World in prehistory. Hand axes from Africa, Europe, and Asia, throughout the span of the Acheulean, share remarkably consistent sets of properties. The persistence of the Acheulean hand axe represents a substantial research problem, with numerous proposed explanations. These possibilities include inherited biological programming for hand axe manufacture, sexual signaling using hand axes, cultural instruction of offspring by parents for the production of hand axes, or simply the functional unity of an effective technological design, which was invented and utilized innumerable times in prehistory. The explanations are too numerous to list here, and there is extremely little consensus concerning this problem.

The function of hand axes is also a frequently debated topic. Boucher de Perthes and other early researchers often suggested that hand axes were hafted, similar to modern axes. There is no evidence for this, however. Currently, there is a sizable set of frequently mentioned possible functions for hand axes: butchery, woodworking, digging, projectile weaponry, stylized core for flake production, and many more. There is certainly no consensus concerning function, although butchery is probably the most widely accepted. In addition, most current research tends to see unmodified flakes as sharper and therefore more effective cutting tools than hand axes. This notion has built more support for hand axes as sources for useful flakes, especially since bifacial flaking is an effective strategy for maximizing the output of useful flakes from a core. The most likely explanation, and perhaps the reason for the remarkable duration of hand axes as a phenomenon in prehistory, is that hand axes were extremely flexible technological objects and were used for most, if not all, of the functions offered above.

Hand axes have frequently tempted researchers into deep speculation. On the one hand, these unique and distinctive artifacts would seem to offer clues into vital areas of inquiry, such as hominid cognition, language, social structure and cultural transmission, subsistence, population history and movement, and a host of others. However, despite the immense number of cases from which data have been collected, there are extremely few questions concerning hand axes that have been answered unambiguously. It seems unlikely that any simple or easy answers are likely to come. In addition, modern archaeology has become wary of stone tool typology as an analytical technique and therefore less comfortable with research solely concerning hand axes. A more concerted effort is being made to see the variability among hand axes and their context as an aspect of the variability of Paleolithic stone tool assemblages. Still, hand axes represent a fascinating and puzzling research problem that will no doubt engage the interest of investigators long into the future.

— Grant S. McCall

Further Readings

Deacon, H. J., & Deacon, J. (1999). *Human beginnings in South Africa: Uncovering the secrets of the Stone Age.* Cape Town: David Philip.

Klein, R. G. (1999). *The human career: Human biological and cultural origins.* Chicago: University of Chicago Press.

Schick, K. D., & Toth, N. (1993). *Making silent stones speak: Human evolution and the dawn of technology.* New York: Simon & Schuster.

AYMARA

The Aymara are an indigenous ethnic group of Bolivia and Peru, who occupy the high *altiplano* region surrounding Lake Titicaca. In Bolivia, the Aymara number nearly 2 million, comprising a quarter of the national population, and their concentration in and around La Paz gives Bolivia's capital city a distinctly Aymara flavor. Another 350,000 Aymara live in Peru and some 20,000 in northern Chile. The Chilean Aymara have mostly lost their ancestral language but it is still widely spoken in Bolivia and (to a lesser degree) Peru. Nevertheless, the language can be considered endangered, inasmuch as most speakers today are bilingual, and many bilinguals raise their children as Spanish monolinguals. Traditionally an agricultural people, many Aymara have moved to urban centers in recent decades, with the accompanying cultural assimilation and language loss characteristic of such situations. Many have also migrated to Argentina in search of employment.

Between AD 400 and 1000, Aymara civilization centered on the ancient city of Tiahuanaco (Tiwanaku), the capital of an empire that extended from the western coastal desert to the humid slopes of the eastern Andes. After long-term drought led to the empire's collapse, the Aymara (aka *Collas*) comprised a dozen independent chiefdoms, which were incorporated into the Inca empire during the 15th century. Due to centuries of contact, there are deep parallels between Aymara and Quechua language and culture. The traditional subsistence/tribute economy was based on potatoes and other tubers, high-altitude grains such as *quinua*, and camelids (llama and alpaca), today largely replaced by sheep. Extensive marketing networks between different ecological zones existed for many centuries before European contact.

Traditional Aymara social organization varies by region but typically consists of monogamous, patrilineal, extended-family households. The *compadrazgo* system of fictive kinship is widespread and essential to social and economic life. Compadrazgo ties may be horizontal (between equals) or vertical (crossing class strata and ethnic boundaries). Some communities observe the classical civil-religious hierarchy or *cargo* system, which is formally restricted to men but actually based on conjugal pairs. Communities are grouped into *ayllus*, headed by an informal council of elders *(amautas)*. Most Aymara are nominally Catholic, with considerable syncretism from earth-centered indigenous religion, but Protestantism is spreading among the Aymara, as throughout Latin America.

Aymara society was drastically disrupted by Spanish colonization. Many communities were dispossessed of their lands and forced into feudal arrangements with European landowners, or enslaved in the region's rich silver and tin mines. However, many communities were able to maintain their culture relatively intact, due to their remote and arduous high-altitude habitat. The Bolivian land reform of 1953 brought much land back under Aymara control, but drought, low prices, and increasing land pressure have driven many out of agriculture and into the cities. Today, integration into the cash economy and national institutions is more the rule than the exception; the urban proletariat of La Paz is predominantly Aymara. At the same time, increased opportunities

Source: ©Reuters/CORBIS.

for social mobility have given rise to a significant number of Aymara professionals (including social scientists). Even Bolivia's overwhelmingly nonindigenous Parliament now contains some Aymara (and Quechua) deputies. Victor Hugo Cárdenas, Bolivia's vice president from 1993 to 1997, is Aymara.

— *Aurolyn Luykx*

See also **Peru**

Further Readings

Eagen, J. (2002). *The Aymara of South America.* Minneapolis, MN: Lerner.

Hardman, M. J. (Ed.). (1981). *The Aymara language in its social and cultural context: Essays on aspects of Aymara language and culture.* Gainesville: University Presses of Florida.

Kolata, A. L. (1996). *Valley of the spirits: A journey into the lost realm of the Aymara.* Hoboken, NJ: Wiley.

Aztec Agriculture

Some of the most impressive technological achievements of ancient Mesoamerican societies involved increases in the scale, efficiency, and overall productivity of agricultural land use systems. In late pre-Hispanic times, Mesoamerican farmers devised creative ways to meet the subsistence demands of burgeoning populations. Their solutions, which included terracing, irrigation, and raised fields, produced more food per unit of land than traditional farming methods. Anthropologists describe this process as "agricultural intensification," which appears in many cases to coevolve alongside population growth and political centralization in the development of complex societies.

Agricultural intensification was a key economic process in the growth and development of the Aztec empire, which occupied highland central Mexico from the early 14th through the early 16th centuries AD. How the Aztec empire fed the large population of its capital, Tenochtitlan, has long intrigued researchers, since most of the city's estimated 250,000 inhabitants at the time of Spanish contact in 1519 were not food producers. Feeding the residents of Tenochtitlan and other urban places in the region was primarily the job of rural farmers. Agricultural intensification and exploitation of locally available resources provided these farmers with a mixed economy that ensured local prosperity, while supplying urban areas with critically important staple goods and raw materials.

Capitalizing on the mosaic of microenvironments afforded by the Basin of Mexico, Aztec farmers combined three distinct farming techniques: terraced hillslopes irrigated by spring water that was carried long distances through complex networks of aqueducts, dry-farming fields watered by rain or alluvial flooding, and raised fields constructed as long rectangular plots in swamps and shallow lakebeds. These techniques were sometimes combined and supplemented with other methods, such as intercropping and fertilizing. This work, which took place year-round, produced very high yields of corn, beans, squash, fruits, chilies, chia, amaranth, and some species of cactus, all of which circulated widely in periodic community markets and in the Great Marketplace at Tlatelolco near the capital. In addition to providing daily sustenance, these staples were used in other ways in Aztec society, such as to mark social identity and hierarchy during political feasts, to pay tribute in support of the Aztec political economy, and to conduct religious rituals.

Agrotechnologies

One of the greatest challenges for Aztec farmers was the poor condition of highland soils and the lack of arable land. Multiple agrotechnologies were brought together to address these problems. To improve soil quality, Aztec farmers left certain fields fallow for a period of time, and then used slash-and-burn techniques, in which trees were cut down, left to dry, and then set on fire; the resulting ash added nutrients to the soil. To increase the amount of cultivatable terrain, Aztec farmers built terraces along piedmont hillslopes. These terraces, made out of walls of stones, allowed farmers to use more land on the slopes and to move farther up the hillsides than otherwise possible. However, only a limited range of crops could be cultivated on these terraces due to the thin and rocky nature of upland soils. Plus, crops were usually dependent upon available rainwater, which made them susceptible to destruction by drought or heavy runoff from summer rainstorms. To buffer the risk of low productivity from terraced fields, Aztec farmers also created plots of land called *chinampas* (from the Aztec term, *chinamitl*, meaning "square made of cane"), artificial raised fields constructed in swamps and shallow lakebeds from layers of mud and vegetation.

Chinampas, which covered some 9,500 hectares (about 23,500 acres) in the basin's two southern lakes, Xochimilco and Chalco, represented a highly productive form of intensive agriculture that provided up to one half or more of the food consumed in Tenochtitlan. In its most intensive form, cultivation was continuous throughout the year, producing two to four crops that yielded an annual surplus of 16,500 metric tons of corn. Fields were never left fallow; as soon as one crop was harvested, another set of seedlings was put in place. Scarce land was thus not tied up by long-cycle crops growing from seed. Whenever corn was cultivated, ground-hugging cultivars, such as beans and squash, were planted between the rows. Intercropping of this sort helped to keep soil nutrients in balance, since root action and silage of the bushier plants returned to the earth the minerals consumed by corn.

Modern aerial surveys show an overall uniformity in chinampa size and orientation, indicating a planned program of construction. Plots were rectangular fields 2 to 4 m wide (roughly 7 to 12 feet) and 20 to 40 m long (roughly 65 to 130 feet), surrounded on three or four sides by canals. Each plot was bordered by reeds, forming a fence around the plot, which was filled in with mud and decaying vegetation to raise the field surface just above the water level. The proximity of the field surface to the water table provided adequate soil moisture for crops and improved nighttime temperatures, reducing the chance of frosts. Soil fertility was maintained by periodically adding vegetation, household refuse, organic rich silt dredged up from the canal bottoms, and sometimes human excrement. The long and narrow layout between parallel canals, low profile above water, and layering of specific soil types obviated the constant need for irrigation.

Cultigens

The 16th-century Franciscan missionary, Bernardino de Sahagún, compiled an account of Aztec daily life from native informants, entitled "Historia general de las cosas de Nueva España," which included an extraordinarily detailed narrative of cultivated plants and how they were used. These plants included corn, chia, and amaranth, as well as abundant varieties of beans, squashes, fruits, and chilies, all of which were farmed with a single kind of multipurpose digging stick known as the *uictli.*

The principal crop of Aztec farming was corn or "maize" *(centli),* which played an intimate part of the everyday lives of the Aztec. Maize was a central element to many stories, poems, and songs, as well as creation myths (the gods were said to have fashioned cornmeal into human flesh). Maize was prepared in numerous ways. The ear was consumed, the fiber was used for tea, maize honey was made from the tender canes, the fungus *(cuitlacoche)* was cooked and eaten, and the dry grains were used as the base for making tortillas, tamales, and a variety of gruel drinks. Atoles *(atolli)* were drinks made with maize dough mixed with water and sweetened with some kind of syrup or made spicy with the addition of chili. Pozol *(pozolli)* was a nutritious meal, taken as a drink prepared with *nixtamal* (boiled corn kernels in water with lime) and honey, chocolate, or dry chilies. A similar drink, *yolatolli,* was used as a curative for fever and some diseases.

Along with maize, beans were often served with meals and also included as ingredients in other dishes, such as tamales. Chia *(chiematl)* and amaranth *(huauhtli)* were used like maize in making pozol, and amaranth seeds were sometimes mixed with maize for making tamales. Cakes of amaranth seed dough were used in some religious ceremonies to adorn idols. There were more than one hundred varieties of chili peppers *(chilli),* which were mostly used to season foods, but some were eaten fresh, dehydrated, or smoked and pickled. The many varieties of squashes and fruits were eaten raw or cooked. Some species of flower—bishop's weed, may flower, and zucchini flower—were cooked and used to prepare soups and teas.

Second only to maize, chocolate *(chocolatl or xoxolatl)* and cotton *(ichcatl)* were essential to both subsistence and political economies. Chocolate beans *(cacao)* sometimes served as a form of currency, especially for use in market exchange, where it was commonly accepted as payment for merchandise and labor. Writing in the mid-16th century, the Spanish priest and historian Bartolomé de las Casas noted that one strip of pine bark for kindling was worth five cacao beans and one turkey egg cost three beans. Chocolate drink (ground, toasted cacao beans mixed with water and sometimes sweetened with honey or maguey syrup) was a prestigious beverage, reserved for people of high rank and consumed during special meals. Like chocolate, cotton was usually reserved for nobility; the woven fibers were often considered a prestige clothing of the elite. Cotton cloaks also appear to have had exchange value as currency. Depending on the quality, one cloak was said to be

worth from 65 to 300 cacao beans. Unlike maize, however, cacao and cotton were grown outside the Basin of Mexico, including Morelos and the coastal regions of Veracruz and Oaxaca, and transported to the basin by means of trade and tribute.

Two types of cactus were cultivated, prickly pear *(nopal)* and agave or "maguey" *(mexcalmetl)*. These succulents were important dietary supplements, especially in areas with low rainfall. Nopal and maguey were cultivated using dry-farming techniques, in which available rainfall was usually sufficient for watering crops. Nopal was roasted and eaten as a vegetable or served in tamales. The nopal plant also provided fruit *(nochtli)*, which was consumed raw. Maguey provided medicine, fiber, building material, fuel, fertilizer, and intoxicating beverages. The most common fermented drinks were mezcal *(metl)* and pulque *(poliuhqui)*. Pulque was usually reserved for consumption as a curative and on ceremonial occasions, including harvest festivals, rainmaking rituals, birth ceremonies, marriages, and funerals.

Agrarian Ritual

The Aztec considered the complementary themes of rain/moisture, maize and maguey, and agricultural fertility to be crucial to life-sustaining cosmological forces. As such, all agricultural practices were regulated by a calendrical system and a ritual almanac. The creator gods, Cipactonal and Oxomoco, created time in order to organize and plan earthly and divine phenomena and to give them sequence. Earthly time was organized according to the solar year *(xiuitl)*, which was divided into 18 months of 20 days, plus 5 "unlucky" days *(nemontemi)*. A great deal of the Aztec's time and energy was devoted to ceremonies throughout the 18 months, most of which was aimed at placating deities of rain and agricultural fertility. These ceremonies coincided with the most critical periods in the agricultural cycle: the primary planting, growing, and harvesting seasons.

Divine time was structured by a ritual calendar *(tonalpohualli)*, which consisted of 13 periods of 20 days each, creating a 260 count of days that were each associated with ceremonial observances. Each 13-day period was presided over by a patron deity or deities, including Tlaloc (god of rain) and other gods associated with fertility and agriculture, such as Xipe Totec (god of spring and new vegetation), Chicomecoatl (goddess of foodstuffs, especially maize and sustenance), Cinteotl (god of maize), and Xilonen (goddess of tender young maize). Each of the 20 days in the period also had a patron deity, who imparted special attributes to these days. For example, the patron of the rabbit *(tochtli)* days was Mayahuel, goddess of maguey, who presided over drinking and drunkenness.

The anthropological significance of Aztec agriculture is revealed in the Aztecs' intensive and highly diversified agroeconomic system that stimulated specialization in areas of food production. Farmers in the drier reaches of the northern part of the basin specialized in nopal and maguey cultivation, while those in the south took advantage of a wetter climate for maize and bean agriculture; lowland farmers focused on cacao and cotton. Exchange between these regions sometimes enabled staple goods to be used to create and acquire durable valuables that could be amassed and redistributed as loans or gifts for building and enhancing social status and prestige. The Aztec agricultural system also yielded enormous surpluses of foods that enabled urban dwellers to focus their time and energy on non-food-producing enterprises, such as religious observances, governmental services, craft manufacture, and military duty. In this way, intensive agriculture and surplus production were extremely important factors in the development of Aztec society.

— *E. Christian Wells*

See also **Agriculture, Intensive**

Further Readings

Evans, S. T. (1992). The productivity of maguey terrace agriculture in Central Mexico during the Aztec period. In T. W. Killion (Ed.), *Gardens of prehistory: The archaeology of settlement agriculture in greater Mesoamerica* (pp. 92–115). Tuscaloosa: University of Alabama Press.

McClung de Tapia, E. (2000). Prehispanic agricultural systems in the basin of Mexico. In D. L. Lentz (Ed.), *Imperfect balance: Landscape transformations in the pre-Columbian Americas* (pp. 121–146). New York: Columbia University Press.

Nichols, D. L., & Frederick, C. D. (1993). Irrigation canals and chinampas: The development of hydraulic agriculture in the northern basin of Mexico. In V. Scarborough & B. L. Isaac (Eds.), *Economic aspects of water management in the prehispanic new world* (pp. 123–150). Greenwich, CT: JAI Press.

B

Baboons

Modern baboons (Superfamily Cercopithecoidea, Family Cercopithecinae, Tribe Papionini, and Genus *Papio*) are relatively large Old World monkeys of sub-Saharan Africa. There are five species of *Papio* (Hamadryas, Guinea, olive, yellow, and chacma baboons) spread across sub-Saharan Africa (see below for species names and their geographic distribution). It should be noted, however, that the five species are not completely isolated geographically and hybridization does occur. Guinea, olive, yellow, and chacma baboons are generally referred to as the *savannah baboons*. The hamadryas baboons live in the arid scrublands of Ethiopia. Mandrills (*Mandrillus* or *Papio sphinx*), drills (*Mandrillus* or *Papio leucopaeus*), mangabeys (*Lophocebus* and *Cercocebus*), geladas (*Theropithecus*), and the macaques (*Macaca*) are closely related to the baboons.

The baboons are extremely sexually dimorphic; males weigh above 16 kg, and the females are about half the size of the male. Males, especially the hamadryas baboon males, have long hair around their shoulders, giving the appearance of having a cape. Males but not females have large canines adapted for shearing the flesh of their opponents, whether conspecifics or predators. Large unicusp first premolars (the P_3), known as *sectorial premolars*, have a ridge of heavy enamel that runs down the front of the tooth, which is used to sharpen the back side of the upper canine. A gap in the upper tooth row, sectorial P_3, and large upper and lower canines are identified as the *Canine/P_3 shearing complex*. Baboons have arms and legs of about the same length and are described as terrestrially adapted quadrupeds that walk and run on the ground and on top of tree branches in the same manner. Branch-to-branch leaping, swinging, and jumping are rare in baboons. Like other Old World primates, baboons have stereoscopic color vision. Unlike other primates, however, baboons have a long muzzle.

The cercopithecoids (i.e., the Old World monkeys) diverged from the hominoids (i.e., apes and humans) about 25 million years ago. The fossil record of the cercopithecoids is known from the Early and Middle Miocene with a group of remains recognized as belonging to two African genera named *Victoriapithecus* and

Source: © iStockphoto/Jakob Mikkelsen.

Source: © iStockphoto/Jakob Mikkelsen.

Prohylobates. These two genera preceded the separation of the two extant subfamilies of Old World monkeys, the Colobinae or leaf eaters, and the Cercopithecinae or fruit and insect eaters. During the Miocene, cercopithecine fossils are scarce compared to the more numerous fossil hominoids. The sparse fossil record of the genus *Papio* dates to about 3 to 4 million years ago and is limited to Africa.

One group of baboons, the kinda baboons *(Papio cynocephlus kindae),* a subgroup of yellow baboons *(Papio cynocephlus),* are particularly interesting. They are smaller and have a shorter face than the other savannah baboons. Instead of the dark coat color of other newborn baboons, kinda baboon neonates are born white, and the adult coat color is slightly more golden than other baboons. It might be tempting to view the kinda baboons as the ancestral form of the Papionini, but more fossils are needed to confirm or reject this hypothesis.

The social system of the savannah baboon is a multimale/multifemale troop in which the females remain in their natal troop throughout their lives, and the males emigrate at puberty. The troop forages and sleeps as a single unit, although troops have been observed to permanently divide into smaller troops. Males and females each have a dominance hierarchy; however, males are dominant to females by virtue of their large size. Mating is promiscuous, but females tend to mate with their male friends. Male/female friendships are important to the stability of a troop in that they provide for mutual support and aid, especially during agonistic encounters. Making friends with a female, moreover, can facilitate the entrance of a male into a new troop.

It has been difficult to determine the nature of the dominance hierarchy in baboon males. Some troops, especially small troops, may have a linear hierarch, but in other, perhaps larger troops, the males attain and maintain their high rank by forming coalitions. Rank among the females, however, is relatively stable and based on the rank of their mothers. Females also have stable friendships with other females that provide each other aid and support. Both rank and friendship help to maintain the stability of the baboon troop.

The hamadryas baboon, on the other hand, lives in uni-male bands in which the males actively herd his females away from other males. There are usually one to four females and their offspring in the uni-male bands. Mating occurs within the context of the uni-male group. The uni-male bands usually forage together as a group and independently of other uni-male groups. On their sleeping cliffs, however, the uni-male bands congregate into larger groups. The uni-male band is initially formed when a young male kidnaps an older juvenile female and begins to care for her. The young female stays with the male, and a new uni-male group is formed.

The reproductive life of baboons begins between 4 and 6 years of age, when males and females become sexually mature. However, males do not reach their full adult size until they are 9 to 10 years of age. The first sign of sexual maturity in a female baboon is the swelling of the area under the tail, known as the sex swelling, which correlates with ovulation and is attractive to male baboons. Baboon females generally have their first offspring by about the age of 7 years, and gestation lasts about 6 months. Assuming that an infant survives, the interbirth interval is a little

Order Primates
Suborder Anthropoidea
Infraorder Catarrhini
Superfamily Cercopithecoidea
Family Cercopithecidae
Subfamily Cercopithecinae
Tribe Papionini

Genus and Species (Common Name)	(Distribution)	
Papio anubis	Olive baboon or Anubis baboon	Spread across Africa just north of equator and extend slightly down below the equator in central and east Africa
Papio cynocephalus	Yellow baboon	Spread across central Africa from just south of the equator to about 20° south of the equator
Papio cynocephalus kindae	Kinda baboon	Zambia
Papio hamadryas	Hamadryas baboon, sacred baboon	Ethiopian lowlands, Arabian Peninsula
Papio papio	Guinea baboon	Extreme western Africa in Senegal and Sierra Leone
Papio ursinus	Chacma baboon	Spread across Southern Africa below 20° south

over 2 years. The menstrual cycle covers about 35 to 40 days; the sex swelling appears about midcycle and lasts 7 to 10 days. Baboons in the wild may live to be 30 to 35 years of age. Incest is avoided by male emigration.

Baboon communication, similar to communication of other primates, is accomplished through body postures and facial gestures, vocalizations, grooming and other forms of touching behaviors, and odors referred to as pheromones. While fighting does occur, most aggression is mediated by body postures and facial gestures. In general, communication concerns the warning of the presence of predators; establishing and maintaining mother/infant and other friendly relationships; keeping contact during foraging; mediating acts of aggression, submission, and reconciliation; and broadcasting reproductive status.

Safety from predators and access to adequate food, water, other resources, and safe sleeping sites are important environmental variables influencing the daily foraging, resting, and sleeping cycle. Savannah baboons generally find refuge from predators and safe-sleeping sites in trees. Hamadryas baboons are known for their use of cliffs for sleeping, although all baboons will use trees or cliffs depending on what environmental features are available. Baboons have also been observed entering caves, presumably to escape temperature extremes and predators. The diet of baboons is best characterized as omnivorous and consists of young leaves, fruit, grasses and grass roots, and invertebrates. Baboons also eat vertebrates, including small mammals. Consuming mammals is unusual among primates. In areas where baboon habitat has been turned into agricultural lands, crop raiding is common.

— *Linda D. Wolfe*

See also **Monkeys, Old World; Primatology**

Further Readings

Altmann, J. (1980). *Baboon mothers and infants.* Cambridge, MA: Harvard University Press.

Altmann, S., & Altmann, J. (1970). *Baboon ecology: African field research.* Chicago: University Chicago Press.

Fleagle, J. G. (1999). *Primate adaptation and evolution* (2nd ed.). New York: Academic Press.

Groves, C. (2001). *Primate taxonomy.* Washington, DC: Smithsonian Institution Press.

Kummer, H. (1968). *Social organization of hamadryas baboons.* Chicago: University of Chicago Press.

Smuts, B. B. (1985). *Sex and friendship in baboons.* New York: Aldine.

BABOONS

Because primates share many genetic links with human beings, biological anthropologists have long been interested in exploring all aspects of various species of apes and monkeys. In April 2003, officials at Lake Manyara National Park in Tanzania discovered that more than 200 male olive baboons at the park were exhibiting symptoms of a disease that was similar to venereal disease in humans. According to reports, no females were infected. The disease attacked the reproductive organs of male baboons, causing excruciating pain as it ate away at the organs. Several infected baboons subsequently died. Researchers around the world watched closely as research teams from Sokoine Agricultural University and Tanzania's Wildlife Research Institute attempted to identify and contain the disease. Afraid that the disease could spread to neighboring Kenya Tsavo National Park and the surrounding areas, experts from Kenya's Institute of Primate Research joined the Tanzanian research teams.

Much of the mystery surrounding the sick baboons involved the question of how the syphilis-like disease had been acquired and whether or not it was sexually transmitted. Baboons would be particularly vulnerable to a sexually transmitted disease because they tend to travel in troops of 100 or more with male baboons traveling freely among various families. Other incidents of venereal-type diseases in baboons have been reported, but no baboons have died in the other cases. Scientists at the Southwestern National Primate Research Center in San Antonio, Texas, revealed that the facility had discovered herpes-like lesions on some baboons in their colony of over 4,000.

Ultimately, the unidentified disease affected thousands of baboons and monkeys in Tanzania. Subsequent reports revealed that the disease had also spread among baboons and monkeys in nearby Gombe National Park, which was made famous by Jane Goodall's work with chimpanzees and continues to serve as a sanctuary for thousands of primates. African officials succeeded in ruling out bacterial causes but were unable to go further.

Ironically, baboons have been used in research on HIV/AIDS (Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome) since 1994, when research at the Southwest Foundation for Biomedical Research began injecting baboons with the HIV-2, a less virulent form of the virus that was initially confined to West Africa but has since spread to Asia. The research team reported that the baboons developed full-blown AIDS. Scientists first identified the HIV-2 virus in Senegal in 1985. Some scientists believe that the HIV virus evolved from the family of lentiviruses collectively known as SIV or Simian Immunodeficiency Viruses. It was first identified in the sooty mangabey or green monkey of West Africa.

In an October 28, 1994, article for *Science* magazine, a research team from the Southwest Foundation for Biomedical Research, led by scientist Krishna K. Murthy and physician Jay A. Levy, announced that because the immune system of baboons was similar to that of humans, their research provided significant progress in the battle against HIV/AIDS in humans. Previously, scientists had successfully injected both chimpanzees and monkeys with the HIV-1 virus, which is the form of the disease that has spread, largely through sexual contact, around the globe. Those tests had failed to replicate the pattern of the viruses in humans.

— Elizabeth Purdy

BABYLON

At 2,100 acres, Babylon was the largest and most important urban center in ancient Mesopotamia for over 2,500 years. The ancient city is located on the east bank of the Euphrates River, about 60 miles southwest of Baghdad in modern Iraq. Boasting monumental palaces, temples, and ziggurats, as well as ordinary houses and shops, Babylon was an important political and religious center for several ancient Near Eastern societies, including the Babylonians, Assyrians, Persians, and Greeks. Examination of their texts and architecture reveal that the Babylonians' dedication to religion, philosophy, and astronomy is misrepresented in our modern popular imagination, which considers Babylon a city of decadent and immoral inhabitants.

Scholars have pieced together the city's history through archaeological excavations, cuneiform records, and classical sources. While a high-water table has flooded the city's first architectural levels, early sources mention that Akkadian King Sargon destroyed the city around 2340 BCE. The city's importance was elevated in 1894 BCE, when a dynasty of Amorites, formerly nomadic kings, took control of the city. When Hammurabi ascended the throne in 1792 BCE, he expanded the city's control to dominate the entire Mesopotamian region. As the capital of the Old Babylonian empire, Babylon laid claim to several large temples dedicated to important deities such as Marduk and Ishtar and surrounded by monumental city walls and gates. The Old Babylonian empire would not last; Hittites from Anatolia sacked the city in 1595 BCE. For the next 400 years, a nonindigenous group called the Kassites ruled Babylon, a period that scholars are only now beginning to examine. Babylon gained its independence after the death of the last Kassite king, beginning a period of independent but politically unstable rule.

In northern Mesopotamia, the increasingly powerful neo-Assyrian empire conquered Babylon in 729 BCE. Although the Assyrians looked on the city as an important religious center, Babylon did not escape the wrath of Assyria's strongest king, Sennacherib, who destroyed the city's important temples to suppress a revolt. The reconstruction of the city's holy centers in the subsequent decades signifies Babylon's religious importance to the Assyrians.

Starting in 626 BCE, Babylon grew in size and wealth when the city became the capital of the neo-Babylonian empire for the next century, replacing the Assyrians as the dominant force in the Near East. The city's temples were rebuilt, the city was substantially refortified, and new palaces were erected during this period. Like the Assyrians before them, the Babylonian empire declined under King Nabonidus's rule, and it was not long before the Persians under Cyrus would take control of Babylon in 539 BCE. Although not the capital of the Persian Empire, Babylon continued to thrive as a royal seasonal residence for the ruling dynasts.

Babylon remained an important political and religious center in the ancient Near East despite the city's inhabitants' attempted revolts against their Persian superiors. The city's significance in the ancient world continued upon Alexander the Great's conquest in 331 BCE. Alexander wished to make Babylon the capital of his world empire and made resources available to repair the city's important temples and construct a Greek theater.

Upon Alexander's death and the dismantling of his empire into three districts, the Selucid dynasty established its capital 50 miles north of Babylon, demoting the city to a level from which it would never regain its supremacy in the region. The Greek rulers, recognizing

Source: Courtesy of FreeStockPhotos.com.

the city's religious importance to the indigenous population, continued to support Babylon's religious institutions, while at the same time ordering the inhabitants to relocate to more prosperous cities. Babylon's condition did not improve much under Parthian rule beginning in 122 BCE. The city was largely abandoned when the Roman emperors Trajan (116 CE) and Septimius Severus (199 CE) visited the city during their campaigns against the Sassanians.

Excavated architectural remains as well as surviving cuneiform documents, and Classical sources (e.g., Herodotus and Pliny) permit a reconstruction of the city during the latter half of its history. An inner-city precinct reserved for palaces and temples sat within a larger thriving urban metropolis. The Euphrates River bisected the city, dividing it into two halves. Monumental fortifications encircled both the inner and outer cities, and kings spent considerable energy repairing them, especially during the Old Babylonian, Kassite, and neo-Babylonian periods. At least eight gates permitted entry into the city, the most famous being the Ishtar Gate, leading into the inner precinct. The Ishtar Gate was rebuilt several times; its latest version, now displayed in Berlin's Pergamon Museum, consisted of glazed bricks depicting bulls, lions, and dragons, symbols of the city's patron gods, in relief. Leading through the gate was the Aibur-shabu, a processional way that played an important role each year when the city's gods were paraded through the streets to a designated temple, the Bit Akitu, in a celebration marking the new year.

The Esagila was the most important temple in Babylon and was the dwelling place of Marduk and other important deities. The temple precinct, Etemenanki, lay slightly north of Esagila and contained a high ziggurat with a shrine to Marduk at its summit. Many believe this structure to be the Tower of Babel, whose destruction is described in Genesis 11:1–9. Other smaller temples, such as Emah dedicated to the goddess Ninmah and a shrine for Ishtar in the Merkes quarter, sat in the shadow of Esagila and Etemenanki.

Babylon's most important royal residences, the northern, southern, and summer palaces, were constructed in the city during the neo-Babylonian period under King Nebuchadnezzar and were located in Esagila and Etemenanki's vicinity. Some nonelite residences have been excavated in the Merkes district dating from the Old Babylonian to neo-Babylonian periods.

During the 18th and 19th centuries, dozens of explorers visited Babylon, some of which conducted limited excavations. But it was not until 1899 that the Deutsche Orient-Gesellschaft sponsored a 15-year excavation project under the direction of Robert Koldewey. Koldewey's team worked year-round to uncover the neo-Babylonian city plan; the results were published in extensively detailed reports in German. Since 1958, Iraq's Department of Antiquities has carried out annual excavation and restoration projects.

— Benjamin W. Porter

See also **Mesopotamian Civilization**

Bakhtin, Mikhail (1895–1975)

Mikhail Bakhtin made a remarkable contribution to social and cultural theory under the most difficult of circumstances: at first under Stalin and then under the relatively relaxed but still highly constrained circumstances of the Soviet Union after Stalin's death. Though Bakhtin's thought is compatible with Marxism broadly speaking and has been enthusiastically been adopted by many soft Marxists, particularly in literary studies, Bakhtin's thought is not expressed in a demonstratively Marxist manner and is certainly not an expression of Marxism-Leninism or Stalinism of any kind. The strange conditions of Bakhtin's career have left something of a puzzle about what exactly he did write. There are some great works on literature, language, and culture that are clearly by Bakhtin, along with some other notable work in these fields, published under the name of Bakthin's associates V. N. Vološinov and P. N. Medvedev, which may have been at least partly written by Bakhtin. This article will refer only to the first category of texts rather than try to sort out the complicated question of the authorship of other texts.

Bakhtin's most direct object of concern is the status of literary genre; however, this concern is embedded in a theory of history and culture. For Bakhtin, literary genres can be understood only with regard to the loss of natural humanity. In nature, we live in a union of sexuality relations and family life, birth and

death, nutrition and defecation, and natural seasons and natural rhythms of the body. The study of literary genres is premised on the loss of this state and the attempt to return to it. Literary genres focus on the content of culture in symbolic form. The loss of the natural state is marked in different forms of time and space. The basic form of time and space is the chronotype. The more folkloric forms of literature have mythic characters unconstrained by normal bonds and a purely additive attitude to time, in which episodes accumulate with no limitation or unifying logic. At this more naturalistic level, we find idylls close to the unities of nature. More pure high-literary genres turn the unified opposites of natural life into abstracted oppositions between life and death, obscene sex and family life, and prepared food and gross defecation.

For Bakhtin, the most vital moments in literature come from influences in popular culture that challenge these abstractions and hierarchies. Bakhtin refers to these kinds of works as *Menippean satires* or *polyphonic* or *carnivalesque*. The Menippean satire is a reference to an antique satire that does not exist as a generally recognized genre paradigm. In Bakhtin, it serves as a convenient way of referring to any work, ancient or modern, that mixes popular and high discourses and uses a variety of voices that relate to each other in a mocking and comical way, in which there is descent from pure aestheticism, with its clearly defined characters, plots, and moral points, into death, obscenity, and the bizarre.

The polyphonic refers to any literature that interweaves a variety of voices, all of which are equal. This is dialogic, interactive, as opposed to the monologic domination of one voice. The paradigm here is the novels of Fyodor Dostoevsky, which according to Bakhtin refer to popular culture in order to challenge aesthetic hierarchies. Dostoevsky's polyphonic novels are themselves rooted in the carnivalesque. The paradigm of the carnivalesque is to be found in Antoine Rabelais's Renaissance novel, *Gargantua and Pantagruel*. This exercise in the learned and the obscene, the aesthetic and the grotesque is a response to the tradition of carnival. For Bakhtin, the carnival is the appearance of natural and folk peasant life, where natural growth is promoted by the inversion and mockery of authority and hierarchy. Bakhtin invokes an analysis of the relation between culture and natural life, which itself refers to the ethical impulses of 19th-century Russian literature, in particular, the work of Leo Tolstoy and Dostoevsky, where aesthetic refinement coexists with the idealization of peasant values and life. Bakhtin also draws on Immanuel Kant, Ernst Cassirer, and a very Russian tradition of the unity of philosophy and history to produce a view of nature and culture influential in literary and cultural studies, with much to say in any discussion of the society and culture.

— *Barry Stocker*

See also **Kant, Immanuel**

Further Readings

Mikhail B. (1983). *The dialogic imagination.* Austin: University of Texas Press.
Mikhail B. (1984). *Problems of Dostoevsky's poetics.* Manchester, UK: Manchester University Press.
Mikhail B. (1984). *Rabelais and his world.* Bloomington: Indiana University Press.

Balkans

Defining the Balkan region is a continuous project of contemporary geographers, anthropologists, political entities ranging from the United Nations to local nongovernmental organizations, economists, literary figures, historians, and others both inside and outside the ill-defined region. For example, Hungary is occasionally included in the region, due to the country's 150 years of Ottoman domination, while contemporary Turkey, but not Ottoman Turkey, is often left out due to its greater affinity with the Muslim countries of the Middle East. The most common countries included in the Balkans are Albania, Bulgaria, Greece, Romania, the countries of the former Yugoslavia (Serbia and Montenegro, Croatia, Macedonia, Bosnia and Herzegovina, Slovenia), and the European portion of Turkey.

The peoples of this area speak a large number of different languages from a variety of different language families. Serbian, Croatian, Montenegrin, Macedonian, Bosnian (a dialect of Serbo-Croatian), Slovenian, and Bulgarian are all Slavic languages and are partially to largely mutually intelligible, while Romanian is a romance language, Turkish is a Turkic

language, and Greek and Albanian are the sole remaining languages in their own subbranches of the Indo-European language family. Religiously, as well, the peoples of this region differ widely, including great diversity within some countries. For example, contemporary Albania includes a majority Muslim population but also includes a large Roman Catholic minority (Mother Theresa was Albanian) and a smaller Orthodox community. Similarly, Macedonia (Former Yugoslavian Republic of) and Bosnia and Herzegovina are both largely Orthodox, but also have large Muslim minorities. Croats are predominantly Roman Catholic, while Serbs largely follow the Serbian Orthodox church. Romanians, Montenegrins, Greeks, and Bulgarians are likewise Orthodox, each with their own patriarchate, while Turks are overwhelmingly Muslim. A third area of diversity in the region is the large numbers of ethnic and national minorities; Hungarians, Germans, Italians, Czechs, Slovaks, Poles, Ukrainians, Roma, Vlachs, and a small number of Jews can be found in scattered communities in many Balkan countries even to this day.

Historically, all of the contemporary Balkan countries shared domination by the Ottoman Turks, beginning in the 14th century. Nonetheless, this domination was considerably longer in some areas than in others. For example, the Serbs lost their hegemony in 1389 at the Battle of Kosovo and the Greeks in 1393, while it took another 64 years for the Ottomans to conquer the last Byzantine emperor in Constantinople (Istanbul), and yet another hundred years to expand beyond Romania. The end of Ottoman rule also came over a long period, with Greece gaining its independence in 1832 after an 11-year nationalist war of independence, while Romania, Serbia, Montenegro, and parts of Bulgaria were not independent until the treaty of San Stefano ended the Russo-Turkish War in 1878. The states of Albania, Montenegro, and the remainder of Bulgaria finally gained independence following the Balkan league's victory over the Ottomans in the first Balkan War, 1912 to 1913, while Macedonia remained divided between Greece and Serbia after their defeat of Bulgaria in the second Balkan War, in August 1913.

As has been the case since at least the end of World War II, the term *Balkan* is most associated with a political process known as *balkanization*, referring to nationalist fragmentation, usually through violent confrontation. This connotation has gained strength only in the past decade and a half, since the wars that emerged during the breakup of the former Yugoslavia. From the relatively quick war between the Yugoslav federal army and Slovenia (June 25–July 7, 1991) to the extensive battles betweens Bosnians and both Bosnian and Serbian Serbs that lasted for 42 months beginning in April 1992—and brought "ethnic cleansing" into the global vocabulary—these events have done nothing to alleviate the image of the Balkans as a violently nationalist, brutal backwater on the periphery of Europe.

Nonetheless, it is a mistake to characterize this region solely in terms of primordial, or even just 19th-century, nationalisms. Even with regard to these postcommunist wars, a large number of both local and outside experts have argued that they were more about contemporary conflicts than ancient hatreds that had been suppressed by the power of the Yugoslav federation and the communist leadership. As many have noted, the most brutal events and long-lasting of these wars took place in the most ethnically mixed regions, in places and amongst peoples whose very lives made a mockery of the nationalist ideologies being propagated by leaders far from their homes. Rather than primordial ties, these wars were about contemporary power struggles.

In addition, the Balkans are also home to a large number of ethnographically interesting features, many of which have been studied extensively by both indigenous folklorists, beginning in the 19th century, and Western-trained anthropologists, sociologists, and others. One of these features is the complex social organization of many South Slav and Albanian communities. From the *zadruga,* or joint household in Serbo-Croatian, up to the lineage, clan, and even tribal levels, anthropologists and folklorists have taken great interest in these features that seem so rare in other parts of Europe. Another feature of many Balkan communities, although not unique to this area by any means, is the focus on the patriarchal system of honor and shame. While the indigenous legal system of Albania, the *kanun,* has codified this system to a greater extent than elsewhere, it is certainly a part of the ethnographic record for many other Balkan communities, particularly Greece and portions of the former Yugoslavia, as well. Other features that have likewise been studied in many Balkan communities are ritual godparenthood, or *kumstvo* in Serbo-Croatian, the importance of hospitality and reciprocity, and to a lesser degree, the sworn virgins, or honorary men, of Albania, Kosovo/a and Montenegro. In Romania and

Bulgaria, more extensively than elsewhere in the Balkans, recent ethnographic efforts have gone largely to studying the transition away from communism, while the record of both Romania and Yugoslavia under their differing communist systems is also quite extensive due largely to the vicissitudes of cold war politics.

— *Barbara West*

Further Readings

Hammel, E. A. (1968). *Alternative social structures and ritual relations in the Balkans.* Englewood Cliffs, NJ: Prentice Hall.

Hayden, R. M. (1996). Imagined communities and real victims: Self-determination and ethnic cleansing in Yugoslavia. *American Ethnologist, 23,* 783–801.

Todorova, M. (1997). *Imagining the Balkans.* Oxford: Oxford University Press.

BALUCHISTAN

Baluchistan means "land of the Baluch." It is found where Iran, Afghanistan, and Pakistan meet, spreading over southeastern Iran, southwestern Afghanistan, and western Pakistan. This is a harsh and broken land of sand and pebble deserts punctuated by jagged volcanic mountains and deeply gouged runoff wadis. The climate is dry or dryer, and the little rain that falls does so in the winter.

Baluchistan's hypothetical boundaries are defined by its dominant language, Baluchi, a Western Iranian language most closely related to Kurdish. Baluchi varies in dialect, influenced more by Persian in the west and Urdu in the east. Commonalities of Baluchi culture seen across the region would include mixed subsistence production, pastoralism, nomadism, oasis occupation, tribal organization, dress and coiffure, and Sunni Islam.

Aside from small regional capitals and smaller administrative towns, most of post–World War II origin, there are two main kinds of settlement pattern: small nomadic herding camps that occasionally or seasonally make use of mud brick huts and permanent oases with huts of mud brick and palm frond construction. In some groups, nomadic trajectories occasionally or seasonally meet oasis settlements. Nomadic migration patterns are irregular in timing, direction, and distance, a result of the unreliability and irregularity of precipitation and vegetation growth.

Until recently, production has overwhelmingly been oriented toward subsistence consumption. Goats, sheep, and camels are raised on natural pasture; winter wheat and barley are grown opportunistically in rain runoff gullies or on patches irrigated by *kanat* or *karez,* underground tunnels tapping higher-altitude water tables. Date palms are cultivated in part-time and permanent oases, as are vegetables and some grain. This mixed or multiresource production is adaptive, in that a failure in one sector leaves other resources available for consumption. But in such a severe environment, shortfalls are inevitable and were made up by imports: in the past by predatory raiding of villages and caravans for livestock, grain, or other valuables, including captives destined either to be sold as slaves, used as agricultural workers, or to be adopted or married, and in recent times by migrant labor locally, regionally, or in the Persian Gulf, or by entrepreneurship in trading, transportation, and similar services.

Two main forms of organization are typical: One is the tribe defined by patrilineal descent from common male ancestors, in which larger and smaller groups are formed based on more distant or closer common ancestors. Lineage groups at every level are vested with collective responsibility for defense and vengeance and for welfare and fellowship. At every level, lineage groups are balanced by others descended from collateral kin of their antecedents. For the most part, tribes are egalitarian and decentralized. Small tribes are led by weak chiefs, larger tribes by more powerful chiefs. Generally, tribes consist of pastoral nomads. The other form of organization is the *hakomate,* a hierarchical, triangulate form consisting of a small elite ruling over oasis peasantry, with the collusion of pastoral nomads from the countryside who act as the elite's military force.

Sunni Islam, while shared and important, remained in the background until recent decades, during which a religious renaissance and intensification of ritual observance, religious education, and religiously inspired political activism has taken place.

— *Philip Carl Salzman*

See also **Islam**

Further Readings

Salzman, P. C. (1999). *The anthropology of real life: Events in human experience.* Prospect Heights, IL: Waveland Press.

Salzman, P. C. (2000). *Black tents of Baluchistan.* Washington, DC: Smithsonian Institution Press.

Scholz, F. (2002). *Nomadism and colonialism: A hundred years of Baluchistan, 1872–1972.* Karachi, Pakistan: Oxford University Press.

Titus, P. (1997). *Marginality and modernity: Ethnicity and change in post-colonial Balochistan.* Karachi, Pakistan: Oxford University Press.

Bates, Daniel G.

Daniel G. Bates champions significant contributions in the study of human ecology. Human ecology links the disciplines of anthropology, biology, geography, demography, and economics in a distinctive theoretical model. It is concerned with the interplay between humans and their environments. Human ecology is based on evolutionary theory and seeks to understand and explain how cultural symbols guide human interaction with the environment. Bates is the editor of the bimonthly journal *Human Ecology,* a worldwide, leading peer-reviewed journal in anthropology and environmental studies. Bates is also coeditor of a book series in environmental studies and has five books in print. He served as a consultant to the World Bank Inspection Panel, the U.S. International Development Agency, the Government of Kenya, a legal firm representing the Government of Turkey, and the Caspian Development Advisory Panel. He has field experience in Turkey, Iran, Bulgaria, Azerbaijan, Georgia, Egypt, Kenya, and Uganda. His third edition of *Human Adaptive Strategies* came out in 2005. Throughout his career, he published numerous texts on human ecology and cultural anthropology. He also served as a special issue editor of *Anthropology Quarterly* and as the section editor for the *Anthropology and the Environment Section* in the American Anthropological Association newsletter.

Bates is presently professor emeritus of anthropology and research at Hunter College and the Graduate School and University Center, City University of New York. He studied at Robert College, Istanbul; the University of Freiburg; and the University of Michigan (PhD, 1970). Bates's doctoral dissertation in anthropology was titled *The Yoruk of Southeastern Turkey: A Study of Social Organization and Land Use.* It was published as *Nomads and Farmers: The Yoruk of Southeastern Turkey.* The Yoruk are nomadic sheepherders. Their culture has changed greatly, as they now move their flocks from winter and summer pasturelands with trucks and tractor-drawn wagons. Bates's ongoing research with the Yoruk shows how their cultural traditions adapt as they grow increasingly dependent on the market economy.

Most of Bates's professional activities have been in Turkey, where he taught at Istanbul Bilgi University (1998–2002). He maintains an ongoing affiliation with the University at Bilgi. His fieldwork in Bulgaria concerned the ethnic Turkish minority's responses to policies of the previous communist regime and its place in the democratic transition. Bates's earlier work among nomadic pastoralists and farmers in Turkey and Iran focused on patterns of land use, intergroup relations, and household organization and demography.

— Barbara J. Dilly

See also **Ecology and Anthropology; Ecology, Human Behavioral**

Further Readings

Bates, D. G. (2005). *Human adaptive strategies: Ecology, culture, and politics* (3rd ed.). Boston: Allyn & Bacon.

Bates, D. G., & Lees, S. (1990). The ecology of cumulative change. In E. Moran (Ed.), *The ecosystem concept in anthropology* (2nd ed., pp. 247–278). Ann Arbor: University of Michigan Press.

Bates, D. G., & Rassam, A. (2001). *Peoples and cultures of the Middle East* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Banyang Medicine Man

The Banyang people of Cameroon, West Africa, have a strong physical connection to the physical world and the underworld. The Banyang are not exactly

animistic; they do not ascribe sentience to natural phenomena.

But they believe that natural phenomena are the abode of spirits. Lakes and rivers, hills and forests are inhabited by spirits that offer protection, fertility, creativity, health, and wealth as well as spirits that cause disease, destruction, and death. Much like in Taoism, the Banyang believe that individuals cannot be isolated from the matrix of relationships, which extends beyond those of humanity and the animal realm, but must be seen as existing in a web of influences, of natural cycles of the day, season, and phase of life, which cannot be ignored. This is a fundamental principle of Banyang medicine, which sees disease primarily as a disorder or misalignment of the internal and external milieu of a person. The primary role of the Banyang medicine man is to realign the patient with the matrix of influences.

The medicine man is the most fascinating personality to have emerged from the Banyang civilization. His role within the society is so central that it is said that as the medicine man goes, so does the society. The term *mmu-njoh,* which in the Kenyang language means "medicine man," is a blanket term loosely used to describe anyone who practices any form of traditional medicine as well as anyone who possesses supernatural powers, such as herbalists, magicians, voodooists, charmers, conjurers, and witches.

More precisely, the term refers to the traditional doctor. The medicine man is the divine healer who practices traditional medicine—the approaches, practices, knowledge, and beliefs—while incorporating plants, animals, and minerals; spiritual therapy; exercises; and hands-on techniques to prevent, diagnose, and treat illnesses. Among Banyang, the medicine man is seen as the reincarnation of a spirit or as a priest through whom the gods maintain their connection to the world of men.

The medicine man's duties are as varied as his talents. First, as the defender of the society, he must purge witches, detect sorcery, and remove failure from hunting and farming. He is a healer. The gods remove disease through the medicine man. The gods invest him with knowledge that gives him power and prophecy, which strengthens his soul. He is an expert in dietary therapy, psychotherapy, surgery, and in addition to the traditional format of questioning, observing, and touching, he may perform exorcisms, rituals, and sacrifices; he interprets dreams, thanks to his ability to divine the hidden, and he can stop the rain from interrupting outdoor festivities because he has the power to control the weather.

Traditional Versus Western Medicine

Western medicine was introduced to the Banyang people as a consequence of colonial occupation. The colonialists, in their civilizing mission, considered everything African to be primitive and inferior. African history, cultures, and traditions as well as African medicine had to be discarded in order to make way for Western enlightenment. Traditional doctors were dismissed as charlatans. Hospitals were built in the urban centers, where traditional medicine all but disappeared.

Traditional medicine not only survived Western invasion, it flourished. Today, a wealth of medicinal and aromatic plants continues to ensure the primary health care of the poor in sub-Saharan Africa. Of the close to 6,400 plant species used in tropical Africa, more than 4,000 have medicinal value. It is estimated that up to 80% of the population relies on these traditional medicines. The primary reason for the survival of traditional medicine had to do with its affordability. Urban Africans often without insurance found traditional medicine to be as effective as the more expensive Western medicine. Hospitals were also found to be unable to deal with the religious etiology of illnesses. Africans continue to see illness as a religious experience: Illnesses are caused by spirits or by other people or could be punishment from the gods. Mental disease is caused by witchcraft. As the custodian of sacred ancestral traditions and of the theories of healing, the medicine man is seen as the only hope for his society.

Doubts regarding the efficacy of traditional African medicine persist, but like ethnic Chinese medicine, it is gaining acceptance and respect in Western cultures. Traditional doctors have been recognized for having varied and valuable experience in treating AIDS-related illnesses, and their knowledge of herbs has been fundamental in the development of ethnobotany.

The fusion of traditional and Western medicine is on the increase in the example of Dr. Eric Gbodossu, a Western-trained medical practitioner who also uses traditional medicine, and Dr. Sekagya Yahaya Hills, a modern dentist and traditional healer. Both men have concluded that the two cultures are not exclusive; instead, they reinforce each other.

Attitudes toward traditional medicine have been slow to change among educated Africans who continue to regard traditional medicine as the domain of the uneducated. Among the Banyang, there is a rigid dichotomy between Western and traditional medicine, which is that of the civilized versus the uncivilized and of enlightenment versus witchcraft. Still, there are more educated Banyang people consulting medicine men than one might expect. These include patients who suspect their illnesses may be caused by witchcraft, and people seeking protection, such as public servants and politicians, who suspect their subordinates covet their positions and would not hesitate to usurp them by witchcraft.

Religion and Traditional Medicine

The Christian missionaries who came to Africa saw traditional medicine as one of several arcane heathen practices that held the souls of Africans in thrall. Spiritualism, which is a necessary aspect of the traditional healing process, is antithetical with Christian teaching on diabolism. Protective amulets, good-luck charms, and other fetishes dispensed by medicine men are considered evil and proscribed from Christian homes. Though the Banyang people accepted the teachings of Christianity and conceded to be baptized, they did not agree with Christianity's assumption that they were an inherently evil people to whom God had never revealed himself until the coming of Christianity. The Banyang have been a religious people with a keen sense of good and evil. Before the coming of Christianity, the Banyang viewed the underworld as inhabited by both good and evil spirits—good spirits, whose favors had to be courted constantly, and evil spirits, which have to be shunned. Christianity did not include the benevolent gods into its horde of saints. All gods were demonic and were cast into hell.

The Christian doctrine of exclusion and prohibition did not result in the complete repudiation of the Banyang gods among Banyang Christians. These gods were too real to be ignored. Many Banyang people accepted Christ but kept their protective amulets just in case. Banyang Christians believe that Christianity and traditional medicine can complement each other in the fight against evil.

When illness strikes, it is not uncommon for the Banyang to consult a medicine man first to ascertain the source of the illness. If the illness is divined to be of natural causes, then they can trust the hospital to treat it. Many Banyang people today continue to be active in both the church and in traditional sacred societies, which they see as important social institutions. Almost every festivity includes an invocation and a libation.

Ironically, it was long-held Banyang traditional beliefs and practices that made the message of Christianity easy to assimilate. The Banyang could easily relate to the resurrection of Christ, for they had been living with ghosts all their lives. They could draw a parallel between Joseph's interpretation of dreams in the Bible and their time-honored practice of having their dreams interpreted by soothsayers.

The Medicine Man's Exclusive Preserve

Among the Banyang, there are illnesses that only the medicine man can handle. Some of these illnesses are as follows.

Nsok: The word in Kenyang means "elephant." The elephant is a symbol of invincible strength among the Banyang people. In the distant past, when Banyang indigenous technology was almost powerless before the mighty elephant, some natives chose to invest their souls in the elephant for safekeeping. These people are said to have gained elephantine strength in the process.

Nsok is familiarly used to refer to a mysterious illness, which results when an elephant in which someone has invested his soul is shot. Nsok cannot be treated by Western medicine. A competent medicine man must intervene quickly to retrieve the victim's soul from the elephant before the elephant dies, lest the man will die. The most common symptom of Nsok is the smell of gunpowder on the breath of the victim.

Nya-nyen: Nya-nyen literally means "river animal." It refers to the incident of a mermaid or merman being born to human parents. Like the sea creature, the nya-nyen child's upper body is completely human, but the lower body is that of a fish, in function if not in appearance. The child's "legs" are not designed for walking. The clairvoyant actually sees a tail fin where the ordinary people see legs. When the medicine man determines that a child is a nya-nyen, the only solution is to return the child to the river where it belongs. A series of rituals are performed, then the child (with all his belongings tied up in a

bundle) is escorted to the river. The medicine man drops off the child at the riverbank, then retreats to a hideout location, usually atop a tree from which he can watch what happens next. The nya-nyen child has to be sure it is alone, before taking the plunge. This it does by letting out a loud and sustained wail. If no one comes to pick it up, the child knows it is alone. It then pushes its bundle into the river, dives in, and vanishes.

Eko: Eko is the child that must be pampered incessantly. The Eko child is a pretty common occurrence among the riverine people. When women bathe in the river, the spirits of the river may come into them and be born as humans. The spirit that is born as Eko comes from the river royalty and must be treated with excessive attention. The Eko child is beautiful, sensitive, and emotional and manifests suicidal tendencies. The child can die from a simple instance of ill treatment. The medicine man must mark the child so the entire community will know that it is an Eko child and accommodate its constant need for attention.

Esame: Esame means "cast away." Esame is a rare occurrence. It denotes a child who is born and dies in its infancy and is reborn several times over in the same body. The Esame child does not come to stay. It is a spirit that envies the love and affection that babies get and decides to come into a woman and be born. When the child senses that it is no longer the center of attention, it dies, only to be born again. Any woman who mysteriously loses a healthy child in its infancy consults a medicine man. If it is found out that the child is an Esame, the next child born to the woman is marked. Deep lines are etched into the child's cheek to make a lasting mark in one of several rituals designed to break the spirit's cycle. Occasionally, Esame children are born bearing the mark from their previous lives. This happens when the medicine man does not completely exorcise the Esame spirit from the human body. The procedure must be repeated preferably by a more competent medicine man.

Nnem-nor: Nnem-nor is commonly referred to as "slow poison." It results from stepping on a fetish/poison. The poison eats up the flesh on the foot down to the bone and steadily moves up to the leg. If nnem-nor is not arrested on time, the entire leg may fall off and may result in death. Hospitals are not known for treating this mysterious disease. Only medicine men can.

The Good and the Bad

Every once in a while, a village is favored with more than one medicine man, but every village needs one good medicine man. A good medicine man is the quintessential man of power whose skills serve the greater good of the community. His authority does not come from politics, and he does not indulge in politics, even as he might be called upon to settle political disputes. He identifies with the truth and is constantly going after evil. He prefers a life of quiet to a life of ostentation, justice over fortune, and integrity over fame. He is incorruptible. He acknowledges limitations to his powers and refers his patients to other specialists or advises against a course of action or treatment.

Many medicine men do not subscribe to this ideal. They have abused their power to instill and dispel beliefs as well as herbal treatment. Some healers are blamed for the spread of unhealthy myths: The dead can be brought back to life for the right price; soccer games cannot be won without first consulting the oracles; and all diseases can be cured by the use of charms. In South Africa, traditional healers known as *Sangomas* claim that AIDS can be cured by sleeping with a child under the age of 10, a criminal practice that has only advanced the spread of the disease. Human sacrifice is on the increase. Several ghastly killings recommended by medicine men have been reported recently. To gain power and status, rituals involving the killing of humans and drinking their blood from their own skulls are encouraged. In a ritual called "obeh," the fingers are used as charms, and bones are ground to paste to give strength. In the 1990s, a medicine man from Ntenako encouraged a man from a neighboring village to murder his sister and take out her genitals. It is common knowledge that in occult killings, the blood boosts vitality; brains are used to impart political power and business success; and genitals, breasts, and placentas ward off infertility and bring good luck, with the genitalia of young boys and virgins being especially prized because they are uncontaminated by sexual activity. Many Banyang medicine men are infamous for selling harmful charms to anyone willing to buy them. They have often been accused of proliferating certain vicious poisons whose recipe is known only to them and charging exorbitant fees to treat victims of these poisons.

The Medicine Man and the Law

The medicine man is the principal enforcer of the law in Banyang societies, through the threat or ultimate use of his power.

Deterrence: The law is best served when people in society take the medicine man's threats seriously. The medicine man's powers work like the omnipresent eyes of the law. To prevent trespassing, for example, the medicine man places a fetish where everyone approaching the property can see it and be warned. Violators are afflicted with a disease or a curse that only the medicine man can reverse.

Investigating crime: It is said that the medicine man can solve any crime using his *enebe* or divination if he can obtain something personal from the perpetrator: a hair strand, fingernail, or a piece of clothing or even a footprint. In the absence of any samples, the medicine man can cast a spell on the perpetrator, which can be broken only by a confession of guilt.

Punishment: Banyang societies never used incarceration as a form of punishment. There were no prisons in earlier societies. The gods, via the medicine man, determined punishment. The accused were made to swear by a powerful oracle, which would spare the innocent and strike the guilty. This practice is still very common among rural Banyang people. The system is not foolproof, however. Questions regarding the integrity of medicine men have cast doubts on the justice of their decisions.

— *Peter Ita Eta*

See also **Ethnomedicine; Religious Rituals; Witch Doctor; Witchcraft**

Further Readings

Achebe, C. (1986). *The world of the Ogbanje.* Enugu, Nigeria: Fourth Dimension.

Chekwas, S. (1994). *Ogbanje: Son of the gods.* Long Island City, NY: Seaburn Books.

Chukwuemeka, I. (2001). *The naked gods.* Ibadan, Nigeria: University Press.

Fomin, E. S. D. (1998). *Slave settlements in the Banyang country, 1800–1950.* Buea, Cameroon: University of Buea.

Kotun, D. (1998). *Abiku.* Pasadena, CA: Nepotist Books.

Becker, Gary S. (1930–)

Gary S. Becker received the Nobel Prize in Economic Sciences in the year 1992: "For having extended the domain of microeconomic analysis to a wide range of human behavior and interaction, including nonmarket behavior." With his new perspective, he widened the scope of economic sciences and at the same time added numerous insights to the human behavior research and the field of anthropology.

Becker considers economics not as a science that deals with a specific subject matter. For him, economics is a specific method that can be applied to all areas of human life. The basic assumptions of his approach are based on the rational choice model: maximizing behavior of human beings, stable preferences in regard to the central aspects of life, and the existence of markets where the allocation of scarce resources is coordinated and a market equilibrium is reached. At the same time, Becker acknowledges the wide range of human interests as basis for maximizing behavior and does not focus just on selfishness or gain like other economic research in the past.

On the basis of these assumptions, Becker reached well-accepted models about human behavior, within the family or in regard to crime, as well as further explanations for several human characteristics such as altruism.

Gary S. Becker was born in 1930 in Pottsville, Pennsylvania. He studied at Princeton with a focus on mathematics and economics. Later in his studies, he nearly lost interest in economics, since it did not seem to deal with crucial social questions.

For his graduate work, he decided to go to the University of Chicago. The encounter with Milton Friedman and his approach to economics as a "tool to analyze the real world" renewed Becker's fascination for economics.

Becker's first larger publication, *The Economics of Discrimination,* was based on his PhD thesis (1955) and came out in 1957. Within this work, Becker applied the economic view to analyze the effects of prejudices concerning minorities on their earnings, employment, and occupations. Becker concluded that discrimination leads to economic disadvantages for the person discriminated against as well as for the person practicing discrimination.

After he finished his third year of graduate study, Becker received an assignment as assistant professor

at Chicago. To become more independent, he left Chicago 3 years later and accepted a position at Columbia University and the National Bureau of Economic Research. In the following 12 years, he taught at Columbia and did research at the bureau, especially on the subject of human capital. Based on existing research, Becker developed a general theory on human capital. The theory answers the question of how investments in human competence, as in the case of education, can be explained, and what consequences these investments imply. As a result of these activities, he published his book *Human Capital* in 1964. Today, his theory has a wide application. It helps to explain human behavior in regard to education, migration, as well as investments and earnings in the health sector. Empirical data have shown the huge impact of human capital on real-world phenomena.

Other research projects of Becker in this period resulted in frequently cited articles, for example, on the allocation of time, irrational behavior, or crime and punishment. Becker's view on crime as a possible rational behavior helped to find new concepts to explain and to prevent crime.

In 1970, Becker returned to Chicago. Besides the increased interest in the economics of politics as a result of his encounter with George Stigler, Becker concentrated on the research of human behavior within household and family. He applied his approach to different interactions of family members and questions of fertility, marriage, children, or employment. Within Becker's theory, families are described as an interaction of different people with distinct and interdependent calculations of their utility functions. The theory allows predicting and explaining the results of this interaction and offers new insights into human behavior. In Becker's conception, a household can be considered a small factory, which produces the basic goods the members of the family need, such as meals, a residence, or entertainment. The production presupposes the input of time and ordinary market goods.

As part of his theory of family, Becker has worked on the important anthropological question concerning the existence of altruism as a human trait. Becker suggests a combination of economic and sociobiological methods to solve this question. Through the application of his economic theory, he argues that the survival of altruism can be explained by the results of the utility-maximizing behavior of altruists and egoists. The main reason for this effect is that altruistic behavior results in interdependent utility calculations between the person acting altruistically and the person in whose favor the action was. The people who receive a benefit from altruistic behavior have a motive for acting altruistically toward the person being altruistic to them, because they realize that an increase in the well-being of the giver enhances their own well-being. This dynamic leads to an economic advantage for human beings showing altruistic behavior. The altruists may not intent to benefit from their altruistic actions, but it is the case that the likelihood of their survival increases and with it the survival of the altruistic trait. Because Becker's model is based on interaction and not on shared genes, it is able to explain altruism outside the family, for example, between neighbors.

The approach of Becker is especially interesting considering Nietzsche's critique of morality. It shows that even within a society based on egoism and individual interests, altruism as a human trait could survive.

Because of Becker's unusual way of using the economic approach, his work was often not accepted as real economics. But his way of analyzing human behavior proved to be very effective, and as a result, he received the Nobel Prize in Economic Sciences in 1992.

— *Reyk Albrecht*

See also **Altruism; Behavior, Collective**

Further Readings

Becker, G. S. (1990). *The economic approach to human behavior.* Chicago: University of Chicago Press.

Becker, G. S. (1992, December 9). *The economic way of looking at life* (Nobel lecture). Chicago: Department of Economics, University of Chicago.

Behavior, Collective

Collective behavior is defined as mass activity among a specified population and is often used to describe action of localized mass public activity. Collective action usually occurs among aggregates who meet and disperse and interact on a temporary basis. Examples range from crowds at sporting events, to a collection of individuals listening to a public speaker, to protest activity and public rallies.

Historically, collective behavior was viewed as deviant behavior. It was assumed that individuals engaging in these activities were somehow disengaged from society and rebelling against society's norms. However, theorists argue that individuals may be rebelling against society's norms because they are so connected with the social institutions they seek to change.

Before Robert Park coined the term "collective behavior," psychologists were analyzing variations on this concept. Freud, Lebon, and others began writing on crowd psychology. This concept differed from the more recent understandings of collective behavior. Early analysts were asking what forces were at play when people were together in mass that led to the occurrence of undesired behavior, usually in the form of deviant acts against social norms. However, sociologists tend to view acts of collective behavior as components of social change, not simply instances of loss of control among individuals usually resulting in violence.

Theoretical Development

Two primary theoretical paths serve to explain instances of collective behavior. Some theorists have argued that collective behavior can be truly explained only from the perspective that societal strain must exist in order for an instance of collective behavior to occur. Others explain the behavior as a result of a localized mass acting together toward a specific outcome. Following this explanation, protests, rumors, fads, and fashion are also considered types of collective behavior.

Turner and Killian provide an excellent overview of the history and field of collective behavior. They point out three types of collectivities: the crowd, the public, and the social movement. Each of these provides a social setting where collective behavior takes place. Theorists have moved away from the view of collective behavior as pathological and now primarily focus on acts of collective behavior as instances of social change. In their model, they acknowledge emergent norms, feasibility and timeliness, and preexisting groups and networks that are present in order for collective behavior to occur.

Turner and Killian argue that collective behavior is constantly formed and reformed. It may focus on events and individual action in the beginning, but as the process evolves, the meaning of the action changes. Their model takes into account both structural and emotional underpinnings of collective action. Their work continues to provide a quintessential understanding of collective behavior.

Smelser developed another primary model in studies of collective behavior. His model takes into account a series of conditions that need to be present in order for collective action to be defined as such. Based on the concept of social strain, Smelser's argument poses conditions such as a breakdown of social control, structural conduciveness, and a precipitating incident usually occur prior to the emergence of collective behavior.

Social control is often weaker in collectivities because the individual has no ongoing relationship with the collectivity to worry about consequences of their actions.

The collectivity may develop norms of its own and encourage this behavior among its members. Often, members of the collectivity do things they may never do on their own. Structural conduciveness is another important factor to consider.

Structural conduciveness allows the situation to occur in some way, whether it be by a collective grievance or some other condition that allows the collective action to take place. In the case of a grievance, conflicts of interest that produce the grievance are known as *structural strain*. In addition, the grievance usually flows from some generalized belief among the population. Smelser also argues that there is usually a precipitating factor, or something that triggers the instance of collective behavior.

Instances of Collective Behavior

Evidence to support these theories can be found in classic cases of collective behavior. The civil rights movement in the United States provides ample evidence of collective behavior activities. In particular, the Freedom Summer riots in June 1964, March on Washington in 1963, and numerous other protests called attention to issues of inequality in the United States.

Other types of collective behavior are classified as less spontaneous and more dispersed than typical crowd or protest behavior. These exist in the form of rumors, fads, and fashions. Examples of dispersed mass behavior are evident changing styles of clothing in a culture, rumors such as urban legends, and popular culture toys and fads.

Does collective behavior have an effect in our daily lives? Cultural norms and values often set out to define acceptable behavior. Collective behavior by nature is a group activity. One is more likely to engage in collective behavior when norms come in conflict with our everyday behavior. Collective behavior ranges from expressions of discontent with society to crowd behavior and even simply following a certain fashion. Researchers have made efforts to make distinctions among types of collective behavior, and this is where searches for causes depart. Some even classify our current society as a global collectivity, where all behavior is somewhat collective—that we are acting and reacting to commonly held values resulting in expressions of collective behavior in the "everyday."

How do we move from feelings of discontent to actions expressing these feelings? Researchers continue to pose this question today. Usually, a specific grievance or claim of discontent is easily identifiable to offer some explanation of collective action. However, there are many instances when a grievance clearly exists yet no action takes place. Why? What is unique about these situations that no action takes place? Many have attempted to answer this question citing structural conduciveness, feasibility, and current political climate. Emphasis on continual collection of empirical evidence is still necessary for a more complete understanding of the nuances of collective behavior.

— Erin E. Robinson

See also **Social Change**

Further Readings

Curtis, R., & Aguirre, B. (Eds.). (1993). *Collective behavior and social movements.* Needham Heights, MA: Allyn & Bacon.

LeBon, G. (1960). *The crowd: A study of the popular mind.* New York: Viking Press.

McAdam, D. (1988). *Freedom summer.* New York: Oxford University Press.

Smelser, N. (1963). *Theory of collective behavior.* Glencoe, IL: Free Press.

Tilly, C. (1979). Repertoires of contention in America and Britain, 1750–1830. In M. Zald & J. D. McCarthy (Eds.), *The dynamics of social movements.* New York: Little, Brown.

Turner, R., & Killian, L. (1987). *Collective behavior* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Benedict, Ruth (1887–1948)

Ruth Fulton Benedict, renowned anthropologist, ethnographer, field researcher, and founder of the integrative approach to culture, viewed small-scale culture holistically based on a theory of "cultural relativism." Mentored by Franz Boas, Benedict examined interactive choice, personality, and patterns of culture among the Serrano, Zuni, Cochita, Pima, Pueblo Indian, Dobu Islander, and Zuni Pueblo cultures. Her analytical approach has been recognized as the configurational approach to culture, and she is recognized as an early contributor to both the theory of "cultural relativism" and "cultural determinism."

Born in New York State on June 5, 1887, Benedict received her bachelor's degree in English literature from Vassar College (1909), taught English literature in secondary schools for 3 years, and conducted research about literary women before studying under

Source: © Special Collections, Vasser College Libraries.

Alexander Goldenweiser and Elsie Clews Parsons at the New School for Social Research (1919–1921). They introduced her to Franz Boas, at Columbia University, who mentored her for her PhD degree in anthropology (1923). She later became editor of the *Journal of American Folklore.*

Benedict was beset with seemingly insurmountable personal problems as a child. Her father, Frederick S. Fulton, who was a surgeon, died suddenly when she was 2 years old. Her mother, Beatrice Skattuck, who was a school teacher, was traumatized by his death and grieved endlessly as she frequently moved with her daughters Ruth and younger sister Margery to escape the persistent pain of her loss. As a child, Benedict resented her mother, conceptualized an imaginary friend whom she preferred to Margery, and withdrew into her own imaginary world. Her relationship with the reality of social interaction was painfully difficult, as she had partial deafness, suffered from depression, had frequent psychogenic seizures and uncontrollable tantrums, and an inwardly directed temperament and shyness. Suffering from personality disorder, poor socialization and social skills, and low socioeconomic status compared with her age cohorts, Benedict struggled with challenges yet found an inner strength to prevail. She labored to maintain a cool and rational exterior, began to write poetry, and overcame obstacles with a power of infinite capacity to realize her potential academically, while maintaining reason and an insight into the dynamic relationship between culture and personality. She was very bright and receptive, gained a scholarship to Vassar, where she was elected to Phi Beta Kappa, and her confidence to excel and make a difference grew exponentially.

In 1914, Benedict married Stanley Benedict, a biochemist. Their relationship was empty and void of the intellectual dynamics that Benedict aspired to. During that time, she began to pursue her interests, and an anthropologist of immeasurable strength and influence was nourished. Encouraged by Boas and Edward Sapir, she was to become a role model for women in the 20th century.

Benedict began her investigation of the interaction between individual creativity and cultural patterns (the culture-personality isomorphism) and established the approach of analyzing cultures through choices made by individuals. Based on field studies among the Serrano (1922), Zuni (1924), Cochita (1925), and Pima (1926) cultures, she developed her theory that culture is a dynamic synergy of personality and cultural systems are related to varieties of human temperament. To Benedict, humanistic cultural potentialities existed in all cultures, a psychic unity of mankind: Individual cultures manifest differentially the inherent potentialities of humans.

At Columbia University, Benedict was assistant professor to Boas (1931), acting executive director of the Department of Anthropology (1936), associate professor and executive officer (1937), founding member of the Institute for Intercultural Studies (1941), a recipient of the Annual Achievement Award of the American Association of University Women (1946), principal investigator of the Columbia University Research in Contemporary Cultures Project (1947–1951), and professor (1948) before her death on September 17, 1948.

In 1934, Benedict's American classic and best seller, *Patterns of Culture,* was published. It remains the most readable introduction to anthropology as a fusion of humanistic science and humanities. The book has influenced generations of anthropologists, including her former student and friend Margaret Mead, whom she had met at Barnard College. Their friendship was strong, lasting, and extraordinary.

Benedict's other major works include *Zuni Mythology* (1935), *Race: Science and Politics* (1940), and the best-selling *The Chrysanthemum and the Sword: Patterns of Japanese Culture* (1946). Together with *Patterns of Culture,* these works have had a profound effect on cultural anthropology and stand as first-rate scholarship and science.

Benedict's theory of "cultural relativism" (each culture is distinctive and particularistic in problem solving) coupled with her theory of "cultural determinism" (synergy of dramatic individual adaptation and customs) generated the argument of human potentialities and adaptation, which became inspirational to the progressives of the post–World War II era who emphasized individual choice and change over state control.

Benedict was a pioneer among anthropologists, a role model for women of the 20th century, and an inspiration to the women's movement. Her work links anthropology and the humanities, and science and cultural regularities, and her emphasis on social change helped influence the transition from the perspective of static cultural patterns to the perspective of dynamic cultural patterns.

— *Stewart B. Whitney*

See also **Boas, Franz; Cultural Relativism; Mead, Margaret; Women and Anthropology**

Further Readings

Caffrey, M. M. (1989). *Ruth Benedict: Stranger in this land.* Austin: University of Texas Press.

Mead, M. (1959). *An anthropologist at work: Writings of Ruth Benedict.* Boston: Houghton Mifflin.

Mead, M. (1974). *Ruth Benedict.* New York: Columbia University Press.

Modell, J. S. (1983). *Ruth Benedict: Patterns of a life.* Philadelphia: University of Pennsylvania Press.

RUTH BENEDICT

American anthropologist Ruth Benedict has often been identified as one of the best minds of the early 20th century. In addition to enhancing the work of her mentor Franz Boas (1858–1942) and providing a strong foundation for her protégée Margaret Mead (1901–1978) to build on, Ruth Benedict was instrumental in shaping an environment in which anthropology was used as a tool for eradicating racism, sexism, and ethnocentrism in the United States and abroad. Her work, including *Patterns of Culture* (1934), *Race, Science, and Politics* (1940), and *The Chrysanthemum and the Sword* (1946) all led to major advances in expanding the scope of cultural anthropology.

While other biographers, including Benedict's close friend Margaret Mead, have not identified Benedict as a feminist, biographer Margaret M. Caffrey argues that Benedict could, indeed, be identified as such. Caffrey insists that Benedict's brand of feminism focused on changing values of individuals and societies rather than laws and courts. For Benedict, feminism dealt with encouraging women to recognize their right to individual identities. Like British writer and feminist Mary Wollstonecraft, whom Benedict so admired, she believed that women should be freed from the false stereotypes forced upon them by patriarchal societies.

Benedict's feminism was shaped in the wake of first-wave feminism, which began with the Seneca

Falls Convention of 1848. In the 1970s, as the second wave of the women's movement took shape, consciousness-raising became a major tool for helping women to discover themselves. In small-group sessions, women began to develop their right to be independent individuals, as Benedict had envisioned some 30 years before.

Young feminists of the 21st century, part of feminism's third wave, have also begun using consciousness-raising as a tool for self-awareness. Researchers Stacey R. Sowards and Valerie R. Renegar argue that the return to consciousness-raising sessions is a response to cultural changes and a need to react to both personal and social injustices. As individual women become more aware of the need for action in specific areas, they motivate changes in education, media, and popular culture in much the same way that Benedict foresaw.

Many feminists see the changing scope of third-wave feminism as a reaction to political shifts to the right and the attempt of the so-called radical right to redefine women's identity only through their roles as mothers and wives. In a 2004 study, researchers Catherine I. Bolzendhl and Daniel J.

Myers examined shifts in attitudes toward feminism between 1974, during second-wave feminism, and 1988, the end of the Reagan era in the United States. As predicted, they found that attitudes toward women's public participation, social roles, and sexual behavior have become more liberal over time. However, they contend that their evidence indicates a slowing down of this trend, possibly because of increasing public agreement on feminist issues. The exception to this agreement is the continued controversy over abortion. This controversy may be due in part to religious and partisan views on abortion that override feminist positions on the issue.

— **Elizabeth Purdy**

Berdache

Berdache is a term that commonly refers to Native North American gender variants. These are individuals who assumed alternate gender identities by taking on all or some of the tasks and behaviors associated with the opposite sex. Although it is often used in the anthropological literature to refer to biological males who fully or partially took on women's roles, it is occasionally used for gender variants of both sexes.

The term has become disputed in the anthropological literature for several reasons. The main reason is that the term itself was originally used by Spanish explorers and was derived from an Arabic word meaning "male prostitute" or "slave." These explorers had a derogatory view of gender variance and related behaviors, so the term assumed a negative connotation.

Gender variants were often mistaken by early European settlers to be transvestites, homosexuals, or hermaphrodites. None of these identities is accurate in describing the identity of the gender variant. Although cross-dressing and same-sex relations existed to varying degrees among gender variants across Native societies, they carried a different significance within local cultural frameworks than they did for Europeans. Hermaphrodites, individuals who are born with elements of female and male genitalia, may or may not have become gender variants.

The anthropological literature holds evidence of a higher incidence of male than of female gender variance. Some Native societies had both female and male variants while others had only male variants. This might be due to a higher level of flexibility for women in terms of the behavior and tasks in which they could engage without losing their status as women. In any case, these individuals were categorized as members of third or fourth genders rather than as members of the opposite sex.

The Navajo and the Mohave are examples of societies where both female and male gender variance existed. The Navajo term for both male and female variants is *nádleeh,* while the Mohave distinguish between the male (*alyha*) and the female (*hwame*) variant.

In many Native societies, an individual became a gender variant by showing an affinity in childhood with tasks associated with the opposite sex. In many cases, such as among the Mohave, there was a ceremony that served to test the strength of this propensity and to mark the individual's new status.

Societies differed in the extent to which the gender variant was expected or allowed to adopt behavior of the opposite sex. Depending on the cultural context, the individual might fully or partially adopt the dress, tasks, sexuality, and demeanor associated with the opposite sex. An example of the nearly full adoption of behavior linked with the opposite sex is the Mohave alyha, who would not only carry out female chores and wear women's clothing but would imitate menstruation and childbirth.

Attitudes toward gender variants in Native societies ranged from admiration and awe to fear and ridicule. However, the spiritual systems in place in many of the societies where gender variance existed provided a context whereby a gender-variant identity was validated and given meaning. Very often, the gender variant was considered to hold sacred powers and had special status as a healer or filled specific roles in sacred ceremonies.

While early European explorers assumed that all gender variants were homosexual, there was variation in their sexuality. Some variants engaged in sexual relationships with one sex only; others had relationships with both women and men; and others had no sexual relationships at all. In many cases, short- and long-term unions could form between a gender variant and a member of the same sex. Even in societies where homosexuality was generally frowned upon,

such as the Navajo, these unions were acceptable since the participants were of different genders.

By the middle of the 20th century, the numbers of visible gender variants among Native societies had decreased significantly. Forces of Western socialization contributed to changes in attitudes toward gender-variant individuals, and they came to stand greater chances of being marginalized. Recently, wider movements for the rights of homosexuals, bisexuals, transsexuals and other categories of people who fall outside of the sexual mainstream have had echoes in Native communities. Gay, lesbian, bisexual, and transgender Native North Americans have promoted a new recognition of the role of gender variants in Native societies. Although local terms are sometimes used to describe these individuals, the pan-Native term "two-spirit" has come into popular usage.

— *Nancy Leclerc*

See also **Gender; Navajo; Sex Roles**

Further Readings

Nanda, S. (2000). *Gender diversity: Crosscultural variations.* Long Grove, IL: Waveland Press.

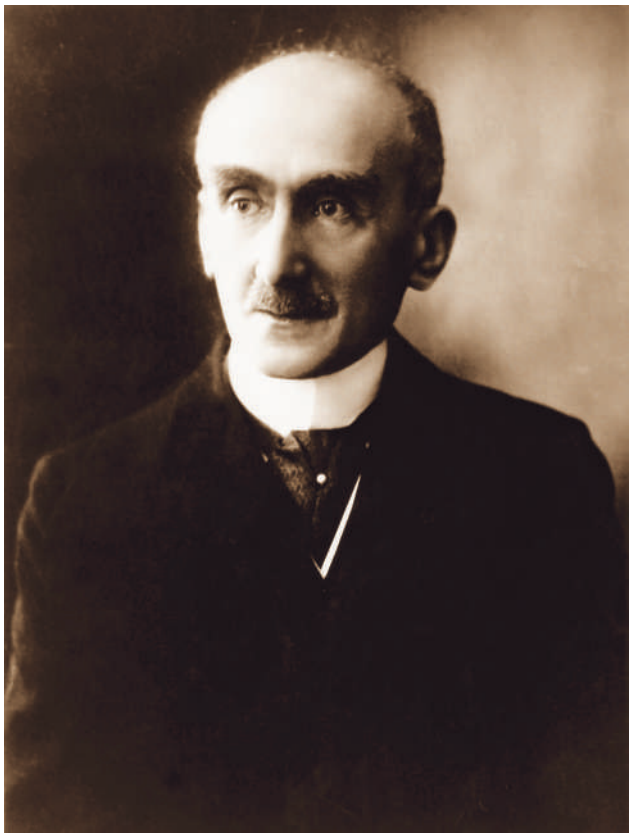
Roscoe, W. (1998). *Changing ones: Third and fourth genders in Native North America.* London: Macmillan.

Williams, W. (1992). *The spirit and the flesh: Sexual diversity in American Indian culture.* Boston: Beacon.

Bergson, Henri (1859–1941)

Henri Bergson was a French winner of the Nobel Prize for Literature in 1927. An important philosopher, Bergson's philosophical and psychological insights into the nature of time and evolution have also affected the discipline of anthropology.

Bergson was educated in France at the Lycée Condorcet and the École Normale Supérieure, where he studied philosophy. He taught philosophy in secondary schools until he was appointed chair of philosophy at the Collège de France, where his popular



lectures drew large crowds. Devoted to politics outside of the academy, Bergson resigned in 1921 to write and work for the League of Nations, and he would spend the years immediately preceding his death in 1941 opposing the Vichy government.

Bergson was primarily interested in the psychological and philosophical nature of intuition, but this interest lead to the examination of time and evolution—topics of great interest to anthropologists. He did not favor, in general, sociocultural explanations of phenomena. Even so, Bergson's influence on anthropology can be traced to two texts in particular: *Essai sur les donnes immédiates de la conscience* in 1889 (Time and Free Will: An Essay on the Immediate Data of Consciousness) and *L'evolution créatice* in 1907 (Creative Evolution). Bergson's understanding of psychic states, their intensity, their duration, and the use of intuition as the proper method of studying such states had a general influence not just on anthropology, but psychology, literature, and philosophy as well.

Bergson's critique of the concept of empty, homogenous time, what he called "objective time,"

was part of a general questioning of the nature of time that took place in the late 19th and early 20th centuries. For anthropologists, Bergson's notion that inner, or subjective, time is experienced as a flow, or *durée* ("duration"), and is only broken up by higher orders of rationalization is a tremendous insight. However, whereas Bergson privileged the individual as the locus of the codification of pure duration, anthropologists tend to see social categories at the root of such rationalization. Ultimately, the Bergsonian and anthropological views are compatible if one accepts that individuals are populated by inherently social concepts.

Whereas Bergson's thinking on time had a more diffuse effect on anthropology, Bergson's work on evolution touches directly on anthropological concerns. In *Creative Evolution,* Bergson returned to his thinking on time and intuition to argue against a notion of mechanistic evolution (as he would characterize Darwin's view). Instead, Bergson posited a creative evolution based on *élan vital* ("creative urge") that took the place of material selection. The creative urge, according to Bergson, accounted for the greater complexity of organisms over time. By placing intuition at the heart of the evolutionary process, Bergson offered a third way for anthropologists to understand evolution, as opposed to Darwin and Spencer. Although today Darwin's view, modified by Niles Eldredge and Stephen J. Gould, is more widely accepted, the effect of Bergson's thinking can be seen in the works of others, such as Pierre Teilhard de Chardin.

Bergson died of bronchitis on January 3, 1941.

— Michael W. Hesson

See also **Ecology and Anthropology; Evolution, Models of; Teilhard de Chardin, Pierre**

Further Readings

Bergson, H. (1928). *Time and free will: An essay on the immediate data of consciousness* (R. L. Pogson, Trans.). New York: Macmillan.

Bergson, H. (1983). *Creative evolution* (A. Mitchell, Trans.). Lanham, MD: University Press of America. (Original work published 1911)

Birx, H. J. (1984). *Theories of evolution.* Springfield, IL: Charles C Thomas.

Bermúdez de Castro, José María (1952–)

At present, the codirector of the Atapuerca project, José María Bermúdez de Castro Risueño (1952–), is one of the two most outstanding Spanish paleoanthropologists. Research professor at National Museum of Natural Sciences in Madrid, Bermúdez de Castro has been a member of the research team of Atapuerca site since 1982, when Emiliano Aguirre organized a multidisciplinary group to study this hominid site. Since 1991, he has been codirector of the Atapuerca research team that was awarded in 1997 with the Principe of Asturias prize, which is the most important scientific research award in the Hispanic world. Furthermore, Bermúdez de Castro became Member of Real Academia de Medicina y Cirugia de Galicia.

Bermúdez de Castro is very well-known by his research of the human remains from Trinchera Dolina excavations at Atapuerca site. In 1994, several human fossils were discovered: a handful of upper and lower teeth, a large cranial fragment, and a mandible with a molar wisdom tooth in the process of erupting. Furthermore, 36 human fragments were recovered of at least six individuals dated of 780,000 years ago. In 1997, a new human species was defined: *Homo antecessor,* which is considered the species that discovered Europe. These findings allowed him and his colleagues to publish many papers in the most prestigious scientific journals.

In the field of anthropology, Bermúdez de Castro is a specialist in dental morphology, systematic and phylogeny of hominids, growth and development, paleoethology, sexual dimorphism, paleodemography, paleopathology, and sociobiology. His new species *Homo antecessor* is a key "missing link" in the hominids evolution and allowed him to propose a new phylogeny for the last 2 million years. Apart from his main research in Atapuerca, he is also excavating in the Late Pleistocene site of Pinilla del Valle (Madrid).

Bermúdez de Castro's book *El chico de la Gran Dolina: En los origenes de lo humano* (*The Boy of the Great Dolina: In the Origins of the Human*) (2002) is very well-known in Spain. This book constitutes an excellent popularization of his findings in the Atapuerca site, a firsthand chronicle of the *Homo antecessor* discovery, and an exhaustive explanation of

many details of his proposal regarding the origin and evolution of the hominids.

— *Eustoquio Molina*

See also **Arsuaga, J. L.; Atapuerca; Homo Antecessor; Missing Link; Orce**

Further Readings

Bermúdez de Castro, J. M., Arsuaga, J. L., Carbonell, E., Rosas, A., Martínez, I., & Mosquera, M. (1997). A hominid from the Lower Pleistocene of Atapuerca, Spain: Possible ancestor to Neandertals and modern humans. *Science, 276,* 1392–1395.

Carbonell, E., Bermúdez de Castro, J. M., Arsuaga, J. L., Díez, J. C., Rosas, A., Cuenca-Bescós, G., et al. (1995). Lower Pleistocene hominids and artifacts from Atapuerca-TD6 (Spain). *Science, 269,* 826–830.

Fernández-Jalvo, Y., Díez, J. C., Bermúdez de Castro, J. M., Carbonell, E., & Arsuaga, J. L. (1996). Evidence of early cannibalism. *Science, 271,* 277–278.

Big Bang Theory

Throughout the ages, most people believed that the cosmos had existed for all eternity in an unchanging or static condition, neither expanding nor contracting. One reason individuals held this belief was an absence of scientific data, coupled with the inability to answer questions about the universe through measurement and observation. Another reason was that most individuals' beliefs tended toward parochialism and traditionalism. They preferred to believe in eternal, absolute truths, which supported their beliefs in an eternal, infinite cosmos created by God. With the arrival of the 20th century, both science and technology had developed to the point where scientists were able to formulate and then explore the empirical validity of what is called the "big bang theory." According to this theory of the origin of the universe, at one time all space and time were packed into an incredibly small package or dimension. About 14 billion years ago, this package or dimension increased in size at an unimaginable speed, due to a massive explosion (called "singularity"). The primordial universe that was created consisted primarily of strong radiation, which led to the formation of matter and, eventually, to stars, galaxies, solar systems, planets, and moons. The evolution of the cosmos over billions and billions of years produced the right conditions for life to form on earth, leading to the development of thinking beings such as us. Although no one theory perfectly explains—or can explain—everything about the origin and structure of the universe, the big bang theory is convincing. No other theory comes as close in explaining what scientists think happened in the creation of the cosmos. The big bang theory fits both deductions from mathematical models and conclusions from observations of the cosmos.

The First Cosmologies

The Greek philosophers moved the study of the universe away from a strictly religious approach to a more naturalistic one. Aristotle's ideas influenced philosophers and scientists in the West for centuries. His observations of celestial events convinced him that the earth was spherical rather than flat like a pancake. During lunar eclipses, Aristotle noted that the shadow of the earth on the moon was always round, an impossibility if the earth were flat. A flat planet would have cast an elongated shadow, not a round one (unless he always made his observations when the sun was directly under the earth, an unlikely event). Aristotle made another observation that convinced him of the roundness of earth. He saw the sails of ships coming over the horizon before the rest of the vessel. (On a perfectly flat earth, Aristotle's first view would have been of the entire ship, not just its mast.) Although some of Aristotle's conclusions about the universe were accurate, others were not. For example, he remained steadfast in his conviction that the earth was stationary and the moon, sun, other planets, and stars moved in perfectly circular orbits around the earth.

The impact of both religion and philosophy on cosmology diminished with the growth of the physical sciences. Nicholas Copernicus, a Catholic priest, suggested in 1514 that the sun was stationary and the earth and other planets moved in circular orbits around it. Copernicus's heliocentric view was discounted for nearly a century until two astronomers, the Italian Galileo Galilei and the German Johannes Kepler, reaffirmed Copernicus's deductions. The invention of the telescope (in Holland) in the early

1600s allowed Galileo to observe stars, planets and their movements, meteors, and comets. It was during his observation of the movement of Venus that he realized Copernicus was right to believe that the earth moved around the sun. Kepler, like Copernicus and Galileo, concluded correctly that planets rotated elliptically around the sun, although he erred by thinking it was magnetic forces that were responsible.

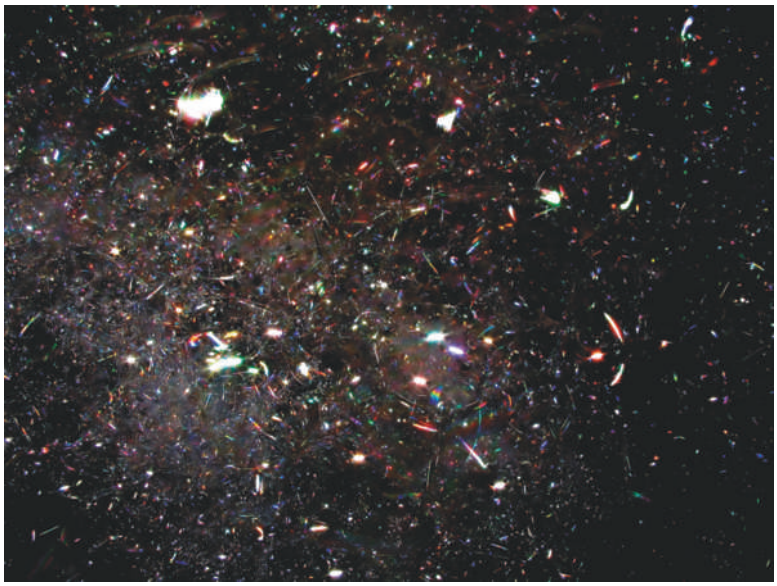
Issac Newton was the first individual to develop a coherent understanding of the physical forces that impact the cosmos. He figured out that the same force that pulled an apple to the ground also attracted humans, animals, other objects, and the planets and moons to one another. In other words, objects in the universe both attracted and were attracted by other objects. Ultimately, Newton developed an understanding of the laws of motion in space and time, as well as a theory of universal gravitation. The gravitational attraction between any two objects is directly proportional to the size of their masses and inversely proportional to the square of the distance between them. For example, if the distance between two objects were to double, the gravitational force between them would only be a fourth of what is was originally. Despite his brilliance, Newton did not understand the full implications of his work for cosmology. He believed the universe was, and always would be, unchanging or static, principally because he believed the universe was infinitely large, containing an infinite number of stars spread uniformly throughout it. Because the universe had no central point, Newton thought a perfect balance of gravitational forces would exist. He failed to realize that in a cosmos of different-sized planets, moons, and stars, these heavenly bodies would always be attracting one another, so that smaller objects would be pulled to larger ones like steel balls to a magnet. (Newton thought that in order to keep the universe perfectly tuned, it would require some tweaking by God, who might have to move a planet a little to the left or a star a little to the right.)

The Einsteinian Watershed

Modern cosmology really began in 1905 when a young man by the name of Albert Einstein, working alone in his spare time at his desk in a Swiss patent office, had an opportunity to work through some of his ideas about space, time, gravity, motion, distance, mass, and energy. He wrote four papers that year that were to transform physical science and our understandings of the universe in substantial ways. One of the papers, for which he won a Nobel Prize, showed that light could be understood both as a flow of particles and as a wave, a distinction that laid the basis for the development of quantum mechanics. A second paper showed that the collisions of atoms and molecules are responsible for Brownian motion, the jerky movement of pollen grains or other small particles that are suspended in a liquid. It was his third paper that shook the foundations of physics, altering the prevailing view of the universe. Newton's system was based on absolutes: A second on earth is identical to a second everywhere else in the universe, and a mile in one place is the same as a mile in every other place. Einstein surmised that Newton's system was wrong by using what Einstein called "thought experiments." For example, he wondered how space and time would look to individuals traveling on a train that was going nearly the speed of light (the speed of light is 186,282 miles per second). From his thought experiments, Einstein developed what came to be known as the "special theory of relativity," which impugned Newton's absolutist view of space and time. Imagine that a train moving across a prairie at near the speed of light is being chased by a gang of thieves on horseback, who are going almost as fast as the train. The robbers would report later that no matter how fast they rode, the train was still racing ahead of them at an incredible speed. To a stationary observer, however, the robbers were almost keeping up with the train. How could the robbers have an experience so different from the observer's? Einstein's answer was that, for the robbers, time itself had actually slowed. The faster you go, the slower time passes relative to a stationary observer. Separate two identical twins, and put one of them on a spaceship that leaves earth at the speed of light. When the rocket returns to earth (also at the speed of light), the rocket twin will be younger than the twin who remained on earth. For the space twin, time slowed, and this individual aged less than the earth twin. Einstein's fourth paper showed that energy and mass are not separate, but that mass is really compressed energy. Energy is equal to the mass of some object multiplied by the speed of light squared, an incredibly large number. An awesome amount of energy can come from a small amount of mass.

Einstein's major accomplishment, in all likelihood, was his development of the general theory of relativity,

which also modified and extended Newton's theories. Newton believed that gravity was a force that traveled instantaneously throughout the universe and caused objects to be attracted to one another. Einstein reasoned that this is impossible, because nothing can travel faster than the speed of light. What is actually happening is that gravity is an *effect* of the curving, warping, or bending of time and space. If a heavy brick is placed on a mattress and a ball is rolled past it, the ball will not travel in a straight line. It is not the force of gravity, however, that accounts for the path of the ball (a ball and a brick have too small a mass to exert much gravitational force on one another). What really happens is that the brick warps or curves the mattress enough that the surface of the bed *pushes* the ball so that its path is changed. If we replace the brick with the sun and the ball with a planet, we get an understanding of how different general relativity is from Newtonian physics. It is not gravity from the sun that is principally responsible for the way planets rotate around it. What actually happens is that the sun's mass warps the space around it, and the altered space pushes planets in such a way that they orbit around the sun. Objects in the universe (such as planets or stars) bend space in ways that are similar to the way a heavy object can bend the surface of a mattress. Einstein's theoretical work paved the way for an understanding of the smallest subatomic forces, as well as for the largest, the big bang of the universe.



Source: © iStockphoto/Don Wilkie.

The Big Bang

For almost three centuries, views of the origin of the universe had placed the earth, our solar system, and our galaxy at the center of all that happened. When Einstein applied his revolutionary views about gravity, energy, and mass to the cosmos, he recognized that the earlier views could not be correct. In Newton's view of the universe, stars, moons, and planets were held in perfect balance because of the force of gravity. If true, it means that energy would move in one direction only, from the center outward. As light sped off into the far reaches of the cosmos, it would be lost, never to return. This would mean that the universe would be continually losing energy and decreasing in size. Einstein thought this was unlikely. It neither fit the mathematical models he had developed nor his ideas about time, space, and relativity. Einstein posited the existence of a universe that was finite, boundless, and static, which meant that energy could be recycled. You could start traveling in any direction and eventually come back to where you started, although it could take billions and billions of years. It would be like traveling on earth except on a much larger scale. An individual could circle earth again and again without falling off into space or ever coming to a boundary. Einstein found himself in a quandary. His calculations indicated that the universe had to be expanding, but he, like Newton, preferred to believe it was static. Einstein continued to fiddle with his equations until he got them to fit what he wanted to believe. The universe would be expanding, he reasoned, except for the fact that it was kept in a motionless state by a force that he called the *cosmological constant.* This provision allowed Einstein to burn his candle at both ends. A potentially expanding universe was actually held in check by some mysterious force.

While Einstein was busy portraying the cosmos as a static system, some other scientists who had familiarized themselves with the principles of relativity were reaching different conclusions. Alexander Friedmann, a Russian meteorologist, worked out equations to show that the universe was actually expanding. He believed the cosmos had started some 15 to 20 billion years ago and had continually

expanded to reach its present form. Another individual, working independently from Friedmann, came up with similar conclusions. His name was Georges Lemaître, a Belgian priest. His prodigious intellectual abilities made it possible for him to build on Einstein's valid conclusions while avoiding his blunders. Lemaître reasoned that at some past time and place, all matter was concentrated into a tight bundle—a "primeval atom"—from which the cosmos erupted. Over the billions and billions of years, it expanded to reach its current form, and it would continue to expand for all eternity. The understanding of the cosmos was improving as a result of Einstein's theory of general relativity and its modifications and extensions by other scientists. However, the data were purely logical, based entirely on mathematical computations.

Nobody had been able to gather much empirical evidence about the nature of the universe, but that was to change. In 1923, Edwin Hubble, a skilled astronomer and mathematician, was viewing a nebula in Andromeda with the aid of the powerful telescope at Mount Wilson Observatory. He spotted Cepheid stars. In 1908, Henrietta Leavitt proved that the speed with which Cepheids get duller or brighter over time correlates directly with how bright they actually are. This knowledge allows scientists to compare how bright a Cepheid star actually is with how bright it appears, allowing them to figure its actual distance from earth. Another physical characteristic of light helped Hubble. Light looks different if it comes from a moving source rather than from a stationary one. If a source is moving away, light looks redder than it is (called "redshift"), and if it is moving closer, it looks bluer (called "blueshift"). By studying Cepheids and redshifts, Hubble was able to determine that the universe was expanding, as well as how quickly it was happening. Those galaxies that were farthest from earth appeared to him to be moving the fastest. (For example, Hubble observed that a galaxy that was twice as far from earth moved twice as fast, and one that was four times as far moved four times as fast.) Hubble's research indicated that the cosmos was expanding at an accelerated rate, but it neither proved that it began billions of years ago from a "primeval atom" nor that the cosmos would continue to expand for all eternity.

In the 1920s, only a few generally accepted beliefs about the nature of the cosmos existed: Einstein's theory of relativity was viewed as giving correct information about the shape of the universe, and the universe was viewed as an expanding system in which stars and galaxies were moving away from one another at an accelerated rate. Things changed by the end of the 20th century, as more and more scientists came to view the big bang theory or some variation of it as generally correct. (Oddly, the name "big bang" was coined by British astronomer Fred Hoyle to mock the theory, but the name caught on and is now the preferred one.) According to the big bang theory, about 14 billion years ago, the cosmos was densely packed into an incredibly small, remarkably hot package, dimension, or "seed." All mass, energy, space, and time were contained inside the "seed." For some reason, the "seed" exploded, and its contents expanded dramatically and rapidly outward, leading to the creation of atoms, stars, planets, moons, and, ultimately, living things. This big bang was unlike any other explosion, because in ordinary explosions, matter is propelled into some physical space. In the big bang of the cosmos, matter, space, and time were jumbled all together, and they were actually *created* by the explosion. The primeval cosmos remained dark and without much structure for a long time after its origination. Stars probably did not appear until 100 million years after the initial explosion, and galaxies probably did not form until 1 billion years after it.

In the 1980s, Alan Guth proposed inflation theory, which suggests that moments after the explosion of the big bang or singularity, the universe experienced a striking rate of expansion. If inflation theory (or some variation of it) is true, as most scientists now believe, then the universe must continue to increase in size. If it is bigger today than it was last year, then it was bigger last year than it was the year before that. It seems reasonable to conclude, then, that billions and billions of years ago, the cosmos was a great deal smaller than it is now, suggesting strongly that it has not existed forever and that it did originate at some specific point in time and space. Most scientists also believe that the universe is finite, because a universe containing an infinite number of stars would be incredibly bright all the time and we would never experience the darkness of night.

If a big bang did actually occur, then all of the matter that now exists in the cosmos would had to have been formed in that initial explosion billions of years ago (or at least been created by something that did originate during the big bang). Is this possible? Could a big bang have produced what we see in today's

cosmos? In 1946, a Russian physicist named George Gamow showed how a big bang could indeed have created the cosmos. He theorized that the nascent cosmos was filled with a thick mass of neutrons and these neutrons eventually bound together due to what is called the "strong force." The strong force can hold even similarly charged particles together into a tight bundle if they are close enough together for the strong force to overcome their natural tendency toward repulsion. The strong force could have been a principal way that both heavy elements (e.g., carbon or oxygen) and light elements (e.g., helium or deuterium) were formed in the universe. (Whether an element is "light" or "heavy" is determined by the number of particles it has in its nucleus.) The prevailing view is that lighter elements joined together to form heavy elements, a hypothesis given support by the fact that light elements are far more abundant in the visible universe than are heavy ones. An additional source of heavy elements could have been stars, because stars were both plentiful and hot enough in the early universe to do the job. Stars warmed and ionized gases, while producing and dispersing heavy elements through the process of thermonuclear fusion that took place in each star's core. However, lighter elements needed a source other than the stars. Although stars do churn out small amounts of helium from their hydrogen-burning centers, helium is far too abundant in the universe for stars to have been its principal source. Furthermore, the deuterium that comes from stars is destroyed almost as quickly as it is produced. Thus, the existence of any deuterium at all in the cosmos and an abundance of helium mean that these elements had to have been created from something other than stars, and a big bang seems to be a likely source.

Gamow eventually joined forces with two others researchers, Ralph Alpher (a graduate student) and Robert Herman (a colleague). This collaboration led to a more refined picture of the origin of the cosmos. The primeval universe, they argued, initially contained a swirling mass of nothing but neutrons (which Alpher called "ylem"). As this hot, swirling mass expanded, it continued to cool until it hit the pivotal temperature of 6,000 degrees Fahrenheit. This is the perfect temperature for element formation: It is hot enough to energize particles that might otherwise repel one another, but it is not so hot that the particles would move too fast for the strong force to bind them together. With cooler temperatures, a point was reached in which light and energy could escape from the chemical mass, and this radiation then traveled across the cosmos without interference. According to quantum mechanics, particles materialize and then disappear from space all the time. They do not pop into existence as single particles, but always as pairs; a particle and its antimatter counterpart materialize together. In the usual case, as soon as a particle and an antiparticle appear, they bump into one another and instantly disappear. In the early universe, especially under conditions of extreme heat and rapid inflation, things were different. As a particle and its antiparticle partner popped into existence, it was impossible for them to reunite fast enough to dematerialize, so the number of particles went up by two. As more and more particles came into existence, they provided the raw material to create many of the physical structures in the universe. The *quarks* in the universe (the building block of all matter) would have eventually reached the right temperature to coagulate into neutrons and protons (electrons are quark free). The expanding universe contained structures that varied in their density enough that gravity and the curvature of space worked together to cause the denser regions to slow their expansion and start to contract, leading to the creation of stars, galaxies, solar systems, planets, and moons.

In June 1964, in a perfect example of serendipity, Arno Penzias and Robert Wilson made a discovery that offered strong support for the big bang theory (they received a Nobel Prize in 1978 for their work). They had started to work for Bell Labs and were trying to measure any radiation coming in from the heavens at a 7.35-cm wavelength. Their initial attempt was simply designed as a test to make certain that the antenna they were using was calibrated correctly. Although they expected to hear only silence, indicating that the antenna was working correctly, this is not what happened. They heard a signal at 3.5 degrees above absolute zero. After discounting the possibility that the radiation was coming from some specific source, either on earth or in the sky, they started searching for flaws in the antenna itself. For several months, they worked to make sure the antenna had not been contaminated. (A family of pigeons had nested in it, and it took a great deal of work to get rid of them and their droppings.) No matter what Penzias and Wilson did, they still picked up radiation with their antenna. They finally concluded that the cosmic microwave background was coming from the universe itself. This background radiation is exactly the temperature it should be if a

big bang had occurred, especially in an expanding universe. A similarity in temperature is found in parts of the universe that are so far from one another that they have no reason to have the same temperature, which offers strong evidence that everything reached the same temperature *before* inflation occurred. Once the different structures from the big bang were spread across the universe—galaxies formed in clusters and in clusters of clusters, separated by huge voids or vacuums where few visible structures are found—they evolved in similar ways with similar temperatures.

The Cosmological Constant, Dark Matter, and the Uncertainty Principle

It is possible that the big bang that formed our universe was simply one moment in a constantly evolving cosmos in which all matter and energy expand and contract for all eternity. Einstein thought that an abundance of high-density matter in a universe would cause space to curve back on itself like a sphere and any expansion in the universe would eventually stop and a collapse would occur (called the "big crunch"). If the density of matter in a universe is low, then space will be shaped more like a saddle or shuttlecock and the universe could expand indefinitely so that no crunch or collapse will occur. With medium density, space would be flat (or nearly so), and whatever expansion occurred would be very gradual for all time. Friedmann studied Einstein's equations and concluded that more than one possibility existed. The universe could expand and contract only once, or it could grow and shrink repeatedly through multiple beginnings (bangs) and endings (crunches). The prevailing view of our universe is that it is flat (or nearly so). This does not necessarily mean that it resembles a pool table. What it means is that two beings could stand a mile apart and start traveling in the same direction, and they would never cross paths or come in contact with one another; they would always be a mile apart. The exact shape of the "flat" universe is still a mystery, however. A piece of paper that is rolled into a tube is also "flat," because two paths could be drawn on it that do not converge. The paper could be rolled and shaped into an oval, a circle, or some other shape. These, too, would still be "flat." A far-distant light in the sky might be nothing more than a reflected image of our own galaxy.

An ongoing series of big bangs might have occurred, which continued to produce new universes in a huge multiverse or metaverse. (Guth calls this possibility "eternal inflation.") Some theorists speculate that an infinite number of parallel universes exist, each one having its own distinctive history of evolution. In some universe, for example, Abe Lincoln did not get assassinated, Elvis Presley still lives, and the *Titanic* reached harbor safely. If the number of universes is infinite, all possibilities become realities. Every athletic event or presidential election would replay itself over and over again, and each individual on earth might exist an infinite number of additional times in alternate universes. The gravity from some parallel universe might influence the way galaxies and stars move in our own universe, and black holes might be the entrance or exit from one universe to another. Dimensions might exist in addition to Einstein's three space dimensions (forward and back, left and right, up and down) and one time dimension, perhaps as many as 10 or 11 space dimensions, but these cannot be seen because they give off no light. This information about eternal inflation and multiple universes—and it does sound more like science fiction than science fact—gives us another way to think about the origin of our universe and the big bang. Two parallel universes could have had intersecting membranes, and these universes could have collided with one another, creating the big bang that created our cosmos.

As galaxies move away from each other, the stars in their outer rims seem to move faster than they should if the force of gravity from visible objects is all that is operating. The term *dark matter* has been coined to describe the factor that could be responsible. What dark matter is made of—or whether it exists at all—is one of the great scientific mysteries. Without a presumption that something like dark matter exists in the universe and in sufficient quantities, it is difficult to understand how stars and galaxies could have formed as quickly as they have or how our universe could go from a big bang to its present form (i.e., without help from the gravity coming from dark matter, atoms and other elementary particles would have been unable to bind together long enough to create stars and galaxies). Dark matter may even have helped to produce the elements we see in the universe today, particularly light elements such as hydrogen, deuterium, and helium.

As the cosmos cooled, dark matter separated from visible matter, and the cooling of hydrogen would have formed a rotating disk of celestial matter and

debris. Clumps of dark matter would neither give off much radiation nor lose much energy, so they would scatter throughout the universe. The most compact pockets of gas would eventually develop into stars under the influence of gravity and the curvature of space. Deep in the core of a star is a blast furnace whose phenomenal heat is fueled principally by hydrogen. The heat and pressure would have been so intense in stars in the young universe that ionized hydrogen atoms would have been forced close enough together that the strong force could have bound the protons and neutrons together to create heavy elements. Massive stars (at least 8 times as large as our sun) would have continued to fuse heavier and heavier elements in their cores until iron was eventually produced. The fusion of iron does not give off energy, but uses it up, meaning the star eventually will be without fuel to burn. A dramatic collapse occurs, and what is left of the star is spewed violently into space in a powerful supernova explosion. Although the stars were responsible for creating some essential elements in the primordial universe, they could not be responsible for all the elements that now exist, especially light elements. Because dark matter probably formed before stars, it could have played a major role in the production of both light and heavy elements.

Social scientists are familiar with the "Hawthorne effect": When you study humans, your observations and measurements can change your subjects in a multitude of ways. You could be creating through your research that which you are trying to uncover. Whereas research methods exist in the social sciences to make it possible to conduct unobtrusive research, this is impossible in the physical sciences because of the *uncertainty principle.* The uncertainty principle was formulated in 1927 by Werner Heisenberg, a German physicist. It shows that any measurement of the position or velocity of a particle is inherently ambiguous. An observer can never know the precise velocity and position of a particle, because an increase in the accuracy of describing either velocity or position is automatically correlated with a decrease in the accuracy of describing the other. This means that uncertainty is a basic, inescapable quality of the cosmos. If it is impossible to measure the state of the universe without disturbing it to an unknown degree, it is even more difficult to predict what is likely to happen. Heisenberg, Erwin Schrödinger, and Paul Dirac developed quantum mechanics, based heavily on the uncertainty principle. Particles no longer had—or could no longer be viewed as having—fixed positions and velocities. On the contrary, particles were presumed to have a large number of different possible outcomes or positions, and quantum mechanics describes probabilities, not positions. Whether an electron is a wave or a particle, for example, depends on what procedures are used to observe it. In some experiments, electrons act like waves, and in others they act like particles. A tree does not look the same to someone 500 feet in the air as it does to someone leaning against its trunk. The physical world, like the social world, is characterized by enough uncertainty that definitive statements about physical reality are difficult to make.

Heisenberg's uncertainty principle cautions us against having strong faith that the laws of physics are, have been, or will be uniform in all times and places. Maybe in the far-distant reaches of our universe—or in parallel universes—physical facts and physical laws are different from what they are closer to home. Light, for example, does not have to travel at a constant 186,282 miles per second. If two photons of light left a galaxy 2 billion light-years from earth at exactly the same moment, they would reach earth a minute apart. In some situations, gravity may be able to travel as quickly as light. Hubble's observations of redshift might mean something other than that the universe is expanding at an accelerated speed. Light might actually lose energy as it travels over the incredible distances involved (called the "tired light theory"), which would make it look red even if it came from a stationary object. (A decrease in energy produces a longer wavelength, making light appear red regardless of the nature or velocity of its source.) Galaxies and stars may have an inherent or natural redshift regardless of whether they are traveling away from earth. (Halton Arp put forth this idea.) If redshift is an uncertain measure of the state of the universe, if it has nothing to do with whether an object is moving away from earth, then it will offer a tremendous blow to big bang theory and all the efforts to determine how fast galaxies are moving and how old they are.

The Anthropic Principle and Life in the Cosmos

One of the most remarkable things about our universe is that it has developed in such a way that it is capable of sustaining life, especially human life. The

anthropic principle is an idea first delineated by Brandon Carter in 1974, and it has both a weak and a strong version. The weak anthropic principle states that because the universe contains human life, it must be the kind of place that can support human life. At its most basic, the weak principle is self-evident: The universe must be a place that can support life, otherwise life could not possibly exist. This is like saying that the park bench on which people are sitting is strong enough for humans to sit on or else they would not be able to sit on it (or think about the experience). The weak version claims that in a universe as expansive as ours, the conditions necessary for the development of intelligent life will exist—will exist *only*—at particular times and places. In contrast, the strong anthropic principle offers the claim that life-sustaining regions of our universe evolved *in order* to produce intelligent life.

It cannot be denied that our universe seems uniquely capable of sustaining life, especially human life. If our universe were even slightly different, it would be a place where complex organisms could not have developed. If the inflation rate of the early cosmos had been altered from what it was, then galaxies would never have formed. If gravity had not been as strong as it was, stars would never have developed or lasted long enough to warm planets. Minor alterations in the forces in the universe would have made it impossible for hydrogen—necessary for both the formation of water and the constant fueling of the sun—to form. A change in the strong force would have made it impossible for protons to form. Minor changes in the universe would have meant that the forces of gravity and electromagnetism would not have been in the correct ratio for our sun to form. If things had been any different in the universe, too little carbon would have been made for organic life to develop. Our universe, with a sun that allowed the existence of a warm planet to sustain human life, with an abundance of water, with sufficient oxygen for living creatures to breathe, with a gravitational force to keep the universe from collapsing too soon, is really an ideal place for life to evolve.

With the universe so finely tuned for human life to develop on earth, is it possible that it all was an accident? According to Karen Fox, the odds of a human-compatible universe happening purely by chance are as likely as a tornado tearing through a junkyard and creating a Boeing 747. It may be even harder for most scientists to accept the claim that our universe was deliberately mapped out in order to sustain intelligent life, the assertion of the strong anthropic principle. Most of the planets in our solar system, a life-sustaining system to be sure, are without both life and the physical conditions necessary for it. If it were true that an infinite number of universes exists, it becomes far easier to accept that one universe could originate by chance that contained a particular solar system with a planet that had all the necessary elements for intelligent life to develop and evolve. It just so happened that our planet, in our solar system, in our galaxy, in our universe, contained all that was needed to sustain beings who could think and wonder about what was happening to them. In fact, it would be surprising if, in a multiverse or metaverse of infinite possibilities, intelligent life had not evolved.

Our solar system formed about 5 billion years ago from a swirling mass of metal, dust, gas, and other debris. Our sun formed in the central part of this nebula, and as the nebula rotated slowly around the sun, it flattened. Specific areas of this mass began to spin like whirlpools in a river. These spinning areas attracted nearby particles of matter and ultimately developed into the planets and moons that now circle the sun. In 1953, Stanley Miller, a graduate student at the University of Chicago, did an experiment that both reflected and reinforced the prevailing view of how life began on earth. He combined water, methane, ammonia, and hydrogen together in a container, heated it, and ran an electric current through it. Within a week, the jar was teeming with microscopic life in the form of amino acids, the building block of proteins. This offered some experimental evidence that the earth was—or at least could have been—created by a slow convergence of rock and other materials over the eons. It seemed clear from Miller's experiment that the earth started out cold and its inner core did not heat up until radioactive elements slowly turned up the temperature in the center. Iron, unable to melt and sink to the core, would have remained close to the surface for hundreds of millions of years, where it would attract oxygen, making it difficult for carbon dioxide to form. Instead, the carbon would have combined with hydrogen to form methane and ammonia, the chemicals that made the Miller experiment work. If Miller was correct, the earth's earliest atmosphere, lacking both carbon dioxide and free oxygen, would have been inhospitable to the development of both plants and oxygen-breathing, carbon-based life forms.

In retrospect, it is likely that Miller was wrong and earth was probably formed by violent collisions of celestial debris rather than by some gradual warming process under the influence of gravity. These violent collisions would have melted the iron, sending it plummeting to the earth's core. Oxygen would then have been available to mix with carbon, making earth's early atmosphere rich in carbon dioxide (as is the atmosphere of Venus), and it would have been difficult for organic compounds to develop in this environment. One way that life might have developed is that the young planet's gravitational field and the curvature of space attracted all sorts of material from the cosmos, and the organic building blocks were transported to earth by comets, asteroids, and meteors. Another possibility is that the building blocks of life were transported by interplanetary dust particles that fell down on earth. Even today, countless particles fall to earth like cosmic raindrops, many carrying a load of organic compounds.

Charles Darwin postulated that life on earth started in a warm little pond. He was probably right about the water but wrong about its temperature and its location. It was in the ocean where life first formed, not in a pond, and the region where life formed was hot, not warm. Initially, earth's surface would have been so hot that any moisture that fell would instantly turn into steam. This moisture absorbed some of the heat and helped to cool the planet, and the cloud masses that formed from the evaporating water would have kept the sun's warmth from reaching earth's surface. After thousands of years, the planet cooled enough that it reached the freezing point of rock (1,000 to 2,000 degrees Fahrenheit), and a crust formed. The time eventually came when the earth cooled to beneath the boiling point of water. The moisture did not evaporate into steam but started to accumulate on the planet. It may have taken a billion years to fill the crevices enough to form oceans.

The epicenter of life on the primitive earth was, in all likelihood, what are now called "hydrothermal vents." These are cracks in the ocean floor, leading to subterranean areas of molten rock. Cold water rushes into the vents, and hot water gushes out in a series of endless undersea geysers. High temperatures and all the underwater energy could have provided the conditions necessary to make life. The hotter it is, it seems, the easier it is for life to flourish, although researchers have found no organisms living in temperatures hotter than 235 degrees Fahrenheit. The organisms that now anchor the food chain around the hydrothermal vents are sulfur-eating organisms, creatures that probably look very much like the first living organisms on the planet. It is possible that rather than being the birthplace of life on earth, hydrothermal vents were only its nursery. Living organisms that originated elsewhere might have migrated to the vents for protection and nourishment. They survived because the deep water made it possible for them to survive any intergalactic calamity—radiation from exploding stars or environmental changes produced by collisions with asteroids and meteors—that wiped out their surface-dwelling relatives. Some of the larger asteroids that ploughed into earth would have generated enough heat to vaporize rock, boil oceans, and fill the atmosphere with debris and steam. These environmental changes would have made it impossible for life to survive, so life might have started but then disappeared many times on earth before it finally took root. The Chilean biologist Humberto Maturana coined the word *autopoiesis,* meaning "self-creation," to emphasize that a key feature of life is that it is organized to create and re-create itself.

When life on earth was established well enough to reproduce itself, it came in stages. The first organisms probably resembled current-day viruses, bacteria, and fungi. These original organisms could reproduce, but they could not breathe oxygen because there was not much to breathe. They broke down chemicals in the oceans through a process of fermentation. A characteristic byproduct of fermentation is carbon dioxide, which eventually reached a saturation point in the oceans of the young planet. The carbon-dioxide-rich environment became a starting point for new forms of life containing chlorophyll. These living organisms survived through a process of *photosynthesis:* Carbon dioxide, water, and sunlight are converted into sugar, which serves as food for chlorophyll-containing forms of life. Photosynthesis produces oxygen as a waste product. Oxygen seeped through the water in which the first plants grew and accumulated in the atmosphere. The conditions were finally right for the evolution of oxygen-breathing organisms, first in the oceans, and then later on land. Mutations would have occurred, most of which would have perished because of their inability to adapt to prevailing environmental conditions. However, some of these mutations would have survived and developed into successful

breeders, eventually supplanting the creatures from which they were descended. Higher life forms evolved, such as fish, amphibians, reptiles, mammals, and, eventually, humans. Recent discoveries in anthropology have suggested that the hominid line really began about 5 million years ago, when *Ardepithecus ramidus* and, later, *Australopithecus africanus* abandoned their arboreal existence to walk upright on the savanna of eastern Africa, which required them to adapt to a new and constantly changing natural environment. Upright posture, complex brains, successful breeding, tool use, cultural innovations and modifications, group living arrangements, advanced cognitive and emotional capabilities, and the refined ability to invent and use symbols and language—all these made it possible for humans to become remarkably successful at surviving on earth. The relationship of humans to their environment is characterized by *world-openness* (an idea proposed by Peter Berger and Thomas Luckmann). Humans are found all across the planet, having started their geographic expansion millions of years ago, and they show great adaptability and flexibility in regard to the physical world and the various social situations in which they find themselves. They continue to search for a more thorough understanding of the origins of the universe and life in it. The big bang theory can help them in their quest.

— John Curra

See also **Anthropic Principle; Catastrophism; Creationism, Beliefs in; Sagan, Carl**

Further Readings

Brian, D. (1996). *Einstein: A life.* New York: Wiley.
Fox, K. (2002). *The big bang theory: What it is, where it came from, and why it works.* New York: Wiley.
Greene, B. (1999). *The elegant universe.* New York: Norton.
Guth, A. (1997). *The inflationary universe: The quest for a new theory of cosmic origins.* Reading, MA: Helix.
Hawking, S. (1988). *A brief history of time: From the big bang to black holes.* Toronto, Canada: Bantam.
Kragh, H. (1996). *Cosmology and controversy.* Princeton, NJ: Princeton University Press.
Livio, M. (2000). *The accelerating universe: Infinite expansion, the cosmological constant, and the beauty of the cosmos.* New York: Wiley.
Siegfried, T. (2002). *Strange matters: Undiscovered ideas at the frontiers of space and time.* Washington, DC: Joseph Henry Press.
Silk, J. (2001). *The big bang* (3rd ed.). New York: Freeman.
Stachel, J. (1998). *Einstein's miraculous year.* Princeton, NJ: Princeton University Press.

Binford, Lewis Roberts (1930–)

Lewis Binford is one of the most productive and influential archaeologists of the 20th century. His primary accomplishment has been the organization and definition of the so-called New Archaeology. Binford did graduate study as a student of A. C. Spaulding at the University of Chicago. Like Spaulding, Binford emphasized in his writing the importance of rigor in the process of making inferences about the past. During the late 1960s, Binford reacted to the chronology-obsessed archaeology of the day by suggesting a new emphasis on the explanation of culture change. He proposed that archaeology, newly equipped with absolute radiometric dating techniques, focus on the processes of culture change rather than simply the description of culture areas and chronological sequences. Binford also demanded that archaeologists be more explicit with their links between archaeological remains and inferences of behavior. He noticed that many archaeological interpretations were unsystematically based upon conjecture or ideas in the archaeologists' minds. He proposed ethnoarchaeology and other so-called middle-range observations as ways of linking archaeological observations with the behavior in the past that produced them.

Binford also contributed a great deal to the study of taphonomy and the archaeology of the Paleolithic in the Old World. During his ethnoarchaeological research among the Nunamiut, Binford noticed the importance of carnivore accumulation of bones with respect to archaeological sites. He used this information to reinterpret the early hominid archaeological assemblages as not the work of mighty hunters, but instead the result of carnivore activity with marginal scavenging activity on the part of hominids. This critique fundamentally challenged current evolutionary theory, which had hominid hunting as the central

Source: Courtesy of Lewis Binford.

feature, and changed the landscape of approaches to the Paleolithic. Binford's effect on Paleolithic archaeology is palpable in the field's modern sensibility toward issues of taphonomy and approaches to making inferences about past hominid behavior.

Binford has also contributed significantly to the study of modern foragers. His ethnoarchaeological accounts of the Nunamiut are a testament to his skill as an ethnographer. In addition, Binford conducted ethnoarchaeological work in Africa and Australia. His main contribution in the study of foragers has been an increased awareness of variability, and rejection of the notion of foragers as a cultural type. In his recent synthetic summary of recent foragers, he stresses variability provides a long-needed foundation and frame of reference for the archaeological study of foragers.

Despite his massive corpus of work, Binford's most prolific output was his students. He closely contributed to more than 100 students, many of whom make up the elite scholars in the archaeological academy today and heavily populate anthropology department faculty. Through his research and through his care in direction of students, the effect of Binford's work is ever present in archaeology today, and will continue to be felt for generations into the future.

— *Grant S. McCall*

See also **Archaeology**

Further Readings

Binford, L. R. (1978). *Nunamiut ethnoarchaeology.* New York: Academic Press.

Binford, L. R. (1981). *Bones: Ancient men and modern myths.* New York: Academic Press.

Binford, L. R. (1983). *In pursuit of the past.* New York: Thames & Hudson.

Binford, L. R. (2001). *Constructing frames of reference: An analytical method for archaeological theory build using hunter-gatherer and environmental data sets.* Berkeley: University of California Press.

Bingham, Hiram (1875–1956)

One's background does not always indicate a particular future career. Perhaps this view applies to Hiram Bingham, whose academic training on the graduate level was somewhat different from one major area of his life that identifies him as one of the great anthropologists in the 20th century. He was, however, an individual who was to make important contributions both in archaeology and government during his interesting career in the 20th century.

Hiram Bingham was born in Honolulu, Hawaii, in 1875, from a family background that involved missionary work. Both his father and grandfather were missionaries. Hiram, however, chose a different path in life by becoming an academic and specializing in Latin American history. His early years allowed him to successfully pursue an Ivy League education on both the undergraduate and graduate levels. His BA degree was earned at Yale University in 1898, and in 1905, he received a PhD degree from Harvard University, where he studied history and political science.

In 1906, he sailed to South America and traveled extensively there. His early travels in that part of the world were described in a publication, *The Journal of*

an Expedition Across Venezuela and Colombia. Hiram Bingham later continued his interest in exploring, and these activities were described in another work, *Across South America.*

As noteworthy as these travels were, they were later outshined by what he is perhaps best remembered for, the discovery of Machu Picchu, usually referred to as the "Lost City," on a Peruvian hilltop. This particular discovery provided important archeological and historical findings, which still are of great interest and relevance today. They have not only provided important insights into a particular culture but have also contributed to a substantial interest in archeological studies among people around the world.

Hiram Bingham later was to add to his illustrious career by his future military and political activities. After the start of World War I, he became part of the American military, where he rose to the rank of lieutenant colonel and had the opportunity to serve abroad in France. He later became involved in politics on the state and national level, even becoming a U.S. Senator representing the state of Connecticut for 8 years. Upon completion of his service in this office, Hiram Bingham resumed other public and private contributory activities, attesting to his intelligence, vigor, and worldly capabilities. He died in 1956.

— *William E. Kelly*

See also **Peru; Venezuela**

Further Readings

Bingham, A. M. (1989). *Portrait of an explorer: Hiram Bingham, discover of Machu Picchu.* Ames: Iowa State University Press.

Bingham, H. (1951). *Lost city of Machu Picchu and its builders.* London: Phoenix House.

Bingham, H. (1979). *Machu Picchu, A citadel of the Incas.* New York: Hacker Arts Books.

James, N., & Fox, J. (1968). *The riddle of the Incas: The story of Hiram Bingham and Machu Picchu.* New York: Hawthorn Books.

Bioethics and Anthropology

Concepts

The term *bioethics* was first coined by the biologist Van Rensselaer Potter in his book *Bioethics, Science of Survival* (1970). The term is taken from two Greek words: *bios,* the Greek word for "life," and *ethics,* which has its roots in the noun *ethos,* meaning "custom." Van Rensselaer used it for ethical questions concerning survival and quality of life. This terminology never became widely established. Instead, bioethics is sometimes used in a broad sense to refer to the whole terrain of moral problems of the life sciences encompassing not only medical ethics but also important aspects of environmental ethics. Mostly, however, bioethics refers to old and new ethical questions arising in the field of medicine and medicine-linked biotechnology. It is bioethics in this latter sense that the present article takes as a conceptual basis.

The term *anthropology* is taken from two Greek words: *anthropos* and *logos,* which can be translated as "human being" and "word," respectively. As a combined word, it can be understood as the rational inquiry into the human being. Nowadays, there are further subdisciplines of anthropology as a science.

Biological anthropology deals with questions such as evolution, modern human populations, and human biodiversity. Archeology, in a certain way, is a link between biological anthropology and cultural anthropology. Cultural anthropology, which in Europe is often labeled *social anthropology* or *ethnology,* aims at studying different cultures. Questions of whether different cultures follow different bioethical standards and whether or not we should accept a bioethical relativism are part of the more comprehensive topic, ethics and anthropology. Philosophical anthropology deals with questions such as the mind-body problem and the difference between human beings and nonhuman beings. These questions are also addressed in theological anthropology with the important adjunct of mankind created by God.

The Importance of an Exchange Between the Different Anthropologies and Bioethics

It is of great importance that bioethics is in touch with the results of the different anthropologies. Philosophical and theological anthropologies have an impact on the bioethical framework, especially the questions of whether human beings are special beings (the question of human dignity and human autonomy) not allowed to be killed (sacredness of life). Biological anthropology is of great importance for ethical questions concerning the beginning and the end of life, which are central in contemporary bioethical debate. It is not possible to answer the question of whether harvest of human embryonic stem cells should be allowed without knowing the current state of the art of embryology. Social and cultural anthropology help us to understand how new possibilities in reproductive medicine are going to change the traditional concepts of mother, father, and children and raise the question of which kind of society we desire. Reflections on organ transplantation have to take into account the different cultures and different ways of reflecting the transition from life to death and the different forms of family structures. Anthropologists, therefore, play an important role in broadening the bioethical reflection.

On the other hand, ethical reflections also have an impact on the different anthropologies, for example, the prohibition of killing human beings, the declaration of human rights, and the importance of human autonomy.

Sacredness of the Human Life, Human Dignity, and Autonomy

The prohibition of killing has a central place in almost any morality around the world, even if in most societies there are exceptions, such as voluntary abortion. The religious conviction that human life is sacred and belongs to God plays a special role in this context.

The experiences of the cruelties during and after World War II led to the *Charta* (1945) and the *Universal Declaration of Human Rights* (1948) of the United Nations. Both documents affirm the importance of human dignity and the right to live, but they do not affirm a sacredness of life and they do not use any foundations of human dignity besides the historical experiences, conscience and reason. The focus of the documents is to declare humiliation and killing of human beings against their will as morally unacceptable (exceptions may be self-defense or some forms of abortion) and to create a framework in order to abolish wars, one of the worst sources of humiliation and killing. On the one hand, these documents were and are of great help. It is no coincidence that in 1947, the Nuremberg Code officially introduced the informed consent into the bioethical discussion and the medical research practice. In the following years, the paternalistic paradigm of the Hippocratic tradition has given way to a principle-based approach in clinical ethics, especially in the United States. Nowadays, the principle of autonomy of the patient is a fundamental cornerstone in the relationship between physician and patient.

On the other hand, the *Charta* and the *Declaration* are only of partial help for concrete bioethical problems concerning the beginning and end of life. Although in some cases, clear moral decisions can be drawn from them, there are cases where a lack of precision leaves us with unsolved moral problems. For example, they show the common conviction that active involuntary euthanasia cannot be a morally acceptable option. Still, they cannot be of help, however, to the evaluation of certain ethical conflicts at the beginning of human life and at its end. That is because the *Declaration* speaks about born human beings and does not deal with the specific bioethical questions of what kind of moral status human zygotes, morulas, blastocysts, embryos, or fetuses have. According to biological taxonomy, a human zygote is a human being consisting of two cells; a

morula is a human being approximately 3 days after fertilization; and a blastocyst is a human being after the division in an inner cell mass, called *embryoblast,* and the outer cell mass, called *trophoblast.* The concept "pre-embryo" is used for all these forms of human beings. Following this use of language, an embryo is a human being from the time of implantation until the end of the organogenesis, and a fetus is a human being from the end of organogenesis until birth.

The Beginning of Human Life

The decision of when human life begins is very important for bioethical evaluations of human embryonic stem cell research in determining the morality of destroying human blastocysts, not implantation of human morulae after preimplantation genetic diagnosis and voluntary abortions. If a human zygote is considered a human being with the full moral status of a born human being, then the destruction of human zygotes, morulae and blastocysts, as well as voluntary abortions, are morally unacceptable. Only two dilemmas may be accepted: (1) abortion after rape (negating the autonomy of the woman involved) and (2) abortion to save the life of the mother. If instead the pre-embryo, embryo, and fetus are not given full moral status, but some value, then a balancing of goods (e.g., therapeutic purposes, wishes of the mother involved, and so on) is ethically permissible. There would be, however, an important moral difference in evaluating the wishes of an incompetent 15-year-old girl to abort and of a 30-year-old woman who does not want to continue her pregnancy because of her wish to go on a long-planned holiday.

The question of when a human being comes into existence has a twofold meaning: Biological anthropology does not answer the question of when human life first appeared on earth (the question of anthropogenesis). It can only answer questions such as: What kind of earliest hominids have we discovered? Biological anthropology and embryology cannot answer the other question either, of whether a zygote, a morula, a blastocyst, or an embryo with a beating heart are already human beings with the moral status of a person. What it can do is to explain when the formation of a common genetic code is completed, when twinning is no longer possible, and so on. Therefore, the decision of when an entity of human origins has to be considered a human being in the moral sense depends on various presuppositions. Decisions on the moral status are very important for the moral evaluation of embryonic stem cell research, preimplantation genetic diagnosis (to select the pre-embryos with certain or without certain genetic traits), or voluntary abortion in its various forms.

Social and cultural anthropology tells us that the decision of when a human being is morally considered a person depends on the different cultures; for example, in ancient Rome, the father decided about the moral status. When he accepted the newborn child into the family, it gained the moral status of a person. Otherwise, it was abandoned and left to die. For Jews, the unborn in its beginnings has only value insofar as it is potential life that can fulfill the commandment of the Bible, "Be fruitful and multiply." For most Roman Catholics, the pre-embryo in the state of a zygote is instead understood as a person with full moral status. Two main reasons for the Roman Catholic position are named: the potentiality argument, in the sense of an active potentiality of a new organism, and the precautionary principle. The active potentiality must not be understood as the potentiality of a prince to become king. It is meant as an inner active force of the new organism, which may be guaranteed by its unique soul being there at this early stage. This argument makes two important presuppositions: the inner active force at this early stage and the definition of "new organism." Undoubtedly, a new human organism comes into being with fertilization, but one may question whether it is identical with the later-born human being. So, some argue for a number of important biological moments: the division of embryoblast and trophoblast, the end of the possibility of twinning, or when the final structure evolves by cooperation between maternal positioning and the embryo. They conclude that the new human organism after fertilization is only the predecessor of the individual organism that the ultimately born human being will be.

Even if one agrees for the sake of argument that the active potentiality of the new human being is given with fertilization, two different morally relevant problems remain. First, there are human beings who never seem to develop into "normal" human persons because their genomes are genetically altered in a way that prevents them from developing certain cognitive capacities. Their active potentiality, therefore, differs from the active potentiality of "normal" human

beings. Empirically, these human beings seem to be so handicapped that the active potentiality of a normal ape genome seems to be of a higher cognitive degree. If active potentiality were a necessary and sufficient condition for moral status, then handicapped people would not be deemed worth being protected in the same way as "normal" human beings because they seemed to lack that active potentiality.

Second, even if the active potentiality explains why this early human being should be protected, does it give sufficient reason to protect its life in the same way the life of an already-born human being is protected? Following the Roman Catholic precautionary principle, it is safer to strictly protect the pre-embryo as long as we cannot be sure of its moral status. Even highly respected theologians such as Thomas Aquinas (1224–1274) or Karl Rahner (1904–1984) doubted this position. Rahner argued that if there are serious positive doubts about the moral status of pre-embryos, there might be good reasons to allow certain forms of research. "Serious positive doubt" means that the probability that the pre-embryo is not a human being in the same sense as a born human being is very high. So precaution is exaggerated. How problematic a precautionary principle without limits can be becomes obvious when looking at the position of traducianism 1,500 years ago. It was claimed that the male sperm already represents a human being (homunculus); similar to a plant, it is the male semen that carries the whole active potential. For many people, this caused a moral dilemma, as every waste of sperm must be considered killing a human being. It was Thomas Aquinas who rejected this position. His doubts were based on philosophical reasoning rather than medical or scientific findings, as the latter were not yet at his disposal. Coming back to the contemporary debate, one is faced with the question: Is there a moral difference (not an ontological one) between destroying the nucleus of the sperm and the nucleus of the egg at the moment when the genetic material of the sperm is in the egg but not yet united with the genetic material of the egg, or destroying the fertilized egg at the moment after fertilization? If the answer is no, and if we do not protect this juxtaposition of egg and sperm in the process of uniting, then it would be cautious to protect the pre-embryo the same way we protect born human beings. This is especially the case when other goods are at stake, for example, the development of new therapies by the means of embryonic stem cell research.

The End of Human Life

It was and is widely accepted that (biological) human death means the irreversible cessation of the integrated functioning of the human organism. But it is an open question of whether or not death is the irreversible loss of function of the whole organism (or cell), that is, of every one of its component parts, or whether it is the irreversible loss of function of the organism as a whole, that is, as a meaningful and independent biological unit. For a long time, there was no need for this distinction. Irreversible cessation of cardiopulmonary functioning was accepted as the criterion of death. However, this criterion is not accurate. Technologies developed during the last century have resuscitated many patients whose respiration and heartbeat had already ceased. Today's medicine can determine the death of essential parts of the brain as leading to the loss of the capacity for consciousness and to a persistent vegetative state. It is possible to determine the death of the brain as a whole or the cortical death. Physicians can describe that the death of the brain results in the irreversible cessation of the integrated functioning of the human organism as a whole, leading to a complete disintegration of the whole organism after some days. Important questions, however, remain open: Is the death of essential parts of the brain, that is, the death of the higher brain, in particular the cerebral cortex, where consciousness and mental activity are realized, the death of the human being—or does the death of the brain mean the death of the human being, that is, the loss of the functioning of the higher and lower brain, consisting mainly of the brainstem, where the various somatic functions of the organism are coordinated? Or is only the result of the death of the brain, namely the death of the whole organism after some days, the death of the human being?

The establishment of the right criterion of death is very important for bioethical questions about the end of life, especially for organ transplantation and the cessation of therapies. If, on the one hand, the death of the higher brain is the death of the human being, then organ transplantation is permissible at this moment. It would not only be permissible but also obligatory if the person has given the permission before death and if there are people in need for the respective organs. Following this presupposition, it would be good medical practice not to keep someone

on life support machines if the human being were declared dead after higher brain failure. In consequence, there is no human person in a persistent vegetative state, but only a thing with human origins. If, on the other hand, someone were considered dead when the whole organism was dead, our current practice of organ transplantation would represent a form of active euthanasia, killing a dying person who voluntarily has accepted this form of dying. There is, however, a very good reason not to accept the position that someone is dead only when the whole organism is dead: A photograph of a public decapitation in a Bangkok square in the mid-1930s shows a decapitated victim. Jets of blood from the carotid and vertebral arteries in the neck illustrate, however, that the heart is still beating. This picture illustrates why someone should be considered dead whose brain is dead, even if there is a heart beating. In this case not the whole organism, but the organism as a whole is dead. Therefore, whoever demands as the criterion of death the death of the whole organism demands too much.

The Unknown Territory

Bioethical reflections and anthropological studies will gain further importance. Genetic engineering and nanotechnology will soon press the questions harder: Do we want to change our nature in an irreversible way, and if so, to what extent? Only if scientists and ethicists work together, open to listening carefully to one another, will human welfare best be served.

— *Nikolaus Knoepffler*

See also **Ethics and Anthropology; Human Dignity**

Further Readings

Callahan, D. (1995). Bioethics. In W. T. Reich (Ed.), *Encyclopedia of bioethics* (Rev. ed., Vol. 2, pp. 247–256). New York: Macmillan Library Reference.

Koenig, B., & Marshall, P. (2004). Anthropology and bioethics. In S. G. Post (Ed.), *Encyclopedia of bioethics* (3rd ed., Vol. 1, pp. 215–225). New York: Macmillan Reference.

Kuhse, H., & Singer, P. (2001). (Ed.). *A companion to bioethics.* Oxford: Blackwell.

Biogeography

The Scientific Study of the Distribution of Animals and Plants

Animal and plant species are not global in distribution; nor are they distributed at random around the globe. Their ranges are constrained by part events and by past and present environments; so we can speak, in broad terms, of historical and ecological biogeography, though these two subfields are very strongly interdependent. One constantly finds that the species on either side of a barrier, such as a river, a mountain range, a sea channel, or a belt of hostile terrain, are different; the question arises whether the division is due more to the physical barrier itself or to subtle ecological differences on either side.

Zoogeographers (those who study animal distribution) and phytogeographers (who study plant distribution) each divide the world into major regions; these coincide in broad outlines, but differ in detail. The corresponding regions are as follows.

Within each of the floral kingdoms (except the Capensic) are distinct subkingdoms, and within each of the faunal realms are distinct regions; in many cases, these broadly correspond, like the larger divisions themselves. For example, the Palaeotropical in both cases divides easily into African (or Afrotropical), Madagascan, and Indian (or Oriental) subdivisions, but the floral kingdom has an extra subkingdom called "Malesian," which includes all of Southeast Asia, which in the faunal case is divided between the Oriental region and the Australian realm. The Holarctic is divided into a Palaearctic (Eurasian) and a Nearctic (North American) region in zoogeography, but phytogeographers prefer a more complex division of their Holarctic kingdom.

The reasons for the differences between the zoo- and phytogeographic classifications are in some cases obscure, in others fairly easy to detect. Any faunal version of the floral Capensic kingdom has presumably been long since swamped by the movements of animals from tropical Africa. Possible elements of the floral Antarctic kingdom may be detected in cold regions of Chile, Tasmania, and New Zealand, but these too have largely been lost by faunal interchange. The real puzzle is the position of New Guinea: Why is its flora as typically Malesian as that of western Indonesia (and there are even Malesian elements in

Floral Kingdoms/ Faunal Realms	*Approximate Regions Covered*	*Differences Between Floral and Faunal Regions*
Holarctic (Boreal)	Europe, N. Africa, Asia N. of Himalayas and C. China; N. America	Faunal H. includes most of Arabia (except far south)
Palaeotropical (Afrotethyan)	Sub-Saharan Africa; S. Arabia; S. Asia; S. E. Asia	Floral P. includes whole of Arabia and Iran, extends E. to New Guinea, Oceania
Neotropical (Neogaean)	S. and C. America	Floral N. includes Florida, Baja California; does not include far S. of S. America
Australian (Notogaean)	Australia	Faunal A. includes New Guinea, New Zealand, Oceania
Capensic	Southern rim of S. Africa	Floral kingdom only
Antarctic	Antarctic continent, sub-Antarctic islands; S. end of S. America; New Zealand	Floral kingdom only

the rain forests of Far North Queensland), whereas its fauna is fundamentally Australian? At the moment, there are no clear-cut answers to this conundrum.

How these biogeographic divisions have come to be has been the subject of some polemic in the past. One model, dispersalism, holds that animals and plants spread out from centers of origin, crossing barriers and speciating (forming new species) as they go. The other major model, vicariance, sees animals and plants spreading widely, after which the barriers arose, fragmenting their formerly continuous ranges; plate tectonics, which in geologic time has split and rejoined whole continents, is just one of many ways in which vicariance has taken place. One can assume that vicariance explains most biogeographic patterns, simply because there is such wholesale concordance of distribution patterns between widely disparate species; dispersal across preexisting barriers seems to require more powers of endurance than most organisms possess. Although the most unlikely animals do occasionally survive long sea voyages, whether by swimming or flying or clinging to floating vegetation, this is surely not the usual way in which they got to their present homes.

One should not think of biogeographic boundaries as static. Paleontological evidence suggests that the Palaearctic/Oriental boundary in China has swung back and forth through the Pleistocene, partly in concert with climatic cycles and partly as a consequence of the gradual uplift of the Tibetan plateau. Again, in the Late Pleistocene, the fauna of the Maghreb (North Africa) was overwhelmingly Afrotropical; the succeeding millennia saw the progressive extinction of Afrotropical elements, and today it is Palaearctic in nature.

Primates follow general biogeographic trends as well as any other group. The Lorisiformes and Catarrhini have an overall Afrotropical and Oriental distribution; the Lemuriformes and Chiromyiformes are wholly Madagascan; the Platyrrhini are Neotropical. There are no Holarctic nonhuman primates, except as marginal "overspills" from the Palaeotropical core (mainly *Macaca* in China, Japan, and North Africa); and there are no Australian nonhuman primates at all. Within each area, major river barriers (the Congo and its tributaries in Africa, the Amazon and its tributaries in the Neotropics, the Mekong and Brahmaputra in the Oriental region) separate closely related species. Primates also, like other organisms, illustrate the principle of endemism: that isolated areas tend to have unique species. An example would be the Eastern Arc mountain forests of Tanzania, a region that has many endemic species of both plants and animals, only distantly related to their relatives in Central Africa and elsewhere; endemic primates include a species of mangabey *(Cercocebus sanjei)*, a species of colobus *(Piliocolobus gordonorum)*, and at least two species of bushbabies *(Galagoides orinus* and *G. rondoensis)*.

As far as human evolution goes, the early stages are all Afrotropical; and there is increasing release from vicariance principles through time, first as the descendants of *Homo ergaster* spread out of Africa, culminating in the invention of boats and crossing of ocean barriers by *Homo sapiens*. Even at the beginning of the Late Pleistocene, humans were still subject to

zoogeographic principles. The nature of the fauna preserved in the caves of the Carmel and the Galilee in Israel fluctuated according to climatic cycles, from predominately Palaearctic to predominately Afrotropical, and the human species changed back and forth alongside the rest of the fauna: Whenever the Israeli cave faunas were Palaearctic, the humans were Neandertal, and when the faunas were Afrotropical, the humans were *Homo sapiens*. There can be no more eloquent example of the relevance of biogeography to anthropology.

— *Colin Groves*

Bioinformatics

Bioinformatics has been defined as the mathematical, statistical, and computational methods that are directed toward solving various biological problems by using DNA, amino acid sequences, and other related biological information. Inherently, the field of bioinformatics is dependent on computer technology to store, retrieve, analyze, and actually predict the composition and structure of biomolecules, for example, nucleic acids (genetic material).

The advent of bioinformatic methods was pivotal and necessary in completing the Human Genome Project, and with its completion, many scientists now refer to our living in the "postgenomic" era. This technology and knowledge will without a doubt affect many fields of study and how they are studied. For example, now that entire genomes are completed and available, we are better able to examine the differences and similarities among the genes in multiple species. Information gained from these types of studies may be useful in establishing conclusions about evolution; this new branch of science in known as "comparative genomics."

There are many interdisciplinary fields that are related to and incorporated into bioinformatics. One of these fields is "biophysics," a field that applies methods and techniques from the physical sciences in order to understand biological structures and functions. Another important field is "computational biology," which is an approach that involves the use of computers to study and analyze biological processes. "Medical informatics" is a discipline that is concerned with the implementation of structures and algorithms that are to be used for the manipulation of medical data for the population at large.

Another field incorporated into bioinformatics that uses a combination of chemical synthesis, biological screening, and data-mining approaches in order to guide drug discovery and development is known as "cheminformatics." This is important because the discovery of new drugs is typically the result of chance, long-term observation, labor-intensive chemistry, and trial-and-error processes. Now, the possibility of using bioinformatic technology to better plan the development of new drugs intelligently and to automate their chemical synthesis is becoming a reality.

The fields that look to benefit the most from bioinformatics and may have the most impact on humankind and their quality of life are "pharmacogenomics" and "pharmacogenetics." Pharmacogenomics uses the application of genomic approaches (which is the analysis of an entire genome) to determine the identification of drug targets in a biological system. This will be useful in investigating the patterns of gene expression in the pathogen and in the host during infection, which will lend insight as to how host immunity fights off infection and how some organisms circumvent the host's immune system. This approach can also be useful in diagnostic procedures, for example, by examining expression patterns found in tumors that are different from those expressed by normal cells. The identification of these different expression patterns will lead to improvement in therapeutic approaches.

Pharmacogenetics, which is thought to be a subset of pharmacogenomics, uses genomic and bioinformatic methods in order to identify characteristics of a particular patient response to a single drug and then uses that information to improve the administration and development of therapies. This is important because every individual responds differently to drug treatments; for example, Drug A may affect most of the population positively, others with little change, and some with adverse side effects and life-threatening allergic reactions. The reason why everyone responds differently is because of the variations in genetic makeup, which can lead to a difference in the expression of a certain protein(s) that will evidently cause a different type of reaction or response in an individual from a particular drug. Pharmacogenetics is recently being implemented to optimize doses of chemotherapy in individual

patients with certain types of cancer, more notably prostate cancer. This is giving raise to the concept of "personalized medicine" and may change the way medicine is practiced in the not-too-distant future.

Besides the tremendous contribution that bioinformatics has made to the Human Genome Project, it will eventually have a massive impact on fields such as anthropology, biological research, pharmaceutical development, and clinical medicine. Of course, improvements in computer technology and hardware will also contribute to the manner in which bioinformatics is utilized and advanced.

— *John K. Grandy*

See also **Genomics; Human Genome Project**

Further Readings

Ewens, W. J., & Grant, G. R. (2005). *Statistical methods in bioinformatics: An introduction (Statistics for biology and health)* (2nd ed.). New York:Springer.

Jones, N. C., & Pevzner, P. A. (2004). *An introduction to bioinformatics algorithms (Computational molecular biology)*. New York: MIT Press.

Mount, D. (2001). *Bioinformatics: Sequence and genome analysis.* New York: Cold Spring Harbor Laboratory Press.

Biological Anthropology

According to the eminent historian of anthropology, Frank Spencer (1941–1999), "Biological anthropology can be regarded essentially as a modern synonym for the traditional term 'physical anthropology.'" The latter term came into use by North American anthropologists by the end of the 19th century. In the decades that followed, it referred to that aspect of the natural history of humankind assigned to one of the four components, or subfields, of the broader discipline of anthropology. This "four-field approach" was favored by Ales Hrdlicka (1869–1943) of the Smithsonian Institution and Franz Boas (1858–1942) of Columbia University, both major figures in the history of American anthropology who shaped the research areas and curricula of their discipline. They and their anthropological colleagues came to define the other subfields as prehistoric archaeology, linguistics, and cultural anthropology. Physical anthropologists focused their research and teaching on human biological diversity, adaptability, and evolution, including studies of the nonhuman primates. This four-field approach became a unique feature of the North American school of anthropology.

In European academic and research institutions, "anthropology" refers specifically to the scientific study of biology and evolution of the human and nonhuman primates, ancient and modern. Scholars who investigate social structures and customs of living human populations are identified as "ethnographers." Theories of cultural behavior emerging from ethnographic research fall under the heading of "ethnology." Linguistics remains a separate discipline, although it impinges upon anthropological linguistics. Archaeology retains its autonomy, although embracing both

Source: © Robert Jurmain.

Source: © Robert Jurmain.

By the 1950s, American anthropologists were using the term *human biology* to define a particular biological orientation of their investigations of specific problems in their studies of living populations, for example, variations in patterns of growth and development, nutrition and disease, adaptations of body form and size to cold-stress and heat-stress environments, adaptations to highland habitats with lower oxygen availability than in lowland settings, and other investigative issues relating to genetic and plasticity features of the human body. Published today are scientific journals titled *Human Biology* and *American Journal of Human Biology*, along with books and journal articles in which this phrase appears. Scholars who pursue these research areas of human biology usually have a broad training background in biological anthropology, human genetics, statistics, and physiology, but they are less directly involved in gross human anatomy, primatology, and the hominid fossil record (human paleontology, bioarchaeology, paleoanthropology).

prehistoric and historic studies of earlier cultures from artifacts, ruins of architectural structures, and other preserved vestiges of ancient lifeways.

In the 1980s many American anthropologists began using the term *biological anthropology* rather than *physical anthropology*, although recognizing that these names corresponded to the same subfield of their discipline. There was some discomfort with the continued use of the traditional term *physical anthropology* as it implies an earlier historical tradition when classification of ancient and modern populations into "races" was a major focus of research and depended heavily upon anthropometry in an era prior to the advancement of human genetics. There was also the issue of the adjective *physical* that suggested some relationship to the science of physics. Certainly the study of human anatomical diversity and evolution falls within the biological sciences. Today both *physical anthropology* and *biological anthropology* are used interchangeably. The former term continues in the title of the *American Journal of Physical Anthropology* founded by Hrdlicka in 1930, 12 years after his establishment of the American Association of Physical Anthropology. And one of the sections of the American Academy of Forensic Sciences is called "Physical Anthropology." Many recently published books and scientific articles retain the older name for this subfield of anthropology.

Within a broad spectrum of research topics in this subfield of biological (or physical) anthropology, there are further subdivisions. An example is primatology, the study of the anatomy, diversity, and adaptations of the nonhuman members of our taxonomic order. While trained in biological anthropology, these specialists may direct their investigations to Old World monkeys, New World monkeys, Asian apes, African apes, or prosimians (lemurs, lorises, and tarsiers) and fossil remains of ancestral forms. Dental anthropologists are involved with the measurements and morphological features of teeth. Cusp and groove patterns of occlusal surfaces provide data for a clearer understanding of genetic profiles, estimation of degrees of biological affinities between human and nonhuman species, both ancient and modern, and the remodeling of dental tissues resulting from genetic variations, dietary customs, pathology, and patterns of wear.

Biological anthropology is interdisciplinary in its approach to learning about human biological-physiological diversity and evolution. Practitioners are mindful of the cultural practices of their subjects, ancient and living, that affect bodily features of all humans in time and space. It is this recognition of the four-field approach that characterizes North American anthropology whereby students of the discipline are taught that different cultures are the products of learned traditions within the social milieu that lie outside the traits inherited through the genetic system. Both culture and heredity have significant roles to play in human adaptability to changing and different environmental settings over the course of some 7 million years of hominid evolution and over 65 million years of evolution of our nonhuman primate kin. Answers to some of the questions about our biological history are sought by biological anthropologists active today throughout the world where this discipline is included in the curricula of higher education.

Departments of anthropology exist in most universities, colleges, and other teaching and research institutes throughout the modern world. Their curricula usually include lecture, field, and laboratory courses in biological anthropology offered by instructors who have earned graduate-level degrees. Depending upon the training of biological anthropologists at various institutions, certain aspects of the subfield may be emphasized over others, for example, human paleontology, primatology, nutritional anthropology, human genetics and molecular biology, forensic anthropology (application of osteological and other laboratory methods within the medical-legal context of personal identification of human remains as in cases of homicides or mass disasters), dermatoglyphics (study of fingerprint patterns and their geographical and ethnic distributions), paleopathology (study of diseases of earlier peoples whose hard part anatomy has been preserved and have left markers on soft tissues, bones, or teeth), MOS (identification of markers of occupational or habitual stress on bones and teeth where muscular attachments are hypotrophied or otherwise remodeled), and biomechanics of locomotion and other functions of the skeleton. Biological anthropology, besides being interdisciplinary and international, is now contributing to the health-related sciences as well as to exciting hypotheses engendered by the discoveries of the ever-growing fossil record of prehistoric hominids and their nonhuman primate ancestors. This is a burgeoning and relatively new scientific field (compared to astronomy, physics, and chemistry) with an expanding body of qualified specialists and students curious about the scientific study of human biological diversity and evolution.

— Kenneth A. R. Kennedy

Further Readings

Comas, J. (1969). *Historia sumaria de la Associacion de Americana de Antropologos Fisicos 1928–1968.* Corboda, Mexico: Instituto National de Antropologia e Historia.

Hodgen, M. T. (1964). *Early anthropology in the sixteenth and seventeenth centuries.* Philadelphia: University of Pennsylvania Press.

McCown, T. D., & Kennedy, K. A. R. (Eds.). (1972). *Climbing man's family tree: A collection of major writings on human phylogeny, 1699–1971.* Englewood Cliffs, NJ: Prentice Hall.

Spencer, F. (1986). *Ecce homo: An annotated bibliographic history of physical anthropology.* New York: Greenwood Press.

Spencer, F. (1993). The rise of academic physical anthropology in the United States 1880–1980: A historical review. *American Journal of Physical Anthropology 56,* 353–364.

Spencer, F. (1997). *History of physical anthropology* (2 vols.). New York: Garland.

Stocking, G. W., Jr. (Ed.). (1988). *Bones, bodies and behavior: Essays in biological anthropology, history of anthropology 5.* Madison: University of Wisconsin Press.

WILLIAM BASS

While archaeologists have been involved in studying human remains for centuries, forensic anthropologist pioneer Bill Bass has used anthropology to study human bones to solve crimes both old and new for only decades. Bass retired in 1999 from the facility that has been popularly known as the "Body Farm" since 1994, when it was immortalized in writer Patricia Cornwell's novel of the same name, featuring medical examiner Kay Scarpetta. Even without Bass on hand, the study of

bodies continues at the facility known officially as the Anthropological Research Facility of the University of Tennessee. Knowledge of the work done at the Body Farm has also spread through Bass's work on the notorious O. J. Simpson case and his influence both direct and indirect on television shows such as *Forensic Files* and *Autopsy.*

Individuals and families have donated over 300 bodies to the cause of forensic anthropology, either because burial costs have become so expensive or because they believe in the work that Bass and his colleagues are accomplishing at the Body Farm, where approximately 40 bodies may be found in varying stages of decomposition at any given time. To discover what can be learned from decomposed bodies, workers at the Body Farm bury them in shallow graves, lock them in trunks of old cars, submerge them in water, hide them under concrete walls, place them in burning buildings, and leave them exposed to the elements. Results from the stages of decomposition are used as comparisons for bodies that are victims of various crimes, allowing investigators to draw scientific conclusions from available evidence. Bass's methods concerning the identification of personal characteristics, such as sex, race, and age from bones, have also been instrumental in helping to identify bodies after the Asian tsunamis of 2004.

One third of all board-certified forensic anthropologists working in the United States were trained at the Body Farm by Bass. Federal Bureau of Investigation (FBI) agents, criminologists, and law officers from around the world continue to train at the Body Farm's National Forensic Academy located at the University of Tennessee Medical Center in Knoxville, Tennessee.

Due to his impact on forensic anthropology, Bass has received international recognition and has changed the face of anthropology. A Forensic Anthropology Section has been established within the American Academy of Anthropology. Likewise, the American Academy of Forensic Science has formed a special section for forensic anthropology. Potential forensic anthropologists may now be trained at numerous institutions throughout the United States, including the University of California at Los Angeles, Cornell University, the University of South Carolina, New York University, and the University of Missouri. Internationally, students can study forensic anthropology at McMaster University in Ontario and at the University of Toronto in Canada and at Dundee University in Scotland.

While Bass declared himself an atheist after losing two wives to cancer, he began the practice of holding a monthly memorial service to honor all the human remains in residence at the Body Farm, acknowledging that they have contributed greatly to forensic anthropology, to science, and to criminal justice. The chaplain of the University of Tennessee conducts the service.

— Elizabeth Purdy

FORENSIC ANTHROPOLOGY

Forensic science is an outgrowth of anthropology, that discipline that has as its subject matter our own species. Its rapid growth in both application and popularity during the last 15 years has been due to an increase in the number of books, videos, films, college courses, and television programs focused on the subject matter. Interestingly enough, more females than males become practicing forensic anthropologists.

The human animal is the focus of anthropology in general and forensics in particular. Emerging out of physical anthropology, forensic inquiry is primarily concerned with the human skeleton in order to establish the biological characteristics of a deceased individual and then, if possible, to make a positive identification of the corpse and, when necessary, to determine the cause or method of death and to suggest or confirm the murderer or murderers, when appropriate.

In light of forensic evidence, it may be determined that a death was due to murder or suicide or an accident, or the cause of death may remain unknown. The forensic anthropologist may also be an expert witness at a trial. Consequently, forensic science is an example of an applied area of general anthropology, that is, the use of anthropological data and methods for the purpose of solving a problem in the human world,

whether this problem is recent or in the remote past. With its emphasis on application, forensic inquiry represents the relevant orientation of anthropology today.

In modern anthropology, humankind is seen as consisting of dynamic populations that are referred to as gene pools, and, therefore, the so-called human races of traditional anthropology are now replaced by viewing humankind as consisting of many changing ethnic groups. The biological variations in our species are explained in light of genetics and adaptations. All human beings are members of *Homo sapiens sapiens;* that is, each human individual belongs to the same genus, the same species, and the same subspecies. What physical differences that do exist in our species are meaningful only below the subspecies level of classification. This biological unity of humankind is ultimately supported by DNA evidence.

In particular, forensic anthropology focuses on differences in the human skeleton in order to determine the age, sex, height, weight, health, anomalies, and ethnic background of an individual, as well as other specific physical traits that may lead to a positive identification. Dental characteristics are very significant, as dental records may lead to a positive identification. By using clay models or line drawings by forensic artists, or computer generated three-dimensional images, as well as other advances in science and technology, a facial reconstruction is produced that is crucial in helping to achieve a positive identification.

To the trained eye of the forensic anthropologist, human bone can be distinguished from nonhuman bone; the same is true for blood and hair, and so on. These investigations rely on the old concept of variations on a theme. The theme is the human animal, while the variations are due to genetic and adaptive differences from person to person.

But, in general, forensic science may be used to identify an individual from a Civil War gravesite, determine the cause of death for the 5,000-year-old "Ice Man," and unravel the mystery surrounding a mummy of ancient Egypt. Of course, these studies have no legal purpose, since each case is over 50 years old. Nevertheless, the findings from these studies will be valuable to anthropology in general and perhaps to medicine in particular.

The discipline of forensic science continues to progress, particularly in light of advances in chemistry, genetics, and computers. The old beliefs in phrenology, physiognomy, and criminal types are now replaced by facts and ideas grounded in modern scientific investigations and rational evaluations of the empirical evidence.

— H. James Birx

MARY HUFFMAN MANHEIN

Mary Huffman Manhein is a professor of anthropology at Louisiana State University (LSU) in Baton Rouge. She is a forensic anthropologist and teaches courses that include Introduction to Physical Anthropology and World Prehistory, Forensic Anthropology, and Paleopathology. In 1999 and 2000, she lectured at New Scotland Yard in London, England. She also serves as the deputy coroner for the East Baton Rouge Parish.

As a forensic anthropologist, Manhein works in a subfield of physical anthropology. She practices methods for reconstructing the physical features of people who have been dead so long that all that remains is a skeleton or some portion of it. She is also working to develop improved tools for forensic anthropologists.

When human remains (a skeleton or body) are found by archaeologists, they seek the aid of forensic anthropologists like Manhein to both determine how the person died and what they may have looked like. To aid her work in this area, Manhein has studied osteology, bioarchaeology, and paleopathology. She is also a student of historic cemeteries.

Manhein is director of the Forensic Anthropology and Computer Enhancement Services (FACES) Laboratory at LSU. In the laboratory, she works on high-profile cases to help to identify bodies tagged as John Doe or Jane Doe. The reconstruction of the facial features of the previously unidentified bodies allows for their eventual identification.

Manhein has published a number of works on forensic anthropology. In 1987, she published with

colleagues the results of her study on "Archaeological Testing of the Horton Cemetery," in Jackson, Louisiana. In 1997, she published an article, "Decomposition Rates of Deliberate Burials: A Case Study of Preservation," in *Forensic Taphonomy: The Postmortem Fate of Human Remains.* In 2000, she contributed, with others, an article on facial tissue in children and adults to the *Journal of Forensic Sciences.* She has also written other articles.

Manhein's best-known work is her book, *The Bone Lady,* published in 1999 at the Louisiana State University Press. The book is a collection of stories in which she has testified as an expert witness.

— Andrew J. Waskey

Biological Anthropology and Neo-Darwinism

Biological anthropology is the study of human biological variation and its genetic and environmental causes within the framework of evolution. The roots of physical anthropology, the name usually given to this subfield of anthropology until recently, lie in the 19th century. However, there was no university-based training in the subfield until well into the 20th century. Using observation and measurement, physical anthropologists in the early days studied human evolution, classified human races, and collected data on human variation, taking anthropometric measurements and observing skeletal traits. In understanding human evolution, physical anthropologists used the fossil record to draw many of their conclusions. As a result, the field of physical anthropology was greatly influenced by anatomy and paleontology. The term *biological anthropology* slowly came into use, in part through the influence of the modern synthetic theory of evolution, also known as *neo-Darwinism,* or simply the *evolutionary synthesis.* Subsequently, physical anthropology was transformed from a science based in typological thinking, the idea that there was an essence or type based on morphological characters that marked each human race, to one grounded in evolutionary biology and population concepts.

With the emergence of the evolutionary synthesis during the middle part of the 20th century, physical anthropologists slowly began working with data other than anthropometric measurements in the form of Mendelian traits, like the blood group antigens to incorporate genetics into their analyses. The modern evolutionary synthesis can be understood as a unification of the macroevolutionary theories of natural selection and the microevolutionary theories of changes in the genetics of populations over time. However, to fully understand the synthesis and its impact on biological anthropology, the underlying history behind evolution and its effects on the human species must be examined briefly.

In 1858, Alfred Russel Wallace published a paper supporting descent with modification. The following year, Charles Darwin published *On the Origin of Species,* in which he formally presented his theory of natural selection supporting the concept of evolution. Darwin defined *natural selection* as the adaptation of an organism to its environment through selective reproduction. Many years later, after the development of genetics, it came to be understood that organisms were selected for the genes that benefit survival and procreation in response to environmental pressures. Both Wallace and Darwin are considered fundamental contributors to the development of the theory of evolution.

Somewhat later, Francis Galton, cousin of Darwin, suggested that evolution occurred discontinuously. During the same time, Gregor Mendel presented his data on the inheritance of traits in peas, which went largely unnoticed until their rediscovery in 1900. Three scientists in that year independently studied and clarified Mendel's ideas, which explained the transmission of traits and discrete units that eventually came to be known as *genes.*

Scientists who took Mendel's approaches and conceptualized them in populations recognized the processes of mutation, random genetic drift, and migration as mechanisms capable of altering gene frequencies. Under circumstances devoid of disturbances like these, gene frequencies would remain relatively constant from one generation to the next. However, if mutation, random genetic drift, or migration were operating in a population, gene frequencies could change regardless of whether the change conferred a survival advantage to the organism. Many of the

scientists studying Mendel's principles gradually began to support the idea that mutations were the most important evolutionary mechanism for change in populations, not natural selection, as Darwin had suggested.

Biometry, statistical analysis applied to biology, developed during the decades just before the rediscovery of Mendel's work and ideas. Biometricians believed that natural selection occurred continuously, incorporating small changes over long periods of time. As a result of these scientific advances in the first decade of the 1900s, there developed a clear division between supporters of Mendel's laws and the biometricians. The division between these two groups served as a platform for debate over the mechanism of evolution leading into the following decades.

Determining a mechanism for evolution, whether it occurred continually, over a long period of time, or in leaps and bounds, was pushed to the forefront in the biological sciences. Many geneticists of the time tried to resolve the different theories of how evolution occurred. Likewise, geneticists and others tried to understand how traits like those of interest to the biometrists, what we now label *metric traits,* could be understood in Mendelian terms. The answer came in 1918, when Ronald Fisher published a paper explaining the correlations between relatives and Mendelian inheritance. This important paper represented the first comprehensive attempt to reconcile the differences between the Mendelians and biometricians relative to metric traits like height, intellectual functioning, and the like.

However, developments in genetics and developments in selection theory, brought about by mathematical and experimental modeling studies on evolution, remained divided concerning the theories of how evolution occurred. Fisher's subsequent work, as well as that of J. B. S. Haldane and Sewall Wright, led to the development of classical population genetics and the theoretical underpinnings of the evolutionary mechanisms that change populations over time.

The first successful attempt to unify the evolutionary theories and demonstrate how they applied in natural populations occurred in 1937, when Theodosius Dobzhansky, a Russian biologist, published *Genetics and the Origin of Species.* His book synthesized the theoretical mathematical models of evolution developed by population geneticists such as Fisher, Haldane, and Wright, with natural population studies by field biologists like Dobzhansky himself. Following Dobzhansky's book, biologists such as Julian Huxley, Ernst Mayr, and George Gaylord Simpson published books of their own throughout the 1940s, each of which supported Dobzhansky's synthesis. The support from Huxley, Mayr, Simpson, and their colleague led to the unification of researchers from a wide variety of biological sciences. Scientists from the fields of genetics, embryology, anthropology, ecology, physiology, microbiology, and medicine were all involved in the synthesis and its aftermath. Working together, they found a way to integrate genetics into the framework of natural selection that satisfied all requirements for a unified theory, and thus neo-Darwinism was born.

There is general consensus among historians of biological anthropology that the influence of the evolutionary synthesis on research in the subfield began in earnest after the Second World War. Biological anthropologists slowly realized the value of including population concepts, based on the theories and applications of evolutionary genetics, in their research. It provided a new tool that would enable them to conceptualize changes in human biological characteristics through time. Anthropologist Sherwood Washburn was among the pioneers during the 1950s and 1960s in the application of neo-Darwinism to the evolution of primates, specifically as it relates to the origin of humans. Many point to the publication of Washburn's paper on "The New Physical Anthropology" in 1951 as the watershed moment for the influence of population thinking in the field.

This shift in thinking came about because many biological anthropologists were in essence retooling. Grounded in anatomy, paleontology, and taxonomy, they were now being exposed to the works of Dobzhansky, Mayr, and others, as well as developments in genetics, and the immediate impact was on the training being offered to the next generation of students in the subfield. Teaching was more apt to include exposures to population genetics, demography, ecology, and other population-based fields with an evolutionary perspective. Historians of biological anthropology have stressed the impact of the modern synthetic theory across diverse areas of research in the subfield, including primate field studies, human paleontology, hominid paleoecology, skeletal biology, human adaptation, and, of course, studies of biological variation in living human populations. The movement toward population thinking clearly had its greatest outcome in the broadening of biological

anthropology from a science based in anatomy and paleontology to one that attempts to understand biological variation in the human species and the primates, and its causes, past and present.

— *Kara Rogers and F. John Meaney*

See also **Evolution, Models of; Genetics, Human; Selection, Natural**

Further Readings

Mayr, E., & Provine, W. B. (Eds.). (1980). *The evolutionary synthesis: Perspectives on the unification of biology.* Cambridge, MA: Harvard University Press.

Smocovitis, V. B. (1996). *Unifying biology, the evolutionary synthesis, and evolutionary biology.* Princeton, NJ: Princeton University Press.

Spencer, F. (Ed.). (1982). *A history of American physical anthropology 1930–1980.* New York: Academic Press.

BIOMEDICINE

Biomedicine is the name given to a form of western professional medicine that asserts that illness is largely caused by deviations from universal biological norms. For most of the past century, this approach to medicine has been the standard for evaluation of all other approaches, whether popular or professional. Biomedicine assumes that illness and medical theory, science and practice, are acultural and have universal validity.

Research in the latter quarter of the 20th century has led to a reformulation of biomedicine within anthropology and, to a lesser extent, within sociology. Our recognition of the cultural bases of biomedical theory and practice has led to an understanding of biomedicine as a professional *ethnomedicine*, not an objective medical standard against which all other systems are measured. Medical knowledge can present problems, "facts" given by research or nature.

Before the 1980s, anthropologists considered western medicine to be of an entirely different order than medicines of other cultures. They applied the term ethnomedicine to other, nonwestern medical systems, and they referred to biomedicine as *scientific, modern, cosmopolitan*, or simply *medicine*. While the term *western medicine* differentiated biomedicine, the other terms clearly indicated anthropologists' negative assumptions about nonwestern medicines.

Attendant upon the use of a dichotomy differentiating ethnomedicine and (bio)medicine was another, implicit contrast: the distinction between ineffective and ephemeral "beliefs" found in nonwestern medicines and the perceived "knowledge" of western medicine. In the late 1970s and early 1980s, researchers such as Good, DelVecchio, and Kleinman shattered the perception of biomedicine as acultural, rational, and scientific. They found that extra-medical domains of culture were intimately bound up with the theory and practice of medicine. These domains include systems of social classification (ethnicity, race, gender, age, religion, class, rurality, and so on), self-concepts, prestige, competition, kinship and friendship, personal advancement, ritual, and magic.

Biomedicine is heterogeneous, in contrast to the scientific ideal. It is locally construed, constructed, and practiced, that is, "many medicines" and not a single enterprise.

Although science is basic to medicine, researchers have demonstrated that science itself is a cultural endeavor, thus joining colleagues in the philosophy and history of medicine and science with critical studies of the sciences that medicine applies. These studies often come from cultural, often interpretive, perspectives and are appropriately labeled *cultural studies of science.*

The term *biomedicine* eliminates the implicit hierarchy of earlier terms and highlights the equally professional nature of many nonwestern medical systems and their schools, licensing, pharmacopoeia, texts, divisions of labor, domains, forms of practice, specialties, hierarchies, and technologies. Each ethnomedical system exhibits a culturally specific formulation of human biology, that is a *local biology* rather than a universal one. This concept of local biology addresses the very different conceptualizations of human physiology encountered in professional medicine and makes sensible divergences in diagnoses and therapies as well as illness. Racialized and gendered local biologies figure prominently in this research.

Today, studies of biomedicine emphasize interpretation, discourse, experience, suffering, and meaning, although some adhere to materialist perspectives. In the contemporary interpretive view, the "bio" in biomedicine is a form of materialism that constitutes its greatest failing in the face of human suffering.

Anthropologists with this view see illness in categorical, transpersonal, and decontextualized terms. Ironically, most physicians hold that the biological focus is biomedicine's strength.

Changes in the character of biomedicine have led to novel avenues of research, including conflicts of interest in biomedical practice and research and the related issue of pharmaceutical companies' activities that affect medical practice. The nature and impact of medical technologies—building on earlier studies of reproductive technologies—and how technology affects training are further areas of research. Others include the disease category of dementia, biomedical ethics cross-culturally, and the sciences that biomedicine applies.

Contemporary research and insider critiques have moved biomedicine from an unquestioned subject to a principal object of research in medical anthropology, illuminating our understanding of biomedicine and other medical systems.

— Atwood D. Gaines

Further Readings

Foster, G., & Anderson, B. (1978). *Medical anthropology.* New York: John Wiley.

Gaines, A. D. (1992). *Ethnopsychiatry: the cultural construction of professional and folk psychiatries.* Albany, NY: State University of New York Press.

Gaines, A. D., & Hahn, R. A. (Eds.). (1982). Physicians of western medicine: Five cultural studies. *Culture, Medicine and Psychiatry, 6*(3).

Good, B. J. (1994). *Medicine, rationality, and experience: An anthropological perspective.* Cambridge: Cambridge University Press.

Good, B. J., & DelVecchio Good, M-J. (1999). "Parallel sisters": Medical anthropology and medical sociology. In C. Bird, P. Conrad, & A. Fremont (Eds.), *Handbook of medical sociology,* 5th ed. (pp. 377–388). Englewood Cliffs, NJ: Prentice-Hall.

Kleinman, A. (1995). Writing at the margins: Discourse between anthropology and medicine. Berkeley: University of California Press.

Biometrics

Biometrics is a statistical study of biological observations and phenomena, which can be implemented to provide automated methods that can be utilized to identify an individual based on physiological and behavioral characteristics. Examples of features that can be measured include facial variations, fingerprints, hand geometry, handwriting, iris and retinal differences, and voice.

The ability to identify and distinguish among individuals based on specific physical features is grounded in the existence of genetic diversity throughout humankind. The identification of a specific trait that is expressed (known as the *phenotype*) is possible because each individual possesses a unique genetic makeup (known as the *genotypes*) that expresses certain physical characteristics that are also unique (e.g., fingerprints and retinal differences).

Those presently benefiting from biometric technologies are enterprise-wide network security infrastructures, government IDs, secure electronic banking, investing and other financial transitions, retail sales, law enforcement, and health and social services.

The history of biometrics dates back to the late 1800s, when Sir Francis Galton (the founder of biometrics and cousin of Charles Darwin) opened the Anthropometric Laboratory at the International Health Exhibition in 1884. Galton's passion for applying statistical methods to biological phenomena eventually lead him to invent the first system of fingerprints in 1892. This system was adopted by police departments worldwide and is still used today.

For biometric identification systems to be reliable, physical and behavioral features used for recognition must be unique, permanent, measurable, and user-friendly. Uniqueness, biometrically, means that the trait being measured is specific to only one individual and must not appear in two people. If a trait is found in many people, then it is known as "universal" and is not unique. Permanence means that this trait must also not change over time or be able to be physically altered. Measurability means that these specific traits must be able to be consistently measured with technical instruments. The information measured must be able to be effectively stored and compared in a biometric reference database so that the identification of an individual can be determined and authenticated.

The use of fingerprinting in individual identification was successful because each person has a unique and immutable fingerprint (including identical twins). Physically, a fingerprint is composed of many series of ridges, splits, dots, valleys, furrows, and "minutiae points." Minutiae points are specific ridge characteristics that are found on either a ridge bifurcation or a

ridge ending. Today, all of the characteristics found on an individual fingerprint can be converted to a "digital fingerprint template" and stored on a central database for subsequent matching or authentication processes. Fingerprinting was the most reliable form of identification in forensics until the development of DNA technology.

Handwriting recognition (or signature recognition) is also used in biometrics. This is more modernly referred to as "dynamic signature verification" (DSV) and analyzes the manner in which a user signs (e.g., velocity and pressure exerted by the individual's hand, as well as the static shape of the finished signature). Technology used to measure these characteristics ranges from simple scanners, video cameras, and pens that contain sensors to ultrasonic sensing.

Facial recognition and photo identification are another widespread use of biometrics. This type of identification is used worldwide for important matters, such as international passports, and nominal matters, such as purchasing beer. However, facial recognition is not the most accurate form of identification because of similarities that are found in facial structures, especially among relatives. Information on identification cards can also be altered. In addition, physical alterations can be made surgically with relative ease.

Currently, biometric methods measuring voice recognition are being used for personal items such as computers and cellular phones. Voice recognition technologies are also being used in the medical field for quicker retrieval of a physician's dictation of medical records or office visits. In the past, a typical visit to the doctor's office was documented on paper by hand or dictated onto a tape recorder and later typed by a medical transcriptionist, which may have taken days to get back. Now, with the new technology of voice recognition, a medical dictation can be spoken into a computer and made available within a few minutes. In the future, voice recognition may eventually replace the use of keys in automobiles.

The iris (the colored region of the eye) and the retina (found in the back of the eye) can be scanned to authenticate individual identification. The iris scan utilizes a special camera with an infrared imager that illuminates the eye and captures a very-high-resolution photograph, which is then matched for verification. This process takes only a few seconds. In addition, contact lenses and eyeglasses present no problems with the quality of the image. The retinal scan analyzes the blood vessels in the back of the eye, which supply nutrients to the photoreceptors (known as rods and cones) of the retina. The scanning utilizes a low-intensity light source and an optical coupler, which reads blood vessel patterns with great accuracy. However, a person must stand still for several seconds to receive an accurate read, and there are concerns that the light source used may cause damage to the eye. In addition, the cost of the technology for retinal scans and its inability to evolve with newer technology have made retinal scan devices impractical for most situations, and it is being replaced with the more user-friendly iris scan. Iris and retinal scans are more widely used in military bases, bank vaults, corporate repositories, airports, and other areas of high security.

In the future, it may be conceivable that "genetic sampling" will replace all other forms of biometric measurements. This is a realistic possibility because the genomic makeup of an individual is the most specific element of our physical being and it is unique above any characteristic presently measured. The idea of genetic sampling will become more of a reality with the completion of the Human Genome Project.

— John K. Grandy

See also **DNA Testing; Genomics; Human Genome Project**

Further Readings

Ashbourn, J. (2003). *Practical biometrics: From aspiration to implementation (Springer professional computing).* New York: Springer-Verlag.

Bolle, R. M., Connell, J. H., Pankanti, S., Ratha, N. K., & Senior A. W. (2003). *Guide to biometrics.* New York: Springer.

Wayman, J. L., Jain, A. K., Maltoni, D., & Maio, D. (2004). *Biometric systems: Technology, design and performance evaluation.* New York: Springer.

Bipedal Locomotion

Among living primates, only humans are bipedal. It is not certain when this unique feature emerged, but it must have been before the 3.6 million-year-old Laetoli footprints were made. Although the prints were not made by completely modern feet, they are

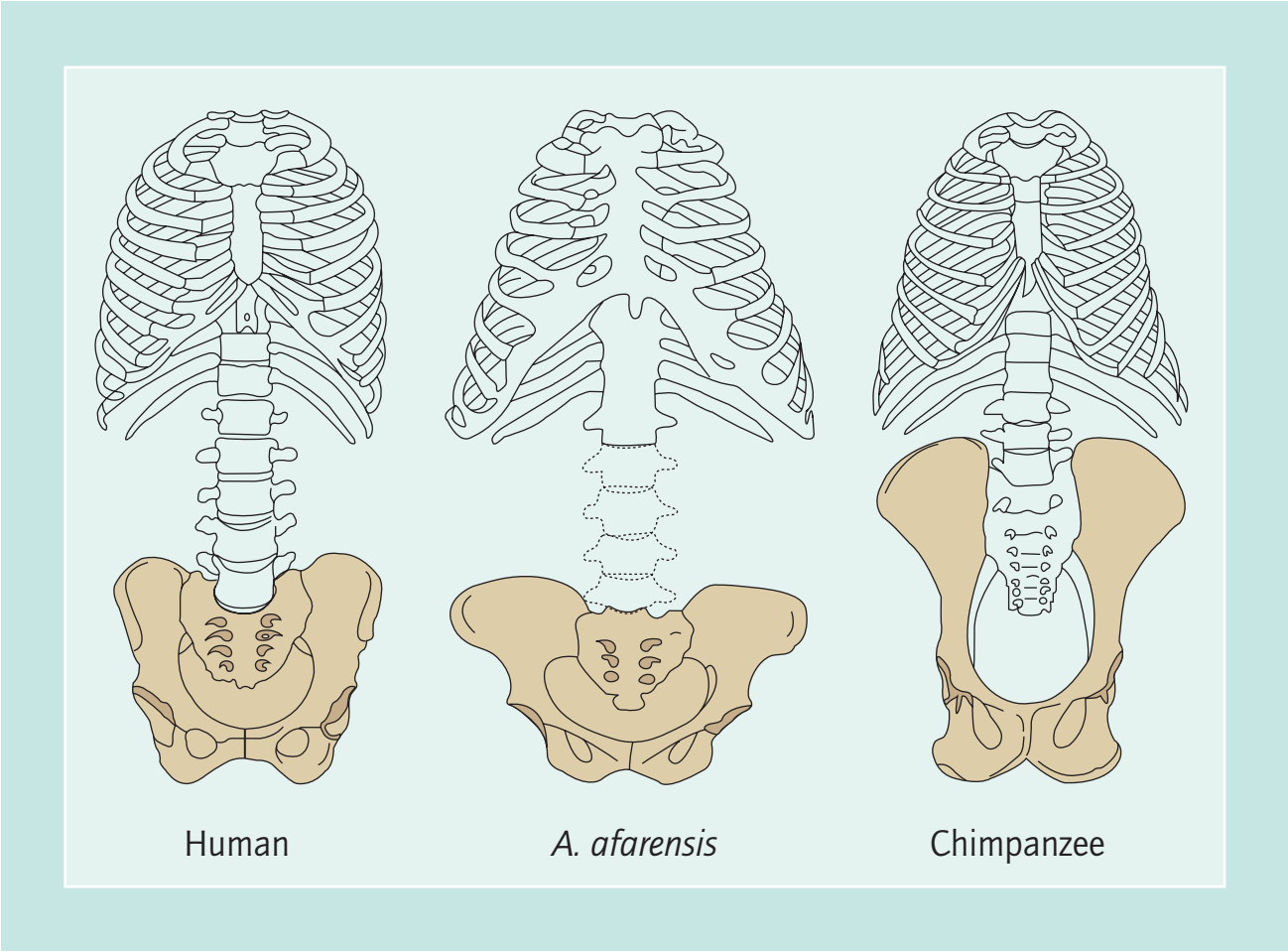


Figure 1 Torsos and pelves of a modern human, a reconstruction of *A. afarensis*, and a chimpanzee.

unequivocally the prints of bipeds. They are the impressions of feet that lacked a distinctive human rounded ball, or swelling, at the base of the great toe, that had no well-defined arch, and that retained ever so slightly divergent great toes. Somewhat later in time, the well-known 2.9 million-year-old *Australopithecus afarensis* Lucy fossil is the earliest human ancestor to display the clear skeletal hallmarks of bipedalism. Earlier fossils are either not yet described or lack the two most diagnostic parts, the pelvis and the distal (i.e., lower) femur.

Despite the paucity of fossils near the beginning of the human lineage, most paleontologists regard bipedalism as the earliest distinctively human feature to have evolved in hominins. *Hominin* refers to members of the taxonomic family Homininae, which consists of human ancestors and collateral species after the lineage split from that leading to chimpanzees. In great apes, the pelvis is vertically elongated so that it makes up much of the back (see figure), leaving the back somewhat inflexible. The human pelvis is vertically short and shaped like a bowl with an open bottom, the opening being the pelvic inlet or birth canal. Humans also possess a valgus femur, a femur that angles in at the knee, whereas ape femora have no angle, giving them a bowlegged appearance. *A. afarensis* clearly exhibits these two hallmarks of bipedalism. Many other early hominin features, however, are more primitive. Early hominins have a partly divergent great toe, long curved lateral toes, short legs, a knee joint that is small and flexible, a cone-shaped rib cage, long robust arms, disproportionately long forearms, a scapula or shoulder blade with a tilted-up joint surface, and curved robust fingers with distinctive concavities on the inner surface to accommodate large finger flexor tendons.

Two features in *A. afarensis* are neither chimpanzee-like nor humanlike. First, the pelvis, while human shaped, is extraordinarily broad. Second, the joint at the base of the great toe, deep in the foot near the ankle, is shaped like a hinge. As with a hinge, it allows little movement up or down and is therefore a rigid strut for pushing off during walking or running, just as is the great toe of humans. Like a hinge, it swings side to side, perhaps to allow the great toe to grip small branches. In chimpanzees, the whole foot is modified so that the great toe functions like a human thumb.

Disagreement among experts on the locomotor habits of early hominins has little to do with these details themselves and much to do with their interpretation. Some argue that the apelike features are holdovers from an arboreal ancestor, "primitive retentions," and therefore unimportant for inferring behavior. Others interpret the primitive features more straightforwardly.

As might be expected, given that experts disagree on function, the circumstances that led to the evolution of bipedalism are quite contentious. The first bipedalism origin hypothesis was that of Charles Darwin. Although some human fossils had been discovered in his lifetime, Darwin never mentioned them. Rather, he compared living humans to apes and suggested that our enormous brains and upright locomotion were linked. Quite the opposite of our current understanding, Darwin suggested that humans evolved large brains when still apelike tree dwellers. Having conceived of tools, they became bipedal to free the hands to carry and manipulate tools, and having adopted tool use, lost their projecting canines. The fossil record shows us this is backward. Human-sized brains evolved only in the last tenth of our existence, whereas bipedalism evolved early.

In the early 1900s (1912, 1923), Sir Arthur Keith observed that gibbons held their legs extended during their distinctive hand-over-hand suspensory locomotion, called brachiation. He suggested that humans were the product of a trend for progressively more erect posture in primates, starting with a rather typical quadrupedalism in monkeys to a more erect quadrupedalism in apes, an erectness required by their long forelimbs and culminating in bipedal humans. He offered no argument for why such an unwavering progression was inevitable, and current theory does not consider such evolutionary inertia possible. Keith noted that gibbons had large muscles of the upper limb but small lower back muscles. Large back muscles are used by monkeys to uncoil the back when leaping. He found more than 80 shared by apes and humans that are not shared with other primates. As Keith's hypothesis matured, gibbons, great apes, and human ancestors were all seen as sharing long arms, rotatable wrists, mobile shoulders, short backs, broad torsos, pronounced shoulders, and powerful upper bodies, all as adaptations to brachiation.

Although Keith's scenario was not uncontested, many saw Darwin's tool-carriage hypothesis as easily melded with Keith's increasing-erectness scenario to model bipedalism having evolved as a brachiator included more tool use in its daily behavior. Just as the Keith perspective achieved this splendid internal consistency, contrary evidence emerged to reinvigorate the opposition. At mid-century, Louis S. B. Leakey brought his considerable persuasiveness and the first *Proconsul* fossils to bear on the issue, weighing in against the Keith brachiationist model. *Proconsul,* an early ape—too early to inform us on the anatomy of the chimp-human common ancestor, we now know—had a monkeylike body. Bolstering Leakey's arguments was the steady discovery of hominin fossils at Sterkfontein, South Africa, hominins with unsettlingly ape-sized brains.

Although carrying/tool use hypotheses bore up rather well in the face of this contrary evidence, by the 1960s a multitude of bipedalism-origin contenders crowded the field. The tool-use hypothesis was embellished to suggest that throwing in particular was critical, though this did nothing to resolve the brain-size/tool-use problem. Others suggested that bipedalism might have freed the hands for carrying something other than tools—infants, for instance. This certainly touches an important evolutionary pressure point; however, no other primate infant needs help clinging to its mother. Carrying food to a home base to provision mates or other group members was proposed in the early 1960s and found its adherents.

Raymond Dart, famous for his hunting hypothesis for human origins, saw bipedalism as having evolved to allow long-distance viewing over tall grasses, to spot prey in Dart's view, to spot predators in the view of others. Such vigilance bipedalism is not extremely rare among chimpanzees, nor have other mammals adopted bipedalism due to predation pressure. Noting that chimpanzees are bipedal during social displays, and that bipedalism makes individuals

appear larger, some suggested that bipedalism functions to frighten predators or to bully competitors. Threats, however, are *more* effective when rare, the better to contrast with usual behavior. Surely low-ranking bipedal bluffers would attract aggression from dominants.

The 1960s also saw the first presentation of the aquatic hypothesis, the idea that bipedalism evolved as a wading posture for collecting aquatic foods. Critics argued that natural buoyancy reduces the need to evolve anatomical adaptations to this sort of bipedalism, and they pointed out that other aquatic mammals are not bipedal.

In 1970, Cliff Jolly proposed that early hominins stood erect to gather grass seeds, a seed-eating hypothesis. He argued that small seeds required a constant two-handed picking action to achieve a reasonable rate of ingestion; bipedalism freed the hands. The hypothesis was an immediate hit, but criticisms gradually mounted. Grasses can be pulled over and harvested without bipedalism. The hominin habitat was more likely woodland or forest, rather than grassland. Hominin dental microwear suggested a diet of fruits rather than seeds. As the hypothesis was debated, newly discovered *A. afarensis* fossils exhibited more arboreal anatomy than expected. Mike Rose suggested a saving modification. He had observed that baboons were bipedal when harvesting small fruits from bushes. Perhaps small fruits rather than seeds were picked bipedally. This friendly amendment to the Jolly perspective yielded the small-object feeding hypothesis, salvaging Jolly's most appealing arguments while addressing their weaknesses. Richard Wrangham argued that when trees are packed together closely, bipedal shuffling uses less energy than repeatedly lowering and raising the torso to walk quadrupedally. Most important, this suggested a means by which bipedal locomotion might gradually increase in frequency, even if inefficient.

In 1980, Peter Rodman and Henry McHenry drew on data showing that human bipedalism was efficient compared to chimpanzee quadrupedalism to suggest that bipedalism arose to make moving between increasingly dispersed feeding trees more efficient. Critics pointed out that some quadrupeds are more efficient walkers than humans, suggesting that bipedalism was not a likely adaptation when efficiency is desired. A quadrupedal hominin ancestor, moreover, would lose efficiency by standing up and adopting a locomotion for which it was not adapted. Although the authors had claimed that bipedalism was efficient only in relation to apes, many saw an initial inefficiency, should a quadruped stand up, as an insurmountable evolutionary barrier.

In 1980, Owen Lovejoy gave the carrying hypothesis a complete overhaul. He emphasized that bipedal locomotion was a ridiculous adaptation. Its two points of contact rather than four afford less maneuverability, less stability, and less speed. Unlike other mammals, bipeds cannot use their backs to increase their stride, and with only two limbs and therefore half the muscle power to move the body, humans accelerate slowly and stay slow. Lovejoy set high hurdles barring the evolution of bipedalism and then found a way over them: He suggested that bipedalism dramatically increased female reproductive rates. He proposed that males who collected and carried supplementary food to females could significantly increase their birthrates. If males had high confidence in paternity, they would aid their own offspring. As Lovejoy envisioned it, bipedalism, monogamy, lack of visible estrus (sexual swellings), terrestriality, and the relative success of humans as a species were interrelated.

This elegant hypothesis was at odds, critics argued, with great body size differences between males and females. In most monogamous species, males and females are similar-sized. Long curved toes, short legs, and especially wide hips imply a rather inefficient bipedalism, whereas carrying would seem to require efficiency. Others pointed out that tooth morphology suggested that australopiths ("australopithecines" in traditional taxonomy) were fruit eaters, and carrying fruits when the arms are needed to gather more food is clumsy, if not impossible. The obvious solution to this problem, a carrying device, obviates the need for bipedalism. Furthermore, provisioning need not mean carrying; ingestion and regurgitation accomplishes the task without the disadvantages of bipedalism. Others noted that long male absences while gathering would prevent males from guarding females from other males, a behavior common in monogamous species.

Lovejoy responded that large body size in males might be related to the larger day-ranges required for provisioning, that body size differences have been overstated, that arboreal traits are merely holdovers from a previous arboreal lifeway, and that many of the arboreal adaptations were overstated anyway.

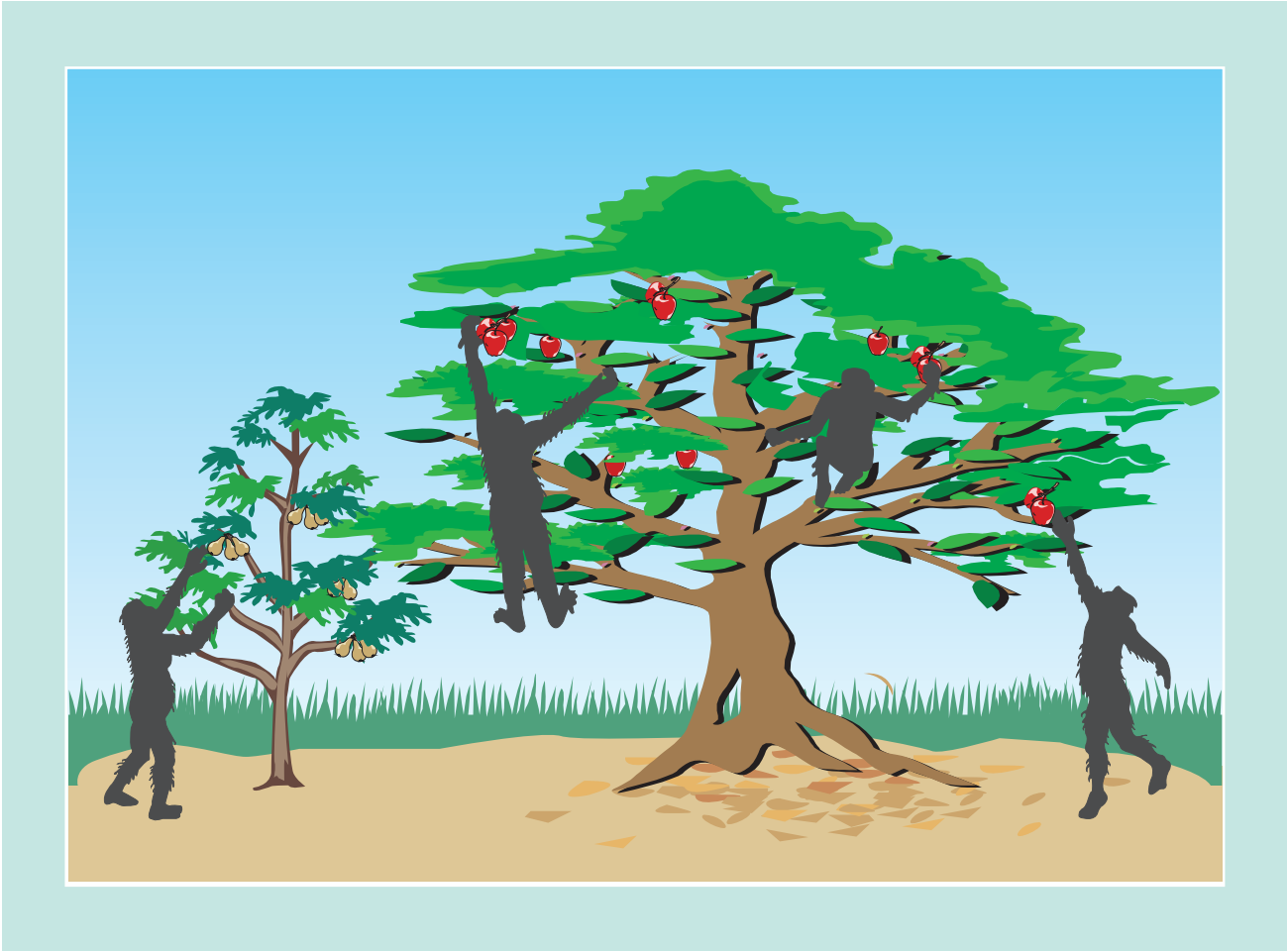


Figure 2 Bipedal foraging in early hominins used to harvest small fruits found in small trees. Some individuals reach up from the ground. Others stand bipedally using the lateral toes to grip, but not the great toe. The smaller branches in such small trees are difficult to balance on, requiring gripping overhead branches using a forelimb as it is used in arm-hanging.

Peter Wheeler suggested that bipedalism evolved to avoid overheating. He noted that a bipedal hominin exposes only 7% of its surface to sunlight, whereas quadrupeds expose 20% of their surface to the sun. Wind speed is greater and temperatures lower only a meter above the level baboons are forced to walk in, he found, and bipeds lift their torsos into this cool zone. Wheeler's hypothesis was criticized because the reduction in thermal radiation was only significant near noon, when few animals are active anyway. Others noted that early hominin habitats were likely partly wooded, or even forested. Living species adapted to high heat environments are slender to better dissipate heat, whereas the short legs, wide hips, and robust upper bodies of australopiths are stoutly heat retaining. Furthermore, the inefficient locomotion of australopiths would generate considerable heat. Wheeler's heat-stress hypothesis seems an excellent explanation for the long-legged, slender hipped morphology of the earliest *Homo* specimen, WT 15,000, but critics argue that it cannot explain the evolution of bipedalism.

In 1994, Kevin Hunt presented data on chimpanzee locomotion and posture that supported a small-object feeding hypothesis, albeit with a more arboreal slant than the classic Jolly and Rose hypothesis. Hunt found that in chimpanzees, most behaviors offered as reasons to adopt bipedalism were rare: display, tool use, carrying, and looking over obstacles made up only 1% or 2% of bipedal behavior each. Feeding made up 85% of bipedal episodes. Chimpanzees were bipedal most often when feeding on small fruits from small trees. Small trees, he noted, were only found in the driest parts of the chimpanzee range. Chimpanzees were

bipedal when reaching up to feed from the ground, as Rose and Jolly might have expected, but also when harvesting fruits arboreally. Small trees elicited bipedalism because their small branches were too flexible to sit on, whereas a modified bipedalism where the lateral toes gripped lower branches and a hand gripped an overhead branch was quite stable. He speculated that if prehominins were confined to habitats drier and more open than those in which chimpanzees live, bipedalism might evolve as a feeding adaptation. This interpretation is consistent with Yves Coppens's argument that hominins were restricted to East and southern Africa by geographic barriers such as the Great Rift, resulting in a dry-habitat ape (hominins) and a moist-habitat ape (chimpanzees).

Hunt's analysis of chimpanzee locomotion and posture suggested that curved robust fingers and toes, mobile shoulders, and cone-shaped torsos were evolved for arm hanging. Gripping great toes, short hind limbs, and short stiff backs, he argued, were adaptations to hand-over-hand vertical climbing. Australopiths share arm-hanging traits with chimpanzees, but not climbing adaptations. Because small trees can be ascended with a single agile leap, harvesting fruits from small trees requires none of the vertical climbing anatomy forest-adapted chimpanzees need to access tall trees. He explained that wide hips and short legs in early hominins functioned to increase stability on unstable branches by lowering the body's center of gravity. Short but curved and robust fingers evolved to grip small branches—the only kind available in these small trees—during arm hanging. A tilted-up shoulder joint in Lucy and a cone-shaped torso reduce stress on the shoulder and torso during one-handed hanging. Curved robust toes functioned to grip branches during arm-hanging-bipedalism (see Figure 2). These arm-hanging features are found in the first hominin specimens over 6 million years old and persist through *Australopithecus afarensis,* through *A. africanus,* and right up to the last fossils that cannot be called *Homo.* None of these arboreal traits are found in *Homo erectus,* suggesting that arboreal traits disappear quickly once the trees are abandoned.

Critics noted that neither chimpanzees nor other primates in dry habitats have evolved bipedalism, that it is not clear that hominins evolved in open habitats, that posture is not stressful enough to demand the wholesale anatomical changes required for bipedalism, and that small fruit–small tree resources may not have been abundant enough for hominins to specialize in them. Hunt responded that evidence that fauna associated with hominins suggests that they were found in drier and more open habitats than chimpanzees, that such habitats have abundant small trees, that bipedal feeding postures require adaptations to prevent fatigue, and that bipedal posture encourages bipedal locomotion.

Although there are unanswered criticisms to each, Wheeler's thermal radiation avoidance hypothesis, Lovejoy's provisioning hypothesis, and the small-object postural feeding hypothesis are the three bipedal origins scenarios most often cited by scientists to explain the evolution of bipedalism.

— *Kevin D. Hunt*

Further Readings

Coppens, Y., & Senut, B. (Eds.). (1993). *Origine(s) de la Bipédie chez les Hominidés.* Paris: CNRS Cahiers de Paleoanthropologie.

Stanford, C. (2003). *Upright: The evolutionary key to becoming human.* Boston: Houghton Mifflin.

Strasser, E., Fleagle, J. G., McHenry, H. M., & Rosenberger, A. (Eds.). (1998). *Primate locomotion: Recent advances.* New York: Plenum.

ORIGIN OF BIPEDALITY

Bipedality, or the ability to walk upright, is one of the oldest and most important characteristics that distinguishes humans from apes. Anthropologists have long debated and studied archaeological data in an effort to determine when and why bipedality originated.

Bipedalism was the first distinctive feature of human lineage to evolve. All other primates are able to walk upright in a clumsy manner, but spend most of their time on four feet. Other distinctive features, including development of the hand and enlargement of the brain, came later. Humans have been walking with an upright posture for over 4 million years. In 1978 and 1979, Mary Leakey discovered hominid footprints preserved in layers of volcanic ash. It was determined that they dated to at least 3.6 million years ago. Study of the prints

proved that these early hominids were fully bipedal. In the fall of 1994, a team of experts discovered the remains of 16 small creatures in the Middle Awash region of Ethiopia. Their backbones suggest that they walked with an upright posture.

The next year, Maeve Leakey discovered a new species dating back 4.1 million years. It was discovered near Lake Turkana, and it was determined from the structure of the knees that this species was clearly bipedal. Knees of bipedal beings are distinctive because of their ability to lock while standing.

The first hominids, or humanlike primates, appeared 5 to 7 million years ago on the African continent. At that time, the climate was changing, and the large, unbroken tracts of tropical forest were starting to give way to drier and warmer woodlands and savannas covered with grass. In a more open landscape, it was easier to travel on two legs than on four. The trees were no longer close enough together to travel long distances by swinging from limb to limb. When traveling long distances, walking on two legs uses less energy than walking on four legs.

It was necessary for the primates to adapt to living on the ground, rather than among the trees. The upright posture afforded these early humans several other advantages. First, they were able to see over the vegetation in order to find food and to spot enemies. This was a distinct advantage. Walking upright left the hands free to carry items. Humans could now throw stones at enemies and move items from place to place. With hands free, early man was now able to learn to manipulate crude tools.

Darwin conjectured that humans were now defenseless and therefore had to develop intelligence and also social qualities in order to cooperate with others. However, the rapid development of the brain came almost 2 million years after man began to walk upright.

With the passing of the dense tropical forests, sunlight was more intense. It has been theorized that walking erectly gave man less exposure to the sun and therefore afforded some protection.

The origins of bipedality are likely due to a combination of the reasons set forth in these theories.

— Pat McCarthy

Black, Davidson (1884–1934)

Canadian anatomist and paleontologist Davidson Black received a degree in Medical Sciences from the University of Toronto, Canada in 1906, and continued with graduate work at the University of Manchester, England. After receiving his education, Black was employed as an anatomy instructor at Western Reserve University, in Cleveland, Ohio, until the onset of World War I, whereby he served in the Canadian Army Medical Corps. Black eventually gained a position at the Peking Medical College in 1918. After the establishment of the Cenozoic Research Laboratory in 1929, Black became honorary director of both the laboratory and the affiliated Peking Medical College. With a generous grant from the Rockefeller Foundation, excavations at Choukoutien, China, provided evidence for a new fossil hominid, which Black interpreted as *Sinanthropus pekinenis,* or Peking Man (450,000 years old) from the Middle Pleistocene Period. With the contributions of the laboratory staff (Pierre Teilhard de Chardin, chief geologist, advisor, and collaborator; Dr. Young, assistant director and paleontologist; Mr. Pei, paleontologist and field director; and Mr. Pien, assistant), the findings were published by The Geological Survey of China and The Section of Geology of The National Academy of Peking, in *Geological Memoirs,* in May 1933. Black died in 1934.

Contributions and Perspectives

Although many of the specimens and related data were lost, destroyed, or stolen during World War II, Black's contribution and the team's dedication provided the evidence for important phylogenic analysis, as depicted below.

Sinanthropus Pekinensis

The greatest *Sinanthropus* deposits were recovered in the fissured limestone in the Ordovician anticline in the area of present-day Choukoutien village. Known as Locality 1, *Sinanthropus* remains were found throughout Locus A–G, within layers 4 (Cultural Zone A) thru layers 11 (Cultural Zone C). Due to the irregular findings throughout the layers, it became evident that the deposits were neither accidental nor an accumulation of prey by predatory animals. According to Black's evaluation, *Sinanthropus* morphology is as follows.

Dentition: Evidence of root fusion and reduction in crown size, the first molar being the largest, and third-molar variability. The crowns of the lower molar are trapezoic in shape, with crown enamel greater than modern man. In addition, the lower canines are large, with long roots. The upper molars are low and large, the root being conical. Upper canines, similar to the lower canines, are large and long rooted. The incisors can be described as being semi–shovel shaped.

Mandibulae: Although the lower jaw is neanthropic in nature (except in the morphology of the symphysis and areas of the horizontal ramus), the curve of the dental arcade is modern in type, with a deviation from modern human due to stresses through use. The symphysis region is regarded as being similar to anthropoids. Yet the thickness of the horizontal jaw ramus is consistent with *Paeloanthropus.* The presence of multiple mental foramina suggests a common ancestor to both hominids and anthropoids.

Skull: The morphological features of *Sinanthropus* are characterized by a prominent supraorbital margin, parietal calvarial with parietal eminences, and the pyriform of the calvaria. Both the temporal bones and condylar exhibit a modern direction. In the tympanic region, the morphology differs from more modern hominid types. Overall, the skull differs from both Neanderthal or Rhodesian man and anthropoids.

Upper extremity: The specimen does not differ in any great respect from modern man. Excavation had yielded a clavicle, *Os lunatum,* and a questionable fragment of radius. The clavicle, through missing the sternal epiphyseal articular portion and the acromial fourth, was found to be similar to that of modern human of similar stature. Similarly, the *Os lunatum* of *Sinanthropus* is similar to modern humans, but differs from modern anthropods. The specimen was identified as that of a right radius (included the head and 10 cm below the radial tuberosity). Morphologically, the radius does not differ greatly from that of modern human.

Lower Extremity: Ossa incerta was the only bone recovered and assigned to the lower extremity of *Sinanthropus.* The terminal phalanges are highly questionable as to their origins. Although there are no known similarities among nonhominid remains found at the site, the bones are more characteristic of modern man (terminal phalanx of the thumb) than other known hominids.

Source: © New York Academy of Medicine.

Endocranial casts: The brain was essentially human in form, with a cranial volume from 964.4 (+ –) .027 cc to 1,000 (+ –) 50 cc. It is suggested that *Sinanthropus* was right-handed and possessed the nervous mechanism for articulate speech. What contributed to this evaluation was the evidence of cultural remains.

The cultural remains in the Choukoutien Locality 1 can be divided into three cultural zones, A, B, and C. The three zones contained not only hominid and animal remains but also evidence for the use of fire and lithic technology. Scrapers, bipolar flake choppers made predominately of vein quartz, were recovered throughout the three layers. Even though the use of bone, via workmanship, is obscured by natural causes, whereby the belief in a bone industry in Choukoutien remains suspect, as does bone material within Paleolithic culture in general. Between morphology and cultural remains, Black places *Sinanthropus* as a hominid representative of the family Hominidae.

After Black's death in 1934, Frans Wiedrenreich became honorary director of the Cenozoic Research

Laboratory. Continuing Black's research, Wiedrenreich's analysis suggests that *Sinanthropus* represents an earlier or more primitive type of hominid than *Pithecanthropus.* Despite cranial volume, endocranial casts, and peculiar morphology, not only does *Sinanthropus* resemble the gibbon and chimpanzee, but *Pithecanthropus* is more evolutionarily advanced. It is assessed that *Sinanthropus* is an early stage of the *Pithecanthropus*, evolutionarily speaking, a representative of *Homo erectus.*

— *David Alexander Lukaszek*

See also **Hominids; Human Paleontology**

Further Readings

Birx, H. J. (1988). *Human evolution.* Springfield: Charles C Thomas.

Black, D. (1933). *Geological memoirs: Fossil man in China.* Peiping, China: Geological Survey and the Section of Geology of the National Academy of Peiping.

Etler, D. A. (1996). The fossil evidence for human evolution in Asia. *Annual Review of Anthropology, 25,* 275–301.

Movius, H. L. (1955). Recent research on early man in China. *American Anthropologist, 57,* 334–337.

Smith, G. E. (1932). The industries of *Sinanthropus. Man, 32,* 7–10.

Weidrenreich, F. (1937). The relationship of Sinanthropus Pekinesis to Pithecanthropus, Javanthropus, and Rhodesian Man. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland, 67,* 51–65.

Weidrenreich, F. (1943). The Neanderthal man and the ancestors of *Homo sapiens. American Anthropologist, 45*(1), 39–48.

Blombos Cave

Blombos Cave is located on the extreme southern coast of South Africa, nearly 200 miles east of Cape Town. This site, overlooking the Indian Ocean, has revealed evidence of modern human behaviors existing 75,000 years ago.

For decades, archaeologists believed that modern *Homo sapiens* evolved almost 150,000 years ago but did not develop "modern" skills, behavior, or thought processes until 50,000 to 40,000 years ago. The most widely known examples of this modern behavior are located in Europe. Cave paintings, decorative arts, elaborate burials, specialized tools, and areas of occupation with discrete functions can be found in many sites in Northern Spain and Southern France.

Professor Christopher Henshilwood, of the South African Museum in Cape Town, discovered some finely made 75,000-year-old bifacial stone tools while investigating Blombos Cave in 1991. These leaf-shaped spear tips, known as "Still Bay points," were found together with well-preserved animal remains. Similar tools had previously been seen only in Europe, dated at 30,000 to 20,000 years old. Henshilwood launched a series of excavations in the cave that have archaeologists worldwide rethinking the development of human culture.

Blombos Cave was occupied periodically during the Middle Stone Age (MSA), which ranged from 250,000 years ago to 40,000 years ago. There was a 70,000-year hiatus, in which the unoccupied cave was filled with wind-driven sand as the sea level lowered and the entrance was blocked by a 40-m dune. The cave appears to have reopened only after the mid-Holocene, 5,000 to 3,000 years ago, as the sea level rose again and eroded the base of the dune.

The MSA layers of occupation yielded an array of artifacts. In addition to Still Bay bifacial points, Henshilwood has uncovered 75,000-year-old stonework of a kind seen only in Europe 20,000 years ago. Bone tools are another technological innovation surprising to find at this level. Worked bone is a rare find in the Paleolithic, but 30 artifacts have been found at Blombos. Faunal remains illustrate a varied diet. Bones of both large and small mammals, seal, seafood, and shellfish have been retrieved. Thousands of pieces of ochre have been recovered from MSA levels. Most pieces show signs of being scraped, and some are deliberately flattened and engraved. A very small sample of human remains have been found, seven teeth. Measurements of these teeth, however, indicate the presence of children, which would imply women also occupied the site. Measurements of the crowns indicate the people at Blombos cave were anatomically modern. Perhaps the most hotly debated find has been 41 perforated and red-stained snail shells that Henshilwood states were strung as beads. All the holes are in the same

place and show the same wear patterns, but some scholars are skeptical. The lack of beads at other nearby sites casts some doubt on the symbolism of beads being widespread.

Anatomically, modern humans almost certainly evolved in Africa more than 100,000 years ago. The origin of "modern" human behavior, however, is extensively debated. There is no consensus on the definition of "modern behavior." Evidence for modern human behavior in Africa has been sketchy, leading to the existing model of culture developing in Europe 50,000 years ago, where sites are firmly established. In recent years, though, an increasing number of African sites have been revealing cultural and symbolic artifacts dating back more than 70,000 years, implying that symbolic thought, or culture, evolved slowly throughout the Middle Stone Age.

— *Jill M. Church*

Further Readings

Gore, R. (2000). People like us. *National Geographic, 198,* 90–118.

Henshilwood, C. S., & Marean, C. (2003). The origin of modern human behavior. *Current Anthropology, 44,* 627–652.

Van Bergen, B. (2004). *Blombos Cave project.* Cape Town, South Africa: African Heritage Research Institute. Retrieved April 28, 2005, from http://www.svf.uib.no/sfu/blombos/The_Site.html

Blood Groups

Distinguished by particular cell membrane surface antigens (protein markers) on red blood cells (RBCs), there have been over 35 different blood groups identified thus far. Although these include groups such as MNSs, Duffy, Lewis and so on, the ABO and Rh blood groups play the most significant role in blood transfusions. The frequency and stability of these blood groups in human population not only enhances our knowledge of human migration but have also been found to play a vital role in many applications of medicine including blood transfusion, transplantation, disease, and other physiological processes.

Immune System and Blood Group Compatibility

A blood transfusion involves the transfer of blood from one individual to another to restore the RBC levels and their ability to carry sufficient oxygen throughout the body. Our blood is composed of plasma (liquid portion) and formed elements, which consist of RBCs, white blood cells, and platelets. On the surface of the RBCs are antigens (substances that induce an immune response), which when bound by specific antibodies (plasma protein markers) cause agglutination or cell clumping to occur. In addition, the interactions between antibodies and antigens may lead to the destruction of RBCs, called *hemolysis.*

On the whole, medicine has come a long way in understanding the importance of blood group compatibility and biological mechanisms associated with blood transfusions and graft rejection. Today, matching the blood groups to prevent destruction of the donor RBCs is a relatively easy and successful procedure. As efficient as this system may be, it quickly becomes challenging due to the large numbers of blood groups and antibodies. It becomes extremely difficult when matching the various antigens that are present on tissues and organs. As a result, even after matching ABO and Rh blood groups between donor and recipient, transfusion reactions and transplantation rejection may still occur.

Whether it is a microorganism, bacterial infection, or donor blood that enters our body, our immune system has the remarkable ability to distinguish self from nonself in fighting off foreign material. This provides an explanation for unsuccessful blood transfusions of the past, where the antibodies of a recipient would combine with blood antigens from the donor, causing the transfusion reaction. The first recorded blood transfusions took place in Italy in 1628; however, the procedure was quickly banned due to the large number of deaths. It was not until the mid-19th century that human blood transfusions were again being performed in an attempt to fight against severe hemorrhages that were killing many infants after birth. This led to Leonard Lalois, a physiologist, discovering that blood cells from different species would clump together when mixed.

ABO Blood Group

The ABO blood group system was discovered in 1900 to 1902 by Karl Landsteiner and his fellow students. According to the presence or absence of antigens on the surface of RBCs, four different blood groups were determined: type A, B, AB, or O.

In the ABO system, type A blood has the A surface antigen with the ability to produce B antibodies in its blood plasma against type B antigens, which makes it compatible with type A and O. Type B has the B antigen on its surface with the ability to produce A antibodies against type A antigens, making it compatible with type B and O. Furthermore, Type AB, known as the universal acceptor, has both A and B surface antigens and cannot produce A nor B antibodies against other ABO blood antigens. Last, type O blood, which is known as the universal donor, has neither A nor B surface antigens and has the ability to produce both A and B antibodies against type A and B antigens.

Thus, if a person with type A blood were transfused into a person with type O blood, antibodies would be produced in the plasma against the A antigen on the RBC, leading to its destruction and possible death of the patient. If type O blood is transfused into an individual of type A blood, no reaction occurs between RBC antigens from the donor and antibodies of the recipient.

In the United States today, the Caucasian population has a distribution of 47% type O, 41% type A, 9% type B, and 3% type AB. The African American population has a distribution of 46% type O, 27% type A, 20% type B, and 7% type AB.

Rh Blood Group

The Rhesus or Rh blood groups were first discovered in 1940 by Landsteiner and Wiener, who found that the RBCs in the Rhesus monkey and the majority of humans would clump together when exposed to rabbit antibodies made against Rhesus RBCs. Further evidence was shown when an Rh mother showed a strong reaction against her ABO compatible, Rh+ husband during a blood transfusion. The clumping of the husband's blood demonstrated that her body had antibodies against the Rh antigen and that it was not due to ABO incompatibility. Human blood that does not have the Rhesus antigen, 15% of the population, is Rh negative, whereas 85% of the population do possess the antigen and are Rh positive. The common types of Rh antigens, C, D, and E, are named because of their specific loci (locations) along the chromosome. Overall, there are over 45 different antigens in the Rh blood groups system, making it the most polymorphic of them all.

For antibodies to develop against the Rh antigen, an Rh- individual must be exposed to Rh+ blood via blood transfusion or pregnancy. Furthermore, with 1 in 1,000 births being diagnosed with anemia, a deficiency of RBCs, Rh blood compatibility becomes extremely important during pregnancy. During pregnancy or child birth, because the IgG antibody (one type of antibody) is capable of crossing the placenta, the RBCs from an Rh+ fetus may enter the blood of an Rh– woman. Now that this Rh– individual has become sensitized and produced anti-Rh antibodies, a subsequent blood transfusion or pregnancy of Rh+ blood would cause a reaction. There would be sufficient anti-Rh antibodies produced by the mother because she has already been sensitized, which would cause agglutination and hemolysis of fetal RBCs.

This would result in hemolytic disease of the newborn (HDN), the destruction of fetal red blood cell, causing decreased oxygen transport and jaundice due to the breakdown of hemoglobin (oxygen-carrying molecule). However, treating the mother with an anti-Rh antibody mixture (RhoGAM) within 72 hours may prevent this from occurring. This treatment is successful by preventing sensitization and allowing antibodies to bind to Rh antigens of any fetal RBCs that have entered the mother's blood.

Blood-Typing Difficulties

For almost an entire century, ABO blood typing was used in forensic laboratories, until enhanced knowledge and technology made it a procedure of the past. Looking into the genetic aspect, there are two alleles in every human that determine blood type, one from each parent. Thus, there is a total of six different possibilities of blood types: AA, AO, BB, BO, AB, and OO. However, although it is easier to distinguish between type O and type AB, it becomes impossible to distinguish types AA from AO and BB from BO. This is because the blood groups are codominant (both alleles being expressed at the same time); thus,

blood typing would identify them both as type A or type B accordingly.

Population Frequencies and Historical Studies

Physical anthropologists of antiquity have agreed that distinguishing factors for humans must have the ability to remain stable while being transferred to the genes of an individual. Researcher A. E. Mourant has explained how in contrast to physical characteristics of an individual, the blood groups antigens maintain more stability in the formation process and therefore are not as easily influenced. There are exceptions to this, which include the diseases such as sickle cell anemia and thalassemia. With any complex system in nature, there are many influences that affect the frequency of a gene through generations such as mutations, natural selection, or mixing of populations. With natural selection, these influences have the ability to select for genes that would be advantageous for the individual. For example, researchers that find a higher-than-normal frequency of a particular blood group will attempt to determine possible explanations for this occurrence. If a gene undergoes mutation, the resulting effects will be determined by the selective value of the effect on the individual. If the effects bring about minimal value, the mutation will eventually die out through generations. Last, human procreation brings together the intermixing of genes, resulting in new possibilities for the next generation. Thus, these may affect specific gene frequencies throughout different populations.

One classic example of tracing migration of populations can be understood by studying the blood group frequencies of the Gypsies. Mourant describes how the Gypsies who are scattered throughout Europe are composed of approximately 20% type A, with higher type B frequencies. Researchers are able to compare different blood group frequencies along with other data of populations to try and determine where they migrated from. These findings along with other blood group studies have provided strong support for their migration from northern India.

During World War II, Professor Fleure and Mrs. Hirszfeld were the first to discover a variation in blood group frequencies between different populations. It has been primarily the research of Professor Boyd and Fleure that has provided a basis for understanding the distribution of blood groups throughout the world. By using gene frequencies of the four blood groups, McArthur and Penrose had estimated the total population to be O 62.3%, A 21.5 %, and B 16.2%. These statistics were found to be different from present studies of Caucasian populations in the United States. A high frequency of type O has been found to exist in North Western Europe, some areas in Australia, South West Africa, and other isolated regions. The researchers made a significant finding when they discovered that most of the Native tribes of Central, South, and North America are almost entirely composed of type O. Although no strong patterns were found to exist with type A, researchers found its existence to be rare in Aboriginal populations of the world. Similarly, type B was found to be extremely rare throughout Native Americans and Australian Aborigines, and it is likely that no type B existed before the arrival of White men. In addition, type B existed in higher frequency in central Asia and northern India, while showing lower occurrences in Egypt and central Africa. During these historical studies, Fleure discovered that although frequencies varied among populations, blood groups have been shown to have a minimal impact on their survival.

So, how did humans evolve to possess different blood groups? One interesting fact that has been discovered is that certain anthropoid apes have the same A and B blood groups that are found in humans. Does this mean that the apes were the common source for human ABO blood groups? On the contrary, many Native American tribes have been found to possess almost all group O blood, with minimal type A and B. Further research has shown that the Native Americans already possessed the type A blood before the presence of White men. Researchers continue to find rare similarities that bring an additional twist to existing theories on human blood groups. For example, the blood group distributions between Greenlanders and Australians are tremendously similar. A number of examples have been found where certain "unrelated populations" have identical blood group distributions. Thus, Wyman and Boyd feel that this supports the theory that blood groups are older than the present races.

A professor of genetics, Bryan Sykes, analyzes historical blood group studies to find a common principle evident today. Through genetics and evolution, there is a greater chance of populations being related if they share similar gene frequencies than if their frequencies greatly differ.

To think that humanity has only begun over the last century to understand the importance of blood group compatibility is incredible. From blood transfusions and organ transplants to a greater understanding of diseases, medical advances have saved millions of human lives. This allows one to appreciate the miracles of modern medicine that we have today. Although the efficacy of transplantation has increased tremendously, graft rejection still occurs, and further research is essential. With the advances in science and technology along with the help of immunosuppressive therapies, various organ and tissue transplants have become common and successful procedures. With further research, new discoveries and innovative treatments will continue to enhance the future of the medical field.

— Joshua M. Zavitz

See also **Genetics, Human**

Further Readings

Coico, R., Sunshine, G., & Benjamini, E. (2003). *Immunology fifth edition: A short course.* New York: Wiley.

Lee, H. C., & Tirnady, H. (2003). *Blood evidence: How DNA is revolutionizing the way we solve crimes.* Cambridge: Perseus.

Marks, J. (2002). *What it means to be 98% chimpanzee.* Los Angeles: University of California Press.

Schwarz, H. P., & Dorner, F. (2003). *Karl Landsteiner and his major contributions to haematology.* Vienna, Austria: Baxter BioScience.

Sykes, B. (2001). *The seven daughters of eve: The science that reveals our genetic ancestry.* New York: Norton.

Blumenbach, Johann Friedrich (1752–1840)

Considered the "father of physical anthropology," the famous German physiologist, anatomist, and naturalist began his lustrous academic career at the University of Jenna. Perfecting his studies in literature, rhetoric, and natural history (archaeology), Blumenbach finished his remaining medical studies at the University of Gottingen. Under the auspices of Heyne and Buttner, Blumenbach was offered the office of assistant, whose primary responsibility was to both lecture and organize the university's natural history collection. After the successful completion of his remaining studies, he received his degree in 1775, a tutor in 1776, and professor of medicine in 1778. In the year of 1778, he married into the influential Brandes family. During his professional career at the university, he was elected to the faculty of honors and a senior of the medical faculty. He was also the director of the natural history museum.

Throughout his academic and professional career, he became a member of the Society of Sciences in 1784, aulic councilor in 1788, perpetual secretary of the physical and mathematics in 1812, and commander of the order in 1822. He was elected as an associate of 78 societies and lectured to potentates and scholars around the world. His commanding presence and genius can be seen in the multitude of published works, especially his work *History and Description of the Bones of the Human Body* (1786), *Handbook of Comparative Anatomy* (1805), and *On the Natural Varieties of Mankind* (1865). Described by his contemporaries as being kind, inquisitive, systematic, and highly intelligent, Blumenbach conducted himself with the utmost care and to the highest standard possible, securing his status not only as a scholar but also as a gentleman.

Contributions and Perspectives

During Blumenbach's time, science in general and the future of anthropology in particular owes much to the contributions of Buffon, Linneaus, and Cuvier; yet the systematic study of our own species was left under the auspices of philosophers and theologians. The influence of Aristotle and Christianity upon scientific investigation at this time was certainly profound. Blumenbach, whose own Christian ideas influenced the formulation the unity of our species, sought to refine the system of classification set forth by Linneaus. Blumenbach redefined our species' place in nature using three criteria: (1) distinction of mutable characteristics among our species from the rest of the animal kingdom, (2) consider only evidence and facts supported by rational speculation, (3) after comparing extremes, search for intermediate segments

between the known extremes. Though philosophical in nature, this systematic approach, in conjunction with his intelligence and keen eye for detail, resulted in the classification of the variation found with our own species.

The distinct variation found within our species had been commented upon by previous scholars, most notably by Linnaeus. These classifications based on phenotypic expressions often can become problematic when ascertaining an intermediate specimen that shares characteristics, for example, morphology, of two or three established categories. Acknowledging this taxonomical problem, including the philosophical implications, Blumenbach stated that there are five varieties of humankind, but one species. These varieties are as follows: Caucasian, Mongolian, Ethiopian, American, and Malay. These categories are based on morphology and phenotypic expressions. Blumenbach, contrary to our modern-day evaluation skewed by a disjointed philosophical system within the discipline of anthropology, never asserted racist ideology within the context of his evaluation, though bias in opinion could be seen concerning the beauty of symmetry found within the Caucasian variety. Based on phenotypic expressions, Blumenbach's categories and their common expressions can be seen below:

Caucasian

The Caucasian variety is found in Europe, Eastern Asia, and Northern Africa. They are depicted as having white pigmentation with brown hair (variation), oval face, narrow nasal opening, and a rounded chin.

Mongolian

The Mongolian variety can be found in Asia and the northern parts of Europe and America. They possess a yellowish pigmentation with straight black hair, broad and flat face, small nasal opening, and narrow eyelid openings.

Ethiopian

The Ethiopian variety can be found in all Africans (with exception of Northern Africa, which is considered Caucasian). They posses black pigmentation, with curly black hair, narrow head, prominent eyes, wide nasal opening, and receding chin.

American

The American variety, equated with the indigenous peoples of the Americas, are found within America (except the most northern parts of America, where inhabitants are considered Mongolian). They are depicted as having copper pigmentation with straight black hair, deep eyes with a prominent nose, broad face with prominent cheeks (though the head maybe artificially distorted due to cultural practices).

Malay

The Malay variety is located in the Malayan peninsula and the Pacific Islands. They are depicted as possessing a yellowish-brown pigmentation with black curly hair, prominent facial features (profile), and narrowed head with a full-featured nose.

It can be easily seen how problematic the classification process can become, especially when considering the evolutionary process of regional adaptation and amalgamation (gene flow) that occurs at a greater rate than was seen in our species' history. An increase in population, fast and safer travel, and eroding ethnocentric morays and laws will continue to add to the diversity found within the human species. As modern science progresses and a more complete understanding of the evolutionary process becomes available, Blumenbach's classification can be reduced to genotypic and phenotypic variation. This newly acquired scientific knowledge (e.g., genetics) does not deter nor detract from Blumenbach's contribution to science; rather, his contributions had contributed to the foundation of anthropology and the awareness concerning the diversity found in our species.

— David Alexander Lukaszek

See also **Gene Flow; Genetics, Human; Linnaeus, Carolus**

Further Readings

Blumenbach, J. F. (1969). *On the natural varieties of mankind.* New York: Bergman.

Brues, A. (1977). *People and races.* Prospect Heights, IL: Waveland Press.

Cavalli-Sforza, L. L. (2000). *Genes, peoples, and languages.* Los Angeles: University of California Press.

Franz Boas (1858–1942)

Franz Boas, considered the "father of American anthropology" and the architect of its contemporary structure, helped revolutionize the consciousness and conscience of humanity by fighting against 19th-century colonial Anglo-American ethnocentrism and racism and championing 20th-century cultural relativism, tolerance, and multicultural awareness.

Boas stands among the last of the great Renaissance minds. Born in Minden, Westphalia, Germany on July 9, 1858, the son of Meier Boas (a merchant) and Sophie Meyer (a kindergarten founder), he was raised in idealistic German Judaism with liberal and secular values, internalizing democratic and pluralistic beliefs and a strong disdain for anti-Semitism. Challenged by poor health as a child, he embraced books and nature while developing a strong antagonism toward authority. Following education at school and the Gymnasium in Minden, he studied natural history (physics, mathematics, and geography) at the Universities of Heidelberg and Bonn, before studying physics with Gustav Karsten at the University of Kiel, where he received his doctorate (1882). Having developed an interest in Kantian thought during his studies at Heidelberg and Bonn, he pursued study in psychophysics before steeping in geography to explore the relationship between subjective experience and the objective world. This focus of inquiry excited Boas, and in 1883, he began geographical research on the impact of environmental factors on the Baffin Island Inuit migrations. Following the successful defense of his habilitation thesis, *Baffin Land,* he was named *privatdozent* in geography at Kiel.

The universality and passionate interest of Boas's study increased. He continued to study non-Western cultures and published *The Central Eskimo* (1888), and he worked with Rudolf Virchow and Adolf Bastian in physical anthropology and ethnology at the Royal Ethnological Museum in Berlin, which directed him toward anthropology. Becoming especially interested in Native Americans in the Pacific Northwest, he traveled to British Columbia in 1886 to study the Kwakiutl Indians. He secured an appointment as docent in anthropology at Clark University (1888), followed by an appointment as chief assistant in anthropology at the Field Museum in Chicago (1892). He then received an appointment at the American Museum of Natural History (1895–1905) and began teaching anthropology at Columbia University (1896). In 1899, he was appointed the first professor of anthropology in America, a position he held for 37 years.

Boas's contributions to and influence on anthropology and anthropologists are profound. The prevailing sentiment among biologists and anthropologists at the time of Boas's early work was that a principle of evolution explained why non-Western cultures, especially those inhabitants of microsocieties, were "savage," "primitive," and "uncivilized" and composed of "inferior races" compared to Western civilized culture, with superior races. By employing an historical model of reality operationalized by empiricism, Boas developed a scientific anthropology (Boasian anthropology) that rejected theories of sociocultural evolution developed by Edward Burnett Tylor, Lewis Henry Morgan, and Herbert Spencer ("orthogenesis"). He accepted the principle of Darwinian evolution (cultural relativism), which holds that all autonomous human cultures satisfy human needs (and are relatively autonomous), and vehemently argued against the theory of sociocultural evolution that human society evolved in a timeline of stages. Thus, Boas established the historicity of cultural developments and the primary and basic role of culture in human history as well as the relative autonomy of cultural phenomena: Cultures, not culture, are fundamental to the study of man (cultural diversity).

Having realized his life's goal to study cultural history and learn about peoples, Boas developed and promoted academic and professional anthropology. He was instrumental in modernizing the *American Anthropologist* and in founding the American Anthropological Association (1902). He reorganized the American Ethnological Society (1900), organized and directed the Jesup North Pacific Expedition, founded and edited the major publications in anthropological linguistics, founded the American Folklore Society and its journal (1888), led the development of anthropology in Mexico, and was active in the development of the American Association of Physical Anthropologists and its journal.

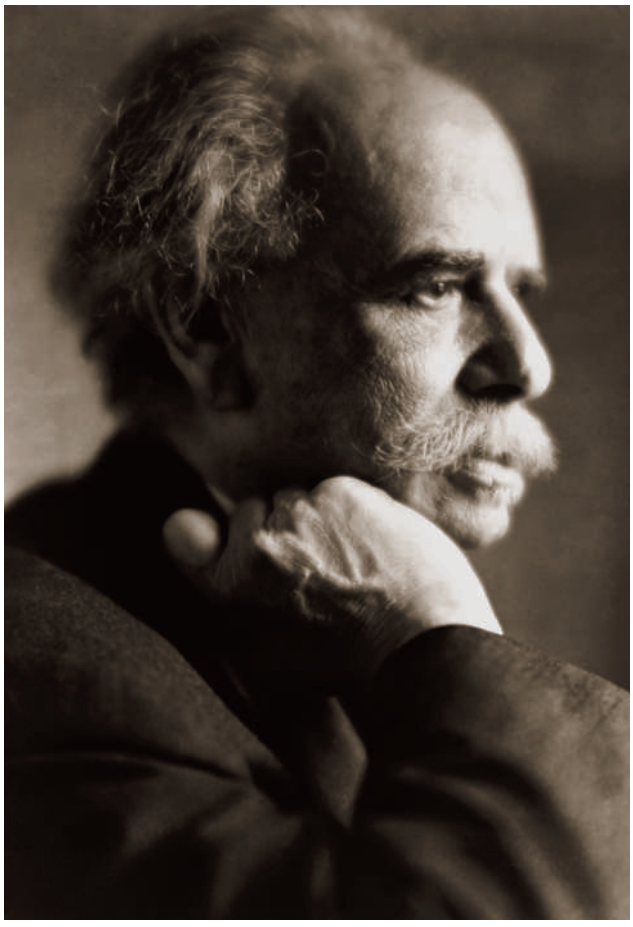
With a vigorous commitment to empiricism, scientific methodologies, and historicity, Boas developed the science of anthropology and transformed the field by basing it on the fundamental conception of

cultures as environments of human biological and behavioral life. He reorganized anthropology to include relative autonomy among physical anthropology, archaeology, linguistics, and cultural anthropology (ethnology). The importance of Boas's work cannot be overestimated: It is of immeasurable historical significance. In physical anthropology, linguistics, and cultural anthropology his theories and findings in field research changed anthropology: Boas's work became the hallmark of anthropology. He strongly believed in and championed truth.

As a professor of anthropology, Boas had profound influence by mentoring A. F. Chamberlain, A. L. Kroeber, Edward Sapir, A. A. Goldenweiser, R. H. Lowie, Frank G. Speck, Fay-Cooper Cole, H. K. Haeberlin, Paul Radin, Leslie Spier, Erna Gunther, J. A. Mason, Elsie C. Parsons, G. A. Reichard, M. J. Herskovits, Franz Olbrechts, A. I. Hallowell, R. L. Bunzel, M. J. Andrade, George Herzog, Frederica de Laguna, M. Jacobs, Ruth M. Underhill, Gunter Wagner, Jules Henry, Rhoda Metraux, Marcus S. Goldstein, Alexander Lesser, G. Weltfish, M. F. Ashley Montagu, E. A. Hoebel, May M. Edel, Irving Goldman, and the 20th-century anthropological role models, Ruth Fulton Benedict and Margaret Mead. He influenced thousands of students.

Boas's scholarly publications are quintessential anthropology. His books include *The Mind of Primitive Man* (1911), *Primitive Art* (1927), *General Anthropology* (1938), *Race, Language, and Culture* (1940), *Anthropology and Modern Life* (1928, 1962), and *The Central Eskimo* (1964 paperback). He also published more than 700 monographs and articles, lectured extensively, and accumulated a wealth of field research findings.

As formidable as Boas's contributions and influences on anthropology and anthropologists were, they were formative to his iconic status. He changed our conception of man by rejecting biological and geographical determinism, specifically racial determinism, and speaking out boldly on cultural relativism and the findings of anthropology to challenge ignorance, prejudice, racism, nationalism, fascism, and war. Boas advanced an internationalism based on the "common interests of humanity" (1928) and combated race prejudice with pioneering antiracist theories. In 1906, W. E. B. DuBois, founder of the Niagara Movement and the National Association for the Advancement of Colored People (NAACP), invited Boas to give the commencement address at Atlanta University, where he argued against Anglo-European myths of racial purity and racial superiority, using findings of his research to confront racism.



Source: © CORBIS.

By studying 18,000 American children of European immigrants, Boas obtained results that showed that biological adaptation (height, weight, head shapes) is a function of environmental factors (diet, lifestyle). These data together with his field research data of the Inuit and Kwakiutl peoples enabled him to champion antiracism long before it was fashionable. To Boas, cultural plurality was fundamental (multiculturalism, cultural diversity). He became a role model for the citizen-scientist, a dedicated humorist with understanding, sympathy, and consideration, who maintained that anthropologists have an obligation to speak out on social issues.

— *Stewart B. Whitney*

See also **Anthropology, History of**

Further Readings

Goldschmidt, W. R. (Ed.). (1959). *The anthropology of Franz Boas: Essays on the centennial of his birth.* Menasha, WI: American Anthropological Association Memoirs.

Herskovits, M. J. (1953). *Franz Boas: The science of man in the making.* New York: Scribners.

Hyatt, M. (1990). *Franz Boas: Social activist.* New York: Greenwood Press.

Kardiner, A., & Preble, E. (1961). *They studied man.* Cleveland OH: World Publishing.

FRANZ BOAS

Cultural anthropologist and German immigrant Franz Boas, who died on December 21, 1942, was known as "the father of American anthropology." Boas's antiracist views were based on his belief that earlier anthropologists were wrong in their assessment that the brains of certain races were biologically inferior to others. Boas argued that environment and individual characteristics were more important than race in determining intelligence. With fervent dedication, Boas set out to discredit anthropological and social science theories that had led to centuries of racism around the globe. Former students, including anthropologists Ruth Benedict (1887–1948), Margaret Mead (1901–1978), and Alfred Kroeber (1871–1960) and writer Zora Neale Hurston (1901–1960), carried on Boas's work, adding their own contributions to fighting racism and sexism.

Boas was also closely associated with W. E. B. DuBois (1868–1963), who became a voice for Black America in the 20th century. On May 31, 1906, at a commencement speech at the all-Black Atlanta University in Georgia, Boas called for new methods of examining human beings that did not depend on race as the deciding factor. By dwelling on the evils of racism, Boas indirectly set off a wave of Afrocentrism that reached its prime with the "Black is beautiful" movement of the 1960s and 1970s and led to the addition of African studies on college campuses around the United States. Boas was an active member of the National Association for the Advancement of Colored People (NAACP) in its early years, working closely with DuBois and other Black leaders.

In the years immediately before and during World War II, Boas and his students were instrumental in discrediting the racist theorists of Adolf Hitler and the Third Reich. Nevertheless, in the years immediately following World War II, Boas's reputation as an anthropologist was somewhat tarnished. Leslie White (1900–1975), a cultural anthropologist heavily influenced by Charles Darwin (1809–1892), led the campaign to discredit Boas by insisting that anthropological theories should be based on pure scientific evidence. Boas's critics argued that he had been too easily swayed by his political views and that it had damaged his legitimacy as a scientist. His critics also objected to Boas's habit of collecting numerous data, including photographs, notes, and personal stories, assuming that they all fit together to explain culture. Boas had repeatedly rejected the scientific method as too narrow to offer full explanations.

Boas maintained that as populations had shifted throughout history, all races had become mixed to such an extent that cranial formation based on race alone was inaccurate. Instead, Boas promoted the idea of cranial plasticity. By the beginning of the 21st century, anthropologists were still debating the validity of Boas's findings in his 1912 classic study of 13,000 European immigrants that examined the impact of environment on cranial formation over a period of time. In 2002, Corey S. Sparks and Richard L. Jantz attempted to discredit Boas's findings, concluding that the cranial differences in English and American offspring of European immigrants were insignificant. Sparks and Jantz estimated that 99% of all identifiable variations revealed in their study were attributable to ethnic variation, with only 1% from immigration. In a contrasting 2003 study, Clarence C. Gravlee, H. Russell Bernard, and William R. Leonard substantiated Boas's findings. Indeed, they contend that when analyzing Boas's data using modern statistical methods, the evidence was even stronger that environment plays a distinct role in cranial formation.

— Elizabeth Purdy

Bonobos

The bonobo (*Pan paniscus*) belongs to the Pongidae family of the Primate order and is restricted to the central Zaire basin, south of the Zaire River in Africa. They live in forested areas and are often called "pygmy chimpanzees." They are closely related to common chimpanzees (*Pan troglodytes*) but are not necessarily smaller.

Bonobos spend their time on the ground and in the trees. In the trees, they are able to move quadrupedally, bipedally, and suspensory. On the ground, they knuckle-walk like their chimpanzee relatives.

Discovery

The earliest description of a wild bonobo is from the 1641 journal of a Dutch anatomist, Nicolas Tulp. His observation of what was thought to be a small chimpanzee includes a description of toes that are webbed between the second and third digits. This trait is common among bonobos, but not chimpanzees.

The first-known captive bonobo lived for only 6 years, from 1911 to 1916, and died of pneumonia in the Amsterdam Zoo. Mafuca, as he was named, was being raised with an infant chimpanzee. In 1916, the Dutch naturalist Anton Portielje suspected that Mafuca was not a chimpanzee, but it was not until 1929 in a Belgium museum, that what was thought to be an infant chimpanzee skull was more closely examined. Due to the suture closure, German anatomist Ernest Swarby determined the skull could not possibly belong to an infant chimpanzee. Swarby accurately assigned bonobos to their own species based on these observations.

Robert Yerkes is also credited with early observations of the unchimpanzee-like characteristic differences in the bonobo he worked with, named "Prince Chimpsky." Yerkes described the bonobo as more gentle, graceful, and intelligent than any chimpanzee he had ever known.

During the 1930s, Eduard Tratz and Heinz Heck at the Hellabrunn Zoo in Munich conducted the first comparative study of chimpanzees and bonobos. Their list of trait comparisons is still relevant. Alison and Noel Badrian began studying wild bonobos in 1974 in the Lomako forest, which is still a study site. In the same year, Takayoshi Kano from Kyoto University began studies in Wamba, the most productive study site also still in use.

Anatomy

Chimpanzees and bonobos are human's closest living relatives, sharing more than 98% of the same DNA. We are not more closely related to one or the other. Our lineages separated about 6 million years ago. We are also their closest relatives of all of the living primates. Bonobos and chimpanzees are thought to have shared a common ancestor from whom they split approximately 3 million years ago.

Bonobos are commonly called "pygmy chimpanzees"; however, the overall size difference is negligible. The basic anatomy is the same. The average male bonobo weighs only a few pounds less than the average male chimpanzee. This point is especially true when bonobos are compared with smaller-stature colonies of chimpanzees, like those who live in Gombe, Africa.

There is less sexual dimorphism, size difference between males and females, in bonobos than chimpanzees. A female bonobo's weight is approximately 85% that of her male counterpart, which is the same difference as in humans.

The main anatomical difference between bonobos and chimpanzees is in limb length, head size, hairiness, and upright ability. Bonobos have longer and more slender limbs, a longer torso, and a leaner, more gracile appearance than chimpanzees. The head of a bonobo is smaller than the head of a chimpanzee, and they have a crop of longish black hair with a central part. Bonobo infants are born with dark-skinned faces, compared with the pale appearance of chimpanzee newborns.

When it comes to bipedal ability, bonobos surpass chimpanzees. Bonobos have an upright position that makes them appear more humanlike when walking. In mechanical observations of the efficiency of bipedal walking, bonobos and chimpanzees are equal in energy expenditure and speed when walking upright. However, bonobos seem to have mastered bipedal efficiency and have been observed wading upright in streams and rivers while fishing for small shrimps and insect larvae, walking upright with an arm around a partner's shoulder, and walking upright with both hands full of sugar cane from research observation stations.

The bonobos dental formula is 2123/2123 = 32, the same as all great apes. However, their molars are smaller than chimpanzees.

Source: © Gallo Images/CORBIS.

Behavior

Bonobos live in colonies of up to 150 individuals. Colony membership is determined by sex. Female bonobos migrate out of their birth group when they reach sexual maturity. Bonobos forage in a group of 6 to 15 individuals that often has an equal number of males and females. They eat mainly fruit, pith, and leaves. Bonobos have been observed eating small ungulates, insects, and fish. They are known to wade in small rivers to obtain food. Bonobo hunting, especially of other primates, has not been observed, as it has been for chimpanzees.

Takayoshi Kano of Kyoto University is one of the pioneering researchers in the study of wild bonobos. He and his collaborator, Suehisa Kuroda are working in Wamba, Zaire. Kano first arrived in Wamba in 1973 and has continued research in the region for the past two decades. Kano has played a major role in uncovering the behavioral peculiarities of the bonobo. Among the more important behaviors, Kano describes long-term mother-infant bonding, especially between mother and son; the use of sexual contact as a social tool and as aggression substitute; and a female-centric social structure.

In bonobo society, the mother-son bond is the most important social tool that is use by a male bonobo in order to rise through the ranks. This is not in order to obtain dominance over the entire troop, which does not happen in bonobo society, but more to curry favor with other high-ranking adult females who rule bonobo society in an almost egalitarian manner with the adult males. Bonobos do not have as formalized or ritual displays of dominance as chimpanzees do. Rank within the bonobo hierarchy seems to be based more on age and the amount of time spent within a group, for females, and who one's mother is, for the males.

Kano described the adult alpha male and female as being almost equally dominant. The male of the highest rank is well-known, but the hierarchy blurs after that. Unrelated females bond in bonobo society and control the hierarchy. This is one of the most important of the bonobo behaviors. It allows females to act collectively to protect offspring and monopolize resources against males. The female-male relationships are also important and are most evident when a major shift in the hierarchy takes place. The idea of a female-centric social organization contrasts sharply with the known male-dominated social hierarchy that rules chimpanzee life, often by force.

Another striking characteristic of bonobo social organization is the use of sexual contacts and relationships to bond the troop. Even though bonobos have the same birthrate as chimpanzees, about one infant every 5 years, they have several sexual interactions every day. Bonobos employ sexual contact as more than strictly an act of reproduction. All members of a bonobo troop engage in sexual contact of some form with each other. Males will rump rub to console one another, defuse a stressful situation, and cement friendships—whereas females engage in genital-to-genital, or G-G, rubbing, while face-to-face with friends, as well as male-female sexual activities. Males also engage in rump rubbing, self- and mutual manual and oral stimulation, "penis-fencing," and they present their erect penises to one another, embrace and excitedly rub together. A major display of these behaviors can be observed when a bonobo troop encounters a food source. Everyone gets excited, engages in sexual contact with a troop mate, and then proceeds to share the food.

Bonobo sexual activity is not restricted to the female estrous cycle or to individuals of the same age set. Bonobo females are continually receptive to sexual contact and will mate face-to-face with males, other females, and juvenile males. They even continue sexual activity during pregnancy and lactation, which chimpanzee females do not do. This continual receptivity makes it difficult for males to know which infants they have fathered. In turn, this has reduced the value of infanticide to dominant males. Infanticide has not been observed or suspected to occur in bonobo communities.

Bonobos do observe traditional sexual taboos, such as interactions between fathers and daughters. Since paternity is sketchy, incest is best avoided by the practice of female bonobos transferring out of their natal group when they reach sexual maturity. Also, primatologist Amy Parish found that if captive females were not transferred to a new community, reproductive maturity was delayed by several years.

Zoologist Frans De Waal has studied the sexual behavior of bonobos in relationship to conflict resolution and coalition building among captive colonies. Aggression is not completely absent from bonobo society, but it is mild and restrained when compared with the elaborate and aggressive behaviors of chimpanzees. Bonobos prefer peaceful resolution and are quick to appease each other with sexual contact as opposed to violent physical attacks.

Bonobos also use other familiar social tools, such as pout and play faces and hand gestures similar to chimpanzees, but in conjunction with sexual contact. They reach their hands out to one another for play invitations, food begging, and to get someone else to come near them for an embrace. These actions are most often done with the right hand, like humans. It may suggest a lateralized brain structure, where the left half of the brain controls communication that is not necessarily language specific. While the physical and facial gestures are very similar, bonobos gesticulate and vocalize more often than chimpanzees. They have higher-pitched voices, which are easily distinguished from chimpanzees.

Primate Language Studies

Bonobos have been shown to surpass chimpanzees in their ability to acquire language skills. This is also not to say that bonobos are more intelligent than chimpanzees, for their relatives often surpass them in other cognitive areas. At the Language Research Center of Georgia State University, in Atlanta, Sue Savage-Rumbaugh has been working with Kanzi, one of the bonobo stars of language studies. Kanzi was able to learn 200 vocabulary symbols and construct rudimentary sentences of words and gestures by the age of 6. He was also very good at responding to verbal commands.

Savage-Rumbaugh's research suggests that bonobos and chimpanzees may have separate cognitive strengths. While working with Panshiba, a bonobo, and Panzee, a chimpanzee, she observed differences in their abilities and the speed with which they learned. Panshiba consistently led in the acquisition of language symbols, while Panzee was always better at spatial and object manipulation, such as mazes.

The bonobos always seem more aware of the social factors surrounding them. Panshiba has been known to ask for extras of the treats she receives and then for them to be given to Kanzi and his sister. When in a group, the bonobos tend to sit together and protest if one of them is removed for a separate task. The chimpanzees tend to be less concerned with what others are doing, be they other chimpanzees or the researchers.

Tool Use

Unlike chimpanzees, wild bonobos have never been observed making or using tools. It is likely that bonobos do not need tools in the wild. The colonies that have been researched the most live in areas of abundant resources that do not require a tool to obtain. The fact that wild bonobos have not been observed using tools may also be a result of the relatively recent commitment to their study. Bonobos have only recently become widely known, and longevity in their research may provide evidence of still unknown behavior, such as tool use.

In captivity, however, bonobos will make use of objects at hand. They have been observed to use halved red peppers as a water scoop, tennis balls as a water sponge, wood-wool as toilet paper, sticks to pole vault, and smaller sticks as honey "fishing poles," like chimpanzees. Kanzi, the language studies ape, was also taught how to make and use a rudimentary stone tool, which he used to cut through a rope on a food box. Although he developed his own method to produce the flint tool, different from the one he had been taught, he showed an understanding of how to make and use the sharp edge to cut the rope.

Understanding Emotions

Bonobos' cognitive ability is demonstrated by their ability to pass the self-recognition mirror test, like chimpanzees. Bonobos also display a surprising amount of sensitive behaviors that suggest a cognitive specialization in sympathy, empathy, and understanding others' needs.

This ability is oddly demonstrated in the bonobo nest-building habits. Like chimpanzees, bonobos build nests of intertwined tree branches to sleep in for the evening. They also build them during the day for napping. What is interesting about the bonobos' habit is that the nest seems to denote individual space, which is not to be entered by any other without permission. Anecdotal observations include a mother bonobo in the process of weaning her young bonobo and not allowing the youngster into her nest despite incessant pleas. Also, individuals will build a rudimentary nest as a retreat when food is encountered. They are left alone regardless of the amount of food they have that could be shared. In another case, a male bonobo built a quick nest to avoid a charging display by another individual, who stopped at the base of the tree containing the nest. Instead of charging up the trunk, he walked away. These examples demonstrate an understanding of both actors, each wanting something different and understanding the other's intentions and position.

Kanzi, the language studies bonobo, understands many verbal commands and has demonstrated the ability to tell the difference between commands intended for himself and those intended for others, such as his sister, Tamuli, who has little experience with experiments. In one session, the instructor clearly asked Tamuli to groom Kanzi. Tamuli did not understand what was being asked, but Kanzi did. He also appeared to understand that his sister did not know what to do. Kanzi repeatedly grasped her hand and put it to his chest, holding it in place with his chin. Kanzi demonstrated his own understanding of the command, the fact that it was not meant for him to act, but also that his sister was not capable of understanding what to do but he could show her.

The sensitivity to others is not restricted to interactions between bonobos. At the Twycross Zoo, in England, Betty Walsh observed a bonobo named Kuni capture a starling. Concerned for the bird, the caretaker encouraged Kuni to release the bird. Kuni made several attempts before climbing to the top of a tree, carefully spreading the bird's wings and tossing it as far as she could. When this failed as well, Kuni stood near the bird, protecting it from others until it eventually flew away.

The ability to see what another individual needs or wants is a cognitive skill possessed only by apes and humans. It provides the skills necessary for social relationships that while ultimately based on resource acquisition and reproduction, are far more complicated than in any other mammals.

Conservation

Research observations of wild and captive bonobos are ripe with evidence of their understanding of other's emotions and needs. This humanlike predisposition to sensitivity seems to be the foundation of their civilized social interactions and the apparent ease with which a bonobo community functions. This, in turn, appears to be the result of an abundant environment, with plenty for all, and may be one of the most important models for the evolution of our human ancestors. Unfortunately, human encroachment on bonobo habitats for agriculture, forest products, and hunting for the bushmeat trade threaten the existence of the bonobo, as well as the other great apes of Africa. Plans for expanding the bonobo sanctuaries around the Wamba and Lomako research stations are being petitioned for, but the need for funding and public education still exists. Protection of the bonobos must ultimately lie in the hands of those with whom they share their habitat.

— Jackie L. Orcholl

See also **Apes, Greater; Chimpanzees and Bonobos, Differences; Intelligence; Primatology**

Further Readings

Boesch, C., & Hohmann, G. (Eds.). (2002). *Behavioural diversity in chimpanzees and bonobos.* Cambridge: Cambridge University Press.

D'Aout, K., Aerts, P., DeClercq, D., DeMeester, K., & Van Elsacker, L. V. (2002). Segment joint angles of hind limb during bipedal and quadrupedal walking of the bonobo *(Pan paniscus). American Journal of Physical Anthropology, 119*, 37–51.

De Waal, F. (1997). *Bonobo, the forgotten ape.* Berkeley: University of California Press.

BONOBOS IN CAPTIVITY

Of all primates studied by anthropologists who focus on either biological or anthropological linguistics, the bonobo or "pygmy chimpanzee," which was first identified in 1929, has the closest genetic link to human beings. Many primatologists contend that bonobos or pygmy chimpanzees are able to understand human speech and, in some cases, make sounds that approximate human speech. Researchers have demonstrated that bonobos understand the difference between subjects and objects and know whether a verb is used in modifying or subordinate clauses. Kanzi, a bonobo who spent most of the first 19 years of his life in the Language Research Lab at Georgia State University (GSU), in Atlanta, Georgia, is the best known of all apes that have demonstrated the ability to comprehend speech. Born in 1980 at the Yerkes National Primate Research Center, also in Atlanta, Kanzi was taken over by Matata, the group's female leader, shortly after his birth. Born in the wild, Matata was transferred from the Yerkes Field Center to the GSU language lab, and Kanzi went along.

While Matata began training at the language lab, 6-month-old Kanzi seemed to ignore the keyboard and symbols used in the training, either playing or trying to reclaim his adopted mother's attention. After Matata was removed from the lab, however, Kanzi demonstrated the ability to identify all symbols to which Matata had been introduced. He eventually learned to recognize over 200 words productively and 500 words receptively, and developed the ability to understand and react to complex sentences. By the time that Kanzi returned to the Yerkes Field Station in 1998, he could comprehend over 1,000 sentences and had a comprehension level similar to that of a 2½-year-old human child. In the spring of 2004, Kanzi, his baboon family, and his researcher Sue Savage-Rumbaugh were moved to the new Iowa Primate Learning Center in Des Moines, Iowa, a 137-acre sanctuary for great apes funded by Iowa businessman Ted Townsend.

Disputing the claims of linguists Noam Chomsky and Steven Pinker, who argue that apes do not have the ability to communicate linguistically with humans, Kanzi's researcher Savage-Rumbaugh maintains that language in humans was acquired through evolutionary gradualism and that speech in apes may be evolving also. Patrick G. Gannon of Mount Sinai School of Medicine in New York also accepts the idea of gradually evolving language ability in apes.

Observations of bonobos at the College of William and Mary in Williamsburg, Virginia, support the notion that bonobos acquire language in ways similar to human babies. Anthropologist Barbara King notes that the structured routines that fill the interaction between mother bonobos and their babies is similar to those that human mothers use with their babies, permitting mother-child communication even before human babies have acquired language skills. For instance, observations of Elikya, an infant bonobo, and her mother, Matata, demonstrated that the two frequently played peek-a-boo and that Matata walked backward to encourage Elikya to crawl toward her.

Bonobos that travel in the wild and in reserves have also demonstrated an unusual grasp of symbolic language. Anthropologists have observed that traveling bonobos leave clues such as twigs and leaves to convey directions or warnings to other bonobos. While observing bonobos in the Congo in 1995, Savage-Rumbaugh discovered that the animals frequently "chattered" to one another just as humans do. Other anthropologists believe that bonobos, whose shrill calls are immediately identifiable from other apes, are also able to convey various emotions through verbal communication.

— Elizabeth Purdy

KANZI

Kanzi is a male Bonobo at the Language Research Center, in Atlanta, that learned to communicate with humans through signs. Bonobos are a species of great apes. They are the rarest of all the great ape species, which includes gorillas, chimpanzees, and orangutans. Bonobos bear the scientific name of *Pan paniscus.* They are also called "pygmy chimps" and "left-bank chimps."

Bonobos are found only in the Congo River valley in Africa, and only on the river's southern or left bank. They are about the size of chimpanzees, but more slender, and are matriarchal, while chimpanzees are patriarchal. Bonobos are very social and engage in frequent sexual interactions that make their behavior far less violent than that of chimpanzees. Researchers believe that this makes them more naturally communicative.

Since the 1960s, a number of ape language projects were established to study the possibility of developing communications between apes and humans. One ape sign language (ASL) center was the Yerkes Regional Primate Research Center of Emory University, in Atlanta, Georgia.

Kanzi was born at the Yerkes Field Station to Lorel (mother) and Bosondjo (father) on October 28, 1980. He would eventually be a very successful learner and communicator. His story has been described in *Kanzi: The Ape on the Brink of the Human Mind* (1994), by Sue Savage-Rumbaugh and Roger Lewin.

Kanzi was able to use a keyboard with 120 symbols to communicate. He was such a quick learner that he captured the meaning of words and symbols without any instructions or with little training. Eventually, his active vocabulary increased to over 200 words and to 500 words for his receptive vocabulary. He also made tools.

Numerous tests were used to demonstrate Kanzi's level of comprehension of speech. He would be asked either/or questions and would respond correctly. He was thus the first ape to demonstrate comprehension of human speech. Kanzi was able to grasp spoken English at the same level as an average 2½-year-old child.

Psychological studies of the ways children acquire language skills were advancing rapidly in the 1970s. The new insights helped teach Kanzi. In return, Kanzi has been a contributor to the new view that if children are taught to sign, they can communicate well before they can speak. This enables them to communicate with parents or caregivers and thereby to reduce problems with living.

— Andrew J. Waskey

Boucher de Perthes, Jacques (1788–1868)

Jacques Boucher de Crèvecoeur de Perthes was born September 10, 1788, in Rethel, France.

Considered in France as the "father of prehistory," Boucher de Perthes worked from 1825 as a custom officer in Abbeville, like his father did, until 1853, when he was 65. From then until 1860, he embarked on six big trips to Africa and Europe. His father was also a botanist, so he gave to his son a broad culture on arts and sciences. In 1837, he met Dr. Casimir Picard. Influenced by him, he became fond of archaeology. Picard introduced him to stratigraphical methods and caused his interest in the Somme River Valley.

Boucher de Perthes undertook surveys on Somme River terraces, finding abundant Paleolithic industry. The tools were located on the high terraces. They also were associated with bone remains of extinct animals.

Hand axe found in Portalette by Boucher de Perthes

The findings proved that the antiquity of man was greater than previously proposed by the Catholic Church (4004 years BC). These results were first published in 1847 in Paris, included in the first of the volumes of his *Antiquitès celtiques antèdiluviennes.*

The reactions to such innovative theories came quickly. Part of Boucher de Perthes's work was dedicated to describing the strange "hieroglyphs" or symbols that he observed on some stones. There is no doubt they were natural, but he found strong opposition from the scientific establishment. One of his first detractors, another "amateur" archaeologist, Jean Paul Rigollot (1810–1873), excavated the Saint-Acheul and Saint-Roch deposits, in his intention of refuting Boucher de Perthes's theories. To his surprise, he found new materials to reassert the new hypothesis. At the same time, other geologists obtained data that confirmed his thesis. Among them stood out the geologist Charles Lyell (1797–1875), the palaeontologist and botanist Hugh Falconer (1808–1865), and the archaeologist and geologist John Evans (1823–1908), who also visited Saint-Acheul by 1859. Finally, the great palaeontologist Edouard Lartet (1801–1871) published in 1861 his own work from Aurignac Cave. The deposits were so well preserved that there was no doubt of their antiquity, and the presence of man was undoubtedly linked with extinct animals.

During his life, Boucher wrote 49 books. Among them, his memoirs were published in eight volumes. Boucher de Perthes died on August 5, 1868, in Abbeville, France. His great intuition laid the foundation of the modern prehistory.

The Museum Boucher de Perthes can be visited today in the village of Abbeville, opened in 1954. The collections cover diverse materials and chronological periods.

— Belén Márquez Mora

Further Readings

Aufrère, L. (1940). *Figures de préhistoriens: Boucher de Perthes.* Paris: Leroux Presses Universitaires.

Boucher de Perthes, J. (1847). *Antiquitès celtiques antèdiluviennes. Mèmoire sur l'industrie primitive et les arts à leur origine.* Paris: Treutel et Wurtz.

Cohen, C., & Hublin, J.-J. (1989). *Boucher de Perthes: Les origines romantiques de la préhistoire.* Paris: Belin.

Bourdieu, Pierre (1930–2002)

French philosopher, anthropologist, sociologist, and public intellectual, Pierre Bourdieu rose from the relative obscurity of provincial France to become one of the most influential thinkers in the social sciences. His most famous work, *Distinction: A Social Critique of the Judgment of Taste*, was named one of the 20th century's 10 most important works of sociology by the International Sociological Association.

Born the son of the village postmaster in Denguin, in the Pyrénees' district of southwestern France, Bourdieu was known locally as a star rugby player. He studied philosophy at the École Normale Superiéure, then worked as a teacher for a year until he was drafted into the army. He was posted to Algeria as part of the French mission to pacify its rebellious colony. Bourdieu stayed in Algeria from 1959 to 1960 to lecture at the University of Algiers and study the lives of the Kabyle people. Of the experience, he once said, "I thought of myself as a philosopher and it took me a very long time to admit to myself that I had become an ethnologist."

Returning to France, Bourdieu taught at the University of Paris (1960–1962) and at the University of Lille (1962–1964). In 1964, he joined the faculty of the École Pratique des Hautes Etudes. He became known for an elegant series of structuralist accounts of Kabyle life, the most famous of which, *The Kabyle House*, not only describes how the layout of a typical Kabyle house encodes local cosmologies but suggests that these cosmologies are reproduced among Kabyle by the process of living in the house and inhabiting these meanings. This interest in how cultural systems are reproduced in and through everyday life was central to work done by Bourdieu and his colleagues when he became director of the Centre de Sociologie Européenne in 1968. Bourdieu argued in his 1970 work *La Reproduction* that the French educational system operated to reproduce the French cultural system, and particularly class differences. He returned to the issue of class reproduction in his most important work, *Distinction.*

Bourdieu continued and extended these ideas in the journal *Actes de la Recherche en Sciences Sociales,* which he launched in 1975. The publication, 2 years later, of an English translation of his *Outline of a Theory of Practice* led to his becoming one of the world's most frequently cited social scientists. In

Source: Courtesy, Wikipedia.

1981, he was appointed to the prestigious chair of sociology at the Collège de France. By the mid-1990s, Bourdieu had become a public figure in France, appearing on television shows, supporting striking rail workers, and speaking on behalf of the homeless. His 1996 work, *On Television,* was an unexpected bestseller. In 1998, he published an article in the newspaper *Le Monde* comparing the "strong discourse" of neoliberal economics with the position of the psychiatric discourse in an asylum, which became popular among antiglobalization advocates. Bourdieu died of cancer in Paris on January 24, 2002.

Bourdieu's theoretical work was rooted in an effort to overcome the epistemological divide in social theory between the description of objective social structures and efforts to capture the subjective lived worlds of the people being studied. This divide was especially pronounced in the debates between the anthropologist Claude Lévi-Strauss's structuralism and philosopher Jean-Paul Sarte's existentialism that raged on the French academic scene in Bourdieu's formative intellectual years. His solution to the problem was the concept of *habitus,* the predispositions to act in certain ways that people develop by living in social institutions (such as the Kabyle house or the French school system). Habitus is neither entirely constraining nor entirely under a person's control. In one paper, Bourdieu gives the example of a provincial French accent, which, even though it may put one at a disadvantage in Paris, is not so easy to change. Growing up in a provincial village, one trains one's vocal apparatus to pronounce sounds in particular ways, literally embodying the local culture.

That an accent may be less valued in Paris brings up two more of Bourdieu's key concepts, that of *symbolic capital* and *social field.* Bourdieu argued that in addition to economic capital, people's social worth was determined by possession of various forms of symbolic capital (linguistic, social, cultural), the ability to enact or display, through one's habitus, valued cultural forms. Social fields are particular social domains defined by the kinds of capital valued in them. People whose enculturation has provided them with valued cultural capital tend to do better than those who start with less valued capital, but particular individuals may be able to accumulate valued capital in spite of their backgrounds. To make matters more complex, people usually inhabit more than one social field; the Parisian accent one struggled to master in Paris may make one appear affected or effeminate back home.

The different forms of capital are transferable—certain forms of symbolic capital can be converted to economic capital (as when linguistic ability leads to a diploma, which leads to a higher paying job) or to social capital (as when displays of particular forms of femininity or masculinity lead to a successful marriage). Caught in the tension between different social fields and different forms of habitus, people employ their *practical reason*—their sense of the situation and how to act in it—to define goals, pursue them, and rationalize their successes and failures.

As the theory of practice became more and more clearly articulated in Bourdieu's voluminous writings, it was hailed as a major contribution that solved a number of critical problems in social science: It could be used to contextualize statistical information or to examine the behavior of individuals, thus bridging the macro/micro divide in social science methodologies. It accepted each individual as a choice-making actor with a unique life trajectory while yet offering ways to describe how choice making is constrained by the structured social fields within which people act.

Many anthropologists were particularly attracted by the ways in which Bourdieu's project took such standard disciplinary interests as enculturation and difference and demonstrated how they could be linked to local production of power. Practice theory also lends itself well to ethnographic modes of research and description.

Bourdieu has been criticized for any number of things, from his sometimes impenetrable writing style to a tendency toward "sociological terrorism" in his treatment of scholars of differing views. One of the most cogent critiques by anthropologists has been the concern that Bourdieu's notions of capital and practical reason naturalize economic reason (the weighing of risk and reward by social actors), in contradistinction to the more common anthropological assumption that economic reason is but one historically produced form of cultural logic. Another has been Bourdieu's tendency to overemphasize the importance of how symbolic capital can be converted into economic capital, rather than acknowledging that social and symbolic capital—such as strong kin bonds or deep religious faith—may be valued for themselves.

Bourdieu was extremely conscious of his own position as a French intellectual analyzing and criticizing the French academic system and the role of intellectuals in it. His concept of reflexivity in social science extends beyond scientists' acknowledging their positions in the systems they study, to include also their awareness of their positions in the field of knowledge production. Studying the conditions of its own production of knowledge is the best way to enable social science to overcome those conditions, he argues. Moreover, reflexive awareness of how we ourselves have been, and continue to be, produced as social persons allows us greater insight into, and empathy with, the ways in which those we study are produced. These concerns are explored in several works, most accessibly in *Invitation to a Reflexive Sociology*, published with Loic Wacquant.

— *Mark Allen Peterson*

Further Readings

Bourdieu, P. (1977). *Outline of a theory of practice* (Richard Nice, Trans.). Cambridge, UK: Cambridge University Press. (Translation of *Esquisse d'une théorie de la pratique, précéde de trois études d'ethnologie kabyle,* 1973)

Bourdieu, P. (1987). *Distinction: A social critique of the judgement of taste* (Richard Nice, Trans.). Cambridge, MA: Harvard University Press.

Bourdieu, P., with Wacquant, L. (1992). *An invitation to reflexive sociology.* Chicago: University of Chicago Press.

Calhoun, C., LiPuma, E., & Postone, M. (1993). *Bourdieu: Critical perspectives.* Chicago: University of Chicago Press.

Reed-Danahay, D. (2004). *Locating Bourdieu.* Bloomington: Indiana University Press.

Brace, C. Loring (1930–)

Dr. Charles Loring Brace is a paleoanthropologist best known for his research on controversial topics such as cultural and biological impacts on dental reduction in modern populations, the fate of the Neandertals, and the biological race concept. He is curator of biological anthropology for the Museum of Anthropology, and professor of anthropology at the University of Michigan in Ann Arbor.

Brace was born on December 19, 1930, in Hanover, New Hampshire, to Gerald Warner Brace, an English professor, and Huldah Laird Brace, a biologist. Brace became interested in prehistory in the ninth grade, when his mother introduced him to Andrews's 1945 book, *Meet Your Ancestors.* Brace entered Williams College and, since there was no anthropology program, majored in geology (BA, 1952).

Brace earned his MA (1958) and PhD (1962) degrees in anthropology from Harvard University. At Harvard, he studied with Earnest A. Hooton and William W. Howell, both paleoanthropologists interested in issues of race, morphometrics, and human origins. Brace taught at the University of Wisconsin-Milwaukee and the University of California, Santa Barbara, before joining the faculty of the University of Michigan in 1967. Over several decades, he has compiled one of the largest and most regionally diverse datasets of hominid cranial and dental measurements. He uses this dataset to study cultural and biological impacts on dental reduction in hominids, to study the fate of the Neandertals, and to dismantle the biological race concept.

Dental Reduction and the Probable Mutation Effect

Brace is concerned with tying anatomical changes to natural selective forces to explain hominid evolution and the patterns of variation seen in modern human populations. In 1963, he observed that Darwin's remarks that once-adaptive traits can become reduced due to relaxed selection could explain the reduction in robusticity and size of hominid skeletal and dental dimensions. He called the genetic mechanism for this reduction the probable mutation effect, or PME. When once-adaptive traits, such as skin color or tooth size, experience a relaxation in selective forces, then mutations can occur without being detrimental to the individual's survival. According to the PME, the accumulation of these random mutations will ultimately result in reduction of the trait in question. For example, Brace reasons, if large tooth size is maintained in hominids by natural selection, and this selection becomes relaxed, then individuals with smaller teeth with survive, and over time the mean tooth size in the population will decrease.

Brace was interested not only in what can happen when selective forces are relaxed but also why they can become relaxed. The major factor, he argues, is the "cultural ecological niche," which buffers natural selection. Dietary changes and the evolution of cooking technologies acted to reduce the amount of chewing needed to process foods; Brace documented that geographic areas with a long history of obligatory cooking (thawing frozen foods) or food processing techniques (such as grinding stones, pottery, and earth ovens) have experienced dental reduction at the rate of 1%–2% per 2,000 years.

The Fate of the Neandertals

In the first half of the 20th century, research in the origins of modern human beings was influenced by the image of Neandertals as brutish and primitive—an unlikely ancestor to modern humans, who must have invaded Europe from elsewhere. In 1964, Brace challenged this image of Neandertals, arguing instead that the differences between Neandertals and modern humans were due to general robusticity of the skeleton and teeth. He explained that technological and behavioral changes could cause trait reduction in modern humans, and advocated a Neandertal stage of human evolution.

However he argued, many human paleontologists seemed to think that none of the fossil forms differing from modern humans could be ancestral to modern humans but that, instead, ancient modern forms would be always be found to represent the proper ancestors. He characterized models that required a modern invading ancestor to be antievolutionary and similar to the essentialist position known as "catastrophism" first proposed by Georges Cuvier in the 19th century; he called these models examples of hominid catastrophism. This paper proved to be highly influential, and, as a result, Brace is considered by some to be the intellectual father of the regional continuity model of modern human origins.

The "Race" Concept

Perhaps Brace's most influential work has been his four decades of research on the biological concept of race. Brace argues that the concept of "race" has no biological reality but rather is a social construct. Biological traits affected by natural selection create an unbroken gradient from one region to another; these gradients are called "clines" and respond to changes in selective pressure. Each cline is under a different set of selective forces, and therefore the clinal pattern differs for each trait; these clines cross typologically defined racial categories. Furthermore, many features that cluster people into similar-looking groups, he argues, are due to random genetic drift and have no adaptive significance. For these reasons, it is impossible to define racial categories with any biological meaning. Brace's argument influenced a great many anthropologists and has forced the rewriting of many textbooks.

Brace is one of the few truly synthetic scholars and a vocal proponent of the four-field approach to anthropology (integrating physical anthropology, cultural anthropology, archaeology, and linguistics). His lifetime of work on modeling the mechanisms shaping human origins and biological variation, the integration of biological and cultural factors in human evolutionary models, as well as philosophy and history of science, is a significant legacy to the field of anthropology.

Brace is also known for writing anthropology-themed poetry (which he often calls "doggerel") to drive home his arguments. He wrote this limerick for this encyclopedia entry:

Helped by a brilliant wife,
And despite academic strife,
I've been lucky indeed
To be able to lead
A long and productive life!

Sometimes met with words of disdain,
My efforts have not been in vain;
And it could be said
That my work has led
To anthropological gain.*

— *Cathy Willermet*

See also **Mutations; Neandertals**

Further Readings

Brace, C. L. (1963). Structural reduction in evolution. *American Naturalist, 97*, 39–49.
Brace, C. L. (1964). The fate of the "classic" Neanderthals: A consideration of hominid catastrophism. *Current Anthropology, 5*, 3–43.
Brace, C. L. (2005). *Race is a four-letter word: The genesis of the concept.* Oxford, UK: Oxford University Press.
Falk, D., & Seguchi, N. (2006). Professor C. Loring Brace: Bringing physical anthropology ("kicking and screaming") into the 21st century! In Derek Brereton (Ed.), *Michigan Discussions in Anthropology* (Vol. 16).
Ferrie, H. (1997). An interview with C. Loring Brace. *Current Anthropology 38*(5), 851–869.

*Reprinted by permission of C. Loring Brace.

Brachiation

A form of arboreal locomotion among primates in which the animal progresses using the forelimbs only. The animal swings below branches using alternate left and right handholds while the body undergoes 180° rotation to the opposite side. This type of locomotion is observed to varying degrees among hominoid primates but is especially characteristic of the gibbons and siamangs (the hylobatids). Adaptations for brachiation include forelimbs that are longer than the hindlimbs; a broad and short thorax; a shoulder blade that is positioned dorsally to allow the forelimb to be raised above the head; highly mobile shoulder, elbow, and wrist joints; and long, hooklike hands. The hylobatids are extremely proficient brachiators, and they are able to cross gaps in the tree canopy by propelling the body through a free-flight phase between successive handholds. This type of agile, acrobatic brachiation is referred to as ricochetal brachiation.

There has been considerable confusion over the use of the term *brachiation* in the literature. It was originally applied to the specialized form of arm swinging seen in the hylobatids, but it has since been increasingly used to describe the more deliberate forms of arm swinging and forelimb suspensory behaviors of the great apes. In the 1960s, brachiation was further extended to include similar, but less specialized, behaviors in New World monkeys and colobines and was termed "semibrachiation." Similarly, evidence of incipient forelimb suspensory behaviors in the fossil ape *Proconsul* from the Miocene of East Africa led to it being described as a "pro-brachiator." However, these latter terms have largely fallen into disuse. With further observations on the anatomy and behavior of living apes and monkeys, most researchers prefer to restrict the term *brachiation* to the locomotor behaviors of hylobatids (true brachiation) and the great apes (modified brachiation), while the less specialized behaviors observed in other primates are referred to as forelimb suspensory postures and locomotion.

Classification of the locomotion of primates using such terms as *brachiation* is rather restrictive and clearly does not encompass the full range of behaviors that characterizes the locomotion of individual primate species. For this reason, researchers prefer to document all of the different types of postural and locomotor behaviors observed for each species and then identify the most frequently used according to the time dedicated to them. In this way, it can be shown that gibbons use brachiation for more than 80% of their locomotor bouts, while the African apes (i.e., gorillas and chimpanzees) use it for less than 5%.

— *Terry Harrison*

Further Readings

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego, CA: Academic Press.
Martin, R. D. (1990). *Primate origins and evolution: A phylogenetic reconstruction.* Princeton, NJ: Princeton University Press.
Napier, J. R., & Napier, P. H. (1985). *The natural history of the primates.* Cambridge, MA: MIT Press.

Braidwood, Robert John (1907–2003)

Hailed as one of the founders of scientific archaeology, Robert Braidwood (1907–2003) is credited with a multitude of discoveries and novel research methods, including the use of interdisciplinary teams to study the transition from a hunter-gatherer society to an agriculture-based civilization. Through a series of important excavations in Iraq, Iran, and Turkey, Braidwood and his colleagues discovered evidence of the earliest signs of food production, metallurgy, and architecture.

Braidwood studied architecture at the University of Michigan and received his MA in 1933. Later that year, he joined the University of Chicago Oriental Institute's Syrian Hittite Expedition to the Amuq Plain, where he worked under legendary archaeologist James Henry Breasted until 1938. In 1937, he married Linda Schreiber (1909–2003), a fellow University of Michigan graduate who would later become his constant field companion and research partner. During World War II, Braidwood headed a meteorological mapping program for the Army Air Corps, and in 1943 earned his doctorate at the University of Chicago. Upon graduation, he was immediately hired by the University of Chicago, where he was professor in the Oriental Institute and the Department of Anthropology until his retirement.

Braidwood's work in the Amuq Plain represented one of the first rigorous archaeological surveys, where researchers meticulously map artifacts in order to date them. In 1947, Braidwood was introduced to the principle of carbon dating, developed by University of Chicago colleague Willard Libby, and proceeded to use the method to date ancient artifacts more precisely.

Also in 1947, Braidwood launched the Oriental Institute's Jarmo Project in Iraq, the first field project focused on retrieving evidence of early agricultural societies. This project is credited with pioneering a new form of interdisciplinary archaeology that requires the contributions of biologists and geologists to study such mundane evidence as bone fragments, plant remains, and sediment to learn more about the interworkings of early societies. In 1954, this cooperative program was awarded a National Science Foundation grant, one of the first such awards given to an anthropology team. However, political strife in Iraq forced Braidwood to withdraw from the country in 1958, and he subsequently conducted similar field programs in Iran and Turkey.

In southern Turkey, Braidwood and colleagues from Istanbul University extensively worked a site called Çayönü. Evidence stemming from this work suggested that the transition from a hunter-gatherer society to an agriculture-based civilization occurred 8,000 to 12,000 years ago in the foothills of the Vagros Mountains in southern Turkey. To rigorously test this suggestion, Braidwood uncovered some of the earliest known farming villages and studied the wild ancestors of plant and animal species that were later domesticated.

In addition to his work on the origins of agriculture, Braidwood is also credited with several additional discoveries, including the oldest known sample of human hair, the earliest example of handcrafted natural copper, and the oldest known piece of cloth. He authored several important technical papers and popular accounts of his research, among them the seminal textbook *Prehistoric Men*. In 1971, he received the medal for distinguished archaeological achievement from the Archaeological Institute of America.

— *Stephen L. Brusatte*

See also **Mesopotamian Civilization**

Further Readings

Braidwood, R. J. (1937). *Mounds in the plain of Antioch: An archaeological survey* (University of Chicago Oriental Institute Publications, Vol. 68). Chicago: University of Chicago Press.

Braidwood, L. S. (1953). *Digging beyond the Tigris.* New York: H. Schuman.

Braidwood, R. J. (1967). *Prehistoric men.* Glenview, IL: Scott Foresman.

Brain, Evolution of Primate

Cognitive thought processes that arise from consciousness are depicted as being an exclusive human characteristic. Reflected in the metaphysical views from Aristotle (384–322 BCE) to Rene Descartes (1596–1650), the philosophical implications for our species result in an unbridgeable chasm between our species and the rest of the animal kingdom. These

geocentric and anthropocentric depictions of our species would be irrevocably damaged by the theory of organic evolution by Charles Darwin (1809–1882). With evidence refuting the traditional view of our species held by both philosophers and theologians, speculation as to our relationship with other primates began a critical point of inquiry. Inquiry into this relationship by Thomas Huxley (1825–1895) provided critical evidence in support of his pithecometra hypothesis, whereby he stated that our species is closer to the great apes (orangutan, chimpanzee, and gorilla) than the two lesser apes (gibbon and siamang). In further support of Huxley's hypothesis via embryology, Ernst Haeckel (1834–1919) concluded that not only does our species resemble other primates, but we share a common ancestor in the form of the illusive "missing link" that was speculated to be found in Asia. These scientific inquiries supported Darwin's claim that our species differs from other primates in degree and not in kind. These differences in degree can be extended to anatomical, physiological, and cognitive functions of the primate brain. Such bold statements would require evidence from the fossil record.

Though Darwin and Haeckel differed regarding the geographic location of human evolution (Darwin supported Africa, whereas Haeckel supported Asia), the search for fossil evidence resulted in the successful discoveries of fossil hominids in many areas of the world. Discoveries and interpretations by Davidson Black (1884–1934), Robert Broom (1866–1951), Raymond Dart (1893–1988), Eugene Dubois (1859–1940), Donald Johanson (1943–), and the Leakey family (Louis, Mary, Richard, and Meave) have contributed crucially needed evidence to aid in reconstruction our species' phylogenic past. Though the fossil record is far from being complete, the accumulated evidence can suggest an evolutionary descent as speculated by Darwin. Utilizing cladistic analysis, our species' phylogeny is speculated as having the following relationship: *Australopithecus afarensis* gave rise to *A. africanus,* which then split into two branches, one leading to *Homo habilis* and the other leading to *A. robustus/boisei.* Our species, whose descent is from the *Homo* line, can trace its origin back to these primitive hominid forms.

Our relationship to other primates extends back further than these hominid forms. The discovery of the fossil *Proconsul* indicates a common ancestor dating back 18 to 20 million years ago. Further back in time, around 40 million years ago, there was a split between New World and Old World monkeys. An additional split between Old World monkeys and apes had occurred around 35 million years ago. Of the great apes, it is speculated that there was a split that was ancestral to the orangutan around 16 million years ago and the gorilla split from the chimpanzees around 8 million years ago. The most recent split between hominids, the third chimpanzee, and both chimpanzees (common and pygmy) was as little as 6 million years ago. Supported by both immunology and molecular methods, the DNA hybridization indicates and vindicates the fossil record, whereby the human primate is closer to the chimpanzee and gorilla than any other primate. In fact, our species shares 98% of our DNA sequence with our chimpanzee cousins. However, it must be noted that sharing 98% DNA does not confer or equate that our species is *exactly* the same; a similar misconception applied to the Darwinian model of evolution erroneously states that our species descended *from* the chimpanzee and not the fact that our species *shares* a common ancestor. Just as cranial capacity does not confer complexity, the sharing of common genetic material does not confer exact characteristic and behavior shared by all primates. Our species does resemble the chimpanzee (and other apes) in both in anatomy and physiology, same dental formula (2–1–2–3), close embryonic development, and a degree of mental capabilities and behavior. However, does 2% make a difference, not only in morphological features, but in the degree of complexity of the brain? Regardless of the percentage held to be in common, the evolutionary differences among the primate brain (in terms of reorganization) is evident; yet it does produce an affinity between our species and our cousin, the chimpanzee. The exact circumstances surrounding the evolution of primate brain is a point of speculation; however, certain anatomical and physiological features that coincide with cranial expansion may give the necessary indications as what factors may be responsible.

The exact nature surrounding the advancement of the primate brain is continuously a source of inquiry. Random mutations, changes in diet, environmental factors, and bipedality are the most speculated influences that are implicated in the evolution of the brain. It is the contention of this author that morphology features of the cranial base hold determining factors as to the degree of bipedality and an indication of efficiency concerning the anatomical changes

between bipedality and cranial capacity (inferring complexity). Such efficiency would translate to an enlarged cranial capacity that is capable of sustaining the advanced hominid brain. These revolutionary changes in morphology that had occurred during our species' evolution are reflected in both cranial (and postcranial) and endocranial casts of these early hominid forms. The evidence appears to support this author's speculation and other scientific evaluations. What the endocasts had revealed, starting with *A. afarensis,* was the presence and location of the lunate sulcus and fronto-orbital sulcus, all of which indicates an emergence of an advanced hominid brain. Though there is much controversy as to their interpretation, regarding it being more ape or human in appearance, the emergence of a "humanlike" Broca's area and development of the prefrontal cortex suggests that a rudimentary form of language and associated skills was used by the *H. habilis* stage in human evolution, all of which indicates the development of cerebral symmetry.

A degree of symmetry can be found in all primates, though our species expresses the greatest degree. These characteristics, along with morphological features of the cranium, can give an indication as to our ancestral behavior. If bipedality and endocranial casts indicate a trend to a more humanlike appearance, perhaps the behavior suggested by Odeodontokeratic, Oldowan, and Mousterian cultures are well-founded. Furthermore, if research correctly indicates the degree of complexity and similar physiology (brain) of our primate cousins, any remaining anthropocentric attitudes concerning our place in nature would have to capitulate for the lack of scientific evidence and reason. Our species, as Darwin indicated, differ only in degree and not in kind. The progression by which these changes in various portions of the brain occurred and are sustained is grounded within biological processes of evolution.

Advancements in the hominid brain that resulted in phylogenic change are due to random mutation and the selective forces of environmental factors and behavior. The genetic sequence that resulted in the advanced hominid brain are due to random nucleotide base changes, whereby nucleotides that contain methylated cytosine control the rate by which mutations occur, via insertions, deletions, and structural sequencing. Though in a constant state of genetic flux, the phenotypic expressions that translate into the hominid brain are speculated as being a result of the stochastic nature stemming from the founder effect. These mutations most likely changed the composition and function of brain peptides and fostered great cytological alterations (reorganization). This resulted in both an enlarged cerebral cortex and asymmetry, which allowed for "human" characteristics of language, dexterity, and other distinctly human behavior patterns. Once expressed, these phenotypic changes of an enlarged brain, neural reorganization, and behavior are then offered to the selective forces of evolution.

Though random genetic shuffling created the advanced hominid brain, sustaining this "new adaptation" would require positive outcome when offered for selection. The advanced hominid brain (multifarious rational thought), bipedality, and complex behavior allowed for our ancestors to manipulate their environment and broaden their dietary base. The environmental factors surrounding these hominid forms indicate few predators in a semiarid climate, with sporadic open woodlands, bush, and grassy savannahs. These roving bands of hominids, utilizing their evolutionary and revolutionary cerebral adaptations, migrated, occupied, and successfully adapted to different environments. With an increase in diurnal hunting activities (including higher efficiency) and later the use of fire, the increase in particular meat consumption (liver) would affect $Ca^{\cdot\cdot}$ levels in the bloodstream. High levels of $Ca^{\cdot\cdot}$ would influence synaptic response, resulting in greater memory and learning capabilities. In addition, meat proteins, which contain amino acids of tryptophan, tyrosine, and lecithin, would affect the performance of neurotransmitter activity. Essentially, behavior that influences diet will influence neurotransmitters, which then in turn influences behavior. Together, this cyclical process not only contributed to the sustaining of any genetic advancements of the hominid brain but also aided in the direction of its evolution toward greater reorganization. Considering these processes, the arbitrarily set traditional "Cerebral Rubicon" of 750 cc, as posed by Sir Arthur Keith, must be rejected in light of recent scientific advancements. Such distinction between complexity and cranial capacity serves to illustrate the obscurity of that defining moment of becoming "Homo" within our hominid ancestry. Furthermore, our close affinity with the other great apes forces our species to reconcile its metaphysical views concerning our own place within nature. Only with such naturalism within an

evolutionary framework can our advanced hominid brain allow the discovery of its true humanity in ourselves and, to a lesser extent, the other primates.

Though the evolution of the advanced hominid brain, as with evolution in general, is accepted by the scientific community, there are contentions as to which evolutionary model correctly depicts this evolutionary process. In Darwinian evolution, the rate of change is slow or gradual. Regardless of population size, sympatry or allopatry provides unidirectional phylogenic change toward phylogenic speciation. Contrary to this view, the punctuated equilibria model of evolution, as postulated by Eldridge and Gould, states that environmental changes spur highly episodic rates of change of small and isolated populations. It is the survival of stochastic changes that results in allopatric speciation. In a synthesis of these perspectives, the advanced-brain model of evolution, as postulated by Bennett Blumenberg, states that the episodic and unidirectional change on isolated populations resulted in the survival of nonrandom stochastic expressions. Similar to punctuated equilibria model, survival of stochastic changes results in allopatric speciation. In this manner, once the advanced hominid brain emerged from the process of evolution, the symbiosis between our species' physiological process and expressed behavior had a directional impact on the accumulative complexity or reorganization of our ancestral brain. As if by design, but certainly not, the greater degree of mental capabilities allows our species not only to discover the processes by which it was derived but also to understand and direct its own future.

As there is evolution, so too is there extinction. These two aspects of the same evolutionary coin reveal not only our origin but also the future of our species. In this manner, extinction becomes a real possibility, if not an eventuality. Our advanced primate brain, an overspecialized product of evolution, has interred within its evolution a responsibility toward its environment and the rest of the animal kingdom. In regarding our primate relatives, greater care and diligence should be taken in order to both conserve their natural habitat and to ensure their prosperity and longevity; for if 6 million years ago, the DNA difference of 2% produced different results than today, it would be interesting to speculate on our own primate's future and final outcome. Such speculation should indicate both the chance and consequences of evolution. Furthermore, environmental conservation guided by reason should regulate the extent of our modifying activities of the external world. Excessive modifications of the environment can lead to critical thresholds and total collapse of ecological systems. With the unity of life on this planet and the intricate symbiosis among species, it would be in the best interest of our species to reduce these environmental problems down to a minimum. This will help to ensure the survival of our species, all of which propels the evolution of our species into the future.

With advancement made in the areas of genetics and the cognitive sciences, the mysteries of the human brain and cognition are beginning to become demystified. The nature of the relationship among sensory receptors and logarithmic processes of mental processes are being explored by revenant computer simulations provided by science. Such advancements in computer technology, which is in itself a recent product of the primate brain, can not only simulate the mathematical process of organic evolution but also reflect the mental processes that created it. Innovations in artificial intelligence, genetic engineering, cloning, and environmental changes (both controlled and uncontrolled) will certainly challenge the regality of our primate brain. With rapid advancements in technology stemming from our complex brain (more rapid than the evolutionary process that produced the biological foundation for their development), the next evolutionary change is a point of curious speculation, for the future can lead to the evolutionary direction as envisioned by Arthur C. Clark's *2001: A Space Odyssey* or Friedrich Nietzsche's *Ubermensch.* Evolution or exoevolution (as postulated by H. James Birx), our species now has limited control over the direction of its evolution, all due to the evolution of the primate brain.

— David Alexander Lukaszek

See also **Brain, Human; Brain, Primate; Extinction**

Further Readings

Birx, H. J. (1988). *Human evolution.* Springfield, IL: Charles C Thomas.

Buss, D. M. (1999). *Evolutionary psychology.* Boston: Allyn & Bacon.

Corballis, M. (1991). *The lopsided ape: Evolution of the generative mind.* New York: Oxford University Press.

Corballis, M. (1999). Phylogeny from apes to humans. In M. C. Corballis & S. E. G. Lea (Eds.), *The descent of mind: Psychological perspectives on hominid evolution* (pp. 40–70). New York: Oxford University Press.

Brain, Human

The human brain is by far the most intriguing, complicated, and highly organized organ in the human body. Furthermore, the human brain is far more complex then all other known creatures, stars, galaxies, and planets in the universe. It is no wonder that research on the human brain has been an extremely daunting and challenging task for scientists. However, despite the demanding nature of brain research, scientists have made great progress in understanding the intricacies of the brain. From the teaching of Aristotle to the findings of Broca, advances in brain research have enabled scientists to further understand the functionality of the human brain, and this, in essence, has helped them develop methods of analysis and treatment for illnesses such as schizophrenia, depression, anxiety, and many others.

Historical Findings on the Brain

Throughout history, many have attempted to understand and explain the functionality of the human brain. For instance, in ancient Egypt, the heart and not the brain was regarded as the most important organ within the human body. Furthermore, archeological evidence from 2000 BCE suggests that trepanation, a form of brain surgery that involved cutting a hole through one's skull, was widely practiced by individuals in prehistoric civilizations. The main purpose of trepanation is not known for certain. However, scientists believe that this practice could have been for religious/mythical rituals or it could have been performed in hopes of relieving one from headaches, epilepsy, and mental illnesses.

In 450 BCE, Alcmaeon, a Greek physician, performed some of the earliest recorded dissections. His work led him to conclude that the brain was the central organ of sensation and thought. In contrast to Alcmaeon's findings was the great philosopher Aristotle. The latter believed that the heart was the center for sensation, thought, and emotion. At the time, Aristotle's position on this matter was well respected by many, and his teachings were extremely influential.

In the early 1800s, German anatomist Franz Gall founded the study of phrenology and became the first person to propose the idea of cerebral localization, a doctrine that emphasized that various mental faculties could be localized to different parts of the human brain. Gall claimed that he could identify and localize 27 faculties in different parts of the human cerebral cortex by simply examining the bumps on one's skull. As dubious as this practice may seem, it was widely accepted at the time because it offered a method to objectively assess one's personality characteristics.

In 1848, a horrible accident involving a railroad worker named Phineas Gage enabled researchers to get a better understanding of the concept of cerebral localization and also of the frontal lobe's role in personality characteristics. Gage was struck with an iron rod, which penetrated his skull and passed through his frontal lobe. Gage survived the incident. However, after recovering, he was no longer the loving and caring person that his friends and relatives remembered. Gage's personality quickly changed to one that expressed much impulsiveness and anger. The incident led to the suggestion that the frontal lobe of the brain played a significant role in the regulation of emotion.

In 1861, French scientist Paul Broca made a discovery that had a lasting impact on the doctrine of cerebral localization. Through the use of clinical case studies, Broca noticed that patients who suffered from aphasia (a loss or impairment in language) had damage to the left frontal lobe. He concluded that the area responsible for speech is located on the left frontal lobe, on the posterior portion of the third frontal convolution. Although Broca wasn't the first person to propose that the left frontal lobe was the center for speech, his well-documented clinical studies and his accuracy in pinpointing the exact area (now called "Broca's area") is what differentiated his research from those of others such as Gall and Dax.

Nervous System

The human brain weighs approximately 1.3 kg and despite its relatively small size is composed of more

than 100 billion neurons. The neurons within the human brain are commonly referred to as the "building blocks" of the nervous system. These neurons consist of dendrites, a cell body (soma), and an axon. Information relating to memory, feeling, impulse, and thought travels from the dendrites to the cell body, then away from the cell body to the axon. Once the information reaches the end of the axon at the site called the "terminal buttons," the information is released into the synapse by way of synaptic vesicles. These synaptic vesicles carry molecules known as *neurotransmitters*. Neurotransmitters are found throughout the nervous system and play a key role in carrying information across the synapse. Therefore, neurons communicate by means of several different neurotransmitters, and disruption of these neurotransmitters can have serious adverse effects on the human brain.

The other type of cell found within the human brain is known as the *glial cells*. These cells outnumber neurons by about 10 to 1. Glial cells are found within the spaces between neurons and provide structure and support for the neuron.

Organization of the Nervous System

The nervous system comprises the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS is composed of the brain and the spinal cord. The spinal cord's primary function is to carry sensory information to the brain and relay motor instructions from the brain to muscles and glands throughout the human body. The PNS consists of bundles of axons from many neurons that connect the CNS with sense organs, muscles, and glands throughout the body. These "bundles of axons" are commonly referred to as "nerves." The PNS subdivides into the somatic nervous system and the autonomic nervous system. The somatic nervous system connects the brain and spinal cord to voluntary muscles. The main role of the somatic nervous system is to regulate voluntary muscular movement in response to several external environmental demands. Alternatively, the autonomic nervous system connects one's internal organs and involuntary muscles to the central nervous system. Furthermore, the autonomic nervous system subdivides into the sympathetic and parasympathetic systems. The sympathetic system prepares the body for rigorous activity; it is also known as the "fight-or-flight" system. This system increases the heart rate, blood pressure, and concentration of blood sugar in the body. On the other hand, the parasympathetic system is known to work in the opposite way. This system enables the conservation and restoration of energy that was dispensed during physical activity. As a mediator, the parasympathetic system decreases heart rate, blood pressure, and concentration of blood sugar. The sympathetic and parasympathetic systems work "hand in hand" to maintain one's internal bodily functions and homeostasis. The autonomic nervous system is crucial to one's overall health; without this balancing act, the human body would not be able to properly respond, react, and recover from stressful, strenuous, and frightening stimuli.

Protective Barrier

The human brain is responsible for many essential duties, such as intellect, thought, intuition, memory, emotion, and imagination. Consequently, this organ needs to be well protected from the external environment. Fortunately, the human brain is well sheltered by bone, tissue, and fluid. First, the outermost layer of the human brain is known as the skull; it is a thick, bony structure composed of the occipital, temporal, parietal, and frontal bones. Found within the skull are three protective and supportive tissues known as the *meninges*. The outermost layer of the meninges is known as the *dura matter*, a tough and thick membrane that follows the outline of the skull. Next, beneath the dura matter is the thin weblike membrane known as the *arachnoid membrane*. The third meningeal layer is the *pia matter;* this tissue is very tightly bound to the surface of the brain and spinal cord. Another essential protective barrier found within the human brain is the cerebral spinal fluid (CSF). This fluid allows the brain to float within the cranium, allowing the brain to withstand certain degrees of physical trauma. Furthermore, it lessens the overall weight of the brain. When floating in the CSF, the brain weighs a mere 50 g instead of 1,400 g. Although the brain does receive trauma through activities such as sports and vehicle accidents, the protective barriers provided by the skull, meninges, and CSF enable the brain to withstand much of the physical trauma. Without these protective tissues, the brain would surely be unable to cope with even minor blows to the head.

Source: © iStockphoto/Mark Evans.

Structures Within the Brain

The cerebral cortex is the outer covering of the cerebrum. It is divided into two nearly symmetrical halves, known as the *cerebral hemispheres.* Although the two hemispheres seem to be two separate and distinctive brains, they are actually attached by a structure known as the *corpus callosum.* This structure enables the transmission of neuronal messages back and forth between the two cerebral hemispheres. The left hemisphere is in charge of verbal, intellectual, analytical, and thought processes, while the right brain or right hemisphere is in charge of personality, intuition, nonverbal, emotional, and musical functions. Found within the cerebral cortex are the four lobes: frontal, temporal, parietal, and occipital. The brain's frontal lobe is mainly involved with voluntary motor functions, aggression, and emotion. The right frontal lobe controls the left side of one's body, while the left frontal lobe controls the right side of one's body. The temporal lobes are mainly involved with hearing and are conveniently located just above the ears on the sides of each cerebral hemisphere. The parietal lobe is situated at the top of the brain, posterior to the frontal lobe. This area of the brain receives and evaluates certain sensory information that is sent its way. Last, there is the occipital lobe that is located just behind the parietal lobe and is primarily in charge of visual functions.

The brain stem is composed of a group of structures in the brain that regulate bodily functions crucial to the survival of humankind. Within the brain stem is found the medulla oblongata, pons, and midbrain. The *medulla oblongata* is the lowermost part of the brain stem. It contains several regions that are involved with reflexes, such as swallowing, heartbeat, blood pressure, breathing, coughing, and sneezing. Located just above the medulla oblongata is the pons. The *pons* is composed of a band of nerve cells about an inch long, which serves as the link between the midbrain and the cerebellum. Furthermore, the pons contains structures that play a role in sleep, arousal, and the regulation of muscle tone and cardiac reflexes. Finally, the upper-most part of the brain stem is known as the *midbrain.* Located within the midbrain are the superior and inferior colliculi, which are primitive centers concerned with vision and hearing. Furthermore, the midbrain also plays a role in the perception of pain and the guidance of movement by sensory input from vision, hearing, and touch.

The *thalamus* is situated just above the brain stem very close to the center of the brain. The yo-yo shaped thalamus receives input from all senses with the exception of olfaction and then directs these messages to the cerebral cortex and other parts of the human brain.

The *hypothalamus* is a tiny structure that plays a major role in influencing behavior primarily through the production and release of hormones. The hypothalamus is involved with the regulation of the autonomic nervous system by helping control heart rate, movement of food through the digestive tract, urine release from the bladder, perspiration, salivation, and blood pressure. Furthermore, it also contains centers that influence consumption of food and water, reproduction, metabolism, homeostasis, and the regulation of the sleep-wake cycle. Last, the hypothalamus is connected to the pituitary gland and plays a role in the regulation of the endocrine system.

The *cerebellum* is situated just behind the brain stem and weighs approximately one eighth of the brain's total mass. It is primarily involved with the coordination of muscular activities. It has also been

found to play an important role in emotions such as anger and pleasure.

The limbic system is composed of several structures that play a role in emotional responses and behavior. One of the structures found deep within the human brain is the *amygdala.* This part of the limbic system is important for fear, anxiety, and aggression responses. Another important part of the limbic system is the *hippocampus;* this structure is linked to the hypothalamus and is very important for memory functions.

The *basal ganglia* is located on the left and right sides of the hypothalamus. It is composed of the caudate nucleus, putamen, and globus pallidus. These structures work together to exchange information with the cerebral cortex. Its main role is to plan motor sequences of behavior.

Technological Revolution

Throughout the years, much progress has been made in understanding the structure and function of the human brain. Most of the progress in understanding the complexities of the human brain derive from the advances in neuroimaging techniques. Neuroimaging can be divided into two basic categories, structural imaging and functional imaging. The former involves a scanning technique that reveals the gross anatomy of the human brain. Examples of structural neuroimaging include computerized tomography (CT) and standard magnetic resonance imaging (MRI). On the other hand, functional imaging is used to provide information on some sort of functional brain activity. Such imaging techniques are provided by positron emission tomography (PET), single photon emission tomography (SPECT), and functional magnetic resonance imaging (*f*MRI). Researchers use these instruments to measure certain aspects of brain activity, such as cerebral blood flow and oxygen consumption. With the help of functional and structural imaging techniques, surgeons in the field of neurology can fully examine the brain prior to performing dangerous surgical procedures.

Mental Disorders and Imaging Techniques

In the past, mental disorders were very difficult to classify, and many believed that mental disorders were nothing but a human weakness. Furthermore, many believed that those who suffered from a mental illness were possessed by evil spirits and thus were placed in hospitals for the mentally insane, where they were often deprived of their basic human rights. However, many of these beliefs have changed since the arrival of technological instruments that could measure the structural and functional anatomy of the human brain. Such techniques have illustrated that mental diseases such as schizophrenia, autism, and attention-deficit hyperactivity disorder may in fact have biological aspects.

For instance, researchers have found that decreased frontal lobe volume and diminished neuronal and blood flow activity are common in patients who suffer from schizophrenia. Furthermore, MRI studies suggest abnormalities in the temporal lobes of individuals afflicted with schizophrenia.

There has also been an increasing amount of research on autism. Researchers have found that defects in the brain stem may account for symptoms of the disorder and also that the cerebellum and frontal lobes are less developed in autistic patients than in normal individuals.

Another popular and often misunderstood mental disorder is attention-deficit hyperactivity disorder or ADHD. Researchers have been able to identify structural abnormalities among ADHD patients. For instance, it has been found that ADHD patients seem to have smaller corpus callosums and caudate nucleii than those patients without the disorder.

Therefore, neuroimaging techniques have enabled researchers to further understand mental disorders, and the knowledge gained from these techniques can help in developing methods of treating, rehabilitating, and caring for those affected by these mental disorders.

The human brain is a highly complex and intriguing organ that has proven to be very difficult to study. However, with the pioneering research of many individuals within the wide range of disciplines, such as chemistry, biology, psychology, medicine, and others, much knowledge has been gained about the functional and structural characteristics of the human brain. Although researchers have discovered many of the mysteries of the human brain, there remains much to be discovered. Through a multidisciplinary approach, advances in medical technology, and more government funding toward research, remaining secrets of the human brain will begin to be unraveled.

— *Justin M. Carré*

See also **Biological Anthropology; Brain, Primate**

Further Readings

Beatty, J. (1995). *Principles of behavioral neuroscience.* Dubuque, IA: Wm. C. Brown.

Joel, D. (1997). *Mapping the mind.* Toronto, Canada: Carol Publishing.

Nietzel, M., Bernstein, D., & McCauley, E. (1997). *Abnormal psychology.* Englewood Cliffs, NJ: Prentice Hall.

Purves, D., Augustine, G., Fitzpatrick, D., Katz, L., LaMantia, A-S, McNamara, J., & William, S. M. (2001). *Neuroscience* (2nd ed.). Sunderland, MA: Sinauer.

Restak, R. (2001). *The secret life of the brain.* Washington, DC: Joseph Henry Press.

Springer, S., & Deutsch, G. (1997). *Left brain right brain* (5th ed.). New York: W.H. Freeman.

Toomela, A. (Ed.). (2003). *Cultural guidance in the development of the human mind.* Westport, CT: Ablex.

Brain, Primate

The primate order is composed of a group of species that differs very little in its morphological structure but varies quite dramatically in its behavioral patterns. Researchers in the fields of chemistry, biology, neurology, psychology, and medicine have found that behavior is a cognitive mechanism that is processed in the brain. It has been found that larger, more complex and highly organized brains have a more elaborate behavioral repertoire than smaller, more primitive brains. Therefore, in order to have a greater appreciation for these differences, it is imperative to investigate topics such as relative brain size, expansion of the brain, social relationships, evolution of language, and ecology.

Relative Brain Size

Primates tend to have relatively larger brains than most other terrestrial mammals. This would lead one to assume that mammals with larger brains are more intelligent. However, this is not always the case. For instance, if one believed that absolute brain size, used alone, is a good predictor of intelligence, then one would find themselves less intelligent than the elephant, who has a brain 4 times larger than humans. Another way to investigate the size of the brain is by applying a simple ratio: brain weight over body weight. As body weight increases, so does the weight of other organs in the body, such as the heart, liver, intestines, and, of course, the brain. This happens because larger bodies require larger organs to meet their everyday energy demands. Although this simple ratio seems like a good way to measure potential cognitive abilities, it also has its pitfalls. Take, for instance, the squirrel monkey, which has a brain/body weight ratio of 0.032, and compare it with the human brain/body weight ratio of 0.020. If this ratio were used as a measure of potential intelligence, then squirrel monkeys would defeat modern humans in intellectual capacity. The main problem with this ratio is that the size of the brain increases at a slower rate than one's body weight. Therefore, the larger the mammal, the smaller the brain/body weight ratio.

The way around this impasse is to use a regression line graph. It was in 1885 that Charles Darwin's cousin Francis Galton invented this idea of a regression line to illustrate the average tendency within a population. This technique enables researchers to overcome the problem of comparing the human brain with that of a smaller primate. On this graph, you would find the weight of the body on the X-axis and the weight of the brain on the Y-axis. Once these points have been illustrated on the graph, a "regression" line can be drawn through these points to represent the trend among the primate species. This line allows researchers to compare the brain of a human with that of a theoretical primate of the same weight. This method along with comparisons of anatomical structures has been very helpful in comparing the brain of a human with that of other primates. These methods of analysis have enabled researchers to determine that the brain of a human is 3 times larger than the brain of a chimpanzee, whose body weight is approximately the same.

Expansion of the Brain

Now that relative brain size and absolute brain size have been examined, it is important to take a look at the relative proportions of certain structures found within the primate brain. Is the human brain simply an expanded version of another primate's brain, or is the human brain equipped with different proportions of structures? To answer this question, one must

return to the regression line method; that is, one would have to take a part of the human brain and predict how large it would be in a primate of the same body weight as the human animal. We would then compare the predicted value of this brain structure (regression line) to the actual value of this structure. The difference between the two values would tell us how much larger our brain structure is than that which would be expected of a primate of the same body weight as us. When examining the results, it has been found that both the cerebellum and neocortex are larger in humans than in a theoretical primate of the same body weight.

Now that the proportional weight of the cerebellum and neocortex have been found to be heavier in humans than in a theoretical primate of the same *body weight,* it is important to take a look at what these proportions would look like in a theoretical primate with roughly the same *brain weight* as ours. Therefore, in order to carry out this analysis, one would have to plot the brain volumes of each primate on the X-axis and then plot the neocortex volume on the Y-axis of the graph. The regression line would then be drawn through the data, which would give the predicted volume of the neocortex based on the volumes of each primate brain. The results are surprising, because they indicate that the neocortex of the human brain is no larger than would be expected of a hypothetical primate with the same brain volume. Therefore, these results suggest that the human brain differs in its relative proportions from the brain of other primates but that these differences occur in a predictable fashion.

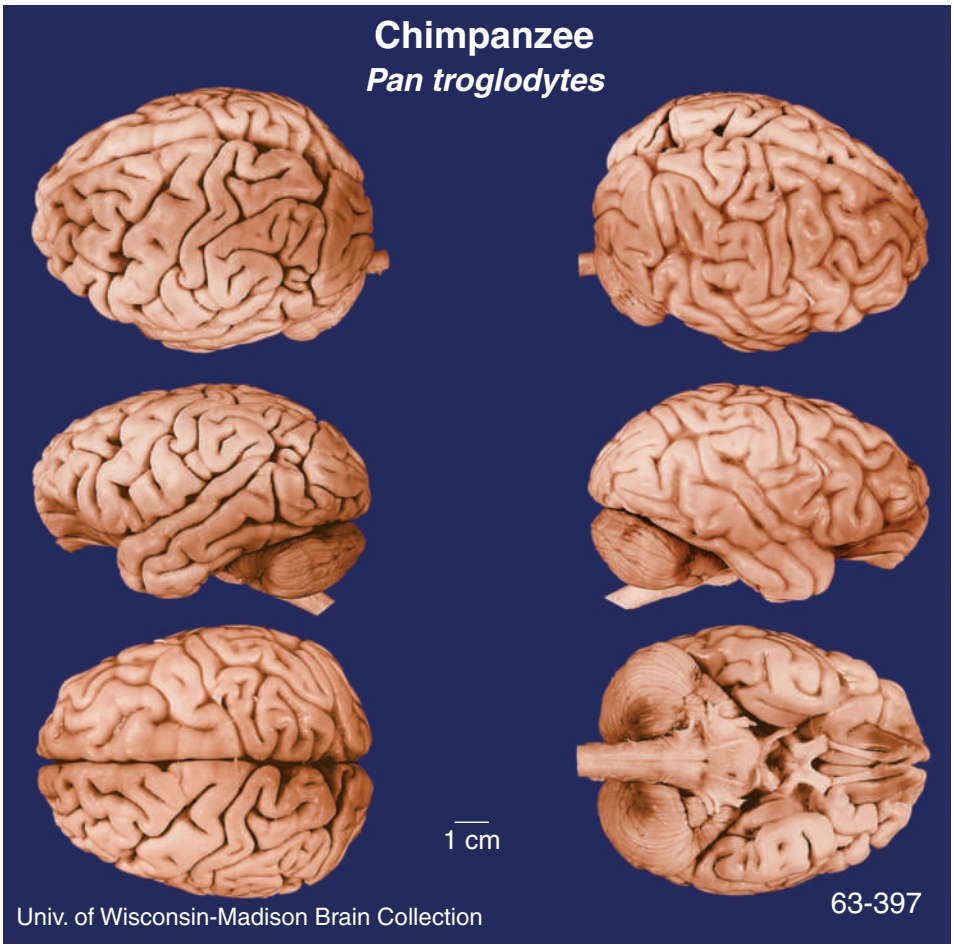
Social Relationships

One of the most obvious characteristics of primates is their remarkable ability to engage in ongoing social relationships. Robin Dunbar and Sawaguchi and Kudo have found that mean group size is directly related to the relative neocortical volume in nonhuman primates. Dunbar stated that studies illustrate that primates are unable to maintain the unity of groups larger than a size set by the cognitive capacity of their neocortex. Sawaguchi and Kudo also found that social prosimians have relatively larger neocortex sizes than solitary prosimians. This finding lends additional support to the notion that mean group size can be directly related to the relative neocortical volume in nonhuman primates.

It is through the use of socializing techniques such as grooming and language that nonhuman and human primates, respectively, can maintain social relationships with a maximum number of individuals based on the relative size of their neocortex. Nonhuman primates maintain relationships through the use of social grooming. This method of socialization is utilized by primates to establish and maintain friendships and coalitions within a given group. Most primate groups rely heavily on social grooming mechanisms, and thus they dedicate countless amounts of time to this tedious, yet potentially rewarding task. At times, however, despite the fact that primates can maintain a certain number of social relationships based on their cognitive capacity, they are restricted to a limited number of social relationships due to the lengthy time requirements of social grooming. Therefore, with the evolution of the primate species and the expansion of the neocortex, it may be said that "higher" (later evolved) primates are capable of maintaining a larger number of social relationships within a group. Dunbar stated that another form of social grooming evolved in modern humans, that is, "vocal" grooming that is more commonly referred to as "language." This other form of socialization enables humans to engage in social relationships with a larger number of individuals at once. He suggested that language evolved as a "cheap" form of social grooming, so enabling the ancestral humans to maintain the cohesion of the unusually large groups demanded by the particular conditions they faced at the time.

Evolution of Language

Language is a function that is processed in the cerebral cortex in areas known as Broca's and Wernicki's areas. Paul Broca first discovered this area in 1861. Broca's area is located in the left hemisphere, on the inferior surface of the frontal lobe, and is responsible for the articulation of speech. It has been suggested that Broca's area may have evolved and expanded among the hominoids. For instance, Ralph Halloway's research found that the surface impression left by the brains of *Homo habilis* indicated an enlargement of the inferior surface of the frontal lobe corresponding to the adjacent Broca's area. Later, in 1874, Carl Wernicke discovered another area associated with speech that is located in the left temporal lobe. Wernicke discovered this speech center, which is now



Source: Reproduced with permission from University of Wisconsin-Madison, http://www.brainmuseum.org, supported by the NSF division of Integrative Biology and Neuroscience, Grant # 0131028. Photo by Wally Welker.

known as Wernicke's area, while performing autopsies on language-impaired patients. Wernicke's area is mainly responsible for the analysis and understanding of sounds and words. There has been evidence that similar regions have been identified in the brains of rhesus monkeys and chimpanzees. Furthermore, it has been found that apes are indeed capable of understanding some forms of speech; therefore, this suggests that their brains are equipped with structure that enables them to analyze auditory information.

Ecology

Tomasello and Call have suggested that dietary regiments are closely related to brain size and cognitive potential. They reported Clutton-Brock and Harvey's study, which argues that frugivorous (fruit-eating) primates have, on average, larger brains relative to body size than do folivorous (leaf-eating) primates.

The reasoning behind this hypothesis is that fruits are much more patchily distributed in an environment and are more difficult to find and retrieve, thereby requiring primates to possess greater cognitive abilities in order to locate their food. Another study by Milton supports this claim. Milton studied two species of New World monkeys, the howler monkey and the spider monkey. These monkeys are of comparable size, live in social groups of similar size, and inhabit the same forests of Central and South America. Upon examination of the anatomical structure of these two types of monkeys, Milton found that the frugivorous spider monkeys had relatively larger brains than did the folivorous howler monkeys. Therefore, as demonstrated by these studies, there is a strong link between foraging practices and relative brain size among the primate species.

The primate species have undergone a series of changes throughout their evolution, most notably to the brain. The primates have maintained their overall body structure. However, expansions of the neocortex and cerebellum have led to various changes in cognitive abilities, which can explain the various differences in behavioral patterns. This evolution of the brain has enabled the higher primates to have better spatial recognition and an enhanced memory, which is key to locating fruits and shelter and is necessary for their survival. Furthermore, the expansion of the neocortex has enabled the primate species to socialize within a larger group size, which in essence has enhanced their ability to exchange useful information. It remains to be seen what will become of this trend. However, we are now experiencing an evolution of socialization methods with the advent of the Internet and computers in the human species. We no longer

have to communicate verbally, or face-to-face, in order to maintain or gain social relationships. We are now able to communicate globally and exchange information with thousands upon thousands of people almost instantaneously. This form of socialization or communication can play a key role in the future of our species. Only time will tell where it will lead us.

— *Justin M. Carré*

See also **Intelligence; Language; Socialization**

Further Readings

Allman, J. (1999). *Evolving brain.* New York: Scientific American Library.

Crow, T. J. (Ed.). (2002). *The speciation of modern Homo sapiens.* Oxford: Oxford University Press.

Feagle, J. (1999). *Primate adaptation and evolution* (2nd ed.). San Diego, CA; Academic Press.

Napier, J. R., & Napier, P. H. (1994). *The natural history of the primates.* Cambridge: MIT Press.

Rumbaugh, D., & Washburn, D. (2003). *Intelligence of apes and other rational beings.* New Haven, CT: Yale University Press.

Brazil

Brazil is a republic of the South American continent, a major industrial country, producing aircraft, armaments, automobiles, nuclear power, and steel as well as many consumer commodities. In addition, Brazil is mineral rich in gold, iron ore, aluminum, bauxite, manganese, mica, and other minerals, including precious stones. Brazilian agrocorporations export bananas, coffee, cotton, oranges, sugar, tea, tobacco, and beef products, among other things.

Having 3,286,426 square miles of territory, Brazil is located between 40.5 degrees to 70.5 degrees longitude. The latitude from the equator (traveling north) reaches 10.5 degrees from the equator (traveling south) to 50.25 degrees latitude. The North Atlantic Ocean comprises most of Brazil's northern border, stretching (west to east) from the state of Amapa to the state of Paraiba. Traveling west from Amapa, Brazil's northern border touches French Guiana, Surinam, Guyana, Venezuela, Colombia, and Peru. On the western border (from north to south), Brazil touches Colombia, Peru, Bolivia, Paraguay, Argentina, and Uruguay. From the southernmost tip of Brazil (the state of Santa Cruz) traveling north to the state of Pernambuco, Brazil is again bordered by the South Atlantic, giving Brazil one of the longest seacoasts (4,600 miles) in the world.

Briefly, the major topographical features include the hot and humid Amazon River Valley lowlands, which occupy a third of Brazil, and La Plata (an elevated tableland), which is semiarid and temperate (woodland and prairie watered by the La Plata River system and its tributaries). In the northeast is a mountainous region, part forest and part desert. Coastal plains are hot and humid, having two seasons: winter (wet) and summer (dry). In general, temperatures decrease in Brazil as one travels from the north to the south of the country. Occasionally in July and August, there is frost and snow in the three southernmost states.

Archaeologists find evidence that the first humans to arrive (in what was later to become Brazil the political entity) came via the Isthmus of Panama. Anomalous data are attributed to Asian and African contacts as well. Some disputed data may indicate human presence in Brazil as long ago as 50,000 years. However, some archaeological sites date from the end of the last glacial age, approximately 10,000 years ago. This early population of Brazil practiced swidden agriculture perhaps 1,000 years before the arrival of Europeans. When the Portuguese first colonized the eastern half of South America, it was inhabited by indigenous tribes, such as Tupinamba-Guarani, Ge, Carib, and Arawak. Certain of these Native cultures practiced hunting, gathering, and horticulture. Others were simple agriculturalists, using slash-and-burn techniques. All of them were seminomadic.

The demographics of Brazil today include the Native American tribes of Brazil, descendants of European immigrants from Portugal (who claimed Brazil in the 1500s as their own), as well as immigrants from the United States of America, Japan, Syria, Lebanon, Greece, Saudi Arabia, the Czech and Slovak republics, Italy, Poland, France, Germany, Switzerland, and Spain and Africans from the present countries of Tanzania, Mozambique, Malawi, Benin, Nigeria, and Cameroon, among others who were imported by the Europeans to work as slaves on plantations. These three major populations amalgamated to form the unique cultural climate of Brazil. Most of Brazil's

178 million citizens live in or near cities, such as Brasilia, Rio de Janeiro, Sao Paulo, and Recife. The rest of the country is populated sparsely, immense tracts belonging to a few wealthy families and their employees.

Expansion of the Euro-American majority into the Brazilian interior poses a deadly threat not only to the many medicinal and rare plants and animals of the Amazon rain forest but also to the indigenous populations. Between 1900 and 1967, 98 indigenous tribes "ceased to exist." In 1912 alone 40,000 Indians were massacred. Today, ranchers, loggers, and other businessmen expropriate indigenous land and hire gunmen to murder those who protest. Most recently, the president of Brazil, Luis Inacio (Lula) da Silva, sent 4,000 troops into the Amazon region following the murder of several unionists and human rights activists, including American Roman Catholic nun Sister Dorothy Stang, who was gunned down on February 12, 2005.

Brazil has an extreme economic imbalance based upon social inequity and traditional hierarchies of church and state. According to a World Bank study, it has the highest concentration of wealth in the world for 10% of the citizens, who control 50.6% of the country's income. Only 5% of the population owns 80% of the land. Brazil ranks at 105th place in per capita income worldwide. Pockets of affluence exist that are surrounded by the vast majority (two thirds) who live in abject poverty. An extreme distance exists between the Brazilian elite that is small in number and the Brazilian hundreds of millions of poor.

Many millions live in *favelas,* communities of shacks without electricity or running water. Untold millions are totally destitute, begging and eating the offerings left on the ground at crossroads by worshipers of Macumba gods. Many survive through criminal activities, their sole means of support. Favela dwellers and the entirely homeless are not only subject to the diseases, infirmity, and suffering that poverty causes, but periodically they are targeted by government for elimination. In the late 1990s, police and military invaded favelas of Rio de Janeiro to search for drugs and gangs, murdering totally innocent persons who happened to be poor with impunity. The wealthy and politically powerful also finance off-duty police manhunts of homeless children, who when found are shot as though they are noxious vermin rather than human beings.

This economic imbalance coupled with government repression aimed at the poverty-stricken masses does not make for either a healthy economy or society. The quality of life for all Brazilians deteriorates as a consequence. Violence, social unrest, and widespread resentment engendered by social inequity causes the radical action of class warfare. The middle class and elite must barricade themselves behind high walls and hire bodyguards for fear of kidnappings, thefts, and murder. Western business executives who travel to Brazil in search of private and government contracts are not exempt from such attacks, necessitating the hiring of limousines with bulletproof glass, driven by armed guards.

In the late 1980s and early 1990s, President Collor's policy "to modernize," by the "privatization" of "deficit-ridden state enterprises" and a promise "to reform social security," only exacerbated the already-ailing economy. Collor's administration ended in 1992 amidst charges of corruption, for the sale of utilities and other government-owned developments had resulted in kickbacks to the wealthy few, who thus benefited twice at the expense of Brazilian taxpayers. The present government of Brazil is struggling to correct this legacy of gross economic mismanagement, but the trouble is compounded by the existence of monied elitist opponents who are backed by paramilitary.

Focusing upon Brazil's economic ills alone, however, will prevent one from grasping the sheer vibrancy, creativity, and deep spirituality of Brazilians. Ninety percent of Brazilians identify themselves as Roman Catholic, while 1 in 3 also take part in Afro-Brazilian Macumba, Umbanda, and Quimbanda ceremonies. These religions blend elements of Roman Catholicism with those of Native American and traditional African religions. All three of the African-Brazilian traditions are animistic, adherents believing in magic, trance, the forces of nature, and divination. Most Brazilians exhibit either a fervent belief in magic or cautious neutrality that nonetheless bespeaks not only tolerance of such belief systems, but perhaps even a certain fear and respect for them. Brazilians (either believers or nonbelievers) will politely interrupt a person who speaks with derision of either the saints or the *Orixas* (African gods), gently changing the subject. Gazing up into the trees of a park, one suddenly notices dolls hanging in the branches. Such dolls symbolize living persons who are the objects of all magic spells. Tourists strolling to Copa Cabana

Source: © iStockphoto/Jose Carlos Pires Pereiara.

beach will see plates of beans and rice accompanied by candles, incense, and glasses of water that are placed upon the ground beneath traffic lights. These are offerings made to the African gods in supplication or in return for favors rendered. Residents of Rio de Janeiro walk past these objects as though they were quite unremarkable, yet strange occurrences that relate to the Orixas are often the topic of dinner conversation in otherwise orthodox Roman Catholic households.

Mainstream Protestant sects such as the Methodists, Presbyterians, Congregationalists, and Episcopalians have also imported their faiths to Brazil. There are also Muslim and Jewish urban communities that attract little attention. In contrast to the understated presence of the above-mentioned minority religionists, the Pentecostal Protestant movement is converting thousands who are incited to open hostility against the Afro-Brazilian sects. It has been documented that some Evangelicals have even physically attacked members of Afro-Brazilian churches as being in league with Satan. Most Brazilians who convert to Evangelical Christianity are drawn from the ranks of those who cannot afford medical care and thus hope to obtain miracle cures by attending revival meetings. Some of the poor convert because they are promised material success in return for "accepting Jesus" as a "personal savior." It remains to be seen, however, if the majority of Brazilians will succumb to the intolerance exhibited by some Christian Evangelical leaders. From the early 1800s, when the first Protestants (German Lutherans) arrived in numbers, Brazilians have seemed remarkably resistant to conversion to Protestantism, though recent economic conditions that particularly impact the poor have caused sweeping gains for the Pentecostal movement.

Many European and North American anthropologists and sociologists have focused upon the cultures

and societies of Brazil. Two early social scientists to do so were anthropologist Melville J. Herskovits (1895–1963) and sociologist Roger Bastide (1898–1974). Since then, anthropological studies multiply yearly, many of them positing the existence of "two Brazils," in the classic linguistic oppositional theory of Claude Lévi-Strauss.

One Brazil, according to this theory, is composed of the urban and rural poor, who allegedly conserve traditional culture; and the other Brazil is that of the upper classes subscribing to and promoting something called "modernity" in the urban centers. Brazil is thusly dichotomized into social classes that are either modern or traditional, Western or non-Western, egalitarian or hierarchical, individualistic or communal. This method of analysis prevailed until anthropologist Roberto A. DaMatta (b. 1936), of the Catholic University of Rio de Janeiro (PUC-Rio), inspired by postmodern projects, began to deconstruct the classic oppositions using Victor Turner's (1920-1983) stance of regarding history, rituals, and social practice as meaningful action.

Rather than separating the hierarchical and communal from the egalitarian and individualistic, DaMatta proposes that the two behaviors operate simultaneously within both sectors of Brazilian society. In other words, DaMatta describes modernization as a dynamic process by which "social dramas" (from Carnival to everyday social interaction) provide the opportunities to negotiate between a modern, egalitarian "code" and a traditional one.

Another key concept of DaMatta's anthropology is that of "encompassment." Originally developed by Louis Dumont (1911–1998), encompassment refers to hierarchical relationships that include the opposite. One example of this dynamic at work in Brazil would be the ways in which Afro-Brazilian religions have absorbed (or encompassed) the rituals and ideology of the Roman Catholic Church, so that both Christianity and its (supposed) opposite, Paganism, operate together to form a unique and integrated belief system. In the words of DaMatta, "a non-modern Brazilian ethic encompasses the modern alternative."

DaMatta's theory influences many contemporary anthropologists, such as Livia Neves de H. Barbosa and Roberto Kant de Lima (associate professors at the Instituto de Ciencias Humana e Filosofia at the Universidade Federal Fluminense in Niteroi). Barbosa analyzes Brazilian behavior patterns, such as that of *jeitinho*. De Lima compares the Brazilian justice system with that of the United States. Martha de Ulhoa Carvalho (adjunct professor at the Universidade Federal de Uberlandia, Uberlandia in Minas Gerais) examines popular music and identity in Brazil according to DaMatta's interpretational device. Others who have been influenced by DaMatta include David J. Hess (associate professor at Rensselaer Polytechnic Institute), who examines religious therapies, and Jeffrey Jarrad (Trinity College in Burlington, Vermont), who studied the importation and "Brazilianization" of Alcoholics Anonymous, originally a Protestant North American abstinence program. Conrad P. Kottak (the University of Michigan) writes of the impact of nationwide commercial television on traditional Brazilian culture. Rosane Prado (the Universidade Estadual de Rio de Janeiro) studies social relations in small-town Brazil. Cynthia A. Sarti (PhD candidate at the University of Sao Paulo) is interested in how the Brazilian poor define moral persons. Leni Silverstein (Museum Nacional of the Universidade Federal do Rio de Janeiro) studies the relations between state, church, and Afro-Brazilian Spiritism in Bahia.

There are other anthropologists who do not necessarily utilize DaMatta's schema, having their own perspectives. American anthropologist Nancy Scheper-Hughes is noted for her study of Brazilian poor women who practice selective infanticide. Tobias Hecht's ethnographic fieldwork brought him among homeless children in the city of Recife. Claudia Milito and Helio R. S. Silva have also written ethnographic accounts of Brazilian "street children." John H. Bodley has concerned himself with the struggle of indigenous peoples to resist the impoverishment that globalization imposes in Brazil, among other countries. The above list of anthropologists is not intended as exhaustive.

— *Susan Kirwan*

See also **Magic; Religion and Anthropology; Religious Rituals; Tropical Rain Forests**

Further Readings

Hess, D. J., &. DaMatta, R. A. (Eds.). (1995). *The Brazilian puzzle: Culture on the borderlands of the Western world.* New York: Columbia University Press.

Levine, R. M., & Crocitti, J. J. (Eds.). (1999). *The Brazil reader: History, culture, politics.* Durham, NC: Duke University Press.

Page, J. A. (1995). *The Brazilians.* New York: Addison-Wesley.
Ribeiro, D. (2000). *The Brazilian people: The formation and meaning of Brazil* (G. Rabassa, Trans.). Gainesville: University Press of Florida.

Breuil, Henri (1877–1961)

Henri (known as Abbé) Breuil began his lifetime study of prehistory when, toward the end of the 19th century, this young discipline developed a systematic methodology and established itself on a scientific foundation. According to all accounts, Henri Breuil was one of the great pioneers of prehistory, perhaps even the "father of prehistory" (as the title of Broderick's biography suggests). He possessed a rare combination of skills, energy, and curiosity. These traits and an excellent education—through classroom, laboratory, and fieldwork experiences—enabled Breuil to make significant contributions to archaeology, ethnology, and paleontology. He was an incessant traveler and visited most of the sites where important discoveries were made; his advice was eagerly sought and his opinions were regarded as authoritative, especially in matters related to prehistoric chronology, stone tools, and cave art. Breuil made many friends and advanced the careers of young scholars; he published more than 800 items, some of which remain classics in academic fields that are constantly advancing. It is reasonable to assert that no single scholar had an impact on the study of prehistory equal to that of Abbé Breuil. To fully appreciate his accomplishments, however, it is necessary to understand them in their context and identify the factors that came together to make such a full and productive life possible.

Henri Édouard Prosper Breuil was born in Normandy in 1877, but he grew up in Clermont. He showed no particular talent in his early education but was interested in nature and especially insects. Young Henri suffered from poor health, but he had a strong interest in nature. The powers of observation that he developed exploring the countryside as a child, especially during a year-long sabbatical (1894–1895) that he took to improve his health, served Breuil well. Until late in life, this diminutive scholar spent prolonged periods of time below ground studying cave art and traipsed all over the Old World to visit and explore sites in China and numerous countries in Africa and Europe (especially France and Spain). Perhaps it was the sabbatical that gave Breuil occasion to think about his vocation, the choice to become a priest and a scientist; he entered the seminary at Issy-les-Moulineaux in 1895, which preceded his move to Saint-Sulpice Seminary (Paris) in 1897.

Meanwhile, Breuil had become acquainted with Geoffroy d'Ault du Mesnil, a geologist and archaeologist who explored the Somme Valley and helped spark the young seminarian's interest in the study of prehistory; this was one of several noteworthy scientists—including priests who were also scientists—who influenced his choice of scholarly pursuits. At Issy, it was the Abbé Guibert (with his background in natural history and evolutionary theory) who encouraged Breuil to study prehistory. As Broderick notes, Guibert taught these subjects before Teilhard de Chardin was born; the latter, a Jesuit who later became a friend and colleague of Breuil, was famous—or infamous—for his views. While at Issy, Breuil also met Jean Bouyssonie, who was part of the team that discovered Neadertal fossils at La Chapelle-aux-Saints. Meanwhile, Joseph-Louis Capitan, a student of Gabriel de Mortillet, stimulated Breuil's interest in the typology of flint tools, a field that he later mastered. During his stay at Saint-Sulpice, Breuil also registered as a science student at the University of Paris, and in 1897, he began to travel widely in France to see important rock overhangs and caves with prehistoric remains. One of his traveling companions was Édouard Piette, an archaeologist whose own research on Magdalenian art and artifacts captivated Breuil's imagination.

The budding prehistorian was ordained as a priest in the Church of Saint-Sulpice in 1900, but Abbé Breuil received a dispensation that relieved him from the normal duties of a parish clergyman. His twofold preparation continued as he graduated from the University of Paris in 1903—where studies included geology, geography, and physiology. Though Breuil did not pursue the normal activities of a priest, he melded his faith and theological education with his multifaceted anthropological research into one seamless pursuit and a lifelong identity. Even before he became a *privat-docent* at the Catholic University of Fribourg, in Switzerland (beginning in 1905), Breuil had begun to refine the classification system of prehistoric Europe's lithic and bone industries. One of

his major contributions in this regard was the demonstration that the Aurignacian culture predated the Solutrean. He presented stratigraphic evidence for this sequence at a 1912 conference in Geneva; Breuil's paper on "Les subdivisions du paléolithique supérieure et leur signification" is still consulted, even though more recent research has modified his conclusions.

Abbé Breuil's name is forever linked with famous sites and fellow scientists and with his identity as a priest and prehistorian, but his work was made possible through his association with a number of institutions. His teaching at Fribourg was already mentioned, but this was the first in a series of academic bases and sources of funding for his travel and research. Breuil had a useful friendship with Prince Albert of Monaco, who expressed special interest in Breuil's work on the paintings at Covalanas and Altamira. When Prince Albert established the Institut de Paléontologie Humaine (Paris), in 1910, he offered Breuil a professorial post. At the same time, he worked at the Muséum National d'Histoire Naturelle (also in Paris); colleagues in these research centers included Marcellin Boule and Teilhard de Chardin (who joined Breuil on his expedition to Castillo Cave in 1913). In 1929, he was appointed as the first professor of prehistory at the College of France, a position he held until retirement in 1946. During World War II, Breuil also taught at the University of Lisbon and the University of Witwatersrand.

When Breuil was a still a small boy, and during the years of his theological and scientific education, very important discoveries were made in southwestern France and northern Spain (Cantabria). It was during this time that explorers and academics began to document caves that contained wall paintings and engravings from the Upper Paleolithic, including those at Altamira, Font de Gaume, Les Combarelles, and La Mouthe. Breuil applied his powers of observation and remarkable skills as an artist to the study of cave art for approximately 50 years; he is especially known for his work on wall paintings at Les Trois-Freres and Lascaux (in France) and the "White Lady of the Brandberg" (in Namibia), among others. Over the course of his lifetime, he spent the equivalent of many months in scores of decorated subterranean chambers; one of his most famous books, *Four Hundred Centuries of Cave Art,* is a reflection of his expertise and enthusiasm for this subject. This special interest—or obsession—led Breuil to visit all such caves in France and most of the important sites in other countries where ancient artists left their mark. Initially, of course, he had to convince his contemporaries that these beautiful paintings were done by Stone Age artists. He also worked out a sequence of styles for wall paintings and other sculptured and engraved art, though many of these theories have been abandoned. The modern reader must recall that a great deal of this work was carried out and sweeping formulations proposed before radiocarbon dating was known. Breuil's interpretation of the *purpose* of these Paleolithic paintings is especially significant. He believed that they served a magical purpose and were originally created to guarantee success on the hunt (i.e., "sympathetic magic"). Other proposals have been made in more recent years, but the opinion of a scholar who knew these paintings so intimately still carries weight in this ongoing debate.

Though it is not as important as his work on the classification of Paleolithic artifacts and his study of cave art, Henri Breuil is also known for his study of human paleontology. Along with Boule, he was involved in the controversies surrounding the so-called Piltdown man and followed all of the discoveries that related to the debate on human origins. Breuil knew most of the experts in this field of research and visited their sites and/or laboratories—and took a special interest in stone tools associated with these finds (Broom in Pretoria, Dart in Johannesburg, Leakey in Nairobi). Because of the work of Davidson Black and Teilhard de Chardin, he visited China to see the site of Zhoukoutian and the remains of Peking man.

Abbé Breuil worked right up to the end of his life. Fortunately, this "pioneer of prehistory" left behind a great legacy of publications and tracings of cave paintings. Much of his research has stood the test of time, though the field of prehistoric archaeology has moved beyond Breuil in many ways. He died at his country home near Paris in 1961, but his genius and influence are still recognized today.

— Gerald R. Mattingly

Further Readings

Breuil, H. (1965). *The men of the Old Stone Age (Palaeolithic & Mesolithic).* New York: St. Martin's. Original work published 1951.

Breuil, H. (1979). *Four hundred centuries of cave art.* New York: Hacker Art Books. (Original work published 1952)

Broderick, A. H. (1963). *Father of prehistory–The Abbé Henri Breuil: His life and times.* New York: William Morrow.
Perello, E. R. (1995). *El Abate Henri Breuil (1877–1961).* Madrid, Spain: Universidad Nacional de Educacion a Distancia.

Bride Price

Anthropologists have long recognized that marriage exists cross-culturally. Even though all human groups across the globe practice some type of marriage, there is a great deal of variation to be found in its meaning and form. One central way marriage varies from one culture to another pertains to whether or not explicit marital economic transactions are required between the kinship groups of the bride and groom. In approximately 75% of all societies known to anthropologists, there is one or another explicit form of economic exchange surrounding marriage. The most notable of these include bride service, where a man works for a specified time for his bride's family; exchange of females, where a man is expected to offer one of his "sisters" (or other female relative) as a marital partner to his new brother-in-law; dowry, where a woman's family bequeaths a reserve of money and goods directly to their daughter in order to ensure her and her children's future security; and bride price. Some of these exchanges occur before marriage, while others begin or continue for a specified amount of time after the marriage.

Bride price, also referred to as "bride wealth," is the most common of these, occurring in approximately 44% of all societies that have explicit forms of marital economic transactions. Bride price is a gift of money or goods given by the groom and his family to the bride's family. A few of the most common gifts cross-culturally include items such as tools, cloth, livestock, and food. Contents of this gift are not everywhere the same and ultimately consist of items that the group deems socially and economically valuable. For example, cattle are fundamental to the subsistence of the Kuria of Tanzania, as with many peoples in diverse regions in Africa, and so comprise a great part of the bride price gift. Similarly, the Sebei of Uganda traditionally paid bride price with cattle but also included clothing, cash, and consumables, such as beer and tobacco. In Papua New Guinea, however, arm shells, pigs, and yams were highly prized as bride price gifts. Bride price payments of the Hausa of the Maradi region of Niger include cowry shells, as these are associated with female fertility and good luck. In recent years, cash or money has increasingly supplemented, and in some cases entirely replaced, traditional gift items in many societies.

Not only do the specific types of gifts vary, but the expected monetary value also differs from society to society and even from one family to the next. The Kikuyu of Nairobi, for example, pay bride prices ranging from the equivalent of $25 to as high as $2,500 (U. S. dollars). In some societies, a man and his family are expected to pay the bride price either before or immediately after marriage, while in others, the payment is made over several years.

Bride price affects men and women differently, as it reinforces their distinct marital rights and responsibilities. While it may appear that the bride price payment reduces a woman's status to that of chattel, it is more accurate to view this transaction as compensation made by the groom's family to the bride's family for the loss of her labor as well as the right to her children. Therefore, bride price is also referred to as progeny price. In most societies where bride price is practiced, children are highly valued for their economic contributions to the family. Therefore, a married woman will often be expected to have as many children as possible. Among some groups, however, such as in Papua New Guinea, the groom's family may still be required to pay a bride price even if no child is born to the couple. The couple may then adopt children from other family members, such as cousins. One way that women may be negatively impacted by this practice pertains to their freedom to terminate the marriage. A woman's family may block her attempts to leave an unhappy marriage if they are unable to repay the bride price to the groom's kin. On the part of a man and his marital obligations, payment of the bride price is a testament to his ability to access resources and, therefore, to care for the bride and their future children. If he cannot secure the bride price, he likely will be unable to marry.

We might ask where and why we see this practice, which differs so dramatically from our own Western marital customs. Bride price is found in several areas throughout the world but is most common in Africa. Societies with bride price tend to practice horticulture as opposed to other types of economic production,

such as intensive agriculture or industrial production. In horticultural societies, women contribute significantly to subsistence, generally more than do men. The norm of compensating the bride's family for her loss of labor is particularly fitting in such a context. Another characteristic of societies with bride price is that most reckon kinship patrilineally (i.e., descent is passed on through men's line only) and exhibit patrilocal residence patterns (i.e., upon marriage, a woman moves to live with her husband and his kin group). A woman and her children are, in a sense, permanently transferred to the groom's kin group. Now that she will contribute solely to the subsistence of the groom's family in addition to producing children that will be members of his kin group rather than hers, it is understandable why there is an expectation that his kinship group compensate her kinship group for her loss.

Bride price also serves to unite kin groups to one another in an expansive network of relationships. Not only are the bride and groom's kinship groups united by the economic exchange, but the members of the groom's kinship group act collectively to acquire the payment. The groom, in turn, will later act with his kin group to secure bride payments for his other male kin. The money that a bride's family receives from their daughter's marriage will most likely be spent on finding a bride for her brothers and, in turn, uniting the family to yet another kinship group.

— *Catherine Mitchell Fuentes*

See also **Dowry; Patriarchy; Sex Roles**

Further Readings

Cooper, B. M. (1995). Women's worth and wedding gift exchange in Maradi, Niger, 1907–89. *Journal of African History 36,* 121–141.

Goody, J., & Tambiah, S. J. (1973). *Bridewealth and dowry.* Cambridge: Cambridge University Press.

Kuper, A. (1982). *Wives for cattle: Bridewealth and marriage in Southern Africa.* London: Routledge & Kegan Paul.

Briggs, Jean L. (1929–)

An eminent anthropologist of Inuit society, Jean L. Briggs (1929–) has been at the forefront of change and innovation in her discipline in many respects. At a time when it was uncommon for women to conduct prolonged and intensive fieldwork in isolated and extreme environments, she conducted fieldwork in Alaska, the eastern and central Canadian Arctic, and briefly, in Siberia. She went to North Alaska in 1961 as a research assistant for Norman Chance, to study child-rearing practices and the roles of women in two rapidly "acculturating Eskimo" villages. Her independent work began in 1963, when, as a Harvard graduate student, she flew to Chantrey Inlet to study the social relations of shamans and discovered only after the plane left that the Utkuhiksalingmiut no longer practiced shamanism. A great success nevertheless, her fieldwork resulted in her first book, *Never in Anger: Portrait of an Eskimo Family* (1970), and stands as a testament to the flexibility and detailed observation that renders ethnographic research so powerful.

Briggs has explored many aspects of Inuit life, including emotion concepts and emotional behavior, socialization and learning processes, gender, autonomy, cultural change, time orientations, and language. *Never in Anger,* a model of ethnographic research, instantly became a classic and is currently in its 18th reprinting (2001). Whereas earlier work on Arctic societies was dominated by male researchers and focused primarily on economic and material adaptations to the environment, Briggs's work provided detailed information on Inuit social and emotional life. *Never in Anger* was one of the first anthropological studies of culturally patterned emotion concepts and their workings in social life. It not only made a significant contribution to northern anthropological work but was also at the forefront of a new trend in anthropological studies.

Briggs has been an inspiration and role model for northern researchers, psychological anthropologists, and female anthropologists in general. She not only broke the pattern that characterized northern research in the 1960s, she also challenged contemporary anthropology by writing in a reflexive, introspective, narrative mode. In her view, the researcher's experiences and reactions are a valid and enriching source of data, because, like other people, the researcher "understands" as the result of accumulated experience in many modes: intellectual and emotional, verbal and nonverbal. Interweaving personal experiences with scholarly and astute observations, Briggs provides readers with a lens through which to share the anthropologist's experience and helps them to understand the crucial role of the ethnographer in

writing ethnography. Originally controversial, that style now defines good ethnographic writing.

In "Eskimo Women: Makers of Men" (1974), Briggs examined how femininity and masculinity are shaped in the experiences of Inuit children. While male and female roles are clearly distinguished, they are complementary and of equal value; and most important, each gender may perform with honor the roles appropriate to the other. Briggs contributes to a body of evidence that counters Ortner's argument regarding the universal subordination of women.

Briggs's work remains at the cutting edge of investigations into interactions with the environment. She has suggested that Inuit approach both physical and social worlds "as if nothing was ever permanently knowable" and every aspect of life potentially dangerous; analyzes the psychological and behavioral ramifications of this view; and describes how Inuit learn about, and cope with, risk and uncertainty.

One of Briggs's greatest contributions is her study of socialization. *Inuit Morality Play: The Emotional Education of a Three-Year-Old* (1998) received the Victor Turner Prize for ethnographic writing and the Boyer Prize for psychoanalytic anthropology in its first year of publication. Briggs's detailed descriptions and analyses of exaggerated moral dramas, or "morality plays," illustrate how Inuit children learn not only to recognize but also to become emotionally committed to moral behavior by trying to solve moral problems that they experience as dangerous. The analysis also illuminates the complex dynamics of Inuit autonomy by demonstrating how a morally useful tension is created between autonomy and dependence. Briggs's research is important not only for understanding Inuit social life but also for more generally understanding the process of learning and the ways in which culture and individuality interact and "create each other" in that process.

Briggs continues to make important contributions and returns regularly to the field. Her ongoing work of compiling an Inuktitut-English dictionary in the Utkuhiksalik (Chantrey Inlet) dialect demonstrates the benefits of longitudinal research, as does her work on cultural change. Her commitment to working with one group of people undergoing tremendous cultural change, as well as her experience of working in several circumpolar communities, gives Briggs's insight both depth and breadth. Her tenacity for learning and commitment to anthropology have produced works that have both changed the nature of ethnographic research and advanced the understanding of cultural and psychological processes involved in socialization.

In 1966, Jean Briggs joined the Department of Anthropology at Memorial University, in St. John's, Newfoundland, where she is now professor emeritus. She was awarded her PhD in anthropology from Harvard University in 1967. She has received numerous accolades besides the Boyer and Victor Turner prizes, including a Simon Professorship at Manchester University in England (1991), a University Research Professorship and a Henrietta Harvey Professorship for Distinguished Research, both at Memorial University (1986–92 and 1994–97), and an honorary doctorate from the University of Bergen in Norway in 1996. She was elected fellow of the Royal Society of Canada in 2001. She has given many distinguished and invited lectures and has held many research grants, most recently, two SSHRC grants to facilitate her work on the Utkuhiksalik dictionary. In 2005, Professor Briggs received a Lifetime Achievement Award from the Society for Psychological Anthropology—an award given to those whose contributions to psychological anthropology have substantially influenced the field: its research directions, relevance, and visibility. Be it the painstaking detail of dictionary work or the careful and considered insights into Inuit emotional expression, the extraordinarily powerful hallmark of Jean L. Briggs's work remains the intensive and reflexive observation of her subject matter.

— Kerrie Ann Shannon and Evie Plaice

See also **Ethnographer; Ethnographic Writing; Inuit**

Further Readings

Briggs, J. L. (1970). *Never in anger: Portrait of an Eskimo family.* Cambridge, MA: Harvard University Press.

Briggs, J. L. (1991). Expecting the unexpected: Canadian Inuit training for an experimental lifestyle. *Ethos, 19,* 259–287.

Briggs, J. L. (1998). *Inuit morality play: The emotional education of a three-year-old.* New Haven, CT: Yale University Press and St. John's: Memorial University, ISER Books.

Chance, N. (1966). *The Eskimo of North Alaska.* New York: Holt, Rinehart & Winston.

Ortner, S. (1974). Is female to male as nature is to culture? In M. Rosaldo & L. Lamphere (Eds.), *Women, culture, and society* (pp. 67–87). Stanford, CA: Stanford University Press.

Bruno, Giordano (1548–1600)

The great Italian philosopher Giordano Filippo Bruno (1548–1600) was born in Nola, in the Campania. As a young scholar, he studied philosophy and literature in Naples, and later theology at the Monastery of San Domenico Maggione. He had a tenacious memory and extraordinary intellect. In 1572, Bruno took the vows of priesthood. Yet in 1576, doubting many of the teachings of Christianity and therefore suspected of heresy, this Dominican monk with unorthodox opinions abandoned his religious order and subsequently was forced to flee to the more secular Northern Italy in order to escape both the Neapolitan Inquisition and the Holy Office of Rome. Fearing for his safety and seeking freedom of expression, the restless Bruno wandered as a solitary figure through Switzerland, France, England, Germany, and the former Czechoslovakia. These were years of study, reflection, speculation, writing, and lecturing.

With steadfast determination, creative thoughts, and controversial books, Bruno challenged those entrenched beliefs of the Roman Catholic faith, the Peripatetic biases of his contemporary astronomers and physicists, and that unrelenting authority given to the Aristotelian worldview. Unfortunately, Bruno as ingenious freethinker had a personality that aggravated both the general populace and serious scholars to such a degree that he could never claim a permanent home anywhere during his lifetime; nevertheless, he no doubt saw himself as a citizen of the entire universe.

During a 2-year period in London (1583–1585), the autodidactic Bruno lectured at Oxford University and both wrote and published six strikingly brilliant Italian dialogues: *On the Cause, Principle, and Unity; On the Infinite, the Universe, and Worlds; The Ash Wednesday Supper; The Cabala of the Horse Pegasus; The Expulsion of the Triumphant Beast;* and *The Heroic Frenzies.* These volumes contain the essential elements of his daring cosmology, new epistemology, and bold statements on ethics, religion, and theology. He had rigorously rejected the geostatic, geocentric, anthropocentric, and finite-because-spherical model of the universe found in those Aristotelian writings of antiquity that were still supported by the Roman Catholic Church.

Bruno also wrote Latin poems in which he ridiculed, with caustic sarcasm and bitter satire, both the superstitious beliefs and dogmatic clergymen of this age. In 1591, his last philosophical books and poetic writings were published at Frankfurt, in Germany. These works include *On the Monad, On the Immense,* and *On the Triple Minimum.*

After many years of solitary wandering through Europe and with reckless abandon, the courageous Bruno returned to Italy in optimistic hope of convincing the new Pope Clement VIII of at least some of his controversial ideas. As a consequence of entrapment by the young nobleman Giovani Mocenigo, the self-unfrocked monk was tried and condemned twice (first by the Venetian Holy Inquisition in 1592, and then by the Roman Holy Inquisition in 1593). Bruno's critical writings, which pointed out the hypocrisy and bigotry within the church, along with his tempestuous personality and undisciplined behavior, easily made him a victim of the religious and philosophical intolerance of the 16th century. Bruno was excommunicated by the Roman Catholic, Lutheran, and Calvinist churches for his heretical beliefs. The Catholic hierarchy found him guilty of infidelity and many errors, as well as serious crimes of heresy. However, Bruno stubbornly refused to recant his lofty vision. He was subsequently handed over to the Italian state, which determined his final fate. The philosopher was imprisoned in the dungeons of the Holy Inquisition in Rome for 7 years, denied pen and paper as well as books and visitors, relentlessly interrogated, and probably tortured. After enduring this living tomb, he was eventually sentenced to death under the influence of the Jesuit Cardinal Robert Bellarmine. Obstinate to the end, Bruno never recanted his heretical position.

At Rome, on February 17, 1600, at the age of 52, the contemptuous and rebellious Giordano Bruno was bound, gagged, and publicly burned alive at the stake in the center of the Campo dei Fiori, not far from the Vatican, while priests chanted their litanies. His windblown ashes mixed with the very earth that had sustained his life and thought. Three years later, the writings of the apostate monk and intrepid thinker were placed on the index of forbidden books. In June 1889, during the reign of Pope Leo XIII, contributions from anticlerical groups around the world enabled an impressive bronze statue of Bruno, by Ettori Ferrari, to be erected by the public on the very spot where he had been executed.

A New Cosmology

With a profound imagination, Bruno had ushered in a new cosmology. Boldly, he held this universe to

be eternal in time, infinite in space, and endlessly changing. In the history of Western philosophy, his speculations are a lasting and significant contribution to our modern conceptualization of a dynamic universe. The awesome Brunian worldview is a remarkable interpretation of reality, which, in its vision, far surpasses the closed cosmological frameworks presented by Cusa, Copernicus, Brahe, Kepler, and Galileo. Bruno's creativity was a result of his freedom from the traditional thought system grounded in the Aristotelian view of nature and the dogmatic belief system of the Roman Catholic Church.

In fact, Bruno stood utterly alone in foreshadowing our present understanding of and appreciation for space, time, matter, and life itself (particularly concerning the place of humankind within the cosmic flux of all things). No longer did the heavens and earth represent two separate but different realms in terms of matter and motion.

During the tumultuous period of the Italian Renaissance, it was Bruno who critically reflected upon the heavens and, as a result, seriously considered the far-reaching implications and inevitable consequences that his unique vision held for considering the true position of the human species within this universe. Because he was neither a scientist nor a mathematician, Bruno relied upon rational speculations and the extensive use of analogies, along with magic, intuition, and mysticism (he had developed an intense fascination for Renaissance hermeticism), to support his cosmic model of creative reality. His daring worldview undermined the split, finite, and closed conceptual framework offered by the physicists, astronomers, philosophers, and theologians during his time.

It should be stressed, however, that Bruno was not greatly influenced by the Copernican model of a heliocentric universe. In sharp contrast to Copernicus, Bruno was aware of those limitations that result from a strictly mathematical approach in attempting to comprehend the characteristics of this universe. Instead, he emphasized that the use of symbolic logic and discrete geometry merely supplement (but do not replace) the findings of rational speculations grounded in intuition and imagination. Reminiscent of those natural cosmologists of the pre-Socratic period, Bruno gladly extrapolated his new ideas and vast vision from his own critical observations of nature and a rigorous use of his powerful imagination. His interests in the art, magic, and numerology of ancient Egypt were essentially a reflection of his own fascination with change and memory (increased by the thoughts of the Catalan monk Raymond Lully) as well as his view of the universe as a living and divine cosmos (as he interpreted it).

Breaking new ground in cosmology, Bruno's philosophy of nature depends upon the metaphysical concepts of plurality, uniformity, and cosmic unity along with the logical principle of sufficient reason. He ruthlessly criticized all geocentric, zoocentric, anthropocentric, and heliocentric views of reality. His new philosophy rigorously repudiated the Peripatetic terrestrial/celestial dichotomy and instead maintained that the same physical laws and natural elements of the earth exist throughout this eternal and infinite universe. In doing so, Bruno was able to correct and surpass the planetary perspective expounded by Aristotle, Ptolemy, and Aquinas. He even advanced beyond the sun-centered astronomy advocated by some of his contemporaries. His own model of the world is free from any fixed point of reference. In retrospect, it may be claimed that his pioneering thought actually fathered modern cosmology.

Bruno's vision replaced a finite cosmos with an infinite universe. His insights are free from the erroneous assumptions, moribund scholastic prejudices, and restrictive dogmatic beliefs held by the established religion of his time. Without ignoring the value or limitations of reason (mathematics and logic), he took intuitive leaps that synthesized both perceptual experience and the critical intellect into a daring worldview that grasps the basic features of cosmic reality. For him, such rigorous reflection also led to humanistic action. Because Bruno was unable to demonstrate his metaphysical claims scientifically, he relied upon thought experiments to glimpse the ramifications of his sweeping vision. (In the 20th century, Albert Einstein would use the same imaginative method to fathom both the extraordinary implications and startling consequences of his special and general theories of relativity.) Bruno also taught that there are an infinite number of perspectives, with there being no privileged or fixed frame of reference: Human experience can be unified in religious or scientific or philosophical concepts. Nevertheless, he maintained that all religious formulations are inevitably doomed in light of the successful use of the scientific method and ongoing empirical discoveries.

Not restricting himself to the concept of finitude, Bruno was thrilled by the idea of infinity. He was not

willing to set limits to those possibilities and probabilities that are inherent in this universe (as he saw it). His imagination thrived on the plausibility of extending the concept of infinity to embrace all aspects of cosmic reality (e.g., this universe is infinite in both potentiality and actuality, and its creative power is both eternal and infinite). As such, no fixed ceiling of a finite number of stars sets a spherical boundary to the physical cosmos, and moreover, no dogmatic system of thoughts and values should imprison that open inquiry that is so necessary for human progress and fulfillment.

Relativity, Unity, and Infinity

For Bruno, there are no real separations (only logical distinctions) within the harmony and unity of dynamic nature. He overcame the myopic earth-centered framework of his time with a challenging but liberating sidereal view of things: In the cosmos, there are an infinite number of stars and planets (as well as comets and moons) more or less analogous to our sun and earth, respectively. He even envisioned an infinite number of solar systems, cosmic galaxies, and island universes strewn throughout this boundless and endless reality.

Clearly, Bruno was in step with progressive science and natural philosophy in his attempt to overcome all those belief systems preoccupied with this planet and our species. He affirmed the essential homogeneity of this cosmos, teaching an atomistic philosophy that maintains all things both inorganic and organic to be composed of monads as the ultimate units of process reality: The physical unit is the atom, the mathematical unit is the point, and the metaphysical unit is the monad. The infinitesimal and irreducible monads mirror this changing and infinite universe in accordance with the dialectical principle of the unity of the microcosm with the macrocosm. In addition, Bruno claimed that this continuous universe had no beginning and will have no end in either space or time and that there is life (including intelligent beings) on countless other worlds. Humankind is merely a fleeting fragment of our earth, which, in turn, is only a temporary speck within cosmic history. This dynamic philosophy emphasizes that our species is a product of, dependent upon, and totally within the flux of nature.

Bruno argued for an infinite number of inhabited worlds. Hence, he conceived of life forms and intelligent beings existing on other planets throughout this universe. As such, his cosmology anticipated the emerging science of exobiology in modern astronomy: For him, neither this planet nor our species is unique in the incomprehensible vastness of cosmic reality.

Not until 1609, 9 years after Bruno's death, did the astronomer/physicist Galileo Galilei (1564–1642) first use the telescope to discover that the heavenly bodies do in fact resemble our earth; in this same year, Johannes Kepler mathematically demonstrated the elliptical orbits of the planets. The Aristotelian dichotomy between our imperfect terrestrial world and the seemingly perfect celestial realm was finally abolished; thereby, cosmic unity made the idea of life forms and intelligent beings elsewhere in this universe a more plausible hypothesis in modern astronomy and natural philosophy.

Bruno offered a cosmology that anticipated Einstein's theory of relativity and perhaps even Darwin's theory of evolution. In an infinite universe, Bruno argued that space, time, size, weight, motion, change, events, relationships, and perspectives are always relative to any particular frame of reference. For him, from the village of Nola, Mount Vesuvius looked like a barren volcano devoid of life. Yet from the slopes of Vesuvius, it was Mount Cala that looked like a lifeless volcano. In fact, both geological formations support life. This experience impressed upon Bruno the relativity of perspectives and the crucial distinction between appearance and reality; Aristotle had been wrong in maintaining that appearance is reality. Consequently, in the reach for knowledge and wisdom, our limited senses need to be supplemented by technology, mathematics, and especially rational speculation.

Furthermore, in a thought experiment, Bruno even imagined himself floating above and beyond the earth. As he drifted closer and closer to the moon, it got larger, while our planet got smaller. From the lunar surface, it was now the earth that seemed to be a satellite, while the moon itself looked as if it were the size of our planet. If Bruno had drifted far beyond the moon, then he would eventually have seen both the earth and its only satellite first become merely specks of light, and then, eventually, they would disappear into the blackness of deep space. Using his powerful imagination, the philosopher once again demonstrated the principle of relativity and emphasized the crucial difference between the appearance of things and their true reality.

Bruno's model of this universe disclaimed any dogmatic judgments, for it maintains that the center of this universe is everywhere and its circumference is

nowhere. In sharp contrast to an Aristotelian framework, the bold Brunian viewpoint gives an open-ended perspective free from any absolutes in science or philosophy or theology.

In the history of Western philosophy, Bruno's iconoclastic ideas and unorthodox perspectives remain a symbol of creative thought and open inquiry. He advocated religious and moral reforms and heralded the modern cosmology through his emphasis on an infinite universe and an infinite number of inhabited worlds. During the past four centuries, advances in descriptive astronomy and theoretical physics have given empirical and conceptual support to the Brunian philosophy. No longer is there a split between the terrestrial world and the celestial realm. Moreover, the principles of relativity and uniformity pervade the modern interpretation of this cosmos. The more our space age technology probes reality, the larger we discover this universe to be. Scientists and philosophers now take seriously a cosmic perspective that includes billions of galaxies, each with billions of stars. Furthermore, it is highly probable that other solar systems fill this universe and also very likely that life forms (including intelligent beings) inhabit and evolve on other planets similar to our earth.

Having rejected any ontological separation of the superlunary and sublunary realms, Bruno would be delighted with the modern scientific quest for a unified field theory to explain everything throughout this physical universe in terms of several equations, especially since such an undertaking is in step with his own cosmic monism. Also, he would be thrilled by the ongoing unmanned missions to the surface of the red planet Mars and other solar bodies in order to detect any signs of life before they are inhabited by human beings in the distant future.

In general, Giordano Bruno paved the way for the cosmology of our time. To his lasting credit, the most recent empirical discoveries in astronomy and rational speculations in cosmology (including the emerging science of exobiology) support many of his brilliant insights and fascinating intuitions. This is an appropriate legacy from a daring and profound thinker, who presented an inspiring vision that still remains relevant to and significant for both our modern scientific and new philosophical frameworks.

— H. James Birx

See also **Big Bang Theory; Sagan, Carl**

Further Readings

Bruno, G. (1964). *Cause, principle, and unity.* New York: International Publishers.

Gatti, H. (1999). *Giordano Bruno and renaissance science.* Ithaca, NY: Cornell University Press.

Greenberg, S. (1950). *The infinite in Giordano Bruno.* New York: King's Crown Press.

Mendoza, R. G. (1995). *The acentric labyrinth: Giordano Bruno's prelude to contemporary cosmology.* Shaftsbury, UK: Element Books.

Michel, P. H. (1973). *The cosmology of Giordano Bruno.* Ithaca, NY: Cornell University Press.

Buber, Martin (1878–1965)

Martin Buber, a German-born Jewish philosopher and Zionist, made meaningful contributions to the fields of existential philosophy and philosophical anthropology during a long and productive scholarly career. Buber is best known for his conception of human relationships as "I-Thou" and "I-It," a distinction that was a common theme throughout all of his works.

Early in his life, Buber was moved by two chief influences, the teachings of the Hasidism and the philosophy of neo-Kantianism. As Buber matured, he gradually shed his neo-Kantian beliefs and delved ever deeper into his own Jewish heritage as a source for his philosophy and worldview.

Buber wrote extensively and produced four major works that are widely recognized as having lasting significance: *Ich und du* (*I and Thou*), published in 1923; *Moses* (1946); *Between Man and Man* (1947); and *Eclipse of God* (1952). In *I and Thou,* by far his most influential work, Buber explains his views on the nature of human relationships with other human beings and with the world of things that surrounds them.

His fundamental thesis is that human beings do not, or at least should not, relate to other people in the same way that they relate to things. Put simply, every human interchange should have an "I-Thou" character. Every human being is, of course, intimately aware of himself or herself as an "I." So, in the course of any meaningful contact with another person, there will be a coming together of two different versions of "I," each of which requires acknowledgment from the other. In other words, the "I" must be willing to recognize the other "I" as a "Thou," as a separately existing human

being, rather than as a mere extension of the physical world. In an "I-Thou" relationship, meaningful contact and exchange with another person is possible because the other, the "Thou," is seen as in effect another "I," a human being whose history, opinions, and character are regarded as possessing intrinsic worth—independent of the relationship to the "I." Although the "I" and the "Thou" remain separate, the communion or fellowship that takes place in an "I-Thou" relationship is quite real, and worthy of pursuit.

The "I-Thou" relationship contrasts directly with what Buber calls the "I-It" stance. In the interaction of a person with an inanimate object, the "I-It" relationship reflects a perfectly appropriate "objective" attitude toward the thing with which the "I" finds itself in contact. The philosophical-anthropological problem emerges, however, when people apply the "I-It" attitude in their dealings with another human being. Such an "I-It" relationship is not a genuine one, because the reduction of the other human being to the status of a thing has the effect of isolating the "I" from any meaningful contact with the other person.

As an ardent Jew and Zionist, Buber applied his insights on the "I-Thou" relationship to the Israeli *kibbutz,* in which he saw a realization of the "I-Thou" in a social order in which the individual stands in a meaningful relationship to the greater community and of which he or she is an inherently valued part.

— Daniel Horace Fernald

See also **Israel; Jews; Kant, Immanuel; Kibbutz**

Further Readings

Audi, R. (Ed.). (1995). *The Cambridge dictionary of philosophy.* Cambridge: Cambridge University Press.

Brown, J. (1955). *Kierkegaard, Heidegger, Buber, & Barth.* New York: Collier Books.

Buber, M. (2000). *I and Thou.* New York: Scribner.

Buddhism

The founder of Buddhism is Gautama Buddha Shakyamuni. He was born as a royal prince in 624 BC in a place called Lumbini, which was originally in northern India but is now part of Nepal. *Shakya* is the name of the royal family into which he was born, and *Muni* means "able one." His parents gave him the name "Siddhartha," and there were many wonderful predictions about his future. In his early years, he lived as a prince in his royal palace, but when he was 29 years old, he left the comforts of his home to seek the meaning of the suffering he saw around him. After 6 years of arduous yogic training, he abandoned the way of self-mortification and instead sat in mindful meditation beneath a bodhi tree in Bodh Gaya, India.

On the full moon of May, with the rising of the morning star, Siddhartha Gautama became the *Buddha,* the enlightened one. For the next 45 years, the Buddha wandered northeastern India, teaching the Dharma or path that he had realized in that moment of enlightenment.

The philosophical foundation of Buddhism is the theory of Dharmas. According to that theory, all that is, all nature, is a single stream, a whirlwind consisting of elements (atoms). The life span of an element is infinitesimal or momentary, and everything that consists of them will sooner or later cease to exist, but that which really exists cannot cease. Therefore, all phenomena of nature, both material and spiritual, cannot be called genuinely real being. The elements have their carrier, Dharma, the eternal and immutable substance, which is the genuinely real being or essence of all phenomena. *Nirvana* is the ultimate aim.

Buddhist Teachings

Soon after his enlightenment, the Buddha had a vision in which he saw the human race as a bed of lotus flowers. Some of the lotuses were deep inside in the mud, others were emerging from it, and others again were on the point of blooming. In other words, all people have the ability to unfold their potential and attain enlightenment, though some need just a little help to do so. So, the Buddha decided to teach, and all of the teachings of Buddhism may be seen as attempts to fulfill this vision: to help people grow toward enlightenment.

Buddhism sees life as a process of constant change, and its practices aim to take advantage of this fact. It means that one can change for the better. The decisive factor in changing oneself is the mind, and Buddhism has developed many methods for working on the mind. Buddhists practice meditation, which is the most important method of developing a more positive state of mind that is characterized by calm, concentration, awareness, and emotions such as compassion, love, and

friendliness. Using the awareness developed in meditation, it is possible to have a fuller understanding of oneself, other people, and of life itself; love, friendliness, and compassion, however, are the Buddhist way of life.

First of all, Buddha taught the first Wheel of Dharma. These teachings, which include the *Sutra of the Four Noble Truths* and other discourses, are the principal source of the Hinayana, or Lesser Vehicle, of Buddhism. Later, he taught the second and third Wheels of Dharma, which include the *Perfection of Wisdom Sutras* and the *Sutra Discriminating the Intention,* respectively. These teachings are the source of the Mahayana, or Great Vehicle, of Buddhism. In the Hinayana teachings, Buddha explains how to attain liberation from suffering for oneself alone, and in the Mahayana teachings, he explains how to attain full enlightenment, or Buddhahood, for the sake of others.

Source: MorgueFile.com.

The Four Noble Truths

The Buddha's Four Noble Truths explore human suffering. They may be described as follows.

Dukha (life is suffering): The reality and universality of suffering. Suffering has many causes: loss, sickness, pain, failure, and the impermanence of pleasure.

Samudaya (all suffering is caused by ignorance): The cause of suffering is a desire to have and control things. It can take many forms, such as craving of sensual pleasures, the desire for wealth and fame, and the desire to avoid unpleasant sensations, such as fear, anger, or jealousy.

Nirodha (suffering can be ended by overcoming ignorance and attachment): Suffering ceases with the final liberation of Nirvana. The mind experiences complete freedom, liberation, and nonattachment, and there is no desire or craving for anything.

Magga (the Eightfold path leads to the suppression of suffering): To suppress suffering, the Noble Eightfold Path must be pursued, which consists of *right view, right intention, right speech, right action, right livelihood, right effort, right-mindedness,* and *right contemplation.*

Buddha preached three practices, which consist of the following.

Sheel: Virtue, good conduct, morality. This is based on two fundamental principles:

The principle of equality: All living entities are equal.

The principle of reciprocity: Do unto others as you would wish them do unto you.

Samadhi: Concentration, meditation, mental development. Developing one's mind is the path to wisdom, which, in turn, leads to personal freedom. Mental development also strengthens and controls our minds; this helps us maintain good conduct.

Prajna: Discernment, insight, wisdom, Enlightenment. This is the real heart of Buddhism. Wisdom will emerge if your mind is pure and calm.

Buddhist Ethics

Buddhist ethics has two levels: positive and negative. It advocates the eradication of greed, hatred, and egoism from our minds (negative) and the cultivation

and development of *metta,* which is compassion. From the Pali word that is usually translated as "love," metta's meaning is closer to a combination of friendship, love, and kindness.

Buddhist ethics is concerned with the principles and practices that help one to act in ways that help rather than harm oneself and others.

The core ethical code of Buddhism is known as "the Five Precepts," and these are the distillation of its ethical principles. The precepts are not rules or commandments, but "principles of training." The Buddhist tradition acknowledges that life is complex and there is no single course of action that will be right in all circumstances. Indeed, rather than speaking of actions being right or wrong, Buddhism speaks of them being skillful *(kusala)* or unskillful *(akusala).*

The Five Precepts are

1. Not killing or causing harm to other living beings. This is the fundamental ethical principle for Buddhism, and all the other precepts are elaborations of this. The precept implies acting nonviolently wherever possible, and many Buddhists are vegetarian for this reason. The positive counterpart of this precept is love.
2. Not taking the not given. Stealing is an obvious way in which one can harm others. One can also take advantage of people, exploit them, or manipulate them: All these can be seen as ways of taking the not given. The positive counterpart of this precept is generosity.
3. Avoiding sexual misconduct. This means not causing harm to oneself or others in the area of sexual activity. The positive counterpart of this precept is contentment.
4. Avoiding false speech. Speech is the crucial element in our relations with others, and yet language is a slippery medium, and we often deceive ourselves or others without even realizing that this is what we are doing. Truthfulness, the positive counterpart of this precept, is therefore essential in an ethical life. But truthfulness is not enough, and in another list of precepts (the Ten Precepts or the Ten *kusala Dharmas*), no fewer than four speech precepts are mentioned, the others enjoining that our speech should be kindly, helpful, and harmonious.
5. Abstaining from drink and drugs that cloud the mind. The positive counterpart of this precept is mindfulness, or awareness. Mindfulness is a fundamental quality to be developed in the Buddha's path, and experience shows that taking intoxicating drink or drugs tends to run directly counter to this.

Buddhist Tradition in the East

Buddhism is the fourth-largest religion in the world, being exceeded in numbers only by Islam, Christianity, and Hinduism. As Buddhism expanded across Asia, it evolved into different forms, which evolved largely independently from each other. Each tradition has different sects.

Theravada Buddhism (Southern Buddhism) now has 100 million followers. Buddhist missionaries from India took the religion to a number of countries, but it initially achieved a foothold only in Sri Lanka, led by Mahendra and Sanghmitra (son and daughter of Samrat Ashok of India). It later spread from Sri Lanka to Burma, Cambodia, Laos, Thailand, and parts of Vietnam. They promoted the *Vibhajjavada* school (Separative Teaching). By the 15th century, this form of the religion reached almost its present geographical extent.

Its concepts and practices include

Dana: thoughtful, ceremonial giving.

Sheel: accepting Buddhist teaching and following it in practice; refraining from killing, stealing, wrong behavior, use of drugs. On special days, three additional precepts may be added, restricting adornment, entertainment, and comfort.

Karma: the balance of accumulated sin and merit, which will determine one's future in the present life and the nature of the next life to come.

The Cosmos: consists of billions of worlds grouped into clusters; clusters are grouped into galaxies, which are themselves grouped into supergalaxies. The universe also has many levels: four underworlds and 21 heavenly realms.

Paritta: ritual chanting.

Worship: of relics of a Buddha, of items made by a Buddha, or of other symbolic relics.

Festivals: days of the full moon and 3 other days during the lunar cycle are celebrated. There is a New Year's festival, and celebrations tied to the agricultural year.

Pilgrimages: particularly to Buddhist sites in Sri Lanka and India.

Mahayana Buddhism (Northern Buddhism) is the predominant religion in China, Japan, Korea, and much of Vietnam. The tradition entered China during

the Han dynasty. It found initial acceptance there among the workers; later, it gradually penetrated the ruling class. Buddhism reached Japan in the 6th century. It underwent severe repression during the 1960s in China, during the Cultural Revolution. It has many distinct schools: T'ein-t'ai, Hua-yen, Pure Land teachings, and the Meditation school. They celebrate the New Year, harvest festivals, and five anniversaries from the lives of Buddha and of the Bodhissattva Kuan-yin. They also engage in dana, sheel, chanting, worship, and pilgrimage.

Vajrayana Buddhism (Tantric Buddhism) has perhaps 10 million adherents in parts of China, Mongolia, Russia, and Tibet. The head of Buddhist teaching became the Dalai Lama, who ruled Tibet. Ceremony and ritual are emphasized. They also engage in dana, sheel, chanting, worship, and pilgrimage. They developed the practice of searching out a young child at the time of death of an important teacher. The child is believed to be the successor to the deceased teacher. They celebrate New Year's, harvest festivals, and anniversaries of five important events in the life of the Buddha.

Spread of Buddhism in the West

Buddhism first became known in the West during the latter half of the 1800s, when European colonial empires brought to the intellectuals of Europe the ancient cultures of India and China. A surge of interest in "orientalia," as it was called, caused scholars to study Asian languages while adventurers explored places previously inaccessible and recorded the cultures they found therein.

In England, Germany, and France, it became the rage. In the U.S., thousands of Chinese immigrants were arriving on the American west coast to provide labor for building railroads and other emerging industries. America's east coast intellectuals read books about Buddhism, including Thoreau, who actually took a French translation of a Buddhist Sutra and translated it to English.

Buddhism Today

What we call Buddhism today is an amalgamation of the true teachings of Buddha combined with invented myths and large amounts of culture derived from the country in which the Buddhism is practiced. Tibetan Buddhism, for example, is as much Tibetanism as it is Buddhism. Buddha's words were handed down for several centuries through oral tradition before a committee was formed to preserve Buddha's teachings.

However, with the fast pace and high stress of modern life, many people are becoming interested in the peaceful philosophy of Buddhism. In particular, there is a very deep interest in learning how to meditate, to overcome stress and anxiety, and to deepen one's spiritual experience. In response to this growing interest, Kadampa Buddhism offers many different ways of learning about Buddhism and practicing meditation.

Relevance of Buddhism

Buddhism is relevant even today. Its principles when properly understood can be of great value to any human being. It is important that these teachings become institutionalized and an indigenous part of a society, for there is no other way that they can reach all levels of humanity and also last for a period of many generations. The Buddhist believes that not only all mankind but all creation is one, that all beings are equal, and that distinction could be achieved only through good works. The idea of unity of mankind removes all those barriers that make people strangers to one another, if not enemies. The elements of love, compassion, and nonviolence are the need of the hour, too.

The word *Buddhism* represents beliefs and concepts that can just as well be represented by some other word. If we hold Buddhism as the only truth, we cease to be Buddhists.

Albert Einstein rightly said that Buddhism has the characteristics of what would be expected in a cosmic religion for the future: It transcends a personal God, avoids dogmas and theology, covers both the natural and spiritual, and is based on a religious sense aspiring from the experience of all things, natural and spiritual, as a meaningful unity.

— *Abha R. Pal*

See also **Hinduism; India, Philosophies of; India, Rituals of; Islam**

Further Readings

Barua, P. S. K. (1994). *Buddhist thought and meditation in the nuclear age.* Taipei, Taiwan: Corporate Body of the Buddha Educational Foundation.

Chitkara, M. G. (1999). *Encyclopedia of Buddhism: A world faith.* New Delhi, India: APH.
Chopra, P. N. (Ed.). (1983). *Contribution of Buddhism to world civilization and culture.* New Delhi, India: Chand.
Coomaraswamy, A. K. (1985). *Buddha and the gospel of Buddhism.* New Delhi, India: Munshiran Manohar Lal Publishers.
Davids, T. W. R. (2000). *Dialogues of the Buddha.* Delhi, India: Motilal Banarsidass.

Buechel, Eugene (1874–1954)

Fr. Eugene Buechel S.J. was a German Jesuit who labored as a missionary among the Lakota (Sioux) of the Pine Ridge and Rosebud Reservations in southwestern South Dakota. Although not formally trained as an anthropologist, he made important contributions to knowledge of the Oglala and Sicangu bands through his friendship with many Lakota people and through astute study and recording of various aspects of Lakota language and culture.

Fr. Buechel was born the last of 10 children in Schleid, Germany, 6 years after the Lakota signed the Fort Laramie Treaty of 1868 and 2 years before the Battle of the Little Big Horn. His father, Heinrich Joseph Büchel, was a farmer. According to his own reckoning, Eugene attended grade school in Schleid from 1880 to 1886, and then gymnasium, which was part high school and part college, from 1886 to 1896, and a year of seminary in the neighboring town of Fulda. He left the diocesan seminary in 1897 to enter the Jesuit novitiate in Blyenbeck, Netherlands.

In response to political and religious struggles in Germany and the growing spiritual needs of German Catholic immigrants in the United States, German Jesuits and members of other religious orders began immigrating to the United States as early as 1847. Fr. Buechel came to the United States in 1900, 14 years after Fr. Jutz S.J. inaugurated the first Jesuit permanent mission to the Lakota of the Rosebud reservation. Buechel continued his Jesuit training in the United States, studying philosophy at Prairie du Chien, Wisconsin (1900–1902), teaching religion and music and serving as a prefect at the Catholic boarding school (1902–1904) on the Rosebud reservation, where he also began learning the Lakota language.

He completed his studies in theology in St. Louis (1904–1905) and was ordained in 1906, completing his last year of Jesuit training (tertianship) in Cleveland, Ohio. Although Fr. Buechel showed great aptitude for languages while studying Latin and Greek, his persistent headaches rendered him unsuitable for scholarly pursuits in his superior's opinion, and he was assigned to work as a mission pastor. Fr. Buechel's time was divided between the Catholic Jesuit missions of the Pine Ridge and Rosebud reservations. He was the superior at Holy Rosary Mission from 1908 until 1916, a remarkable distinction given that he had been ordained for only 2 years and was just 34 years old. He served as superior of St. Francis Mission on the Rosebud reservation from 1916 to 1926, returned to Holy Rosary on Pine Ridge until 1929, when he transferred back to St. Francis on the Rosebud, where he remained until his death in 1954.

His scholarly work began with the elaboration of a dictionary, the core of which was an earlier Dakota dictionary begun by the Pond brothers and worked on by Stephen Return Riggs. He also made use of the linguistic work of Dakota linguist Ella Deloria, who worked closely with Franz Boas. He collected artifacts for a museum, which he originally housed in the Jesuit residence. Later, his collection was moved to a separate building constructed in 1950 to honor his 50 years as a Jesuit.

Fr. Buechel believed that the Lakota needed to change and "progress," but at the same time, he held that Lakota language and culture would endure and believed his own work would contribute to its preservation. He states this explicitly in the introduction to his Lakota grammar. He was frustrated by the generation of Jesuit missionaries who followed him, now American instead of European, who were far more assimilationist-minded, believing the Lakota had best leave their ways behind and enter the mainstream of American life. Buechel's study of the Lakota culture convinced him that for Jesuit ministry to be successful, Jesuits must have a profound understanding of Lakota culture and language. He also valued both the sheer pleasure of learning Lakota ways and the strong solidarity and friendship it brought him with Lakota people. In 1926, Father John Cooper, founder of the Catholic Anthropological Conference, encouraged Buechel to record cultural data for the sake of science. Buechel had begun doing this much earlier, as evidenced by his Lakota language narratives begun in 1904 and his ethnographic notes dating to 1915.

Fr. Buechel took a keen interest in the natural world of the Lakota. He recorded temperature and barometric readings and with a number of Lakota teachers, notably Cleve Bull Ring and Big Turkey, he collected local plants and recorded their Lakota, Latin, and English names and traditional uses in the 1920s. Always careful in his work to note the names and specific contributions of his Lakota teachers, he collaborated with Ivan Star Comes Out and Peter Iron Shell, whom he taught to write Lakota, as well as others, to assemble a collection of Lakota language narratives. Buechel also worked with the Lakota Catholic Catechists, including Nicholas Black Elk.

Fr. Buechel S.J., pointing out the Lakota process of preserving meat and intestines by drying while he himself wears clothes and hat typical of the Jesuits in the 1920s. Taken at the Catholic Indian Congress, Spirit Lake Reservation, circa 1940. The wall tents belong to Mr. Joseph Fire Cloud, from the Standing Rock Reservation, Kenel, South Dakota.

Source: Reprinted with permission of the Buechel Museum, Rosebud Educational Society.

Although he had wide research interests, Fr. Buechel in fact published very little. Most of his work was intended for the Catholic Lakota and larger Catholic mission audiences. He authored a Lakota Bible history (1924) and a Lakota grammar (1939) and was the primary author of a Lakota prayer and hymnbook (1927). He also wrote short pieces for mission magazines in English and German, such as the *Mittheilungen aus der Deutschen Provinz* (Communications from the German Province of Jesuits), *The Calumet,* and *The Indian Sentinel.* His spiritual diary, ethnographic notes, sermons, letters, and other materials reside in the Marquette University Archives dispersed among the records of Holy Rosary-Red Cloud, St. Francis, and the Bureau of Catholic Indian Missions.

Works based on Fr. Buechel's research, published posthumously, include his Lakota dictionary, which was organized, edited, and published by Fr. Paul Manhart S.J. in 1970 and revised and republished by him in 2002; a catalogue of plants; a book of narratives in Lakota; and two collections of his photographs, 41 of which were displayed at the Museum of Modern Art (1975–1976). Fr. Manhart subsequently translated Buechel's Lakota narrative collection into English (1998). Buechel's material culture collection and associated notes were digitized and placed online in 2003. His photographic collection, material culture collection records, and photography logbook remain at St. Francis mission. Markus Kreis in Germany, is the most active researcher on Fr. Buechel and the early German missionary Jesuits and Franciscan Sisters. Ross Enochs has written the history of the Jesuit missions from a theological standpoint, and Harvey Markowitz's anthropological dissertation deals specifically with the Jesuits and Franciscans at St. Francis Mission.

— *Raymond A. Bucko*

See also **Deloria, Ella Cara; Native Peoples of the Great Plains**

Further Readings

Buechel, E. S. J. (1974). *Rosebud and Pine Ridge photographs, 1922–1942.* El Cajon, CA: Grossmont College Development Foundation.

Enochs, R. A. (1996). *The Jesuit Mission to the Lakota Sioux: Pastoral theology and ministry, 1886–1945.* Kansas City, MO: Sheed & Ward.

Kreis, K. M. (in press). *Lakotas, blackrobes, and holy women.* Lincoln: University of Nebraska Press.

Markowitz, H. (1987). Catholic mission and the Sioux: A crisis in the early paradigm. In R. DeMallie & D. Parks (Eds.), *Sioux Indian religion: Tradition and innovation.* Norman: University of Oklahoma Press.

Bunzel, Ruth Leah (1898–1990)

Ruth Bunzel was born in New York City into an intellectual Jewish family. She graduated as a history major from Barnard College in 1918. In 1920, she became Franz Boas's research assistant and secretary in the anthropology department at Columbia University, a position funded by the wealthy social psychologist and feminist Elsie Clews Parsons. This early contact with one of the leaders of the discipline encouraged Bunzel to undertake graduate work in anthropology. She entered the graduate program in 1923, and the following year she went on her first field trip to the American Southwest. The research trip was organized by the anthropologist Ruth Benedict. Each summer, for the next 10 years, Ruth Bunzel undertook research on the material art of the Southwest. During this time, she learned to speak the Zuni language fluently.

In 1929, she received her PhD in anthropology from Columbia University. Her dissertation, *The Pueblo Potter: A Study of Creative Imagination in Primitive Art*, was immediately published as a book under the same title by Columbia University Press. In this classic work, she combined her discussion of the materials, methods, and decorative elements together with statements made by Zuni and Hopi potters about their craft.

In 1930 and 1931, when Bunzel was a fellow of the John Simon Guggenheim Foundation, she wrote and edited her findings on Zuni language and culture. This work was published as a set of four interrelated essays running 610 pages in length in the *Annual Reports of the Bureau of American Ethnology*. Her first essay, "Introduction to Zuni Ceremonialism," was an elegant introduction to Zuni religion. She analyzed the organization of ritual, the cult of the ancestors, and placed this within Zuni conceptual categories. In "Zuni Origin Myths," she demonstrated that there is no single Zuni origin myth but rather a long cycle of overlapping myths. In the third essay, "Zuni Ritual Poetry," she asserted that for the Zuni, prayer was never the spontaneous outpouring of the soul but rather a repetition of magical formulae. The final section, "Zuni Katcinas," contains an analysis of this religious cult, a list of all known masked dancers, their role in Zuni religion, and black-and-white ink drawings of these deities.

During the 1930s, Ruth Bunzel went to Guatemala, where she once again undertook detailed ethnographic and linguistic research. This time she worked with the K'iche' Maya of the highlands. Her book *Chichicastenango: A Guatemalan Village* is widely considered a classic ethnography. This careful work on both the language and the culture of two unrelated Amerindian cultures has encouraged some scholars to consider her an ethnographer's ethnographer.

Her final work was an ambitious applied anthropology project that she undertook jointly with Margaret Mead. They received funding from Columbia University to set up an institute for Research on Contemporary Cultures (RCC) in which they coordinated a multiethnic study of immigrants in New York City.

— Barbara Tedlock

Further Readings

Babcock, B., & Parezo, N. (1988). *Daughters of the desert: Women anthropologists and the Native America Southwest, 1880–1980.* Albuquerque: University of New Mexico Press.

Caffrey, M. M. (1989). *Ruth Benedict: A stranger in this land.* Austin: University of Texas Press.

Parezo, N. J. (1993). *Hidden scholars: Women anthropologists and the Native American Southwest.* Albuquerque: University of New Mexico Press.

Burial Mounds

A burial mound is an area of land that has been set aside to bury the remains of a human, an animal, or artifact. It is not to be confused with a grave, where the body lies beneath the surface of the ground. Instead, it rests above the surface, covered with soil, gravel, and sand, or other substances. There are many

different shapes, sizes, and forms of burial mounds, depending on the culture that created them. The mounds may consist of the remains of a human or humans, fully intact or cremated, and sometimes with burial goods. Burial mounds can provide insight into the social, political, cultural, and demographic characteristics of a society. This explains the fascination with ancient burial sites. Archeologists and anthropologists attempt to learn more about past cultures by analyzing the characteristics of a burial mound.

Through analysis of burial mounds, archaeologists attempt to reconstruct the social, political, and religious life of a culture. They examine the way the body was found and how it is dressed and positioned. Artifacts can distinguish the time and environment of the person, as well as the details of burial rites or ceremonies. Artifacts that have been recovered include jewelry, pottery, clothing, or other objects of religious or spiritual importance, such as amulets, hair combs, and fetishes. Cultural scripts and encoded meanings may be written upon these items through the intricate designs and patterns used to decorate them.

Extracting Information Through Burial Mounds

Archeologists reconstruct burial mounds to acquire information about former cultures and civilizations on six levels. By examining burial sites, they investigate the ideas, beliefs, and meanings attributed to the afterlife. They give insight into the processes that the culture may have believed were necessary for the deceased to reach another world or realm after death. Rituals or ceremonies may have taken place during the burials as a means for the deceased to rest in peace or as reassurance that the deceased would not haunt or harm the living. They may have believed that specific rituals were required to aid in the deceased's transition from the earthly world to the spirit world. Materials found in the burial provide clues that lead to these findings.

By investigating the processes performed by cultures during burials, archaeologists attempt to interpret changes and adaptations made through time. By examining the differences amongst burials over time, archaeologists are able to study the evolutionary processes of cultures, making note of cultures that flourished and spread in contrast to those that die. Migrations can be traced, as well as epidemics that may have affected the population. Changes include the addition or elimination of particular burial goods, different styles of dress, body position, multiple bodies, or the residue of rites practiced during the burial.

Burial mounds may illustrate the differences amongst age and sex of individuals. Although it is difficult to accurately make conclusions, hypotheses may be made when examining the deceased, burial goods, and location of the mounds. Cultures quite often are consistent in their burial methods. By examining the differences amongst males and females, babies, children, adults, and the elderly, archaeologists are able to speculate on the different social positions of members within the culture. This is possible only when examining the gender and age within the same culture. They must be able to differentiate between the two sexes and various ages based on the consistency of characteristics and burial practices. Individuals may be recognized as being of importance if they are buried in a certain position in contrast to others in the culture, if they are buried with more artifacts or artifacts of special significance, or if the burial mound is created in a larger or more complex manner. For example, burial customs of ancient agriculturalists from the Near East and Central Asian regions illustrate the differences among male and female roles within the community. Female burials include objects that represented their occupations, such as needles for those who knit and pestles and querns for those involved in food preparation. Within male burials, warriors were buried with weapons such as arrows and spearheads.

According to Masson, investigating burial mounds to determine the social stratification within a culture may be achieved by examining the quality and quantity of burial goods compared with that of the norm within each specific culture. The burials with more variety, larger quantities, and frequency of goods and artifacts are suggested to belong to individuals of higher social or economic status. Burials with minimal goods are suggested to be from individuals of lower social or economic status. Taking this into account, it must be stated that although there may be many objects found in the mound, the material that makes up these objects must be examined as well. An individual may be perceived as having high social or economic status even if the individual has few objects in the burial. An object made of precious metals or gems may be considered worth more than numerous objects made of materials commonly used among the whole population. Another consideration is the

geographic location of the sites and the materials available. Ornaments, tools, weapons, and vessels can be produced only with materials that are accessible from the physical surroundings or available by trade.

Information on marriage and family is investigated through burial mounds. There is much speculation when it comes to collective burials. Some archaeologists believe that collective burials indicate kinship ties. If a male and female are buried in the same mound, the assumption is made that they are related by blood or marriage. Collective burials may also be formed by members of the community with similar characteristics or social backgrounds, although this is not a definitive conclusion.

The last level of analysis is the demography of a culture. By examining the characteristics within the population, archaeologists and anthropologists attempt to decipher the causes of death, epidemics, diseases, and injuries that may have occurred, the average life expectancy within the culture, and factors that may alter the normal life expectancy and health of individuals.

Origins of Burial Mounds

Burials have been established as early as 2700 BCE for the pyramids created by the Egyptians, with barrows made of stone chambers in England dating back to 2000 BCE. Between 1700 BCE and 1400 BCE, forms of mounds were built in central Siberia, and around 1000 BCE, mounds were formed in northern China during the Choo Dynasty. Historians such as Otis Rice suggest that in America, burial mounds were built to commemorate significant individuals within the community who emphasized special influence or power over other members, such as chiefs, priests, and shamans. He also suggests that the common individuals within a community were usually cremated and then placed into mounds, although not as impressive as those of the higher-status individuals.

There are many theories on the origin of the burial mound. Some people believe that they were created due to the necessity to protect the living. The hardpan theory relies on the belief that it was quite difficult to dig into the earth, possibly due the presence of shield, frozen earth, or other inadequate physical conditions. A hardpan is a layer of dense, compacted soil, often part clay, 1 to 3 feet below the surface. Greenman speculated that perhaps the primitive tools were insufficient in digging surfaces such as these. A third theory suggests that mounds were created to protect the corpse from destruction by animals and humans. There would have been enough matter on top of the body, and animals could not disrupt the body, but humans would have been able to identify the presence of something buried. Another theory suggests that the burial mound was first created by accident. It is possible that an individual came up with the idea after digging a large grave and having extra earth that was left over from the grave itself. That person may have duplicated this procedure in the future, creating a culture of burial mound use.

Indigenous mounds have been located on hilltops or in close proximity to other larger natural mounds. Burial mounds appear to have been constructed in smaller forms compared with those found later on. The height of a mound may have increased as a result of people walking by and placing additional material, such as stones or rocks on the mounds, for other reasons, perhaps of spiritual, superstition, or symbolic purpose. Other theories suggest that the living placed large amounts of burial material on top of the mound in case the deceased mysteriously reawakened from the dead.

Types of Burial Mounds

In reference to the mounds found on and around Manama Island, early burial mounds date back to between 2500 BC and 2300 BC. These are the oldest and smallest mounds found. They are commonly located on hilltops and are surrounded by a wall of large stones. Intermediate type mounds date between 2300 BCE and 2000 BCE and are larger in size, with flat surfaces. The sides of these mounds are lower and become narrower as the height increases. Stones used were both small and medium in size. Pottery and seals are found with the deceased. Late-type burials consist of individual mounds and collective mounds, dating between 2000 BC and 1400 BC. An individual mound consists of a single chamber where one person is buried. Collective burials consist of a main burial chamber and subsidiary mounds. Artifacts found in these chambers are ornaments, pottery, seals, amulets, and foodstuffs. Children were commonly found within the subsidiary mounds. Tylos-type burial mounds are large and expand over the site surface. They are built of small and medium stones, which form a hill. Some are a four-sided shape built to fit a single individual. Ornaments and others goods are commonly found among these mounds.

Natural mounds are defined as preexisting mounds found in the natural landscapes and geographical settings. These are considered natural places and monumental areas. Mullen suggests the reason for the formations of burials within natural mounds lies in the relationship between the association of a specific location and cultural heritage. These locations become significant in relation to preserving the history and setting of a culture. Natural mounds have also been associated with cremations and urns during prehistoric times.

A primary burial consists of one individual, usually cremated, and placed into a subsurface pit. Secondary burials consist of the construction of a mound on top of the primary burial, whereas secondary cremation burials take place over an extended period of time.

The Use of Burial Mounds Among Cultures

The largest amounts of burial mounds are found all over Manama Island, with highest concentrations within the northern and central parts of the island. With an estimated 100,000 mounds found, Bahrain's mounds span over 20 square miles. These burial mounds were created over the course of several millennia. Four different types of mounds were found, which include Early, Intermediate, and Late Tylos burial mounds.

The Adena people, thought to be an archaic form of the Hopewell, are likely the first Native Americans to have constructed ceremonial burial mounds (Ohio region). Their burials consist of a rectangular subfloor chamber, approximately 10 to 15 feet in length and almost that in width, and approximately 6 feet deep. The Adena marked a transition in the construction from graves to burial mounds. They seem to have used both techniques. Burials were found both in the subfloor tombs and above-floor mounds. The Grave Creek Mound, found in Moundsville, West Virginia, is the largest pointed-type burial mound in the United States. Archaeologists believe the mound was built between 250 BCE and 150 BCE. The mound and its two forts form the shape of a triangle. It is believed to have been created for a very important member in the community.

The Hopewell culture followed and was a continuation of the Adena culture, with some amplification. Archeologists have found a number of burial mounds, in which they attempt to piece together possible descriptions and characteristics of this society. The

Source: © iStockphoto/Fanelie Rosier.

Hopewell burial mounds are found to be quite large in size, numerous, and extravagant. Greenman suggested that the Hopewell strongly believed in the preservation of the dead, in burial and afterlife. Reasons for this speculation include observations made of the time and effort it must have taken to build these burial mounds. They are well constructed, with a platform, surrounded by symmetrical earthen walls, reflecting the highest regard for "the sanctity of the grave."

The Manitou Mounds, located in the Rainy River Country of northwest Ontario, Canada, have the largest quantity of burial mounds in all of Canada. The lands in which the mounds are located are believed to have been utilized for habitation for about 10,000 years and are the largest prehistoric structure in Canada. The Ojibway are currently the caretakers of this site, which dates back to the first Ice Age hunters. In 1970, the region was recognized as a significant prehistoric site. Within the span of 3 kilometers, it appears to have about 29 habitation sites, with one of the earliest ceremonial burial grounds. The burial mounds reveal the region was a central place where trade took place, and quite possibly people from all over the continent traded goods. Manitou Mounds are

open to the public, and visitors are able to experience history as far back as 3000 BC. The burial mounds have shed light on the way in which the inhabitants have lived in the past, through their beadwork, weapon making, and tipi painting. Serpent mounds are also found in Ontario and Ohio, believed to have originated from the jungles of Central America or Mexico. Serpent mounds are formed by a collection of oval mounds, which create the image of a serpent.

Japanese burial mounds date back between the 3rd and 7th centuries, also known as the Kofun period. Individuals of high status, such as emperors, were frequently buried in tombs covered by large mounds forming shapes of keyholes called *kofun*. The Daisen Kofun, with a length around 1,640 feet, is located is the middle of Mozu Tumuli, a collection of 92 smaller and larger kofun covering an area of 16 square kilometers.

There are numerous types and forms of burial mounds found worldwide, describing the cultures that built them. They represent many facets within a culture's social, political, and religious life. Archaeologists continue to uncover ancient burial mounds, unraveling and revealing human history.

— *Karen Hodge Russell and Jenny Etmanskie*

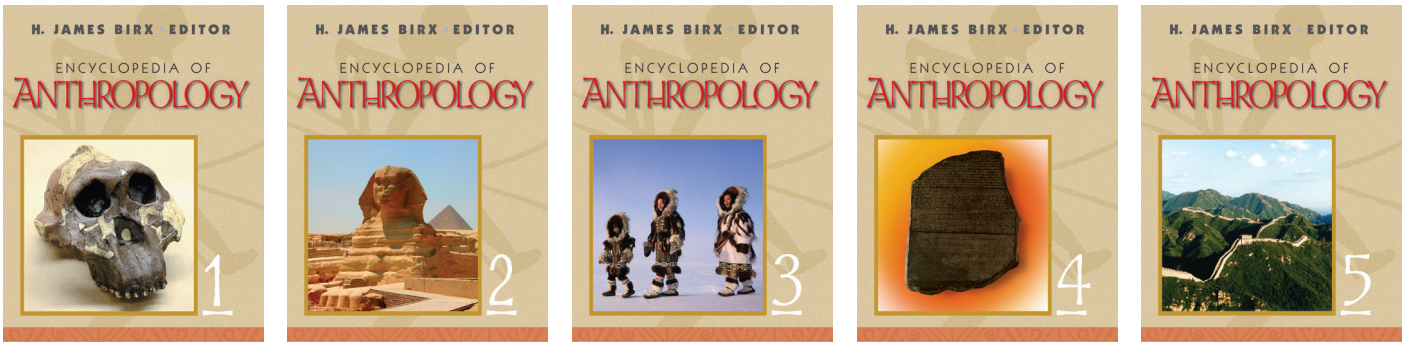
See also **Death Rituals; Hoaxes in Anthropology**

Further Readings

Alekshin, V. A. (1983). Burial customs as an archaeological source. *Current Anthropology, 24*(2), 137–149.

Greenman, E. F. (1932). Origin and development of the burial mound. *American Anthropologist, 34,* 286–295.

Kenyon, W. A. (1986). *Mounds of sacred earth: Burial mounds of Ontario.* Toronto, Canada: University of Toronto Press.



ENCYCLOPEDIA OF ANTHROPOLOGY

H. JAMES BIRX ▪ EDITOR
Canisius College, SUNY Geneseo

2

A SAGE Reference Publication

SAGE Publications
Thousand Oaks ▪ London ▪ New Delhi

Copyright © 2006 by Sage Publications, Inc.

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

For information:

Sage Publications, Inc.
2455 Teller Road
Thousand Oaks, California 91320
E-mail: order@sagepub.com

Sage Publications Ltd.
1 Oliver's Yard
55 City Road
London EC1Y 1SP
United Kingdom

Sage Publications India Pvt. Ltd.
B-42, Panchsheel Enclave
Post Box 4109
New Delhi 110 017 India

Printed in China.

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Encyclopedia of anthropology / H. James Birx, editor.
p. cm.
Includes bibliographical references and index.
ISBN 0-7619-3029-9 (cloth)
1. Anthropology—Encyclopedias. I. Birx, H. James.

GN11.E63 2005
301′.030—dc22
2005013953

05 06 07 08 09 10 9 8 7 6 5 4 3 2 1

Sage Reference:	Rolf Janke, Sara Tauber
Production:	Claudia A. Hoffman
Permissions and Image Research:	Karen Wiley
Typesetting:	C&M Digitals (P) Ltd.
Indexing:	Will Ragsdale
Cover Designers:	Ravi Balasuriya and Michelle Lee Kenny

CONTENTS

List of Entries
ix

Reader's Guide
xvii

Editorial Board
xxix

Entries C–E
435–940

Index
I-1–I-96

2

C

Cannibalism

Cannibalism is defined as the ingestion of members of one's own species. As used in zoology, it refers to species that prey on their own kind. In anthropology, it is used specifically to refer to the eating of humans by humans. Around the 16th century in English-speaking countries, the term cannibalism began replacing the Latin-derived term *anthropophagy.* The word *cannibal* is usually traced to the Caribbean and the voyages there of Christopher Columbus. Richard Hakluyt's *Divers Voyages Touching the Discovery of America and the Islands Adjacent* (1582) popularized the word in its English form.

Analytic categories of cannibalism vary. A recent archaeological study used the threefold classification of survival, funerary, and gastronomic cannibalism. Other categories commonly found in the literature, both anthropological and otherwise, include aggression, criminal, epicurean, nutritional, ritual, sexual, spiritual, and, less commonly, medical and autocannibalism.

Anthropologists usually focus on ritual cannibalism and often use the subcategories of *exocannibalism* to refer to the consumption of members from a culturally defined outside group and *endocannibalism* to refer to the consumption of members of one's own group. Hermann Helmuth suggests that exocannibalism was more common among agriculturalists and endocannibalism among foragers. In the folk model, exocannibalism is usually associated with the effort to strike fear in the enemy as well as to absorb the spirit of the enemy, and involves killing. Associated with an effort to maintain the group's identity, endocannibalism is often viewed as showing respect for the deceased. Obviously connected to burial ceremonies and sometimes called "mortuary cannibalism" or "compassionate cannibalism," endocannibalism rarely involves killing. For example, according to Beth Conklin, the Wari people of Amazonia justified their mortuary cannibalism with the belief that when they consumed the corpse, the spirit of the dead was absorbed by the entire tribe.

Cannibalism has a long history, ranging from 5th century BC writings of Herodotus to Bruce Knauft's documentation of three cases of cannibalism between 1978 and 1983 among the Gebusi in south central New Guinea. Probably the first full-scale treatment of cannibalism in English was Garry Hogg's 1958 *Cannibalism and Human Sacrifice.* More journalistic than anthropological, the book, nevertheless, was based on acceptable scholarship and remains a useful survey.

Recently, archaeologists working in the U.S. Southwest have provided incontrovertible evidence of cannibalism. For example, Tim White's extraordinarily meticulous account of cannibalism among the Anasazi in the U.S. Southwest uncovered the cannibalized remains from one site of 17 adults and 12 children. The number of cannibalized remains from other Anasazi sites is expected to exceed 100. Christy Turner and Jacqueline Turner concluded that cannibalism occurred in the Four Corners area for about four centuries, beginning about AD 900. In some Anasazi sites, human proteins have been identified as residues in cooking pots and in human feces. And preserved human waste containing identifiable human tissue was found at an Anasazi site along with osteological evidence of cannibalism.

The Naysayer

William Arens critically reexamined several anthropologically accepted accounts of cannibalism. Although he contended that he was simply investigating the connection between anthropology and cannibalism and not the existence of cannibalism itself, his writings

have frequently been read as proposing that ritual cannibalism never existed.

The charge of cannibalism clearly has been used historically to impugn the reputation of certain groups, but Arens's notion that cannibalism is primarily a construction of European colonizers seems a peculiar instance of ethnocentrism; since Europeans did not do it, nobody did it. Unfortunately for Arens's position, Europeans did do it. Peggy Sanday briefly summarized the European medicinal cannibalism that existed from the first until at least the 19th century. And anthropology has never been as obsessively focused on the study of cannibalism, as Arens suggested.

Anthropologists before and after Arens have, indeed, considered the occurrence of cannibalism as quite obvious. One of the most vivid eyewitness accounts of cannibalism was written by Paul P. de La Gironière, from his travel in 1820 among the Western Kalingas of the North Luzon Highlands, also known as the Tinguians. The striking similarities between the details of his writings and the stories told to me by my elderly nonliterate Kalingas about what they had witnessed during their youth and the impossibility of any collusion between La Gironière and my informants convinced me of the truth of ritual exocannibalism among the Kalingas. And as one anthropologist stated, "The case for past cannibalism in parts of Papua New Guinea is no longer an issue for the majority of Melanesian scholars" (Goldman, 1999, p. 19).

Psychological, Symbolic, and Ecological Perspectives

After an exhaustive survey, the psychologist Lewis Petrinovich wrote, "Cannibalism is not a pathology that erupts in psychotic individuals, but is a universal adaptive strategy that is evolutionarily sound. The cannibal is within all of us, and cannibals are within all cultures, should the circumstances demand the appearance" (2000, p. vii). Psychologists offer many theories to explain cannibalism, most of them centering around the notion that the cannibal was ovenurtured as an infant. Ethnographic evidence does little to support most of the psychological explanations.

Some of the more convincing symbolic explanations of cannibalism focus on the development of the Eucharist and the doctrine of transubstantiation in Europe in the Middle Ages, seeing in the ritual of ingesting consecrated bread and wine an association with theopagy (consuming the body/flesh of a deity).

While ritual cannibalism has been established beyond question, the origins and causes for the practice remain elusive. Previously ranging from obfuscations and elaborations of folk models to the phantasmagoric notions of psychoanalysis, analytic models were significantly advanced by the introduction of ecological perspectives. For example, Michael Harner famously proposed protein deficiency as the cause of Aztec cannibalism. With the careful reexamination of ethnohistoric accounts, the continuing gathering of ethnographies, and the important contribution of archaeology, anthropology and the public may expect still better explanations of cannibalism.

— *Robert Lawless*

See also **Anasazi; Religious Rituals; Taboos**

Further Readings

Arens, W. (1979). *The man-eating myth: Anthropology and anthropophagy.* New York: Oxford University Press.

Conklin, B. (2001). *Consuming grief: Compassionate cannibalism in an Amazonian society.* Austin: University of Texas Press.

Goldman, L. R. (1999). From pot to polemic: Uses and abuses of cannibalism. In L. R. Goldman (Ed.), *The anthropology of cannibalism* (pp. 1–26). Westport, CT: Bergin & Garvey.

Marlar, R. A., Leonard, L., Banks, L., Billman, B. R., Lambert, P. M., & Marlar, J. E. (2000). Biochemical evidence of cannibalism at a prehistoric Puebloan site in southwestern Colorado. *Nature, 407,* 74–77.

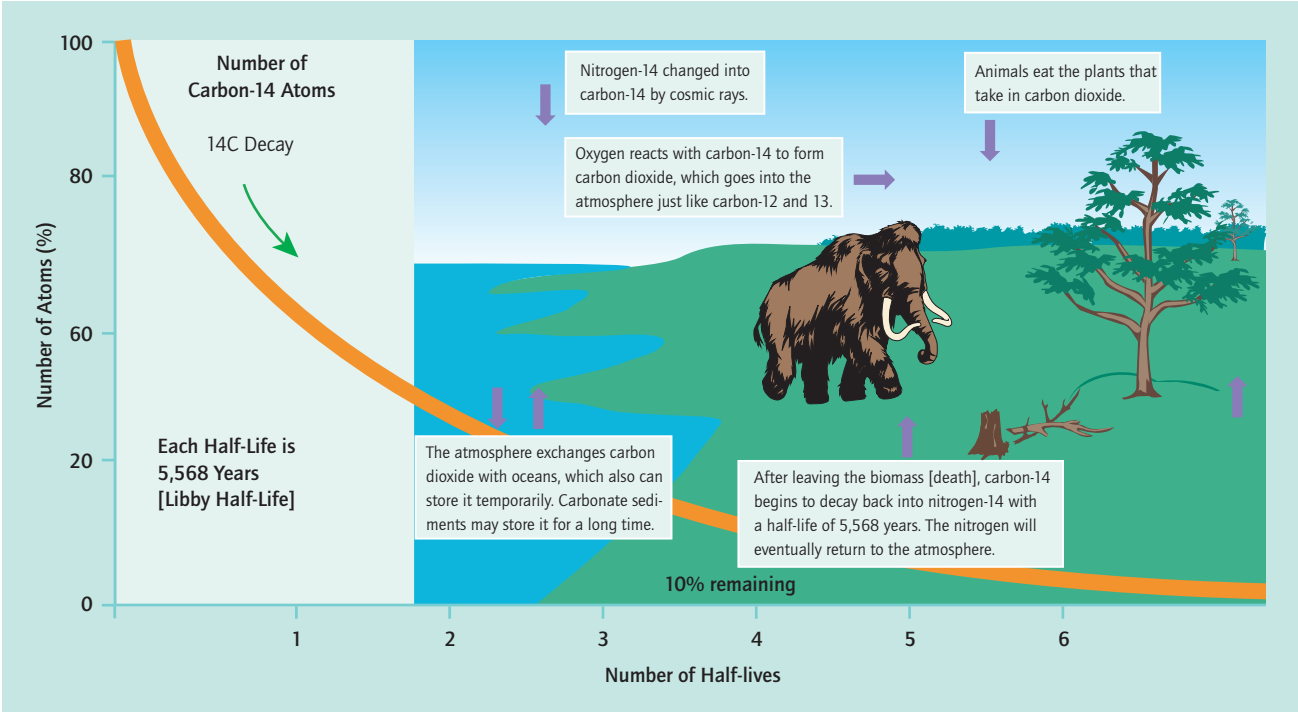
Petrinovich, L. (2000). *The cannibal within.* New York: Aldine de Gruyter.

Price, M. L. (2003). *Consuming passions: The uses of cannibalism in late medieval and early modern Europe.* New York: Routledge.

Turner, C. G. II, & Turner, J. A. (1999). *Man corn: Cannibalism and violence in the prehistoric American Southwest.* Salt Lake City: University of Utah Press.

Carbon-14 Dating

Radiocarbon is the best-known radiometric dating technique due to its successful application to problems in human history and prehistory for over 50 years.



The decay of carbon-14 through 6.64 half-lives or 37,000 years, after which only 1% of the original carbon-14 remains. The production, mixing, and fate of the carbon-14 as part of the carbon cycle is shown in the insert.

Willard Libby's development of the technique in the late 1940s permitted relative time to be sorted radiometrically in archaeological contexts in a manner that eclipsed the more traditional relative dating methods that had developed over the previous century.

Carbon-14 is a radioactive isotope produced in the upper atmosphere when cosmic rays generate neutrons as they bombard that outer atmosphere. These neutrons can enter abundant nitrogen-14 nuclei (78% of the atmosphere), converting some of them to carbon-14. The carbon-14 combines with oxygen to form carbon-14 dioxide, which is assimilated by plants and the animals that consume those plants. The carbon-14 production is relatively constant over short periods of time and is in equilibrium with the carbon sinks in the environment (see figure).

The Libby radiometric clock is started when the organic item (animal or plant) dies. The clock is set to "0" at death and begins to tick, with a half-life of 5,568 years. After 5,568 years, one half of the original radiocarbon-14 remains; after 2 × 5568 years, one quarter is left, and so on. There are two methods employed today to determine the amount of radiocarbon remaining in a sample: (1) decay counting, the traditional method, which relies on the decay of carbon-14 to nitrogen-14 with the emission of a beta ray that can be measured in decays per minute per gram and compared with a standard that has a decay rate of 15 decays per minute per gram; and (2) accelerator mass spectrometry (AMS), the atom-counting method, which counts the atoms of radiocarbon-14 in a sample and compares that result with those of a standard.

Libby made a fundamental assumption when he developed his technique. He assumed that the rate of carbon-14 production was constant through time. Subsequently, this assumption was shown to be untrue, but the difficulty could be overcome by instituting a calibration that compared the radiocarbon age of an item with the radiocarbon age of a wood sample of known age. Today this calibration curve is known as the dendrochronological correction curve, and it allows the dated sample's age to be expressed either in calendrical years B.C. (or B.C.E.) or A.D. (or C.E.), or as a conventional radiocarbon-14 age expressed as B.P. (before 1950 in radiocarbon years). Today, there is a convention, not universally accepted, that radiocarbon-14 dates that have not been dendro-corrected (for example, very old dates [> 40,000], groundwater dates, or atmospheric pollution dates) should be designated with a lowercase bp (before present). AMS

does not escape this dendro-correction limitation, but does offer advantages in that smaller samples can be used (milligrams vs. grams); shorter counting times are possible due to improved counting statistics (hours vs. days); the backgrounds associated with cosmic rays, which must be shielded against in the traditional method, are not a factor; and ages up to 70,000 years are measurable because of lower backgrounds and greater counting statistics.

A further complication in some kinds of materials used for radiocarbon dating is the issue of the natural introduction of old carbon into living organisms in and around oceans, due to the presence of old carbon from carbonate sources and upwelling water. A marine correction can be made for this effect in parts of the world where the offset is known. The standard method for determining this offset is to date a sample that was collected prior to 1950 (prior to the atomic bomb testing peak) and determine the difference between actual age and the radiocarbon age.

The two analytical methods exist side by side today, each having a specific market niche. While AMS may be preferred when samples are small or high precision dates (errors of less than 60 years) are required, the traditional beta decay method provides, at a reasonable price, perfectly acceptable results when sample size or high precision are not an issue. Not all laboratories are equal throughout the world, and *caveat emptor* should be kept in mind when choosing a lab from which to obtain results, for there exist those that are good, bad, and ugly. Surprisingly, this state of affairs has more to do with the chemistry of sample preparation, which varies greatly from lab to lab, than it does with either the AMS or decay systems themselves. There are slightly fewer than 100 active traditional radiocarbon dating labs throughout the world and more than two dozen AMS labs.

— *L. A. Pavlish*

See also **Dating Techniques; Dating Techniques, Radiometric; Dating Techniques, Relative; Libby, Willard**

Further Readings

Bennett, C. L., Beukens, R. P., Clover, M. R., Elmore, D., Gove, H. E., Kilius, L., et al. (1978). Radiocarbon dating with electrostatic accelerators: Dating of milligram samples. *Science, 201,* 345–347.

Libby, W. F. (1955). *Radiocarbon dating.* Chicago: University of Chicago Press.

Pavlish, L. A., & Banning, E. B. (1980). Revolutionary developments in carbon-14 dating. *American Antiquity, 45*(2), 290–296.

Cardiff Giant Hoax

The Cardiff Giant hoax involved a large stone figure, advertised as a petrified giant man. The Giant is of anthropological interest both as a classic example of a hoax and as a source of insight regarding the interaction of popular and scientific conceptions of human prehistory.

On October 16, 1869, workers digging a well on William "Stub" Newell's farm outside Cardiff, New York, exhumed a gray stone figure of a giant man with contorted limbs and a serene facial expression. According to a contemporary advertisement, the Giant was 10' 4.5" (about 3.2 m) long and weighed 2,990 pounds (about 1,350 kg). Newell exhibited the Giant, charging 50¢ admission, for 2 weeks, and then sold a majority interest in it to a syndicate of businessmen from nearby Syracuse, where the Giant began to be exhibited on November 5. The Giant was of commercial benefit both to its exhibitors and to the city itself, which profited from the tourist trade.

Opinions about the Giant's provenance were divided. The popular view, encouraged by its exhibitors, was that it was a petrified giant, possibly one of the giants described in the Bible (for example, Genesis 1:6). It was sometimes called "the American Goliath," after the Philistine giant in Samuel 1:17. Scientific investigators, however, disagreed for a variety of reasons. The Giant was composed of gypsum, a soft stone that would not hold details for long when buried in wet soil; it displayed soft tissues, such as skin and muscle, which are incapable of petrifaction; and it appeared to bear the mark of sculpting tools. A minority thought that the Giant was a genuine ancient statue; most, including paleontologist O. C. Marsh and Andrew Dickson White, the president of Cornell University, regarded it as a recent hoax. Despite the opinion of the experts, the public remained fascinated by the Giant.

In December 1869, George Hull, a cousin of Newell's, admitted that he had commissioned the

sculpting of the Giant and conspired with Newell to perpetrate the hoax. Motivated by a conversation with a Methodist minister who insisted on the literal truth of the Bible, including the stories about giants, Hull sought to expose—after profiting from—the gullibility of the religious. His admission was corroborated by the testimony of the sculptors. Not everyone was convinced, however; the Reverend Alexander McWhorter insisted, despite Hull's confession, that the Giant was a Phoenician statue.

The Giant remained popular after the hoax was exposed, spending the 1870s touring throughout New York, Pennsylvania, and New England. In New York City, during the winter of 1869 to 1970, it was in competition with a duplicate commissioned by P. T. Barnum, who advertised his as the "original" Cardiff Giant. (Barnum and Hull later collaborated on a similar hoax, "The Solid Muldoon," in Colorado.) As interest in the Giant dwindled, it changed hands a number of times; it is now on display at the Farmers' Museum in Cooperstown, New York.

Among the literary works inspired by the hoax are Mark Twain's "A Ghost Story" (1870), A. M. Drummond and Robert E. Gard's play *The Cardiff Giant* (1939), and Harvey Jacob's novel *American Goliath* (1997).

— *Glenn Branch*

See also **Hoaxes in Anthropology**

Further Readings

Dunn, J. T. (1948). *The true, moral, and diverting tale of The Cardiff Giant, or, The American Goliath.* Cooperstown, NY: Farmers' Museum.

Feder, K. L. (2002). *Frauds, myths, and mysteries: Science and pseudoscience in archaeology* (4th ed.). Boston: McGraw-Hill.

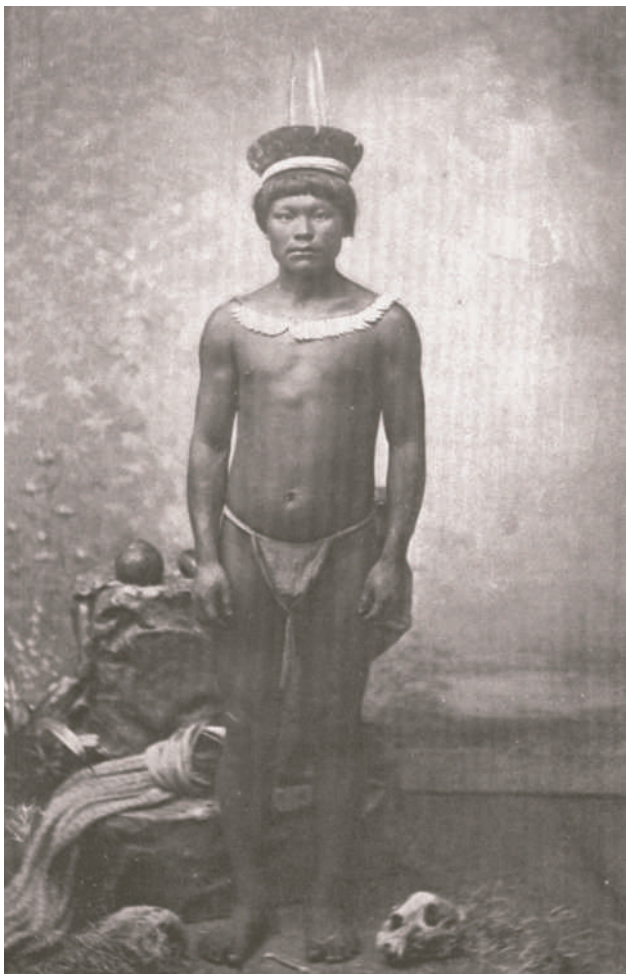
Franco, B. (1990). *The Cardiff Giant: A hundred year old hoax.* Cooperstown, NY: New York State Historical Association.

Caribs

The Caribs are a group of native peoples in the Lesser Antilles, after whom the Caribbean Sea was named. They are thought to have originated in the Orinoco River Basin of Venezuela and spread northward into the Antillean chain of islands. They spoke languages in the Carib family indigenous to South America, which are now widespread across northern South America from the mouth of the Amazon River to the Colombian Andes. The 29 living Carib languages are divided into a northern branch (21 languages) and a southern branch (8 languages). Some common words used in English were borrowed from the Carib language, such as *hammock, iguana,* and *hurricane* (after the Carib god of evil).

Archaeology suggests that pottery-making horticulturalists of South American origin spread from the mainland into the Lesser Antilles around 500 BC. These early Caribbean peoples are known from their distinctive Saladoid pottery, named after the Saladero site in Venezuela, some of which is intricately designed and decorated. They also brought with them crops for cultivation; the primary crop was cassava (also known as tapioca or manioc), a major staple for Amerindian groups, and various animals such as the dog, hutia, and the guinea pig (the latter of which is currently known only from Puerto Rico). These early settlements consisted of smaller villages and were largely focused on the coastlines. Research indicates that native groups incorporated both marine (for example, shellfish, turtle, fish) and terrestrial (for example, lizards, land crabs, birds) foods into the diet. Carib-speaking peoples continued to occupy the Lesser Antilles up until European contact and, according to some historical accounts, apparently killed, displaced, or forcibly assimilated with the Arawakan peoples who inhabited islands in the northern Caribbean, but who also originated from South America.

According to some of these same European accounts, the Caribs were aggressive, warlike, and cannibalistic. In fact, the English word *cannibal* comes from the Spanish *caníbalis,* which was recorded by Christopher Columbus from the earlier Carib word *karibna,* meaning "person." Although some Native Americans and other peoples around the world were known to practice cannibalism, Columbus's characterization of the Carib as eaters of human flesh probably reflected his and general European desire to represent them as savages: In 1503, Queen Isabella of Spain ruled that only cannibals could be legally taken as slaves, which encouraged Europeans to identify various Native American groups as cannibals.



Source: © iStockphoto/Regina Alvares.

The 1748 Treaty of Aix-la-Chapelle, between Britain and France, settled on control of the Lesser Antilles. Because of the formidable resistance mounted by the indigenous Caribs on the islands of Dominica and St. Vincent, they were left as "neutral" islands. This treaty was violated first by the French and later by the British, who obtained possession in 1783 and drove the existing Carib population to the mountains and Atlantic coasts.

In 1797, almost the entire population of 5,000 or more Caribs on St. Vincent were forcibly removed from the island by British troops and banished to Roatan Island, off the coast of Honduras. The Garifunas of Belize are their direct descendants today. The remaining Caribs on St. Vincent were allocated 233 acres by the British government for their subsistence. In Dominica, the Caribs lost control of their lands but were not forced to migrate. By 1764, the Caribs had jurisdiction over just 232 acres, in a remote area called Salybia on the east coast of Dominica.

In 1903, the British government, on recommendation of the British administrator, Sir Heskeith Bell, expanded the Carib reservation to 3,700 acres in northeast Dominica and officially called it the Carib Reserve. This was a paltry gesture by the government, considering that it amounted to only about 2% of the Caribs' original land on the island. The declaration that established the reserve officially recognized the authority of the Carib chief, but he was not given actual control of the area. Today, the Carib Reserve in Dominica is the only one of its kind in the Caribbean and has a population of around 2,700 people. Although it has helped the Carib community to maintain its own identity, the loss of language, cultural traditions, and lifeways as a result of European domination has severely impacted the Carib peoples.

— Scott M. Fitzpatrick

Further Readings

Farnsworth, P. (Ed.). (2001). *Island lives: Historical archaeologies of the Caribbean.* Tuscaloosa: University of Alabama Press.

Hulme, P., & Whitehead, N. L. (Eds.). (1992). *Wild majesty: Encounters with Caribs from Columbus to the present day: An anthology.* Oxford: Oxford University Press.

Wilson, S. M. (Ed.). (1997). *The indigenous people of the Caribbean.* Gainesville: University Press of Florida.

Carpenter, C. R. (1905–1975)

During the 1930s, C. Ray Carpenter carried out the first modern studies of free-ranging primates. In its scope, duration, systematic data collection, and revelations about the naturalistic behavior of primates, his research went far beyond all previous studies, such as those by Bingham, Nissen, Zuckerman, and Marais. Although his 1931 doctoral dissertation was on the behavior of pigeons in captivity, he immediately switched to field research on free-ranging

primates. Over the next decade, in Central America, Southeast Asia, and the Caribbean, he carried out landmark field studies of howler monkeys, spider monkeys, gibbons, and rhesus macaques. The rhesus were on Cayo Santiago, a small island off Puerto Rico, in a colony established in the late 1930s with monkeys that Carpenter shipped from India. In the years since then, that colony has been the subject of research by many scientists.

After completing his doctorate with Calvin Stone at Stanford (1931), Carpenter began his primate field studies under a 3-year postdoctoral appointment to Robert Yerkes's laboratory at Yale. Thereafter, he had professorial appointments in psychology at Columbia University (1934–1940) and in both psychology and anthropology, first at Pennsylvania State University (1940–1970), then at University of Georgia (1970–1975).

Although Carpenter was trained in psychology, his primate studies included a diversity of topics more characteristic of biology, including demography, manipulation and locomotion, foraging, ranging and territoriality, sexual behavior, mother-infant relationships, competition and cooperation, agonistic behavior, dominance relations, vocalization and communication, and grooming and play.

His field methods were essentially those of a descriptive naturalist, as he observed representative samples of populations on-site in their natural habitats and made accurate and detailed reports of his observations. He made several important contributions to the methodology of primate field studies, including (a) censusing groups as they progressed single file instead of when they were congregated; (b) breaking the complexity of ongoing interactions in a group into their more readily observed components, dyadic relationships; (c) gradually habituating animals to his presence and remaining at a distance at which he could observe them without undue disturbance; (d) taking advantage of available technology, including photography, sound recording, and playback equipment; (e) making objective records of behavior, often quantitative and checked when possible by repeated observation; and (f) taking representative samples, not just of the dramatic or unusual.

Carpenter was adamant about the potential of observational field studies to conform to the same canons of science that characterized laboratory research, including accuracy of records, adequate sampling, and data that permit "comprehensive description, measurement, interpretation and even prediction." He was interested in theoretical frameworks that might have the potential to encompass the complexities of primate social processes, and in his search for unifying principles, he turned, at various times, to sociometry, semiotics, mathematical models, design features of language, dominance hierarchies, homeostasis, and cybernetic functionalism.

In five articles published in 1942 (two), 1952, 1954, and 1958, respectively, Carpenter featured his generalizations about primate grouping and social processes. These eclectic articles include many revelatory statements. Here is a small sample, rearranged and edited for brevity. Most are from Carpenter's two earlier reviews, emphasizing his prescience and eclecticism, which went well beyond that of his contemporaries.

> For the complete description of a group, each of the $N(N-1)/2$ paired interactions among N individuals should be minutely described and measured for a number of different characteristics. . . . The strength of the attachment between two individuals may be judged, or actually measured, by observing for a period of time the average distance which separates the two animals. (1942a)

> A basic fact for primate societies is that all the individuals in a group are capable of perceiving and discriminating all the other individuals in the group and react discriminatively toward them. (1952)

> A universal characteristic is that all social relations are, in varying degrees, reciprocal. . . . A relatively high degree of interdependence in natural groupings of primates is an important characteristic of their social life. Perhaps such expressions as mutual aid, altruism, cooperation, and social service are too anthropomorphic in connotation, and thus may becloud the actual relationships, by provoking controversy. (1942a)

> Charles Darwin and many natural historians following him have so emphasized "the struggle for existence" and competition that the facts of interdependence in animal societies have not been accurately and fully represented. As a result, the formulated theories and principles of social behavior are faulty, since they are build on inadequate factual bases. . . . The survival and

> reproduction of groups of monkeys of a species depend on the social coordination—one may say cooperation—of all the individuals of the group. (1942b)

> The monkey or ape in its natural group in the tropical forest has its freedom of movement strictly limited by the structure of its group. (1942a)

> The ratio of adult males and females in a group seems to express a balance between the summed female sex needs or capacities in a group and the sexual capacities of the effective males available to satisfy the needs. (1942a)

> Individuals in free-ranging organized groups deploy themselves in space in inverse relation to the strength of centripetal (cohesive) interactions and in direct proportion to the strength of centrifugal interactions. (1952, 1954)

> There is no question but that groups of monkeys and apes are organized around several dominance gradients (1942b). . . . However, when multimale-multifemale groupings of monkeys and apes are observed under "free-range" conditions and for long periods of time, rarely if ever does one male have complete priority to all incentives at all times (1952). . . . Also, measures of dominance show wide individual variations in the magnitude of dominance, a variation which is not accurately indicated by describing an order of priority or general relative aggressiveness. (1942a)

> In a concerted attack on the group, individuals may be killed, but this is incidental to the fact that the group survives and the species is perpetuated. (1942b)

In the years after completing his investigations of sexual behavior on the rhesus of Cayo Santiago, Carpenter's research was devoted primarily to educational films and television. He produced several documentary films on free-ranging primates, recensused the howler monkeys on Barro Colorado, and wrote several reviews of behavior in free-ranging primates. In 1971, Carpenter undertook his last fieldwork. He collaborated with José Delgado and others in their study of gibbons on Hall's Island, Bermuda. The object of the study was to induce lasting modifications of free-ranging behavior by means of remote, long-term stimulation of the brain.

Starting in the mid-1950s, research on free-ranging primates has been doubling about every 5 years, much faster than science as a whole, which doubles every 15 years. By comparison, at the time of Carpenter's early investigations, in the 1930s, no one else was actively engaged in such studies. Under the circumstances, his accomplishments are remarkable.

— *Stuart A. Altmann*

See also **Field Methods; Primate Behavioral Ecology**

Further Readings

Carpenter, C. R. (1964). *Naturalistic behavior of nonhuman primates.* University Park: Pennsylvania State University. [Note: Carpenter's major primate field study reports and several reviews are reprinted in this volume]

Haraway, D. (1983). Signs of dominance: From a physiology to a cybernetics of primate society, C. R., Carpenter, 1930–1970. *Studies in the History of Biology, 6,* 129–219.

Montgomery, G. M. (in press). Place, practice, and primatology: Clarence Ray Carpenter, primate communication and the development of field methodology, 1931–1945. *Journal of the History of Biology.*

Rawlins, R. G., & Kessler, M. J. (Eds.). (1986). *The Cayo Santiago macaques: History, behavior, and biology.* Albany NY: State University of New York.

Carson, Rachel (1907–1964)

The mother of the 20th-century environmentalist movement, Rachel Carson shed light upon the scientific as well as philosophical misconceptions embraced by Western society about humanity's relationship with the ecosystem. During an era in which the practices of science went almost unquestioned, Carson made known to all the hazardous effects of pesticides in her then-controversial book *Silent Spring* (1962). Not only did Carson spur the prohibition of such indiscriminate "biocides" as DDT

(dichloro-diphenyl-trichloroethene), but even more awesome was the birth of the environmentalist movement that followed. Carson showed the world the true nature of our roles as participants within a delicate and intricate ecosystem.

Carson was foremost a writer and originally envisioned herself as an English major at Pennsylvania College for Women (PCW) (now Chatham College). She also held a strong love and interest for biology, which stemmed from her childhood in Springdale, Pennsylvania. There, she would accompany her mother on many of her bird-watches and nature studies along the Allegheny River. In school, with the support of a professor, she eventually switched her major to zoology. After completing her degree at PCW, she went on to receive her master's degree from Johns Hopkins University (1932) and soon after discovered her adoration for the sea, studying at Woods Hole Biological Laboratory and Johns Hopkins.

She began her career as a radio scriptwriter for the Bureau of Fisheries in 1935 (which became the U.S. Fish and Wildlife Service in 1939) and was given permanent appointment as junior aquatic biologist the following year. She held one of two professional positions occupied by a woman at the agency.

She published her first book, *Under the Sea-Wind,* in 1941, which entailed the story of a sea bird's arduous migratory journey from Patagonia to the Arctic Circle. It received great critical acclaim, but little public attention due to the ensuing World War II.

Carson became the editor in chief by 1949 of all publications put out by the agency and participated in major conferences regarding the latest scientific and technological developments. Slowed by her increased responsibilities with the agency, Carson published *The Sea Around Us* in 1951, 10 years following her first book. The book discussed the latest research in oceanography and earned Carson overwhelming critical acclaim as well as literary vogue. Her newly gained celebrity status made her following book, *The Edge of the Sea* (1955), an unsurprising best seller. Her literary popularity came from her ability to translate copious amounts of scientific information into lyrical prose that could appeal to the public eye.

Carson also had a secondary project she had been working on, dealing with the persistent ecological damage caused by the misuse of pesticides. She

submitted an article about the observed dangers of pesticides to 15 journals and periodicals, including *Reader's Digest* and *National Geographic,* and was rejected by all. Finally, *The New Yorker* recognized the importance of her work and serialized *Silent Spring* in 1962. Well before *Silent Spring* was published, Carson made her ecological campaign well-known and accordingly received abundant threats from not only pesticide corporations but colleagues as well. The threats proved futile against Carson's everlasting ardor for ecology.

Silent Spring and Carson's later testimonies before Congress challenged the government's approval of certain nonspecific pesticide usage and conveyed the uniquely ecological idea that humanity was just as susceptible to the hazards of pollution as any other element of the ecosystem. Just having ended World War II and with the advent of the Cold War, Western society was fixated upon the potentials of science and technology. This awe of industrial science heralded an ecological view of humanity as a controlling figure over nature, growing more and more omnipotent with every discovery and breakthrough. Carson humbled these sophisms with startling data about the affects of manmade pollutants on the ecosystem as well as the human body. Her work led directly to the

prohibition of DDT and several other nonspecific "biocides" (a word she coined).

Prior to Carson, the field of ecology held little scholarly recognition for its broader take on the processes of the environment. Carson's writings not only gave the science scholarly legitimacy but also popularized it among the masses. So recognized were her writings that they inspired the beginnings of the modern environmentalist movement, which evaluates environmental issues from an ecological view. The significance of her work to humankind was monumental in presenting controversial concepts that today seem common sense to a generation born into an environmentally aware society. Rachel Carson was not the first to notice the encroaching dangers of our ecological malpractices, but she was the first to successfully and comprehensibly convey her concerns to a society too self-infatuated to notice on its own.

— *Andrew P. Xanthopoulos*

See also **Ecology and Anthropology**

Further Readings

Carson, R. (1989). *The sea around us* (Special ed.). New York: Oxford University Press.

Carson, R. (1998). *The sense of wonder.* (Reprint ed.). New York: HarperCollins.

Carson, R. (2002). *Silent spring* (40th anniv. ed.). New York: First Mariner Books.

Lear, L. (1997). *Rachel Carson: Witness for nature.* New York: Henry Holt.

Carter, Howard (1874–1939)

There have been a number of momentous findings as a result of consistent and diligent archaeology efforts. However, certainly one of the most impressive and important of those findings is the excavation relating to the tomb of Tutankhamun due to the energetic efforts of Howard Carter, an individual who not only discovered a historical entity of great magnitude but also taught us lessons about the importance of continuing efforts to uncover the past in order to inform the present and future.

Howard Carter had an interesting background, which may have impelled him to his adult profession

Source: Courtesy of the Lear/Carson Collection, Connecticut College.

as an archeologist. He was born in a small town in Kensington, London, England, the son of a father who was an artist who specialized in animal paintings. Perhaps his father did influence him with this background, but the son who was later to become internationally famous found himself at the relatively young age of 17 going to Egypt, where he was hired to help record information about tombs. In 1900, he was appointed Chief Inspector of Antiquities to the Egyptian government for Upper Egypt, but a short time later, in 1904, took on another responsibility as Chief Inspector for Lower Egypt. In 1909, he became associated with the Earl of Carnarvon, who decided to finance some archeological work, and Carter was given the chance to again pursue his professional interests. His efforts in unearthing the famous Tomb of Tutankhamun followed the beginning of his association with the Earl of Carnavon and became perhaps became the crown jewel of his professional success.

We have much for which to thank this great archeologist by the name of Howard Carter. He has contributed lasting rewards about a subject that remains of immense interest to people throughout the world. Obviously, his findings have also increased knowledge about a time that few of us know a great deal. Of course, there is also a lesson that all of us can learn from Howard Carter no matter what our intellectual pursuit may be, and it is that diligent, persistent effort often does have its rewards.

— *William E. Kelly*

See also **Egypt, Ancient; Egyptology**

Further Readings

Ford, B. (1995). *Searching for King Tut.* New York: W. H. Freeman.

James, T.G. H. (2001). *Howard Carter: The path to Tutankhamun.* Cairo: American University in Cairo Press.

Reeves, N., & Taylor, J. H. (1993). *Howard Carter: Before Tutankhamun.* New York: Abrams.

Winstone, H. V. F. (1991). *Howard Carter and the discovery of the tomb of Tutankhamun.* London: Constable.

Caste Systems

The term *caste* comes from the Portugese *casta* (breed, lineage) and was coined by Portuguese travelers to India in reference to the social, economic, and religious system they witnessed. The traditional Hindu term is *varna,* and its earliest meanings include color, covering, tribe, and species. The caste system is easily the most controversial aspect of the Hindu tradition. It is defended as a religious expression of one's progression toward liberation or as a formalized division of labor. Alternatively, it is condemned as a form of systematized oppression and racism. Either way, it generates emotional and rhetorical assertions on both sides of the discussion.

The first mention of the fourfold division of society that serves as the basis of the system is found in the Rig Veda, one of the most ancient and sacred of the Hindu holy writings. The earliest elucidation of the system appears in the *Laws of Manu,* the authoritative law book (3rd century BCE–3rd century CE) that sets forth the duties and restrictions for members of each *varna.* For orthodox Hindus, this text remains the ultimate authority in most caste matters. In addition to varna, there are several additional subcategories in the system, especially *jati* and *gotra.* Each category influences aspects of the lives of its members. Taken together, they have traditionally predetermined, to a large extent, almost every facet of the lives of Hindus in India.

Varna (caste)

It is uncertain as to when one's varna became determined by birth rather than occupation and role in the society. However, in early writings claiming to contain the words and teaching of the Buddha, already there are criticisms of the system and of deciding one's worth based on birth rather than actions. Nevertheless, once birth became the primary, or even sole, determinant, and caste became a closed group, it also came to determine, for the most part, one's occupation and possibilities for economic advancement, one's sphere of association and access to social involvement, one's marriage choices, and finally one's place in the developing religious hierarchy and access to religious activities and rituals.

The ancient system divided society into four varnas. The *Brahmin* was the priestly and learned caste. The duty of its members was to teach the others knowledge and wisdom and to oversee and lead the religious life of the community. The warrior and rule caste was called *Kshatriya.* The duties of its members were to protect and rule, in order to maintain a safe and stable society. The *Vaisya* were the agriculturalists and merchants. They grew and provided food and other necessities to the community. The lowest caste was the *Shudra,* which consisted of the laborers and servants. Their duty was to serve the other castes by doing all the menial and difficult physical tasks. Eventually, a fifth caste was added, the *Panchama,* or *Antyaja,* the "Untouchable." Members of this caste were actually placed outside the system *(avarna),* either because of alleged transgressions made against established rules of conduct or because of the defiling nature of their occupations. Their duties involved cleaning up after all the other castes and undertaking those tasks that were too impure and polluting for the others castes to perform.

Thus, of the five castes, only members of the upper four are considered varna Hindu. Of the four, only the upper three are called "twice-born." This term comes from a rite of passage ritual available to their male members, which qualifies them to learn Sanskrit, study the sacred scriptures, and participate in Vedic rituals. The mark of this status is the donning of the sacred thread, known as *yagyapavitra* or *janeu.* Of the three twice-born castes, the upper two are called "high caste," and some religious rituals and institutions have been limited to their male members only.

The religious justification for varna is closely tied to the concept of transmigration of the soul. It is based in the belief that the individual soul experiences countless lifetimes in its path to enlightenment

and that one's birth in the present life is a direct consequence of knowledge gained and karma accrued from previous lives. Thus, one who has lived many lifetimes and has advanced on the path toward wisdom and enlightenment will be born into a higher caste, while a soul that is not as far along the path or that has accrued appreciable negative karma from past bad actions will be born into a lower caste. Therefore, the varna into which one is born reflects the dominant qualities of the individual, with those born into the higher castes having more positive and refined qualitites and characteristics, while those born into the lower castes have more base, negative, and unrefined characteristics.

Jati (subcaste)

The true functional unit of the caste system for everyday life in India is the *jati,* or subcaste, of which there are literally thousands. The development of individual jatis over the millennia is the result of many factors, including the assimilation of foreign groups who migrated to India in sufficient numbers to create their own communities, as well as the development of new religious sects that would also form their own endogamous communities. Primarily, however, jati formation seems to have been occupational. When a particular craft was developed, those families whose members focused on performing the skill would typically come to be identified with it, and eventually a new subcaste would form within the larger caste structure. In many ways, this development mimicked that of the European guild system, in which artisans and craftsman formed associations based on their specific skills and specializations. Because each craftsman tended to teach his skill to his offspring, one's craft was often the result of birth. In a similar fashion, jati, like varna, apparently began as a division of artisan professions but ended up a birth determined category. The elaboration of jatis brought with it the development of reciprocal relationships between the various subcastes, both within a particular varna as well as between them. The common Indian term used to refer to the system of occupational and reciprocal interrelationships is the *jajmani* system. Although there was a great proliferation of jatis, mostly within the merchant and servant castes, there was very little change in their status within the overall caste hierarchy. With exceptions, jatis within a caste have generally existed on a horizontal relationship with each other, as opposed to a vertical one.

Although many no longer pursue their traditional crafts, jatis continue to exist with their own distinctive customs, rules, and internal structural hierarchy. While there has always been, for various reasons, some degree of intermarriage between jatis in the same varna, they have tended to remain endogamous, which keeps the relationships of the members close-knit. Jatis are typically controlled by local and regional caste organizations and boards, or *panchayat*s, and leaders tend to have a great deal of influence in the internal functioning of the group and the activities of its members. For example, when Mahatma Gandhi wished to travel to England to get a law degree, his local subcaste leaders forbade him to do so. In his day, there was a religious restriction against crossing the ocean, since it was believed that one would not be able to adhere to purity rules on the journey. Gandhi went against the prohibition and was ostracized from his jati.

Gotra

Each jati is made up of multiple *gotra*s. A gotra (literally, cowshed) is a patrilineal clan group that claims ancestral lineage to famous ancient figures. Brahmin gotras, for example, trace their ancestry to one of eight sages believed to have been connected to portions of the Vedas, the ancient Hindu scriptures. Initially, the only varna that had gotra was Brahmin, but eventually all castes, nearly all jatis, and even Jains, adopted the tradition. Today, gotras number in the thousands, and some jatis have up to 100 or more.

Gotras are also important aspects of identity. In some, male members would wear distinctive garb or hairstyle to distinguish themselves from other gotras. Various orthodox rituals, especially rites of passage, require both name and gotra identification of the beneficiary as a part of the preparatory rites. When a jati panchayat meets, a member or leader of each gotra is supposed to be represented. When one has a dispute with another member of the same jati in a village, it is often the gotra heads who will be called upon to mediate. In some jatis, decisions by gotra heads carry the weight of law and are rarely disputed.

Because gotras are viewed as extended families, they are exogamous. Marriage, then, occurs within

one's jati, but outside one's gotra. Like last name, a female adopts the gotra of her husband. Most jatis strictly prohibit marriage within one's gotra but allow marriage to a member of any other gotra within the jati. One of the only added limitations for most jatis is between offspring of a brother and sister, even though the children are of different gotra.

Caste as Indian, Caste as Hindu

There has been an ongoing debate for several decades on the role of caste in India, as opposed to caste in Hinduism. This is because caste can be found in non-Hindu religious traditions in the country as well. Although many will not admit it, caste plays a role in Buddhism, Islam, and Christianity in India. It is true that it is a holdover from caste consciousness among Hindus, but it has clearly become a reality in those traditions. At the same time, Hinduism outside of India is essentially caste free. Thus, caste as a social hierarchy and ranking has become more endemic to the land than to the religious tradition. For those who are against caste, this is both positive and negative. It is positive in that it shows that Hinduism can exist without caste, but it is negative in that it suggests that India may not be able to exist without it, at least rural India.

Caste in Modern India

The varna system continues to have its supporters, especially in the rural areas, especially those at the top of the hierarchy. They see it as necessary for social stability and for the maintenance of traditional values and institutions. At the same time, those who defend the system generally acknowledge that the long-standing and inherent prejudice against avarna Hindus should be removed. They envision a system that returns to one based strictly on a division of labor. The problem here is that occupational exclusivity of subcastes has been dying away since the 19th century. Some of the only professions that remain primarily caste or subcaste restricted include the work of priests at the top and most avarna occupations at the bottom. Those at the bottom of the system, on the other hand, see nothing positive in it at all. While the occupational elements of the system are ending, the inherent social prejudices connected with it are more resistant to change.

Diaspora Hinduism and Caste

In the early 1800s, the British government began the system of indentured servitude, whereby it sent more than one million impoverished, primarily rural, Indians to work British plantations in the Caribbean, Fiji, Mauritius, and South Africa, creating the Hindu Diaspora. The vast majority of Hindus who participated were from Shudra or Untouchable families and did so both for economic as well as social reasons. They sought to craft a new life for themselves in their new lands, and they left caste identity behind in the process. Consequently, Diaspora Hinduism is essentially caste free. Not only has this not hurt the practice of Hinduism in Diaspora lands, but it has benefited it in many ways. The intercaste tension and discrimination that seems natural and commonplace does not exist, and this allows Hindus in those lands to more freely interact, intermarry, and work together toward common goals.

Challenges to Caste

Ever since the early days of the development of Buddhism, more than two millennia ago, there has been criticism or the caste system. Buddha himself is said to have rejected the system for his followers. Nearly all the founders of new religious movements since that time, especially devotional movements, have echoed the Buddha's call for rejection of caste. Yet it persists. However, as Indian society is becoming more urban, adopting Western-style education and social values, the caste system is becoming less and less relevant. In the larger cities, socioeconomic class has become the basis for the hierarchy, and it appears that a similar pattern will eventually occur in villages as well. Nevertheless, the varna system still has a great deal of influence in India even though the original purpose of the system has been lost. For the most part, all that remains is a purposeless hierarchical structure that continues to keep those on top in power and those at the bottom relatively powerless.

— *Ramdas Lamb*

See also **Buddhism**

Further Readings

Kolenda, P. (1981). *Caste, cult, and hierarchy.* Merrut, India: Folklore Institute.

Sharma, K. L. (1986). *Caste, class, and social movements.* Jaipur, India: Rawat.

Zinkin, T. (1962). *Caste today.* London: Oxford University Press.

Catastrophism

The principle of catastrophism states that all of the Earth's surface features and topography were produced by a few great catastrophes throughout history. These catastrophes were thought to have been so enormous in scale that no ordinary process could have initiated and supernatural forces had to be invoked. However, this was the philosophy of scientists in the 17th and 18th centuries, whereas the modern understanding of the principal relies very little on biblical providence. Not only were these land-altering catastrophes believed to be the fabricators of all the mountains, valleys, seas, and deserts, but the original catastrophism concept also implies that they need to have occurred in the relatively recent history so that they would fit the scriptural chronology of the Bible. The contemporary concept of catastrophism now allows for its rival principal, uniformitarianism, to overlap and combine to form a more accurate portrait of geologic change. Although the slow, uniform processes that operate in an almost regular, cyclic manner are responsible for most of the geology we observe on the planet, improbable and unique catastrophic events can and have radically altered this path of slow change.

When geologists study the vast extent of time recorded in the rock layers, evidence for catastrophes that would be improbable in the span of human history becomes highly abundant in the nearly 4.6 billion year history of the Earth. Evidence for such great catastrophes includes giant meteor impact craters from large bolide objects that have impacted the planet. This caused the vaporization and upheaval of large portions of land and earth that then fraught the atmosphere with accumulated soot and covered the earth, choking out the sunlight and slowly raining back down to earth. Another example would be huge volcanoes that have belched enormous amounts of noxious gas and dust into the atmosphere. It's easy to see how calamities such as these created havoc and instantly, in terms of geologic time, forced the extinction of entire ecosystems and many forms of life on Earth. Such events would assuredly bring about global change and permanently affect the course of geology and speciation on the planet. However, when catastrophism was first proposed as a singular reason for all the variety of land forms we see on Earth today, there was no evidence, aside from biblical accounts, for any such devastation having occurred. In the 17th century, there was little reason to worry about this void, simply because the secular view and the spiritual view of Earth were one and the same.

The leading champion, defender, and primary composer of the principle of catastrophism was Baron Georges Leopold Chretien Frederic Dagobert Cuvier (1769–1832). The French Cuvier was one of the leading geologists of his time, the foremost pioneer of comparative anatomy, as well the father to an entire branch of geology known as *vertebrate paleontology*. Although he did not accept evolution, but rather favored catastrophism, Cuvier was the first to authoritatively insist that species can go and have gone extinct. His high esteem in scientific society allowed Cuvier to suppress opposition to catastrophism while he was alive. He believed that the Earth was extremely old and that the conditions had changed relatively little since its formation; however, periodic "revolutions" would disturb the harmony and cause all of the changes we see in the fossil record. Living at the time he did, Cuvier was familiar with "revolutions," whereas he disliked the term *catastrophism* because of its supernatural distinction. Although he was a lifelong member of the Protestant church, Cuvier never identified any of his "revolutions" with acts described in the Bible. He regarded the turnovers as events with natural causes, but considered their causes a mystery and a geologic puzzle. Many later geologists, including the famous Rev. William Buckland from England, concluded from Cuvier's work that the most recent "revolution" must have been the biblical flood. This hypothesis was enjoyed until a former protégé of Cuvier, Luis Agassiz, determined that the "flood deposits" were actually glacial deposits from the last Ice Age. Cuvier's impact on geology, and science as a whole, can never be overestimated. Cuvier brought catastrophism to its

height in the annals of science, where another student of his, Léonce Élie de Beaumont, carried it to nearly the end of the 19th century.

The harsh lack of evidence for these catastrophes has plagued the theory from its conception. The paradigm of uniformity held from 1850 to 1980, as most geologists supported catastrophism's rival, uniformitarianism, largely due to the lack of verifiable, concrete evidence for sudden devastation on a global scale. A dinosaur paleontologist named Walter Alvarez helped forge the ideas of uniformitarianism and catastrophism into the modern synthesis that is learned today. Alvarez was curious about a distinct clay layer a rough centimeter thick at Gubbio, Italy. The layer was highly enriched with a rare noble metal Iridium, which is normally completely absent from the crust of the Earth. This layer appeared nearly everywhere at what is known as the *KT boundary.* This boundary marks the demise of the dinosaurs 65 million years ago at the end of the Mesozoic and can be identified at over 50 separate locations on Earth. The source of such a concentration of this element could only be from the Earth's core or from a cosmic source such as a meteor. Alvarez eventually determined that the layer was created from an impact of a 10 km asteroid that accompanied the extinction of the dinosaurs. Soon after this discovery, a hunt for impact locations was launched that scoured the globe. Known meteor sites yielded evidence such as tektites (glass balls), stishovite, and shocked quartz grains, which were used to identify new impact craters. After several new impact craters were uncovered, the true culprit and murder of the Mesozoic was discovered at Chixculub of the Yucatan Peninsula in the Gulf of Mexico. This was a defining moment for catastrophism and for all of geology.

The modern synthesis of catastrophism has a history that stretches back to when humans first wondered why the land looks the way it does. Catastrophism has masked many philosophies and hidden agendas of persons from before geology was even a science. For 130 years, catastrophism has been shamed as religious fallacy and has now come full circle to be appreciated and accepted as part of Earth's geologic cycle.

— *Christopher Cody Matson*

See also **Big Bang Theory; Extinction**

Further Readings

Ager, D. (1993). *The new catastrophism.* New York: Cambridge University Press.

Albritton, C. C. Jr. (Ed.). (1975). *Benchmark papers in geology* (Vol. 13). Stroudsburg, PA: Dowden, Hutchinson & Ross.

Berggren, W. A., & Van Couvering, J. A. (Eds.). (1984). *Catastrophes and earth history.* Princeton, NJ: Princeton University Press.

Categorical Imperative

The concept of categorical imperative is one of the most important notions of Kant's practical philosophy. This concept falls under the Kantian project of the foundation of morality. To be precise, Kant does not attempt to create a new morality, but to propose a new formulation of it. From this point of view, the categorical imperative must provide a criterion that makes it possible for any human to differentiate with certainty the moral actions from those actions that are not moral.

Generally, Kant calls "imperative" the formula of a command, that is, the representation of an objective principle that is constraining for the will.

Since the human will is subjected to subjective motives that stem from the sensibility, the actions that are objectively necessary remain subjectively contingent so that their necessity appears for the agent as a constraint. Consequently, all imperatives are expressed by the word "ought" and indicate the relation of an objective law of reason to a will, the subjective constitution of which is not necessarily determined by this law.

Kant distinguishes two sorts of imperatives: hypothetical and categorical. When the imperative expresses the practical necessity of an action only in order to obtain something desirable, the imperative is *hypothetical* (these are imperatives of skill and of prudence). When the imperative expresses the practical necessity of an action as good in itself and for itself, the imperative is *categorical* and is a law of morality.

There is no difficulty in regard to the possibility of hypothetical imperatives: The constraint on the will is simply the application of the principle: "Whoever wills the end, wills also the means in his power that are indispensably necessary thereto." By contrast, the

possibility of the categorical imperative presents a real difficulty because the necessity of this sort of imperative does not depend on any antecedent condition or of any consecutive end: This necessity unconditionally connects the will with the law.

To resolve this difficulty, Kant suggests considering if the conception of a categorical imperative would not supply the formula with it. Since beside the law, the categorical imperative contains only the necessity that the maxims shall conform to this law, and since the law contains no conditions restricting it, there remains only the general statement that the maxim of the action should conform to a universal law. Consequently the (first) formula of the categorical imperative is: *Act only on that maxim whereby thou canst at the same time will that it should become a universal law*.

The categorical imperative requires the ability to will that a maxim of one's action should be a universal law. To clarify this claim, we can take the four examples of maxims-duties (suicide, false promising, noncultivation of one's natural talents, and indifference to the misfortune of others) that Kant mobilizes. It appears in these examples that a maxim can be raised to the universality of a law, when we can conceive and/or want it without contradiction. Exactly, Kant distinguishes the action's maxims that cannot without contradiction be *conceived* as a universal law; these are the action's maxims that are *logically* contradictory (these maxims violate strict or rigorous [inflexible] duty, that is, the duty that admits no exception in favor of inclination), and the actions for which it is impossible to *will* that their maxim should be raised to the universality of a law; these are the actions maxims that are *practically* contradictory (these maxims violate the laxer, meritorious duty, that is, the duty whose application's modalities are left for the consideration of the agent). It is the practical noncontradiction, more than the logical noncontradiction, that makes it possible to distinguish the morally defended maxims of the morally allowed maxims (duties). It is thus false to consider, as Hegel does, for example, that the formal identity and the empty logicism of Kant's morality authorize the universalization of any maxim of action. From Kant's point of view, it is the will, more than the understanding, that must refuse to be contradicted by setting up certain maxims in universal laws.

From this first formula of the categorical imperative, Kant deduces three other formulae, which "are at bottom only so many formulae of the very same law and each of itself involves the other two": Act (2) as if the maxim of thy action were to become by thy will a universal law of nature; (3) as to treat humanity, whether in thine own person or in that of any other, in every case as an end withal, never as means only; (4) as if he were by his maxims in every case a legislating member in the universal kingdom of ends.

The four formulae of the categorical imperative are complementary. To say that our maxims must always be wanted, with regard to form, without contradiction (logical or practical) like universal laws of nature, to say that they must always respect the human dignity as end in itself or to say that they must always allow the will to represent itself as legislating member in the kingdom of ends, it is to say the same thing.

These four formulae are simply various manners of expressing the law of the autonomy of the will. So, the first two formulae of the categorical imperative privilege the formal criterion of the maxim, its conformity with the moral law, the fact that it can be desired without contradiction (logical nor practical) like an analog of a natural law. It is here that "Kantian formalism" takes shape: The will must be determined by the only *form* (universalizable) of its maxim, that is to say, by a independent rule of the objects of the will, abstraction made of the action's matter, of any material motive, by the pure respect for the *formal* principle a priori of the moral law.

On the other hand, the two last formulae privilege the subjective aspect of the ends, of the matter of the will. By giving to the maxims, morally allowed, for object the rational being as end in himself and as member legislator of kingdom of ends, the third and the fourth formulae underline the concrete dimension of the maxim.

Finally, the formalism of Kantian morality does not mean that our actions should not take place in the sensible world, but only that they should not originate there, that the moral action does not draw its value from the purpose which it reaches, but from the form (universalizable) and the quality (disinterested) of the maxim that determines the will. That being said, Kant does not claim that autonomy must regulate *all* our actions. Beside the categorical imperative, which provides us a certain criterion to recognize the actions that are moral and those which are not moral, there is place for hypothetical imperatives (technical and pragmatic), which include the inclinations and the human desires, the advancement of happiness.

Moreover, against the charge of formalism generally carried against Kantian morality, it is fundamental to see that Kant's practical philosophy is not reduced to a simply formalism, that the formal moment, the moment of the foundation, is only the first moment, that before it is to be *applied* the morality must be founded. The "formal" moment is the condition sine qua non of practical philosophy—only this moment guarantees its objectivity, universality, and apodicticity—but it does not exhaust it: It must be necessarily followed by a second moment, the moment of the application (metaphysics of morals and anthropology).

— *Sophie Grapotte*

See also **Kant, Immanuel**

Further Readings

Allison, H. (1990). *Kant's theory of freedom.* Cambridge: Cambridge University Press.

Beck, L. W. (1960). *A commentary on Kant's critique of practical reason.* Chicago: University of Chicago Press.

Nell, O. (1975.) *Acting on principle. An essay on Kantian ethics.* New York: Columbia University Press.

Paton, H. J. (1971). *The categorical imperative: A study in Kant's moral philosophy.* Philadelphia: University of Pennsylvania Press.

Cavalli-Sforza, Luigi Luca (1922–)

L. Luca Cavalli-Sforza was born on January 25, 1922, in Genoa, Italy, and is variously referred to as a pioneering population geneticist, the founder of genetic anthropology, the person who brought together modern genetics, archaeology, linguistics, and history, and one of the most distinguished geneticists in the world. He received an MD degree from the University of Pavia in 1944; went to Cambridge University for a few years, where he studied bacterial genetics; returned to Italy in 1950, where he served as director or chair of several genetic research positions; and in 1970 was appointed professor of genetics at Stanford University in Palo Alto, California. He retired in 1992 but is a professor emeritus at Stanford, is the principal investigator at Stanford's Human Population Genetics Laboratory, and was a founder of the Human Genome Diversity Project, which seeks to collect a genetic database for medical purposes from throughout the world, especially from indigenous groups, which are relatively unmixed genetically. He is a member of the U.S. National Academy of Sciences and is a foreign member of Britain's most prestigious scientific organization, the Royal Society.

As early as the late 1940s and early 1950s, he was the first geneticist to suggest that genes of contemporary populations could be analyzed to obtain a historical record of humans. At first, he analyzed human blood groups, but then, as genetic research advanced, he changed to DNA for his analyses.

He introduced the methodology of studying gene frequencies in different locations to show the historical migrations of peoples throughout the world. He disagreed with archaeologists and cultural anthropologists who focused only on culture but emphasized that archaeology and the spread of agriculture were in agreement with migration patterns suggested by the analysis of gene distributions. He strongly supports a multidisciplinary approach and has analyzed the degree of relationship between genetic diversity and linguistic diversity. He argued for demic diffusion, that people with advanced knowledge introduced their knowledge and their subsequent reproductive success into an area via migration.

The African origins of modern humans, the migrations out of Africa that populated the world, the dates and locations that go with all major world migrations, and the contemporary distribution of genes in the world have all benefited tremendously from Cavalli-Sforza's genetic maps, genetic distance charts, and other publications. Nearly every recent book on human origins, evolution, or migration is based partly on Cavalli-Sforza's research.

Cavalli-Sforza has authored or coauthored a number of books, including *The History and Geography of Human Genes* (1994), a 1,000-page atlas of migrations and genetic diversity throughout the world. *The Great Human Diasporas: The History and Diversity of Evolution* (1995), written for the nonspecialist, summarizes the lifework of Cavalli-Sforza and uses genetic data to construct a tree of all human populations. *Genes, Peoples, and Languages* (2000) summarizes Cavalli-Sforza's lifetime work and shows how he

has synthesized genetic, linguistic, and archaeological data. *Consanquinity, Inbreeding, and Genetic Drift in Italy* (2004) is based on a team project that Cavalli-Sforza began in 1951 and shows the results of a massive study of 8,000 communities in Italy on topics specified in the title. Other books also have furthered genetic knowledge.

— *Abraham D. Lavender*

See also **Genetics, Population; Human Genome Project**

Further Readings

Cavalli-Sforza, L. L. (2000). *Genes, peoples, and languages.* New York: North Point Press.

Cavalli-Sforza, L. L., & Cavalli-Sforza, F. (1995). *The great human diasporas: The history of diversity and evolution.* Reading, PA: Addison-Wesley.

Stone, L., &. Lurquin, P. F. (2005). *A genetic and cultural odyssey: The life and work of L. Luca Cavalli-Sforza.* New York: Columbia University Press.

Cave Art

In the broadest sense, cave art is identical to rock art. In a narrow sense, it is painting on cave walls, ceilings, remote and hard-to-reach places; it is defined as nonmobile or monumental in contrast to small transportable objects like statuettes, bone engravings, and so on.

Origin and Evolution of Cave Art

The earliest displays of artistic activity or "natural creativity" of prehistoric populations are seen in Aucheulean times. In that period, the animal was used in ceremonies as an image of special kind. For that purpose, animal carcasses or bodies (or their most important fragments, often head only) were brought to the caves, where people lived, and usually were displayed at specially prepared places, situated at the central part of the cave or next to the entrance (Torralba in Spain, Leringen in Germany). Sometimes, numerous animal fragments were placed at caves used only for that purpose (i.e., Early Paleolithic Bear Caves—Drahelauh in Switzerland, Regourdout in France).

The next period of cave art evolution, or the stage of the "natural model," as argued by Russian archaeologist A. Stolyar, is marked by first attempts of animal body (or its fragments) simulation. It begins with the exhibition of the animal head on at first natural and later artificial rock platforms, which at the end of this stage were accompanied by primitive clay simulations of headless animal bodies; sometimes such compositions were covered by natural animal hide (Bazua in Italy, Peche-Merlet in France).

Such activity soon develops into the creation of three-dimensional sculptures made of clay (the "clay period"). Their size, at first close to real, decreased, leading to the bas-relief genre of visual art (Tuque d'Odoubert in France, Castere-Godena in Italy). This is most likely when statuettes and other forms of mobile art began to spring up (Dolni Vestonice, Pavlov).

The most brilliant examples of cave art in the form of paintings on cave walls are connected with the stage of "monumental animalistic masterpieces," after A. Stolyar, within the last 20,000 years of the Upper Paleolithic. During that time, prehistoric graphics went through many changes, which schematically could be represented as follows: profile contours of static "bipedal" figures shaped by stable line; inner shading, detailing of the contour; simple composition of similar animals or their pairs; painting of the contour in the form of monochromatic spots; "fresco" and color tone technique; appearance of dynamics and perspective, depth of image; complex compositions consisting of different figures (sometimes human being included) on the earth surface; and frontal perspective composition.

Function and Historical Interpretation of Cave Art

In contemporary prehistory, cultural anthropology, and art studies, there are few attempts to conceptualize cave art in all its historical, technological, and stylistic forms. Most existing cave art interpretations usually involve a separate case study, with scarce analogies in neighboring territories. Nonetheless, a series of theories and hypotheses have been elaborated.

The *magical (or ritual) explanation* for cave art was one of the earliest speculations of its function. The animal was the center of ritual activities (totemic, magic, and other forms) of Paleolithic hunter-gatherers; animal images on cave walls most probably were realistically identified with live animals. Inherent in

the function of prehistoric cave art is the principle of analogy, which implies that one can control the object if one controls its image.

The *ideological explanation* is based on the stylistic homogeneity of cave art and the absence of painter personality. Most images are not connected with particular objects or animals and look like generalizations, with some slight variations. It testifies to the predominance of collective ideas and collective consciousness.

Source: © Kathleen Cohen.

The *social (ethnic) identification* function of cave art is associated with its ideological explanation. As group symbols were the main subject of cave art, their creation could be used for expression of any form of collective identity (kin, community, ethnic, ritual) and were deeply connected with ritual activity of these populations.

The *communicative and memorial (or mythological) explanation* is associated with the previous theories but stresses that the symbols and images of art objects could reflect collective unity and integrity only if they expressed a connection with preceding generations, the early ancestors. It also implicates the informative function of prehistoric cave art and is the background for the cognitive explanation of cave art.

The *cognitive explanation* of cave art concentrates on the "information flow" throughout generations, which could be transmitted by images. Interpreting art in general as a peculiar form of world knowledge and information storage, it emphasizes that only important hunting species were the subject of cave pictures and that prehistoric painters were well-informed about animal anatomy and hunting means. Such information could be used in the preparation of adolescent members of the community for the various initiations. Contemporary postmodernists also suggest the cognitive significance of prehistoric cave art images, regarding them as texts that could be deciphered or images that could be read in order to comprehend past culture.

The *ecological-demographic explanation* is based on the idea that climate deterioration resulting from the last glaciation (Middle Paleolithic), which caused food and other sources shortage and, in turn, had forced people to move to more suitable areas for their subsistence territories. Their concentration at a few niches demanded strict allocation of their foraging territories, which was accompanied with groups' inner integration and consolidation; thus the necessity of marking territory borders and the origin of cave art.

The *aesthetic explanation* ("art for art," or "game hypothesis") emphasizes that the broad emotional sphere of prehistoric populations displayed itself in the process of image stylization and creation of monumental animalistic compositions of high aesthetic value. It could not be ruled out, at the same time, that the artistic process was one of many forms of Paleolithic hunters' leisure.

In many modern case studies, researchers have tended to emphasize the primacy of the symbolic function of cave art and its connection with ritual activity of prehistoric communities. The complex character of such compositions, along with their remoteness, which ensured high secrecy of the process, supports this hypothesis. Later, with polychromatic images and improvement of forms and technique of image making, an aesthetic perception was forming, and it may be that only since that time can one argue the existence of "art." At the beginning

of the 21st century, new discoveries of cave art in Australia, Asia Minor, and other parts of the world have caused many researchers to recognize the plurality of backgrounds, places, and reasons that influenced cave art origin and defined its historical function.

— *Olena V. Smyntyna*

See also **Petroglyphs; Pictographs; Rock Art**

Further Readings

Banh, P. G. (1995). Cave art without the caves. *Antiquity, 69,* 263.

Gamble, C. (1991). The social context for European Paleolithic art. *Proceedings of the Prehistoric Society, 57,* 1.

Mithen, S. J. (1991). Ecological interpretations of Paleolithic art. *Proceedings of the Prehistoric Society, 57,* 1.

Mithen S. J. (Ed.). (1998). *Creativity in human evolution and prehistory.* London: Routledge.

Cazden, Courtney B.

Courtney B. Cazden is an educational sociolinguist at the Harvard Graduate School of Education. Since the 1970s, she has been a key figure in the ethnography of schooling, focusing on children's linguistic development (both oral and written) and the functions of language in formal education, primarily but not exclusively in the United States. Combining her experiences as a former primary schoolteacher with the insight and methodological rigor of a trained ethnographer and linguist, Cazden helped to establish ethnography and discourse analysis as central methodologies for analyzing classroom interaction. Her work displays sensitivity and insight to the communicative demands made on both teachers and students in classroom settings, especially those involving ethnic minority students.

Formal schooling involves the mastery not only of academic content but also of the particular forms of discourse that are considered legitimate for classroom use. These forms are seldom explicitly taught; rather, they form part of the "hidden curriculum" of schooling. While they differ significantly from the forms of discourse that children customarily use in their homes and communities, the differences tend to be greater for ethnic minority children. Children who are U.S.-born, White, middle-class, native speakers of English are more likely to arrive at school already familiar with the parameters of classroom discourse, since these overlap considerably with the epistemological traditions, linguistic standards, and interactive patterns of White, middle-class communities. In contrast, African American, Chicano, low-income, and other "nonmainstream" children are likely to encounter greater discontinuities between the discourse of their home and community environments and that of the school. These discontinuities involve, among other things, ways of asking and responding to questions, structuring and interpreting oral narratives, and engaging written texts and can have a significant impact on students' learning opportunities as well as on teachers' perceptions of students' abilities.

Cazden's work has focused on the contours and effects of these home/school discontinuities and on what the discourse patterns of the classroom presume, foster, and ignore with regard to students' communicative competence. Inasmuch as discursive criteria partly determine "what counts" as knowledge and learning, they have important implications for student outcomes and the much-commented achievement gaps among students of different ethnicities, language backgrounds, and social classes. By making explicit the unconscious aspects of classroom discourse, Cazden has aimed to problematize classroom communication as a medium that is far from transparent or culturally neutral.

Throughout her career, Cazden has collaborated extensively with other distinguished scholars of language and education, such as Dell Hymes, Joshua Fishman, and Hugh Mehan. She is a past president of both the Council on Anthropology and Education and the American Association for Applied Linguistics, a member of the National Academy of Education and the Reading Hall of Fame, and recipient of various scholarly awards.

— *Aurolyn Luykx*

See also **Education and Anthropology**

Further Readings

Cazden, C. B. (1992). *Whole language plus: Essays on literacy in the United States and New Zealand.* New York: Teachers College Press.

Cazden, C. B. (2001). *Classroom discourse: The language of teaching and learning* (2nd ed.). Portsmouth, NH: Heinemann.
Cazden, C. B., John, V. P., & Hymes, D. (Eds.). (1972). *Functions of language in the classroom.* New York: Teachers College Press.

Cebids

Cebid refers to Cebidae, a family of New World monkeys distributed throughout Latin America. The family consists of three extant (living) subfamilies and eight genera that have been in South America since the Oligocene (about 3 million years ago). Cebids have long hairy tails used for counterbalance. Some species have semiprehensile tails, which are hairless on the bottom tip and can be used as a fifth limb.

The first subfamily, Aotinae, includes one genus, *Aotus.* The common name for this genus is owl monkey, night monkey, or douracouli. The name *owl monkey* comes from the low, owl-like hoots that the monkeys make, possibly to attract mates and/or maintain contact during nighttime foraging. Owl monkeys are the only higher primates that are nocturnal, and as a result, they have the largest sized orbits of any anthropoid (higher primate). Owl monkeys weigh around 1 kg and have slightly opposable thumbs. They are monomorphic, with males and females having similar body sizes. Owl monkeys live in monogamous families, and infants spend most of their time with the father, who carries them around and sleeps with them. However, unlike most monogamous primates, owl monkeys rarely groom each other. They are arboreal and eat mostly fruit, but also eat leaves and insects.

The second subfamily, Callithrichinae, is made up of three groups, the tamarins *(Saguinus, Leontopithecus),* marmosets *(Callithrix, Cebuella),* and Goeldi's monkeys *(Callimico).* Callitrichines are the smallest of the New World monkeys, weighing between 100 and 750 g. They often have brightly colored manes, moustaches, and coats. Although uncommon in higher primates, callithrichines have derived claws instead of nails, which allow them to cling to tree trunks to feed on exudates, insects, and fruits. Marmosets and tamarins usually give birth to dizygotic twins, while Goeldi's monkeys have single births. Although mating systems vary among callitrichines, many groups are polyandrous and contain a single breeding female and several adult males that help care for the young. Callitrichines can live in marginal and disturbed habitats.

The third subfamily is Cebinae, which consists of the capuchin monkeys (Cebus) and squirrel monkeys *(Saimiri).* Capuchins weigh an average of 3,000 g and live in multimale-multifemale groups of 8 to 30 individuals. They are arboreal and normally feed on many different types of fruits, leaves, and animal matter. Some capuchins use their proportionately large brains to obtain food not available to other species, such as the tufted capuchins' ability to break open the hard shells of palm nuts. Squirrel monkeys are smaller than capuchins, weighing between 554 and 1,250 g. They live in groups of 20 to over 50 individuals and are frugivorous and insectivorous. Squirrel monkeys, unlike capuchins, which have semiprehensile tails, have prehensile tails only as juveniles. In addition, squirrel monkeys often are used as laboratory animals. Furthermore, both squirrel monkeys and capuchins are easily recognized as pets on television, in films, and other forms of entertainment. A handful of Cebids are classified as vulnerable,

Source: © iStockphoto/Kevin Tate.

Golden Lion Tamarin

Source: Photograph copyright © by Gregory Scott Hamilton. Used by permission.

endangered, or critically endangered due to deforestation of vital habitat.

— *Lisa M. Paciulli and Adam M. Isaak*

See also **Marmosets; Tamarins**

Further Readings

Fedigan, L. M., Fragaszy, D. M., & Visalberghi, E. A. (2004). The *complete capuchin: The biology of the genus Cebus.* Cambridge: Cambridge University Press.

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego, CA: Academic Press.

Kinzey, W. G. (1997). *New World primates: Ecology, evolution, and behavior.* New York: Walter de Gruyter.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Celtic Europe

Celtic Europe is that part of the Eurasian continent under the influence of the Celtic language family, a subset of the Indo-European group of languages. In very early Classical times, this included most of the European subcontinent west of a line running roughly between the modern cities of Gdansk, Poland, and Odessa, Ukraine, and north of the Alps, then south onto the Iberian Peninsula. In later Classical times, the area east of the Rhine and north of the Danube was considered Germanic; the area west of the Rhine and north of the Alps was considered Celtic, as well as Iberia. In the most strictly technical sense, the name *Celt* comes from a first millennium BCE tribe, the *Keltoi*, which occupied a very rough triangle of ancient Gaul, stretching north from a line between Marseille *(Massalia)* and Bordeaux *(Burdigala)* along the Garonne River, north of Aquitaine *(Aquitania)*, and east to Seine. Their name has been applied to the entire culture. The names of various Celtic tribes still survive today, disguised as modern European place names, for example, the *Parisii* gave their name to the city of Paris, and the *Boii* lent theirs to Bohemia. The modern Celtic parts of Europe are influenced more by an understanding of common origins and cultural elements, such as legends and music, and less by the Celtic language family; they include Scotland, Wales, and Cornwall on the island of Britain, Ireland, the Isle of Man, Brittany in France, and Galicia in Spain.

Ancient Celtic Europe

Pre-Celtic Europe in the Late Neolithic and Copper-Bronze Ages

Prior to the spread of Celtic culture from central Europe, Western Europe was occupied by Neolithic and Copper-Bronze Age farmers. These people farmed the land and built huge megalithic burial chambers, such as New Grange, in the Boyne Valley, and ritualistic and ceremonial centers, such as Stonehenge, in England, and Carnac, in France. Some of these sites may have served as calendrical devices or celestial observatories. It is unlikely that these Neolithic farmers were wantonly wiped out by the later Celtic invaders in a wholesale slaughter. Rather, it is more plausible that they were conquered and absorbed as the agricultural lower classes who supplied the food to an invading, pastoralist elite (see below), a story that repeats itself

throughout the modern ethnographic literature as well. Quite possibly, some of the later megalithic people were speakers of a Celtic language themselves but had moved westward prior to the development of an Iron Age pastoralist economy. The influence of these early farming people can be seen in the continuation of an art style that emphasizes flowing tendrils and spirals from the Neolithic through the Iron Age, from the carvings on the great entry stone at New Grange, to the illuminated manuscripts in the *Book of Kells,* and the *Lindisfarne Gospels* nearly 4,000 years later. This art style may have influenced the later La Tène style, or led to its wide acceptance.

The Coming of the Celts From Central Europe: Their Earliest Archeological Appearances at the Iron Age Sites of Hallstatt and La Tène

The earliest (not the oldest) archaeological evidence for the Celts comes from two sites in central Europe, Hallstatt and La Tène. Hallstatt is a salt mine in Austria in which the 2,000-year-old brine-preserved body of a man was found in 1734.The body has been lost, the local people having assumed at the time that he was pagan and unworthy of Christian reburial. A century later, the area was excavated archeologically and found to have been an extensive Iron Age Celtic settlement that carried on long-distance trade in salt. Salt-preserved tools, clothing, and shoes have been excavated from this site. This mid-European mining culture may have developed out of the earlier Urnfield culture and been influenced by or converged with the equestrian Cimmerian peoples from north of the Black Sea, migrating onto the Hungarian Plain and up the Danube after being pushed west by the expanding Scythian people. During the Hallstatt period, we witness the development of mobile, warrior elite with several different centers of development from Spain to the areas north of the Danube. We know them from large pit burials that included four-wheeled wagons, long slashing swords, horse trappings, and, later, gold and Mediterranean trade items, such as are found with the rich burials of the "Princess" of Vix, in France, and the "Prince's" tomb from Hochdorf, near Stuttgart, Germany, which contained a magnificent 9-foot-long bronze couch supported by small human figurines who appear to be riding unicycles. The Hallstatt period came to an end around 500 BCE, when it was replaced by the La Tène era.

La Tène is the site of a prehistoric lake dwelling in Switzerland, as well as the name of an art style associated with the Celts. Celtic lake dwellings are known from Central Europe to Ireland, where they are called *crannogs.* They consist of artificial islands upon which homesteads were built on pilings and connected to the mainland by causeways, or in some cases by boats. Etruscan trade goods, especially bronze vessels and flagons, began to appear, and the burials now contained two-wheeled chariots, daggers, spears, and helmets in addition to the swords found in earlier graves. It was in the 4th century BCE that Pytheas of Marseille, the first European anthropologist, traveled into the northern and western regions and described the lands and their inhabitants (although labeled a liar by Strabo several centuries after the fact, Pytheas's observations since have been vindicated). It was during the early La Tène period that the Celts under Brennus invaded the Po Valley and sacked Rome in 390 BCE. A century later, Celts under another Brennus (hence H. D. Rankin's belief that it may have been a title rather than a name) invaded the Balkans following the death of Alexander, attacked Delphi, and invaded Asia Minor, where they settled and became known as the Galatians. Their Celtic identity remained distinct at least into the 1st century CE, when they were addressed as such in an epistle by Saint Paul.

By contrast to the archeological record that the Celts came from central Europe, the *Irish Book of Invasions (An Leabhar Gabhála Eireann)* states that the last protohistoric invaders of Ireland came from Spain: the Sons of Mil Espáine, or Milesians; Spanish Galician sources also reflect this point of view. Mil Espáine may be a corruption of the Latin, *miles Hispaniae,* a soldier of Spain. According to Daniel Bradley of Trinity College, Dublin, DNA analysis shows a common genetic link between the peoples of the Atlantic "Celtic Fringe" and Iberian populations. It is possible that the bulk of the people were descended from pre-Celtic or early Celtic Iberian settlers (based upon linguistic evidence) but that the elite culture came from the east with warlike Iron Age pastoralist invaders (see below). Rankin, however, believes that the linguistic evidence points to the mirror-opposite conclusion. Oxford archeologist Barry Cunliffe ties the Atlantic populations together into a separate subculture area from that of the mid-European Celts in a cultural line dating back before the Iron Age. He sees the rise of a mobile warrior elite during the La Tène phase that either spread out of development centers in central Europe or whose style

influenced elites in other areas, leading to the spread of Celtic culture, if not necessarily chromosomes.

The Earliest Historical Sources and Linguistics

It is possible that Homer's equestrian Cimmerians in a cloudy land by a sea to the north may have been Celts. Some sources nominate the Cimmerians' neighbors, the Scythians, as the ancestors of the Celts on the basis of some linguistic cognates: The early Irish claimed that they were descended from the Scythians through their ancestress, *Scota;* thus, they were known as the *Scoti,* a name that transferred to north Britain when an Irish tribe, the *Dál Riada,* colonized it in the early Christian era, making Scotland the "land of the Irish." The Celtic love of horses is documented by classical authors, and a major goddess was horse-related, the Gaulish *Epona,* known to the Welsh as *Rhiannon* and to the Irish as *Macha.* A 6th-century BCE Greek description of a sea voyage, *Massiliote Periplus,* describes Celts living in Spain and France and mentions the two islands of *Ierne* (Ireland) and *Albion* (Britain). In the mid-5th century BCE, Herodotus calls them the Tin Islands because of their importance as sources of tin to make bronze. Herodotus says that the Celtic lands stretched from Spain to the Danube and that they were among the most western-living people in Europe. About 325 BCE, Pytheas of Marseille *(Massalia)* described the Irish and British *(Pritani)* as cattle and sheep pastoralists. The earliest historical sources provide linguistic evidence that ties the Greek *Keltoi* and the Roman *Galatai* as cognates. According to Julius Caesar, the people west and northwest of the Ligurians referred to themselves as *Celtae.* Caesar's division of the transalpine people into Celts and Germans may be somewhat arbitrary, as various tribes are believed to have been of mixed heritage, for example, the Belgae and the Aedui of northern Gaul; indeed, Nora Chadwick suspects that *Teutones* (Germans or Danes) and the Gaelic *Tuath* (a tribe or group of people) are linguistic cognates. Unfortunately, most of our early linguistic data come from Greek and Roman authors, as the Celts were a preliterate people, although there is a Celtic inscription from Egypt using Greek characters, and a calendar from France. It was not until the Common Era that the Celts began to develop a form of writing of their own, *Ogham,* which consisted of a series of horizontal and vertical slashes on the edge of a stone or piece of wood.

What is the common thread between the ancient *Gauls* and the modern Gaels, the areas of Galicia in both western Spain and eastern Poland, and Galatia in central Turkey? It is the linguistic cognate in these names: *Gaul, Galtee, Galatia, Galicia, Gaelic, Galati, Keltoi, Celtae,* and *Celt.* There are two main divisions in the Celtic language family; linguists distinguish between the "p" and "q" Celts, that is, the Brythonic versus the Goidelic speakers. At some point, the early Celtic speakers developed a linguistic shift in part of their language family from the hard "q" or "c/k" sound to the softer "p" or "b" sound, splitting proto-Celtic into Brythonic and Goidelic. As an example, the Picts of Northern Britain were known to the ancient Goidelic speakers, or "q" Celts, as *Cruithni.* Eventually the hard "c" softened to "p," *Pruithne.* Around 325 BCE, Pytheas called Ireland and Britain the *Pretanic* Islands and the people *Pritani,* from which we get the modern word, Britain. The main difference is in the hard versus the soft consonant. This difference distinguishes the Celtic languages to this day: Irish, Scots, and Manx are Goidelic; Welsh and Breton (as well as the now extinct Cornish, Brittonic, and Gaulish) are Brythonic. Galego, the language of Spanish Galicia, is a Romance language closely related to Portuguese, the indigenous Celtic language having been lost, although it is believed to have been Goidelic. The Breton language was brought to Armorica (Brittany) from Wales and Cornwall in the 5th century CE by refugees fleeing the Saxon invasions, giving Brittany its present name. Some sources say it may contain traces of the old Armorican Gaulish toward the east of the peninsula.

Economics and Politics

The pre-Romanized Celts elected their leaders from a pool of eligible aristocrats. Although some observers see this as an early form of democracy, it just as easily could be seen as analogous to the "big man" system in tribal Melanesia. The king, or chief, could choose a successor, who acted as a second in command but was not guaranteed succession should the electors prefer a different candidate. According to Poseidonius, the most renowned warrior at a feast could claim the "hero's portion," or best joint of pork, and any challenge could lead to a fight to the death, or tests of bravery, such as laying stretched out on the floor to see if anyone present had the courage to cut the hero's throat with a sword. This tradition is preserved among the Insular Celts in that portion of the Ulster Cycle known as *The Feast of Bricriu.* These pork prestations would serve to enhance group

solidarity and reinforce the position of the chief through his ability to redistribute his wealth. Rankin compares them to the North American potlatch. The Celts were renowned in the Classical world for their drinking bouts and feasting, at which the Romans disingenuously (in light of their orgies) claimed to be shocked. There were at least four levels of society, although some authors consider only three; the aristocrats and an upper and lower level of free men and women. The fourth level were the slaves, whose existence, along with gold, tin, and amber, helped to provide a flourishing trade with the Mediterranean in exchange for finished jewelry, wine, and the jugs *(amphorae)* and vessels to ship, store, and serve it. Beverages also were served in elaborately decorated gold drinking horns.

There seems to be little doubt that the early Celtic peoples of Europe were headhunters, as described in legends such as the Irish *Táin Bó Culainge* or Cattle Raid of Cooley (which Cunliffe believes originated as a much older Continental La Tène tale because of its extensive descriptions of chariot warfare, which is archeologically unknown from Ireland. By contrast, according to Caesar, chariot warfare lasted in Britain centuries after it had been eclipsed on the Continent) and demonstrated archaeologically from such sculptures as the Celto-Ligurian sanctuaries of the Rhone Valley, as well as from numerous sculpted disembodied heads found throughout Western Europe. Likewise, boar hunting (and eating) was an important aspect of Celtic life in ancient times, as demonstrated in sculptures and legends. The backbone of the Celtic economy, though, appears to have been cattle pastoralism. This form of pastoralism is correlated in the anthropological literature with warfare and conquest of neighboring farming peoples to supply food, as the cattle represent wealth and are less likely to be eaten than are cultivated products. Indeed, this is what we find with the ancient Celts whose mixed farming economy left the warrior aristocracy battling over cattle, while the lower end of the social hierarchy was left to scratch the land to produce barley, wheat, and so on. Even into the late Middle Ages, the Irish aristocracy would spend the warmer months of the year moving from hunting camp to hunting camp, traveling with their cattle. Towns as a focus of Celtic life did not appear until about 200 BCE, in the form of the fortified, transalpine, Gaulish *oppida* as centers of iron working. Although they appear to be homegrown products of an indigenous cultural milieu, possibly in response to increasing pressure from Germanic tribes, they may have been influenced by the Mediterranean region in the west. These *oppida*'s fortifications, what Caesar calls *murus galliccus,* nearly allowed the Gaulish king, Vercingetorix, to succeed in his rebellion against Rome during Caesar's first century BCE campaigns. Ireland did not develop towns until the Viking era more than 1,000 years later, when cities such as Dublin, Limerick, and Waterford were founded as Viking raiding camps.

Social Life

Classical authors from Pausanias to Plutarch speak with admiration and surprise about the status and size of Celtic women and their heroism in warfare. Tacitus describes the story of Boudicca, the queen of the British *Iceni,* who led a war of rebellion against the Roman invaders in the first century CE. In the *Táin Bó Culainge,* the boy hero, Cúchulain, is taught the warrior arts by a woman, Scathach. Free women among the ancient Celts had equal property rights with men and could make contracts freely, if they chose. During the early Christian era, women held equal status with men in the Celtic Christian church. Because of the lack of episcopacy in the Celtic church, the monastic system had female abbots, such as Brigid in Ireland, ruling over monasteries of mixed sex.

History and legend both show that upper-class women among the ancient Celts were willing to sacrifice sexual favors for political or military ends. Greek and Roman authors described the Celts as maritally promiscuous, incestuous, and cannibalistic. However, it is likely that some of the more outlandish reports by the classic writers were a combination of ethnocentrism, hearsay, and war propaganda, as other reports show admiration of the Celts' intense marital loyalty and codification of laws of conduct and morality. What was taken for incest very well may be a confusion of biology with kinship terminology, while reports of sexual license may be out-of-context religious rites associated with fertility and prosperity for the tribe, as in Geraldus Cambrensis's 12th-century report of a ritual in which a northern Irish king mated with a white mare, then drank a soup made from the sacrificed animal. At least we can say with little hesitation that they were patrilineal and patrilocal; the patrilineal assertion is borne out by amazement of the ancient Irish at the Picts' practice of matrilineal descent. The Celts may have practiced polygyny, and Caesar reports fraternal polyandry.

A woman's dowry had to be matched in wealth by her husband's, and this combined wealth was held in joint tenancy with rights of survivorship. Divorce was easy, and serial monogamy was known from the Celtic world even in the Christian era.

In early accounts of warfare with Celtic tribes, they are reported to have slaked back their hair with lime, giving them a frightful appearance. They also were reported to charge into battle naked (as shown by the statue, *The Dying Gaul,* a Roman copy of a Pergamene Greek original), screaming a terrifying war cry to the accompaniment of trumpet blasts. The frontline naked warriors, *gaesatae,* whose name derived from a type of javelin they carried, may have been a chronologically limited fad, however, as many other depictions show the Celtic military fully clothed in belted tunics and trousers, accompanied by armor. Both descriptions are attested by Polybius in the mid-2nd century BCE. In other instances, warfare was conducted from a safe distance with javelins, followed by single combat between champions, according to both the *Táin Bó Cuailnge* and reports of 4th-century BCE Roman encounters, in a parallel to the cattle pastoralist Zulu prior to Shaka's military innovations.

The ancient Celts shaved and washed their bodies with soap at a time when the Romans' hygiene had them scraping the sweat from their bodies, followed by oiling. Obesity not only was frowned upon, but there were penalties for being overweight. Men frequently are depicted wearing cloaks. Diodorus Siculus, writing in the 1st century BCE, describes their clothing as being dyed every color in stripes and small squares (plaid?). Some sculptures, such as those on the Gundestrup cauldron, show people wearing what appear to be two-piece knit or herringbone-weave outfits, consisting of long-sleeved shirts and knee-length trousers. Long, bushy moustaches were a common feature on men. Neck torques, solid metal necklaces open in the front, also were a common feature, as were winged or horned helmets, metal breastplates, and swords and daggers. Both men and women wore long linen shirts as undergarments. Women's clothing consisted of fringed tunics (visible on the dead wife on the sculpture *The Suicidal Gaul,* the companion piece to *The Dying Gaul*), covered by brightly colored cloaks decorated with jewelry or bells and held in place by large, elaborate brooches. Women further enhanced their appearance with makeup and hairstyles, from braids to raised coiffures styled using decorated mirrors. In contrast to the Greek and Roman penchant for sandals, well-made shoes, as found in burials, were an important feature for both sexes.

Religion, Druids

Ancient Celtic religious leaders were known as *druids*, after the Greek word for oak, *drus,* after the oak groves in which they performed religious ceremonies involving harvesting the parasite, mistletoe, from sacred oaks with golden sickles, according to Pliny the Elder. The different grades of druids were not only priests but scholars, judges *(brehon),* and diviners. Because the ancient Celts were a preliterate society, the druids spent decades memorizing all their knowledge of law, religion, and history in verse form, to be able to repeat it back without error. This ability was still found among rural storytellers among the Insular Celts until recent times. The power and importance of speech was such that druids (and in later times Bards) reputedly could kill with their use of satire, literally making their victims die of shame. Just as the British believed the Nuer prophets to be too-powerful a force inciting insurrection in their cattle pastoralist society, the Romans believed the druids to be too-powerful a force in Gaulish cattle pastoralist society. Tacitus reports that the Romans sent an expeditionary force to the druid college on Anglesey in Britain in the 1st century CE to massacre them, thus bringing about the fall of the old religious order in the Roman-held lands and unwittingly paving the way for the new religion, Christianity, to fill the vacuum. This attack preceded Boudicca's rebellion by one year and may have been related to it either by her allies' outrage over the sacrilege or incitement by the druid survivors.

An important ceremony held by the druids was the blessing of cattle on *Beltaine* (after the god *Belanos*), the feast of May Day. Pairs of bonfires would be built, and the herds would be passed between them while they were blessed. In addition to *Beltaine,* other Celtic feast days (determined by the druids' astronomical calculations) were *Imbolc,* February 1 (Christianized as St. Brigid's Day after a syncretism of the goddess *Brid* with a powerful early Christian abbess of the same name); *Lughnasa,* August 1, after *Lugh* (in Ireland, *Lludd* in Wales, and *Lugus* among the Britons and Gauls), whom some consider to be the Celtic Apollo; and *Samhain,* November 1, when the veil between this world and the Otherworld became thin and spirits could pass back and forth between the two

worlds, the inspiration for the modern Halloween and All Souls' Day. The day after *Samhain* marked the Celtic New Year.

Lakes and other bodies of water held a special place in early Celtic culture, not just as defensible dwelling sites, but as holy places to reach the Otherworld and into which treasures, weapons, and sometimes people were thrown in sacrifice. Lindow Man, a young male member of the druidic class, was found sacrificed and preserved in a bog in Cheshire, and the bodies of apparently Celtic sacrificial victims were found in bogs in Denmark. To this day, holy wells are common places of prayer in rural Ireland. It is likely that the Celtic belief in an immortal soul aided the druids to convince their victims to become human sacrifices in much the same way that it aided the Aztec priests of Mexico a millennium-and-a-half later (too, many of the sacrificed were criminals or war captives). Tales about the Otherworld depicted it as a land of eternal feasting and dancing. Other stories, such as that of King Bran, whose head continued to talk after his decapitation, would have confirmed the belief in an afterlife. Some of the more sensational accounts of human sacrifice, such as Caesar's report of giant wicker human figures filled with living men and women and set afire, may have been exaggerations to justify conquest. In any case, even if accurate, they are bereft of their cultural and religious context and rationales.

Carved stone heads with three faces are known from the pre-Christian Celtic world. The Celts had a strong belief in spiritual triplicity, from tripartite gods to supernatural groupings of three, as in the three war goddesses, the *Morríghan.* The concept of a holy trinity is an ancient Indo-European belief found from India to Western Europe. A description of pre-Christian Celtic culture from folkloristic sources such as the *Táin Bó Culainge* demonstrates remarkable similarities with the early Vedic literature from India, showing the common Indo-European origins of both. Most of our knowledge of Celtic myths and legends comes from Ireland, where the Romans never settled, leaving the Irish free to continue the Celtic traditions for centuries after they had been lost on the Continent and, to a lesser extent, in Britain. Welsh myths and legends are very similar to those from Ireland, although the names and places have a Welsh context, as in the epic *Mabinogion.* Many stories tell of heroes under *geis,* a supernatural compulsion that occurs sometimes in hero tales of the Insular Celts. It cannot be ignored lest the hero come to some karmic harm as a result. Possibly the *gaesatae,* the berserk, naked Celtic warriors of Galatia in Asia Minor, were operating under some form of geis that compelled them to sacrifice themselves, analogous to the Cheyenne contraries of the American Plains.

The Middle Ages Through the Enlightenment

Following the Christianization of Ireland by Patrick in 432 CE, and the fall of Rome 44 years later, the Insular Celtic monks, called *Peregrini,* established monasteries throughout Western Europe, beginning with Columcille's monastery on Iona. They and their converts kept learning alive in Medieval Europe, following the fall of Rome, through these centers of scholarship on the Continent, where they carefully reproduced classic texts, as well as recorded their own ancient myths and legends under a thin Christian veneer. Their work and the associated art styles in volumes such as the *Book of Kells* and the *Lindisfarne Gospels* give clues to the important spiritual aspects of the Celtic world.

Successive waves of invasions, conquest, and acculturation destroyed much of the Celtic heritage on the Continent and the English part of Britain. It was not rediscovered until the 16th century; in 1582, George Buchanan reintroduced the word *Celt* into history. Based upon classical works, he located them in northern Italy, France, and Spain. From Spain, some settled in Ireland and from there, in Scotland. England and Wales, according to Buchanan, had been settled by the *Galli* from Gaul.

In the 17th and 18th centuries, the study of Celts took on national importance in France and Wales as a means of establishing cultural identity. Ironically, during this same period, we had the end of the Gaelic political order in Ireland (the Flight of the Earls) and the defeat of the last Celtic (Stewart) king at the battle of the Boyne by William of Orange, an event that led to sectarian strife in the United Kingdom to this day. Celtic culture took on popular overtones during the Enlightenment when William Stukeley wrote *History of the Ancient Celts* and John Pollard wrote his *History of the Druids.* In France, authors wrote that all the megalithic monuments had belonged to the Celts. This "Celtomania," as Cunliffe calls it, led to the establishment of societies that put on invented, or at best reinterpreted, ceremonies, such as the Welsh *Eisteddfodau* and the various modern druidic societies.

Modern Celtic Europe

Prior to the Revolution, the French traced their origins to Germanic roots. In Napoleonic France, the Bonaparte government identified with the Celtic past to legitimize its new order rule. Napoleon III, a great admirer of the Celtic past, even had a statue erected in 1865 to honor Vercingetorix for his defiance of Rome in 52 BCE. The Germanic invasions of Gaul in the 5th century serve to reinforce the Bretons' assertions that they are the only true Celts in France, despite the rest of the country's reference to itself as "Gallic." Even the name, *France,* comes from that of a Germanic tribe, the Franks. Nonetheless, the Breton language began to decline in the 19th century because of what Cunliffe calls "the French official desire for homogenization." The desire for Breton autonomy received a black eye in the 1940s, when it was learned that *Parti National Breton* was going to negotiate with Germany for independence after its conquest of France. Newer groups, such as *Emgann* and the militant *Armée Révolutionaire,* have taken up the cause in recent years. Today, the relatively prosperous Brittany concerns itself with language preservation and plays host to several international folkloric and Celtic festivals.

The use of the Celtic languages was dying; the last native speaker of Cornish died in 1777 ("Revised Cornish" has been reconstructed from historical sources, aided by infusions of Breton and Welsh). Speaking Celtic languages was punished in schools in the areas of the British Isles, where it still was used. This was done to force the still defiant Celtic people to give up their quests for self-determination and assimilate into the new dominant culture of the United Kingdom. In Ireland, the Penal Laws were aimed at crushing Gaelic-Catholic culture and even excluded the native Irish from receiving education. The Irish language *(Gaeilge)* was almost destroyed by the Potato Famine of the 1840s, which struck hardest in the tuber-dependent *Gaeltact,* or Irish-speaking areas of western Ireland. The population of the island dropped by half in the 19th century, and with it went the Irish language.

Later in the 19th century, the establishment of the Abbey Theatre and the Gaelic League in Ireland brought about a linguistic, literary, and cultural revival, ironically among the Protestant Anglo-Irish elite. Ancient Hiberno-Celtic legends and themes became the subjects of books, plays, and poetry by Lady Augusta Gregory, William Butler Yeats, and John Millington Synge. In a parallel with Karl Marx's outline of the stages of revolution, soon after the cause (or at least the primitivistic glorification) of the oppressed lower classes was taken up by these members of the ascendancy, the home rule advocates took to the bandwagon, eventually leading to the 1916 Easter Rising, the Irish revolution, and establishment of the Free State under Éamon DeValera and Michael Collins. The recent sectarian violence in Northern Ireland is in part an outgrowth of this process, which led to the division of the island into a predominantly Protestant and industrial Northern Ireland, tied to the United Kingdom, and a Catholic and rural Republic in the south. In contrast to Ireland, the other Celtic areas in the British Isles, Scotland and Wales, have been earning their home rule more recently under the less bloody modern process of "devolution."

Today, learning the Irish language is required in schools, and students must take an examination on it in order to pass the "Leaving Cert.," that is, to graduate. Until recently, Irish civil servants were required to pass an Irish language examination to be hired, and all official documents must be printed in both Irish and English. *Raidió Teilifís Eireann,* the Irish national broadcasting company, broadcasts in Irish on one of its radio channels, *Raidió na Gaeltachta,* and on one of its television channels, TG4. The coastal islands, such as the Aran Islands and Tory Island, are considered the most "Irish" parts of Ireland, yet ironically, in recent years, the Irish motion picture industry has been filming popular films about traditional Irish culture not in Ireland, but on Mann (*Isle of Man*).

The Jacobite Rebellion and the Highland Clearances of the 18th and 19th centuries destroyed much of the Gaelic culture of Scotland, leading to mass emigration to America, like their Irish cousins in the later-19th century. What was left of traditional language and culture survived in the westernmost edge of the Highlands and on the islands. In the 19th century, Sir Walter Scott's adventure novels laundered the classical author's barbaric Celtic hordes into noble savages. It was during this time that the various Scottish clans were assigned the tartans with which we associate them today. This came about as a result of George IV's visit to Scotland in 1822; prior to this, individuals wore whatever tartan they chose. As representatives of the various clans came to the mills to order tartan fabric for the royal visit, they were assigned whatever was available or scheduled to be made, in the order in which they came in, and that association has lasted to

this day. Today, Hebridean society is seen as retaining one of the "purest" forms of Scottish culture.

The Welsh Language Act of 1967 put the Welsh language on equal par with that of English in Wales, and Welsh is required to be taught in all schools. In a reversal of the 19th-century practice, one school requires students not to speak English on school property. A large part of the Welsh economy has been mining since prehistoric times; to this day, the Welsh people are identified with coal mining in Britain. BBC Wales maintains an all-Welsh television station, which can be watched on the Internet.

Galicia has a Celtic village at Santa Trega in which some of the houses have been reconstructed. To this day *castroes,* circular stone fortifications with concentric walls, may be seen. As in other Celtic areas, Galicia experienced a revival, the *Rexurdimento,* with political overtones in the 19th century. By the 20th century, the movement had solidified into political parties, the Autonomous Republican Organization and the Galeguist Party, which were persecuted by Francisco Franco's government. Galicia finally became a recognized Autonomous Community in 1981 under a 1936 Spanish law. Galician bagpipes *(gaita),* similar to the Scottish Highland pipes, are gaining resurgence in popularity, as are traditional dances.

Today, the "Celtic Fringe" of Europe includes Ireland, Scotland, Wales, Mann, Cornwall, Brittany, and, arguably, Galicia. Besides having been possessors, if not currently speakers, of the Celtic languages, other common themes include bagpipes, the best known being the Highland pipes, then the Irish *Uillean* (elbow) pipes, played not with a mouthpiece, but with a bellows strapped to the arm, similar folklore and legends ("such as little people" and hero tales); low mountains and rocky soils; manufactured soils of seaweed, manure, and sand in the coastal areas; the importance of potatoes, swine, sheep, and dairying to the economies; deep religious feelings, a love of speech and music; poverty (the automobile manufacturing industry in Rennes is an exception to this) and a long history of emigration; seacoasts with excellent harbors; the wetness of the maritime climate; stem families with celibate adults; and, perhaps most strongly, a common sense of themselves as Celtic, distinct from the greater political communities of which they are parts. The Interceltic Congress, begun in 1867, still meets today, and international Celtic festivals play host to Scottish, Irish, Breton, Welsh, and now even Galician musicians, whose Celtic bagpipe CDs can be purchased internationally. An international Celtic magazine, *Carn,* is designed to unite and inform the remaining Celtic communities of *Alba, Breizh, Cymru, Éire, Kernow,* and *Mannin* (respectively, Scotland, Brittany, Wales, Ireland, Cornwall, and Mann).

In the 20th century, anthropology began to look at folk communities in addition to preliterate, preindustrial societies. Some of the research turned to the Celtic countries; a sample of that work follows. One of the earliest community studies was Conrad Arensberg's and Salon T. Kimball's *Family and Community in Ireland.* Arensberg and Kimball studied three villages in County Clare, Ireland, in the 1930s, which they combined under the pseudonym, *Luogh.* It is a classic study of a now disappeared rural way of life. Isabel Emmett described her research in Llan in *A North Wales Village: A Social Anthropological Study.* In the early 1960s, John C. Messenger Jr. conducted research on one of the Aran Islands, considered one of the traditional parts of the country, at the mouth of Galway Bay. He described his research in *Inis Beag: Isle of Ireland,* with a focus on the rapprochements between religion, sex, and social life. Susan Parman described the island of Lewis in the Outer Hebrides in her book *Scottish Crofters: A Historical Ethnography of a Celtic Village,* which examined the crofting system, attitudes of the islanders to historic occurrences, such as the Highland Clearances, and to the intrusiveness of modern culture, as well as an examination of the history and current practice of the cottage industry of the island: weaving Harris Tweeds. Robin Fox examined marriage and kinship among the Tory islanders, off the coast of Donegal, in *The Tory Islanders: A People of the Celtic Fringe.* Nancy Scheper-Hughes wrote the controversial *Saints, Scholars, and Schizophrenics: Mental Illness in Rural Ireland,* describing her research into the connection between the traditional rural inheritance system and mental illness in County Kerry. Ellen Badone wrote *The Appointed Hour: Death, Worldview, and Social Change in Brittany,* about the cultural changes in Brittany since 1945.

Today, the homogenizing effect of television and other forms of mass communication is blurring the distinctions between communities on a global scale. The Celtic influence in the modern world, politics, and global economy always has been present, from the shipyards of Belfast to Andrew Carnegie's steel mills in America, but the dominant cultures always were given the credit for the innovations (for

example, the *Titanic* was built in Belfast and made its last port of call in County Cork, Ireland, yet it is referred to as a British ship). Despite the homogenization of modern mass media, it has allowed the formerly "backward" areas to innovate in ways that the more industrialized regions have resisted on the grounds of the difficulty and expense of retooling. In the 1990s, the central west coastal area of Ireland, especially around Galway and Limerick/Shannon, became a major information-processing center for the world. The new information technology innovations have allowed the "Celtic Tiger" to become an international economic force in what used to be "poor Ireland," a country in which many households did not have telephones in the 1980s, but where now mobile telephones and personal computers are commonplace. For the first time since the 1840s, migration is in to Ireland rather than out of it.

— *Michael J. Simonton*

See also **Prehistory**

Further Readings

Childe, V. G. (1980). *Prehistoric communities of the British Isles.* New York: Arno Press.
Cunliffe, B. (2002). *The extraordinary voyage of Pytheas the Greek.* New York: Walker & Company.
Cunliffe, B. (2003). *The Celts: A very short introduction.* Oxford: University Press.
Eluère, C. (1993). *The Celts: Conquerors of ancient Europe.* New York: Abrams.
Raftery, B., & Clint, T. (Eds.). (2001). *Atlas of the Celts.* Buffalo, New York: Firefly Books.
Rankin, H. D. (1987). *Celts and the classical world.* London: Croom & Helm.
Squire, C. (1975). *Celtic myth and legend: Poetry and romance.* Newcastle: Newcastle Publishing.

Cercopithecines

Cercopithecines are primates that make up one of the two major groups of Old World monkeys. All Old World monkeys are members of a single primate family, Cercopithecidae, and so are referred to collectively as "cercopithecids." The family consists of two distinct subfamilies, Colobinae ("colobines") and Cercopithecinae ("cercopithecines"), which separated about 14 million years ago.

About 73 species of cercopithecines are currently recognized. They range in size from dwarf guenons (females 745–820 g, males 1255–1280 g) to baboons, the largest monkeys (anubis baboon females 14.5–15.0 kg, males 22–28 kg). The cercopithecine group includes several species that are common in zoos, laboratories, and field studies, such as various species of macaques (including rhesus monkeys), baboons, drills and mandrills, guenons, and mangabeys. Currently, cercopithecines are the subjects of about two thirds of all non–in vitro research publications on nonhuman primates. The behavior, social relationships, group structure, ecology, and demography of various free-ranging cercopithecines have been the focus of many studies. As a result, we have, for the best-studied species, a large and rapidly expanding body of information about the lives of these animals in nature.

Distribution, Habitats, and Diets

Other than macaque monkeys, all species of wild cercopithecines are restricted to Africa, with one exception: a small population of hamadryas baboons along the southern edge of the Arabian Peninsula. Conversely, macaques are represented in Africa only by Barbary macaques, in the Atlas Mountain region, but in Eurasia by a series of about 15 species extending eastward across southern Asia to various islands of the south Pacific and north as far as the islands of Japan. The distributions of individual species of cercopithecines range in size from part of one peninsula of one Pacific island (Heck's macaque) to large portions of Africa (anubis baboons) and Asia (rhesus).

The habitats of various cercopithecine species differ widely: swamp forest, many other types of forest and open woodland, alpine meadows and bamboo thickets, savannah grassland, even Ethiopian rocky desert, and the Japanese island of Hokkaido, which is covered by snow in winter. A few species are primarily arboreal (for example, dwarf guenons) or terrestrial (patas monkeys, hamadryas, geladas), but most species are both, in varying proportions.

The two subfamilies of Old World monkeys are distinguished by various dental and skeletal features, but of particular ecological and behavioral significance are two distinguishing features of the animals' soft tissues: cheek pouches, found only in cercopithecines, versus a stomach with at least three enlarged fermentation

chambers, found only in colobines. The cheek pouches of cercopithecines are used for short-term storage of relatively small but locally concentrated foods that can be harvested faster than they can be orally processed, thus reducing exposure to competition and predation. Later, at their leisure, the monkeys bring the foods back into the oral cavity for processing before swallowing them. Monkeys of this subfamily are sometimes referred to as "cheek-pouched monkeys."

Few cercopithecine primates are obligate food specialists. Most species can be characterized as eclectic omnivores, in that their foraging is very selective yet their diet is highly diverse. They feed selectively on a great variety of plant and animal foods that are available in their habitat, eating this part of a plant but not that, feeding on the fruit of one species but not that of a similar, closely related species, feeding on fruit that is fully ripe and ignoring fruit that is semiripe, removing acacia seeds from their pods, then the naked seeds from its seed coats, and so on. Baboons represent the extreme development of such highly selective omnivory. Their mastery of this mode of life has enabled them to become the most widespread and abundant primates on the African continent. Selection for traits that lead to such success are still present: among yearling baboons, differences in dietary intake of proteins and energy are accurate predictors of survivorship and lifetime reproductive success.

Grouping Tendencies

Most cercopithecine populations are partitioned into discrete, relatively closed and permanent social groups. Among the various groups within a local population, age and sex composition varies. Sizes of cercopithecine groups range from two individuals, in monogamous pairs of DeBrazzas monkeys, to 845 animals (mean 620) in hordes of mandrills. At any given time, group composition results from the population's history of seven processes: births and deaths, emigrations and immigrations across group boundaries, group fissions and fusions, and maturation. The first four of these processes can, under some conditions, result in populations having equal distributions of males and females among groups, and these sex distributions are consistent with observed distributions in several species of wild primates, including baboons. Such purely demographic models can indicate how the distribution of individuals among groups of a local population can remain largely unchanged over time and why group composition varies nonetheless. But they do not clarify the adaptive significance of species differences in group compositions. At present, the primary determinants of mammalian grouping patterns are considered to be ecological factors, particularly access to essential resources, such as food and mates, and reduction in exposure to hazards, such as predators.

For female cercopithecines, the characteristic numbers in groups of each species are thought to be determined largely by the spatial and temporal distributions of food and predation. For example, the smallest groupings (less than five adult females) are found among arboreal fruit and leaf specialists, such as mona monkeys and greater spot-nosed monkeys, which feed in trees on fruits and shoots; group size may be limited by the numbers of individuals that can feed together in one tree. Conversely, large groups with many females occur in species that may be particularly susceptible to predation, such as terrestrial species that range into treeless areas. In addition, large groups may have other advantages for females, including better conditions for child rearing, buffers against group extinction resulting from stochastic effects, and a larger pool of socially transmitted information.

In turn, the distributions of adult males among groups apparently are determined by the distributions of females: Males go where females are. Cercopithecine species with few females per group (average of six at most) always include just one adult male; species whose groups average more than 10 females never do. Overall, the number of males per group increases linearly with the number of females.

The dynamics underlying the distribution of adult males among the groups of a local population were revealed in a long-term study of group processes in the yellow baboons of Amboseli, Kenya. First, males that were reproductively less successful had shorter tenure in groups than males that were more successful. Second, the availability of cycling females and an individual male's own mating success were powerful predictors of male dispersal patterns. Males, whether natal or immigrants, were much more likely to emigrate in months when the number of males exceeded the number of cycling females, and they virtually never emigrated when cycling females were in excess. Similarly, the proportion of new immigrants in a group was approximately 4 times greater in months when cycling females were in excess. However, for a

variety of reasons, such as the risks of dispersal, these intergroup migrations did not result in a perfect balance between the numbers of males and the numbers of cycling females. In several species of seasonally breeding guenons, males commonly move into groups at the time of year that females are receptive.

Several species of large, terrestrial cercopithecine primates live in small, one-male groups that merge into larger aggregations at various times. Such repeated fission and fusion of groups occurs daily in hamadryas baboons and geladas and has been reported to occur in pigtail macaques, drills, and mandrills. Among nonhuman primates, the hamadryas baboons of Ethiopia are the extreme example of multilevel, fission/fusion societies. Their basic social and reproductive groups are one-male units, each containing a single adult male, several females, and their offspring. (A few such female groupings, often termed "harems" in the literature, contain a second adult male who mates with the unit females only by stealth.) Two or three one-male units that are strongly associated constitute the next-higher unit, clans, within which each one-male unit remains intact. Social interactions are more common within clans than between. Mature males of a clan often bear a strong physical resemblance to each other and so are thought to be genetically related.

At the next-higher level of social organization, several hamadryas clans and some single males form bands. Band membership and clan membership are stable over many years. Bands are autonomous foraging units, but clans sometimes separate temporarily from their band as they feed on the sparse vegetation of their semidesert habitat. At night, members of a clan sleep on the same sleeping bluff. Several bands may congregate at one bluff, forming large herds (troops) of variable-band composition and sometimes numbering over 200 animals. These various levels of social organization in hamadryas appear to be adaptations to the spatial distribution of essential resources in their rocky desert habitat. Small, dispersed groups most effectively harvest sparse food, and large nightly aggregations provide safety in numbers on their large, dispersed night refuges.

Compared with hamadryas, the fission/fusion groupings of geladas show interesting similarities and differences, but again, probably representing adaptations to an extreme environment. For example, their daily fission/fusion cycle is the opposite of that of hamadryas: One-male, multifemale units of geladas in the Simien Mountains of Ethiopia sleep separately on the abundant cliff ledges during the night, then each morning coalesce into herds of hundreds of animals that feed on the lush alpine meadows.

Maternal Kinships and Social Relations

Selected aspects of cercopithecine kinship and social relationship—topics of particular interest to many anthropologists—are briefly discussed below. The patterns that are discussed here are based primarily on the most extensively studied cercopithecines, namely, yellow baboons, rhesus monkeys, Japanese macaques, and vervets. These primates are among the 25 species (out of 46 cercopithecines for which information on social structure is available) that live and breed in multimale-multifemale groups. Multimale bisexual groups are rare among mammals, and so there has been considerable speculation about why these 25 species—primarily macaques, baboons, and mangabeys—should be different. These multimale-multifemale groups are matrilocal: With rare exceptions, all females remain for their entire lives in the social group in which they were born. However, many males leave their natal group about the time that they reach physical maturity. Thus, each of these groups consists of clusters of matrilines (adult females and their descendants) and several adult males, most of whom have immigrated from other groups.

In these primates, adult females are the stable core of a group, not only because of their lifetime tenure in it but also because among them there is a "linear" (transitive and connected) dominance hierarchy that, with few exceptions, remains stable for many years, often for females' lifetimes. (Among baboon females, the primary exceptions are old females, some of whom drop in rank relative to their daughters.) Furthermore, each adult female ranks above all females of other matrilines that her mother dominates and above all female descendants of those females, again with few exceptions. In that sense, the female lineages themselves can be rank ordered.

In these species of baboons, vervets, and macaques, young females form strong, lifelong social bonds with their mother and other female relatives, and the resulting coalitions may contribute to stabilizing the dominance hierarchy. By contrast, maternal dominance has no discernable effect on rank acquisition among males, perhaps because in these species, the mother is not dominant over any of the other adult males. A few cases of adult females being dominant to

adult males have been reported, but in those groups, the relation of a son's rank to his mother's is currently unknown. Males tend to rise quickly in rank as they approach physical maturity, reach their highest rank in the next few years (about 2 years in yellow baboons), and then decline more slowly but steadily with age thereafter.

Source: Photograph by Carol Berman from p. 69 in *Kinship and Behavior in Primates*, Bernard Chapais & Carol Berman, eds. Copyright © 2004 by Oxford University Press, Inc. Used by permission of the press.

The pattern of strong matrilineal kinship effects described above has been found in provisioned Japanese and rhesus macaques, wild savannah baboons, and vervet monkeys but does not typify macaques of several other species studied in captivity (bonnet, Barbary, Tonkean, and stump-tailed macaques), in which females show little or no kin bias in affiliative interactions. Furthermore, in captivity, bonnet macaque females may come to outrank not only their mothers but also females dominant to their mothers. These species differences appear to be related to the extent to which the agonistic behavior of a macaque species can be described as "despotic" (rhesus and Japanese macaques), intermediate (long-tailed macaques), or "egalitarian" (Tonkean, bonnet, Barbary, and stump-tailed macaques), in that in the more despotic forms, kinship profoundly influenced social and dominance relations, whereas at the other extreme, affiliative interactions among nonkin were much more frequent, and little severe aggression was observed in egalitarian species.

In some species or populations of cercopithecines, a curious pattern of dominance relationships has been observed between sisters. Each new daughter of the matriarch takes on, as she approaches maturity, a dominance rank immediately below that of her mother but above that of her older sisters. Thus, sisters typically rank in reverse order of their ages. This pattern of "youngest ascendant" may result from the mother's agonistic support and defense of her infants against any others that the mother dominates. Since 1958, when this pattern of "youngest ascendant" among sisters was first described in Japanese macaques by Masao Kawai and Shunzo Kawamura, it has also been observed in groups of wild baboons and vervets and in provisioned rhesus monkeys but, curiously, not in unprovisioned wild Japanese macaques.

Even in species in which the "youngest ascendancy" pattern predominates, exceptions have been observed. Several processes have been suggested as promoting these exceptions, including relative physical strengths of the individual females and availability of potential allies, as determined by demographic variables such as interbirth intervals, infant mortality, and competition for clumped food sources.

The tendency for matrilines within a group to be closely related to each other is augmented by two processes. First, when a group of baboons or macaques fissions into two or more new groups, they sometimes do so along kinship lines: Females of each matriline tend to go into the same new group. Second, in some groups, high-ranking females tend to produce a preponderance of daughters (who remain in the group), whereas low-ranking females tend to produce a preponderance of sons, many of whom will eventually leave their natal group. This rank-related sex bias or simply higher reproductive success among high-ranking

females, combined with the tendency of daughters to rank just below their mother, results in a "push-down" system, in which low-ranking matriarchs do not produce as many female descendants, whereas an increasing proportion of the middle ranks come to be occupied by older daughters of high-ranking matriarchs as the lineages of their mother and their higher-ranking younger sisters continue to grow. In such groups, all females probably are related to one another to some degree.

Kinship relations are one of the most important factors influencing behavior and social relationships in female cercopithecine primates. They affect not only dominance relationships and access to resources but also patterns of affiliative behavior, such as spatial proximity, subgroup clustering, social grooming, alliance formation, conflict intervention, reconciliation, and cofeeding. However, females may also form affiliative relationships with supposedly unrelated females. For such cases in particular, rank proximity (closeness in dominance ranks) has been proposed as an alternative basis for attraction among females. Because rank proximity and kinship relatedness are positively correlated, this hypothesis has been difficult to test until recently, when appropriate statistical methods, based on matrix permutations, have been developed. By means of these methods, rank proximity has been shown to affect affiliative behavior independent of the effects of maternal kinship. An alternative and possibly correlated factor is a tendency of females to associate with their paternal siblings, discussed below.

Paternal Kinships and Social Relations

Savannah baboons, vervets, rhesus, and Japanese macaques are all polygynandrous: Males potentially mate with more than one female and females with more than one male, even during a single reproductive cycle. Thus, although the mother of each infant can be identified in the field unambiguously on behavioral grounds, the father cannot, and so until recently, only maternal kinship relationships could be positively identified in field studies. However, development of noninvasive methods for genetic analysis of free-ranging animals using hair or feces has made possible the identification of fathers.

In 1979, Jeanne Altmann pointed out the potential importance of paternal sibships in nonhuman primates. A subsequent series of studies of yellow baboons in Amboseli, Kenya, carried out by Susan Alberts, Altmann, and their colleagues have shown, first, that consortships between siblings involve less sexual but more affiliative behavior than those between nonsibs; second, that adult female paternal sisters are at least as affiliative as maternal sisters; and most recently, that baboon fathers preferentially support their own young, even though an infant's father may not have been the only male to mate with the mother during the fertile part of the cycle in which she became pregnant. Similarly, rhesus females that are paternal sibs and are close in age maintain stronger affiliations with each other than with nonkin.

Thus, these monkeys appear to have an ability to recognize not only their maternal kin but also their paternal kin, that is, to react differentially to them. Beyond that, several experiments, carried out both on group-living captive animals and in the wild, strongly suggest that cercopithecines can also recognize kinship relationships among other individuals in their group. For example, when the distress call of a juvenile vervet monkey was played back, the mother of the infant looked toward the loud speaker, as expected, but the other adult females looked toward the mother. After a group-living, captive, long-tailed macaque was conditioned to respond when shown photographs of a mother and her offspring, she correctly matched photos from her group of mothers and their infants. In agonistic encounters, captive bonnet macaque males consistently recruited support from males that outranked their opponent. In playback experiments, wild chacma baboons responded more strongly to call sequences mimicking dominance rank reversals between matrilineal families than within. In several species (Japanese and pigtail macaques, vervets), monkeys that have recently been threatened will frequently "redirect" aggression by threatening a third party, often specifically targeting a close matrilineal relative of their recent opponent.

The mechanisms for kin recognition by cercopithecines have not yet been identified, but suspects include social familiarity and spatial proximity during development (ultimately based on the mother-infant bond) and phenotype matching, including distinctive odors controlled by genes of the major histocompatability complex. From the standpoint of Hamiltonian kin selection, the essential issue is the result: kin-biased behavior.

Research on paternal kinship is adding a new and unexpected perspective to kinship effects on primate

social systems and will lead to reevaluation of the proximate mechanisms whereby social relationships develop.

— *Stuart A. Altmann*

See also **Baboons; Macaques; Monkeys, Old World**

Further Readings

Chapais, B., & Berman, C. M. (Eds.). (2004). *Kinship and behavior in primates.* Oxford: Oxford University Press.

Fa, J. E., & Lindberg, D. G. (Eds.). (1996). *Evolution and ecology of macaque societies.* Cambridge: Cambridge University Press.

Glenn, M. E., & Cords, M. (Eds.). (2002). *The guenons: Diversity and adaptation in African monkeys.* New York: Kluwer Academic.

Groves, C. (2001). *Primate taxonomy.* Washington, DC: Smithsonian Institution.

Kappeler, P. M. (Ed.). (2000). *Primate males: Causes and consequences of variation in group composition.* Cambridge: Cambridge University Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias.

Chachapoya Indians

The Chachapoya Indians, often described in popular media as Peru's ancient "Cloud People," inhabited the Andean tropical cloud forests between the Marañon and Huallaga River valleys prior to their rapid cultural disintegration after the Spanish conquest in AD 1532 (see Figure 1). In anthropology and in the popular imagination, the Chachapoya represent the quintessential "lost tribe," founders of a "lost civilization," and builders of "lost cities" now abandoned and concealed by cold and rainy tropical cloud forests. In world archaeology, the Chachapoya resemble the ancient Maya and Khmer civilizations insofar as they challenge conventional anthropological wisdom regarding theoretical limitations on cultural development in tropical forest environments. The Chachapoya are most widely recognized for their distinctive archaeological remains. These include monumental clusters of circular stone dwellings 4 to 10 m in diameter and built on terraced, and often fortified, mountain- and ridgetops. The most famous include ruined settlements at Kuelap, Vira Vira, and Gran Pajatén, and elaborate cliff tombs like Los Pinchudos, Laguna de los Condores, and Revash, set high above mountain valleys. Chachapoya settlements typically yield few surface artifacts, but cliff tombs nestled in arid microclimates afford a rare glimpse of perishable Andean material culture, including preserved mummies, textiles, wooden statues, carved gourds, feathers, cordage, and even Inca string-knot records called *quipu.*

Both scholars and lay authors have attempted to reconcile the paradox of a cosmopolitan, urban, Chachapoya "civilization" seemingly isolated within Peru's most remote and forbidding eastern Andean cloud forests. The fortified urban complex at Kuelap contains over 400 circular stone constructions sitting atop a 600 m stretch of prominent ridge top that its builders flattened and entirely "encased" with massive masonry walls up to 20 m high (see Figure 2). Buildings ornately decorated with stone mosaic friezes at Gran Pajatén and Los Pinchudos have been granted World Heritage status by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and are widely considered masterpieces of pre-Columbian monumental art (see Figure 3). These contradictions, coupled with the scarcity of historical documentation, have led to much romanticizing, mystification, and pseudoscientific speculation regarding Chachapoya cultural and "racial" origins. Even most scientific theories posit external origins for Chachapoya populations, based on the assumption that tropical montane forests cannot support dense populations and complex social and political structures. Such theories postulate that brief periods of cultural and artistic florescence were externally subsidized by the Inca state. The fall of the Inca is widely believed accountable for the demise of the Chachapoya and other dependent eastern-slope societies, and the rapid abandonment of regions now blanketed in montane forest. Only within recent decades are archaeologists beginning to construct a reliable Chachapoya culture history and to understand the economic and sociopolitical systems that evidently supported autonomous Chachapoya societies.

The name *Chachapoya* (often written as *Chachapoyas* or *Chacha*) is extrinsic, referring to the administrative province established by Inca conquerors around AD 1470, and later described by Spanish chroniclers like Garcilazo de la Vega and Cieza de León. Scholars now use the term *Chachapoya* to refer to the people and *Chachapoyas* in reference to their

Figure 1 Map of northern Peru with locations of Chachapoya territories and major sites

pre-Hispanic homeland. The former appears to be an Inca-inspired amalgamation of a local tribal name Chacha with the Inca (Quechua language) term for "cloud," *puya*. As such, cultural affiliation implied by Chachapoya is an artifice referring only to local populations grouped together by the Inca on the basis of cultural similarity for the purposes of administration. Archaeological research within the region corresponding to the Inca province reveals broadly shared cultural attributes that evidently reflect the emergence of a regional cultural identity predating the Inca conquest, perhaps by AD 900. Because scholars have been slow to recognize the degree to which cultural and demographic transformations wrought by Inca conquerors permanently altered indigenous social and political structures, they have used the term Chachapoya loosely to refer to pre-Inca, Inca period, and Spanish colonial period cultural identities that are quite difficult to disentangle. Colonial period cultural identities may be the least accessible. By the time of sustained Spanish contact in 1536, the Inca had already exiled large numbers of rebellious Chachapoya, and diseases introduced from the north, west, and east had begun taking a high toll. Chachapoya populations once probably exceeded 300,000 individuals, but by AD 1650, they had declined far in excess of 90%. Demographic collapse, coupled with a lack of sustained Spanish interest in a remote region with no indigenous labor pool, has left scholars with scant historical evidence with which to reconstruct Chachapoya language and culture.

The scale and magnitude of monumental constructions widely distributed across the northern cloud forest have led some to propose the existence of a unified, pre-Inca Chachapoya state or kingdom. Based upon its extraordinary scale, a few scholars have viewed Kuelap as the paramount Chachapoya political center. The settlement's population has been estimated at approximately 3,000 prior to the Inca invasion. News media descriptions of Gran Vilaya (La Congona) and Gran Saposoa reported by explorer Gene Savoy as "metropolises" covering 120 and 26 square miles, respectively, are sensational exaggerations, as they conjoin distinct sites with no obvious interrelationships. The documentary evidence portrays the Chachapoya as a patchwork of autonomous polities that frequently warred upon one another when not confederated against a common outside threat such as the Inca. Historical evidence further indicates a clear lack of political and even military unity during defensive and insurgent actions against the Inca and factional conflicts between local leaders after Spanish conquest. Because of scant documentary evidence, much of the burden for reconstructing Chachapoya culture has fallen to archaeologists. Inspection of the archaeological record likewise reveals regional variation in architecture, ceramics, and iconography. In terms of settlement design and details of building architecture, no two Chachapoya sites are identical.

The paltry ethnohistorical evidence for Chachapoya culture contained in major colonial period chronicles and scattered administrative and ecclesiastical records

offers information of variable reliability. Scholars generally view Garcilazo de la Vega's reproduction of Jesuit priest Blas Valera's description of Chachapoya culture under Inca domination as reliable. Spanish chroniclers typically describe the Chachapoya romantically as renowned for their fierce warriors and powerful sorcerers. Repeated references to Chachapoya women as "white," "beautiful," and "gracefully proportioned" have become fodder for racist theories. The explorer Savoy adds "tall and fair-skinned, with light hair and blue eyes" to buttress his assertion that the Chachapoya reside in mythical Ophir as descendents of Phoenician maritime traders and King Solomon's miners. Unfortunately, such misinformation regarding Chachapoya origins and racial affiliations disseminated by charlatans and profiteers often sells more copy than scientific treatises, and it abounds on the World Wide Web. By styling themselves in the cinematic molds of Indiana Jones or Allan Quatermain, pseudoarchaeologists such as Savoy have built impressive private fortunes by attracting international media attention to periodic "discoveries" of sites well-known to villagers and archaeologists. Contemporary ethnohistorian Waldemar Espinoza's more sober interpretation of Chachapoya culture is based upon analysis of some administrative documents, but he presents some conjecture as fact, and he does not reveal all of his sources. Jorge Zavallos, Duccio Bonavia, Federico Kauffman Doig, Arturo Ruiz Estrada, Alfredo Narvaez, Daniel Morales Chocano, Peter Lerche, Inge Schjellerup, Gary Urton, Sonia Guillen, and Adriana von Hagen are among other contemporary historians and anthropologists who have published significant interpretations of Chachapoya society and culture history. Today, archaeologists strive to document Chachapoya settlements and cliff tombs prior to the arrival of highland colonists, uncontrolled adventure-tourists, and looters, which are rapidly destroying the archaeological record. What follows is a brief outline of present scientific knowledge of the so-called Chachapoya distilled from ethnohistory and archaeology.

Figure 2 The perimeter walls at the fortified settlement of Kuelap reach 20 meters high

Location, Environment, and Territory

The Inca province of "Chachapoyas" encompassed approximately 25,000 sq km of mountainous terrain between the Marañon and Huallaga Rivers. This territory trended north and south from the lower Utcubamba river valley near 6° S. latitude, approximately 250 km to the modern boundary separating La Libertad and Huánuco departments at 8° S. latitude. From east to west, it begins in dry thorn forests in the Marañon canyon, near 78° 30′ W. longitude, and straddles moist montane, alpine, and wet montane rain forest ecological zones of the cordillera, to end somewhere in the lower montane rain forests of the Huallaga Valley, near 77° 30′ W. The deep Marañon river canyon provided a natural boundary to the west. The other boundaries, especially the eastern boundary, are much harder to locate precisely. Politically, Inca-period Chachapoyas covers portions of the modern Peruvian departments of Amazonas, San Martin, and La Libertad. Today, populations cluster between 2,500 and 3,000 m, where they produce staple grains, legumes, and tubers on deforested intermontane valley slopes, while periodically tending

Figure 3 The cliff tombs of Los Pinchudos viewed with a fish-eye camera lens exhibit four hanging wooden statues and characteristic Chachapoya stone mosaic friezes

cattle in higher alpine valleys. Fruit, coca, and chili peppers are cultivated at lower elevations. In pre-Hispanic times, however, Chachapoya populations were much greater and concentrated above 3,000 m on prominent ridgetops along the Marañon-Huallaga divide or between 2,800 and 2,000 m on lower eastern slopes now cloaked in tropical forest.

In general, documentary sources and archaeological evidence still provide scant clues to identify pre-Inca cultural boundaries, which must have shifted frequently with changing social alliances and cultural identities. Enough data are accumulating to begin identifying cultural variability within Chachapoya territory. Documentary sources describe a major Inca and colonial period administrative boundary between northern and southern divisions that shifted between Leymebamba and Cajamarquilla (now modern Bolivar). Archaeologically studied population concentrations and settlement types can be grouped into three imperfectly understood divisions. The first is evident along the Utcubamba-Marañon River divide and throughout the upper Utcubamba watershed. It includes ancient settlements at Kuelap, Caserones (perhaps ancient Papamarca), and Pirka Pirka above Uchucmarca. The second division stretches from Bolivar, southward along the Marañon-Huallaga divide as far as modern Pias, and includes Gran Pajatén and Cunturmarca. Limited exploration of the Huallaga side of the cordillera suggests that this division's demographic core may have lain on the now forested slopes. An apparently distinctive third division lies between Buldibuyo and Huancaspata, centering around the Parcoy and Cajas River tributaries of the Marañon River, and including the sites of Charcoy and Nuñamarca. This third, southernmost area is often excluded from recent considerations of Chachapoya territory, but documentary evidence suggests that it was part of Chachapoyas as the Spanish understood it. Archaeologically, the latter two divisions are the least known. This tripartite grouping may be more apparent than real, as vast stretches of remote and forested terrain remain unknown to science. Even the best-known areas have been inadequately sampled.

The eastern Andean cloud forest habitat of the Chachapoya, often called the "Ceja de Selva" or "Ceja de Montaña" (literally edge, or eyebrow, of the jungle), coincides with a major cultural boundary between highland societies participating in Andean cultural traditions and tropical forest lowlanders practicing Amazonian traditions. Geographers regard this sparsely inhabited region as the last forested South American wilderness. Indeed, the cloud forest represents an environmental transition of unparalleled magnitude. Much 20th-century literature depicts an equally rigid cultural dichotomy, split by the eastern "frontier" where Andean civilization ends and the "uncivilized" world of Amazonia begins. However, archaeologists have begun to recognize that the perceived dichotomy between civilized and savage worlds never existed prior to successive imperial conquests by the Inca and Spanish. The Chachapoya and many other poorly known eastern-slope societies left ample evidence of pre-Hispanic settlement in what was

thought to be an "empty" wilderness with scattered pockets of highland colonists tending coca fields. Archaeological and ethnohistorical analyses of the so-called Andean frontier now acknowledge the presence of elastic, fluid, and sometimes ephemeral series of social boundaries at this major cultural interface, where interaction was constant. Such boundaries shifted in response to circumstances both local and regional, endogenous and exogenous, as societies in each region offered rare and desirable natural or manufactured commodities to societies in other regions throughout the prehistoric past. A vast amount of archaeological evidence of pre-Hispanic settlement and economic activity is masked today by thick forests, which capitalist ventures repeatedly fail to exploit successfully in any sustainable fashion.

Biological Origins

Biological data from skeletal populations recovered by archaeologists remain paltry but promise to shed light on persistent questions of origins. Preliminary analyses of skeletons from Laguna de los Condores, Laguna Huallabamba, and Los Pinchudos document rather typical Native American physiognomies that may reflect variation within the parameters of Andean populations. Not a shred of evidence supports the notion of "White" Chachapoya populations of European or Mediterranean descent. In fact, studies of DNA from mortuary remains at Laguna Huallabamba linked one cadaver to a living descendent in the nearby village of Utchucmarca, a case demonstrating biological continuity between ancient and modern populations not unlike Britain's "Cheddar Man." The problem of origins of the very earliest Andean populations currently remains an issue of contention among archaeologists. Archaeological excavations at Manachaqui Cave in southern Chachapoyas unearthed stone tools and radiocarbon evidence demonstrating human occupation at the edge of the cloud forest by the end of the Pleistocene Epoch, as early as anywhere else in the highland Andes. Although the Manachaqui sequence is not uninterrupted, it yields cultural remains evincing remarkable stylistic continuity through the late pre-Hispanic centuries of Inca imperialism. Of course, cultural continuity does not necessarily reflect biological continuity. Continued biometric research on Chachapoya skeletal samples should address competing hypotheses related to transregional migrations, population interactions, and the antiquity and continuity of human occupation on the eastern slopes of the Central Andes.

Cultural Origins

Anthropology discovered Chachapoyas with the arrival of Adolf Bandolier at the end of the 19th century, while the first scientific archaeology in the region was conducted by Henri and Paula Reichlen during the 1940s. Throughout the 20th century, archaeologists addressed the question of Chachapoya origins, and opinions became divided as they pointed to either highland or lowland sources. Until the mid-1980s, and archaeological fieldwork coordinated by the University of Colorado and Yale University in the United States and Peru's Universidad Nacional de Trujillo, the notion that the Chachapoya Indians descended from late pre-Hispanic migrants from the neighboring highlands remained the predominant interpretation. Early radiocarbon dates from Gran Pajatén and Manachaqui Cave produced unassailable evidence that humans had occupied the montane cloud forests since 200 BC, and the greater eastern slopes by the end of the Paleo-Indian period. As data accumulate, the archaeology of Chachapoyas has begun to resemble that of other Central Andean regions, but the pre-Hispanic population density, the scale of landscape transformation, and the abundance of monument construction in this extremely wet and steep environment still defy intuition. The extraordinary architectural achievements at monumental sites like Kuelap and Gran Pajatén would garner world attention regardless of their geographical contexts. These characteristics, coupled with isolation from modern Peru's coast-centered economy, add to the mystique that has nourished pseudoscientific speculation on Chachapoya origins. But it must be borne in mind that the abandonment of this populated region began with early colonial period demographic collapse and forced-relocation programs. It became permanent with the alteration of indigenous social formations and modes of production and the extinction of cultural memories.

The characterization of pre-Inca Chachapoya boundaries previously offered should introduce the reader to the complex problem of identifying the origins of cultural identities such as the Chachapoya. The Chachapoya "culture," or cultural tradition, was comprised of practices and traditions that converged piecemeal and only crystallized when subjected to

particular internal or external forces that remain to be identified. This time of ethnogenesis, when the Chachapoya first appear archaeologically as a regional tradition with shared architectural, ceramic, and mortuary styles, is to some extent an "artifact" of archaeological visibility. Radiocarbon dates suggest that Chachapoya practices of building circular stone dwellings on terraced mountain tops and interring their dead in masonry cliff tombs date to around AD 1000, while more tenuous evidence suggests one or two centuries of additional antiquity. At Manachaqui Cave, the origins of diagnostic Chachapoya-style coarse brown pottery with appliqué decoration and folded rims can be traced all the way back to 1500 BC, when pottery first appears in the Andes.

The ceramic sequence from stratified deposits excavated from Manachaqui shows gaps between 400 BC and 200 BC, and AD 700 and AD 1000, yet basic shapes and decorative norms persist from earliest times to the European conquest. The Chachapoya preference for promontory settlement locations probably dates to centuries between AD 200 and AD 400, when settlement patterns shifted to higher mountain- and ridgetops all along the eastern slopes. The shift likely reflects a new emphasis on camelid pastoralism at higher altitudes, adoption of llama caravan transport technology, and entry into broadened spheres of Andean interregional exchange. Diagnostic Chachapoya architecture, cliff tombs, and iconography still lack radiocarbon evidence to establish a precise developmental chronology. Hence, the full fruition of the complete constellation of cultural attributes that scholars have come to identify as Chachapoyas remains poorly dated. However, it is already clear that Chachapoya "culture" did not simply arrive from elsewhere, but instead developed locally through processes similar to those that governed the development of other, better-known Andean cultures.

Language

The identification of the pre-Inca, indigenous Chachapoya language or dialects would contribute important information to resolve issues of Chachapoya origins. Unfortunately, recognition of these has been obscured by the Inca imposition of Quechua between AD 1470 and AD 1532 as the imperial lingua franca. The demographic collapse of the 16th and 17th centuries further contributed to the virtual extinction of aboriginal languages in the region. Evidently, there was no ecclesiastical interest in recording local languages for indoctrinary purposes, and the only surviving evidence of Chachapoya languages consists of names of individuals and places appearing in historical and modern records and maps. Analysis of these by several specialists has yielded inconclusive results. Most intriguing are recent suggestions of relationships to Jivaroan languages, which are presently spoken in the forested lowlands to the northeast. A distribution overlapping lowland and highland foothill environments would not be unprecedented, since the ethnohistorically documented Palta and Bracamoro of the southeastern Ecuadorian Andes spoke Jivaroan dialects. It is possible, perhaps likely, that several unrelated languages were spoken across pre-Incaic Chachapoyas and that a widely used trade jargon blended elements of these with pre-Incaic north Peruvian highland Quechua and minority language groups like Culle. While this proposal is speculative, it would help account for the extraordinarily murky picture of historical linguistics emerging from the region.

Economy

Documentary sources offer little to suggest that Chachapoya subsistence strategies differed greatly from those of other highland Andean societies. Cieza de León's observation that the Chachapoya kept substantial herds of camelids (llamas and alpacas) may reflect his surprise at finding these ubiquitous Andean herd animals in such extreme environments. Evidently, Chachapoya settlements were located to facilitate access to herds, as well as to fields for cultivating a typical mix of Andean staples, especially high-altitude tubers like potatoes, and maize, legumes, and squash from lower slopes. Remaining at issue is the question of whether the Chachapoya, or at least those "Chachapoya" populations settled deep in the eastern montane forests, were largely self-sufficient with regard to subsistence needs. The vast extent of terracing systems on eastern valley slopes attests to labor organization and agricultural production on a large scale. Although many scholars believe that such terraces were constructed for monocropping of maize and coca under imperial Inca direction, the emerging picture of the Chachapoya would instead suggest a long history of local economic and subsistence autonomy predating Inca hegemony. Of course, no Andean economy was ever entirely self-contained, as all societies relied to some degree upon interregional

exchange of items crucial to the maintenance of domestic and political systems.

In the moist soils at Chachapoya archaeological sites, food remains do not ordinarily preserve well, but recovered samples of charred potatoes, maize, and beans support documentary evidence. Studies of floral and faunal remains from the subalpine rockshelter Manachaqui Cave (3,650 m), coupled with paleoecological data from sediment cores recovered at nearby Laguna Manachaqui, suggest that local populations intensified the cultivation of high-altitude grains, like quinoa, by 2000 BC. Remains of maize and beans likely cultivated at lower altitudes appear around 800 BC, and camelids enter Manachaqui's archaeological record between AD 200 and AD 400. With the exception of the relatively late introduction of llamas and alpacas, these data exhibit a developmental sequence resembling those recovered from other Central Andean regions. Evidently, local populations did not adopt domesticated camelids as sources of meat and wool, as did Andean populations in neighboring regions. Instead, the appearance of camelids correlates with other evidence suggesting utilization of llamas as beasts of burden in broadening networks of Andean interaction.

Economic activities that lie at the heart of Chachapoya cultural development relate to the geographically privileged location of these societies. Poised strategically between populations that anthropologists typically dichotomize as "Andean" and "Amazonian," the Chachapoya supplied a crucial link in long chains of interregional communication and exchange. Because of its unusually deep penetration into the Central Andes, archaeologists have long believed that the Upper Marañon River valley west of Chachapoyas served as a major "highway" for migrations and trade throughout Andean prehistory. However, the role of the upper Marañon may be overrated, as its canyon is narrow and steep and the river is only seasonally navigable by balsa rafts through the canyon above the mouth of the Utcubamba River. By land, entry to the Central Andes from the northeastern lowlands can be gained only by traversing the populated ridgetops of Chachapoyas. By river, greater penetration of the Central Andes could be gained by canoe navigation up the Huallabamba River into the heart of Chachapoyas or by navigating the southward course of the Huallaga River as far as Tingo María in Huánuco Department. The latter route bypasses Chachapoyas, but also bypasses most of northern Peru. Scattered references to paved roads and Inca outposts in the forested Huallabamba valley further indicate that this was a major gateway to the Central Andes. During the mid-16th and 17th centuries, Chachapoyas was the jumping-off point for expeditions to Amazonia in search of mythical El Dorado. Ethnohistorical analyses describe the lowland Cholones and Hivitos Indians as trade partners living along the middle Huallaga. Products typically traded across the eastern slope would include feathers, wax, honey, stone and metal axes, coca, cotton, wool, vegetal dyes, hardwoods, slaves, medicinal herbs, and a host of products that do not ordinarily preserve in archaeological sites.

Although the Chachapoya are renowned as inhabitants of a remote and isolated region, the archaeological record attests to intensive interaction through extensive exchange networks stretching toward all points of the compass at one time or another. Evidence of long-distance interaction is evident in projectile point and pottery styles shared across considerable distances from earliest times. Studies at Manachaqui Cave reveal that exchange relations with populations to the north and east were particularly important prior to AD 200, when Chachapoya populations intensified their trade relationships with Central Andean societies in Cajamarca, Huamachuco, and the Callejón de Conchucos. Cajamarca trade ware and small amounts of Huari pottery attest to uninterrupted participation in Central Andean exchange networks through Inca times, when even coastal Chimu pottery finds its way into Chachapoya tomb assemblages. However, it was the trade linkages with lowland neighbors in the Huallaga Basin that the Inca coveted to the extent that they conquered, and reconquered, the Chachapoya at great expense. Extensive Inca constructions at sites like Cochabamba and Cuntur Marca reflect the importance of these localities as major entryways to the eastern lowlands. Chachapoyas is remote only to the degree it is isolated from Peru's national infrastructure. The archaeological evidence demonstrates that Chachapoya societies occupied an enviable position at one of South America's most important pre-Hispanic crossroads.

Sociopolitical Organization

Very little is known with certainty regarding indigenous Chachapoya sociopolitical organization, and especially the basis for "Chachapoya" cultural identity

prior to Inca conquest. Documentary evidence attests to unification of autonomous, small-scale polities with the imposition of Inca authority and its attendant political, economic, and religious infrastructure. In the context of empire, the Chachapoya amounted to an ethnic group, which, like other such Andean groups, was recognized by particular clothing and headwear. Current interpretations depict pre-Incaic Chachapoyas as a patchwork of "chiefdoms," or *curacazcos* in Andeanist parlance, led by local chiefs, or *curacas*. These, in turn, were based upon Andean kin-based corporate groups called *allyus* specific to certain settlements, or local clusters of settlements. The small circular dwellings typical of the Chachapoya suggest nuclear family habitations and bilateral descent. Virilocal residence patterns have been suggested. Espinoza's use of the medieval Spanish term *behetias* to describe Chachapoya polities may seem inappropriate as a concept borrowed from the Old World. However, it may be more accurate than "chiefdom" in characterizing political systems in which leadership status could be achieved as well as ascribed. Some pre-Inca Chachapoya polities may have indeed been "rank societies," conforming to the classic "chiefdom" model. However, a graded series of leadership statuses, including the kind of ad hoc and situational varieties described by Espinoza, likely characterized some Chachapoya communities. Archaeological evidence should speak to this problem, but neither chiefdomlike site hierarchies nor elite housing have been positively identified. Both documentary and archaeological evidence make clear that the Chachapoya were far more fractious and unruly than the Central Andean Wanka and other "classic" Andean chiefdoms.

After Inca conquest around 1470, imperial administrators installed a nested hierarchy of *curacas* and lower-level lords overseeing tributary units portioned in accordance with the Inca decimal accounting system. The Inca divided the new Chachapoya province into several *hunos* (groups of 10,000 tribute payers each), split into northern and southern divisions. Following the European conquest, a great deal of litigation occurred in Leymebamba in 1574, where local lords installed or displaced during decades of imperial machinations vied for legitimacy under the viceroyalty. The Inca had been forced to reconquer the rebellious Chachapoya at least twice, and repeated changes in political authority exacerbated factionalism, which further hinders ethnohistorical identification of pre-Inca political structures. A permanent state of political instability was the unintended result of consolidating local populations that subsequently forged a united resistance to Inca imperial authority. The resulting ethnogenesis of a unified Chachapoya group actually fortified an insurgent movement that leapt at the first opportunity to ally itself with Pizarro's Spanish forces against the Inca.

Religion

Documentary and archaeological sources render a picture of Chachapoya *ayllus* venerating ancestors, which they interred in "open" sepulchers built into cliff faces. Los Pinchudos, Laguna de los Condores, and Revash provide examples of mausolea where prominent kin groups maintained access to mummies and consulted with the dead on earthly matters. From these promontories, the ancestors "oversaw" community lands dotted with sacred landmarks central to memories of the mythical past. Mountains, prominent rocks, trees, and other natural features in the landscape could embody ancestor spirits that bestowed water and fertility upon the land. *Ayllus* looked to lakes, springs, and caves as places where their original "founding" ancestors emerged. A less typical Chachapoya mortuary practice was the enclosure of individual seated cadavers in conical clay capsules arrayed in rows along cliff faces. The most famous of these *purunmachus* are found at the site of Karajía, where the clay sarcophagi exhibit modeled heads and faces and elaborate red-painted decorations. Mortuary ritual included the painting of pictographs, usually large red concentric circles, on the rock above tombs. In short, the Chachapoyas landscape was animated with local ancestors, prompting Inca efforts to superimpose imperial symbolism through landscape modifications and new constructions. In this way, they legitimized their presence in Chachapoyas territory and exerted a measure of ideological control.

Although the details of Chachapoya mortuary practices are unique, local religious beliefs were evidently not unlike those of other Andean cultures. The Chachapoya were purportedly unified in their belief in a common deity, which, if true, may reflect construction of regional Chachapoya cultural identity through the metaphor of common descent from a single apical ancestor. Chroniclers mention the local worship of serpents and the condor as principal deities. The serpent is the single most prevalent image

in Chachapoya iconography, appearing in pottery and architectural embellishments. Details of other local deities and cyclical rituals performed to propitiate agriculture remain unknown. Apparently, the Chachapoya did not build temples dedicated to indoor ritual, although outdoor spectacles and feasts certainly took place in central plazas. Excavations in prominent buildings at the sites of La Playa and Gran Pajatén did yield quartz crystals, rare metals, and other evidence for ritual activities, perhaps within elite habitations, but no similar evidence has yet been reported elsewhere in Chachapoyas. Chronicles provide an inordinate number of references to powerful sorcerers, or "shamans," in this region. The importance of Chachapoya shamanism likely has local roots and probably relates to the accessibility of herbs, narcotic plants, and esoteric knowledge at a major gateway to the Amazon lowlands where the greatest shamans reputedly dwelled. However, social and political chaos during the colonial period probably led to widespread increase in the hostile sorcery witnessed by the Spaniards.

Art and Expressive Culture

Chachapoya art and iconography as we know it present themes of war, male sexuality, and perhaps shamanic transformation into alter egos, such as felines. Much expressive culture surely relates to ancestor veneration and agricultural propitiation, but such interpretations rely heavily on indirect evidence. The Chachapoya are most widely known for their stone carving and architectural skills, yet they have been described by chroniclers as among the greatest of Andean weavers. Still, Chachapoya textile arts remained virtually unknown until archaeologists rescued approximately 200 mummy bundles in 1997 from ongoing looting at the cemetery at Laguna de los Condores. The extraordinary preservation at the cliff cemetery now permits experts to unravel the details of Chachapoya weaving techniques and iconography. Designs on textiles, pyro-engraved gourds, and other media typically include representations of serpents, felines, and other fanged creatures, and feline-human hybrids. Anthropomorphic wooden sculptures accompany the dead at the Laguna and hang from ingenious wooden hinges beneath the eaves of mausolea at Los Pinchudos. Because of preservation conditions, wooden sculpture remains unknown elsewhere in the Andean highlands. An obsession with human heads, most frequently carved in stone and incorporated into building masonry, may represent concern for ancestors or trophy heads taken in war. These are among the most significant finds in a growing corpus of artistic media that promises to shed new light on Chachapoya culture. Unfortunately, the problem of looting at Chachapoya tombs is expanding, and sustained scientific archaeology in the cloud forest is a difficult and expensive enterprise.

— *Warren B. Church*

See also **Peru**

Further Readings

Church, W. (1994). Early occupations at Gran Pajatén. In *Andean Past, 4,* 281–318. (Latin American Studies Program, Cornell University, Ithaca, NY)

Schjellerup, I. (1997). *Incas and Spaniards in the conquest of Chachapoyas* (Series B, Gothenburg Archaeological Theses No. 7). Göteborg University, Sweden.

von Hagen, A. (2002). Chachapoya iconography and society at Laguna de los Condores, Peru. In H. Silverman & W. Isbell (Eds.), *Andean archaeology II: Art, landscape and society* (pp. 137–155). New York: Kluwer Academic/Plenum.

Chagnon, Napoleon (1938–)

Napoleon Chagnon is biosocial professor emeritus in the Department of Anthropology at the University of California, Santa Barbara. Chagnon was born in 1938 in Port Austin, Michigan. He earned his PhD in anthropology at the University of Michigan in 1966. There, he studied unilineal cultural evolution under Leslie A. White. Chagnon tested White's assertions that changes in technology played a primary role in social evolution when he gathered ethnographic field data among the Yanomamo Indians of Venezuela and Brazil. When Napoleon Chagnon began his study of the Yanomamo in 1964, few Whites had interacted with them, and none for extended periods of time. Chagnon was able to document the effects of Yanomamo acculturation to outside cultures, particularly the political

and technological impact of trade goods. Chagnon also documented the effects of diseases and epidemics introduced by lumbermen and miners on the Yanomamo population and social organization. In 1988, Professor Chagnon established a survival fund with nonprofit organizations to develop health care programs for the Venezuelan Yanomamo. The Yanomamo are victims of scourges like influenza and water pollution as a result of their contact with an influx of illegal miners.

Chagnon became world renowned for his analysis of Yanomamo warfare and his participant observation field research techniques. He is also widely respected for his international advocacy for Yanomamo land rights, environmental protection, and human rights. The nature of Yanomamo warfare and violence between villages has been the subject of much of Chagnon's research. Chagnon's most important observations of the Yanomamo include their use of hallucinogenic drugs in shamanistic healing rituals and the violent practice of fighting with axes. The "Ax Fight," captured on film, is a popular ethnographic CD-ROM for college students. Chagnon explains Yanomamo violence and warfare as a result of a shortage of wives, perpetuated by female infanticide and cycles of vengeance. In response to protein-shortage explanations for warfare asserted by other anthropologists, Chagnon and partner Raymond Hames measured the amount of protein in several Yanomamo villages. They did not find a correlation between protein levels in local diets and violent warfare.

Chagnon continues to gather field data among extremely remote Yanomamo villages contacted in the early 1990s.

In 1993, Chagnon was part of a team that investigated the violent murders of Yanomamo women and children by illegal miners. The massacre of the women and children followed the Yanomamo shooting of Brazilian miners who had killed Yanomamo men over territorial disputes. In 1999, Patrick Tierney alleged fieldwork misconduct on the part of Chagnon early in his research career, in a sensational book titled *Darkness in El Dorado.* The American Anthropological Association engaged in a detailed investigation in 2001 of the charges that Chagnon and geneticist James Neel had been the cause of a measles epidemic among the Yanomami people. All major allegations made by Tierney were shown to be not only false, but deliberately fraudulent.

Chagnon is currently engaged in computer-assisted longitudinal analysis of Yanomamo demography, settlement patterns, geography, and warfare patterns. He seeks to further understand and explain differences in Yanomamo village life and warfare intensity over time and place.

— Elizabeth A. Dyer

See also **Darkness in El Dorado Controversy; Participant-observation; Yanomamo**

Further Readings

Chagnon, N. A. (1967). Yanomamo social organization and warfare. In M. Fried, M. Harris, & R. Murphy (Eds.), *War: The anthropology of armed conflict and aggression.* New York: Natural History Press.

Chagnon, N. A. (1997). *Yanomamo: The last days of Eden* (5th ed.). San Diego: Harcourt, Brace, Jovanovich.

Chagnon, N. A., & Hames, R. (1979). Protein deficiency and tribal warfare in Amazonia: New data. *Science, 203*(4383), 10–15.

CHANTS

Chanting is an important linguistic act that is part of many secular and religious practices throughout the world. Many political rallies, sporting events, collective religious services, and private religious devotions involve some form of chanting. In general, chanting is distinct from other speech activities by having a unique rhythmic structure, by having distinctive stress and intonation patterns, and by being limited in significance to specific social situations.

The primary purpose of chants, in most cases, is to put the mind beyond words and into an altered state of consciousness in order to, for example, achieve enlightenment, to personally experience God, or to enter into the spirit world. Chanting such as this may be done alone or in a group. Anyone who has ever repeated the same word over and over again has noticed that any repeated word, or string of words, eventually seems to become strange and meaningless. Chanting like this can be found in Buddhist meditation, Christian devotions, shamanistic rituals, and in

other religious contexts. Since chanting like this seeks to affect the individual—even if done in a group—its orientation is toward the self, or ego.

In other cases, while the consciousness of the participants may still be altered, the ultimate purpose of the chanting is to express group solidarity and cohesiveness. Here, the chanting attempts to create oneness and unity in a group, so, its orientation is toward the assembly, or community. Liturgies and rituals in many different corporate religious practices use chanting as a way to bring participants into the ritual space and to define the community and everyone's place in it.

Source: © iStockphoto/Vicky Bennett.

Chanting that is oriented toward the community may be part of a larger complex sociolinguistic ritual. For example, in the liturgy of the Coptic Orthodox Church, the deacons, congregation, and the priest responsively chant for most of the time between the recitation of the Orthodox Creed and communion. This chanting is led by the priest. The deacons and the congregation must respond by chanting in the same language used by the priest. In Egypt, the languages used in the liturgy are Arabic, Coptic, and a little Greek. In Coptic Churches in the United States, the languages used are Arabic, Coptic, English, and a little Greek. The chanting is rhythmic, and the beat is maintained by deacons, who play the cymbals and triangle. The overall effect after only a short time is to induce an altered state of consciousness, in which the participants are drawn into the community of believers and prepared spiritually for the communion.

Communally oriented chanting like that of the Coptic Orthodox Church is meaningful, however, only when the community is gathered and the social roles of priest, deacon, and congregation are all represented. Chanting not only alters the consciousness of the participant but also acts to key different frames and, by so doing, defines the event, act, role, and genre of every event, action, and person in the Coptic liturgy. In this sense, chanting is a powerful sign that keys, or signals, the meaning of various symbols and symbolic acts in the liturgy. The action of a priest walking in a circle around the altar on a weekday, when there is no liturgy, has a different meaning than the same priest walking around the altar during the liturgy against a background of liturgical chant.

The use of chants is not restricted to religious settings. Chanting is also part of many secular activities, such as sporting events and political protests. Such chanting can be done to the point where it alters consciousness, but more frequently in these kinds of contexts, it is done to communicate idea and/or build emotional consensus in a group.

Throughout history, humans have explored many ways to extend the boundaries of linguistic thought and experience: alcohol, hallucinogenic drugs, folk riddling, fasting, exposure, and self-mortification, to name a few. Many instances of chanting can be viewed in a similar way, as an attempt to extend human cognitive experience. The fact that chanting, in some form, is nearly universal across cultures is not surprising. Language is also present across all cultures. So, similar linguistic boundaries are placed on all of humanity. Chanting, whether performed for personal enlightenment or to strengthen the bonds of community, is an effort to go beyond words to get to a transcendent awareness and/or feeling.

— *Richard R. Jones*

See also **Buddhism**

Further Readings

Abdel-Massih, E. T., Melika, Fr. M. M., & Michail, Fr. R. S. (1982). *The divine liturgy of St. Basil the Great.* Troy, MI: St. Mark Coptic Orthodox Church.

Bauman, R. (1977). *Verbal art as performance.* Rowley, MA: Newbury House.

Goffman, E. (1974). *Frame analysis.* New York: Harper Colophon Books.

Leach, E. (1976). *Culture and communication: The logic by which symbols are connected: An introduction to the use of structuralist analysis in social anthropology.* Cambridge: Cambridge University Press.

Chaos Theory

Chaos theory describes the motion of certain dynamical, nonlinear systems under specific conditions. Chaotic motion is not the same as random motion. It is especially likely to emerge in systems that are described by at least three nonlinear equations, though it may also arise in other settings under specific conditions. All of these systems are characterized by a sensitivity to initial conditions within bounded parameters. Chaotic systems must also be transitive (any transformation in period t_1 will continue and overlap in period t_2), and its periodic orbits are dense (for any point in the system y, there is another point with a distance $d = y$ in the same periodic orbit).

The history of this branch of study is a complex, interdisciplinary affair, with scholars in different fields working on related problems in isolation, often unaware of research that had gone before. One of the most important characteristics of chaotic systems is their sensitivity to initial conditions. In 1961, one of the fathers of chaos theory, Edward Lorenz, accidentally discovered this principle while studying a simple model of weather systems constructed from no more than 12 parameters. Wishing to review a certain set of results, he manually reentered values for these parameters from a printout and started the simulation again in midcourse. However, the new set of predictions that the computer made were vastly different from the first series that had been generated. After ruling out mechanical failure, Lorenz discovered that that by reentering the starting values of the parameters, he had truncated the decimals from five places to three. Lorenz and his colleges had assumed small variance in the inputs of a set of equations would lead to a likewise small variance in the outcomes. Yet in a system of complex or chaotic movement, very small variance in initial conditions can lead to large difference in outcomes. This property is popularly referred to as the "butterfly effect."

Theoretical Implications

While chaotic motion may make long-range forecasting of certain systems impossible, it is important to point out that it does not imply randomness. Rather, *chaos,* as the term is used in experimental mathematics, describes systems that are still deterministic that yield complex motion. Furthermore, patterns of predictable, or recurring, aperiodic motion may emerge out of this chaos.

It then follows that one way to visualize a complex system is by *attractors,* or *strange attractors,* which track the motion of the system through a three-dimensional space. In a truly random structure, the value of the system could be at any point in the three-dimensional space. With deterministic chaotic motion, the system's values are all found within a bounded subset of space. The shape of this bounded space will vary in predictable ways as the values of the initial parameters are increased in a proportionate series characterized by "Feigenbaum numbers." One of the most famous of these shapes is the "Lorenz attractor," which has been characterized as a set of linked concentric spirals that resemble either the eyes of an owl or butterfly wings. This was one of the first strange attractors characterized and is often remarked upon for its beautiful and complex fractal pattern.

Implications of Chaos Theory for the Social Sciences

While chaos theory is often characterized as a branch of experimental mathematics, it has important implications for many other fields of study. Early researchers in the development of chaos theory addressed issues in areas as diverse as physics, meteorology, ecology, and even understanding variation in cotton prices over time. Biologists and anthropologists working on ecology or population dynamic problems are no doubt already aware that simple logistic models of population growth can yield

chaotic outcomes when starting parameters are moved beyond certain levels.

Evolutionary biologists have wondered if certain strange attractors have phenotypical expression. For instance, it's interesting to note that not all possible forms can be reached through evolution. While there are certainly great variations in physical form between creatures, not all possible variations are expressed. The giant pangolin from Africa and the giant armadillo from North America look quite similar, but it is not because they are closely related. Rather, the phenomenon of convergent evolution raises the question of whether there are strange attractors for body types.

The social sciences could benefit much from chaos theory precisely because its area of study is often characterized by complex, nonlinear systems. Obviously, this has implications in formalized areas such as economics and game theory. It is also interesting to note that this may also have implications for other sorts of theorizing as well. For instance, teleological theories, such as those advanced by Hegel or Marx, predict that systems move toward a future steady state in which actions may happen but the nature of the system is not disrupted. These future states might be conceptualized as strange attractors for social systems.

One of the traditional misconceptions about teleology stems from the role of the end states. Objections are often raised to the idea that future end states can cause effects in the present (known as "backward causation"). Chaos theory provides a systematic argument for how the same parameters that cause the emergence of a strange attractor also select for a certain set of behaviors in the agents. Therefore, it is not the end state itself that generates change. This also has implications for how agency is conceived in social systems. The movement of a system from a state of random, or indeterminate, behavior to deterministic, or chaotic, behavior will affect the scope of individual agency. Nevertheless, a certain amount of agency remains in these explanations, not only in that a wide range of behavior remains possible once a strange attractor has been reached, but the principle of sensitivity to initial conditions means that much room may exist for agents to determine how the system develops.

— *Benjamin N. Judkins*

See also **Chaos Theory and Anthropology**

Further Readings

Alligood, K. T., Sauer, T. D., & Yorke, J. A. (1996). *Chaos: An introduction to dynamical systems.* New York: Springer.

Byrne, D. (1998). *Complexity theory and the social sciences.* New York: Routledge.

Gleik, J. (1987). *Chaos: Making a new science.* New York: Viking.

Kiel, L. D., & Elliot, E. (Eds.). (1996). *Chaos theory in the social sciences: Foundations and applications.* Ann Arbor: University of Michigan Press.

Wendt, A. (2003). Why a world state is inevitable. *European Journal of Political Science, 9,* 491–542.

Chaos Theory and Anthropology

Confusion is the word we have invented for an order which is not understood.

— Henry Miller, *Tropic of Capricorn*

For those who are familiar with anthropology, the themes of chaos and complexity might seem intuitively related to the field. Immersion in unfamiliar cultures is understood to produce disorientation, confusion, and perceptions of the foreign culture as "chaotic." Consequently, the relevance of chaos theory and complexity theory to anthropology might not require a detailed justification. Here, we make those connections explicit and suggest ways in which chaos theory and complexity theory might be useful in anthropological inquiry.

Chaos Theory

Both chaos and complexity theories have their roots in the development of systems theory, which emerged in the period during and after World War I. In particular, open systems were defined as "open" because they exchanged resources with their environment and "systems" since they were composed of a variety of interconnected and interacting components. The movement to systems theory might be thought of as the "holistic turn," which marked a departure from the reductionist or atomistic approach that sought to

break things down into smaller and smaller pieces in an effort to uncover their essence. In contrast, systems thinking can be characterized as the recognition that the whole is more than the sum of its parts. The parts can, in a sense, be understood as holographic representations of the whole, which, when combined create through their interaction a new and unique entity.

The development of chaos theory began in the 1970s with the work of Edward Lorenz, a meteorologist whose interest in modeling weather patterns led to the discovery that miniscule differences in initial conditions can have tremendous effects on outcomes. The observation became known as the "butterfly effect," described here by Ian Stewart (1989):

> The flapping of a single butterfly's wing today produces a tiny change in the state of the atmosphere. Over a period of time, what the atmosphere actually does diverges from what it would have done. So, in a month's time, a tornado that would have devastated the Indonesian coast doesn't happen. Or maybe one that wasn't going to happen, does. (p. 141)

While positivistic science would typically dismiss small differences as bothersome detail or noise, in chaos theory, these small differences became the subject of intense interest. Over time, this phenomenon became known as "sensitive dependence on initial conditions." What this meant for Lorenz and his interest in weather modeling at the time of his initial experiments was that accurate prediction of the weather was impossible.

A second important observation by Lorenz came through his search for a simplified version of his original experiment. The resulting phenomenon illustrates again that slight differences in initial conditions bring about vastly different outcomes. However, this time, there was something new: What initially appeared to be random behavior turned out not to be random at all. James Glieck, who introduced chaos theory to the general public in 1987, describes the Lorenzian water wheel:

> At the top, water drips steadily into containers hanging on the wheel's rim. Each container drips steadily from a small hole. If the stream of water is slow, the top containers never fill fast enough to overcome friction, but if the stream is faster, the weight starts to turn the wheel. The rotation might become continuous. Or if the stream is so fast that the heavy containers swing all the way around the bottom and up the other side, the wheel might then slow, stop, and reverse its rotation, turning first one way and then the other. (p. 29)

Anyone can observe the workings of a simple water wheel. What Lorenz showed was that the seemingly chaotic behavior of this simple device was actually ordered. Until this time, scientists recognized two types of order: steady state and periodic order. Steady state order describes behavior in which the variables never change, resulting in a repetitive pattern. Periodic order describes a pattern of a single loop that repeats itself indefinitely. Yet when the results of Lorenz's experiment were graphed, a third type of order emerged.

The results of the equations in Lorenz's experiment were also ordered, but neither steady state nor periodic. Never settling on a single point, the patterns did not repeat themselves. What appeared at first to be chaotic was in fact ordered, a phenomenon that became known as the "Lorenz attractor." Within the Lorenz attractor, the butterfly wings image shows both chaos and order: chaos in that the pattern is never repeated twice, and order in that the patterns fall within parameters.

The results of Lorenz's experiments were published in 1963. However, since his work appeared in a meteorological journal, his findings didn't reach a wide audience. It was years before those outside meteorology would hear about his work. Over time, individuals from fields including mathematics and biology reported similar phenomena in experiments with the flipping of a coin, the growth of populations, fluctuations in cotton prices, and coastline measurement. What these experiments brought to light were hidden and surprising aspects of behavior that were to become important concepts in chaos theory.

One of the key developments that emerged from continuing studies of chaos was the concept of the fractal, a graphic representation that embodies the attribute of self-similarity. The term *fractal* comes from *fractional*. Examples of fractals include bifurcation diagrams of Mandelbrot's population equation, the Lorenz attractor, and the Koch curve. Each of these figures exhibits some paradoxical feature that reveals the hidden order within apparently chaotic systems. For example, the Koch curve illustrates how each time new triangles are added to the outside of a triangle, the length of the perimeter line gets longer. Yet the inner area of the Koch curve remains less than

the area of a circle drawn around the original triangle. Essentially, it is a line of infinite length surrounding a finite area. Benoit Mandelbrot, a mathematician studying self-similarity, used this concept to explore anomalies in measuring the length of coastlines.

Developments in chaos theory were aided by advances in computation and measurement technologies. The introduction of high-speed computing had an effect similar to the impact made by the electron microscope. Both allowed scientists to see deeper into the nature of things that had previously been obscured because of the limitations of human vision and capacity to perform massive calculations. And while they allowed us to look deeper inside, they also expanded the scope of our vision: The bigger picture revealed obscure aspects of behavior that challenged long-held assumptions about the universe and the nature of life itself.

The implications of chaos theory would be taken up by researchers from a wide range of disciplines, who continued to evolve new theories. The following section introduces complexity theory and explains its relationship to chaos and other theories that emerged from the intellectual ferment of the early 20th century.

Complexity Theory

There is a close relationship between chaos theory and complexity theory. As previously noted, both grew out of the interest in holism and gestalt theories, followed after World War II by cybernetics and systems theory. What these intellectual movements had in common was the desire to replace reductionism with an appreciation for modeling interactions instead of simplifying them away. Described as strikingly similar to systems theory regarding environmental interaction and awareness, the three states defined by systems theory—organized simplicity, organized complexity, and chaos—are mirrored in the typologies of complexity theorists Stephen Wolfram and Chris Langdon: stability, Edge of Chaos, and Chaos.

Chaos theory, cybernetics, catastrophe theory, and general systems theory share a common interest in deterministic dynamic systems in which a set of equations predicts how a system moves through states from one point in time to another. What distinguishes complexity theory from the others is that it provides an alternative method for exploring regularities that emerge from the interactions of individual components within systems. In combination, these components form what is referred to in complexity theory as *complex adaptive systems* (CAS). One of the key contributors to the development of complexity theory, Murray Gell-Mann, identified four elements common to CAS: agents with schemata, self-organizing networks, coevolution to the Edge of Chaos, and recombination and systems evolution. As the examples of their application in the next section will attempt to demonstrate, each of these characteristics can be related to research topics in anthropology and the social sciences.

According to Robert Axelrod, known for his work on competition and collaboration involving Prisoner's Dilemma (a type of game in which two people engage in a scenario in which the successful strategy is one of cooperation based on reciprocity), complexity theory is the study of many actors and their interactions. Actors or agents might be people, organizations, nations, fish, populations, atoms, or simulated creatures, and their interactions can include any activity from warfare, alliance building, and new product development to mating.

This wide range of application has been cited as evidence to argue that there is no consensus on a definition of complexity science. Moreover, some argue that we cannot refer to complexity as a science or theory at all but should, instead, think of it as a paradigm or discourse, similar to Martin and Frost's characterization of postmodernism.Yet despite this debate, the application of constructs and concepts from complexity theory continues. The growing volume of related literature suggests that complexity is more than a theme. And, as with any new science, defining its parameters requires ongoing scholarly discourse.

A recognizable set of core concepts and principles has emerged to give form and substance to complexity theory. Many of these have worked their way into mainstream academic and practitioner literature. Examples include the Edge of Chaos, emergence, fitness landscapes, phase transitions, adaptive self-organization, and nonlinear feedback loops with mutual causality. The concepts of adaptive self-organization, coevolution, and agents have particular applicability to anthropology and are covered in some detail throughout this section. When applied to anthropological problems, each of these concepts provides new insight to the nonlinear dynamics of complex adaptive systems and the environments from which they emerge, develop, mature, and pass out of existence.

For anthropology, this means the opening of potential channels to investigate complex social systems, which are characteristically dynamic in nonlinear ways.

The risk inherent in applying constructs from complexity theory is that of allowing these concepts to degenerate into descriptive language or metaphor. Referred to as "soft complexity science," the use of complexity concepts and language helps to visualize or "see" the complexity inherent in social systems and sociotechnical organizations. Some complexity theorists refer to the lack of rigor in the use of complexity thought and language as "pseudoscience," which is thought to describe much of the work in complexity theory. While the value of metaphor is indisputable, there is much more that can be done in the way of applying complexity theory to the investigation of complex adaptive systems.

The maturation of new sciences (complexity science) involves the development of research tools and techniques. Rather than simply applying the concepts of complexity theory as a metaphorical lens, more rigorous approaches in the form of agent-based modeling and simulation are producing valuable insights across many scientific domains, including anthropology. Simulation allows researchers to model and demonstrate how the seemingly simple behavior of interacting agents can generate large-scale effects or "emergent properties" as they adapt to changing conditions in their environment.

It is important to stress that the objective of agent-based modeling and computer simulation is not to reproduce realistic models of empirical data. The goal instead is to bring to light the emergent recurring patterns of behavior that bring about a reordering of a complex system. It is important to have a deeper understanding of the dynamics of interaction that reappear across a wide range of diverse circumstances. So, rather than characterizing complexity theory by *what* is studied (i.e., societies, organizations, economies), Stephan Phelan argues that the focus should be on new methods for studying regularities or patterns such as those revealed by Axelrod's work with agent-based models of competition and collaboration.

Where traditional science has focused on simple cause-effect relationships, complexity science seeks to detect simple "generative" rules that cause complex effects. Generative rules are few and simple; they have been used to demonstrate how a group of artificial agents, such as cellular automata in the "Game of Life" or computer-generated flocking patterns ("boids"), will behave over time in a virtual environment.

In Phelan's words, "Complexity science posits simple causes for complex effects." In CAS, this behavior is referred to as *autogenesis,* or self-organizing behavior, which is generated by a set of relatively simple rules that govern the interactions between agents over time ("time t influences conditions at time t + 1"). These rules, in turn, create structure. According to Philip Anderson, "Rules generate structure because the state that is the output of one application of rules becomes the input for the next round." Structure evolves from ongoing interaction between agents within the unit itself, between the unit and other units with which it interacts, and within the larger systems to which it is related. Complexity theorists refer to as *coevolution*, a dynamic process through which components of a system known as "agents" not only adapt to their environments, but shape them over time. The conceptual overlap with cultural ecology and systems theory is clear.

It must be emphasized that models of adaptive behavior are significantly different from so-called rational choice models. The optimizing strategies that support rational choice models, such as those used in classic economics, are based on assumptions of rationality from which the consequences of specific choices can be deduced. In contrast, advocates of agent-based modeling and computer simulation argue it provides a more realistic representation of reality. Multiple agents following a few simple rules will often produce surprising effects, since anticipating the full consequence of even simple interactions is impossible. Although interaction is determined by the set of rules that generate the behaviors of individual agents, Anderson notes that agents need not be prisoners of a fixed set of rules. This notion of infinite variability and surprise is a common characteristic of complexity theory in computer and physical sciences, as well as in the application of complexity theory to social phenomena. In the domain of social phenomena, we can equate this to the capacity of human actors for choice, what Giddens refers to as "agency."

Understanding the central role and functions of the agent in agent-based models is essential to appreciating how complexity can be applied as a theoretical framework in anthropological research. Depending on the level of analysis, agents can be defined as individuals, groups, families, units, firms, or any other

entity distinguished by their differentiation from some "other." The key characteristic of agents is their ability to interact with other agents. The response of each agent is based on the responses of other agents, and their interaction results in the phenomenon of "coevolution." The "adaptive landscape," the field in which they interact, is constantly shifting. This connectivity is what gives CAS their dynamic nature.

Chaos, Complexity, and Anthropology

With its primary interest being the study of human societies and cultures, anthropology undoubtedly qualifies as a science interested in complex systems. The conceptualization of culture from the systems view can be discerned in the work of many of anthropology's key contributors to anthropological theory, notably Malinowski and Radcliff-Brown (functionalism), Steward and White (cultural ecology), and Lévi-Strauss (structuralism). More recent versions of cultural ecology have expanded on this systems view.

Despite obvious correlations, the systems view has been criticized by social science researchers for its mechanistic, deterministic overtones, which did not reflect the often messy reality of social systems. Its unpopularity can also be linked to the influence of postmodernism and distrust of theories of culture that hint at a unified theme. However, more recent iterations of systems thinking, such as chaos theory, have revealed dimensions within the randomness (or messiness) of apparently disordered systems that are found upon closer examination to be ordered, what Glieck calls the stable chaos of self-organizing systems. Complex systems such as social systems can give rise to both turbulence and coherence at the same time. Emergent order within apparent chaos is at the core of both chaos and complexity thinking. Modeling and simulation are the tools that have been developed by complexity scientists to explore this phenomenon.

In applying agent-based modeling to the investigation of complex social systems, it is important to establish the distinction between human responses to routine, known situations and those that address uncertain, complex, and unknown situations. This distinction highlights the critical difference between a closed system, in which equilibrium is maintained through routine responses without regard to external influences, and an open system that must respond to an unpredictable and constantly changing environment.

Although it can be argued that the closed-system model might have been appropriate for traditional anthropological studies of single, small-scale, and relatively isolated populations, it is clearly not adequate for the highly integrated, globalizing world that faces contemporary anthropologists. Chaos and complexity science provide not only a theoretical framework but also unique methods and tools useful in investigating how discrete parts of complex social systems, such as indigenous populations within developing countries or divisions of a multinational firm, relate to and are integrated within the larger environment as a whole. The interest in part-whole relationships is also a primary concern of anthropologists working in the social-cultural ecology framework.

The theme of interaction is consistent within systems and ecological approaches that share a common concern with the dialectic interplay between sociocultural systems, their environments, and reciprocity, or feedback causality, in which both the sociocultural system and environment influence each other. Environment has an active, selective role in shaping the evolution of culture; culture, in turn, influences the characteristics of its environment. This understanding of the relationship between environment and culture relates directly to the notion of coevolution, a key concept from complexity theory.

From the systems perspective, culture is conceptualized as a system of socially transmitted behavior patterns that serve as mechanisms that "adjust" human communities to their environments. Closely aligned to the concept of coevolution described in the previous section, manifestations of this perspective as sociotechnical or sociocultural systems tend to revolve around the notion of reciprocity and feedback. These concepts were also noted in earlier references to Axelrod's work with patterns of competition and cooperation.

The blending of variations of the systems view, chaos theory, and complexity science with anthropological theory provides new avenues for research. Within contemporary anthropology, the complexity of cultural multiplicity has become a prominent theme. Notions of negotiated cultures and nested cultural layers have developed through ongoing dialogue since postmodernism first challenged the assumptions of traditional anthropological thought. Hamada and Jordan explain that the classical concept of nature that explains differences between small, relatively homogeneous societies is challenged by social

groups without boundaries and whose memberships in these groups may overlap, causing shifting allegiances depending on the situation.

While complexity is a hallmark of contemporary social systems, as Hamada and Jordan suggest, the application of complexity theory is not limited to anthropological research on contemporary topics such as the effects of globalization on indigenous communities. Because of its capacity to bring to light emergent patterns within complex and seemingly chaotic systems, complexity theory has the potential to provide the theoretical framework and analytical tools required to accommodate research on complex social systems, regardless of their historic timestamp.

The village simulation model developed by Tim Kohler to study of the collapse of complex social systems and Robert Reynolds's work with cultural algorithms serve as examples. Developed using data collected from sedimentation and other archeological findings from the Mesa Verde region, the village simulation model was initially designed as an approach to understanding the behavior of pre-Hispanic inhabitants. It was hoped that the model would bring to light possible explanations for their disappearance, evidence of which is based on archeological studies of the region. The simulation produced evidence that suggested that more than environmental factors were involved in shaping the social history of the region.

Using Kohler's agent-based model of the Mesa Verde pre-Hispanic Pueblo region, Reynolds employed a framework for modeling cultural evolution. With the addition of cultural factors, Reynolds applied cultural algorithms to explore the emergent properties' impact. If the social system was brittle, it was hypothesized that any factor that induced stress could cause its collapse. By investigating the impact of environmental variability on the formation of social networks, Reynolds and coresearcher Ziad Kobti looked at how the spatial distribution of agricultural land and the temporal distribution of rainfall affected the structure of the social system.

Reynolds and Kobti were able to show how the distribution of agricultural resources was conducive to the development of so-called small-world networks, which depended on the existence of conduits or agents whose connectivity was sufficiently powerful to link the small worlds together. Without the conduits, the small-world network would be prone to collapse. Experiments suggest there was, in fact, a major decrease in these conduits, which would have had a negative impact on the resiliency of the small-world network.

Applicability of Chaos and Complexity Theories

What is particularly noteworthy about the development of both chaos theory and complexity theory is their widespread applicability to phenomena across diverse fields, ranging from computer science to the physical and social sciences. Both theories are inherently interdisciplinary with demonstrated relevance for investigating the workings of complex systems, meaning that the principles are applicable across a diverse spectrum of systems. For example, Joseph Sussman's characterization in 2000 of a complex system describes transportation, but it could also be applied to an economy or a society:

> A system is complex when it is composed of a group of related units (subsystems), for which the degree and nature of the relationships is imperfectly known. Its overall emergent behavior is difficult to predict, even when subsystem behavior is readily predictable. The time-scales of various subsystems may be very different. . . . Behavior in the long-term and short-term may be markedly different and small changes in inputs and parameters may produce large changes in behavior.

The closed-system perspective is, at best, an inaccurate lens for investigating the complex interactions and nested systems that characterize contemporary societies. For similar reasons, theoretical and methodological boundaries that limit the capacity of anthropologists to embrace the scope and depth of their research topics should be transformed by new theoretical paradigms that have proven in other fields to provide valuable insight on a wide range of complex adaptive systems. The recent works in archeology by Koehler and Reynolds serve as examples of how concepts from chaos theory and the methods and tools of complexity science can be applied.

Chaos theory and complexity theory offer anthropologists new areas of exploration and cross-disciplinary collaboration, especially important as the signature concept of anthropology (culture) and core methodology (ethnography) are being appropriated by other

disciplines. Anthropologists are remarkable in their ability to apply their unique skills, methods, and tools to other fields of research, for example, medicine, business, and engineering. However, we could be better at communicating and making explicit what Diana Forsythe called the "invisible" aspects of anthropological work.

Computer simulation has become a common research tool in applying complexity theory to the study of complex adaptive systems across a wide range of disciplines.

Engaging in interdisciplinary research, presenting at academic conferences outside anthropology, and coauthoring journal publications with colleagues from other fields all serve to enhance appreciation for the relevance of anthropology and value that anthropologists can bring to the study of crucial human problems and challenges confronting the world today.

The quote by Henry Miller that opens this entry suggests that order lies hidden beyond the state of confusion in which all appears chaotic. This encapsulates the basic premise of chaos theory and reflects an underlying approach to the investigation of phenomena that is compatible with the basic tenets of anthropology.

Exploring new research perspectives such as chaos and complexity theory provides opportunities for interdisciplinary discourse that both broaden anthropology's research perspective and further a wider understanding of the philosophical and theoretical underpinnings that form the foundation of anthropological inquiry.

— *Christine Z. Miller*

See also **Chaos Theory**

Further Readings

Alliare, Y., & Firsirotu, M. E. (1984). Theories of organizational culture. *Organizational Science, 5*(3), 193–226.

Anderson, P. (1999). Complexity theory and organizational science. *Organization Science, 10*(3) 216–232.

Axelrod, R. (1997). *The complexity of cooperation.* Princeton, NJ: Princeton University Press.

Glieck, J. (1987). *Chaos: Making of a new science.* New York: Penquin Books.

Hamada, T., & Jordan, A. (1990). Cross-cultural management and organizational culture. *Studies in Third World Societies, 32.*

Martin, J., & Frost, P. (1999). The organizational culture war games: A struggle for intellectual dominance. In S. Clegg & C. Hardy (Eds.), *Studying organization theory & method.* London, Sage Publications.

Phelan, S. E. (2001). What is complexity science, really? *Emergence, 3*(1), 120–36.

Reynolds, R. G. (1979). *An adaptive computer model of the evolution of agriculture for hunter-gatherers in the Valley of Oaxaca, Mexico.* Ann Arbor: University of Michigan.

Stewart, I. (1989). *Does God play dice? The mathematics of chaos.* Cambridge, MA: Blackwell.

Sussman, D. (2000). *Ideas on complexity in systems: Twenty views.* Cambridge: MIT Engineering Systems Division.

Chichén Itzá

Chichén Itzá emerged as a principal political player following the Late and Terminal Classic "collapse" of Maya polities in the southern and central lowlands. Situated in the northern lowlands of Yucatán, this center dominated as a regional power until the end of the Early Postclassic period (ca. AD 1200). Key to Chichén Itzá's success were its military accomplishments, blending of old and new cultural traditions, and emphasis on commercial transactions that extended beyond regional borders. Consequently, inhabitants of Chichén Itzá are characterized by their cosmopolitan attitudes manifested in art and architecture, religion, and politics.

Details about the earliest occupation of Chichén Itzá are poorly understood. We do know that in the site's southern section, Terminal Classic inhabitants (ca. AD 800–900), the Yucatec Maya, constructed Puuc-style buildings resembling those erected at Uxmal. One striking example is the Caracol, a spherical building set atop an earlier-constructed rectangular platform. A spiral staircase inside of the Caracol accesses an upper-level observatory. The building's unique design and orientation are believed to have facilitated viewing of astronomical events like planetary movements.

By the end of the 9th century, the Itzá, a Putún Maya group from Tabasco in Mexico, had established a formidable presence at Chichén Itzá. Consequently, this Mexicanized-Maya group instigated dramatic

Source: © iStockphoto/Justin Horrocks.

cultural change through hybridization. The architecture of this later period at the site is particularly innovative in this respect and references Toltec styles. Buildings concentrated in the site's northern section, like the Temple of the Warriors and the Castillo, displayed colonnades, images of warriors and feathered serpents, and *chacmools* (three-dimensional sculptures of reclining figures).

Aside from art and architectural styles, cultural hybridization also affected political organization at Chichén Itzá. Unlike Classic dynastic rulership, political authority in the Early Postclassic period (ca. AD 900–1200) was delegated to a group of elites who ruled jointly. Increased interregional contacts with groups throughout Mexico also occurred during this period, as a consequence of commercial and military endeavors.

By the end of the Early Postclassic period, Chichén Itzá's power had waned. There is evidence that the site had been sacked, quite possibly by inhabitants of Mayapan, a center that filled the political void after Chichén Itzá's demise. The city was abandoned by the beginning of the Late Postclassic period (ca. 1250 AD), though pilgrims continued to visit the Sacred Cenote.

In fact, visitation to *cenotes,* or natural limestone sinkholes, remains the one constant throughout Chichén Itzá's history. *Chichén Itzá* translates into "opening of the wells of the Itza." The presence of two at the site, the Xtoloc Cenote and Sacred Cenote, may have attracted early occupants. Cenotes offered a stable source of water and also functioned as sacred conduits to the underworld. Modern dredging of the Sacred Cenote has yielded human sacrifices and 30,000 objects, including gold artifacts from Panama and Costa Rica, copper from Mexico, and jade and obsidian from the Guatemalan highlands. The tremendous nature of this find underscored the sacred space's long-standing ceremonial usage.

Even today, Chichén Itzá has not lost its pull as a pilgrimage site. Religious obligations have been replaced by the siren songs of scientific inquiry and tourism. Future work at the site may further clarify question marks about chronology, ethnicity, and demography.

— *Pamela L. Geller*

See also **Mayas; Mexico**

Further Readings

Coggins, C., & Shane, O. C. (Eds.). (1984). *Cenote of sacrifice: Maya treasures from the sacred well at Chichén Itzá.* Austin: University of Texas Press.

Miller, M. E. (1996). *The art of Mesoamerica.* New York: Thames & Hudson.

Sharer, R. J. (1994). *The ancient Maya.* Stanford, CA: Stanford University Press.

Child Abuse

Child maltreatment has occurred throughout history and across cultures. Anthropology's cross-cultural approach has contributed to efforts to define and explain aggressive or inadequate treatment of children.

Child maltreatment was brought to public and professional attention when it was identified in the medical and social work literature in the United States and Europe during the 1960s and 1970s. The landmark publication by pediatrician C. Henry Kempe and his colleagues coined the term *the battered child syndrome* and is frequently viewed as initiating the field. The International Society for Prevention and Treatment of Child Abuse and Neglect was founded in the late 1970s, seeking to bring worldwide attention to the problem.

Many nations had similar experiences of first denying the existence of child maltreatment within their boundaries, only to later "discover" its existence. This stimulated interest in the broader cross-cultural record. Anthropology's cross-cultural perspective has contributed to understandings of definitions and etiology of and a literature on culturally competent responses to child maltreatment.

Defining Child Abuse and Neglect

Criteria for defining and identifying child abuse and neglect were developed in European and North American societies by professionals working primarily in clinical settings. Early definitions of child maltreatment centered on physical harm resulting from acts of omission or commission by parents and other caretakers. Over the next 40 years, definitions expanded in both the national and international literatures to encompass a broad range of harms to children. The four basic categories of child maltreatment are *physical abuse, physical neglect, emotional maltreatment,* and *child sexual abuse.* Neglect may also include *medical neglect* or *educational neglect. Munchausen's Syndrome by Proxy,* an illness fabricated by a parent that can cause harm to a child, is also generally included in the spectrum of child maltreatment. *Fatal maltreatment,* in which a child dies from a repetitive pattern of abuse and/or neglect, is often a separate category in the professional literature.

As international work in child abuse expanded, additional definitional categories were added. Even though these problems exist in Euro-American nations, the international literature brought them more to the forefront. These include *child labor* that extends beyond family-based subsistence and is exploitative, and *child prostitution.* In addition, *selective neglect,* or *underinvestment,* has been identified in international demographic data through patterns of differential mortality in which some categories of children are less likely to thrive or survive due to medical, nutritional, and other forms of inattention and neglect.

Establishing culturally valid definitions of child maltreatment has been complex. Identification of child maltreatment relies on a complex interaction of (a) harm to the child, (b) caretaker behaviors that produced or contributed to that harm, and (c) societal or cultural assignment of responsibility or culpability. Just as there is no absolute standard for optimal child rearing that would be considered valid cross-culturally, there has been difficulty in establishing a universal definition of abusive or neglectful behavior. Three definitional levels have been suggested for culturally informed definitions of child maltreatment. First, cultural practices vary, and what one group considers abusive, another group may consider well within the normative range of behavior. Differences in definitions of child maltreatment that can be ascribed to differences in normative cultural beliefs and practices are not, strictly speaking, abuse, since they are not proscribed, at least by the group in question. This does not preclude discussions and evaluations of the relative harm and benefit of different culturally accepted practices but puts different practices in context. Second, idiosyncratic departure from cultural standards and norms affords an intracultural view that highlights those individuals who violate the continuum of acceptable behavior. And third, societal-level maltreatment of children is sometimes confused with culturally acceptable behaviors. Societal

neglect refers to the level of harm or deprivation, such as poverty or war, that a larger political body (nation) tolerates or inflicts on its children. Because child maltreatment has not always been labeled as such in other cultures, some anthropological works have examined physical punishment or emotional climate, as maltreatment requires that behaviors meet three criteria. First, the behavior must be proscribed by the culture in question. Second, it must be proximate to the child and caretaker and not be harm that results from broader conditions beyond parental or caretaker control, such as warfare or famine. And third, it must be potentially preventable.

Incidence and Demographics

In the United States, between 800,000 and 1 million children are identified as abused or neglected each year as a result of reports to child protection agencies. Between three and five children die from fatal maltreatment each day, and homicide by parents is a leading cause of trauma-related death for children under 4 years of age. Between one half and two thirds of child maltreatment cases are neglect. Children under 3 years of age have the highest rates of victimization. Victimization rates are similar for males and females, with the exception of child sexual abuse, in which approximately three to four times more girls than boys are involved.

There is limited data on incidence and prevalence of child maltreatment cross-culturally. While the available evidence suggests that child maltreatment occurs, or has the potential to occur, in all societies, the differential distribution is difficult to estimate. Definitional issues discussed above increase the difficulties in making valid cross-cultural or cross-national comparisons. Despite increasing international awareness, child abuse and neglect are often difficult to recognize or make sense of in the small populations often studied by anthropologists. Because child maltreatment is a low base-rate behavior, it may be rare in a small population during a single year of fieldwork. Rare cases that seem at odds with more general cultural patterns, then, may not find their way into the literature. In addition, it often is difficult to estimate the incidence or prevalence of child maltreatment in societies with high infant and child mortality rates due to disease or malnutrition.

In the United States, there is controversy about whether there are differential rates of child maltreatment across ethnically diverse populations. Questions remain as to whether a higher proportion of reports in poor ethnic minority populations is due to stresses associated with poverty leading to maltreatment or due to increased scrutiny by public welfare agencies leading to higher reports.

Etiology

The etiology of child abuse and neglect is poorly understood, even within those nations that have the longest history of research and policy attention to the problem. More sophisticated etiological models stress the importance of an ecological framework, with risk and protective factors transacting across the ecological levels of individual factors, family factors, community factors, and factors in the larger sociocultural environment. These complex theoretical models, however, have rarely been adequately subjected to empirical testing and research.

A cross-cultural perspective has the potential to enhance understanding of the complex interaction of risk and protective factors that contribute to or prevent the occurrence of child maltreatment. It is not currently known whether common or divergent pathways lead to child maltreatment across diverse populations. For example, does the interaction of poverty and an individual history of child maltreatment have different consequences in different community contexts? Etiological factors should have explanatory power both within and between cultures.

The cross-cultural record sheds some light on categories of children at risk for maltreatment. Even in cultures in which children are highly valued and rarely punished, some children may receive a lesser standard of care than other children. These categories of children may be identifiable through demographic analyses that suggest differential survival by factors such as gender or birth order. Identification of categories of children at risk also requires knowledge of cultural values on specific child behaviors or traits.

Circumstances in which children have diminished social supports or in which social networks are lacking or deficient have also been suggested as increasing the risk of maltreatment. Social networks can act either to prevent child maltreatment or to exacerbate the risk of its occurrence. Social networks, on the one hand, provide the context for assistance with child care, for redistribution of children who may be at risk for maltreatment, and for the establishment, scrutiny,

and enforcement of standards of child care and treatment. These functions of social networks should diminish the likelihood of child abuse and neglect. On the other hand, some abusive or neglectful families may be embedded in closely knit but maladaptive networks. Abusive parents may engage with others whose child-rearing attitudes and behaviors are similar to their own. Networks in which attitudes and behaviors toward children tend toward the aggressive or neglectful may provide precisely the kind of role models that facilitate abuse. Network members may be hesitant to intervene or to report maltreatment because their own behavior is similar. They may be fearful that if they report others, they risk reporting themselves. In addition, network members may be isolated from community facilities and supports and therefore may not know how to access supports or services for themselves or for an abusive parent in their midst. Inequality of power between parents has also been implicated in the etiology of child abuse cross-culturally.

Consequences of Child Abuse and Neglect

Child abuse and neglect has been associated with increased risk of adverse outcomes. Not all abused and neglected children suffer immediate or lasting consequences beyond their immediate injuries. Nevertheless, abused and neglected children are at increased risk for a range of physical, mental/emotional, and social/behavioral difficulties. The pathways to these outcomes are complex. Cross-culturally, children who are treated with rejection rather than with warmth and acceptance by their parents and caregivers display negative psychological outcomes.

Cultural Competence in Child Maltreatment

Child abuse and neglect was originally identified in European and Western nations, and many of the formulations about its definitions, causes, and consequences stem from these origins. Anthropology has offered broader understandings of the issues by applying the cross-cultural record both internationally and for diverse populations within multicultural nations. This is a field with many possibilities for future research.

— *Jill E. Korbin*

Further Readings

Handwerker, H. P. (2001). Child abuse and the balance of power in parental relationships: An evolved domain-independent mental mechanism that accounts for behavioral variation. *American Journal of Human Biology, 13,* 679–689.

Korbin, J. (1987). Child maltreatment in cross-cultural perspective: Vulnerable children and circumstances. In R. Gelles and J. Lancaster (Eds.), *Child abuse and neglect: Biosocial dimensions* (pp. 31–55). Chicago: Aldine.

Korbin, J. (1987). Child sexual abuse: Implications from the cross-cultural record. In N. Scheper-Hughes (Ed.), *Child survival: Anthropological perspectives on the treatment and maltreatment of children* (pp. 247–265). Dordrecht, Holland: D. Reidel.

Korbin, J. E. (1997). Culture and child maltreatment. In M. E. Helfer, R. Kempe, & R. Krugman (Eds.), *The battered child* (5th ed., pp. 29–48). Chicago: University of Chicago Press.

Korbin, J. E. (1998). "Good mothers," "babykillers," and fatal child maltreatment. In N. Scheper-Hughes & C. Sargent (Eds.), *Small wars: The cultural politics of childhood* (pp. 253–276). Berkeley: University of California Press.

Levinson, D. (1989). *Family violence in cross-cultural perspective.* Newbury Park, CA: Sage.

National Research Council. (1993). *Understanding child abuse and neglect.* Washington, DC: National Academies Press.

Rohner, R. (1986). *The warmth dimension: Foundations of parental acceptance-rejection theory.* Beverly Hills, CA: Sage.

Scheper-Hughes, N. (Ed.). (1987). Child survival: Anthropological perspectives on the treatment and maltreatment of children. Dordrecht, Holland: D. Reidel.

Scheper-Hughes, N., & Sargent, C. (Eds.). (1998). *Small wars: The cultural politics of childhood.* Berkeley: University of California Press.

Childbirth

Until recently in the history of human beings, childbirth has been the exclusive work of women, who labor and bear down with their uterine muscles to deliver their babies from their wombs into the larger world of society and culture. Today, however, increasing

Source: © iStockphoto/Erick Jones.

numbers of the world's women deliver babies via the medical establishment's use of forceps, vacuum extractors, surgery through cesarean section. The medical definition of *birth* is the emergence of a baby from a womb, a definition that minimizes women's involvement and agency. This definition and its implications encode the challenges faced by social scientists who study childbirth.

Anthropologists have consistently shown that, although childbirth is a universal fact of human physiology, the social nature of birth and its importance for survival ensure that this biological and intensely personal process will carry a heavy cultural overlay, resulting in wide and culturally determined variation in childbirth practices: Where, how, with whom, and even when a woman gives birth are increasingly culturally determined.

Brigitte Jordan's comparative study of birthing systems in Holland, Sweden, the United States, and Mexico's Yucatan, originally published in 1978, was the first to comprehensively document the wide cultural variations. Her biocultural approach focused on the cultural definition of birth, the place of birth, birth attendants, artifacts to facilitate or control birth, and differences in knowledge systems about birth.

Among these, place of birth has emerged as most salient for how birth happens. In home settings across cultures, from huts to mansions, childbirth flows according to the natural rhythms of labor and women's social routines. In early labor, women move about at will, stopping their activities during the 45 seconds or so per contraction and continuing their activities, which may include doing chores, chatting, walking, eating, singing, dancing, and so on. Such activities subside as they begin to concentrate more on the work of birthing, often aided in this labor by massage and emotional support from their labor companions, who are usually midwives. Many cultures have rich traditions about who should be present (sometimes the father, sometimes only women, sometimes the whole family and/or friends), how labor support should be provided, what rituals should be performed to invoke the help of ancestors or spirits, and what herbs and hand maneuvers may be helpful to assist a birth or stop a postpartum hemorrhage. When birth is imminent, women at home usually take upright positions, squatting, sitting, standing, or on hands and knees, often pulling on a rope or pole or on the necks or arms of their companions, and work hard to give birth, rewarded by the baby in their arms. Postpartum practices vary widely: Some cultures encourage early breast-feeding; some code colustrum as harmful and feed the baby other fluids until the breastmilk comes in. Steam and herbal baths and periods of postpartum confinement are often culturally prescribed, varying in length from a few to 40 days.

Where freestanding birth centers exist, whether staffed by traditional or professional midwives, the experience of birth is resonant with the experience of birthing at home—a free flow. There are no absolute rules for how long birth should take. As long as the

mother's vital signs are good and the baby's heartbeat is relatively stable, trained attendants allow birth to proceed at its own pace.

Birth in the hospital is a different experience. The biomedical model that dominates hospital care demands that births follow familiar patterns, including cervical dilation of 1 cm per hour—an arbitrary rule unsupported by science but consistent with industrial patterns of production. Ensuring a consistent labor requires frequent manual checking of cervical dilation, which, if determined to be proceeding too slowly, may be augmented by breaking the amniotic sac and administrating the synthetic hormone pitocin (syntocinon) intravenously to speed labor. In Western-style hospitals, staff may monitor the strength of the mother's contractions and the baby's heart rate. At the moment of birth, the vaginal opening may be deemed too narrow to permit an easy birth and so an episiotomy may be performed to widen the vaginal outlet. Such surgeries may be medically unnecessary in as many as 90% of births, but some researchers interpret such routine obstetric procedures as symbolic of the core values of the technocracy, which center around an ethos of progress through the development and application of ever-higher technologies to every aspect of human life, including reproduction.

In a world where the high technologies of Western medicine are valued, many developing countries destroy viable indigenous birthing systems and import the Western model even when it is ill-suited to the local situation. Western-style hospitals built in the third world may be stocked with high-tech equipment but lack the most basic supplies. Hospital staff may have little understanding of or respect for local birthing traditions and values, resulting in local women avoiding such hospitals whenever possible. From Northern India to Papua New Guinea to Mexico, indigenous women echo each other's concerns about biomedical hospitals and clinics in both rural and urban areas: "They expose you." "They shave you." "They cut you." "They leave you alone and ignore you, but won't let your family come in." "They give you nothing to eat or drink." "They yell at you and sometimes slap you if you do not do what they say." Ironically, none of the rules and procedures these women find so alarming are essential to good obstetric care; rather, they reflect the importation of the culturally insensitive technocratic model.

This Western-style model of childbirth, sold to governments as "modern health care" and to women as "managing risk" and "increasing safety in birth," has resulted in an unprecedented explosion of technological interventions in birth, including cesarean sections. Despite the World Health Organization's (WHO) demonstration that nowhere should cesarean rates be above 15%, cesarean rates for Taiwan and China are at 50%; for Puerto Rico at 48%; for Mexico, Chile, and Brazil at around 40%; for the United States at 27.6%; and for Canada and the United Kingdom at 22%. Other factors in the rise of cesarean births include physician convenience and economic gain and deeply ingrained medical beliefs that birth is a pathological process that works best when technologically controlled. The Netherlands meets the WHO standard with a cesarean rate of 12%, reinforced by the excellence of birth outcomes in that country. This success is entirely cultural: In combination with Dutch cultural values on family, midwifery care, and careful attention to scientific evidence, the definition of birth in the Netherlands is as a normal, physiological process, resulting in minimal interventions in hospital birth and the high home birth rate of 30%. In contrast, in most of the developed world, home birth rates hover around 1%, despite its demonstrated efficacy and safety.

The disparity between the scientific evidence in favor of less intervention in birth and the increasing interventions of actual practice reflects

- widespread acceptance of the Western technocratic model of medicine as the one on which to base developing health care systems
- the political and economic benefits to physicians and technocrats from the imposition of this model
- the forces of globalization and their concurrent trends toward increasing technologization
- women's concomitant faith in this model as the safest practice for birth

Nevertheless, many contest this model's domination. In addition to the thousands of local birthing systems, three primary models for contemporary childbirth exist throughout the world: technocratic, humanistic, and holistic. The technocratic ideology of biomedicine views the body as a machine and encourages aggressive intervention in the mechanistic

process of birth. The reform effort located in the humanistic model stresses that the birthing body is an organism influenced by stress and emotion and calls for relationship-centered care, respect for women's needs and desires, and a physiological, evidence-based approach to birth. The more radical holistic model defines the body as an energy system and stresses spiritual and intuitive approaches to birth. In dozens of countries, humanistic and holistic practitioners and consumer members of growing birth activist movements use scientific evidence and anthropological research to challenge the technocratic model of birth. They seek to combine the best of indigenous and professional knowledge systems to create healthier, safer, and more cost-effective systems of birth care.

Yet from an anthropological point of view, all three paradigms are limited by their focus on the care of the individual. For example, mortality resulting from birth is widely recognized as a massive global problem. Biomedicine identifies conditions such as hemorrhage and toxemia as major causes of maternal death, and it advises investment in doctors, hospitals, and rural clinics to provide prenatal care to prevent toxemia and active intervention immediately after birth to prevent hemorrhage. In contrast, anthropological research in countries with the highest maternal mortality rates highlights the general poor health of women, who suffer from overwork, exhaustion, anemia, malnutrition, and a variety of diseases resulting from polluted water, showing that the most important interventions required for improving women's health and for increasing safety in birth are clean water, adequate nutrition, and improved economic opportunities for women.

— Robbie E. Davis-Floyd

See also **Midwifery**

Further Readings

Davis-Floyd, R. E., & Sargent, C. (1997). *Childbirth and authoritative knowledge: Cross-cultural perspectives.* Berkeley: University of California Press.

DeVries, R., van Teijlingen, E., Wrede, S., & Benoit, C. (Eds.). (2001). *Birth by design: Pregnancy, maternity care, and midwifery in North America and Europe.* New York: Routledge.

Jordan, B. (1993). *Birth in four cultures: A cross-cultural investigation of childbirth in Yucatan, Holland, Sweden, and the United States* (4th ed.). Prospect Heights, OH: Waveland Press.

Childe, Vere Gordon (1892–1956)

Vere Gordon Childe was a 20th-century archaeologist whose work concentrated on European prehistory, social evolution, and origins of the archaic state.

Born in Sydney, Australia, in 1892, Childe moved to Britain to begin his studies at Oxford University in 1914. After brief involvement in left-wing politics in his native Australia, he returned to England to work in the library of the Royal Anthropological Institute, where he came to publish his first book, *The Dawn of European Civilization* (1925). In 1927, Childe accepted the Abercromby Chair of Archaeology at the University of Edinburgh, where he concentrated his writings on European and Near Eastern prehistory. At this time, he conducted excavations throughout Scotland and published widely on his results, notably, *The Prehistory of Scotland* (1935). Childe left Edinburgh in 1946 to become director and professor of European archaeology at the University of London's Institute of Archaeology. Childe retired in 1956 and returned to Australia, where he fell to his death during a survey of rock formations later that October.

Collectively, Childe's earliest works on European prehistory argue that such cultural innovations as agriculture and metallurgy were developed in Egypt and Mesopotamia and later spread through trade and migration to prehistoric Europe, then a patchwork of heterogeneous societies. Arguing against popular notions that saw European civilization as racially and cultural "pure," Childe insisted that Europe benefited from external influences that upset the status quo and introduced new cultural practices into the region. Europe had adopted the Near East's advancements and reconfigured them in such a way that the student soon surpassed the teacher.

By the 1930s, archaeologists had become dissatisfied with cultural relativism and historical particularism and sought alternatives for explaining why cultures change. Childe introduced a modified social evolutionary framework, multilinear evolutionism, in

which a culture followed a trajectory of increasing/decreasing categories of social complexity (usually band, tribe, chiefdom, and state). While he did not disregard diffusion, Childe sought broader political and economic contexts in which to explain transformations in cultural practices. Change occurred because the role that political and economic institutions played in a society resulted in tensions between progressive and traditional practices. The influence of Marxism, especially historical materialism, on Childe is evident in his explanation of change as a product of conflict.

Toward the end of his career, Childe sought explanations for the origins of the archaic state. With more efficient agricultural practices, he argued, communities produced beyond their everyday necessities, creating a need to manage and distribute this surplus. Efficiency in agricultural production created a role for full-time specialists such as craftsmen and bureaucrats, who engaged in recursive relationships with agriculturalists. Citing the need to supervise large public works such as irrigation canals along with the need to resolve social conflict, Childe suggested a demand for a centralized organization (i.e., the state) to effectively coordinate this complex infrastructure. Childe set out 10 characteristics of archaic states: (1) increase in settlement size, (2) urban dwelling, full-time specialists, (3) taxation for surplus building purposes, (4) monumental architecture, (5) the emergence of a class-stratified society, (6) recording systems, (7) the development of counting, measuring, and calendrical systems, (8) an advancement in artistic expression, (9) the growth in long-distance trade in luxuries, and (10) a politically organized society based on territory rather than kinship.

— *Benjamin W. Porter*

See also **Political Economy; Social Change**

Further Readings

Childe, V. G. (1951). *Man makes himself.* New York: New American Library of World Literature. (Original work published 1936)

Harris, D. R. (Ed.). (1994). *The archaeology of V. Gordon Childe: Contemporary perspectives.* Chicago: University of Chicago Press.

Trigger, B. G. (1980). *Gordon Childe: Revolutions in archaeology.* New York: Columbia University Press.

Childhood

Since the Industrial Revolution, most Western societies have come to consider childhood as a time of innocence rooted in biological processes that gradually progress from infancy, childhood, and adolescence into adulthood. In this concept, all youth are defined as minors who are dependent upon adult guidance and supervision; accordingly, youth are denied legal rights and responsibilities until they reach the age that legally defines adulthood. Progressive social scientists view childhood as a concept dependent upon social, economic, religious, and political environments. Rather than see childhood as a time of nonparticipation and dependence, social constructionists see childhood as an expression of society and its values, roles, and institutions. In this sense, childhood is conceptualized as an active state of participation in the reproduction of culture. Indeed, constructionist views of childhood state that childhood is not a universal condition of life, as is biological immaturity, but rather a pattern of meaning that is dependent on specific sets of social norms unique to specific cultural settings.

Childhood can be characterized as the interplay and conflict of and between institutions, individuation, and individualization. Childhood is positioned within this triangulation, revealing how institutions such as day care and kindergarten are rooted in women's labor issues, creating a pull between the pedagogical needs of children versus the economic needs of adults. Individuation is the process by which individuals become differentiated from one another in society. This process identifies childhood as the target for the attention of the state and produces institutions and care providers who delimit the individuality of children. Therefore, a basic tension exists between individual development and collective needs, between the real needs of children and the economic and political needs of adults. Hence, childhood is kept within specific boundaries defined by institutions administered by adults. Therefore, children can be seen to be at the beginning of the process of individualization, long ago achieved by men and only recently achieved by women.

It has been suggested that childhood constitutes a social class, in that children are exploited in relation to adults, who determine and define the needs of childhood according to adult terms. This forces us to place the analysis of childhood in a political-economic

frame and shows how children are actually buried in the ongoing division of labor within the adult world.

Childhood Reflects Structures of Power and Domination

The Industrial Revolution in 19th-century Europe resulted in major transformations in economic and social relations. These transformations resulted in the concentration and penetration of capital, which generated two distinct classes: bourgeoisie and proletariat. With this transformation, we see the separation of childhood as distinct from adulthood. Children were differentially affected by industrialization according to class and family relations. Innocence, purity, protection, and guidance define the children of the bourgeois class, while children of the proletariat were considered to be miniature adults who constituted a reserve pool of labor power in early and middle industrial capitalism. Children of the upper classes received private education that trained them for positions of leadership and power, while children of the working class were often put to work alongside adults in factories and sweatshops in industrial Europe.

Economics

A key step in redefining childhood beginning in the mid-1800s was the removal of children from the public sphere. The state, religious, and civil societies each had particular interests in redefining childhood and in removing children from their exposure to the adult world. Growing industrialism demanded an unimpeded free labor market, where child labor was plentiful and cheap. However, toward the end of the 1800s, new reformist attitudes about the detrimental effects of child labor were forming. Protestant Christians and social reformers' concerns about the physical and emotional hazards of child labor helped to initiate the welfare movement and led to debates about the desirability and feasibility of controlling the child labor market.

Childhood Changes Culturally

Conceptualizing childhood in diverging cultural settings requires an anthropological perspective that sees children and childhood as windows into societies. Unfortunately, anthropologists have not taken childhood and children seriously enough, focusing instead on adult society as the locus of interest and change. Currently, there is a growing movement in social science to view children as active agents who construct meanings and symbolic forms that contribute to the ever-changing nature of their cultures. Not only are children contributing to the complex nature of cultural reproduction, they are accurately reflecting the unique nature of their specific culture.

Margaret Mead's *Coming of Age in Samoa* (1928) explored the theoretical premise that childhoods are defined by cultural norms rather than by universal notions of childhood as a separate and distinct phase of life. The term *youth culture* was introduced in the 1920s by Talcott Parsons, who defined the life worlds of children as structured by age and sex roles. Such a definition marginalized and deindividualized children. The work of Whiting and Edwards, during the 1950s to late 1970s, in diverse cultural settings, developed methodologies to explore what they exemplified as cross-societal similarities and differences in children. Their attempts at producing a comprehensive theory about childhood development, cognition, and social learning processes were informative and groundbreaking. Their work linked childhood developmental theories to cultural differences, demonstrating that children's capacities are influenced as much by culture as by biology. By the 1980s, social research had moved into predominately urban studies, where youth groups and gangs were conceptualized and defined by American sociologists as deviants rebelling against social norms. Current authors such as Qvortrup, Vered Amit-Talai, Wulff, and Sharon Stephens are recasting global research on childhood by defining children as viable, cogent, and articulate actors in their own right. Such research has spawned strident debates concerning the legal rights of children versus the legal rights of parents.

Managing the Social Space of Childhood

Reform of child labor laws required that the needs of poor families, reformers, and capitalists be balanced. In this equation, public education became a means by which children could be removed from the public sphere and handed over to the administrative processes of the state. Statistics from the late-19th-century censuses reveal the effectiveness of the reformers: In England, by 1911, only 18% of boys and 10% of girls between the ages of 10 and 14 were in the labor market, compared with 37% and 20%, respectively, in 1851. Economically, children moved from being an

asset for capitalist production to constituting a huge consumer market and a substantial object of adults' labor in the form of education, child care, welfare, and juvenile court systems. Although reformers and bureaucrats could claim a successful moral victory in the removal of child labor from the work force, in reality, children had been made superfluous by machinery and the requirement that industrial work be preserved for adult male and female laborers. In this respect, culture is not only perpetuated by children, but changed by it. The late-modern constructions of childhood acknowledge that children are placed and positioned by society. The places that are appropriate for children to inhabit have widened, and children are now seen as targets of media and marketing campaigns, though children as individuals and as a class have few legal rights.

The definitions of childhood as a state of innocence and purity follow long historical cycles of economic change that correspond to the development of capitalism as it spread within the world system. Immanuel Wallerstein's world systems theory describes historical economic relations in terms of exchanges between the core, semiperiphery, and periphery states. The evaluation the role of children in the world system has led to an agreement by many social scientists that childhood is historically and culturally relative. Recent anthropological political economy theory demonstrates how relations between nation-states and the development of capitalism affect growing child poverty. In addition, these relations determine the role of children economically, socially, and educationally throughout the world, affecting policy development at both the state and federal levels, particularly in the areas of child poverty and child development. Social scientists should turn their attention to a generational system of domination analogous to the gendered oppression that has captured the attention of feminist scholars for the last several decades. If successful, this agenda will advance the legal status of childhood globally, freeing future generations to participate as viable actors within political, economic, and legal realms within their unique cultures.

Recent research on street children around the world demonstrates that childhood is a social construction dependent on geographical, economic, ethnic, and cultural patterns. Patricia Márquez, in *The Street Is My Home* (1999), explored how street youth in Caracas, Venezuela, are brought together because of economic scarcity and social violence, by describing

Source: © Photo provided by www.downtheroad.org,The Ongoing Global Bicycle Adventure.

the ways in which these youth are able to gain financial resources and material wealth through the creation of meaningful experiences and relationships in their lives. Tobais Hecht, in *At Home in the Street* (1998), portrayed street children in Recife as socially significant themselves, acting as both a part of and a reflection of the concerns of adults. He found that Recife's street children took pride in working and earning an income.

Social reality may be seen as a process of constructing one's social world through the skillful actions of everyday life. Alongside the development of the constructionist view of race, gender, and ethnicity, childhood is simultaneously viewed as dependent on location. Historically, theoretical views of childhood have profoundly affected how children are positioned socially, politically, economically, medically, and legally. Due to the recognition of the ways in which both popular and academic views of childhood have impacted children, recent social science research now seeks to redefine childhood as a time of agency and self-directed learning and participation in society, while developing new theoretical paradigms that view

children as subjects worthy in their own right, not just in their social status as defined by adults.

— *Marcia Mikulak*

See also **Childhood Studies; Enculturation; Socialization**

Further Readings

Amit-Talai, V., & Wulff, H. (Eds.). (1995). *Youth cultures: A cross-cultural perspective.* New York: Routledge.

Blanc, S. C. (1994). *Urban children in distress: Global predicaments and innovative strategies.* Grey, Switzerland: Gordon & Breach.

James, A., & Prout, A. (1997). *Constructing and reconstructing childhood: Contemporary issues in the sociological study of childhood.* London: Falmer Press.

Mickelson, A. R. (2000). *Children on the streets of the Americas.* New York: Routledge.

Qvortrup, J., Bardy, M., Sgritta, G., & Wintersberger, H. (Eds.). (1994). *Childhood matters: Social theory, practice, and politics.* Brookfield, VT: Avebury.

Rogers, R., Rogers, S., & Wendy, S. (1992). *Stories of childhood: Shifting agendas of child concern.* Toronto, Canada: University of Toronto Press.

Scheper-Hughes, N., & Carolyn S. (Eds.). (1998). *Small wars: The cultural politics of childhood.* Berkeley: University of California Press.

Stephens, S. (1995). *Children and the politics of culture.* Princeton, NJ: Princeton University Press.

Childhood Studies

Childhood studies refers to a reorientation in the interdisciplinary study of children and childhood. The study of children and childhood has a long history in many disciplines, including anthropology, but childhood studies seeks to expand and reorient how the study of children and childhood is conceptualized and approached. Anthropology's role is central to this reorientation because childhood studies builds, in large part, upon anthropology's traditional interests in understanding culture and society from the *emic* (insider, participant) perspective. While children have been the object of a long history of cross-cultural research, the emic perspective of children has received less attention than that of adults. Most anthropological research on children has sought to understand children through the adults charged with their care, usually parents, teachers, and other caregivers. This is also true of the social sciences more broadly. There is a tradition of anthropological work, however, that has actively sought the child's perspective, dating from the foundational work of Margaret Mead (1928) and extending to the present day. This reorientation is similar in some ways to the increased anthropological interest specifically in women that emerged alongside women's studies in recent decades.

Childhood studies also arises from interests that accompanied the 1989 United Nations Convention on the Rights of the Child (UNCRC) that by 2004 had been ratified by all but three nations (the United States, Somalia, and Timor-Leste). The UNCRC has three basic principles: *protection* of children from a range of harms (from intrafamilial abuse to war-related traumas); *provision* of what children need (from the basic physical needs for food and shelter to emotional needs for love and caring); and *participation* by children themselves in matters concerning them insofar as their developmental capacity permits (from family dissolution to educational issues). The UNCRC stimulated a reorientation of thinking about children and childhood. It was clear that children around the world suffered from a range of insults to their development and well-being. It was also clear that children's voices were rarely sought, and thus rarely heard, on issues of basic concern to them. The UNCRC stimulated a body of research, largely in European countries that had ratified the convention, that sought to make children a more integral part of research and to give credence to the child's perspective.

Basic Principles of Childhood Studies

The following are concepts and ideas that form the basis of childhood studies.

Multiple ChildhoodS: Franz Boas transformed the idea of a singular Culture, with a capital C, to the multiplicities of cultureS, with a capital S. Similarly, in childhood studies, a core assumption is that there is no single version of "childhood," but that "childhoods" vary across time and culture. Furthermore, the experience of childhood varies within any culture by

variables such as age, gender, and socioeconomic status. Childhood studies, in a reaction against the paradigm of universal child development, argues against privileging any one version of childhood, usually a Western-oriented model of optimal development. Childhood studies, such as earlier work from the Whiting School, recognizes that the experience of childhood may show equal or greater variability intraculturally as interculturally. One of its central missions of childhood studies, therefore, is to describe and explain multiple childhoods.

Source: © Photo provided by www.downtheroad.org,The Ongoing Global Bicycle Adventure.

Distinguishing Among Childhood, Children, and the Child: Childhood studies distinguishes between terms that are often used interchangeably. *Childhood* is defined as a position in social structure, *children* as the group of individuals who occupy that position, and *the child* as both a whole, complex, and rights-bearing citizen and an idealized entity. Childhood is both a permanent and temporary space in the sociocultural context. It is permanent in that all cultures and societies have a life course stage defined by its immaturity, both physical and social. It is constantly shifting in light of larger sociocultural change. It is also constantly changing because each cohort of children, along with the parents and other adults involved with their rearing, bring with them a set of individual and group differences from the cohort before them. Childhood studies takes as a given that childhoods are culturally constructed.

Children as Competent Social Actors and Active Participants: Childhood studies promotes the idea that children are competent social actors who shape their worlds, take action on behalf of themselves and others, participate in decisions that affect them, and define the directions and processes of their own development. The topic of *agency* has in recent years also become increasingly prevalent in studies of the child, as reflected by the right to *participation* in the UNCRC.

The Child's Perspective: If children are regarded as competent social actors, then they must also be regarded as research participants whose perspectives must be sought. Childhood studies has a central mandate to bring in children's voices, studying children in ways that reveal the experiences and perspectives of the child, from the child's point of view, and in his or her own words.

Methods for Studying Children: Methodologically, childhood studies' interests in the child's emic perspective stimulated interests in methods to obtain that perspective. Anthropological methods such as participant observation and ethnographic interviewing have been important in obtaining children's perspectives. Involvement of children and adolescents in the research enterprise has also been an innovation in childhood studies research.

The Social Spaces of Childhood: The field of childhood studies is concerned with how children inhabit, navigate, and negotiate their social worlds. These studies consider a range of both public and private spaces with varying levels of adult control and supervision and varying levels of direct involvement of children in designing and creating those spaces. Peer cultures

established independently of adults have been of interest in this regard, for example, in preschools or medical settings, even though there is the wide recognition that no age group is entirely independent. In addition to social spaces, childhood studies has stimulated interests in how children use and regard the physical spaces they occupy.

Children, Childhood, and the Interdependence of Generations: The field of childhood studies, even in emphasizing agency and social participation, has cautioned against going too far in promoting the notion of the autonomous and independent person, as if it were possible to be human without belonging to a complex web of interdependencies. There is much to learn about how generational phenomena are played out at family and societal levels. Trends across these levels need not be complementary, but may be contradictory. A balance of research is needed on both the views of children as well as those who are linked to them.

The Complexity of Contemporary Childhood: Childhood studies recognizes the complexity of modern childhood. For every trend in one direction, there is a trend in another direction, especially when we take a global view. For example, in many parts of the world, a pressing question is how childhood will maintain its space/position in society as the childhood population decreases. There will be fewer children to fill the social space of childhood and a greater proportion of adults, particularly elders. There are also increasing numbers of couples and singles who choose childlessness. What is the impact on childhood of "child-free" housing, for example? While this is often seen as of greater salience for wealthy nations, it will be increasingly important for developing countries seeking to control their populations. Shifting age profiles will have a huge impact on societies and childhoods within them. In a contrasting direction, at the same time, in other parts of the world, children remain a majority, or even increasing proportion, of the population. Demographic patterns as well as warfare and disease have altered the population structure, with wide-ranging consequences for the nature of childhood.

— *Jill E. Korbin*

See also **Childhood; Enculturation; Socialization**

Further Readings

Christensen, P., & James, A. (2000). *Research with children: Perspectives and practices.* London and New York: Routledge/Falmer.

Corsaro, W. (2003). *"We're friends, right?" Inside kids' cultures.* Washington, DC: Joseph Henry Press.

James, A., & James, A. (2004). *Constructing childhood: Theory, policy, and social practice.* Houndmills, UK, and New York: Palgrave Macmillan.

James, A., & Prout, A. (1997). *Constructing and reconstructing childhood. Contemporary issues in the sociological study of childhood.* London: Falmer.

Woodhead, M., & Montgomery, H. (2003). Understanding childhood. An *interdisciplinary approach.* Chichester, UK, and New York: Wiley & Sons.

CHIMPANZEES

The chimpanzee (*Pan troglodytes*) belongs to the Pongidae family of the Primate order. They have a wide distribution, extending across central Africa from Senegal in the west to Tanzania in the east. There are three subspecies of common chimpanzee recognized. They are the western subspecies, P. *troglodytes verus*, the central species, *P. t. troglodytes,* and the eastern subspecies, *P. t. schweinfurthi.* A fourth subspecies from Nigeria and Cameroon may soon be added.

North of the Zaire River, the common chimpanzee has been known of since the 17th century. Captive chimpanzees have been studied since the 1920s, beginning with German psychologist Wolfgang Kohler conducting behavioral research. Most famously, Jane Goodall's research at Gombe Stream National Park in Tanzania has been going on for nearly 40 years and is the longest study of a wild species ever conducted.

Anatomy

Chimpanzees are well-known for their strength and ability to walk upright on two feet or bipedally for short distances. They are human's closest living relatives, sharing more than 98% of the same DNA and

with similarities in immune functions and blood composition. Human and chimpanzee lineages separated about 6 million years ago. We are also their closest relatives of all of the living primates, except bonobos. This means that they can contract any infectious disease that a human can be infected by and has led to exploitation by biomedical research institutions. Bonobos and chimpanzees are thought to have shared a common ancestor from whom they split approximately 3 million years ago. Chimpanzees diverged from gorillas 7.5 million years ago and orangutans 16 million years ago.

Chimpanzees live in a variety of habitats, from densely forested jungles to savannas that are believed to closely resemble the environment that human ancestors would have had to endure. Chimpanzees are well suited for life in the trees, where their quadrupedal dexterity and opposable thumbs allow them easy movement, and on the ground, where they knuckle-walk like the other African apes. Male chimpanzees are approximately 1.2 m (4 ft) tall and weigh 60 kg (132 lbs). Females are 1.1 m (3.5 ft) tall and weigh 47 kg (103.6 lbs). Chimpanzees live an average of 30 to 40 years in the wild and longer in captivity.

Chimpanzees have stout bodies with relatively long arms. They have a round head with large, projecting ears and small, forward-facing nostrils on a prognathous muzzle. The top of a chimpanzee skull is flat and is without a sagittal crest. Chimpanzees have large teeth when compared with humans, but have the same dental formula: 2123/2123 = 32. Chimpanzee senses are similar to human senses; however, they have more effective olfactory functions.

There are 13 different categories for chimpanzee calls that range from soft grunts to loud pant-hoots and shrieks. Chimpanzee calls are distinguished from bonobos by being a lower pitch.

Chimpanzees exhibit a high degree of sexual dimorphism. Males are larger and stronger, with characteristically large testes and prominent genitalia. Sexually mature females can be recognized by the pink swellings of perineal skin that are present during the estrous cycle. The estrous cycle is when a female is sexually receptive and fertile. This period lasts for 2 to 3 weeks and occurs every 4 to 6 weeks. Captive females reach sexual maturity at 8 to 9 years of age and give birth for the first time at 10 to 11 years of age. Wild females mature and give birth 3 to 4 years later than captive females.

Male chimpanzees engage in some sexual activity at 2 years of age. They begin to engage in more mature courtship rituals around 3 to 4 years old. These courtship rituals consist of displaying an erect penis, swaggering with hair bristling, and branch shaking and leaf stripping. Receptive females respond by approaching the males and presenting their sexual swellings for inspection.

There is no breeding season for chimpanzees, but females are sexually attractive and receptive only during their estrous cycles, which occur throughout the year. At the beginning of the estrous cycle, females will mate up to six times a day with different individuals. Near the end of the estrous cycle, more exclusive partnerships, called *consortships,* are formed. A consortship, consisting of one receptive female and a male, will often disappear into the forest for several days or even for weeks or months. Sexual activity during this time in the estrous cycle likely results in pregnancy.

The gestation period of a chimpanzee is 8.5 to 9 months long. After birth, the infant is helpless. The female will not be receptive again for 3 to 4 years, when her offspring has been weaned. Unlike bonobos, chimpanzees do not engage in sexual activity during pregnancy or lactation.

Within a few days of birth, infants are able to cling to their mother's underbelly, and they will ride on her back at 5 to 7 months of age. Young chimpanzees are weaned around 3 years of age, and by 4 years of age are walking separately from but always near their mothers. Female chimpanzees leave their natal group when they reach sexual maturity, but males remain in their birth group and maintain close relationships with their mothers and maternal siblings.

Chimpanzees live in colonies of up to 150 individuals. The range of a community is 10 to 50 sq km, with a core area of 2 to 4 sq km. The core area is inhabited 80% of the time. Colonies may have overlapping ranges, but not core areas. Males will regularly patrol the boundaries of their territory. They will chase and attack intruders.

Foraging for food is not an entire group activity. Chimpanzee males will forage in a group of three to six individuals, while females forage alone or with their offspring. Chimpanzees eat ripe fruit for up to 4 hours a day. They also eat soft pith, tree seeds, galls, resin, bark, and young leaves. They have been observed to eat up to 20 different species of plant in

1 day and over 300 different species in 1 year. They are also known to use some plant species for medicinal purposes.

Chimpanzee diets also consist of up to 5% animal protein, which is taken in by foraging for insects and hunting small mammals, including other primates. Females spend twice as much time searching for insects, and males are more active in hunting small mammals, such as monkeys, pigs, small antelopes, and occasionally birds. Different populations of chimpanzees may eat very different diets, depending on their habitats and the traditions of the group. For instance, the chimpanzees of Gombe eat a high percentage of palm oil nuts, while those at nearby Mahale do not. Chimpanzees do not store any food.

Chimpanzee Hunting

Jane Goodall's discovery in the early 1960s that chimpanzees actively engaged in and were successful at hunting small mammals, especially primates, such as colobus monkeys and other mammals, shocked the world of primatology. Since then, different hunting strategies have been observed in various communities, but the most frequently employed technique is based on subgroup cooperation. When prey is spotted, the lead hunter will head silently into the forest to where the monkeys are roosting. The lead hunter is often, but not always, the alpha male. The rest of the hunting troop, a subgroup of the entire troop, follows the lead hunter into the forest. Usually, two of the members will sprint to the periphery of the monkey troop, climb to their level, and act as side blockers. Several other blockers run ahead on the ground to get in front of the fleeing monkey troop and climb high into the canopy to prevent the less heavy prey from getting to an unreachable vantage point, effectively closely the trap.

While this may sound very strategic and organized, a successful hunt is often chaotic. The panicking monkeys dart throughout the canopy, with some of the males staying behind to delay the chimpanzees, even attempting to fight them. When a monkey is captured about 40% of the time at Gombe, the entire chimpanzee troop is brought to a frenzy of excitement. The one who possesses the carcass at this point, which is not always the individual who actually captured the prey, will share the meat with his friends and allies, both male and female. This individual is often not the alpha male, and there is a notable change in the social dynamics of the group during the distribution of the spoils of the hunt.

One possible byproduct of predation, or failed attempts at predation, has been infanticide. In seven instances with the Mahale Mountain National Park chimpanzee group, over several years, the kidnapping, killing, and eating of a male infant followed the stress caused by a failed hunt. The mothers of the victims were fairly new transfers to the group. Therefore, the infanticide might be explained as a result of uncertain paternity and the alpha male's natural desire to get rid of any new infants he suspects are not his own. However, in one case, the mother had been with the group for more than 5 years.

Questions remain as to whether or not the newcomers were seen as threat from the time they joined the group and were intended to be killed. The adult males may have seen the failed hunt as an opportune time to snatch an infant from an excited and distracted mother. Or it is possible that the infants were only viewed as prey in the excitement and disappointment of a failed hunt. Infanticide has finally been accepted as an event that occurs regularly in many species. Our own relationship to chimpanzees and other primates makes it a difficult subject for many to discuss and study without bias. Interestingly, infanticide has not been observed or suspected to occur in bonobo societies.

Social Behavior

In chimpanzee troops, adult males at the top of the social hierarchy are a formidable and overpowering force. The alpha male and several subordinate males dominate and control the troop, often by force and aggression. Physical displays and confrontations reestablish their position on an almost continual basis, which can make life for lower-ranking individuals very stressful. They reestablish and reinforce their positions several times a day. For example, when a chimpanzee troop reaches a food source, the alpha male will usually put on a physical display of his strength by crashing around, reaffirming his dominance by threatening the others. Feeding will then proceed under his watchful eyes, in a hierarchical order, with the least-dominant individuals waiting their turn for and often receiving the least amount of nourishment.

The coalition of adult males is usually intolerant of neighboring troops and are much more territorial

than bonobos. Chimpanzees are known to patrol their territorial range and chase or attack any intruders. Jane Goodall observed a war, the "4-year war," between two troops that had originally been one at Gombe. The original troop systematically searched for and attacked all of the individuals from the splinter group. It is believed that the entire splinter group was killed during the 4 years.

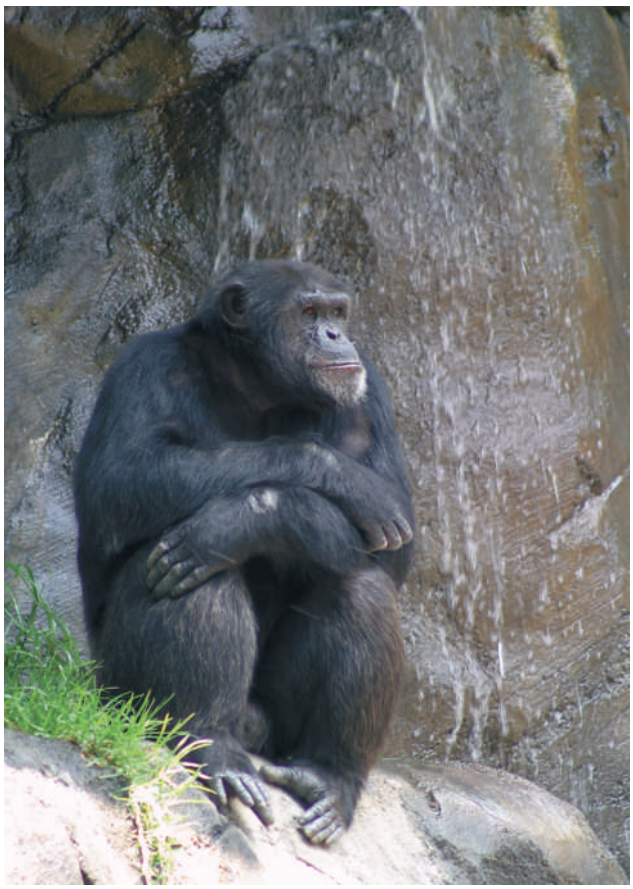
Despite the overwhelming evidence for an aggressive existence, chimpanzees are very affectionate with each other. They are known to frequently embrace their friends when nervous or after a stressful encounter and to reinforce bonds and curry favor from dominant individuals. They will also embrace the individual they were at odds with in order to diffuse the tension of a fight and reconcile. Frans DeWaal has done extensive research on the coalition-building and reconciliation habits of chimpanzees.

Tool Use and Chimpanzee Culture

Chimpanzees are well-known for their ability to make and use tools, in the wild and in captivity. In fact, different tool-making traditions, which some scientists consider primitive cultures, have developed at different locations. These traditions are passed on from one generation to the next by observation, imitation, and even instruction. An example of this process at one location is the use of tree roots and rocks as a hammer and an anvil to crack open palm oil nuts. For this technique to be successful, the chimpanzee must be very selective about the hammer and anvil materials and also must master the cracking technique with strength and aim. They have been observed to carry a good hammer from one feeding site to another.

Some of the tools made and used by chimpanzees are as simple as a termite "fishing stick," which requires the toolmaker to pick an appropriate length of stick, strip it of leaves, and poke it into the right termite mounds. As simple as this sounds, it is a skill that is learned. Some chimpanzees are better at it than others. The fisher must patiently wait for the termites to grab ahold of the wood before removing the stick with a bounty of protein attached. Chimpanzees make other tools from their natural environment, such as chewing leaves and moss and using the wad as a water sponge.

Another example of the various primitive cultures of chimpanzees at different locations includes the hand-clasp grooming technique. Grooming partners clasp hands overhead while facing each other, as if to hold up the arm for better access to the body. However, not all chimpanzees engage in this grooming practice. The habit seems to have originated with one troop and followed an emigrant into another troop, transmitting the culture to the troop that did not originally practice the hand-clasp grooming technique. The technique is even used by a captive group that seems to have learned it from a newly introduced wild chimpanzee.



Source: © iStockphoto/Kevin Tate.

Ape Intelligence

Chimpanzee cognitive abilities are evident in the fact that they pass the self-recognition mirror test. For this test, a red dot is painted on an anesthetized individual. When the individual wakes up and is presented with a mirror, it begins to inspect its image and touch the dot on its own face, recognizing that the image in the mirror is its own and not another

being. Other primates, such as monkeys, do not have this ability.

One of the most significant demonstrations of chimpanzee intelligence has been well documented through ape language studies. Sue Savage-Rumbaugh and her husband, Duane, work with apes at the Language Research Center at Georgia State University, in Atlanta. The experiments that Savage-Rumbaugh conducts include teaching symbolic representations, called *lexigrams,* of English words to chimpanzees and bonobos. As a result of this work, the apes have shown that they are able to combine meaningful lexigrams to demonstrate a rudimentary understanding of language. Other scientists and institutions are engaged in similar research using sign language.

Some scientists, such as Steven Pinker of York University in Toronto, who studies language acquisition in children, are not convinced the apes actually understand what they are doing. Pinker believes the language skills of Savage-Rumbaugh's subject are little more than circus tricks. Fortunately, ape language acquisition research continues with positive results and star pupils in each new study.

Spontaneous communication, especially when not in regard to food or within an immediate experiment, is what most researchers believe is the best evidence of language comprehension by chimpanzees and bonobos. In one instance, one of Savage-Rumbaugh's chimpanzees, Panshiba, wanted to communicate with her, alone. Panshiba took her aside to describe an event that the chimpanzee had overheard in another cage earlier in the day. An adolescent chimpanzee, Austin, had bitten his mother and caused a commotion. Panshiba appeared to want to gossip about the incident by telling Savage-Rumbaugh what had happened.

The emotional lives of chimpanzees are more difficult to research and document. However, they have been observed getting excited, rushing about, and shrieking when they encounter a waterfall or it begins rain. Researchers call this a "rain dance" and believe the chimpanzees are capable of an emotion comparable to human awe of nature. Unlike their bonobo relatives, chimpanzees are usually afraid of standing water, and they despise rain.

Conservation

If chimpanzees share more than 98% of the same DNA as humans, sense their habitat with the same functionary capabilities, and even behave in similar ways to humans, it should logically follow that they have nearly equal emotional and intellectual capabilities. However, this would mean that they are more humanlike than many would like to believe or that we are more animal-like. Whatever position is taken, even those who exploit chimpanzees and their habitats cannot deny the fact that their numbers are dwindling due to the encroachment of humans for agriculture and forest products, as well as hunting them for the bushmeat trade and the live-animal market. Chimpanzee populations today equal a mere 5% of the numbers in existence at the turn of the century.

Like humans, chimpanzee infants are slow to develop and have long periods of dependence. Coupled with a fairly low birth rate, which is not able to keep up with death rates that are influenced by external forces, chimpanzees and the other African apes are in dire need of habitat protection and the enforcement of hunting and selling bans. We have learned so much about or closest relatives in the past decade, yet the knowledge we have amassed is negligible compared with what is still available through continued long-term, intensive studies. If we believe that chimpanzees and bonobos are an important model for our own evolution, we must preserve their well-being in order to continue researching their origins, as well as our own. As the natural conditions are destroyed, so to are the natural behaviors from which we wish to learn.

— *Jackie L. Orcholl*

See also **Chimpanzees and Bonobos, Differences; Chimpanzees, Saving; Goodall, Jane**

Further Readings

Boesch, C., Hohmann, G., & Marchant, L. F. (Eds.). (2002). *Behavioural diversity in chimpanzees and bonobos.* Cambridge: Cambridge University Press.

De Waal, F. (1990). *Peacemaking among primates.* Cambridge, MA: Harvard University Press.

De Waal, F. (1996). *Good natured: The origins of right and wrong in humans and other animals.* Cambridge, MA: Harvard University Press.

De Waal, F. (2000). *Chimpanzee politics: Power and sex among apes.* Baltimore: Johns Hopkins University Press.
Goodall, J. (1986). *The chimpanzees of Gombe: Patterns of behavior.* Cambridge, MA: Belknap Press, Harvard University Press.
Goodall, J. (2000). *In the shadow of man.* New York: Houghton Mifflin Company.
Nichols, M., & Goodall, J. (1999). *Brutal kinship.* New York: Aperture Foundation.
Wrangham, R. W., Heltne, P. G., McGrew, W. C., & De Waal, F. B. M. (Eds.). (1996). *Chimpanzee cultures.* Cambridge, MA: Harvard University Press.

Chimpanzees and Bonobos, Differences

Chimpanzees, the most socially diverse group of apes, are represented by two species, the common chimpanzee *(Pan troglodytes)* and the pygmy chimpanzee, or bonobo *(Pan paniscus)*. Both species are found in the tropical forests of equatorial Africa. Sharing approximately 98% of their genes with humans, chimpanzees are genetically more closely related to humans than they are to any other ape group. For this reason, the chimpanzee has been important to the study of human evolution and behavior.

The common chimpanzee is found in many parts of equatorial Africa, inhabiting the forested regions of 22 countries. The variation in flora and fauna between these different areas has enabled the common chimpanzee to evolve into at least three separate subspecies that are localized to specific regions. The three subspecies are *Pan troglodytes troglodytes* from central Africa; *Pan troglodytes verus* from western Africa; and *Pan troglodytes schweinfurthii* from eastern Africa. Two other subspecies, *P. troglodytes vellerosus* from Nigeria and *P. troglodytes koolokamba* from Cameroon and Gabon, have been proposed, yet these designations are considered more controversial.

The common chimpanzee lives in multimale-multifemale polygynous groups with a single dominant male, several mature males, and several mature females and their offspring. Males tend to remain in their natal groups while females emigrate. This sets up a social dynamic in which males often form alliances with other males, usually related individuals, and females only form loose bonds with each other. Like other polygynous primates, chimpanzees display significant sexual dimorphism, with males weighing on average 60 kg (132 lb) and females weighing 47 kg (104 lb). The social interactions between members of this species include vocal, physical, and gestural-visual behaviors, some of which are typical of most primates and others that are specific either to the species or local population.

The second species of chimpanzee is the bonobo or "pygmy chimpanzee" from the central Congo Basin. Male bonobos weigh on average 45.0 kg (99.2 lb), while females weigh 33.2 kg (73.2 lb). This species, which is the more gracile cousin of the common chimpanzee, not a smaller version, has been little studied compared with the more popular common chimpanzees studied by Jane Goodall and others. However, the little that is known about this species indicates that it is very different from any other ape species in terms of behavior.

Bonobos live in multimale-multifemale groups where the group hierarchy appears to be divided between a dominant male and a dominant female. As opposed to the more aggressive interactions seen in the common chimpanzees, bonobo behaviors are more docile. The social interactions of this species include vocal, physical, and gestural-visual behaviors. However, these behaviors appear to be more complex than that of their cousin, the common chimpanzee, in that there are few displays of dominance, and many physical displays have a sexual component tied to them. As Frans de Waal and other researchers have found, bonobos and chimpanzees lead significantly different social lives.

In common chimpanzees, females mate only when they produce conspicuous sexual swellings as they come into estrus. This advertises their receptivity to males in the group, who spend much of their time engaging in aggressive behaviors in order to gain mating access to females. Bonobos, however, have evolved a different strategy, in which females are continually receptive. In addition, bonobos use sexual activity as a part of normal social interactions. As such, bonobo groups are more cohesive, with males and females interacting more frequently than is seen in the common chimpanzee, where males rarely interact with females who are not in estrus.

Much of what is known about the behaviors of the closest living relatives of humans has been conducted by researchers such as Jane Goodall, Richard Wrangham, Takayoshi Kano, and Frans de Waal. From their studies, it has been discovered that chimpanzee behavior mirrors that of humans more closely than previously thought. For example, Goodall discovered that chimpanzees engage in war to expand their territory and eliminate any competitors. Goodall also found that chimpanzees are capable of producing rudimentary tools to crack open nuts or fish for termites. However, these behaviors are not universal among common chimpanzees. Rather, each localized population possesses its own suite of behaviors, including toolmaking. This has led some researchers to suggest that chimpanzees possess culture in the human sense.

Based on studies of bonobos, it has been found that humans are not unique in engaging in sexual activity for pleasure. Bonobos have also demonstrated an exceptional ability to grasp complex tasks, such as learning a rudimentary language, which is also shared by common chimpanzees but not to the same degree of proficiency. The capacity of both species for learning may relate to their ability to engage in deception and other cognitive tasks that require associative processing above the reactionary responses seen in other primate species. These and other ongoing studies continue to demonstrate that many of the features once thought unique to humans have their origins in their closest living relatives, the chimpanzee and bonobo.

— *Douglas C. Broadfield*

See also **Apes, Greater; Bonobos; Chimpanzees, Saving; Goodall, Jane**

Further Readings

Boesch, C., Gottfried, H., & Marchant, L. F. (2002). *Behavioural diversity in chimpanzees and bonobos.* Cambridge: Cambridge University Press.

Goodall, J. (1986). *The chimpanzees of Gombe: Patterns of behavior.* Cambridge, MA: Belknap/Harvard University Press.

Wrangham, R. W., McGrew, W. C., De Waal, F. B. M., & Heltne, P. G. (Eds.). (1996). *Chimpanzee cultures.* Cambridge, MA: Harvard University Press.

Chimpanzees, Saving

At the beginning of the 20th century, more than 2 million chimpanzees flourished in the forests of 25 African countries. Today, only 4 nations have significant populations. Population estimates for 1999 show that common chimpanzee numbers have dwindled to between 150,000 to 235,000 individuals. Most of the remaining animals are found in the Central Africa forests of Zaire, Gabon, Congo, and Cameroon. There are many factors that have contributed to the decline of wild chimpanzee populations. The largest contributor to the chimpanzee crisis is the threat made by the overpopulation of *Homo sapiens.* Large encampments of human population create a stress on the environment by consuming resources. Harvesting the environment for fuel and raw material results in deforestation and loss of habitat. Harvesting the environment for food results in the bushmeat trade.

The Pan African Sanctuary Alliance (PASA) is an alliance of 16 primate sanctuaries from all over Africa. PASA suggests a need for general guidelines for the establishment of authorities, site location, long-term sustainability, management practice, primate management, and health issues. Norm Rosen, a member of the PASA advisory board and a professor of anthropology at California State University Fullerton, coordinated a study on the extinction rate of the wild chimpanzee. The results of this research suggested that certain subspecies of chimpanzee could become extinct within the next two decades. The *Pan troglodytes vellerosous* is one of four chimpanzee subspecies, and it is estimated that only 8,000 remain in the wild. According to Rosen, the situation is critical; the rising number of orphaned chimpanzees is indicative of the decrease in population. There are a variety of reasons why wild chimpanzee populations are dropping dramatically.

The tropical rain forests of West and Central Africa cover an area of over 2 million sq km. Timber companies enter into untouched areas in search of the valuable trees that are scattered throughout the forest. The building of roads into unlogged areas heavily fragments the forest and opens it up to hunters. Logging companies introduce a large new workforce that increases the demand for meat. Furthermore, logging vehicles are used to transport bushmeat to the market, where the precious delicacy can satiate

the demands of the masses. The vehicles facilitate the process, which results in more demand: more mouths to feed and ultimately far fewer chimpanzees in the wild. The logging companies make it easy and profitable for their workers to enter into the commercial trade for bushmeat.

Source: Photograph by Gregory Scott Hamilton, Honolulu Zoo.

Economics drives the bushmeat crisis. Growing demand for meat in most cities provides new economic opportunities for people whose traditional sources of income have disappeared and where jobs have become scarce. A majority of people who eat bushmeat do so because it is cheap or free and easily accessible. Hunting is vital to families without access to agricultural markets. Hunting is also woven into many societies. Animal parts, such as horns, feathers, or bones, are a crucial part of many cultural and religious ceremonies.

Central Africans typically eat as much as many Europeans and North Americans (30–70 kg/person/year). Approximately 30 million people live in the forests of Central Africa, and they eat approximately 1.1 million tons of wildlife each year. The estimated annual value of the bushmeat trade in West and Central Africa could exceed 1 billion U.S. dollars. A hunter can make $300 to $1,000 per year from commercial hunting, which, in that economic reality, is a lot of money. As the urban populations create more of a demand, more people will be attracted to the bushmeat trade.

Logging companies can potentially have a large role in curbing the bushmeat trade. Not only are they crucial in determining forest habitat management in the region, but they can also establish policy that would reduce the strain on the environment. The majority of large, relatively intact blocks of forest outside of protected areas currently comprise less than 6% of the landscape in Central Africa. These regions are already being logged or earmarked for logging. It is critical that logging companies modify their policies to minimize the impact on wildlife. It is also important that the protected areas have sufficient funding to ensure the long-term existence of forest fauna. To facilitate this, the government along with the logging companies need to establish long-term wildlife management plans, set aside unlogged refuges for rare or threatened species, halt the transportation of hunters and bushmeat of logging vehicles, deny hunters road access to logged forests, and seek ways to provide local populations with alternative sources of protein.

Economics will play a key role in developing resolutions to the environmental tragedy of bushmeat. Cooperative efforts should be made to increase law enforcement and to tax commercial trade in the bushmeat. Local production of economically affordable bushmeat alternatives is vital, to stop the unsustainable levels of hunting. We need to reduce the amount taken out of the forests and shift the demand to the local alternatives. Unless people have economically viable alternatives, they will continue to demand wildlife as an affordable source of food, which is perceived as an inexhaustible and abundant resource. Local government also needs to promote the use of family planning by providing the resources to curb the growth of population.

Not all chimpanzees are pulled out of the wild for bushmeat; some are used in the black-market pet trade and in biomedical research. The Great Ape Project Census 2001 revealed over 3,100 great apes living in captivity in the United States, ranging from modern zoos and sanctuaries to carnivals and laboratories. The census found great apes living in 37 states, 1,280 in biomedical research laboratories. Up to 90,000 chimpanzees a year were once used by biomedical research

in the United States. Labs today rely on their captive breeding policy to provide new individuals, reducing the demand for wild-caught chimpanzees. Chimpanzees are one of the 61 primate species prohibited from commercial trade by the Convention on International Trade in Endangered Species (CITES). Although they are illegal to sell, chimpanzees are still bought and sold in the underground pet trade.

We as humans have to be responsible in how we treat our environment and our neighbors. We need to set aside forests for our closest living relative and properly manage what forests remain. We need to find viable alternative food sources so that all local fauna does not get consumed as food. We need to come up with realistic alternatives for income generation, such as ecotourism. In the long term, the bushmeat trade is not economically viable. It is limited and nonsustainable, and at the current rate of proliferation, the chimpanzee will not exist in the wild in 10 to 15 years.

— *Gregory Scott Hamilton*

See also **Apes, Greater; Chimpanzees**

Further Readings

Bushmeat Crisis Task Force. (2000, April). *The role of the logging industry* (Fact sheet). Silver Spring, MD: Author.

Great Ape Project Census (2001). www.greatapeproject.org

Grolimond, G. (2004). *Alarming study reveals chimpanzee extinction crisis.* Montreal, Canada: Jane Goodall Institute of Canada.

Gunn, C., Liffick, M., & Mathis, J. (2001). *Biological diversity 2001: Chimpanzee.* http://www.earlham.edu/~mathijo/chimp.htm

CHIMPANZEES IN CAPTIVITY

Biological anthropologists closely study chimpanzees, which share 98% of their DNA with humans. Chimpanzees have been particularly useful in helping scientists identify and treat diseases of the liver. As a result, some 1,600 chimpanzees are being used in biomedical research in the United States alone. In addition to medical research, chimpanzees have received a good deal of attention from researchers and the general public in response to Jane Goodall's (1934–) anthropological and conservation work with chimpanzees in the Gombe Game Reserve in Africa. The sale of chimpanzees has been banned since 1977 by international treaties. However, it is believed that 40 to 50 baby chimpanzees continue to be sold each year on the black market. Chimpanzees have also begun to receive the unwelcome attention of hunters from local tribesmen due to the bushmeat crisis in Africa. Hunters trap adult chimpanzees and sell them for meat to be used as food for logging camps or to be shipped all over the world on the black market. Perhaps in retaliation for human violence, chimpanzees in Tanzania and Uganda have stolen and killed 10 human babies, and several others have been seriously injured in attacks.

Because hunters have focused on female chimpanzees in groups of 5 to 10 at a time, they leave thousands of young chimpanzees orphaned and not always able to care for themselves in the wild. Goodall has headed a campaign designed to provide sanctuaries for orphaned chimpanzees. Established in 1983, the Chimfunshi Wildlife Orphanage in Chingola has become such a refuge for motherless chimpanzees. The refuge area was financed by donations from the United States, the United Kingdom, and Germany. The largest primate refuge in the world, Chimfunshi has designated 1,500 acres as a reserve for the 100 or so chimpanzees in its care. In June 2004, officials at the orphanage released 12 chimpanzees that had been held in cages into a 150-acre protected enclosure populated with fruit trees and open grasslands. In addition to those orphaned chimpanzees that are rescued and placed in sanctuaries, many more are lost to death, the black market, laboratory research, and humans who keep them as pets. In addition to Chimfunshi, at least 11 other sanctuaries have been established in Africa. A couple hundred rescued chimpanzees also live in private homes or in halfway homes awaiting transfer to reserves.

In June 2004, anthropologist Norm Rosen of California State University at Fullerton announced at the conference of the Pan African Sanctuaries Alliance that illegal hunting and rapid deforestation have placed chimpanzees in danger of extinction.

The number of chimpanzees has also been reduced drastically by the fact that chimpanzees in reserves are on birth control because unchecked population growth would make it impossible to care for them. Scientists believe that the most vulnerable subspecies of chimpanzees, the *troglodytes vellerosus,* of which only some 8,000 remain, could become extinct by the end of the first quarter of the 21st century. By the middle of the 21st century, all species of chimpanzees could become extinct if the current rate of attrition continues.

— **Elizabeth Purdy**

City, History of

A primary focus of urban anthropology and the archaeology of complex societies is the history of the concept of a *city.* Scholars generally cite the first city as emerging in 3500 BC in Mesopotamia. Discussions of the city have emerged in anthropological literature in association with that considered urban, both as process and spatial locus. Useful distinctions, first drawn by Kemper within this context, are between anthropology *in* cities versus anthropology *of* cities. Equally important are those distinctions between the preindustrial, modern, and postmodern exemplifications of the city. Understanding the process, growth, or history of the city includes consideration of the public and private use and organization of space, architecture, and the economic and sociopolitical life of the inhabitants.

Scholarship focusing on the city began with sociologists locating "society" as being indicative of changes collective humans underwent that ultimately became the city. Early urban sociologists included F. Tonnies (1887), who established the difference between *Gemeinschaft* (community) and *Gesellschaft (*society); E. Durkheim (1897), who introduced the concepts of mechanical and organic society; M. Weber (1904), who considered the social structure of a city; L. Wirth (1938), who developed a theory of the characteristic influences of urban life on social organization and attitudes; and R. Redfield (1947), who built on Wirth's ideas to introduce the folk-urban continuum concept. It was in the 1920s that the Chicago School of Urban Ecology (with R. Park at the University of Chicago) began to focus on issues such as demography, census information, interviews, and historical data, with an emphasis on the social problems within cities, as opposed to the theory of processes of urbanization.

Early Cities in the Old World

The earliest examples of cities in the archaeological record are found in the Old World and date to the Chalcolithic and Early Bronze Age. Located close to waterways, these cities show evidence of increases in population, centralization of power, organization of trade, and the development of communication and mobility.

In explaining the urban phenomenon, archaeologists first looked to prime movers for theories on why the geopolitics of river valleys would lead to the emergence of a city. Key prime movers were increase in population, the technological advancement of irrigation systems (K. Wittfogel's "hydraulic society"), and warfare. As opposed to single-factor and linear reasoning, multicausal theories explaining the development of settlements to urban sites are now commonly accepted. One of the key texts for archaeologists has been V. Gordon Childe's *The Urban Revolution* (1950), which lists criteria for considering a site "urban." This list includes domestication of agriculture, change to sedentary lifestyle, monumental and public architecture, burials, craft specialization (ceramic and metal), and the centralization of power. Sites in the Old World such as Jericho, Catal Ho¨yu¨k, and Mehrgarh are generally thought of as illustrative of the development of urbanism. The first cities are located within river valley civilizations during the Bronze Age: Mesopotamia (Ur), Egypt (Abydos), the Indus (Harappa), and China (An'Yang). These cities were engaged in the storage of surplus, centralization of power, urban planning, and the establishment of long-distance trade.

Early Cities in the New World

In the Oaxaca Valley, one of the earliest examples of settled trading communities is the Zapotec Culture (2000 BC). Monte Alban was an administrative center that was architecturally developed and politically dominant; however, it was abandoned by 750 BC. In lowland Mesoamerica, the Olmec Culture preset the oncoming Maya as a political force. The city of Tikal (c. 800 BC–AD 900), one of the largest Maya cities, emerged as a powerful political force in Central

America. In the highlands, one of the largest cities that emerged in the Valley of Mexico was the site of Teotihuacán (200 BC– AD 750). Teotihuacán is over 21 sq km, and has over 600 pyramids built in its city limits.

In South America, the site of Caral, Peru, demonstrates some of the earliest dates for a city in the New World. Recent dates suggested date Caral to 2600 BC. This 150-acre site consists of a complex of pyramids, plazas, and residential buildings. Other early cultures that demonstrated urban processes were those of El Paraiso (800–500 BC), Chavin (1500–300 BC), and Nazca (600 BC–200 AD). These cities illustrate civic planning and monumental architecture, in addition to evidence of trade and agricultural surplus.

Early Cities: Mediterranean

A major political innovation in Greece (800–700 BC) was the development of the city-state, or *polis*. These political units were centrally based on a single city. A main characteristic of the city-state was its small size, which allowed for political experimentation. It was within this framework that democracy (primarily during Periklean government, ca. 462–431 BC) first came to be developed as a system where free male citizens constituted a small enough body that policy decisions were able to be made effectively.

Concurrently, in Italy, the Etruscans had established city-states, which ultimately formed into confederacies. These became powerful through trade and political connections. Scholars contend that Etruscan city-states provided the framework for the later Roman Empire. It was during the Roman Empire that individuals living in cities commented upon its sociological effects. Writers such as Cicero (106–43 BC) and Livy (64 or 59 BC–AD 17) began to discuss the various hazards of living in cities (such as Rome), including problems with the lack of urban planning, traffic, noise pollution, predominance of unsanitary areas, fires, collapsing buildings, theft and general crime issues, expressing the need to find meaning in life through "retreats" from city life.

Preindustrial Cities

After the fall of the Roman Empire, city-states such as Venice began to flourish around the 6th century AD. The city became associated with maritime powers and controlled trade that flowed from East to West, and vice versa. Venice, as a city-state, was never part of the old Teutonic Empires, but rather maintained its allegiances for centuries with Byzantium. As a city, the interesting aspect of Venice are the more than 200 canals that network the city, increasing internal mobility.

Another example of a varied concept of the city is found in the Vijayanagar Empire (AD 1336–1565), which provides the blueprint for a cosmic city in South India. The planned city of Vijayanagara reproduces, in material form, a pattern that can exist in the cosmic realm and a pattern of celestial authority, characterized by three features: a clear orientation and alignment with the cosmos, a symbolism of centrality, and the throne of the sacred king. The city of Vijayanagara is one of the most architecturally elaborate examples of the cosmic city in the world today.

It should be noted that some early scholars of urban anthropology (mis)used the term *preindustrial cities* to refer to third-world cities in the modern world instead of as a chronological marker, as used in this context.

Industrial Cities

One of the key examples of the progression to an industrial city is that of Chicago. Chicago was incorporated as a city in 1837. Soon after, the railroad arrived, and Chicago became the chief railroad center for the United States. Due to rapid overpopulation and factory booms, new industrial cities were always in danger of fires. This was an acute problem for cities such as Chicago and Philadelphia, because adequate water systems had still not been put into place, nor were fire houses close to some areas of the city. Chicago saw its big fire by 1871. By the time Ford Motors began the factories for the building of motor vehicles, Chicago had rebuilt itself, extended itself out, and created some of the first evidence for a suburban sprawl. The development of the city of Chicago, and of the diametrically opposite inner cities and suburbia, was directly related to the industrialization of the city and the booming of factory businesses.

Urban Planning

The establishment of a planned city is indicative of centralized control and power. Many ancient cities demonstrate evidence of planning and standardization, although the type of urban planning varies region to region. The Indus cities of Mohen-jo-Daro and Harappa are good examples of standardization of building materials and of main aerial streets off which

smaller streets emerge. Ancient Rome is another example of the manner in which urban planning was used for civic convenience and military defense purposes. This is in contrast to cities that emerge from organically settled clusters. Despite the ancient illustrations of planned cities, the 5th-century Greek architect Hippodamus (planned the Greek city of Miletus) is often called the "father of urban planning." Modern examples can be found in most capitals of nations. "New Towns" in Great Britain were developed by long-term loans from the central government and were first authorized by the New Towns Act of 1946. The idea is traced back to a book by E. Howard on garden cities (1898). Other examples of planned cities are Chandigarh, India (planned by Le Corbusier); Brasilia, Brazil (planned by Niemeyer Soares); Queenstown, Singapore (planned through the "New Towns" initiative); and Philadelphia, Pennsylvania (initially planned by William Penn).

The Global City

The concept of the "global city" brought forth by S. Sassen (1991) refers to a type of city that is a prominent center for trade, banking, finance, and, most important, markets. These global cities have much more in common with each other than with other cities within their own countries. For example, cities such as New York City, Tokyo, London, Karachi, Paris, and Moscow would be considered global cities. This type of city clearly privileges economics over other forms of sociocultural affiliations. Sassen's typology, however, may be extended into various genres of global cities; for example, cities of high religious importance might be grouped into Vatican City, Mecca, Varanasi, Jerusalem, and so on.

Current research on cities extends from ancient cities to the cities of tomorrow. Such research must combine understandings of the histories of both the theory of the city and the illustration of urban phenomenon with the spatial location. Definitions of the city depend on the context; however, in each, the core understanding of an urban space remains.

— *Uzma Z. Rizvi*

See also **Economics and Anthropology; Harappa; Tikal; Urban Ecology**

Further Readings

Hannerz, U. (1980). *Exploring the city: Inquiries towards an urban anthropology.* New York: Columbia University Press.

Low, S. (Ed.). (1999). *Theorizing the city: The new urban anthropology reader.* New Brunswick, NJ: Rutgers University Press.

Sassen, S. (1991). *The global city: New York, London, Tokyo.* Princeton, NJ: Princeton University Press.

GHOST TOWNS

One of the essential elements of folklore in the American West is the ghost town, the forlorn remnant of a thriving outpost of civilization from the days of the great silver and gold mines of the old West. Yet not all ghost towns died: Some went on to become successful, reinventing themselves to meet a new era. Tombstone, Arizona, the scene of the famous gunfight at the OK Corral in October 1882, between the Earp brothers and the Clantons and McLowerys, went on to become a major tourist attraction, bringing its heritage to thousands of tourists each year.

The town has been helped by the continued interest in the Wyatt Earp saga, in motion pictures from John Ford's *My Darling Clementine,* to *Wyatt Earp* by Kevin Costner, and *Tombstone,* which starred Kurt Russell as Earp. Both *Wyatt Earp* and *Tombstone* came out in the same year, 1994. Tombstone, the former ghost town "too tough to die," was also immortalized in Hugh O'Brien's 1950s television series *Wyatt Earp,* which was a hagiographic view of the tall frontier gunman based on the biography by Stuart Lake. Walter Noble Burn's *Tombstone* gave a slightly less biased historical account of the hellacious life of the town.

Even today, those who go to the town, which has faithfully restored the frontier buildings of yore, are heatedly divided in their views about the gunfight and what led up to it. One school of thought holds that the gunfight was essentially between two gangs, the Earp and Clanton factions, which were fighting to control the lucrative cattle trade of the area and the gambling dens of the town. Another view says that the Earps represented the law-and-order faction in the town and that the Clantons and the McLowerys were basically cattle rustlers, abetted by their ally, Tombstone's sheriff Johnny Behan.

Yet another view is political: The Earps and the businessmen supporting them were Republicans, and Behan and his allies were Democrats, and the entire feud was a bloody version of a Philadelphia or Boston political ward struggle. Yet another theory was that the Earps were from the North in the Civil War and that the Clantons and their comrades had supported the South, and both groups had brought the festering hate from that struggle west. Whatever the reasons, on October 26, in 1881, Virgil, Morgan, and Wyatt Earp, with that deadly dentist, John "Doc" Holliday, met the Clantons, Billy Claiborne, and the McLowerys near the OK Corral and Camillus Fly's Photography Studio. After the gunfire ceased, Billy Clanton and Tom and Frank McLaury were all killed, and "Doc" Holliday, Virgil, and Morgan Earp wounded. Billy Claiborne and Ike Clanton ran away; Ike was killed rustling cattle later on. Only Wyatt Earp remained unscathed. The history of Tombstone—and the entire American West—would never be the same.

— John F. Murphy Jr.

URBAN ANTHROPOLOGY

Although the term *urban anthropology* was coined only in the 1960s, anthropology and urban studies have always been closely associated. As Chicago sociologist Robert E. Park put it in his founding text of American urban studies, *The City* (1915), the same methods of observation that anthropologists had used to study "primitive" peoples "might be even more fruitfully employed in the investigation of the customs, beliefs, social practices, and general conception of life" in the different neighborhoods of American cities.

Louis Wirth, a colleague of Park in Chicago, greatly influenced the development of urban anthropology through his essay, "Urbanism as a Way of Life." Wirth theorized that urban life exerted a clear influence on social organization and attitudes. To Wirth, urban life is marked by impersonal, instrumental contacts that tend to free individuals from the strong controls of such primary groups as the extended family, yet at the same time, this freedom of individual action is accompanied by the loss of collective security. The Chicago School's early reliance on interviews, ethnographic work, and life histories is particularly evident in founding texts of urban anthropology, such as Carolyn Ware's *Greenwich Village, 1920–1930;* W. Lloyd Warner's *Yankee City;* and William Foote Whyte's *Street Corner Society.*

With its proposed shift from the study of "primitive" civilizations to urban cultures, urban anthropology stands in opposition to colonial anthropology that assumes "primitive" people as being essentially different from Western civilization. This opposition, urban anthropologists claim, is no longer valid, as there has not been a single society that has remained untouched by the process of industrialization.

The new subject of analysis required anthropologists to reassess their methodology. The traditional form of participant observation that put the researcher in a close relationship with a small community for a certain period of time was no longer viable in an urban context. Anthropologists working in the field have had to expand their

scope to include other materials, such as surveys, historical studies, novels, personal diaries, and other sources. The rise of urban anthropology in the 1960s reflects the acknowledgment that traditional target groups of anthropological research, such as tribal and peasant people, became increasingly integrated in an urbanized world. Topics such as rural-urban migration, urban adaptation, ethnicity, poverty, and other social problems have been particularly important in urban anthropology, which has increasingly been integrated in the discourses of other social sciences.

— Luca Prono

Civil Disobedience

Civil disobedience refers to the willful challenge and disruption of law or the orderly flow and process of daily social activity. The intent of such action is to foster change in perceived unjust, immoral, or unethical government policies, mandates, or procedures. Civil disobedience is usually a nonviolent but officially discredited means to resolve citizen grievance. These grievances are generally politically based issues that a segment of the population considers unjust and in which the government is viewed as resisting a suitable resolution.

There are several different methods of civil disobedience that are not criminal by statute, but are nonetheless disruptive. Public speeches, public statements, letters of opposition, petitions, and public declarations are all formal statements that openly deliver an opposing plea. Similar acts such as group representations, symbolic public acts, pressure on individuals, processions, public assemblies, action by consumers, noncooperation with social events, strikes, and rejection of authority are only a few of the equally effective noncriminal tactics available to motivated citizens.

The use of noncooperation and civil disobedience has been widely studied by political philosophers and theorists. Primary questions at the root of civil disobedience are: How sacred is the law of the state, and what are the limits of the authority government can assert over its citizens; also, do citizens have a responsibility to obey bad laws? The fundamental debate is whether government should be responsive to the desires of the people or if the people should absolutely obey the directives of government without challenge.

Two universal truths exist regarding government in civilized countries. The first is whether the creation of laws by government should exist for the welfare of the people. The second is to sustain civility; government is an imperfect but necessary condition. The essential component for a country to remain orderly is citizen respect for the law and the recognition of the authority of some lawmaking body. Each citizen must see himself of herself as a member of the community, and as such, each member has an obligation to respect and obey the law. Certainly as important is the belief that if laws are in place on the behalf and interest of all citizens, then it is the responsibility of the citizens to reshape untenable laws. However, most changes are usually conducted willingly by the government, either by the process of internal or external review. Consequently, when citizens take it upon themselves to violate certain laws, not out of either convenience or self-interest, but rather the larger calling of an ethical or moral good, then their willful disobedience becomes an instrument of change. Any violation of law places offenders under the assessing scrutiny of the justice system, a potential recipient of punishment. Usually those who deliberately commit civil disobedience are prepared for the anticipated judicial response with a defense strategy. An often essential component of the strategy is their arrest and punishment, which draws wider attention and endorsement for their cause. Ideally, others will become polarized and inspired to disobey as an act of both protest and support. As the number of disobedient citizens grows and the impact of their actions spirals into greater social disruption and the corresponding cost to the government increases to intolerable levels, alternatives and compromises will begin to look more attractive to those in power.

Civil disobedience has other qualities that distinguish it from typical criminal behavior. An act of civil disobedience that breaks the law is, of course, as criminal as promoting or to conspire to commit a crime. Those who commit acts of civil disobedience may claim (and often do) a compelling moral duty as citizens. This claim is especially valid in a democratic system, where citizen participation in lawmaking is a

cornerstone of the government ideal. When civil disobedience is employed to provoke change, the defense used is that the wrongful act committed is less harmful than the existence of unjust law and should mitigate the criminal charge. This argument has a greater validity if the government has been aware of the existing injustice, that it has had the opportunity to end the harm, and has failed to act or to act adequately.

Another quality of civil disobedience is that it is a public act. The citizen, in full comprehension of committing a punishable offense, acts in the public service in a clear and open protest and defiance to the government. The disobedience loses its value and message if conducted in secret or covertly, as in the example of one who paints seditious statements of protest on government buildings under the cover of night. In this situation, no matter how well intended, the act takes on the status of simple criminal mischief or vandalism, and the perpetrator, identified or not, assumes the role of a common criminal. The achievement of such public behavior is sometimes hailed as a means for acquiring personal notoriety, self-acclaim, or attention seeking. To some extent, this is true. The actor seeks attention, however, only to bring the illuminating spotlight of public review to the cause they champion. Ultimately, the individuals become synonymous with their cause, and the issue at hand receives greater review, particularly as the transgressors move through the various stages of the legal system.

Another characteristic of civil disobedience as an instrument of change is that the lawbreaking act must be a nonviolent act. Violence and inflicting injury are incompatible with the concept of civil obedience as a means of fostering change. In fact, any interference with the civil liberties of others is unacceptable with this mode of citizen political action because it obscures the message or purpose of the disobedience. Furthermore, an act of violence or injury attaches a distinctly negative sentiment to the political issue or cause. Such a sentiment is counterproductive because it acts to disperse rather than unite citizens in an act of forced change. At the heart of civil disobedience is the desire to inspire the righteous indignation of the complacent citizenry and to incite action.

Another trait of civil disobedience that separates it from most other forms of citizen action to promote change is that while civil disobedience is an expression of disobedience to the law, it also is at the same moment fidelity to the law. It is the fidelity that serves as a message from the minority to the majority of the population that their act is truly political, and separates their act of lawbreaking from mean-spirited aggression. By avoiding violence, the disobedient citizens exhibit a moral foundation and establish themselves as legitimate citizens provoking change, rather than a disorderly and unfocused band of troublemakers.

The last distinguishing trait of civil disobedience is that unlike crime, it has a place and function in civilized societies. This is especially true in countries that embrace democratic principles as the foundation of their government. In nations such as monarchies and totalitarian states, the citizens may plead their cause; however, they cannot disobey if their request is denied because to do so is an act of rebellion against the legitimate authority. In this situation, the ruling authority may have decided unwisely, and the citizens do not have the right to correct the error. However, with a constitutional-based government, where the structure is founded on mutual cooperation of equals, an imposed injustice does not require absolute obedience. Just like free elections and an independent judiciary, civil disobedience, though often illegal, when employed with proper judgment and limitations serves to maintain fair-spirited societies. While remaining faithful to the intent of law in a free democratic society, restrained nonviolent civil disobedience provides stability through a social/political outlet for dissent, challenge, and public voice.

— *Richard M. Seklecki*

See also **Altruism; Social Change**

Further Readings

Debenidetti, C. (1990). *Give peace a chance.* Syracuse, NY: Syracuse University Press.

Feinberg, J., & Hyman, G. (1980). *Philosophy of law.* Belmont, CA; Wadsworth.

Ginsberg, B. (1986). *The captive public.* New York: Basic Books.

Kronenwetter, M. (1994). *The peace commandos.* New York: New Discovery Books.

Peterson, T. (2002). *Linked arms.* Albany: State University of New York Press.

Seaton, C. (1996). *Altruism and activism.* Landham, MD: University Press of America.

Terkel, S. (1996). *People power.* New York; Lodestar Books.

Cladistics

Cladistics is a method of reconstructing phylogeny without necessary recourse to either fossils or molecular distances. It is required to trace the evolutionary changes within a group of organisms (a series of taxa), and the following stages are followed.

First, one or more outgroups are selected; these are taxa that are known to be outside the group under study (the ingroup), but not too distantly related to it. Second, the characters that vary among taxa of the ingroup are listed. Third, the character states (the ways in which the ingroup taxa differ) are listed as objectively as possible, and the corresponding states of the outgroup(s) are also listed. The states shared by the outgroup with members of the ingroup are deemed to be most plausibly inherited from their common ancestor: They are called *symplesiomorph,* or shared primitive. States that occur only in one or more members of the ingroup and not with the outgroup(s) are deemed to have evolved since the ingroup came into being: They are called *apomorph,* or derived. Some of these apomorph states are confined to a single member of the ingroup: These are called *autapomorph,* or uniquely derived. Other apomorph states are shared between different members of the ingroup: These are called *synapomorph,* or shared derived. It is the synapomorph states, of course, that are evidence for phylogenetic relatedness.

The simplest case reconstructs the phylogeny of just three ingroup members (the three-taxon problem). An example in anthropology might be the reconstruction of the phylogenetic relationships of human, gorilla, and baboon. We might take the lemur as a sensible outgroup; it is acknowledged that lemurs are phylogenetically more distant from the members of the ingroup than they are from each other. We can list a few characters that vary in the ingroup, and their states in the different taxa, as follows:

Character	*Human*	*Gorilla*	*Baboon*	*Lemur (outgroup)*
1. tail	no	no	yes	yes
2. canines	short	long	long	long
3. body hair	very sparse	sparse	dense	dense
4. locomotion	biped	quadruped	quadruped	quadruped
5. thorax	wide	wide	narrow	narrow
6. frontal sinus	yes	yes	no	no

In Characters 2 and 4, human is different from the outgroup, but uniquely so: The states are autapomorph (uniquely derived). These two characters therefore show how unusual human is, but not which of the other two ingroup members it more resembles. But if we take Characters 1, 5, and 6, we see that though human is again different from the outgroup, it shares the derived states with gorilla; these states are therefore synapomorph (shared derived) and are evidence that human and gorilla are phylogenetically closer to each other than to baboon. Finally, Character 3 is a special case; it has three states, not just two, and logically, the gorilla state (sparse) is intermediate between that of baboon and the outgroup (dense) and that of human (very sparse).

The deduced primitiveness or derivedness of the character states is called their *polarities.* The character states are typically coded; in the above case, all the characters have States 1 and 2, except for Character 3, which has States 1, 2, and 3. One then has the option of whether State 2 is to be treated as intermediate between 1 and 3 (ordered) or whether all three states are equidistant.

We arrive, then, at the phylogeny shown in this figure:

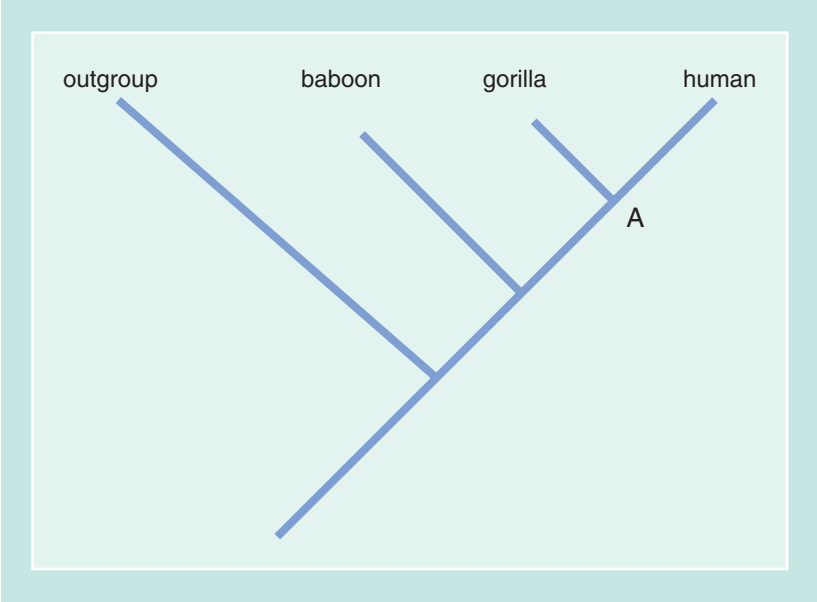
At Node A, the human/gorilla synapomorph states of Characters 1, 3, 5, and 6 appear. Between Node A and human, the human autapomorph states of Characters 2, 3, and 4 appear.

We refer to gorilla and human as a *clade* (branch) with respect to baboon and the outgroup, while of course gorilla, human, and baboon together form a clade. Human and gorilla are sister groups (or if they are species, sister species); the human-plus-gorilla clade is the sister group of baboon.

We can then add other taxa to the analysis: chimpanzee, orangutan, gibbon, for example. The more taxa we add, the more unwieldy the analysis becomes.

What renders it yet more difficult is the existence of *homoplasy.* This is where an evolutionary event occurs more than once. The three types of homoplasy are:

- Convergence: two rather different taxa independently evolve the same character state
- Parallelism: the same character state evolves independently in two descendants of the same ancestor
- Reversal: a more apomorph state, after evolving, is lost again



Phylogeny of Three Taxa

Homoplasy can easily be mistaken for *homology* (the unitary occurrence of an event); when two taxa share an apomorphic state, generally the only way to deduce whether they share it by homology or by homoplasy is by parsimony. On the assumption that an evolutionary change is a rare event, an apomorphic state is more likely to have occurred once than twice or more. The cladist will count up the apparent synapomorphic states between taxa A and B, and those between A and C and between B and C, and will usually suppose that the two that share the largest number are the sister groups. The smaller numbers of shared states that are incompatible with this conclusion are deemed to constitute homoplasy.

When a large number of taxa are being analyzed, using a large number of characters, then cladistic analysis simply cannot be performed without the aid of a computer. There are several computer packages available to perform cladistics quickly and efficiently, giving the number of steps (evolutionary changes) and several indices that record the amount of homoplasy (consistency index, retention index, and so on). When the true phylogeny is already known, or suspected, most of these computer packages can compare the analyzed phylogeny against the known one and so test the assumption of parsimony. In some cases, the result has revealed that homoplasy is unexpectedly frequent.

There is no reason why fossil taxa should not be included in a cladistic analysis. The results often have a bearing on the potential ancestral position of a given fossil, although it is important to appreciate that the function of a cladistic analysis is to discover sister group relationships, irrespective of whether one of a pair of sister groups might actually be an ancestor.

The assumption behind character counting is, of course, that each change of state represents a mutation. If there is reason to think that a state change is more complex than this, then different characters can be given different weights, so that one counts more in an analysis, and another less. Finally, molecular data can be analyzed cladistically as well as by distance methods.

The subject of cladistics is a complex one, with its own language and methodologies. Its influence on evolutionary anthropology has been enormous. A separate question is whether the results can be directly plugged in to make a taxonomic scheme or whether taxonomy should be more than simply a representation of phylogeny.

— *Colin Groves*

See also **Evolution, Organic**

Clans

The anthropological term *clan* comes from Gaelic *clann* and Old Irish *clann* or *cland,* denoting a group claiming descent from a common ancestor. The word was extended to refer to similar kinds of groups in other cultures at least from the early 16th century, and by the 1860s it had entered into sociological and anthropological usage. Anthropologists have given a number of different labels to groups recruited by filiation or descent: for example, *gens* (plural *gentes*) by Morgan and *sib* by Lowie, who reserved gens for the patrilineal form and clan for

the matrilineal form. Clan has become the preferred term, however.

In anthropological usage, a clan is a social group whose members share a doctrine of common ancestry but who do not necessarily trace descent from a common ancestor by known genealogical links. A clan may consist of more than one lineage whose members trace descent from a common ancestor by known (but possibly fictive) genealogical links. The group may be recruited by patrifiliation to form a patrilineal clan, by matrifiliation to form a matrilineal clan, or by a combination of these to form a cognatic clan. Adoptive links may be important. There may be a difference between the descent ideology and actual practice, as in parts of Papua New Guinea, where a matrifilial link becomes converted to a patrifilial one.

Clans may be exogamous; that is, a member ought to marry someone from a clan other than his or her own. Clan organization may articulate with other forms: Two or more clans may cluster into phratries; clans may be distributed between two moieties; or clans may be distributed between four semimoieties. A number of clans may form a larger entity, such as a phratry, tribe, or language group. This hierarchical structure of identities is most elaborate in models of segmentary lineage systems applied to societies of the southern Sudan.

Societies vary in the predominant lineality of clans; in some societies, patrilineal or patrifilial groups are predominant, while in others (though more rarely) matrilineal groups are the most common form. Some societies combine patrilineal and matrilineal clans in a system of double descent. Groups in Polynesian societies draw on ambilineal or cognatic descent to form groups in which an individual has potential claims in a number of groups, through both parents and four grandparents, although only one claim is likely to be activated.

Clans and other kinds of groups coexist with kinship, which is normally bilateral. The form of kin classification, however, may be strongly shaped to fit lineage and moiety identities. In the case of unilineal groups, each individual is often connected to the other parent's clan through complementary filiation, yielding rights that are not transmitted to the next generation.

In general, clan organization has been found in societies in which kinship and descent have provided the main bases for the organization of society, although it can be combined with hierarchical forms of organization. It has persisted in many areas with colonial and postcolonial state structures.

Clans and Hierarchy

Clan organization is capable of elaboration to incorporate various forms of hierarchy. According to the model of the conical clan, which has been applied to descent groups in parts of Polynesia, the birth order of ancestors ideally determines the rank order of their descendant lineages, although a good deal of manipulation is possible, especially where these groups are ambilineal or cognatic. Raymond Firth applied the term *ramage* to the ambilineal Polynesian clan. Hunter-gatherer societies of the northwest coast of North America were hierarchical. Among coastal Tshimshian, for example, the four matrilineal clans were ranked in order, and members of each clan were ranked, with chiefs, who possessed honorific titles, at the top of the rank order.

In some chiefdoms, royal clans and lineages were distinguished from commoner ones. Among Bantu peoples of southern and central Africa, such as the Zulu, Swazi, and Bemba, the descendants of a chief's clan form a ruling caste, and clans are ranked according to the tradition of original migration into the area or the degree of relationship with the chief's descent group.

Clans in Social Theory

The concept of clan has featured in general theories of social organization. For example, the 19th-century theory of totemism outlined an ideal type of "primitive" society in which each exogamous clan was linked to a totemic species. In his outline of the evolution of the division of labor, Émile Durkheim contrasted "segmental structure" associated with a minimal division of labor and "mechanical solidarity," with a more generalized structure of permeable groups associated with a greater division of labor and "organic solidarity."

The concept of clan became linked with the concepts of corporation and corporate group, deriving from the legal history of Henry Maine and Max Weber's theory of the *verband,* but with its ultimate origins in Western law of incorporation. A corporate clan is thus a descent group whose identity persists beyond the life of any individual member and that

holds some kind of property as a group, such as land and/or totemic insignia. In the structural functionalist anthropology of Africa, the clan became one variety of the unilineal descent group, theorized by anthropologists such as Meyer Fortes. Thus, in structural functionalist anthropology, "clan" and related concepts were linked to descent theory, in which descent was seen as a major component of social structure. This approach contrasted with alliance theory, associated with Claude Lévi-Strauss, in which groups such as clans were linked in various ways by marriage exchange.

Critiques of the Concept

From the early 1960s, cultural and social anthropologists, including John Barnes, Robert Barnes, Ian Keen, Adam Kuper, and Roy Wagner, have criticized lineage theory and the use of concepts such as clan and sib on the grounds that the assumptions and metaphors implicit in the concepts distort ethnographic reality. The concept of clan is perhaps best thought of as a model that approximates the constitution of social identities and their entailments to varying degrees.

— *Ian Keen*

See also **Social Structures; Totemism**

Further Readings

Kuper, A. (1982). Lineage theory: A critical retrospect. *Annual Review of Anthropology, 11*, 71–95.

Wagner, R. (1974). Are there social groups in the New Guinea Highlands? In M. Leaf (Ed.), *Frontiers of anthropology* (pp. 95–122). New York: Van Nostrand.

Clines

Clines are gradations in biological features over geographic space. They refer to continuous degrees of difference in either phenotype or genotype across or within human populations. A given cline consists of the gradient in frequency of a single trait over space. This graded change is often associated with a gradually changing environmental factor. Thus, gradients in the appearance or function of a trait represented by a cline can correspond with graded alterations in the environment. Clines are useful to biological, medical, and other anthropologists interested in depicting and analyzing human variation.

When a cline is graphically portrayed, portions of the distribution of the trait that have the same value are connected by a line. On either side of the line appear other lines representing progressively greater and lesser frequency of the trait. Thus, the graph of the cline resembles a weather map, with bands of varying temperature or pressure occurring over space. A map of a cline effectively illustrates how the distribution of the trait is gradual and continuous rather than abruptly different from one area to the next.

Gene flow is one evolutionary process that can generate a clinal trait distribution. Population movements can result in a trait pattern of highest frequency where the population originated and decreasing frequency with greater distance from the ancestral home. Frequencies of the ABO blood group in Europe and Asia provide a good example of this effect of gene flow. The prevalence of Type B is greatest in Asia and declines as one moves west. This pattern is attributable to population movements by Asian nomads who spread to eastern and central Europe in several waves over the last 2,000 years. The dissemination of Type B was less with the smaller groups who migrated farthest, and the concentration of Type B remained greatest in the regions of origin. A second cline of the ABO blood group in Europe and Asia exists with Type A, which is greatest in Europe and decreases as one moves east, a pattern opposite to that of Type B.

In addition to gene flow, an evolutionary process that can produce clines is natural selection. If selective forces vary geographically, responding trait distributions can be clinally patterned. Ancestral skin color provides an example of clines that reflect natural selection. Average skin pigmentation reveals a notable pattern that varies with the selective force of ultraviolet radiation. Darkest skin color is seen at or near the equator, and amount of pigmentation becomes increasingly less as distance from the equator increases. Specifically, in the Old World, the cline of skin color shows gradients that decrease more readily as one moves north of the equator than as one moves south. The general pattern of pigmentation

decline holds in both hemispheres, but it is more pronounced for a given latitude in the northern than in the southern hemisphere. A plausible explanation for this difference is that UV radiation is less in the northern than in the southern hemisphere at comparable latitudes. In the New World, pigmentation clines exist that do not reflect the forces of natural selection, but rather the historical effects of population movements. For example, the mass, forced withdrawal of West Africans during the period when slaves were traded placed human groups in new geographic areas. The resulting trait distributions were not linked to UV radiation as they had been in the ancestral homes.

Other clines revealing an influence of natural selection relate to body size and shape. Climate exerts strong selective pressures on certain body parameters.

As far as size, a cline for mean body mass demonstrates that body mass for a given stature is higher as latitude increases and average annual temperature declines. Concerning body shape, mean body breadth can be assessed by the width between the crests of the two ilia (hipbones). This body breadth measurement shows a latitudinal cline, with breadths wider as latitude increases and average annual temperature falls. A second latitudinal cline for body shape involves mean limb length. Arms and legs are shorter for a given stature or trunk size as latitude increases and average annual temperature declines. Collectively, these three gradients for body size and shape constitute adaptive strategies related to thermoregulation. Through alterations in body form, surface area per unit mass is decreased in colder climates to reduce heat loss, while it is increased in warmer environments to enhance heat dissipation.

With the accumulation of data on gene frequencies in various world regions, clines are sometimes redrawn. The increased knowledge of trait distributions enables clinal maps that have greater detail and smaller increments in trait frequency among neighboring areas. Another ongoing consideration with clines is that as human groups migrate and interbreed with others from different major geographic regions, connections between phenotypes and geography can be weakened.

As an approach to studying human diversity, clines are useful for investigating worldwide and regional distributions of traits and interpreting these distributions. A clinal orientation can be viewed as an alternative to a racial, or typological, perspective on human variation. For example, researchers of clines focus on only one or a few traits at a time, not on combinations of traits that are expected to differ together, as a racial orientation requires. Also, clinal analysis looks at the continuity of trait distributions, rather than the discontinuity that characterizes a racial viewpoint. Furthermore, in explaining the distribution of traits, a clinal approach focuses on evolutionary forces such as natural selection and gene flow that increase and decrease variation within and among human groups. Such an outlook contrasts with the static nature of human diversity assumed by the race concept.

Some anthropologists believe that the clinal approach is most valuable when it is applied in combination with a population focus. It is important to recognize that traits do not exist in isolation, but rather are part of the entire genetic endowment of humans. Thus, while single genotypes and phenotypes can demonstrate a clinal distribution, the overall patterning of traits is fundamentally linked to the behavior of individuals and populations.

— Penelope A. McLorg

See also **Gene Flow; Genetics, Population; Selection, Natural**

Further Readings

Cavalli-Sforza, L. L., Menozzi, P., & Piazza, A. (1994). *The history and geography of human genes.* Princeton, NJ: Princeton University Press.

Molnar, S. (2002). *Human variation: Races, types, and ethnic groups* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Ruff, C. B. (1994). Morphological adaptation to climate in modern and fossil hominids. *Yearbook of Physical Anthropology, 37,* 65–107.

Clinical Genetics

Whereas medical genetics is the study of the genetics of human disease, *clinical genetics* deals with the direct clinical care of people with genetic diseases. Clinical genetics encompasses the scientific methods and their application in clinical practice, with the focus on human diseases caused by genetic variation. The

principal concerns of clinical genetics include clinical evaluation, diagnosis, genetic counseling, and therapeutic management of genetic disorders. Genetic disorders are typically complex, multiorgan, and systemic in nature, requiring a coordinated approach to the care of affected individuals and their families.

Clinical geneticists are physicians who typically have training in a medical specialty, such as pediatrics, medicine, or obstetrics and gynecology, with extended training in medical genetics. Clinical genetics is now a medical specialty in the field of medical genetics, with board certification and standards of care.

The conditions with which clinical geneticists have traditionally been concerned include chromosomal abnormalities, single-gene disorders, and birth defects. Many conditions are now identified through prenatal diagnosis or genetic screening. But most often, genetic disorders are diagnosed through the referral of an individual to a clinical geneticist by his or her physician. Today, clinical genetics is extended increasingly to common later-onset diseases, such as familial cancer, diabetes, and cardiovascular disease, with more emphasis on preventive measures and behavior modification to delay the onset of the disease.

Areas in which the field of clinical genetics relates to anthropology concern both cultural and biological issues. It is increasingly evident that genetic health care services need to be provided by professionals who are culturally competent. Providers of genetics health care should understand culture-based beliefs and attitudes about disease, including genetic disorders, in order to deal effectively with the needs of families. In the assessment of individuals, clinical geneticists often use anthropometric measurements, a traditional tool of biological anthropology, especially in the evaluation of craniofacial dimensions that are important in the diagnosis of many genetic disorders. In addition, clinical geneticists evaluate the physical growth of children, the focus of a traditional research area in biological anthropology, as body growth and size frequently vary from the norm in genetic disorders.

Perhaps there never has been a stronger contribution to the field of clinical genetics than the Human Genome Project (HGP). It is estimated that there are now almost 1,000 diseases for which genetic tests are available. Included in this estimation are a number of the common, complex diseases such as cardiovascular disease and cancer. The HGP has created a human genome map with approximately 35,000 human genes. Almost one third of these genes have been discovered, with many of the gene loci, allelic variants, functions, and disease associations described. The HGP has enabled researchers to identify errors in genes that may contribute to or cause certain diseases. By the year 2010, predictive genetic testing might be available for more than 25 common diseases, such as diabetes and hypertension. This very expectation will impact genetic counseling and testing, in which individuals will seek information to take steps to reduce the risks for certain genetic diseases. For example, cardiovascular disease is a complex interaction of genetic factors (gender, family history, single-gene abnormalities of lipids, diabetes, obesity, and hypertension) that interact with nongenetic risk factors (smoking, physical inactivity, stress, and increasing age). In the future, an individual might seek genetic counseling and testing to determine susceptibility to cardiovascular disease in order to make lifestyle modifications. More important, the identification of disease-related genetic variation plays a role in the prevention of disease and will reshape the future of health care.

— Kathy Prue-Owens and F. John Meaney

See also **Human Genome Project; Medical Genetics**

Further Readings

Davies, K. (2001). *Cracking the genome: Inside the race to unlock human DNA*. Baltimore: John Hopkins University Press.

Nehring, W. M. (1999). Clinical genetics: An overview. *The Journal of Cardiovascular Nursing, 13,* 19–33.

Wilson, G. N. (2000). *Clinical genetics: A short course.* New York: Wiley-Liss.

Clovis Culture

The antiquity of humans in the New World had been a controversy during the 19th and early 20th centuries. Insight into just how long ago the incursion of people into the Americas occurred came in 1927, when lanceolate projectile points were found with the remains of extinct bison near Folsom, New Mexico.

Then, in 1932, similar but distinctive stone points were found at Dent, Colorado, this time associated with the mammoth. These artifacts appeared to be related to the Folsom points, both of them bearing axial channels ("flutes") at their bases for hafting. The Dent points were different, however, in being larger and thicker and having proportionally shorter axial channels and coarser flake scars. Clearly, humans were in North America by at least the late Ice Age.

In the mid-1930s, Dent-type points were found near Clovis, New Mexico, at a site called Blackwater Locality No. 1, beneath an unconformity (a break in the vertical deposition sequence). Above the unconformity were Folsom points. This stratified sequence showed that the Dent-type artifacts (thereafter referred to as "Clovis" points, for the nearby town) were older than the Folsom points. Clovis points, or points closely resembling them, are now known from most of North America. They, and the other artifacts found with them, have come to represent a cultural complex that bears the same name.

Clovis is the oldest clearly defined culture known in North America, with radiocarbon dates concentrating in the range of 11,200–10,900 years BP (before the present) (though a few sites have yielded dates three to four centuries older). Its most characteristic artifact, the Clovis projectile point is lanceolate (axially elongate with roughly parallel sides curving to a point), with a concave base, and one or more elongate axial flakes removed from each side of the base, presumably to facilitate hafting to a shaft. The edges of the lower sides and the base were commonly blunted by grinding, in order to avoid severing the binding. The artifact was made remarkably thin through a process called "overshot flaking" *(outre passé),* which involved removing a flake from one side of the artifact clear across to the other side. These points, or ones closely resembling them, occur in North America from the East to the West Coast, and from the Canadian plains to central Mexico and possibly even Panama. The Clovis lithic industry is also typified by blades, end scrapers, side scrapers, pièces esquillées, and gravers. Burins, while present, are generally rare, and microblades are absent.

While the Clovis fluted projectile point is distinctive, it does show a degree of variation. This is strikingly illustrated by eight points found at the Naco site in Arizona. They were associated with a mammoth skeleton and are believed to reflect a single hunting event. The points differ markedly in length (approx. 11.6 to 5.8 cm), though less so in width and in the profile of the edges. One of the longest Clovis points known is a 23.3 cm chalcedony artifact from the Richey-Roberts Clovis Cache, at East Wenatchee, Washington State.

Clovis blades, most common in the southeastern United States and the southern Great Plains, are large, triangular in cross section, and thick toward the distal end. No microblades have been found at Clovis sites.

The use of bone, ivory, and antler as raw material for toolmaking was an important aspect of Clovis technology. From these were made what have been interpreted as awls, punches, choppers, scrapers, scoops, fleshers, and points. Osseous rods with beveled, cross-scored ends are known from sites widely distributed throughout the United States. Some of them have been interpreted as foreshafts, short cylinders to which points were bound and that, in turn, were inserted as needed into the socketed end of the main spear shaft. It has also been suggested that these beveled osseous rods served as levers for tightening the ligature of a hafted tool as it was used to slice.

While most Clovis osseous tools appear to be expedient, a clearly formal tool, probably made from mammoth long-bone cortex, appears to have served as a wrench for straightening spear shafts (similar to devices used by Eskimos). It is shaped as a ring with a long, straight handle extending from it. The inner edges of the ring are beveled. A shaft 14 to 17 mm in diameter would be the best fit for the ring, concordant with what would be expected to haft the fluted points found in the area. This artifact, from the Murray Springs site in southeast Arizona, was found with Clovis points near a mammoth skeleton.

Because it was first recognized and characterized in that region, the Clovis complex *sensu stricto* is best known in the western United States. As researchers move outside this area, however, defining a true Clovis site becomes more difficult. The term has been used informally to include whatever sites have yielded Clovis-like projectile points. As was demonstrated by the eight Naco points, however, there can be variation in the form of points from a single site. On the other hand, points from widely separated localities can be remarkably similar. Also, the very broad geographical distribution of apparent Clovis points spans a wide range of environments and of associated floras and faunas.

The fluted points themselves show stylistic variation that within a given region has been interpreted as

reflecting changes over time. In the northeastern United States and southeastern Canada, for example, the Gainey type of point most resembles the western Clovis point, while the Barnes and Crowfield types are thought to be later styles.

Another criterion that may be useful is the presence of Pleistocene megafauna, especially proboscideans (mammoth, mastodon), since the type Clovis occurrence is associated with animals (especially mammoth) that disappeared from that area at the same time that the Clovis complex was replaced by Folsom. In Michigan, the northern limits of early Paleo-Indian fluted points and of fossil proboscideans nearly coincide along an east-west demarcation midway up the Michigan peninsula, the so-called Mason-Quimby Line.

Discoveries at the Hiscock site in western New York, however, show that use of this association for such interpretive purposes requires caution. While Clovis-like Gainey points co-occur here with abundant mastodon bones, some of which were used to make tools whose radiocarbon dates are coeval with Clovis, there is no clear evidence that these people were hunting mastodon. On the other hand, there is evidence that they were retrieving bones found at the site and using them as raw material for toolmaking. Thus, the man-beast relationship may not have been "personal," and the chronological separation between the people and the megafauna is difficult to gauge.

While there had been a long-standing belief that the Clovis people were the first humans to enter the New World, the last few decades have cast some doubt on this. A scattering of sites in North and South America have yielded radiocarbon dates associated with non-Clovis cultural remains that predate Clovis. Monte Verde, in Chile, contains evidence of human presence somewhere within the range of 12,000–12,500 radiocarbon years ago. Mammoths may have been butchered near Kenosha, Wisconsin, and a tortoise in Florida at around the same time. Radiocarbon dates in cultural contexts, reaching back to 16,000 years BP, have come from the Meadowcroft rockshelter in southwest Pennsylvania. It seems likely that there were humans in the New World some time prior to Clovis, though the paucity of their traces suggests the populations were quite small and scattered.

Clovis Lifeways

Several aspects of Clovis life are reflected by the varied archaeological sites attributed to this culture. Habitation or campsites were small in comparison with those of the Folsom complex (which succeeded Clovis on the Great Plains). Hearths are represented by depressions less than 3 m in diameter and up to 20 cm deep, containing charcoal. These hearths were not lined with rocks. The presence of well-drained soil and nearby water seem to have been desirable traits for habitations. For example, at the Aubrey site (northeast Texas), a Clovis camp was situated on sandy soil, 1 m above an adjacent pond.

With regard to water, the Hiscock site (western New York) is instructive. This locality featured active springs during the late Pleistocene, and the abundance of bones indicates that animal life here was plentiful. Yet while archaeological artifacts demonstrate the presence of Clovis (or Clovis-contemporary) Paleo-Indians at the site, there is no evidence of significant habitation. This may be due to the fact that Hiscock was a mineral lick, and probably not an appropriate source of drinking water.

There are a few very large, artifact-rich habitation sites that appear to have been occupied repeatedly and/or for extended periods of time (the Gault site in Texas, the Arc site in New York). These are suggestive of places where several bands would come together periodically, a practice that may have been important for the long-term survival of wandering, sparsely distributed human populations.

At sites where prey animals were killed and butchered (or sometimes perhaps scavenged), butchering tools were resharpened on the spot, leaving concentrations of debitage. The Murray Springs site (Arizona) contains a mammoth and a bison kill, along with a hunting camp. A partial mammoth long bone and a tooth found in the camp links it with the mammoth remains. Refitted impact flakes matched with damaged projectile points similarly link the bison kill site with the camp.

Quarry workshops were sources of rock suitable for toolmaking (typically chert), where the raw material was reduced in size and shaped to make it more portable. There were also "bone quarries" (the Hiscock site) where bones, teeth, and antlers were sufficiently abundant to be gathered as raw material for tools.

Clovis people valued chert, obsidian, and other aphanitic rocks that were attractive and of high quality. Many lithic tool collections reflect raw materials obtained from multiple sources within several tens of kilometers of each other, and sometimes from 300 km and even more distant. A point from the

Kincaid Shelter site in central Texas was made from obsidian obtained 1,000 km away, in central Mexico. Of course, it is uncertain to what extent the origins of these various rocks reflect mobility of the people and how much is attributable to serial trading. Nevertheless, the frequent occurrence of raw material from distant sources has generally been taken as evidence of a nomadic way of life for the Clovis people.

Concentrations of stone and bone tools, commonly in good condition and sometimes of remarkable aesthetic quality, have been found at several sites (the Richie-Roberts Clovis Cache in Washington State). These have been interpreted as caches, representing either spiritual offerings or emergency stocks left by nomadic people for retrieval in emergencies.

The wide dispersion of their projectile points, and the fact that they are made from chert that was sometimes obtained from distant sources, suggests that the Clovis people were nomadic hunters. When a Clovis site contains animal remains, proboscidean bones are commonly among them, and in the "typical" western Clovis sites (Naco, Dent, Blackwater Locality No. 1, Murray Springs), these belong to mammoths. Clovis people also used mammoth bones to make tools. Hence, the Clovis have been thought of as mammoth hunters.

The exploitation of mastodon on a similar scale by Clovis hunters has been less widely accepted, with only a few sites providing evidence for predation on this species.

Mammoth and mastodon appear to have occupied different habitats (mammoth favoring more open land such as plains and tundra, mastodon being more associated with wooded areas), so it was thought this led to a preference for mammoth hunting. Beginning in the 1980s, however, there have been reported mastodon skeletons in the Great Lakes region in which marks on the bones and peculiarities in the distribution of skeletal elements in peat bogs (former ponds) strongly implies that the animals had been butchered.

Most of the putatively butchered mastodons were young and middle-aged males, animals in the prime of life. Significantly, virtually all of them had died between midautumn and early winter. This nonrandom pattern suggests hunting rather than scavenging. Among modern elephants, males are excluded from the security of the herd around the time when they reach sexual maturity. If this was the case with mastodons (an uncertain proposition, since mastodons were not true elephants, as were mammoths), the pattern suggests that Clovis hunters stalked isolated males as winter approached, knowing that they would have spent the summer and fall storing up fat and other nutrients. Following a successful hunt, they would butcher the carcass and store those parts not used immediately in the bottoms of cold ponds to secure them from scavengers and decomposition. They could be retrieved during the winter for food resources. It has also been suggested that the hunters had filled mastodon intestines with sediment and used them to anchor the meat to the floor of the pond. Mammoth bone piles at Blackwater Locality No. 1 (New Mexico) and Colby (Wyoming) have also been interpreted as winter meat caches. An aggregation of large boulders at the Adkins site (Maine) has been asserted to be a meat cache, though no bones were found associated with it.

It is not clear how a Clovis hunter would have used a spear in a hunt. While spear-throwers *(atlatls)* dating from the Archaic are known from dry caves in the western United States, none have been found in a Clovis archaeological context. Nevertheless, impact fractures on some Clovis points at the Murray Springs bison kill area indicate sufficient force to suggest they were propelled. Experiments on fresh carcasses from an elephant cull in Zimbabwe demonstrated that a spear tipped by a Clovis point can inflict a lethal wound with the aid of an atlatl. Thrusting with a spear could have done the same, although less reliably. Needle-sharp ivory and bone points, found in Florida underwater sites, may have been useful as lances for reaching the heart. Simple stone tools have proven effective experimentally in performing butchery tasks, and concentrations of chert debitage at kill sites show that stone tools were resharpened and sometimes reshaped during processing.

Most mammoth kills in the West were in low watering places, such as springs, ponds, and creeks. A skilled elephant tracker today can harvest a wealth of information about individual animals and their condition from their trackways, the composition and condition of their dung, and other evidence. It seems reasonable that Clovis hunters would have developed and used similar skills in hunting the proboscideans, which were evidently an important component of their subsistence.

Clovis or early Paleo-Indian hunters seem to have used the local landscape to their advantage. At the Vail

Site (Maine) there is a camp and nearby kill and butchery sites. These lie near the narrowing of a river valley, which could have concentrated migrating caribou herds, affording an opportunity for ambush. Similarly, at the end of the Pleistocene, the Hiscock site, in western New York, lay on the edge of a 3-km-wide emergent area that formed a corridor breaching a 153-km-long belt of ponds and wetlands. The site itself was a salt lick and contains abundant bones of mastodon and caribou, as well as early Paleo-Indian tools. This location may have been a reliable area for monitoring the passage of herd animals.

Dogs appear to have been present at late Paleo-Indian localities in the western United States (Folsom component of the Agate Basin site, eastern Wyoming). It seems reasonable, then, that they accompanied Clovis bands, perhaps assisting in their hunts.

Animals other than proboscideans were also hunted by Clovis people. Bison were one of the prey animals at Murray Springs. This site also includes a possible horse kill. Bear and rabbit bones, some of them calcined (burned), occur in hearth areas at the Lehner site (Arizona). Similarly, calcined bones of caribou, hare, and arctic fox were associated with a pit feature at the Eudora site (southern Ontario). Fish bones were found in a hearth at the Shawnee-Minisink site (Pennsylvania).

How large was a Clovis band? The eight Clovis points at the Naco site (Arizona), associated with a single mammoth, are thought to represent one kill or possibly a mammoth that escaped a hunt and succumbed later to its wounds. Four to eight hunters may have been involved in this hunt. If they constituted 20% of their band, then a band size of 20 to 40 people would seem reasonable.

It is assumed that Clovis people traveled primarily by foot. If they had dogs, these animals may have been used, as by later American Indians, to help carry or otherwise transport items, but there is no surviving evidence to support or negate this.

The presence of Paleo-Indian sites on what would have been islands at that time strongly suggests that these people were able to make some sort of watercraft when the need arose. Certainly, some Old World Pleistocene people (Australian aborigines) lived on lands that could have been reached only by boat or raft, so the technology for making watercraft was likely understood by Clovis people.

Little remains to attest to Clovis aesthetic sensibilities. This is rather surprising, as there is a rich artistic legacy in Late Pleistocene archaeological sites of central and eastern Europe, with which the Clovis culture otherwise seems to have a remarkable number of links (see below). Sculptures and cave paintings, as found in Europe, have not been found at Clovis sites. What have been found are simple beads. A roughly cylindrical bone bead was found in the Clovis component of Blackwater Locality No. 1. One from the Hiscock site, in New York, was made from a crudely rounded piece of gray sandstone, about 8.5 mm in diameter and 6 mm thick, pierced by a lumen just under 2 mm wide. This lumen, which must have been produced by a very fine stone spike, was drilled about three quarters of the way through the piece of sandstone, and then finished from the other side to avoid rupturing the bead. Other beads from Paleo-Indian sites are made from bone as well as stone, although not all date from Clovis times. Presumably, these were worn on cords of animal hide or plant fiber.

Other examples of Clovis artistry are inscribed linear designs and patterns on various hard materials. A bevel-based ivory point from an underwater site in the Aucilla River (Florida) has a zig-zag design engraved along its length on one side. A bevel-ended bone rod from the Richey-Roberts Clovis Cache (Washington State) bears a zipperlike series of short, transverse lines along most of its length. While this latter pattern may have been aesthetic or symbolic, it might also have been functional, for example, to prevent a winding cord from slipping along its axis. Several limestone pebbles with complex patterns of inscribed, intersecting lines were found at the Gault site in central Texas.

Clovis people seem to have devoted much of their aesthetic attention to the manufacture of their fluted biface points, some of which are remarkably large and made from attractive stone. In some cases, the stone was obtained from a considerable distance and may have been valued for its appearance.

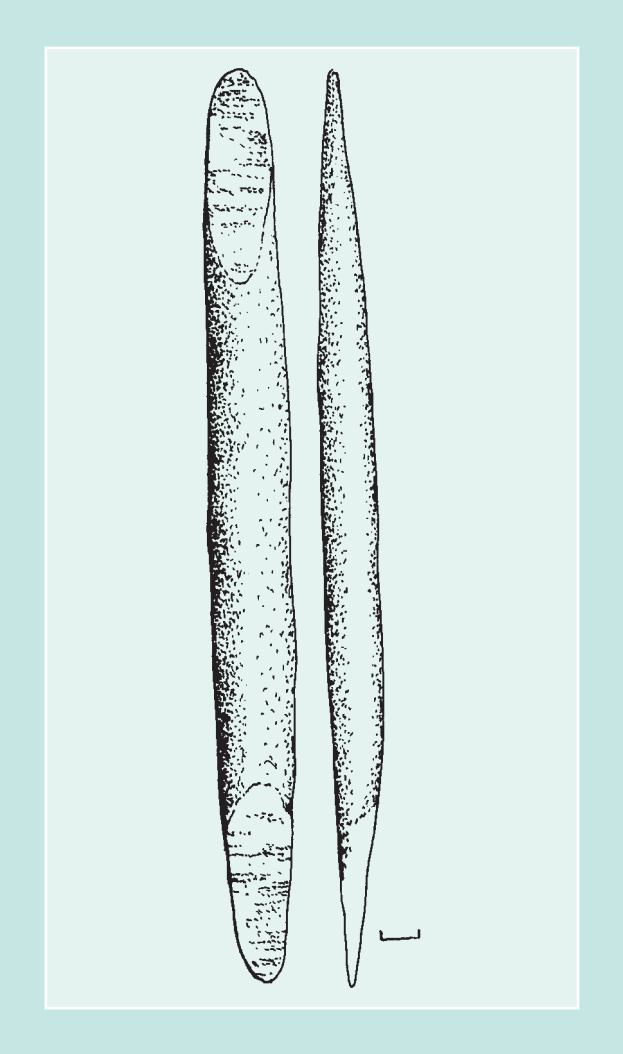
Religious beliefs of the Clovis people are hinted at by a small number of discoveries. At the Wilsall (Anzick) site in Montana, the crania of two juvenile humans, one of them stained with red ocher (a form of the mineral hematite), were found with ocher-stained Clovis age artifacts. Because the site's stratigraphy had been extensively disturbed before it could be properly excavated, the relationship of the two crania and the artifacts was uncertain. The stained cranium proved to be 10,500 to 11,000 radiocarbon

years old, a reasonable fit with the artifacts. (Later radiocarbon dating showed that the unstained bone was 8,000–9,000 radiocarbon years old, and thus fortuitously associated with the older cranium.) Ocher staining has been found in conjunction with burials at widespread prehistoric sites in the Old World, suggesting that this may have been a burial with artifacts left as an offering.

Evidence of the ritual destruction of lithic artifacts was found in southwestern Ontario, at the Caradoc site. Although the artifacts reflect a Paleo-Indian culture later than Clovis (the estimated age of these items is somewhere between 10,500 and 10,000 radiocarbon years BP), it seems reasonable to hypothesize such behavior among earlier Paleo-Indians. Apparent caches of lithic tools at a number of Clovis sites, especially the one associated with the possible burial at the Anzick site, suggest that these people attributed significance beyond the simply utilitarian to the stone implements they crafted. At Caradoc, at least 71 artifacts had been deliberately smashed. The tools were mostly made of Bayport chert from the Saginaw Bay area of Michigan, about 175 to 200 km from the Caradoc site.

Clovis Origins

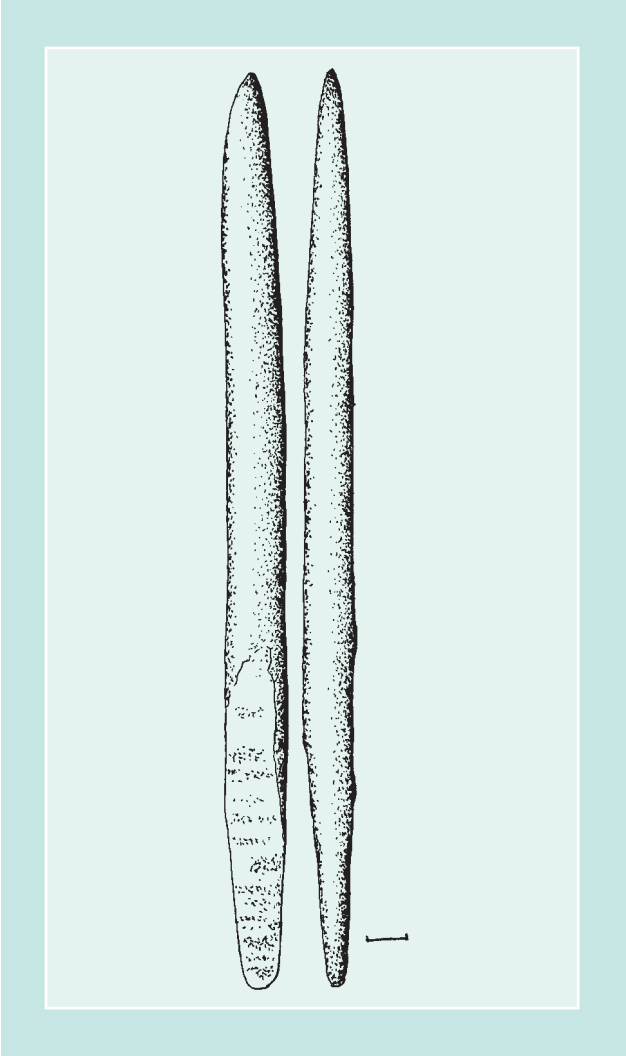
Where did the Clovis culture originate? Its roots may lie among Aurignacian and Gravettian hunters, who were in Eastern Europe beginning 24,000 to 26,000 years ago, using mammoth for food and for materials to produce tools, art, and even houses. The environment in which humans interacted with these animals and other megafauna, called the "Mammoth Steppe," extended into eastern Siberia and picked up again in central North America. A number of archaeological links between the eastern European Upper Paleolithic cultures of the Mammoth Steppe and the Clovis culture have been cited: bifacially flaked projectile points with thinned bases, bevel-based cylindrical bone points, knapped bone, grave goods with red ocher, blades from prismatic cores, end scrapers, unifacial flake tools, bone shaft wrenches, bone polishers, hearths in shallow depressions, and circumferentially chopped and snapped tusks. The percussion bulb was removed from a Murray Springs (Arizona) flake tool by pressure flaking, a common feature in the Old World Late Paleolithic.



Bone rod with roughened bevel at both ends. Bar scale = 1 cm

At Mal'ta, near Lake Baikal (southeastern Siberia), was found an 18,000-year-old burial of two children with red ocher and cylindrical bone points. Though it is much older, this material is strikingly similar to what was found at the Anzick Clovis site in Montana.

Most researchers have looked to northeast Asia as the region from which humans first entered the New World and Alaska as the place of their initial arrival. Since much of the earth's water was transferred from the ocean basins to continental and alpine glaciers during the last glacial maximum, the sea level dropped dramatically. An area of exposed sea floor joined eastern Siberia and Alaska into a vast region called *Beringia,* whose greatest areal extent existed between 15,000 and 20,000 years ago. The steppe-tundra of Siberia and its



Bone rod with roughened bevel at one end and point at the other. Bar scale = 1 cm.

fauna expanded into this region and were presumed to be followed by human hunters.

Archaeological evidence shows that people arrived in eastern Beringia (central Alaska) sometime between 12,000 and 11,000 radiocarbon years BP. Once they had occupied this region, however, when did they enter central North America? Until recently, it was thought that the Cordilleran and Laurentide ice sheets of North America separated as early as 25,000 years ago, providing access to the south via an ice-free corridor. More recent evidence, however, indicates that such a corridor did not exist until about 11,000 BP, and that the glacial mass would have blocked inland access from Beringia to the unglaciated southern regions. On the other hand, the presence of land mammal fossils (such as brown bear and caribou) along the northwest coast of North America indicates that this area was ice-free back to at least 12,500 years BP. This has led some researchers to favor a coastal route, using watercraft, for entry into the south.

Two toolmaking traditions have been found at Late Paleolithic sites in Beringia. One is based on wedge-shaped cores and microblades, which are believed to have been set into grooves carved along the sides of elongate pieces of bone or antler to produce sharp-edged projectile points and other tools. This tradition is found in China and northeast Asia, and it reached Alaska and the northwest coast (where it is called the "Denali complex") by about 12,000 years BP. Microblades, however, have not been found at Clovis sites, and Denali is generally not considered closely related to Clovis.

A second industry that included bifaced projectile points and large flakes struck off of cylindrical cores (the Nenana complex) existed in the central Alaskan region of Beringia around 12,000 to 11,500 years BP. This tradition thus preceded and may have slightly overlapped Clovis, and it has characteristics from which its proponents believe the Clovis tool industry could indeed have been derived.

The Mill Iron site of southeast Montana, a possible Clovis contemporary, contains unfluted, concave-based points. Nenana bifaced projectile points in Alaska are also unfluted. The fluted Clovis point, then, may have developed south of the continental ice sheet in the mid- to late 11,000s BP, rapidly spreading from coast to coast and into Central America. It has been suggested by some researchers that this innovation originated in southeastern North America, where fluted points are unusually abundant and varied, possibly evolving from the Suwanee-Simpson point.

On the other hand, some researchers have pointed to striking similarities between Clovis and the Upper Paleolithic Solutrean and Magdalenian complexes of northern Spain and southern France, which together date to 21,000 to 11,000 years BP. Solutrean points, while unfluted, share other traits with the Clovis form, including the use of overshot flaking. Core blade technology is also similar, and there is even a counterpart to the Murray Springs Clovis shaft wrench. While the European complexes predate Clovis, proponents of a relationship claim that artifacts from putative pre-Clovis North American sites (Meadowcroft

in Pennsylvania; Cactus Hill in Virginia) do have Solutrean features.

These researchers envision the first North Americans as having come west across the Atlantic, perhaps along the edge of the North Atlantic ice pack.

The Environmental Context of Clovis

The Clovis culture was contemporary with some of the most dramatic environmental changes—in climate, hydrology, flora, and fauna—since the Sangamon Interglacial. The oldest Clovis dates may coincide with, or slightly predate, the end of the Intra-Allerød Cold Period (IACP), at a time of reversion to the general warming of the Bølling-Allerød Interstadial. This brief warm period (lasting roughly 200 years) brought with it widespread drought in the Western United States and possibly east of the Mississippi River as well. The large proglacial and pluvial lakes that had formed during rapid melting of the ice sheets were greatly reduced in size, and water tables fell. The dryness is reflected in a 140-cm-deep cylindrical well at the Blackwater Draw site (New Mexico) dug during Clovis times. When the water tables finally rose again in the Southwest, the Clovis complex was gone, as was the Pleistocene mammalian megafauna (with the exception of *Bison antiquus*). This return to wetter conditions is taken to reflect the beginning of the Younger Dryas Cold Period, about 10,900 or 10,800 radiocarbon years ago. The Clovis culture was now replaced by Folsom bison hunters on the Great Plains.

While this scenario may hold for the western states, Clovis sites occurred in such a wide variety of environments that the end of the culture was almost certainly a complex affair, leaving much yet to be learned by archaeologists.

— *Richard S. Laub*

See also **Folsom Culture; Paleontology**

Further Readings

Boldurian, A. T., & Cotter J. L. (1999). *Clovis revisited.* Philadelphia: University of Pennsylvania Museum.

Collins, M. B. (1999). *Clovis blade technology.* Austin: University of Texas Press.

Fiedel, S. J. (1999). Older than we thought: Implications of corrected dates for Paleoindians. *American Antiquity 64,* 95–115.

Gramly, R. M. (1990). *Guide to the Paleo-Indian artifacts of North America.* Buffalo, NY: Persimmon Press.

Haynes, G. (2002). *The early settlement of North America: The Clovis era.* New York: Cambridge University Press.

Soffer, O., & Praslov, N. D. (1993). *From Kostenki to Clovis: Upper Paleolithic-Paleo-Indian adaptations.* New York: Plenum Press.

Coliseum

"The Roman People," wrote the satirist Juvenal in the first few decades of the second century CE, "once used to rule . . . but now they wish for two things only: Bread and Games." And the Roman people had been amply provided with both: the *frumentationes* (free distribution of grain to between 200,000 to 300,000 members of the *plebs*) had been going on since the beginning of the Republic, and magnificent buildings and sites such as the Coliseum and the Circus Maximus offered entertainment many times a year. The emperors supplied the grain, the games, and the impressive buildings, aware of the efficiency of these means of social control.

The Roman Coliseum was built in less than 10 years. Planning was begun in 69 CE, after the death of Nero in 68, and finished in 80 CE, under the reign of Titus, one of the sons of the popular Emperor (Titus Flavius) Vespasianus, who died a year before its inauguration. The construction was paid for by the spoils of the Judaic war, which provided much gold and many captives, who were sold as slaves. The poet Martial, alive at the time, praised the monument and made clear that from its planning stages throughout its execution, the Coliseum was always meant to rival the other seven wonders of the world, such as the Pyramids or the Hanging Gardens of Babylon. Coins were struck that carried its image. It was known as the "Flavian amphitheater" until the 8th century CE, when its current name gradually came into use. It was called "the colossus" after the giant 100-foot-tall statue of Nero that had been

Source: © iStockphoto.

placed beside it, Nero's head having been replaced with the head of Apollo. The Coliseum was built on the site of Nero's Golden House, more precisely, on the site of his private lake. Nero had confiscated this land for his own use after the great fire of Rome in 64 CE, and by returning it to the people, Vespasianus gained enormous popularity.

The inaugural festivities lasted 100 days and involved gladiatorial games and mock hunts *(venationes),* which called for tigers, elephants, lions, antelopes, cranes, and many other animals. In one day, 5,000 animals and men are said to have been killed. Some events were reenactments of myths: for instance, Orpheus, supposedly calming wild animals with his music, was torn limb from limb by a wild bear.

The normal course of events would be a *pompa,* or procession, led by the sponsor of the event, followed by the animals, gladiators, and criminals with placards around their necks announcing their crimes. The *pompa* gave spectators the opportunity to place bets on the competitors. Once in the arena, hunts and executions of criminals by wild animals would be first, followed during lunchtime by some more executions and some less bloody performances, for instance, clowns and jugglers, and then the main gladiator contests in the afternoon. The sponsor or the public would decide on the fate of the defeated gladiators. The dead would be carried out of the arena through a special gate by someone dressed up as the god of death (Pluto), or Charon, the ferryman of the underworld. The winner would receive a crown, a cash prize, and other gifts. Many gladiators had fans and were considered "stars," in the modern sense of the word. Gladiators would specialize in different weapons and gear and sometimes would be (mis)matched against each other or against animals for greater excitement. Over time, expenses related to putting on shows rose so high that several laws were enacted in an attempt to keep costs down. A list from the 4th century CE indicates the maximum amounts that could be charged for imported animals, such as lions, ostriches, lionesses, leopards, deer, wild boars, and wild asses. Crocodiles, rhinoceroses, monkeys, big dogs, and hippopotamuses were also popular.

The gladiatorial contests are believed to have originated in funeral games in the Campania, an area near Rome. At the time of the inauguration of the Coliseum, Rome is calculated to have had about 1 million inhabitants. The Romans themselves knew that the *munera* (duties, or obligations) were blood sports to appease the spirits *(Manes)* of the underworld. They believed that originally slaves or captives would have been sacrificed on the tombs of important men, and that over time this practice developed into contests, always ending in killing. The Coliseum was a permanent place to stage such events, which during the 2nd century BCE became detached from funerals and turned into secular staged shows to entertain (and buy) the masses. The games spread from Rome all over the conquered world: Permanent buildings or amphitheaters, also called *spectacula* because they allowed unimpeded views, are found in France, England, Germany, Spain, and North Africa. Already existing theaters in the Middle East were adapted to accommodate gladiatorial games and executions.

Most amphitheaters are elliptical in shape, to allow for better viewing, as the architect Vitruvius had already suggested in his *De Architectura.* The Roman Coliseum is believed to have had a capacity of 50,000 to 75,000 spectators. For comparison, the Circus Maximus, where horse races were held, could accommodate up to 250,000. The center part where the action takes place is called the *arena* (or sand), and the tiers where the public is seated are called the *cavea.* The area underneath the *arena* is hollow, and contained *carceres,* or cages, for wild animals, tunnels, and other rooms and areas, which allowed quick changes in the scenery by means of pulleys and lifts. Complex plumbing and draining systems characterize all amphitheaters. The multiple entrances and exits were clearly marked, as were the seats, so that spectators of different class and status need never mingle. The emperor, the nobility, and ruling class had the better seats lower down, and the higher up the seat, the less important the spectator. Thus, the seating in the Coliseum reflected a virtual microcosmos of Rome, enforcing group allegiance by the joint witnessing of executions and the transgression of social laws, such as killing for pleasure. An awning covered most of the audience against the sun, since games would last all day; it was operated by experienced sailors.

Many earthquakes and fires damaged the Coliseum over time; repairs were undertaken occasionally. The last gladiatorial games took place during the 5th century; the *venations,* or hunting games, stopped about 60 years later. It is thought that it was the high expense of giving games, rather than moral beliefs, that put an end to these events. In addition, foreign invasions, lightning, plagues, famines, and general population decline—only a few tens of thousand inhabitants occupied Rome in the 6th century CE—accelerated decay. The valley of the Coliseum now lay outside the city limits. The building was variously used as a quarry, as a thoroughfare between the valleys of Rome, as stables, refuge for criminals, storage area, and a fortification for different noble families. In the 14th century, all knowledge of its previous use had been lost, although it continued to symbolize Roman (pagan) power, and was believed to be a place where evil spirits and ghosts gathered. No efforts to protect the structure were made, and quarrying continued. Some archeological work was undertaken in the 15th century, and old channels were identified. At the beginning of the 18th century, Pope Clement XI planned to have a church built inside the Coliseum in honor of the martyrs, which Christians erroneously believed to have been sacrificed there. This belief saved the Coliseum from further destruction. During the 19th and 20th centuries, numerous restorations were undertaken; nevertheless, during World War II, it was used as a shelter and weapons depository for German paratroopers. During the last three decades of the 20th century, further archeological investigation was undertaken; the building is now under control of the Office of Archeological Superintendence of the city of Rome. Approximately 3 million people visit per year.

— *Thérèse de Vet*

See also **Rome, Ancient**

Further Readings

Gabucci, A. (Ed.). (2001). *The Colosseum* (M. Becker, Trans.). Los Angeles: Getty Museum.

Quennell, P., et al. (Eds.). (1971). *The Colosseum.* New York: Newsweek.

Collectors

Collecting, also referred to as "gathering" or "foraging," is a broad anthropological term used to describe a food production strategy. Collectors rely on identifying and harvesting native plants and animals rather than engaging in agriculture or animal husbandry. Collectors migrate in small extended-family bands within fixed boundaries or home ranges in search of food and water. They are successfully adapted to their local environments due to highly detailed knowledge of plant and animal life in particular regions and their sensitivity to the carrying capacities of these resources. Collectors gather only what they need for a few days at a time. If food becomes scarce in an area, due to seasonal variation or weather conditions, the band moves, sometimes over a great distance.

Collectors have few material possessions, which vary according to the resources they gather. Some live in deserts and subsist on the roots and wild plants gathered by women and the wild animals hunted by

the men. Some live in forests, where women collect nuts, berries, and other wild plants and the men hunt wild animals and fish. Some live on plains and subsist on wild grains, fruits, and vegetables. Others live near ocean waters, which supply fish and other aquatic animals. These resources define the materials from which collectors build their temporary shelters and make their clothing. Natural resources also define the nature of the food production technologies developed by collector cultures. This includes simple hunting, fishing, grinding, and cooking tools and techniques.

The social organization of collector cultures is simple. Small bands of 100 or less people control their populations in response to local natural resources. This ensures that resources will not be overused and that people will not suffer starvation. All collector cultures are characterized by a gendered division of labor. The temporary base camp is the center of daily food processing and sharing. Collectors are egalitarian and view the accumulation of wealth as unnecessary, if not actually undesirable. Reciprocity, which is the exchange of goods and services to benefit all in need, is a key element of a collector culture. Members of band societies learn to live and cooperative with one another and their environment in order to survive. They are led, as least spiritually, by a shaman.

Among the best-known collector groups of the modern world are the Aborigines of Australia and the Inuit peoples of Greenland, Canada, Alaska, and northern Siberia. The San (Bushmen) of Botswana, Namibia, and southern Angola formerly subsisted as collectors until their territories were taken from them and their resources destroyed. There are many lesser-known groups of collectors or former collectors in all geographic regions of the world. They find it increasingly difficult to live by their traditional collecting strategies. The pressure from governments and settled neighbors to surrender their lands for commercial development makes it necessary for them to adapt to new social and natural environments. In the process of modifying their traditional food production strategies, collectors sometimes join political movements with others who struggle against overwhelming political and economic forces. Despite romantic support of their causes, their numbers are small, and their cultural survival is threatened.

Anthropologists study collectors to understand the detailed knowledge they have of marginal environments. Despite their simple lives, collectors are well fed, generally healthy, free of stress, and comfortable. Anthropologists argue that collectors represent the most sustainable and successful of all human adaptive strategies. They can teach complex societies much about the long-term benefits of living simply.

— *Barbara J. Dilly*

See also **Aborigines; Inuit**

Further Readings

Bodley, J. H. (1997). *Cultural anthropology: Tribes, states, and the global system.* Mountain View, CA: Mayfield.

Jorgensen, J. G. (1990). *Oil age Eskimos.* Berkeley: University of California Press.

Wilson, D. J. (1999). *Indigenous South Americans of the past and present.* Boulder, CO: Westview Press.

Colobines

Colobine primates make up one of the two major groups of Old World monkeys. All Old World monkeys are members of a single family, Cercopithecidae, consisting of two subfamilies, Cercopithecinae (the cercopithecines) and Colobinae (the colobines). About 54 species of colobines are currently recognized. Like cercopithecines, colobines are widespread both in Africa and across southern Asia and various islands of the southwest Pacific. They range in size from the West African olive colobus (average adult males 4.7 kg) to Himalayan grey langurs (19.8 kg) and proboscis monkeys (21.2 kg). Most colobines are long-tailed, long-legged, primarily arboreal inhabitants of moist, lowland tropical forests. Most species seldom come to the ground, except to cross openings in the forest. A few species are partly terrestrial; grey langurs of the Indian subcontinent spend up to 80% of the day on the ground and obtain much of their food there.

Food and Digestion

Colobine monkeys differ from cercopithecines in having large, multi-chambered stomachs, an

anatomical feature closely related to their behavior and ecology. Anterior sacculations of the fore-stomach are fermentation chambers. They contain bacteria capable of digesting the celluloses and hemicelluloses of dietary fiber. In the forest habitat that most colobines favor, leaves are the most obvious and abundant high-fiber food, and the colobines are sometimes referred to collectively as the "leaf-eating monkeys." However, the digestive system of colobines does not confine them to a completely folivorous (leaf-eating) diet. Less than a tenth of studied species have diets with more than 30% leaves, and when feeding on leaves, they tend to select the youngest ones. Fruits and seeds/nuts are other major constituents of their diets, making up more than a third of the annual diets of several species. Seed storage tissues, whether carbohydrate or lipid, are richer sources of energy than are young leaves. However, seed storage tissues are also substantially tougher than young leaves. Colobines have molar teeth whose shapes and sizes appear to be well adapted to chewing both leaves and tough seeds.

A second possible function of colobines' fermentation chambers is that they may lower the gut's concentrations of various toxic compounds that are produced by plants as a defense against destructive plant eaters. For example, detoxification may account for the ability of purple-faced langurs to eat the toxic fruits of *Strychnos* trees, which contain toxic alkaloids such as strychnine. Conversely, *Strychnos* fruits are avoided by toque macaques, which are cercopithecine monkeys that also have access to these fruits but do not have highly developed fermentation chambers in their guts.

The fermentation chambers of colobines enable them to process relatively indigestible forest foliage when other foods are scarce, thus enabling them to attain unusually high biomass. In many forest communities, the biomass of colobine monkeys is greater than that of all other primates combined.

Social Groups

Colobine monkeys of many species live in relatively small social groups, consisting of a single adult male, several adult females, and their offspring. In other colobines, social groups range from small, monogamous associations to groups of over 200 with many adult males. Compared with cercopithecine primates, aggressive and other interactions occur

Source: © iStockphoto/Holger Ehlers.

infrequently among females in forest-dwelling colobines. This difference in behavior has been attributed to leaves as a key food resource for many colobines. The abundance and dispersion of leaves within large tree crowns allows several animals to feed together without competition. In contrast, foods of cercopithecine monkeys tend to be more clumped: to occur in smaller, more dispersed patches. In cercopithecines, cheek pouches, which colobines do not have, may be an adaptation to the relatively clumped distribution of fruits and other foods that they commonly eat, enabling them to take quantities of foods into their mouths faster than they can chew and swallow them, thereby reducing competition.

The infrequency of aggressive behavior in colobines may be related to another feature of many species: conspicuous fur color in infants, a common trait in those species in which infants are frequently held and handled by females other than the mother, so-called allomothering. If, when that occurs, mothers can

Hanuman langurs near Ramnagar, Nepal, fishing for aquatic plants

Source: Photograph © by Carola Borries.

quickly locate and monitor their infants visually, they may be less likely to try to retrieve them.

Infanticide

After taking over a one-male group, some colobine males kill the infants present in the group at the time. Infanticide in primates was first described among Hanuman langurs by Yukimura Sugiyama in 1965. It has since been reported in a wide variety of other primates and various other mammals. In langurs, it has been regarded by some as a social pathology, an accidental by-product of heightened aggression resulting from higher population densities in populations provisioned by humans. Others consider it a sexually selected adaptation, a male reproductive strategy, in that without a nursing infant, females come into estrus sooner. This would thereby increase the new male's breeding opportunities, particularly if the new male, in turn, might otherwise be deposed before any females have come into estrus. However, this would not be the case in seasonal breeders, in which the male would, in either case, have to wait until the next breeding season. Thus, any reproductive advantage to the males of being infanticidal would depend on the distribution of males' takeover times relative to breeding seasons, the distribution of males' tenure in groups, and a propensity to kill the infants of other males but not their own. In 1999, Carola Borries and her colleagues, using DNA analysis to determine langur paternity, presented the first evidence that male attackers were not related to their infant victims, and in all cases, they were the likely fathers of the subsequent infants. This study strongly supports the interpretation of infanticide as an adaptive male reproductive tactic.

Of course, for infants and their deposed fathers, infanticide is clearly disadvantageous. For mothers, it may not be from the standpoint of their biological fitness—not, for example, if the greater toughness and aggressiveness of the deposing male is inherited by the sons that he sires. If, as adults, these new sons breed more successfully, then more of their mothers'

genes may be passed on to future generations than if their sons by the deposed male had survived.

— *Stuart A. Altmann*

See also **Monkeys, Old World**

Further Readings

Davies, A. G., & Oates, J. F. (Eds.). (1994). *Colobine monkeys: Their ecology, behaviour, and evolution.* Cambridge: Cambridge University Press.

Lambert, J. E. (1998). Primate digestion: Interactions among anatomy, physiology, and feeding ecology. *Evolutionary Anthropology, 7,* 8–20.

Van Schaik, C. P., & Janson, C. H. (Eds.). (2000). *Infanticide by males and its implications.* Cambridge: Cambridge University Press.

INTERSPECIES COMMUNICATION

Interspecies communication occurs when there is communication of thoughts or emotions between species. Interspecies communication studies examine whether and how different species communicate with each other. Throughout history, people have always observed that animals communicate with their own kind. Mating rituals among birds, or even insects, involve communication of signs. Parenting by many species of birds and animals involve extended periods of interaction between parents and their young.

It has long been observed that animals can be taught in domestic situations to cooperate with one another. The first and most obvious is between humans and animals. Humans have domesticated and trained animals for thousands of years. Signals such as hand movements, whistles, or other actions clue the animal that the human trainer wants a particular behavior performed. One example is hunting behavior in falcons or dogs. Communication may involve applying force in the cases of horses and elephants. These communications are in a human-language-based (HBL) code. In recent decades, the question has been asked: Can HBL or a code comprehended by animals be developed for rational communication?

Attention has been focused on communications between different animal species and, more important, communication patterns that seem to be like human communication. For example, studies have been done of several kinds of birds to understand how they learn new sounds or arrange sounds in their songs. In these studies, attempts have been made to teach animals language that can be understood by humans. Extended studies have been made of dolphins. Dolphins have been trained by the U.S. Navy to locate explosive sea mines and scout enemy vessels, especially submarines.

Studies have also been made of great apes. For example, Kanzi and other Bonobos at the Yerkes Center and Koko at the Gorilla Foundation have participated in studies that involve learning language. Koko is a gorilla who speaks sign language. The development of animal sign language is a goal of researchers. It would be used in a variety of situations, including online communications such as the one hosted by Koko on April 29, 1998: the first interspecies Internet chat.

Computers are now being used to aid studies of speech recognition sensors that transmit signals, comprising units of communication. At issue is: What is the degree of rationality that informs symbolic intelligence?

— **Andrew J. Waskey**

SUSAN SAVAGE-RUMBAUGH

Susan Savage-Rumbaugh is a lead scientist at the Great Ape Trust of Iowa, where she does language research with bonobos. For 23 years, she was associated with the Language Research Center at Georgia State University, where she studied communication among primates. She also carried

out research at the Yerkes Primate Center in Atlanta. She is the author of *Kanzi: The Ape at the Brink of the Human Mind* (1996) and, with Stuart G. Shanker and Talbot J. Taylor, has coauthored *Ape Language and the Human Mind* (1998). Both volumes detail Savage-Rumbaugh's discoveries about African bonobos, apes that closely resemble chimpanzees, which apparently use complex trail markers to silently communicate among themselves. Her conclusions contrast with the belief of many scientists that apes lack the brain structure for the use of symbolic language in complex communications.

Observing the behavior of apes in the forest, Savage-Rumbaugh concluded that they could keep their groups together only through communication. Even though bonobos live in groups of more than 100 and the trails are only barely marked, each night they still manage to gather for their rest. This, she argues, is possible only thanks to the signs that they leave for each other at crucial points. For example, she noticed that whenever a trail crossed another trail, the lead group would stamp down vegetation or rip off large leaves and place them carefully. These marks occur only at the junctions of trails, and thus, the lead group is obviously leaving them for those who come after.

Savage-Rumbaugh has also directed her experiments to demonstrate that chimps can acquire language skills in their interaction with humans. Studying the behavior of Kanzi, the pygmy chimp, Rumbaugh has argued that the primate has been able to achieve relatively flowing two-way communication by using symbols that are associated with words and manipulating an electronic keyboard that then generates English words. According to the tests carried out by Savage-Rumbaugh, Kanzi has reached the linguistic competence of a 2½-year-old child and has also demonstrated understanding of some grammatical rules such as word order. Critics charge that these experiments are overinterpreted and that apes are just mimicking what humans do. Yet the story of Kanzi has decisively contributed to the revival of ape language studies.

— **Luca Prono**

Communism

Communism entered world history in a number of forms, of which we may distinguish the following: a vision of ideal human association, a multistranded political movement, a modular set of state systems run by nominally communist parties, a Cold War counter-idea ("the communist menace"), and a widespread human striving. At each of these levels, communism massively shaped the politics of the last 150-odd years. As a consequence, it also shaped the environment in which modern anthropology established itself. And at each level we can trace the intersection of communism and anthropology.

The Vision of Primitive Communism

Communism features neither in Aristotle's famous typology of governmental forms (monarchy, aristocracy, and constitutional government) nor in his list of respective governmental perversions (tyranny, oligarchy, and democracy). It is not until around 1840 that the word finally appears in print. Like its slightly older cousin socialism, communism announced itself from the start as an antidote to the toxins coursing through the veins of early capitalist society: its pauperism, crime, landlessness, war, despotism, injustice, and moral corruption. The instability endemic to the new bourgeois mode of production, and the legacies of Enlightenment reason and the French Revolution, exposed these ancient poisons as not only intolerable but unnecessary. They could be abolished. A new humane and self-legislating social order was possible. And it belonged to humanity by right.

At the center of existing society, and the source of its ills, according to the communists, was the exploitation of one person by another. It was class society, with its pampered rich and its destitute working masses, which had to be overcome. If the source of the power of the bourgeoisie was private property, the manipulation of the state to enforce their alleged property rights, and the reduction of each laborer's working life to an item to be sold to the highest bidder, then the communist antivenin, as it were, must eventually entail the abolition of money, the withering away of the state, and the holding of all productive property in common.

The mid-19th century also saw the emergence of modern anthropology, and it was in the work of some

of the fathers of the new discipline that Marxist communists in particular looked for evidence that communism might be possible. This evidence was of two sorts. In anthropological accounts of the variety of human societies, they found confirmation that capitalism was not in fact the natural order of things. And in descriptions of the earliest forms of human society, they found confirmation that humanity had once organized itself into associations that could fairly be given the name "primitive communism."

The cumulative picture arising from the researches of Johann Jakob Bachofen (1815–1887) and Lewis Henry Morgan (1818–1881), in particular, was one in which the early human societies were egalitarian, property was shared, classes were nonexistent, and sexual relations were unrestricted. Basing his arguments principally on investigations into the Iroquois, Morgan emphasized the matrilineal character of Iroquois kinship, seeing it as evidence for an original and universal matriarchal order. He also proposed an evolutionary schema that attempted to account for humankind's departure from its egalitarian beginnings and its ascent to civilization (a journey he did not wholeheartedly applaud).

Karl Marx (1818–1883) and Friedrich Engel's (1820–1895) interest in anthropological themes had already shown up in their early coauthored work *The German Ideology*. But so significant was the material evinced by Morgan and other anthropologists that it would claim much of Marx's attention in his last years (his observations would eventually be published by Laurence Krader in 1974 as *The Ethnological Notebooks of Karl Marx*). Working up Marx's notes, Engels wrote the first and still most influential "anthropological" book by a Marxist, *The Origin of the Family, Private Property and the State*. Here, preliterate hunter-gatherer society was conceived as an early and rudimentary form of communism in which people lived without prohibitions or jealousies. In the light of this prehistory, the domination, exploitation, and inequality of subsequent social forms had to be seen not as human universals but as specific outcomes of the historical process.

The idea of primitive communism has received its share of criticism, whether for the quality of Morgan's evidence, for his speculations about early promiscuity and matriarchy, his linear model of cultural evolution by stages, his view that goods were once shared and property held in common, his supposition that production was originally simply for "use," or for his assumption that contemporary tribal and band societies could provide direct evidence about the earliest modes of human organization. For many communists, however, the idea has seemed worth arguing for. Certainly there was an empirical case to be made, and various anthropologists, most notably Eleanor Burke Leacock (1922–1987), made it well.

But quite apart from the facts of the matter, primitive communism functioned as an existential guarantee (what once was may come again) and as a germinal model for a future society. In a passage Engels does not fail to quote, Morgan spoke of the democratic era to come as "a revival, in a higher form, of the liberty, equality, and fraternity of the ancient gentes." For the anthropologist Stanley Diamond (1922–1991), writing in the 1970s, any better future for humankind was inconceivable without reference to the primitive egalitarianism now interred under the foundations of civilization.

Movement

Communism, as ideology and as movement, spread rapidly beyond its West European birthplace. By the mid-20th century, regimes from Warsaw to Beijing and capitals farther south were headed by parties calling themselves communists. Meanwhile, the pressures and opportunities created by superpower rivalry, and frequently by the presence of domestic guerilla insurgencies, affected political, economic, and cultural life in what came to be known as the Third World.

Not the least of the consequences for ethnographers was that their fieldwork sites might be traversed by these struggles. This fact could of course be ignored: Robert Redfield (1897–1958), working within earshot of militant Mexican communists in Tepoztlan in the mid- to late 1920s, was undistracted by their struggles. But it could also provoke sympathy and political commitment: when Pierre-Philippe Rey did his initial fieldwork in Congo-Brazzaville, the exposure to local Marxist revolutionaries transformed his understanding of the significance of anthropology.

Although no methodological creed unites communist anthropologists, one common feature is a greater interest in contemporary political forces than is typical of many of their colleagues. Writing of Peru in the 1960s and 1970s, Orin Starn accuses most anthropologists of having missed the revolution that was brewing there. He contrasts the focus on the customs and rituals of Andean highland communities

typical of ethnographic accounts with what can be revealed to an anthropologist with an eye for the economic linkages, labor migrations, poverty, brutalization, and protest endemic in the countryside. One such eye was that of Antonio Díaz Martínez. His book *Ayacucho: Hunger and Hope* clearly anticipated the insurgency to come. Unlike Starn himself, Diaz was a communist. Indeed, within a few years, he had crossed from interpretation to action, joining the leadership of the Maoist Sendero Luminoso (Shining Path).

Official Communist Anthropology

A continuous line of intellectual descent connects the writings of the later Engels to those of his student Karl Kautsky (1854–1938), from there to the father of Russian Marxism Georgi Valentinovich Plekhanov (1857–1918), and from Plekhanov to his younger colleague Vladimir Ilyich Lenin (1870–1924). In this manner, the enthusiastic Morganism of Engels was transmitted to the academic tradition of anthropology in Russia and subsequently to all the societies steering themselves by the twinkling star of Marxism-Leninism.

Outside of Central Europe, these societies went through more or less cataclysmic paroxysms associated with forced modernization. Like every other field of inquiry, anthropology in such conditions was compelled to be immediately useful, its analyses geared to the overriding task of building communism. This ought to have been a straightforward matter, as all these societies were governed, openly or in practice, by one-party states equipped with a scientific ideology capable of resolving every intellectual problem. As it turned out, the party line tended to describe a zigzag course, with yesterday's "rightist deviation" making way for today's "self-criticism" and tomorrow's rejection of "vulgar egalitarianism."

Not all of these "really existing socialist" countries had a preexisting tradition of anthropology but all had largely preindustrial economies and predominantly agrarian populations. Many contained ethnic minorities whose cultural trajectory intersected uncertainly or perhaps not at all with the communist future. In the Soviet Union, with its extensive "multinational" territory, Marxism proved a mercurial guide for ethnographers. Many ethnic cultures, for instance, showed few signs of having evolved according to Morgan's developmental stages. And in any case, was it the task of communists to protect them from assimilation to the ways of the "imperial" Russian ethos or to find ways to expedite their escape from backward kin-based forms of authority and social organization?

As Yuri Slezkine has shown, these and many other questions became flash points for bitter disputes between anthropologists (or ethnologists, as they were more often known), particularly in the 1920s and 1930s. Later, in the post-Stalin era, the disputes became both less bitter and less dangerous, but all positions had to keep in touch with the prevailing doctrinal assessment of the country's needs. All the same, as Ernest Gellner (1925–1995) reminded an English-speaking audience in 1980, even under these conditions important studies continued to be published throughout the Communist period.

No attempt will be made here to sum up the anthropological achievements of the countries run by communist parties over the better part of a century. Mention may be made, however, of one of the most interesting figures from the founding period of Soviet anthropology, the ethnographer Lev Shternberg (1861–1927). A political prisoner under the tsar, in the mid-1920s he would become the dean of the Ethnography Department within the Geography Division of Leningrad University. Despite having fairly moderate politics in the context of the times, Shternberg's moral and intellectual authority was second to none among Soviet ethnologists. Not only had he been a revolutionary martyr, but during his exile on the island of Sakhalin he had contrived to conduct an ethnography of the native Gilyaks. These were a people who impressed Shternberg as simultaneously communistic, nonauthoritarian, and individualistic. His discovery, as he supposed, of "survivals of group marriage" among the Gilyak attracted great interest and was rapidly noticed by none other than Engels (who, like Marx, had troubled himself to learn Russian). As Sergei Kan has documented, Shternberg himself read Engels's *The Origin of the Family* while in exile. Engels in turn paid Shternberg the ultimate compliment of translating a report of Shternberg's findings as an addendum to the next edition of his own book. Shternberg, it seemed, had found living evidence of the group marriage and primitive communism posited by Morgan.

Anticommunist Views of Communism

Twentieth-century regimes run by communist parties were responsible for mass killings of their own

populations on a scale to rival the worst horrors with which human history is replete. Yet these crimes were not the original cause of anticommunism. More basic was antipathy to the very idea of empowerment of the lower orders. When the socialist, anarchist, communist, and republican Communards took over the administration of Paris in 1871, some 30,000 were slaughtered in the street by the troops of the Third Republic. Before the Russian Revolution was a year old, 21 foreign powers had joined the White armies to ensure, as Winston Churchill put it, that Bolshevism was "strangled in its cradle."

During most of the 20th century, Western officialdom, and a goodly slice of Western populations, saw in communism only the menacing visage of totalitarianism. With the end of World War II and the division of Europe into East and West, this anticommunist definition of communism once again became a presupposition of Anglo-American domestic and international politics (though less so on the Continent). As with many other intellectuals, anthropologists were sometimes drawn into the struggle, and here their detailed local knowledge could make their contributions much more than "academic."

When the reformist government of Jacobo Arbenz Guzmán (1913–1971) was overthrown with CIA help in 1954, it was an anthropologist with close knowledge of Guatemalan society who reported secretly to the U.S. State Department on the political leanings of those taken prisoner during the coup. As studies by David Price, Thomas Patterson, and Roberto Gonzalez establish, cooperation between anthropologists and the CIA has not been uncommon in Southeast Asia and other areas of intimate concern to the U.S. administration.

Erik Wakin provides a blow-by-blow description of the uproar in the American Anthropological Association in 1970–1971, when it was alleged that certain anthropologists might have been secretly helping the U.S. government's counterinsurgency effort in Thailand. That such involvement was a scandal at all owed much to the ideological strength of the New Left at the time.

Twenty years earlier, when the Western left was still largely either social democratic or Soviet-aligned, McCarthyite anticommunism had set the tone. In this period American communist and socialist anthropologists felt the pressure to adopt Aesopian language. If their colleagues in the U.S.S.R. had to pepper their articles with obligatory references to Marx, in the United States Eleanor Leacock, Stanley Diamond, Leslie White (1900–1975), Gene Weltfish (1902–1980), and other distinguished anthropologists learned that although Marx was good to read, he was hazardous to cite.

Inner Strivings

Now that the sun of capitalism illumines every corner of the globe, it may be easy to underplay the geopolitical impact made by communism. In fact, this impact was tremendous and must remain inexplicable if account is not taken of a final dimension of the concept. As the urge to discover a "primitive communism" in the past might indicate, this modernizing and often avowedly "scientific" ideology drew much of its strength from the fact that it crystallized a series of perhaps immortal longings. These would include the wish to find that our ends will connect us back to our beginnings; the hope that human history, with all its dreadful and apparently senseless destruction, will not have been a tale told by an idiot; the dream of overcoming the antagonism between nature and culture; the pining for true mutual recognition and understanding; and the demand for a world where finally people will live as free and equal comrades and not as one or other species of predator and prey. All these are forms of the desire for social self-completion, and as such for the overcoming of the antagonistic splits that separate us from what somehow we are meant, as social and natural creatures, to be.

Communism, then, has been the name for a widespread set of human desires. That they are only widespread and not universal can be read off from the fact that many human societies never conceived of any opposition between "nature" and "culture," did not conceive of themselves as "historical," and never sought redemption for their "alienated" condition in an eschatological future.

Yet in societies where some of these elements were present, images of past golden ages have been common. In a letter to his friend Arnold Ruge (1802–1880), the young Marx commented that "the world has long been dreaming of something that it can acquire if only it becomes conscious of it." That something was communism. Of course, from the perspective of modern ethnography, the "world" Marx knew had its limits. But perhaps it was not so limited as a world that thinks to have killed that dream.

— *Sebastian Job*

Further Readings

Díaz Martínez, A. (1969). *Ayacucho: Hambre y Esperenza.* [Ayacucho: Hunger and hope]. Ayacucho, Peru: Ediciones Waman Puma.

Gellner, E. (Ed.). (1980). *Soviet and Western anthropology.* New York: Columbia University Press.

Gonzalez, R. J. (2004). *Anthropologists in the public sphere: Speaking out on war, peace and American power.* Austin: University of Texas Press.

Kan, S. (2001). The "Russian Bastian" and Boas or why Shternberg's *The social organization of the Gilyak* never appeared among the Jesup Expedition publications. In I. Krupnik and W. W. Fitzhugh (Eds.), *Gateways: Exploring the legacy of the Jesup North Pacific Expedition, 1897–1902* (pp. 217–251).Washington DC: Smithsonian Institution.

Leacock, E. (1981). *Myths of male dominance.* New York: Monthly Review Press.

Marx, K. (1974). *The ethnological notebooks of Karl Marx: Studies of Morgan, Phear, Maine, Lubbock.* (L. Krader, Transcriber and Ed.). Assen, Holland: Van Gorcum. (Original work published 1880–1882)

Patterson, T. C. (2001). *A social history of anthropology in the United States.* Oxford, UK: Berg.

Price, D. (2002). Interlopers and invited guests: On anthropology's witting and unwitting links to intelligence agencies. *Anthropology Today, 18*(6),16–21.

Redfield, R. (1930). *Tepoztlan: A Mexican village: A study of folk life.* Chicago: University of Chicago Press.

Starn, O. (1992). Missing the revolution: Anthropologists and the war in Peru. In G. E. Marcus (Ed.), *Rereading cultural anthropology* (pp. 152–180). Durham, NC: Duke University Press.

Wakin, E. (1992). *Anthropology goes to war: Professional ethics & the counterinsurgency in Thailand* (Monograph No. 7). Madison: University of Wisconsin Center for Southeast Asian Studies.

Communities

The concept of community developed mostly in sociology to refer to an organic whole whose components are tied together by a common and innate moral order. Classical literature on community emphasizes its homogeneity in terms of the beliefs and activities of its members, who are interrelated in face-to-face relationships and whose allegiance and belonging are clearly defined. Seminal studies across social sciences depict community in a nostalgic fashion ("Oh, the good old days"), while the nature of modernity is presented as impersonal and bureaucratic. Anthropology, to a certain extent, has contributed to this view because of anthropologists' strategic insertion and approach to the field as a unified and self-contained whole. From the rise of anthropology as a discipline in the 19th century until recently, the most privileged areas carved for ethnographic investigation remained the "exotic others" living in non-Western societies, where ecology and social organization combined with research interests to generate a particular unit of analysis conceived of as "community," endowed with a quasi-ontology. It is within this paradigm that after World War II, community studies in Latin America, the Caribbean, Africa, Southeast Asia, and even in the United States became popular among anthropologists in their quest to grasp discrete worlds (communities) that could escape the capillary power of the nation-state.

During the end of the 1960s through the mid-1970s, the rising voice of multiple currents within anthropology and cultural studies culminated in the concept being reevaluated. This reevaluation resulted from the effect of sociopolitical movements that gave voices to different segments of society and expression of identities. The idea of "community" as an organic whole disallowed thinking about community as a site of violence, political struggle, or multiple hierarchies. Feminist critics questioned how traditional analysis embedded gender inequality to romanticize oppressive structures and omit in its narrative sites of contestation, including the arbitrariness and fixity of the ideas of belonging and allegiance of members to "their" community, as constructed in analytical texts. Critical race theorists brought into the debate the issue of exclusion when it comes to fulfilling the idea of freedom and equality for all in the nation. Postcolonial theorists questioned the oversimplification and the inequality of relationships embedded in the imposition of the concept of community to refer to large complex processes (for example, community of nations, Caribbean community); this oversimplification, they contend, masks new modes of alienations and oppressions implicit to these impositions (for example, economic exploitation and political dominations exercised by powerful nations over weaker ones within the same regional or international community).

Today, new patterns of circulation of people and capital have led to the development of new forms of identity communities and political struggles where articulated movements of networks give way to new modes of belonging and allegiance (for example, experiences of identities among diasporic populations). Given these dynamics, anthropologists as well as some currents in social sciences have come to view alternative narratives of experiences of communities as occurring in a complex web of shifting power relations. As such, the concept of diaspora constitutes a creative medium to give account of immigrants' experiences of differences, marginalization, place, and mobility as well as their political implications in a wider transnational process. Central to this approach is the critical role of complexity in the processes of belonging to multiple communities or larger collectivities. Emerging ways of understanding "communities" call upon anthropologists to reevaluate the classical categories that used to sanction totalities and modes of relationships that used to fall outside anthropology's domain of appreciation. Contemporary anthropology attempts to grasp and render meaningful these emerging strategies of fluid relationships in ever-reconfiguring settings by recalibrating its conceptual tools and incorporating ideas of hierarchies, power, and diversity in its perspectives.

— *Louis Herns Marcelin*

See also **Subcultures**

Further Readings

Anderson, B. R. O' G. (1991). *Imagined communities: Reflections on the origin and spread of nationalism.* New York: Verso.

Brubaker, R. (2004). *Ethnicity without groups.* Cambridge, MA: Harvard University Press.

Redfield, R. (1962). *The little community: And peasant society and culture.* Chicago: University of Chicago Press.

Complexity

The concept of complexity seems to be simple and elusive at the same time. Everyone understands what we mean when we call an object "complex," but if we define this attribute clearly and distinctly, we encounter many difficulties.

The first difficulty arises when we want to specify to what aspect of an object we refer by calling it "complex." Does this mean that an object has a rich structure that cannot be described easily? Or that it fulfils a difficult function? Or that it is intricate to generate this object?

Those three aspects of an object—its structure, its function, and its generative history—do not have to be equivalent in respect to complexity. Let us show this by some examples.

- A part of most intelligence tests are sequences of numbers that appear to be irregular (i.e., to have a complex structure). The task of the test person is to find out the rather simple mathematical formula that produced the sequence in question. Here, we have a complex structure but a simple generative process. In addition, this generative process is performed to fulfill a complex function, namely, to contribute to the quantification of intelligence, which is a much-debated psychological concept.
- A geometrically simple artifact like a parabolic mirror for an optical telescope is intricate to make; for example, it needs different time-consuming steps to polish it. Here, we have a simple structure but a complex generative process. Moreover, the function of such a mirror is, from a physical point of view, rather simple: It has just to focus the incoming rays of light.
- Locks have also a simple function, namely, to hinder burglars from breaking into a house. But in order to fulfill their function, they must show a complex inner structure so that it is not too easy to pick the lock.
- Mathematical set theory has a rather simple structure, which can be defined by a few axioms, but it is used to fulfill complex functions, for example, to talk in a clear way about very abstract philosophical problems, such as: Do there exist different kinds of infinity?

We can remark on a common feature of all these examples: The more space and time we need (or seem to need) for describing the structure, the function, or the generative history of an object, the more complex this object is in respect to its structure, its function, or its generative history.

The next difficulty consists in finding a good quantitative characterization of the relation between, on one hand, the time and space needed for describing an object and, on the other hand, the degree of complexity we ascribe to it. Such a correlation must be as abstract as necessary in order to be principally applicable to any kind of object, but it must also be as concrete as possible in order to be practically applicable to specific objects, their structure, their function, and their generative history.

The best available proposal for an abstract conceptual framework into which all those aspects can be integrated so that the complexity of a specific object can be concretely measured is based upon the idea of computation. By "computation," we understand an ordered sequence of mathematically describable operations that is effective for solving a problem and that can be executed by a computer if it is formulated as an algorithm in a programming language. To sum up two ratios is as well a computation in that sense as the meteorological modeling of tomorrow's weather.

The computational problem to be solved in our complexity-theoretic context is to find an adequate description of the structure, the function, or the generative history of some object. Since the "natural" language of a computer is coded in binary form, we refer from now on by "description" only to strings of zeroes and ones stored in the computer.

To define complexity measures on the basis of the idea of computation, we have to look at the physical resources a computation requires to solve our problem. The first such resource that can be used for measuring complexity is the minimal time a program needs to compute a solution (i.e., to output a description of a chosen object). An important question that arises in this context is: How much does the running time of a computation depend upon the descriptive length of the problem? Is it possible to define different classes for the dependence of the running time of a program upon that length? As a central part of computer science, the theory of computational complexity tackles this problem.

The theory of algorithmic complexity focuses not on time, but on space, namely, on the minimal computer storage required for a program that can solve our problem (i.e., that outputs a description of a chosen object). Its complexity is then defined as the number of bits of the shortest program that carries out this task. The longer this program is, the more complex the object is. Of course, the concrete value depends also upon the type of computer on which the program is run.

Time and space needed for a computation are taken together into account to define the algorithmic depth of an object. This complexity measure is defined as the average running time of all programs that output a description of a chosen object, whereby the respective contribution of a program to this value is weighted inversely proportionally to its running time.

The theory of complexity analyzes the abovementioned and many more measures of complexity. It belongs, like cybernetics, information theory, and semiotics, to the structural sciences. These sciences try, on one hand, to construct formal systems (like all possible machines in cybernetics and all possible codes in semiotics), without taking into account the specific nature of objects that might realize those systems. On the other hand, structural sciences have a clear orientation toward the application of their models upon a wide variety of empirical phenomena. Therefore, it is not surprising to find mathematicians (like Kolmogorov), information scientists (like Chaitin), computer scientists (like Bennett), physicists (like Murray Gell-Mann), biologists (like Bernd-Olaf Küppers), cognitive scientists (like Allen Newell), economists (like Herbert A. Simon), and social scientists (like Niklas Luhmann) among those people that are much interested in complexity. These scientists have contributed to the foundations of the theory of complexity, which today is a network of formal models that help to describe the various aspects of complexity in different empirical contexts.

— *Stefan Artmann*

See also **Chaos Theory and Anthropology**

Further Readings

Davis, M. (1982). *Computability and unsolvability.* New York: Dover.

Gell-Mann, M. (1994). *The quark and the jaguar: Adventures in the simple and the complex.* New York: W.H. Freeman.

Kauffman, S. A. (1995). *At home in the universe: The search for laws of self-organization and complexity.* New York: Oxford University Press.

Computers and Humankind

Computers and Evolution

At first glance, the average person would be familiar with only the last 30 years of computer history. In fact, the origins of the computer, in the way of simple counting aids, date back at least 2,000 years. The abacus was invented around the 4th century BC, in Babylonia (now Iraq). Another device called the *Antikythera* mechanism was used for registering and predicting the motion of the stars and planets around the 1st century BC. Wilhelm Schickard built the first mechanical calculator in 1623, but the device never made it past the prototype stage. This calculator could work with six digits and carry digits across columns.

First-generation computers (1939–1954) used vacuum tubes to compute. The simple vacuum tube had been developed by John Ambrose Fleming, in 1904. The vacuum tube was used in radios and other electronic devices throughout the 1940s and into the 1950s. Most computer developments during this time were used for military purposes. During World War II "the Colossus" (December 1943) was designed in secret at Bletchley Park to decode German messages. The ENIAC (Electronic Numerical Integrator Analyzor and Computer) was developed by Ballistics Research Laboratory, in Maryland, in 1945. This computer was used to assist in the preparation of firing tables for artillery. The UNIVAC (Universal Automatic Computer) was developed in 1951, by Remington Rand. The UNIVAC was the first commercial computer sold. The Census Bureau purchased the UNIVAC on June 14, 1951. It contained a magnetic storage system and tape drives and was so large it was housed in a garage-sized room. The UNIVAC contained 5,200 vacuum tubes and weighed about 29,000 pounds. The UNIVAC I, which was an upgrade of the original UNIVAC, was used to calculate and predict the winner in the 1952 presidential campaign. Interestingly, TV networks refused to trust UNIVAC I's prediction results.

Second-generation computers (1954–1959) used transistors rather than vacuum tubes. Dr. John Bardeen, Dr. Walter Brattain, and Dr. William Shockley developed the first transistor in December 1947. Transistors were developed in an attempt to find a better amplifier and a replacement for mechanical relays. The vacuum tube, although it had been used for nearly 50 years, consumed lots of power, operated hot, and burned out rapidly. Transistors provided a new, more efficient method of computing. International Business Machines (IBM) dominated the early second-generation market. IBM, with Tom Watson Jr. as CEO, introduced the model 604 computer in 1953. This computer used transistors. The 604 developed into the 608 in 1957. This was the first solid-state computer sold on the commercial market. IBM had a number of other significant developments during the same time frame. They developed the 650 Magnetic Drum Calculator, which used a magnetic drum memory rather than punched cards. IBM also developed the 701 scientific "Defense Calculator." This series of computers dominated mainframe computers for the next decade. Although IBM dominated the second generation, several other companies developed computer systems. In 1956, Bendix sold a small business computer, the G-15A, for $45,000. This computer was designed by Harry Huskey.

Third-generation computers (1959–1971) were built with integrated circuits (IC). An IC is a chip made up of many transistors. Three companies played major roles in the development of third-generation computers. The first IC was patented by Jack Kilby, of Texas Instruments (TI), in 1959. Although IC development started in 1959, it wasn't until 1963 that a commercial IC hearing aid was sold. IBM again played a major role in the development of computers during the third generation. They produced SABRE, the first airline reservation tracking system for American Airlines. IBM also announced the System/360. This computer was an all-purpose mainframe computer, which used an 8-bit character word. Digital Equipment Corporation (DEC) introduced the first "mini-computer" in 1968. This was a smaller-sized version of normal computer systems of the day and was called the PDP-8. The "mini-computer" was named after the "mini-skirt" of the 1960s. Early computer applications were also developed during this time. In 1962, Ivan Sutherland demonstrated "Sketchpad," which was installed on a mainframe computer. This program provided engineers the ability to make drawings on the computer using a light pen. Doug Engelbart demonstrated (1968) an early word processor. Toward the end of the third generation, the Department of Defense started development of Arpanet (the precursor of the Internet), and Intel Corp started producing large-scale integrated (LSI) circuits.

The microprocessor was developed in the early 1970s. From 1971 through the present is generally known as the fourth generation of computer development. There have been many developments in computer technology during this time. In 1971, Gilbert Hyatt, at Micro Computer Co., patented the first microprocessor. Ted Hoff, at Intel Corp., introduced the first 4-bit processor in February of that year, the 4004. In 1972, Intel developed the 8-bit 8008 and 8080 microprocessors. The 8080 was the microprocessor design IBM used with its original IBM PC sold commercially in the early 1980s. Control Program/Microprocessor (CP/M) was the earliest widely used microcomputer operating system. This language was used with early 8-bit microprocessors. Many of the components seen on modern computers were developed in the 1970s. IBM developed the first sealed hard drive in 1973. It was called the "Winchester," after the rifle company. It had a total capacity of 60 megabytes. Xerox developed Ethernet in 1973. Ethernet was one of the first environments that allowed computers to talk to each other. The Graphical User Interface (GUI) was developed by Xerox in 1974. Common GUIs seen today are Apples' Mac OS and Microsoft's Windows Operating System. In 1976 one of the companies that revolutionized microcomputer development was started. Apple was a startup business in 1975–76. Jobs and Wozniak developed the Apple personal computer in 1976. In 1977, the gaming industry started. Nintendo began to make computer games that stored data on chips on the inside of game cartridges. A few of the early popular games included "Donkey Kong" (1981) and "Super Mario Brothers" (1985). Probably the most significant software occurrence was the contract between IBM and Microsoft's Bill Gates in 1980. In 1980, IBM offered Microsoft a contract to build a new operating system for IBM's new desktop PC. Microsoft bought QDOS from Seattle Computer and eventually developed MS-DOS. This contract formed the beginnings of Microsoft, which is now the largest software company in the world. Another important event took place in 1987, when Bill Atkinson of Apple Computer developed a program called "Hypercard." Hypercard used hypertext and was a predecessor of the graphical environment used on the World Wide Web today.

Fifth-generation computing (the present and beyond) encompasses common use of the Internet, World Wide Web, virtual reality, Artificial Intelligence, and daily use of sophisticated technological innovations. Several important events set the stage for fifth-generation computing. Among these was the development of the World Wide Web in 1991, by Tim Berners-Lee; the first Web browser, "Mosaic," in 1993; the release of Netscape Navigator in 1994; and the release of Internet Explorer by Microsoft in 1996. Today, technology and computing are moving forward at an ever-increasing rate. The World Wide Web is the common program to browse the Internet. As computers increase in power, virtual reality is becoming common as well. Doctors can use virtual reality to operate on a patient prior to a real surgery. Pilots log hundreds of hours in flight simulators before ever setting foot in the cockpit of an airplane, and astronauts can train for complex maneuvers before takeoff. Computers are becoming smarter as well. Artificial Intelligence and expert systems are being developed daily. The increase in technology has spun off numerous computer-like devices, such as smart cell phones, MP3 players, and many more personal portable computers.

It's interesting to note that as the computer has evolved to support ever more sophisticated software applications, computers are now used to simulate and model everything from the evolution of man to the weather. Information gathered from anthropological finds can be entered into computers, enabling the simulation of prehuman-to-human evolution. By understanding human evolution, scientists can learn, in addition to other benefits, more about natural selection and the processes all life goes through in the evolutionary process. Computers develop climate change models by analyzing environmental data gathered from sensors around the world. These models can forecast what the environment might be like in 50 or 100 years and help humankind prepare for future environmental shifts.

The fast pace of increasing technology has led to serious human physical and psychological conditions. Since the computer has become a necessary component of everyday business, the work environment has seen an increase in repetitive stress injuries (RSI). RSI include carpal tunnel syndrome (CTS), tendonitis, tennis elbow, and a variety of similar conditions. The field of computer ergonomics attempts to improve worker productivity and reduce injuries by designing computer equipment that will be able to adjust to the individual's natural body positions. *Technostress*, a term originally popularized by Sethi, Caro, and Schuler, refers to stress associated with the continually changing and uncertain technology environment

individuals are faced with either at work or home. As a result of the rapid and uncertain change in technology (resulting in technostress), humans, probably more so than at any point in history, must have the ability to quickly adapt to new situations and environments.

As the computer continues to change the world, we will undoubtedly see more technological innovations in the near future. The computer is indeed quickly evolving into a new form that, today, we cannot imagine.

Computers and Research

In the past, research required significantly greater time to complete than today. Data had to be gathered, then analyzed by hand. This was a very slow, tedious, and unreliable process. Today, computers take much of the manual labor away from research. Primarily, computers assist researchers by allowing them to gather, then analyze, massive amounts of data in a relatively short period of time.

Even though scientists began identifying and understanding DNA in depth in the 1950s, detailed analysis could not be performed until technologies were able to analyze and record the volumes of data associated with DNA research. The Human Genome Project began in 1990 and was coordinated by the Department of Energy (DOE) and the National Institutes of Health (NIH), resulting in the coding of the human genetic sequence. The goals of this project were to *identify* all the approximately 30,000 genes in human DNA, to *determine* the sequences of the 3 billion chemical base pairs that make up human DNA, to *store* this information in databases, to *improve* tools for data analysis, to *transfer* related technologies to the private sector, and to *address* the ethical, legal, and social issues (ELSI) that may arise from the project. The Human Genome Project was originally intended to last 15 years but was completed in just 13 due to computer technology advances.

Technologies such as distributed computing (thousands or millions of computers working on the same project at the same time) and the Internet have aided in the development of new research methodologies. For example, when a home computer is turned on, its microprocessor is sitting idle most of the time regardless of the task the user is performing. Distributed processing takes advantage of the idle time by running programs in the background. The user is usually never aware another program is running. The SETI@Home project is one example of how distributed processing can be used in research. This project uses a screen-saver program, designed for home computers, that analyzes radio signals from outer space for patterns or other signs of alien life. Individuals volunteer to use their home computer as part of the program. Each home computer receives data from a radio telescope in Puerto Rico. The home computer then analyzes the data and returns the results. The screen-saver program is the distributed program interfacing through the Internet with the radio telescope. Mainframe computers are typically used to analyze this type of data but can be very expensive to use. Research costs are significantly reduced using distributed computing.

Computers can be used for modeling. Modeling is similar to building a virtual prototype. For instance, rather than an auto manufacturer physically building a new car, then testing it for safety, a computer model is virtually created. That model can then be tested as though it were a real car. The modeling process is quicker and less expensive than traditional methods of testing car safety and performance and allows for a greater variety of tests in a short time frame.

Computers are also used to assist communication between researchers located at geographically separated locations. Researchers in Puerto Rico can easily and instantly communicate with researchers in Hawaii. Researchers from eastern European countries can easily collaborate with their peers from the West. The ability to share resources and knowledge creates an environment where people from many different geographical areas, backgrounds, and experiences can effectively merge, creating a more productive research team.

Computers are being used in education research to better understand how individuals learn. By knowing how individuals learn, educational programs can be tailored so each person can learn more efficiently.

Ironically, computers are being used in research to learn how humans interact with computers. By understanding the interaction process, software can be designed so it is more intuitive and easier to use. This increases user satisfaction and productivity-boosting efficiencies.

Computers impact every facet of research, from education to space research. The ability of the computer to quickly analyze and store massive quantities of data has been a key to the success of the computer in research.

Computers and Genetics

The field of genetics, or the study of genes, is incredibly complicated and contains massive amounts of data. Biotechnology is the study of genetics aided by computers. Computers are an absolute necessity in the field of biotechnology.

Computers help scientists get a three-dimensional visualization of long strings of DNA. Before the advent of computer use in genetics, scientists were able to make only rough guesses as to the makeup of DNA structure.

Computer technology is necessary in managing and interpreting large quantities of data that are generated in a multitude of genetic projects, including the Human Genome Project and companion efforts, such as modeling organisms' genetic sequences. Information in all forms of biotech databases, such as the nucleotide sequence, genetic and physical genome maps, and protein structure information, has grown exponentially over the last decade. As the quantity of data increases, computers become even more important in managing access to information for scientists worldwide. Around the world, there are hundreds of large databases used in genetic research. For researchers to obtain accurate information, it is often necessary to access several different databases.

Computers are able to interface between different types of databases using programs such as Entrez for text term searching. Entrez is a tool used for data mining (searching many databases for specific information such as trends or patterns). Entrez has access to nucleotide and protein sequence data from over 100,000 organisms. It can also access three-dimensional protein structures and genomic-mapping information. Access to this data is important for scientists to understand the DNA structure of organisms. There is similar software used for sequence similarity searching, taxonomy, and sequence submission.

Among the benefits computer technology has brought to the field of biotechnology is the ability to increase the rate at which pharmaceutical drugs can be developed. Screening is a process by which researchers learn how a chemical or natural product affects the disease process. Using computer technology, researchers are now able to screen hundreds of thousands of chemical and natural product samples in the same time a few hundred samples were screened a decade ago. Modern computer technology has enabled the discovery of thousands of new medicines in an ever-shortening time frame.

In the future, computers will be able to simulate cells at two different levels. Computers will be able to simulate cells at the atomic level, allowing scientists to learn how proteins fold and interact. It's important to understand this basic interaction, since proteins are the building blocks of all life. On a larger scale, computers can simulate biochemical compounds, where they can learn more about cell metabolism and regulation. By understanding how the cell works and being able to simulate cells, scientists would then be able to build larger biological models. Rather than test the effects of drugs on animals or humans, scientists would be able to simulate the same test on virtual organisms. Scientists could even create a simulated model of an individual testing the effect medications have on the human system. This technology would enable doctors to treat patients more effectively.

Organizations have been established to create and maintain biomedical databases. The National Center for Biotechnology Information (NCBI) was created in 1988 toward this purpose. A few of NCBI's responsibilities are to conduct research on fundamental biomedical problems at the molecular level using mathematical and computational methods; maintain collaborations with several NIH, academia, industry, and governmental agencies; and foster scientific communication by sponsoring meetings, workshops, and lecture series.

Computers and Education

Computers have changed the face of education. Basic computer skills are becoming more necessary in everyday life. Every facet of education has been affected by computer technology. English, philosophy, psychology, and history teachers now have a wide range of informational and educational resources and teaching tools accessible through the Internet. Mathematicians use computers to better understand equations. Science teachers use computers to gather and analyze large quantities of experimental data. Health and human performance (physical education) teachers are able to use computers to model human anatomy, which provides insight to the cause and prevention of sports injuries. Computer science instructors teach a variety of skills, such as programming, networking, and computer applications. Education in each discipline is important to the success of children worldwide.

The advent of the computer in education has changed many teaching methods. Teachers have traditionally used textbooks and lectured about a

particular topic. Today, computer technology has brought interactive learning methodologies into the classroom. Computer simulations are common. Using the Internet for research is common as well.

Computers in education provide students with a wide array of diverse learning techniques. Some students excel at individually paced courses, while others learn better working in groups. Computers provide a means of improving the learning environment for each type of learner. For example, individual students can use a program on compact disc (CD) that provides course content, complete with quizzes and exams. This enables students to work at their own pace, mastering each unit and then continuing with subsequent lessons. Computers and the Internet can be used by groups of students as a tool for collaboration, enabling them to work together even though they are geographically separated.

In today's busy world, many individuals are taking classes online in order to advance their education and careers. Distance courses provide supplemental classes to high school students and lifelong learners. Distance education is becoming more prevalent as computer technology improves. Home computers with network connections to the Internet are now faster and easier to use. Students enrolled in distance courses today can expect to take part in discussions and chats, view images and video, and be provided with a long list of course-specific Internet resources. Courseware (a program used by teachers to organize and deliver online course content) is becoming very friendly and efficient to use to organize and present course material. Courseware is not only making distance learning easier but is also used to supplement onsite courses as well.

Children with special needs benefit from computer technology in the classroom. A general class of computer technologies that helps children with special needs learn and function is called "assistive technologies." There are many ways assistive technologies help children with disabilities to learn. For instance, applications provide cause-and-effect training activities, which is a beneficial learning style for special needs children. In more severe cases, assistive technologies offer students with cerebral palsy and other debilitating conditions a way to learn through the use of speech-generating devices (augmentative and alternative communication, or AAC). Assistive technologies also assist those who are hearing and visually impaired by using computers as an interface to learning environments.

Computers have changed the face of education in business as well. Today, keeping up with current technology is necessary for companies to remain competitive in a global market. Employees must continually upgrade their skills in order to remain valuable to the company. Computers allow individuals to update their skills through both online professional development and computer-based training applications. Some companies have developed extensive industry-specific curricula, creating a unique learning environment that is partly online and partly onsite. In this example, industry employees are able to learn computer-networking concepts in a combined-media format, containing elements such as text, image, audio, video, and simulations. High school and college students may also participate in this online learning environment.

Computers are used to provide a variety of assessments. These range from the computerized versions of the traditional quiz or exam to interactive-skills-based exams. Individuals have a variety of ways they learn best. Some are visual. Some are better able to memorize information. The computer has provided the means to create a wider variety of assessments, enabling teachers to better determine students' knowledge and skill in a particular discipline or content area. Once individuals are assessed, computers can then analyze the data. Administrators and teachers can monitor and analyze learning trends.

With the world becoming more technical, it is necessary to learn about computers in every educational grade. Whether it is learning about computers or using computers to teach other disciplines, computers are key in the success of today's children as well as adult learners. Computers are the way we work today. With the world and technology changing ever more quickly, it is more important than ever that computers be included in every facet of education.

Many third-world countries are now in the process of developing internal networking technologies, and the world continues to get smaller. The Internet has enabled children around the world to collaborate and communicate with each other. It has brought similar teaching methodologies to the forefront worldwide, creating the most unique learning environment the world has thus far seen.

Computers and the Global Village

The world is continually shrinking thanks to the advent of electronic mediums such as radio and television

and, more recently, the computer and the Internet. These technologies have electronically interconnected the world. Marshall McLuhan first coined the phrase "global village" in the early 1960s. McLuhan was a professor at the University of Toronto's St. Michael's College. He studied the effects of mass media on behavior and thought. McLuhan wrote several books about the effect of the media on humankind. He first predicted world connectivity in 1965.

What is the global village? We'll start by defining the word *village.* What is a village? A village is local. You pass villagers each day on the street. You live next door to villagers. You discuss neighborhood events with the villager who lives next door. Villagers with common interests gather for meetings at the local public school. They gather to socialize at restaurants and other locations. Everyone in the village is connected in some way. This village can be your neighborhood or the city where you live. News, gossip, and community events are known commonly throughout the village. Fires, deaths, and other important community news spread rapidly throughout the community. The village is geographically limited in size.

The global village has been created through the use of the electronic medium. From the 1920s through the 1960s, it was represented by radio, television, movies, and the telephone. One could experience events around the world through these mediums. Regardless of the individual's physical location in the world, they were able to experience the stock market crash in 1929, the Japanese attack on Pearl Harbor in 1941, the Cuban missile crisis of 1963, and the social movements that took place in the late 1960s, in much the same manner as individuals in a village experience their local events within the community. The 1970s saw the development of Arpanet. Arpanet was a U.S. Department of Defense project that connected computers together from several geographical areas across the United States into one network. The modern-day Internet was built upon the technologies and concepts of Arpanet. The introduction of the personal computer in the early 1980s combined with the growth of computer networks and the Internet for business use initiated the socialization of the "net" (Internet) in the 1990s. The World Wide Web (1993) has enabled this socialization, creating a common, easy-to-use interface that became the standard way to navigate and use the Internet.

Throughout the latter part of the 20th and first part of the 21st century, the Internet has developed into the "global village" McLuhan spoke of in the 1960s. The Internet has created a social and information culture similar to the traditional village, yet in a virtual environment. You communicate or chat daily with individuals who are online. You purchase goods through online auctions. You write letters that contain pictures and movies and send them to family and friends through the use of electronic mail. You check the headlines on the daily paper, perhaps the *New York Times* or the *Scotsman,* while living in rural Montana. Through telecommuting, you can work in large urban areas and live in less crowded rural settings. The global village concept extends to education as well. You can take a course to further your education or career from any university in the world that offers distance learning, all from the comfort of you home. This new global village, through the Internet, enables you to be a participant in worldwide events, regardless of location.

The global village has changed how we interact with information. Traditional books are being supplemented by e-books, Web sites, and other electronic sources. McLuhan said reading a book is an individual personal experience. The e-book or Web site (or other electronic medium) becomes a group experience due to the nature of the medium. The information you read is being read by perhaps 100 or 1,000 other individuals at the same time who are physically dispersed around the globe, just as you are.

The global village has in part grown out of a need for socialization. Although it is more personal to interact with individuals face-to-face, career and family needs take a significant amount of time out of our daily lives. Social interaction is an important component of healthy individuals' lives. In today's world, it is normal that both parents have to work to support the family. In one-parent homes, it is difficult to make ends meet with just one job. A parent will often have two or more jobs. Family obligations then take priority once the workday is done. The Internet acts to meet socialization needs. When parents are busy at work, children are home alone until the parents get off work. Children can browse the Internet and take part in chats with friends. After the children are in bed, parents can go online e-mailing or chatting with family and friends. Individuals who live outside a family setting take advantage of the Internet as a social tool as well. Many of these individuals work long hours and haven't the energy or desire to socialize away from home. The Internet meets this socialization need as well by creating a virtual meeting place right in your home.

Since the world is virtually growing smaller, individuals are becoming more aware of issues such as politics and culture. It has become easy and inexpensive to post information and propaganda on a Web site. This has given a voice to politically oriented groups, regardless of cause. People with similar interests gather on the net, creating communities. Communities can be created based on hobby, gender, nationality, or any other preferences. Most often, chats and discussion groups are the preferred means of community interaction within the global village. Culture (cyber, ethnic, and racial) plays an important role on the Internet. Due to its global nature, the Internet has users from many ethnic and racial groups, who form communities based upon their similar interests. Like villages or neighborhoods, cultures form within the Internet. *Cyberculture* is a general term for the subcultures that have developed on the Internet.

The "global village" has changed the world we live in. Although most concepts remain constant, the methods of communication change with advances in technology. In every example given, the Internet has enabled the creation of our modern global village with its specific technology, moral, ethical, and social aspects. Every aspect of the physical village is contained in the global village. Communities form regardless of the physical location or medium, and individuals with similar interests will associate with each other. Books will still be printed, but the medium used by the global village will change the way we use the printed traditional book. Politics contain the same message, but the global village carries the message farther. Culture develops and changes the way we interact with each other both online and off.

The global village has extended our reach. It enables individuals to reach out and participate in world events instantaneously. Our friends are now global. Our education is now global. The (online) communities we are involved in are global. Social interaction has departed from the more personal face-to-face environment to the new cybercommunity. The global village is changing the way we work, learn, communicate, and interact with others. For all the benefits the new village brings, however, there are negative aspects as well. Some say that within the cyberworld, the traditional personal environment is being supplanted with an almost isolationist mentality.

Through the use of real-time multimedia, the Internet will evolve into a more personalized experience. Internet and electronic medium tools will become more intuitive. The Internet will become the facilitator of the global village, the new village nearly every individual on the Earth will interact within. In the future, the global village, created by electronic media, will merge with the traditional village setting, creating a new experience somewhere between the real and virtual.

Computers and Intelligence

Artificial Intelligence (AI) is the science and engineering of making intelligent machines, especially intelligent computer programs. So, how does human intelligence differ from AI? AI is being developed to enable machines to solve problems. The goal in the development of AI isn't to simulate human intelligence; it is to give machines the ability to make their own decisions based on specific criteria. Researchers in AI have suggested that differences in intelligence in humans relate to biochemical and physiological conditions such as speed, short-term memory, and the ability to form accurate and retrievable long-term memories. Modern computers have speed and short-term memory but lack the ability to relate experience to problems. They are unable to compare current problems to past events ("memories" based on experience).

Alan Turing, a mathematician, started researching AI in 1947. By the late 1950s, many scientist were attempting to develop AI systems through a software design approach. Turing developed a test to evaluate intelligence in machines, to see whether a machine could "pass as human" to a knowledgeable observer. He theorized the test could be made with the observer communicating with a computer and a person by teletype (the teletype was prevalent in the 1950s). Essentially, the observer was attempting to discern which was human and which wasn't. Although the "Turing test" was never conducted in full, some test components have been used.

Although some AI researchers' goals are to simulate human intelligence, others feel that machines do not have to be "intelligent" in the same way humans are to be able to make decisions. Using traditional software programming, researchers at IBM developed "Deep Blue." Deep Blue is a computer system that was designed with the intelligence to play chess without human assistance. Many researchers claim the breadth of Deep Blue's knowledge is so narrow that it doesn't really show intelligence since the computer only

examines and then responds to chess moves. They claim that Deep Blue doesn't actually understand a chess position. Other AI researchers claim there is an intelligence involved in Deep Blue. How does a human brain work to enable the individual to make a decision? The brain works because each of its billions of neurons carries out hundreds of tiny operations per second, none of which in isolation demonstrates any intelligence at all. As a result of the background computations going on in your brain, the individual is able to complete conscious thoughts, which lead to intelligent decisions. Essentially, although very narrow in scope, Deep Blue computes millions of chess moves, as a background thought, then will determine the best strategic move. Is this process intelligence? The human mind computes, then determines chess moves. The computer mind computes, then determines chess moves. It would seem that there is at least a level of intelligence within Deep Blue.

Epistemology is a branch of philosophy that studies the nature of knowledge, its presuppositions and foundations, and its extent and validity. Cybernetics uses epistemology, theoretically enabling computers to intelligently understand problems and determine decisions. Cybernetics and AI are similar but use different means to theoretically achieve intelligence in computers. AI involves the application in the real world of knowledge stored in a machine, implying that it is essentially a soft-coded, rule-based expert system (programmers give the computer intelligence). Cybernetics, by contrast, has evolved from a "constructivist" perspective. Under this theory, a computer learns from past experience. The computer builds a database of experiences, then correlates these to solve problems. Cybernetics calls for computers to learn, then change their behavior based upon past experience. Although AI has been at the forefront of computer intelligence for the last 50 years, there is currently renewed interest in cybernetics due to limitations in the ability to further develop AI programs.

AI researchers have attempted to bridge the computer intelligence gap by developing new technologies such as "neural nets." NASA is working on developing "fuzzy logic" and "neural net" technology for use with the Mars Technology Program, attempting to create robots that can make human decisions. Fuzzy logic is closer to the way human brains work, and its approach to problems duplicates how a person would make decisions. A neural network is a processing device used for solving problems using a step-by-step approach, as humans do. This method will allow a robot such as a Mars rover to choose a course on its own, and remember it, without the aid of a remote driver, acting according to logic, not just mechanics.

Many philosophers believe true AI is impossible. Some believe it is immoral. Despite the negative aspects of AI, researchers continue to move forward, attempting to develop a humanlike artificial intelligence. There are many uses for AI, ranging from game playing (such as chess), speech recognition (as in automated telephone systems), to expert systems as well as intelligently guiding and steering vehicles on other planets in our solar system. Researchers are continually working to improve the intelligence of computers and robots.

Computers and the Space Age

Computers have been an integral part of the space program since the National Aeronautics and Space Administration's (NASA) founding in the late 1950s. Today, computers are used in every facet of space exploration. They are used for guidance and navigation functions, such as rendezvous, reentry, and midcourse corrections, as well as for system management functions, data formatting, and attitude control.

Throughout the years, NASA's computing focus for manned space flight has been to take proven technologies and adapt them to space flight. The reliability of proven technologies is of primary importance when working in the manned space flight program. In unmanned programs, NASA has been able to be more innovative and has encouraged innovative new technologies.

There are three types of computer systems NASA uses in the space program: (1) ground-based, (2) unmanned onboard, and (3) manned onboard computer systems. Ground-based systems do the majority of computing, being responsible for takeoffs, orbital attitudes, landings, and so on. Unmanned onboard computers are usually small computers that require little energy and can operate on their own without failure for long periods of time. NASA's Cassini-Huygens mission to Saturn was launched in October of 1997 and arrived in July of 2004. The specialized computer systems on Cassini-Huygens project has worked flawlessly in deep space for over 7 years. Manned onboard systems control all aspects of the manned spacecraft. As in space shuttle missions, once the ground computers at NASA release control of the

spacecraft, the onboard computers take control. The shuttle is a very complicated spacecraft. There are literally thousands of sensors and controls spread throughout it. Information from these sensors is fed into the shuttle's computer systems, enabling real-time navigation, communications, course control, maintenance of the living environment, reentry, and many additional functions. There are typically many smaller computer systems on manned spacecraft that are networked together. This allows for real-time processing of massive amounts of data. System reliability is one of the most important features of the onboard computer systems. If a system crashes, the astronauts will lose control of the spacecraft.

The Mercury project was America's first man-in-space effort and took place in the early 1960s. NASA subcontracted the development of the Mercury spacecraft to McDonnell-Douglas. The Mercury capsule itself was designed in a bell shape. The capsule wasn't able to maneuver on its own and was barely large enough for one astronaut to fit into. A ground system computer computed reentry, then transmitted retrofire and firing attitude information to the capsule while in flight. The ground system computer controlled every part of the Mercury mission; therefore, an onboard computer was not necessary.

The first onboard computer systems were developed by IBM for the Gemini project of the late 1960s and early 1970s. The onboard computer was added to provide better reentry accuracy and to automate some of the preflight checkout functions. The computer IBM developed was called the "Gemini Digital Computer." This computer system functioned in six mission phases: prelaunch, ascent backup, insertion, catch-up, rendezvous, and reentry. Due to the limited amount of space on the Gemini capsule, the size of the computer was important. The Gemini Digital Computer was contained in a box measuring 18.9 inches high by 14.5 inches wide by 12.75 inches deep and weighed 58.98 pounds. The components, speed, and type of memory were influenced due to the size limitation of the computer. Gemini VIII was the first mission that used an auxiliary-tape memory. This allowed programs to be stored and then loaded while the spacecraft was in flight.

One of NASA's primary challenges in the early days of space exploration was developing computers that could survive the stress of a rocket launch, operate in the space environment, and provide the ability to perform increasingly ambitious missions.

On May 25, 1961, President John F. Kennedy unveiled the commitment to execute Project Apollo in a speech on "Urgent National Needs."

The Apollo program's goal of sending a man to the moon and returning him safely, before the decade was out, was a lofty and dangerous one. One of the most important systems of the Apollo spacecraft was the onboard guidance and navigation system (G&N). This system played the leading role in landing the lunar module on the moon at precise locations. The G&N performed the basic functions of inertial guidance, attitude reference, and optical navigation and was interrelated mechanically or electrically with the stabilization and control, electrical power, environmental control, telecommunications, and instrumentation systems. The inertial guidance subsystem sensed acceleration and attitude changes instantaneously and provided attitude control and thrust control signals to the stabilization and control system. The optical navigation subsystem "sighted" celestial bodies and landmarks on the moon and Earth, which were used by the computer subsystem to determine the spacecraft's position and velocity and to establish proper alignment of the stable platform.

The computer and astronaut communicated in a number language. Communication was through a device called the "display and keyboard unit" (or "disky," abbreviated to DSKY). This unit was different than modern keyboards and monitors in that it had a 21-digit display and a 19-button keyboard. Two-digit numbers were programs. Five-digit numbers represented data such as position or velocity. The command module had one computer and one DSKY. The computer and one DSKY were located in the lower equipment bay, with the other DSKY on the main console. The Apollo command module and the lunar module had nearly identical computer systems.

The space shuttle has flown 46 shuttle flights since the mid-1980s. The shuttle's computer system has been upgraded through the years and has become very complex. This computer maintains navigation, environmental controls, reentry controls, and other important functions.

Adapted computer hardware and software systems have been developed to support NASA's exploration of our solar system. Autonomous systems that to some extent "think" on their own are important to the success of the Mars rovers Spirit and Opportunity. NASA has also made use of power sources such as nuclear and solar to power spacecraft as they explore

Source: Courtesy of NASA.

the outer edges of our solar system. The computer systems onboard these spacecraft are built to use the least amount of power possible while still remaining functional. Redundant systems, or multiple systems that can perform the same function in case of a system failure, are important in deep-space exploration. Again, reliability and system hardware and software survivability are important, not just to manned spaceflight but also to missions that may last as long as 10 or 15 years.

Without computer technology, NASA would not have been able to achieve its long list of accomplishments. Computers use distributed computer systems that provide guidance and navigation functions, system management functions, data formatting, and attitude control. Without this functionality, it would be impossible to place satellites and astronauts in orbit, explore the Martian landscape, or take photos of Saturn's moons.

Computers and the Future

In the past 60 years, the development of the computer has had a more profound impact on civilization than any other technological advance in history. In the 1940s, development of the computer was spurred on by the technological advantages it gave the military. After World War II, the business world learned to adopt this technology, giving them strategic and competitive advantages. The development of Arpanet, the forerunner of the Internet, initiated the Internet's development by connecting remote computers together into one global network. In the late 1970s, Jobs and Wozniak's Apple computer brought computers to each person's desktop, starting the microcomputer revolution. Today, we see computers in all forms. Some computers resemble the first Apple and still sit on the user's desktop, but others are now more portable and can be built into nearly every device, such as personal digital assistants, automobiles, phones, and even kitchen appliances. Each of these computers either does or will eventually have the ability to be connected through a network enabling the user or appliance to communicate with others worldwide.

In the future, we will see computers playing an even greater role in our world. Computers will be even more essential in education and business and will become a necessity in the home, enabling individuals to control functions and the environment within the home. Utilities and "smart appliances" will be connected to a controlling computer. Lights, heating, cooling, security, and many other utilities will be controlled through a central computer by kiosks (displays) located strategically around the home. Entrance may be controlled by the main computer through voice or fingerprint authentication. When a person enters the home, that individual's preference in lighting, temperature, television programming, music, and more will be adjusted accordingly. Appliances will be networked through the Internet. For instance, if you are returning home at night and would like the lights turned on, connect to your home's controlling computer by using your wireless personal digital assistant, which has software that enables you to turn on the lights and increase the temperature. You will also be able to check your appliances and settings remotely. Perhaps you are

concerned you left the oven on when you left for a business trip; turn your oven off by connecting to it through your personal digital assistant's wireless connection to the Internet. Refrigerators will be able to scan the items within it, then automatically order items over the Internet. You will never run out of milk or butter. Computers, in one variety or another, will inundate the home of the future.

Computers will continue to play an active role in education. It will be even more important in the future to teach our children useful technology skills. Education's role will not only be to teach through the use of computers but also to teach the theory and skills necessary for students to use technology in their personal and professional lives. Just as in the home, computers will be everywhere in the school. The Internet will still be used for research but to a much greater degree than today. Computers will be able to teach complete courses, transforming the teacher into a facilitator rather than a provider of knowledge. In this classroom, the computer may give an initial test determining the students' basic skills, then teach the entire course, using feedback as a learning indicator and customizing each lesson accordingly. Although common today, distance education will continue to grow. The quality of distance education instruction will continue to improve by giving teachers more and better tools with which to teach. These tools will comprise higher Internet bandwidths, the ability to bring higher-quality multimedia (video, audio, and others) to the students' desktop, and software that will create an easy-to-use interactive learning environment. Classrooms will be "wired" in more ways than ever. Computers are providing an ever-increasing knowledge base for students. They will be able to bring simulations to life in a three-dimensional holographic way, enabling students to be active participants in their own learning.

Computers will also continue to play a major role in business. Many of the current business trends will continue and improve, with integrated electronic commerce systems, online bill paying and customer services, improved communications, and telecommuting enabling a mobile workforce and instant access to information such as sales and marketing forecasts. Business will continue to develop and use advanced technologies to build cars more efficiently and to fuel them with inexpensive, nonpolluting fuels. Computers will enable the business professional to stay more connected than ever.

Computers will play an even larger role in the military. The military computer system is essential in the management of warfare. Without the military computer system, missiles will not fire or may miss their targets, navigation systems will not work, intelligence gathering is inhibited, and battlefield supply and maintenance becomes impossible. Computers will "attack" enemy computer systems using viruses, denial of service, and other types of cyberwarfare. Computers from warring nations will attempt to attack civilian sectors as well, such as power plants, financial institutions, and other strategic targets.

Robotics is a developing technology that is currently in its infancy. There is incredible potential for robotics in the future. Robots will assist surgeons because they are more steady and precise. Although robots are being used to explore our solar system today, their role will become more significant and complicated in the future. Robots will be used to clean your home or take you to work, using AI to make humanlike decisions on their own. Robots are currently being used to manufacture items such as automobiles, but given AI, they will also be able to design cars for maximum efficiencies in both production and use. Intelligent robots will also be used for dangerous jobs or on military missions. Currently, technology is not advanced enough and distances in space are too great to be explored by humans. In the more-distant future, robots with AI will be used to colonize planets at the edge of or outside of our solar system.

The science fiction of *Star Trek* may become reality in the future. The U.S. Air Force is investigating teleportation (moving material objects from one location to another using worm holes). Beginning in the 1980s, developments in quantum theory and general relativity physics have succeeded in pushing the envelope in exploring the reality of teleportation. Computers are mandatory in exploring the practicality, possibilities, and application of such new technologies.

The trend toward smaller, faster computers will continue. Currently under early stages of development by IBM and several research partners are "quantum computers." Quantum computers work at the atomic level rather than on a "chip" or "circuit" level, as in computers of today. They will be able to work on a million computations at one time, rather than just one, as current technology allows, increasing computing power and decreasing size requirements dramatically.

Computers in the future will enable Marshal McLuhan's vision of the "Irresistible Dream," already

beginning to be realized through the Internet, of connecting all computers in the world into one large network, like a global nervous system. This network will be distributed so that there is not one central location of control. This network will be able to reconfigure itself, solve unanticipated problems, be fault tolerant, and always accessible. Users will be able to access any kind of information almost instantaneously, anywhere, anytime.

The use of computers in our world will continue to grow. For the foreseeable future, we will need faster and smaller computers to satisfy the ever-growing need for computing power, either for research, business, education, or for our own personal use. Computer-aided artificial intelligence will give robots the ability to think and perform tasks for the convenience of humans. One comprehensive global network will allow individuals to connect to the resources of the world. Technologies are currently being developed that will make these visions a reality.

— *Shaun Scott*

See also **Artificial Intelligence; Globalization**

Further Readings

Caro, D. H. J., Schuler, R. S., & Sethi, A. S. (1987). *Strategic management of technostress in an information society.* Lewiston, NY: Hogrefe.

McLuhan, M. (1964): *Understanding media.* New York: Mentor.

McLuhan, M., & Fiore, Q. (1968): *War and peace in the global village.* New York: Bantam.

Minsky, M. (Ed.). (1968). *Semantic information processing.* Cambridge: MIT Press.

COMPUTER LANGUAGES

Anthropologists who study the field of synthetic anthropology have much to learn from the development of computer languages. While the first major computer language surfaced in 1957, with the development of FORTRAN (FORmula TRANslating System), the entire field owes a great debt to an early 19th-century scientist and mathematician Charles Babbage (1791–1871), known by various sources as the father, grandfather, or godfather of computing. Babbage's "Difference Engine," which was designed to make tabulating figures error free, is the first recorded instance of a computer programming language. There is no doubt that Babbage was a genius, but his lack of diplomacy doomed his invention. Despite the fact that by 1834, Babbage had raised $1 million to build his first version of the Difference Engine, the project stalled when Babbage quarreled with his engineer and failed to maintain political support for the project.

In the mid-1980s, a group of scholars, historians, and computer experts, led by Doron Swade of London's Science Museum, became interested in the idea of building the second version of Babbage's Difference Engine in time to celebrate the anniversary of his 200th birthday. Made up of some 4,000 parts, the machine performed calculations by manual rotation of a mangle-like handle. At a cost of some $500,000, the finished product was 11 feet long, 7 feet tall, and weighed 3 tons. The cost of building the accompanying printer was considered impractical until Microsoft's Nathan Myhrvold promised to underwrite printer costs in exchange for having an identical Difference Engine built in his home in Seattle, Washington.

Initially, computer languages commanded programs to perform particular functions. In Babbage's case, his computer language was directed toward commanding his inventions to perform certain physical motions. An operator was needed to manually shift gears for the Difference Engine to perform additional functions. By 1942, the U.S. government had built the ENIAC computer, which depended on electrical signals rather than a human operator to shift functions, employing principles developed by Babbage over 100 years before. Beginning with the work of John Von Neumann of the Institute for Advanced Study in 1945, the technology behind computer languages advanced so that functions could be used across programs.

Babbage also designed but never built the Analytical Engine, which, according to today's estimates, would have been roughly the size of a locomotive. The Analytical Engine had much in common with computers of the later 20th century, including separate processing and memory units, looping, microcopying, and punch cards.

Founded in 1978, the Charles Babbage Institute (CBI) of the University of Minnesota, named after the computing pioneer, serves as a link between the ever-expanding field of computer technology and the historical celebration of information technology and information processing. In November 2003, with National Science Foundation (NSF) sponsoring, CBI completed the Web-based "Building a Future for Software History," which included a dictionary of software history, an electronic journal on software history, and an oral history project consisting of interviews with pioneers in the field of software history and programming languages.

— Elizabeth Purdy

Comte, Auguste (1798–1857)

Usually labeled the "founder of sociology and positivism," Auguste Comte was one of the most important 19th-century French philosophers. Born Isidore-Auguste-Marie-François-Xavier Comte on January 19, 1798, in Montpellier, he began life in the chaos of the last years of the French Revolution and spent his life dealing with the problems the revolution had bequeathed.

Sharing the bourgeois values of frugality, routine, and work, Comte's family was profoundly Catholic and counterrevolutionary. Comte had two younger siblings but apparently was no closer to them than he was to his parents. "The correspondence between him and his family members is characterized by constant feuding, demands, reproaches, and slights" (Pickering, 1993, p. 17).

Admitted to the exclusive École Polytechnique in Paris in 1814, he developed a lifelong interest in mathematics. An intellectually superior but rowdy student, Comte was expelled 2 years later.

Living an ascetic life in Paris, Comte studied the writings of Benjamin Franklin and became enamored with the new nation of the United States, where he expected to teach geometry. He also absorbed the works of Montesquieu and Condorcet. The position in the United States never materialized, and instead he went to work for Comte de Saint-Simon as a political journalist. Despite having acquired a mistress, daughter, mentor, and occasional teaching positions that allowed him to write, Comte was often depressed.

Around 1820, Comte began refining his famous concept of the three evolutionary stages of explanation, the theological, metaphysical, and positivist. In 1824, the first signed publication of Comte's signaled his break with the elderly Saint-Simon. About this time Comte became impressed with the German philosophers, especially Johann Gottfried Herder and Immanuel Kant, as well as with the Scottish philosophers.

In 1825, Comte married a strong woman who was not awed by his intelligence. He described his married life as painful, and his writings became rather misogynous. He had a nervous breakdown in 1826 and attempted suicide a year later. His interpretation of his mental problems became incorporated into his three-stage system, and in 1830, he sent the first volume of his magnum opus (often referred to simply as the *Cours*) to the Academy of Sciences.

Comte's mother died in 1837, and he unsuccessfully attempted a reconciliation with his family. His difficulties with his wife and friends continued as he worked on the remaining volumes of the *Cours*. In 1838, he had a second nervous breakdown, but in 1841, he began a remarkable correspondence with John Stuart Mill. Within a few years, Comte was well-known among English intellectuals, and Mill published an influential book on Comte and positivism (1866). He completed the *Cours* in 1842, though his wife left him in the same year.

In 1845, he became emotionally involved with a young woman, who died 16 months later. The last stage of his life has been described as "rapture and absorption in the ideal" (Marvin 1937, p. 43), and nothing of note in positivism came from this period.

Almost always in poor health, constantly in debt, and often dealing with the scandals of his family and his wife's family, Comte died in Paris on September 5, 1857.

— Robert Lawless

See also **Positivism**

Further Readings

Marvin, F. S. (1937). *Comte: The founder of sociology.* New York: Wiley.

Pickering, M. (1993). *Auguste Comte: An intellectual biography* (Vol. 1). Cambridge: Cambridge University Press.

Thompson, K. (1975). *Auguste Comte: The foundation of sociology.* New York: Wiley.

Condorcet, Marquis de (1743–1794)

A member of the radical enlightenment in France, Marie-Jean-Antoine-Nicolas de Caritat Condorcet (b. Ribemont dans l'Aisne, September 17, 1743) believed humanity capable of infinite progress and sought to inject reason into social affairs. Ironically, Condorcet was declared, on March 13, 1794, *hors la loi* (and hence to be executed without trial if apprehended, along with any who aided him). He died of a hemorrhage (Bourg La Reine, March 29, 1794) within a few days of leaving his Paris refuge to protect those who had sheltered him.

Educated at the Jesuit college in Reims and the College of Navarre, where he studied mathematics, he became secretary of the Academy of Sciences in 1777 and was elected to the French Academy in 1782 and the Academy of Sciences in 1789. Condorcet published a biography of Turgot (1786) and Voltaire (1789). When Turgot became Controller General of France in 1774, he appointed Condorcet as Inspector General of the Mint (a post he held until 1791). Condorcet married Sophie de Grouchy, a renowned beauty, in 1786.

Condorcet was a prodigious reader with a superb memory who acquired from working with Turgot a firm belief in economic laissez-faire policies supplemented by state intervention in cases where the market was not developed enough. He knew many of the prominent intellectuals of the age and advocated religious toleration, legal and educational reform, and the abolition of slavery, but his poor rhetorical skills hurt his causes and made him enemies. Condorcet had a major role in writing the first (Girondin) moderate constitution for revolutionary France, but this prejudiced his case when Robespierre and the Jacobins took over.

Condorcet's inveterate optimism showed most explicitly in his last great work, *Esquisse d'un tableau historique des progrès de l'esprit humain* (Sketch of an Historical Canvas of the Progress of the Human Spirit), written while in hiding and largely without a library (1795). Like others, Condorcet imagines humanity progressing from a state of savagery up through a number of stages of civilization. His theme influenced many, including Hegel, but Condorcet's originality lay in his description of a final tenth stage, in which inequality between nations and individuals will disappear and human nature will be perfected intellectually, morally, and physically.

Source: Courtesy of the Library of Congress.

Condorcet's most original contribution may in the end have been in mathematics. He wrote several treatises on calculus (1765, 1772, and a manuscript just before his death) but he gained fame in 1785 with his *Essai sur l'application de l'analyse à la probabilité des décisions rendues à la pluralité des voix* (An Essay on the Application of Probability Theory to Majority Decisions), which radically clarified the mathematics of voting. He was one of the first to point out that preferences of pluralities are not transitive (a plurality may prefer A to B, B to C, and C to A). He developed what has been called a "Condorcet criterion" for winning, in which the result satisfies the criterion that the majority would prefer the winner to any

other single candidate. Condorcet demonstrated the mathematical advantages of what has come to be known as a ranked-pairs method of determining a winner from binary preferences (for example, 9 of 11 prefer A to B), by progressively accepting preferences from greatest plurality to least if and only if they do not entail an inconsistency with those preferences already accepted.

— *Thomas K. Park*

Further Readings

Condorcet, Marquis de (1979). *Sketch for a historical picture of the progress of the human mind* (J. Barraclough, Trans.). Westport, CT: Greenwood Press. (Original work published 1794)

Configurationism

Most often associated with the work of Ruth Benedict (1887–1948), configurationism focuses on understanding phenomena as organized wholes rather than as aggregates of distinct parts. A reaction to European diffusionism, which dealt with isolated traits, configurationism instead stressed the integration of traits with the other elements of culture. Benedict best expressed this approach in her immensely popular book *Patterns of Culture* (1934), which focused on a comparison of three peoples: the Zuñi of New Mexico, the Kwakiutl of Vancouver Island, and the Dobuans of Melanesia. As Benedict (1934) stated, "The basic contrast between the Pueblos and the other cultures of North America is the contrast that is named and described by [Friedrich] Nietzsche in his studies of Greek tragedy" (p. 78), that is, Apollonian (harmonious and restrained) and Dionysian (megalomanic and unrestrained). While Greek tragedy had both, some Native American cultures, according to Benedict, focused on one or the other.

For example, in their search for supernatural power, the dionysian Kwakiutls (and Plains Native Americans) induced visionary experiences by individualized fasting, self-torture, and the use of drugs, while the apollonian Zuñi (and other Pueblo Native Americans) harmoniously grouped together and recited by rote an extensive ritual, numbing their minds and allowing the supernatural to take over. The Dobuans were paranoid, secretive, and treacherous. In each case, all beliefs, behaviors, and cultural institutions were shaped and interrelated by the one dominant configuration.

Benedict (1934) clearly thought that cultures could be adequately described by psychological terms and that "a culture, like an individual, is a more or less consistent pattern of thought and action" (p. 46). Although she traced her intellectual ancestry to the psychologist Wilhelm Dilthey and the historian Oswald Spengler, Franz Boas was her mentor, and she dwelt on Boasian themes of cultural determinism and cultural relativism.

Echoing the appraisal of many anthropologists, H. Sidky stated (2004), "What Benedict provided in her *Patterns of Culture* was description, not explanation" (p. 156). Her scholarship was more humanistic than scientific, idiographic rather than nomothetic. Benedict (1934) explicitly accepted the circular argument that cultures are different because they are different when she approvingly quoted a "chief of the Digger Indians" saying, "God gave to every people a cup . . . but their cups were different" (pp. 21–22). She apparently drew no causal connections among ecology, subsistence, and culture. The unkindest reading of Benedict is that her writings are an obfuscation and elaboration of stereotypes springing from a folk model. And her work did, indeed, create an industry of anthropologists and journalists traipsing off to New Mexico to find drunken Indians and off to British Columbia to find somber ones.

Beautifully written (Benedict was an accomplished poet), *Patterns of Culture* is probably the most widely read book in anthropology. Translated into more than a dozen languages, it is still in print. As Alan Barnard (2000) has pointed out, "Her premise that culture determines both what is regarded as correct behaviour and what is regarded as a normal psychological state, remains one of the strongest assertions of relativism in anthropology" (p. 104). And *Patterns of Culture* did introduce the anthropological concept of culture to the lay public.

— *Robert Lawless*

See also **Benedict, Ruth; Culture, Characteristics of; Kwakiutls; Zuni Indians**

Further Readings

Barnard, A. (2000.) *History and theory in anthropology.* Cambridge: Cambridge University Press.

Benedict, R. (1934). *Patterns of culture.* Boston: Houghton Mifflin.

Mead, M. (1959). *An anthropologist at work: Writings of Ruth Benedict.* Boston: Houghton Mifflin.

Mead, M. (1974). *Ruth Benedict.* New York: Columbia University Press.

Modell, J. S. (1983). *Ruth Benedict: Patterns of a life.* Philadelphia: University of Pennsylvania Press.

Sidky, H. (2004). *Perspectives on culture: A critical introduction to theory in cultural anthropology.* Upper Saddle River, NJ: Pearson Prentice Hall.

Conflict

Conflict involves antagonistic relations of ideas, interests, and persons. It occurs at different levels, including internal, interpersonal, small groups, large-scale sectors, organizations (such as states), and broad social principles. Furthermore, conflict takes many forms, from sullen silence to verbal debate, from interpersonal violence to organized warfare. Important forms of conflict are tacit rather than open, involving differences in concepts and interests buried in the flow of social life. Paying attention to these distinctions is important, for a typical and troubling confusion is explaining organized violence, such as warfare, as a simple extension of interpersonal aggression without attention to the different causes, scales, and activities involved. Anthropology, with its wide comparative scope, is suited to distinguishing among kinds of conflict and exploring each one as part of a complex whole.

Conflict and consensus form a principal axis of theories in the social sciences. Conflict theories explore patterned conflict forming the architecture of social relations. Some conflict theories stress individual actors engaged in competition and maneuvering, out of which social patterns emerge; market and transaction models are typical ones. Other conflict theories emphasize broad social groups acting on profoundly different interests and ideals; Marxist class struggle models exemplify these. Consensus theories, on the other hand, emphasize shared ideas and interests, resulting in coordinated social activity. Social functionalist and cultural pattern approaches are major consensus theories in anthropology. Conflict and consensus are not, however, mutually exclusive—a good example being the enormous level of coordination required for large-scale warfare—and key conflict theories draw on consensual phenomena, and vice versa.

Humans have a biological capacity for conflict, including vertical relations of domination and resistance and horizontal relations of rivalry, broadly shared with other primates. There are important elements of antagonism within the most intimate of relationships, such as between mates or parents and children. But these conflicts are arranged, expressed, and suppressed in highly varied ways, and models that attribute to humans a singular drive to dominance, for example, miss the remarkable flexibility that characterizes the human adaptation. One of the richest—if most debated—biosocial case studies of conflict concerns ritualized violent fighting and extensive intervillage raiding among the Yanomami peoples of the Guinea Highlands of South America. Napoleon Chagnon argues that increased mating and thus reproductive fitness drives violence among men. Others dispute this biosocial interpretation, however. Marvin Harris emphasized group-level conflicts over scarce protein in the rain forest, while Brian Ferguson questioned the context of the ethnographic evidence, pointing to the direct and indirect effects of frontiers of state-level societies on "tribal" peoples. Also, other ethnographers of small-scale societies, such as Robert Dentan, documented alternative cases in which public expression of conflict (especially violence) is highly repressed.

Indeed, the flexible human relation to conflict is most evident in the widespread mechanisms designed to avoid or attenuate it. These include the recourse of splitting groups rather than fighting, and the extensive networks of gift friendships and marriages, which Claude Lévi-Strauss suggested was instrumental in the emergence of human culture. Classic consensus theories, such as British structural functionalism, often found their evidence in mechanisms for resolving public disputes, but otherwise they ignored open and suppressed conflicts. Developed as a reaction to structural functionalism, the Manchester school explored conflict theory approaches to social structure. Their "extended case" method started with an open-conflict situation and traced outward the connections, group alignments, and ideas surrounding the specific case. Max Gluckman argued for a cyclical view, in which rituals first opened up and then reunified

social cleavages (for example, between women and men), but his students explored transformative conflicts, such as the struggles against colonialism and racial hierarchy in southern Africa. An important analytical transition thus took place: from conflict as needing control within an overall emphasis on static culture/society to conflict as a basis for the construction and reconstruction of society/culture over time.

Source: © Photo provided by www.downtheroad.org,The Ongoing Global Bicycle Adventure.

War and class relations are two of the main grounds for the social scientific study of conflict. Although it is heavily debated, many anthropologists today reserve "war" for organized violence in stratified societies and thus distinguish it from general aggression and interpersonal violence (such as intervillage raiding). The question then becomes: What is the social context for war? War sometimes (but not always) involves strategic geography and control over resources, but its most fundamental association seems to be with centralization of political power. For example, the modern democratic nation-state, including its key status of "citizen," comes into being (in part) through taxation for and recruitment of mass militaries.

Class relations are part of a set of conflicts based on differentiated and unequal social relations (gender is another one, though it involves different dynamics). Karl Marx saw class struggles as the driving force of social arrangement and change over time. But his notion of struggle was inherent in the unequal nature of the relationship and only periodically emerged in open conflicts, such as revolution (also, Marx saw conflict not just as a matter to be resolved, but as a driving force of change to new relationships). To anthropologists, orthodox Marxism has serious flaws, such as an insufficiently cultural conceptualization of interests and social groups, but neo-Marxist social science provides us important insights into conflict.

James Greenberg, for example, delineates alternative explanations of violent feuding in indigenous rural Mexico, concluding that it principally stemmed from struggles over different concepts of the morality of capitalist accumulation and exchange upon the advent of commercial coffee production. James Scott likewise explores conflicts beneath the seemingly placid surface of Malaysian village life. Rural class relations were undergoing rapid change, due to new varieties of rice and mechanization of former hand labor jobs (the "green revolution"). Poor peasants could not afford to rebel openly, but they struggled against rich peasants and landlords in subtle ways—insults, gossip, malingering, feigned incompetence, theft, and petty vandalism—what Scott memorably terms "weapons of the weak." In each case, a level of normality and consensus reigned on the surface, and the analytical task was to show the hidden cleavages and struggles in a process of fundamental social change.

— Josiah McC. Heyman

See also **Aggression; War, Anthropology of**

Further Readings

Greenberg, J. B. (1989). *Blood ties: Life and violence in rural Mexico.* Tucson: University of Arizona Press.

Haas, J. (Ed.). (1990). *The anthropology of war.* Cambridge: Cambridge University Press.

Vincent, J. (1990). *Anthropology and politics: Visions, traditions, and trends.* Tucson: University of Arizona Press.

Confucianism

Confucianism is a Chinese system of thought that originated with the teachings of *Kong Fuzi.* Literally "Master Kong" and latinized as "Confucius," *Kong Fuzi* is an honorific for *Kong Qiu* (alias *Zhongni,* 552–479 BC), who served in minor official posts during his lifetime. Confucianism is philosophical as well as spiritual. Historically, its rise paralleled that of the Western philosophical tradition represented by Socrates, Plato, and Aristotle. Since its ascent to the status of state orthodoxy during the Former Han Dynasty (206 BC–AD 8), Confucianism has molded the spirit of Chinese civilization.

What is known as Confucianism actually grew out of contributions from both Confucius and his major followers, such as Mencius (ca. 371–289 BC) and Xunzi (ca. 313–230 BC). The basic Confucian canon consists of two parts. One contains the "Four Books," including the *Analects,* the *Mencius,* the *Great Learning,* and the *Doctrine of the Mean.* The other part contains the "Five Classics," including the *Book of Changes,* the *Book of History,* the *Book of Odes,* the *Spring and Autumn Annals,* and the *Book of Rites.* There is general consensus that the *Analects* is probably the only reliable source of teachings delivered verbatim by Confucius himself.

Philosophical Tradition

Confucian thought is humanistic and rational. It maintains that everyone has the mental and moral potential to fully realize themselves in the fulfillment of their social roles and that the world can be understood through the use of human reason alone. This is why Confucius sought to promote "education without class" and is remembered as the "greatest teacher of all time" in China. If Confucius implied only that human nature was good, Mencius took it a step further to declare that man was equipped with innate knowledge and ability to do good. In contrast to Mencius's Idealistic Confucianism, Xunzi adopted a position known as Realistic Confucianism, and he argued that humans were born selfish and asocial. Nevertheless, both believed in the perfectibility of all humans through education.

At the heart of the Confucian intellectual tradition is a social, political philosophy that centers on "government by virtue." To govern is to correct. Confucius compared two different ways to achieve this end: government by regulations and punishments versus government by moral examples and persuasion. His conclusion was that there would be shameless evasions under the former, but shame and correctness under the latter. Government by virtue was one of benevolence. Three tenets figure large in its building: self-cultivation, rectification of names, and the *Doctrine of the Mean.*

Self-Cultivation

Benevolence, or *ren,* was central to Confucian morality, which also included such virtues as righteousness, loyalty, filial piety, fraternal love, devotion, courtesy, and so on. Self-cultivation involved engaging in an unwavering pursuit of virtues, practicing industry and hard work, and exercising control over desires and emotions. Asceticism was a necessary ingredient of self-cultivation, and not everyone could go through the arduous journey to complete moral perfection and become a *junzi,* or profound person. In Confucian political thought, it was the privileged responsibility of the profound person to assume a position of leadership and render public service to society. Behind the Confucian stress on self-cultivation was a moral idealism that identified the cultivation of virtues with ideal statesmanship. Not only did this moral idealism advocate a political elitism, but it also linked Confucianism to the state through the civil service examinations that were based on Confucian texts.

The moral examples set by the profound person were expected to include the practice of *li,* literally "rites," and the adherence to the *Dao,* literally "Way." People became truly human as their raw impulse was shaped by *li.* Used this way, the meaning of *li* extended beyond "rites" to denote the "rules of propriety" that were generated by the entire body of tradition and convention. The Master believed that the practice of *li* was instrumental in promoting conformity to proper moral values and social behavior and bringing about a civilized society. In fact, the content of benevolence was often defined in terms of ritual behavior; it was in association with *li* that Confucius gave the golden rule: "Do not do to others what you do not want them to do to you." As for the *Dao,* it was the path that led from human nature in the raw to human nature fulfilled. The Way was knowable by the human mind. But adhering to

it called for a tenacious commitment to lofty goals, and people could use a role model from the profound person.

Rectification of Names

To rectify names was to specify moral obligations and behavioral codes for people in various social roles, that is, "names." Confucius identified three most basic bonds of society in the ruler-subject, father-son, and husband-wife relationships. Two more social relationships, namely, elder brother–younger brother and friend-friend, were added to the foregoing "Three Bonds" to yield the "Five Cardinal Relations." Modeling after the traditional Chinese family system, reciprocal obligations and behaviors were specified for each set of relations. However, there was an asymmetry of status, with authority assigned to the first party in each set of relations except that of friend-friend.

The exercise of authority was dependent on the fulfillment of responsibilities, a principle that applied to ruler as well as father, husband, and elder brother. Failure to fulfill their responsibilities nullified the obligation of allegiance by subject, son, wife, and younger brother. The Son of Heaven, for instance, must rule virtuously or risk the loss of his Mandate of Heaven. Confucian thought provided no formal checks against the abuse of power by the government. Rather, the exercise of power by the government rested on the consent of the governed. The rectification of names served to sanction a social hierarchy in moral terms and to institutionalize its behavioral code through state sponsorship. With this, Confucius hoped to see the prevalence of social stability that he had envisioned for an ideal society.

The *Doctrine of the Mean*

The ultimate justification for self-cultivation and the rectification of names consists in the *Doctrine of the Mean,* a tenet that relates moral behavior and good government to the Way of Heaven. The Chinese for this tenet is *zhong yong,* where *zhong* means "centrality," and *yong* denotes "universality" or "commonality." Instead of conjoining to teach moderation and balance, as in the *Analects,* they represent a doctrine expounding what is central in the cultivation of virtuous behavior and how it harmonizes with the universe. The *Doctrine of the Mean* begins as follows:

> What Heaven imparts to the humankind is called human nature. To follow human nature is called the Way. Cultivating the Way is called teaching. The Way cannot be separated from us for a moment. What can be separated from us is not the Way. Therefore the profound person is cautious over what one does not see and apprehensive over what one does not hear.

The Human Way, which originated in Heaven, is inherent in the nature of everyone. Since there is a unity of the Heavenly Way and the Human Way, a natural way, as is preached by Daoism in separation from humanity, is not the Confucian Way. Exemplifying the Confucian personality, the profound person is watchful of the process whereby his inner humanity is to be manifested as the Way. It is a process of increasing self-knowledge that gives one an acute awareness of imperfection until the full discovery of one's inner self. In addition to the centrality of its role in the discovery process, self-knowledge must be realized in a state of mind that transcends emotions and desires in pursuit of self-realization. Ultimately, the centrality of self-knowledge is defined in transcendental terms.

As the self-knowledge of the profound person is employed to guide society, moral behavior becomes a way of life. People are ruled by persuasion, ethical examples are followed, the family system is maintained, and rites and rituals are practiced in honor of the social hierarchy and behavioral codes. In short, the universal values of humanity are translated into common, prevalent behavior. Among them are benevolence and justice, which are built into the government system, and filial piety and ancestor worship, which are accepted as the basis of the fundamental human relatedness. In this idealized fiduciary community, there is affection between father and son, righteousness between ruler and minister, separate functions between husband and wife, proper order between the old and young, and faithfulness between friends. Such is the Human Way, which reflects human nature, harmonizes with the Heavenly Way, and is universally true.

What brings humans and Heaven together is *cheng,* meaning "sincerity" or strong commitment in the cultivation of self-knowledge and self-realization. But in the *Doctrine of the Mean,* the notion of *cheng* goes far beyond a state of mind. A lengthy discussion takes it on a ride of ever-deepening subjectivity to denote a metaphysical force that changes and transforms

things in addition to facilitating human perfection. As this metaphysical force works for the realization of both humans and all things, moral order and cosmic order are literally two in one. In both cases, *cheng* marks the beginning and end of the quest for Heavenly truth and is used as the idiom of ultimate reality. With this, *cheng* becomes a counterpart of the omnipotent principle of Daoism: the Way.

Neo-Confucianism

The *Doctrine of the Mean* has a twin, namely, the *Great Learning,* which discusses the steps of self-cultivation within an overarching framework of scholarship, moral perfection, and fulfillment of social obligations. Originally two chapters in the *Book of Rites,* they were selected by Zhu Xi (1130–1200), the leading scholar of neo-Confucianism, as two of the "Four Books" that would become the basic texts for civil service examinations between 1313 and 1905. Neo-Confucianism was a response to the growing popularity of Buddhism and Daoism of the time. It started to gather momentum in the second half of the 11th century, when neo-Confucianism received formative impact from a conscious appeal to mysticism, on one hand, and a rationalistic reinterpretation of Idealistic Confucianism, on the other.

Classic Confucianism has a simple tripartite cosmology of Heaven, Earth, and Humans. In the drive to revitalize classic Confucianism, efforts were made to enable it to address the fundamental problems of human life, for which people had turned to Buddhism or Daoism. Out of these efforts grew the neo-Confucian metaphysics, which gave new life to the explanatory power of the Confucian cosmology. It recognized *qi,* or "cosmic energy," as a material force in the universe, which was solely responsible for the existence of reality. Mistakenly called "nonbeing" by the Daoists, *qi* gave form to all being and was in a constant state of change. Clearly the development of this metaphysics was indebted to Daoism and Buddhism. But its purpose was purely Confucian, that is, to reaffirm the reality of human existence and provide a metaphysical basis for the teaching of Confucian ethics in rejection of Daoism and Buddhism.

Parallel to the concept of *qi* is the tenet of *li,* or "principle." Principle is that which informs *qi* in the creation of everything. As such, it comprises the eternal laws of creation and manifests itself in the products of *qi.* Both *qi* and *li* have their roots in the Great Ultimate *(taiji),* the source of all being, which also exists in every individual. This doctrine is named the "Cheng-Zhu School of Principle," in recognition of the contributions from both Cheng Yi (1033–1107) and Zhu Xi (1130–1200). Following Mencius's idealistic interpretation of human nature, they agreed that humans were born good. Nevertheless, the material endowment from *qi* varied from individual to individual, causing differential obstruction to the manifestation of one's true nature. By cultivating moral attitudes, however, everyone could overcome the limitations of material endowment to attain the enlightenment of a sage.

As a principal method for self-realization, Zhu Xi proposed the "investigation of things." The observation and discovery of principles inherent in things would lead one to conform to them. Intellectual and rationalistic, this approach reinforced the Confucian emphasis on learning and scholarship. Not only was Zhu Xi the most influential neo-Confucian, but he was also the most brilliant synthesizer of his time. He grouped the "Four Books" and wrote commentaries on each of them. His extensive exegesis on Confucian teachings is highly regarded for its rational approach, which gave Confucianism new meaning, and for its conscientious adherence to orthodox Confucian thought. Zhu Xi has profoundly impacted Chinese thought as well as the thought of Korea and Japan.

Spiritual Tradition

There is a strong spiritual component in Confucian thought. This is because what is moral is also spiritual in the Confucian quest of self-realization. The *Mencius* has a famous saying that describes this grueling journey:

> When Heaven is about to confer a great responsibility on any man, it will exercise his mind with suffering, subject his sinews and bones to hard work, expose his body to hunger, put him to poverty, place obstacles in the paths of his deeds, so as to stimulate his mind, harden his nature, and improve wherever he is impotent.

The description is meant to summarize the making of a profound person or sage. It is important to note that according to Idealistic Confucianism, Heaven is not external to the individual, but abides in everyone's human nature. So Mencius is virtually describing an

internal process. Indeed, contrary to the idea that Confucian moral values are just social, they are really the manifestation of a spiritual quest in the first place. One does what one's conscience commands one to do, and the value realized is entirely internal to one's conscience. It follows that this value is primarily spiritual.

To the extent that self-realization is spiritual, it is also transcendental. Confucius compared the experience to meeting Duke Zhou, an ancient sage, and to fathoming the Mandate of Heaven. The soul-searching led him to believe that there had existed an ideal ancient era against which contemporary realities could be judged. It was his mission to restore the ideals of that golden age. In the process, Confucius went over the old to find the new. But he claimed to be a messenger rather than a creator, implying that the ideals had crystallized to him from conformity to the Way of Heaven. Confucian transcendence is anchored in the awe of Heaven. Despite the Master's reluctance to talk about supernatural beings and forces, he seemed to acknowledge an interaction between humans and a higher order. Thus, he conceded that the ruler was governing on the Mandate of Heaven. To the disappointment of the Master, his sociopolitical ideology failed to win official sponsorship in his lifetime. Sadly, Confucius attributed it to a lack of good timing ordained by Heaven.

After Confucianism came to dominate the system of social values in China, it replaced the ethical function of religion. Confucius was officially elevated to the status of patron saint for the literati. In AD 630, the emperor of the Tang Dynasty (618–907) decreed that all prefectures and districts build Confucian temples in order for the local scholar-officials and scholar-gentry to offer sacrifices to the Master. With the rise of neo-Confucianism during the Song Dynasty (960–1279), the spirituality of Confucian thought was further mystified. The metaphysics of *qi* played an important role in this process and so did the theory of the mind developed by Wang Yangming (1472–1529), a prominent neo-Confucian thinker whose influence was second only to that of Zhu Xi. To Wang, neither principle nor things are external to the mind. To discover principle is to rectify the mind by eliminating from it what is incorrect. As the mind essentially means the will, sincerity of the mind is more crucial than the investigation of things. Under the impact of Wang's idealism, meditation increasingly became a standard practice in the neo-Confucian quest of self-realization, and spiritual enlightenment was sought after.

When Confucianism is juxtaposed with Buddhism and Daoism as the "Three Teachings," it reads *rujiao,* meaning "literati religion." But scholarly disagreement has persisted over whether Confucianism is a religion. On one hand, Confucianism has functioned as a belief system that assigns meaning to life, provides an ethics-based order for society, has sacred space and time, and inspires a sense of religious awe, albeit to different degrees over time. In view of all this, Confucianism is characteristically an ethico-religious tradition. On the other hand, Confucius is typically worshipped as a sage rather than a deity; his moral concerns have a clear "this-worldly" orientation, and his teachings, stripped of the ideological impositions by the ruling class and elite, are primarily philosophical.

Challenges to the Confucian Tradition

Confucian thought has been constitutive of Chinese mores and ethos for over 2,000 years. The vicissitudes of Confucianism in dynastic China show that its moral idealism was vulnerable to disillusionment in times of protracted warfare, national disunity, or invasion from without. But once social order was restored, Confucianism was put back on the pedestal again. This pattern ground to a stop in modern times, when Confucianism had to face challenges from the Western ideology that called its fundamental rationale into question, as in China after the overthrow of the Qing monarchy (1688–1911), in Japan during the Meiji Reforms (1867–1912), and in Korea at the end of the Choson Dynasty (1392–1910).

Modern critics of Confucianism found a loud-and-clear voice in the May Fourth Movement of 1919, a patriotic student campaign that, in protesting against an imminent sellout of national interest, deepened its critical spirit to press for an intellectual modernization of China. Briefly, the root cause of China's backwardness was believed to lie in Confucianism, which dictated blind obedience to authority, promoted servile adherence to the status quo, and provided unconscionable justifications for social inequality and injustice, especially through the Confucian family system. China was badly in need of reinvigorating itself with assistance from "Mr. Democracy" and "Mr. Science," but the authoritarian and conservative nature of Confucian institutions stifled the quest of freedom, individualism, and originality.

"Down with Confucius and Sons!" became a new battle cry of the May Fourth Movement. What some of its leaders wanted, however, was a total rejection of China's past in favor of wholesale Westernization.

After the Chinese communists came into power in 1949, a new round of attacks was mounted on Confucian thought. But these assaults were engineered by an ideology that was critical of Western freedom and democracy as much as of Confucian "benevolence" and "self-cultivation." Confucius was denounced publicly, and Confucian values were declared decadent for fear that they would undermine "socialist ethics." The anti-Confucian mentality culminated during the "Cultural Revolution" (1966–1976), when a violent, destructive vendetta was unleashed against any "remnants," real or suspected, of Confucianism. It was not until the mid-1990s that the Chinese Communist Party started to retreat from its radical iconoclasm and attempted to reclaim the right to speak for China's Confucian heritage.

The rise of industrial East Asia has directed attention to the role of Confucian heritage in modernization. For many researchers, the point of entry is culture as an integral part of economic dynamics. Known as the "Sinic World," East Asia evidences a pervasive influence of Confucian values. Japan and the Four Mini-Dragons (South Korea, Taiwan, Hong Kong, and Singapore) are all situated in this cultural universe. A number of Confucian factors have been proposed in connection with the successful transformation of East Asia: strong government with moral authority, the centrality of the family in capital formation, power politics and moral education, the scholar-official mentality that makes the best minds available for public leadership, duty consciousness, encouragement of learning, good work ethic, and so on.

Explanations have been attempted for the retention of Confucian values in the modernization of East Asia. According to one explanation, Confucianism has a critical spirit and the potential to transform itself, as in its promotion of social reforms by neo-Confucian scholars Wang Anshi (1021–1088) and Kang Youwei (1858–1927). In the East Asian drive toward modernization, Confucian thought has reemerged as a "humanistic rationalism." Another explanation identifies three components in Confucian thought: philosophical insight, political ideology, and popular values. It argues that the first component may prove useful in bridging the philosophical gap between the East and the West, the second must be discarded, and the third is very much alive in the East Asian experience of modernization. A third explanation stresses that modernization in East Asia entails the mobilization of local resources, including the Confucian tradition. As this tradition impedes, facilitates, and guides the process of modernization, it is also being rejected, revitalized, and fundamentally restructured. But there is tradition in modernization, and it is time to redefine modernization in light of its successes outside of the West.

Ethnography on modern China has contributed significantly to the awareness that there is dynamic interaction between the Confucian tradition and modernization. More specifically, it is instrumental in revealing the contemporary metamorphosis of traditional familism in kinship and descent, marriage and gender roles, household economy, economic reforms, lineage organization, local politics, migration, corporate property, resource management, and so on. Since the Confucian tradition happens to hold out most tenaciously in these areas, ethnographic findings are invaluable for the study of its dynamic articulation with modernization. But such findings are possible only if the field researcher rises above the thinking that the Confucian tradition is just a thing of the past.

— Zhiming Zhao

See also **Buddhism; Daoism**

Further Readings

Chan, W.-T. (1963). *A source book in Chinese philosophy.* Princeton, NJ: Princeton University Press.

de Bary, W. T., Chan, W.-T., & Watson, B. (1960). *Sources of Chinese tradition.* New York: Columbia University Press.

Fingarette, H. (1972). *Confucianism: The secular as sacred.* New York: Harper & Row.

Jochim, C. (1986). *Chinese religions: A cultural perspective.* Englewood Cliffs, NJ: Prentice Hall.

Tu, W.-M. (1996). *Confucian traditions in East Asian modernity.* Cambridge, MA: Harvard University Press.

Wright, A. F. (1965). *Confucianism and Chinese civilization.* New York: Atheneum.

Yang, C. K. (1961). *Religion in Chinese society.* Berkeley: University of California.

Consciousness

Consciousness in a very general sense is thought to be merely the state of awareness. However, the definition of what consciousness *is* has received numerous contributions from many different fields of study. For example, psychology, psychiatry, neurophysiology, anthropology, behavioral science, and a new field called "cognitive science," which is the study of the nature of various mental tasks and the processes that enable them to be performed, all have donated some variation to the growing definition of what consciousness is.

A steadfast definition of *consciousness* is that it is the totality of our awareness of bodily sensations, perceptions, emotions, thoughts, and recollections at a particular moment of time. This tends to be considered more of a psychological definition of what consciousness is. However, a biological definition, which has been subdivided by Gerald Edelman into what is called "primary consciousness" and "higher-order consciousness," displays a difference in degrees of consciousness.

Primary consciousness is thought to be the state of being mentally aware of things in the world, of having mental images in the present, but is not accompanied by any sense of a person with a past or future tense. This type of consciousness is thought to be possessed by animals that are nonlinguistic and nonsemantic; it is referred to as "creature consciousness."

Higher-order consciousness is different from primary consciousness in that it involves the actual recognition of an individual's own actions or affections (i.e., we are conscious of being conscious). It also embodies a model of the personal and of the past and the future as well as the present; this is also known as "mental state consciousness." In addition, higher-order consciousness exhibits direct awareness, the noninferential or immediate awareness of mental episodes without the involvement of sense organs or receptors. According to Edelman, it is believed that humans possess both primary and higher-order consciousness and that the two coexist and couple the actions of each other.

Throughout the ages, there have always been "theories of consciousness" addressing who or what possesses consciousness. The "anthropistic theory" holds that consciousness is peculiar only to man; this is philosophically the opinion that Descartes upheld. Another theory known as the "neurological theory" or the "Darwinian theory" holds that consciousness is a result of "progressive evolution" (i.e., the centralization of the nervous system) and is therefore possessed only by man and higher mammals with this anatomical tendency.

Some theories hold that all animals, but not insects, plants, or other life forms, possess consciousness. This is known as the "animal theory." Animal consciousness at the present is loosely defined. The reason for this is most likely because when the concept of animal consciousness is addressed, the following two questions remain unanswered: How can we definitively know which animals, besides humans, possess consciousness (this is known as "the distribution question")? Is it possible for humans to understand what the conscious experience of other animals is like (this is known as "the phenomenological question")? Also, due to the many varieties of species, it would be difficult to differentiate the different types of consciousness that may exist.

The "biologic theory" is another definition that is more liberal and holds that all organisms inherently possess consciousness. A more extreme extension of the biologic theory is the "cellular theory," which believes that consciousness is a vital property of every cell. The final type of theory holds that consciousness is an elementary property of all atoms; this is known as the "atomistic theory." Philosophically, the atomistic theory could imply that each molecule of DNA (which is composed of atoms) may be conscious in a way that is not known to us, and may in fact exert a will of its own. Thus, it is conceivable that "DNA consciousness" may exist. Perhaps this could have been the driving force behind evolution. Of course, each of these three theories is conceivable; however, they all hold a burden of proof and lack an experimental model for evaluation, in addition to our lack of technology to explore these possibilities.

New questions regarding consciousness tend to focus more on an empirical description of the conscious experience and what it is. The most well-known philosophical theory is "Cartesian dualism," which was proposed by Descartes. This model proposes that things in the physical world occur in an extended form in the brain but are then somehow condensed into a nonextended form where thought occurs. This allows for a type of indirect perception due to sense organs and proposes that there is an extended model of the sights and sounds of the

physical world in the brain and this model in the brain is then somehow condensed into a nonextended place where thoughts happen (which is nonmaterial). Therefore, Cartesian dualism proposes that thought, which is nonmaterial, is different from the physical world, which is material, and the two coexist together.

Another theory known as "naive realism," unlike Cartesian dualism, does not distinguish between the mental experience and the physical world. It upholds that an individual's perception is identical to the physical objects that are perceived. However, this is unlikely to be fully acceptable, because it is known physiologically that our special senses—eyes, ears, and tongue, for example—receive input that is deciphered by the brain. Therefore, we experience a neurochemical copy or stimulus of those physical objects, and our brain interprets what that sensory information means neurologically and perceptually.

Another notion is known as "epiphenomenalism," which is a theory that proposes that there may in fact exist a geometric form in the brain (called a "ghost in the machine") that is not considered a direct physical part of the processes in the brain and is only involved in the experience of the things arranged in space. Epiphenomenalists also uphold that there is little conscious involvement in any of the processes occurring in the body or the brain and that all aspects of consciousness regarding events and decisions occur after they have happened. Therefore, epiphenomenalism is a form of dualism that regards mental happenings as a nonphysical phenomenon, which occurs in the physical world but cannot have a direct effect upon it.

The evolution of consciousness, which would mostly likely be defined as a progression from a basic or primary form of consciousness to a higher-order form of consciousness, is inherently dependent on changes in neuroanatomy and physiology. Studies of the human skull have implicated a gross transformation of brain distribution during the course of evolution. It is observed that in *Australopithecines,* there is a much larger occipital region of the brain and a smaller frontal region, as compared to the skulls of modern *Homo sapiens,* which possess a markedly smaller occipital region and a larger frontal region.

This is significant because the frontal lobes of the brain are involved with more higher-cognitive and executive functions (for example, planning and social behavior). An increase in the frontal lobe region would imply a higher-order form of consciousness. Larger and more complicated brains with larger frontal lobes would have provided the neuroanatomy and physiology for a more complicated form of consciousness. In addition, these changes in neuroanatomy, in accordance with changes in degrees of consciousness, support the notion that consciousness has the potential to evolve.

One question that arises is: What caused these changes in early hominid neuroanatomy and physiology? One hypothesis is that the drive to support cortical expansion was fueled by an increased demand for more complicated social behavior. The cooperative behavior and socialization of early hominids provided many benefits (for example, communication could have provided easier access to food). Increased access to better food would, in turn, provide adequate nutrients to support the metabolism of a larger and more complicated brain. The access to better food is an important concept, because even though a larger frontal lobe can provide significant advantages, it comes at an absorbent metabolic cost. Therefore, the increased demand for social behavior to acquire access to better food could have provided the drive for these changes in neuroanatomy and physiology.

This biological "trade-off" for a bigger brain can be seen today in many animals by comparing the size of their brains versus the food source and length of the gastrointestinal tract required to digest that food source. For example, animals that procure easily obtained foods, such as leaves, have smaller brains and a much longer gastrointestinal tract, which is required to digest it. Comparatively, animals that utilize their bigger brains to procure more nutritious but harder to obtain food have much smaller gastrointestinal tracts.

Another biological factor provided early hominids with the opportunity to evolve bigger, more complicated brains (i.e., neuroplasticity). The old view of the brain was that after the first few years of our developmental age, the brain ceased to form new neuronal connections. However, it is now known that the brain continues to reorganize itself by forming new neural connections far after our developmental age; this is known as neuroplasticity.

These reorganizations in the brain involve changes in the connections between linked neurons and are achieved by mechanisms such as "axonal sprouting"; this is where an undamaged nerve can grow a new nerve ending to reconnect to neurons whose attachments were damaged. This allows the brain to compensate for any damage that may occur.

Neuroplasticity occurs not only in response to neuron damage but has also been observed to occur with an increase in stimulus and increase in performing skills. Therefore, it is conceivable that receiving communication input and performing communication skills sparked neuroplasticity to reorganize the hominid brain. Thus, neuroplasticity and the availability to more nutritious food sources enabled frontal lobe expansion in hominids, paving the way for a new form of consciousness.

It is also worth pointing out that the brain of *Homo sapiens sapiens* has changed over time and, as a result, changed our type of consciousness. Therefore, it is also possible that our consciousness could once again evolve into a newer form of consciousness. It is interesting to speculate what factors would drive this evolution.

More modern approaches attempt to incorporate the foundations of "the scientific study of consciousness." This is an effort to describe consciousness in terms of understanding the physical/material world around mankind and how the brain processes it. However, it must be noted that scientific theory should imply that this attempt to describe the physical world is only a description based on our analytical observations, not the physical world itself.

New advances in technology and growing volumes of scientific research, more specifically in neuroscience, have created a great deal of understanding about the neurobiology of consciousness. These understandings have included the role of neurotransmitters and specific regions of the brain that are necessary for consciousness to occur in humans.

Up until now, much has been discussed about frontal lobe expansion and its relevance to developing higher degrees of consciousness. However, what areas of the human brain are primarily responsible for the process of human consciousness?

The cerebral cortex is the largest part of the brain and is subdivided into four regions: the frontal lobe, the occipital lobe, the parietal lobe, and the temporal lobe. All of these lobes in the cerebral cortex consist of neurologically specialized areas that receive sensory information and process different aspects of sensation and motor control. The cerebral cortex also creates mental models, which create a model of the world around us and within us based on sensory data and associations of that data in our memory. However, numerous neurophysiologic experiments confirm that consciousness can exist with damage or ablation to regions of the cerebral cortex but consciousness is abolished when damage or ablation occurs to the thalamus.

The thalamus is subdivided into numerous small and medium-sized nuclei and is connected to the entire bottom layer of the cerebral cortex. These neuronal connections are called "thalamocortical" and "corticothalamic" connections, which receive signals through the "internal capsule" and allow the thalamus to receive input from every sensory and motor process in the nervous system.

Studies involving "persistent vegetative states" (this is physical wakefulness without awareness to one's surroundings) have shown that the overall cortical (cerebral cortex) metabolism remains constant during a vegetative state. This is because the metabolism in the prefrontal cortex is dependent on the activation of the thalamic intralaminar nuclei. This confirms that it is the thalamocortical connections that are responsible for consciousness to occur, not cortical activity by itself.

The location of the thalamus is perfectly placed for integrating all of the brain's activity; thus, it is involved in the global integration of cortical activity and controls consciousness. The intralaminar nuclei are more notably the most profound site of the conscious experience in the thalamus, but neurophysiologists cannot yet say how it works.

Medically, variation in normal states of consciousness can occur, known as "altered states of consciousness." These are changes in our neurobiology that cause perceptual changes and cognitive impairments that are different from our normal state of consciousness. Certain drugs or medications can cause these changes. Also, impairments in one's physical conditions can cause states of delirium or dementia. Delirium is typically seen is cases of drug intoxication, for example, alcohol intoxication. Dementia is more likely to be seen in a patient with a neurodegenerative disease (e.g., Alzheimer's).

Some individuals consider dreams to be a state of altered consciousness. This is an interesting topic, and new researchs is being done in this field. Also, much has been written about shamanism and meditation in respect to individuals intentionally entering an altered state of consciousness. However, at this point, not much legitimate neurological data has been gathered.

The field of "exobiology" is the study of possible biological life in the universe. It would be interesting to examine other types of consciousness that may exist elsewhere and how they may differ from forms of consciousness existing on our planet.

Much has been written and debated regarding human consciousness and other possible forms of consciousness that we are not aware of. Also, neuroscience has compiled an impressive amount of information that still falls short of a comprehensive definition. However, future development in technology and open-mindedness may help us discover the answers that we seek pertaining to our consciousness.

— *John K. Grandy*

See also **Brain, Human**

Future Readings

Bear, N., Bear, M. F., Connors, B. W., & Paradiso, M. A. (2002). *Neuroscience: Exploring the brain* (2nd ed.). New York: Lippincott, Williams & Wilkins.

Blackmore, S. (2003). *Consciousness: An introduction.* New York: Oxford University Press.

Edelman, G. M., Tonomi, G., & Tononi, G. (2001). *A universe of consciousness: How matter becomes imagination.* New York: Basic Books.

Kandel, E. R., Schwartz, J. H., & Jessell, T. M. (2000). *Principles of neural science* (4th ed.). New York: McGraw-Hill Medical.

Koch, C. (2004). *The quest for consciousness: A neurobiological approach.* New York: Roberts & Co.

Continental Drift

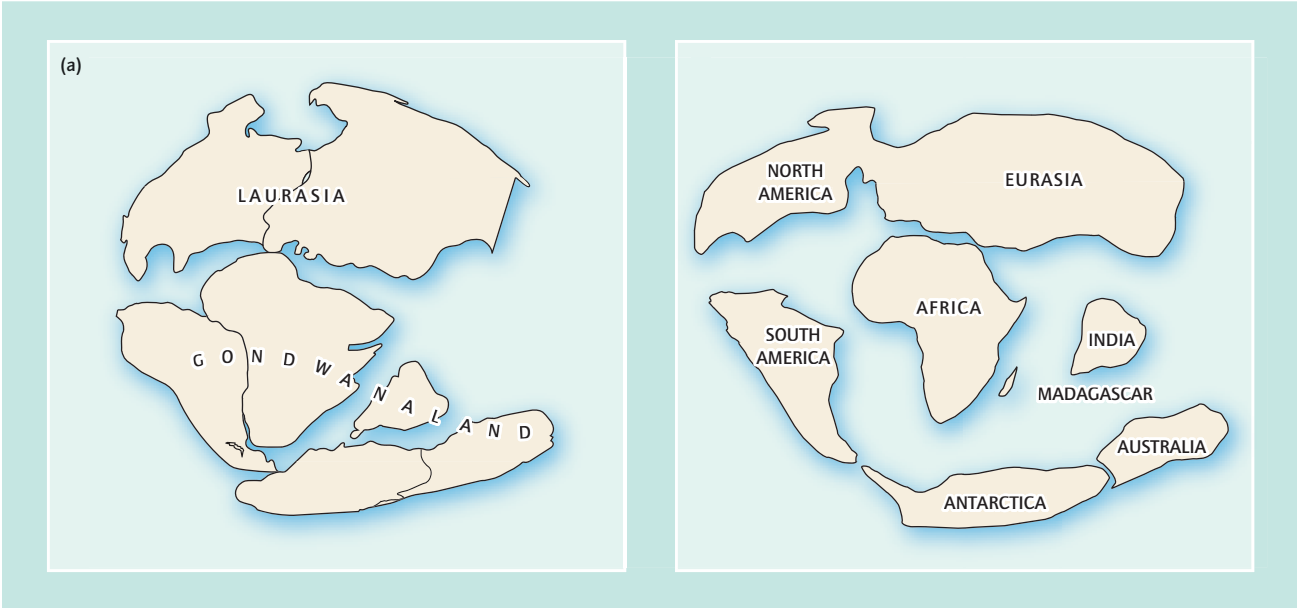
Dating back to the early history of science, it was long thought that Earth was a static, stable planet whose surface remained largely unchanged through time. This view radically changed during the 1960s, as an array of improved analytical techniques and an influx of new observations revealed that Earth's surface is in a state of constant change. This new approach to understanding the Earth is known as *plate tectonics* and is composed of two basic processes: sea floor spreading and continental drift. Although these two processes are coupled, the notion of continental drift has allowed scientists to understand the evolution and distribution of many plant and animal groups, including primates.

The first suggestions of continental drift were offered by 16th-century philosophers and geographers, who noted the congruence between the coastlines of Africa and South America. In 1596, the geographer Abraham Ortelius argued that the Americas were once conjoined with Europe and Asia, but later "torn away" by earthquakes and other catastrophes. In recent years, historians of science have revealed nascent hints of continental drift in the writings of Francis Bacon and noted French scientist Comte de Buffon. However, it wasn't until the early 20th century that a coherent hypothesis of continental drift was presented to the scientific community. This hypothesis was articulated by Alfred Lothar Wegener, a German meteorologist who assembled widely divergent lines of evidence into an understandable theory of continental motion.

Like the early geographers before him, Wegener was intrigued by the closely matching coasts of South America and Africa. After reading a paper describing similar Paleozoic fossils from these two continents, Wegener launched a massive literature search in the hopes of finding additional data to support continental drift. The data he uncovered were varied and wide-ranging. Wegener discovered that South America, Africa, India, Australia, and Antarctica shared a suite of unique Mesozoic fossils, including a signature fern flora and several reptiles. Modern animals do not range across all continents, because it is often impossible to disperse across oceans and other barriers. This suggested to Wegener that these continents were linked during the Mesozoic and have since moved to their present, widely divergent positions. Other evidence gathered by Wegener included closely matching rock units shared by Africa and South America and geological evidence indicative of former equatorial climate belts and past glaciations that made little sense if the continents have always occupied the same positions.

Wegener presented his hypothesis in a series of lectures and journal articles in 1912. Three years later, he outlined his ideas in a short, 94-page book, *Die Entstehung der Kontinente und Ozeane,* which was subsequently revised three times and translated into English as *The Origin of Continents and Oceans.* The notion of continental drift, which overturned much of the conventional geological wisdom of the day, was initially dismissed by critics as untenable, largely because Wegener could provide no plausible mechanism for continental motion. When Wegener died during a 1930 expedition to Greenland, his hypothesis was openly ridiculed and his scientific credibility scorned.

Although Wegener would never know it, his hypothesis was later verified as a new age of science dawned in the shadow of World War II. Over the course of the 1960s, a handful of earth scientists from across the



Source: Hespenheide Design.

globe instituted a scientific "revolution" that saw the birth of plate tectonics. Important data supporting this new theory came from studies of paleomagnetism. As lava cools into solid rock, tiny crystals of the magnetic mineral magnetite are "locked" into position, thereby recording the strength and direction of Earth's magnetic field at the time of the rock's formation. Using trigonometric equations, geologists can take this data and determine the latitude at which a certain rock formed. This procedure was applied to igneous rocks across the globe, and it was discovered that the latitudes at which the rocks formed were different than the latitudes they occupy today. This, along with an avalanche of additional data, strongly supported Wegener's original hypothesis of continental drift, which today is regarded as an important tenant of plate tectonics.

Although important to geologists and other Earth scientists, continental drift is also relevant to studies of primate evolution and distribution. Understanding the patterns of continental motion greatly enhances our comprehension of biogeography, the study of the distribution of living species. As continents move over time, they carry with them living organisms, which evolve as the continents collide and drift apart. The distribution of both fossil and living primates, including members of the human lineage, is illuminated by continental drift.

Primates originated between 85 and 65 million years ago, at the same time that the southern landmass of Gondwana, comprising present-day Africa, South America, Australia, Antarctica, India, and Madagascar, was rapidly fragmenting. Thus, it is likely that the initial evolution and divergence of primates was closely linked with continental drift. The extinct adapoids, a group of primitive primates, are only known from North America, Europe, Asia, and Africa, which is explained by a long-lived land connection between North America and Europe. Continental drift also helps explains the split between Old World and New World primates, including how early human ancestors evolved on an isolated African-Arabian continent and later dispersed after collision with Asia. The distribution of the more primitive prosimians is also elucidated by continental drift, but is somewhat complicated. Patterns of continental motion help explain why prosimians are limited to Africa, Asia, and Madagascar, but do not adequately describe why Madagascar is home to an abundance of species. Several hypotheses have attempted to answer this puzzle, many relying on continental drift, but there is no current consensus among researchers. Interestingly, purely geological processes associated with continental drift have enabled the preservation of important hominid fossils in Africa. The African continent is currently rifting, or splitting in two, as is manifested by the Red Sea and the line of East African lakes, such as Victoria and Malawi. This rifting is associated with volcanism and the formation of valleys, which have enabled preservation of early human fossils in Kenya and surrounding countries.

Continental drift has both revolutionized geology and enabled a better understanding of plant and animal distribution. Primates originated and evolved as continents moved and collided, which has affected modern primate distribution and habitats. As older primate fossils are discovered and more is discerned about the evolution of primate groups, the patterns of continental drift are becoming increasingly important to primatologists.

— *Stephen L. Brusatte*

See also **Fossil Record**

Further Readings

Hallam, A. (1973). *A revolution in the earth sciences.* Oxford: Oxford University Press.

Hartwig, W. C. (Ed.). (2002). *The primate fossil record.* Cambridge: Cambridge University Press.

Wegener, A. L. (1924). *The origin of continents and oceans.* New York: Dutton.

Coon, Carlton S. (1904–1981)

American physical and cultural anthropologist Carlton Coon dealt with the origin of races within the species *Homo sapiens sapiens.* Born and raised in Wakefield, Massachusetts, Coon's early developmental progress was within the patriotic, yet segregated, New England community. A community where religion was the principal factor in the determination of social status, the religious dichotomy often created a hostile environment. Considered an intelligent and a high-spirited youth, Coon's destructive and intolerable behavior was the cause of legal problems. Much to his parent's dismay, these behavioral problems were carried over to Wakefield High School, where an incident caused him to be expelled. Finishing his education at Andover, the environment was well suited for a person of his demeanor. After graduating from Andover, Coon went to Harvard. At Harvard, Coon was exposed to anthropology under Earnest Hooton, American anthropologist. This resulted in an academic shift from English to anthropology, thereby continuing his anthropological education until his graduation in 1925. Coon remained at Harvard to continue his education in anthropology. During his term at Harvard, he married Mary Goodale in 1926, siring two children within the marriage. Mary accompanied him throughout his travels as Coon did research for his dissertation. Coon received his PhD from Harvard in 1928.

After receiving his PhD, Coon remained at Harvard to teach until the outbreak of World War II. During the war, he served with the Office of Strategic Services in Africa. Returning to Harvard after the war, Coon found himself in disagreement over several issues, particularly concerning the topics of race and culture. For Coon, a full professor, the possibility and eventual leaving from Harvard was seen as a relief from the academic politics within the department. Approached by Ephraim Speiser of the University of Pennsylvania, Coon soon accepted the position of curator of the University Museum in 1948. While curator, he constructed the Hall of Man (1949–1950). Within this presentation, his contribution was a logarithmic chart depicting time against human energy use. Essentially, innovations in technology stem from the organization of human society. Besides research and duties as curator, Coon partook in the TV series *Summer School* and *What in the World,* along with being a consultant for *Life.* He finished his career with a combined 20 books and monographs, mostly known for *Tribes of the Rif* (1931), *The Races of Europe* (1939), *Races* (1950), and *The Origin of Races* (1962). After an illustrious yet controversial career, Coon died on June 6, 1981.

Contributions and Perspectives

Even though human classification (for example, races) has been utilized scientifically for over 100 years, the issue is wrought by either scientific obscurity or cultural bias. Thankfully, modern science within an evolutionary framework is beginning to unravel the mystery concerning genetic variation. Coon, venturing on a teetering scale between scientific truth and biased predetermination, understood the essential contributing factors among climate, culture, and genetic variation. In an evolutionary framework, these factors surely contribute to the process of adaptation. However, Coon supported not only the traditional "man the hunter" but also the erroneous process of natural eugenics. From these superior and intelligent individuals, a band or small tribe may become what is now termed a *race.*

Though today the term *race* is noted as being a social construct, Coon took a liberal or radical view

concerning it. Associating individual specimens with places, breeding habits, and behavior, the term *race* begins to take on the more known social stigma. The nature of genes, genotypes, blood groups, and mutation were known by Coon; yet the majority of racial determining factors and associated accomplishments always seemed to possess some Caucasoid phenotypic features. These attributes were not assigned arbitrarily, but conceived by the interpretation of the process that accounts for all life, that being evolution.

Source: © Photo provided by www.downtheroad.org, The Ongoing Global Bicycle Adventure.

Understanding the importance of bipedality, Coon drew the sharp distinction among the varieties of *Homo erectus* and the geography of modern human populations. Viewing the arterial grooves, cranial capacity, and complexity can be used to draw sharp distinction among *Australopithecus, Pithecanthropus,* Negro *Homo erectus,* and *Sinanthropus.* Within the continent of Africa, the primary races are Caucasoid, Capoid, and Congoid, whereby the other races evolved from their perspective geographical hominid form. The progression from *Homo erectus* to *Homo* was not seen in a Darwinian sense. Coon stated a clear jump from one form to another, saltation via *supervention.* This process resulted in the deciding factor that gave our species an advantage, the large and complex cerebral hemisphere. These complexities led to greater complex thought and social organization. According to Coon, evolution places the Caucasoid as the oldest *sapiens* race, followed by Capoids and Congoid. Although the origin of modern human in the Far East is obscured and polarized by two positions, evolution of regional forms and occupation by Neandertal migration, the biological and cultural adaptations resulted in the division or classification of modern *Homo sapiens sapiens.*

In Coon's later works, he held the belief of five distinct races: Caucasoid, Mongoloid, Australoid, Congoid, and Capoid. Each race held certain phenotypic traits that determined their classification. Caucasoid possesses skin whose tones varies from pinkish to nearly black; hair color ranges from varying degrees of blonde, red, and black; eye color ranges from blue, grey, brown, and black. Morphological features include narrow nasal passages and deep eye sockets. The Mongoloid and Capoid races possess varying degrees of yellow skin; black hair; eye color is either brown or black; low nasal passages and flush eyes. The Australoid and Congoid races posses skin color that ranges from brown to black; eye color is either brown or black; hair color is black and curly. Variations among these attributes are due to the evolutionary principles that created the variation and the selective forces found within nature. It was held that this process, along with the added element of culture, decreased his number of races from 30 to 5.

Whether or not Coon's view can be determined as possessing extreme prejudices or just simply overstated, the contributions of his research and insights are incontrovertible. His eye for detail, intelligence, and adventurous spirit furthered the knowledge concerning the detailed analysis of variations in phenotypic expressions of our own species. However, his evolutionary principle was determined by cultural and unknown biological factors, essentially taking an evolutionary principle from scattered and differentiated leaps in biology and culture via energy. Causality always being problematic, the combined view serves only to skew the unity of our species and its own created ontology and self-directed teleology.

— *David Alexander Lukaszek*

See also **Evolution, Models of**

Further Readings

Coon, C. S. (1977). Overview. *Annual Review of Anthropology, 6,* 1–10.

Coon, C. S. (1981). *Adventures and discoveries.* Upper Saddle River, NJ: Prentice Hall.

Coon, C. S. (1982). *Racial adaptations.* Chicago: Nelson Hall.

Copper Age

The Copper Age, or Chalcolithic time period, generally refers to circa 5000 BCE to 2000 BCE. This typology was initiated by Dane Christian Jurgensen Thomsen in 1807 as a three-age system of classifying human prehistory based on toolmaking technologies (i.e., Stone Age, Bronze Age, and Iron Age). These categories were later refined by John Lubbock in 1865. The term *Chalcolithic* ("copper-stone") is derived from the Greek *chalcos* (copper) and *lithos* (stone). The Chalcolithic time period is significant in Old World contexts because it coincides with the beginnings of craft specialization, development of agriculture, long-distance trade, and increased sociopolitical complexity.

Central and Northern Europe

The Copper Age in Central and Northern Europe overlaps heavily with the Middle and Late Neolithic periods. The Middle Neolithic/Copper Age I (4500–4200 BC) is best illustrated by the Tiszapolgar Culture. The first farmers of the Northern European plains, of the Funnel Beaker Culture (4200–2800 BC), settled in southern Norway to the Czech/Austrian border, and from the Netherlands to Ukraine during the Late Neolithic/Copper Age II (4200–3750 BC). Evidence for the first wheeled carts occur in Germany and Poland during this time. Northern Europe developed agriculture, plow tools, copper tools, and monumental architecture. The Corded Ware/Single Grave Culture (2800–1850 BC) continued in the same areas and expanded eastward. Scholars suggest the development of Indo-European language groups at this time. The Corded Ware Culture was followed by the Bell Beaker Interaction Sphere, based on bell-shaped pots found from the Middle Danube to the Iberian Peninsula and from Ireland, Great Britain, and Denmark to Sicily and North Africa. Depending on the location, this sphere may be considered part of the Late Copper Age or Early Bronze Age (2900–1700 BC).

The Levant

The Chalcolithic in the Levant dates between the late 5th and early 4th millennia BC (5000–3500 BC). The chronology and periodization of the Chalcholithic in the southern Levant has long been a contentious topic, resulting in significant overlap between Copper Age material and the Early Bronze Age material. Key to understanding the Chalcolithic in the Levant is the shift in settlement patterns, simultaneously illustrating an increase in sociocomplexity and metallurgy. Examples of sites with Chalcolithic material include Arad, Byblos, Ghassul, Gilath, Jawa, Khirbet Querin (North), Tell Teo, and Tell Um Hammad.

Central Asia and China

The Chalcolithic in Central Asia exhibits the first uses of copper and indications of organized agriculture. In western Central Asia, the typological phase Anau IA (late 6th–early 5th millennia BC) illustrates the use of copper tools at Chakmakli-depe and Mondjukli-depe. Subsequently, the Namazga sequences at these sites define the chronology of the developed Chalcolithic period (4th–2nd millennia BC). This period in western Turkestan represents the first organized agricultural villages in Central Asia, and during the Namazga Chalcolithic, craft (metal and ceramic) specialization became an economic factor linking Central Asia to the Near East and South Asia. Unlike the Namazga sites, the Keltiminar groups of Khoresmia developed separately due to the barrier of the Kyzl Kum desert. Autochthonous developments are also seen in societies north of the Caspian Sea, along the Volga and Ural rivers, such as Tripolye and Sredny Stog (ca. 4000–3500 BC), which represent sedentary communities employing mixed economies of hunting, fishing, animal domestication, and limited agriculture. Similar to those communities, the Botai and Tersek (Ural Mountains and Tobol River in Kazakhstan) show local affiliations and interaction.

In China, the Chalcolithic period (3000–2000 BC) is best represented by three main cultures: Qijia culture, with settlements following the upper course of the Yellow River; Longshan culture, distributed along

the middle and lower Yellow River; and Liangzhu culture, with the settlements clustering around Lake Tai. Whereas in the former two cultures, brass developed with the use of copper, the Liangzhu culture is known for jade artifact production. The Chalcolithic levels mark the beginning of urbanism and a move toward extensive trade networks in East Asia.

South Asia

The Chalcolithic in South Asia is divided into five main regions. The Indus Civilization sites (such as Mohen-jo-Daro and Harappa) have Chalcolithic levels that demonstrate the use of copper/bronze, intensification of agriculture, and the development of trade networks. Other Chalcolithic settlements illustrate a range of subsistence strategies, from hunting/gathering to agropastoralism, at sites in northwest India, northeast India, Saurashtra, and Central India (Deccan and Vidarbha). The Chalcolithic period appears to be absent in the southern parts of India, where the chronology leaps from the Neolithic to the Iron Age. In northwest India, cultural areas such as the Ganeshwar-Jodhpura Cultural Complex and the Ahar-Banas complex existed during the 3rd to 2nd millennia BC. At sites such as Bagor, evidence exists for settled agricultural communities alongside more mobile populations, where copper tools joined the continued use of microlithic tools. In Madhya Pradesh, there are over 40 Chalcolithic sites (late 3rd millennia). Northeast Chalcolithic excavated sites include Golbai Sasan, Randu Rajar Dhibi, and Chirand. Over 70 Chalcolithic sites have been identified in West Bengal. The sites in Saurashtra, considered Sorath Harappan, include sites such as Rojdi and Lothal. These sites share traits with the Indus sites, although they carry distinct ceramic styles. The Deccan Chalcolithic is divided into four periods: Savalda (2000–1800 BC), Late Harappan (1800–1600 BC), Malwa (1600–1400 BC), and Jorwe (1400–1000 BC). These are considered early farming communities with hunters and gatherers living alongside one another. In addition, there are a large number of copper hoards that are found throughout Northern India and across the Deccan. Usually found apart from settlements, these hoards are associated with a particular type of ceramic, dating to approximately 2650 BC to 1180 BC.

The Chalcolithic period indexes the first widespread use of metal by human society, replacing the exclusive use of stone tools. In many parts of the world, this technological advancement marks the transition from a pastoral society to a more agricultural and urban one. This change simultaneously allows for a significant increase in interaction between various regions. Illustrations of the Chalcolithic may be found worldwide, such as in Africa (Egypt and the Eastern Coast), Asia Minor, Mesopotamia, and the Mediterranean, to name a few.

— *Uzma Z. Rizvi*

See also **Prehistory**

Further Readings

Bagolini, B., & Schiavo, F. L. (Eds.). (1996). *The Copper Age in the Near East and Europe.* Forli, Italy: International Congress of Prehistoric and Protohistoric Sciences.

Maddin, R. (Ed.). (1988). *The beginnings of the use of metals and alloys.* Cambridge: MIT Press.

Maisels, C. (1999). *Early civilizations of the Old World: The formative histories of Egypt, the Levant, Mesopotamia, India, and China.* New York: Routledge.

Coptic Monasticism

Christianity was introduced into Egypt in the 1st century and found itself in competition with two other religions: Judaism and the Hellenized native religion. By the 4th century, Christianity was the religion of the majority of the people in Egypt. By the end of the 5th century, the last of the ancient temples and priesthoods were gone.

Christianity originated as a sect of Judaism and, consequently, shares similar traditions and myths. St. Mark brought Christianity to Alexandria early in the first century, which at that time had a large Jewish population. Not surprisingly, early Christianity established itself first among those Jews. Christianity also had a mythology that was similar to many aspects of Egyptian mythology. The stories of Osiris, Isis, and Horus in many ways parallel the Christian story of God, Mary, and Jesus: Jesus defeats Satan and is the champion of his father, God; Horus defeats Set and is the champion of his father, Osiris; Both Jesus and Osiris are killed and resurrected, and so on. The

Source: © iStockphoto/Pierrette Guertin.

ability to find common ground with Judaism, and with the native Egyptian religion, gave Christianity an advantage that no doubt contributed significantly to its eventual success.

Some religious practices already in Egypt influenced Christianity when it was introduced. Philo described an ascetic community that existed in Egypt during the 1st century near Alexandria that was probably Jewish. Also, the life of priests and priestesses in the native Egyptian religion was cloistered and ritualized in some ways that later Christian monastic practice would emulate.

Christian monasticism began in Egypt during the latter part of the 3rd century. The increasing tax burden imposed by the government, and the practices of the civil religion, which were repugnant to many Christians, along with increasing persecutions of Christians, caused many people to leave the cities and villages for the wilderness. Some of those people moved into even more remote areas to lead solitary ascetic lives. People flocked to many of these desert hermits as they developed reputations as healers and teachers. A type of religious revitalization ensued during the beginning of the 4th century that resulted in monastic practice first being institutionalized, and then taking control, within the Orthodox Church in Egypt.

Two types of monasticism developed in Egypt. The first type began with St. Paul (ca. AD 228–343) and St. Antony (ca. AD 251–356), the two earliest ascetic hermits in Egypt. They established the pattern for later anchoritic practice, where monks lived alone in the desert. The second type began with St. Pachom, who instituted a communal, or cenobitic, form of monasticism in AD 320, in Upper Egypt, by building a monastery organized according to military-like rules and order. Both forms of monasticism quickly merged to form a semicenobitic kind of monastic practice that is still practiced today. Monks in contemporary Egyptian monasteries spend some of their time in solitary spiritual pursuits, often still in caves or shelters in the desert, while the remainder of their time is spent living as part of a community within a monastery.

Many monks of the Coptic Orthodox Church are also saints. There is an extensive oral and written hagiography of the lives of many of those desert fathers. Coptic monks, in general, are depicted as champions of orthodoxy, and historically, the monks of Egypt did, indeed, defend the church against numerous heresies. Coptic monks were important participants in the first four Ecumenical Councils.

The development of the Coptic Orthodox Church and Coptic Orthodox Monasticism took place during four major periods. The first period was from AD 284 to AD 451. During that time, Coptic Monasticism was institutionalized, and the first four Ecumenical Councils defined the doctrines of the church. The Coptic Orthodox calendar began in the year AD 284. The second period was from AD 451 to AD 1517. During that time, Coptic culture in Egypt flourished until the Islamic conquest in AD 642, after which Egypt was ruled by a succession of Islamic dynasties. The Coptic language, a form of late Egyptian spoken during Pharonic times, was eventually replaced by Arabic as the spoken language. Coptic was relegated to liturgical use in the church. The third period was from AD 1517 to AD 1798. During that time, the

ethnic and cultural identity of the Coptic people was forged under Ottoman rule. The fourth period, from AD 1798 to AD 1920, saw European influence dominate Egyptian culture and, eventually, the rise of Arab nationalism as the Ottoman Empire collapsed.

Today, the Egyptian Christian Church is referred to as the "Coptic Orthodox Church." The name came from the Greek words *Aigypt/Aigyptios* (Egypt/Egyptian), which became *qibt/qibtii* in Arabic, and *Copt/Coptic* in English. The Patriarch of Alexandria (currently Baba Shenouda III) is head of the Coptic Orthodox Church. Upon the death of the patriarch, a new patriarch is chosen from among the monks of Egypt's monasteries by the bishops of the church. The bishops are also monks who have been chosen and appointed to their sees for life. Consequently, monks, who are also priests, control the entire upper hierarchy of the church. Parish priests, who oversee the operation of the churches and who serve the more immediate liturgical and spiritual needs of Coptic congregations, are married and form a separate hierarchy within the church.

Although exact numbers are impossible to determine and official numbers vary in terms of reliability, there are probably nearly 10 million Copts in Egypt today, about two dozen or more monasteries, and over 1,000 monks in the Coptic Orthodox Church. There is also one Coptic Orthodox monastery in Southern California.

— *Richard R. Jones*

See also **Religion and Anthropology**

Further Readings

Jones, R. R. (1997). *An ethnohistory of Coptic monasticism.* Doctoral dissertation, Wayne State University, Detroit, MI.

Yonge, C. D. (1993). *The works of Philo.* Peabody, MA: Hendrickson.

Cosmology and Sacred Landscapes

Cosmology is literally the "science of nature," from the physics of Aristotle and Newton to the mythical cosmograms of Tibet. A cosmology is any composition or cultural construct relating to the structure and process of systems of creation. Included are the origins of physical elements of earthly or astronomical spheres, the genesis of the material world, and the order and function of the observable universe, including the planets, the solar system, and celestial bodies. Quite simply, a cosmology is any cultural belief related to the creative forces responsible for the composition of the universe.

Landscapes are integral to any cosmology, though not all cosmologies emphasize that landscapes are sacred. *Landscape* is a powerful term, with considerable utility for describing and giving context to cultural beliefs and worldview regarding the natural world in which people live. Hence, it is important in the context of cosmology. People live in landscapes, but landscapes are more than social space. Long the domain of geographers who fashioned "landscapes" from "spatial-scientific" or "structural" geographical theory, broader understandings of non-Western cosmologies have brought deeper comprehension of landscape and its relationship to cultures.

For the anthropologist, landscape has two primary meanings: It is a "framing convention" that provides the backdrop for how a study is presented, and it is a means to attribute the ways that local people view their cultural and physical surroundings. As a spatial element, landscape is intertwined with time, in that it is not a static or abstract entity, but a part of social practices. The term *landscape* dates to the renaissance. In art history, it is based on a geometric perspective in media renderings meant to be viewed in a way that projects a picture involving some aspect of geographic features that can be perceived in a realistic fashion.

Anthropologists have long recognized that many indigenous people view and map landscapes differently than is done in the West and that often conceptions of land and landscape are permeated with notions of the sacred. Among the Andonque of the Columbian Amazon, the land is conceptualized as specific features identified as being both within and outside of their territory. These features include mountains, hills, flat savannahs, and rocks. Each feature has been purposely named by a religious specialist, is "owned" by a specific supernatural force, and is identified socially by specific mythic events that occurred there. This landscape extends well beyond the actual territory of the community. This conception of the world is not fixed or permanent. Shamanic

intervention in the form of specialist communication with specific landscape features results in symbolic remodeling of both the landscape and the ceremonial ways people interact with and are influenced by it.

Specifics about the sacred landscapes are learned: As people grow, they become aware of the relationships between land and ancestors, as well as their social responsibilities, by physically moving through the land. There are dramatic indications of links between memory, ancestral power, and the land. Recently, residents of northern Australia visiting southeastern parts of the continent identified features in the natural environment as being part of their ancestral landscape. This is particularly relevant in that the individuals in question had never been to southeastern Australia before, and little was known about the mythology of the area or the original inhabitants, who had been forcibly removed in the 19th century. This knowledge is part of an ancestral grid, learned through interaction with and observation of highly ritualized activities, and then experienced by traveling to different places. Each place is connected in this chainlike grid, which reflects an individual's current kinship group as well as ancestral validation of links to the land. The landscape is seen as composed of segments that reveal ancestral ties to specific areas of the land. "Because ancestral beings not only created the landscape, but also placed people in a particular relationship to it as perpetuators of the ancestral inheritance, the landscape is viewed simultaneously as a set of spaces for people to occupy" (Morphy, 1995, p. 192). Even in land disputes, such as when a group moves into a new land and takes over, they view this as the land taking over the people, thus preserving the continuity. When previously unoccupied land (or that for which direct links are no longer articulated) is settled, there exist "mechanisms for creating or recreating the linkages" (Morphy, 1995, p. 186).

Temporality has been an important concept in anthropological studies of sacred landscapes. Landscapes are perpetuated through and imbedded in memory, which makes them more processes than objects. Landscape is a crucial element in enculturation, defining the limits of social space in ways that are both transmitted between people and fluid though time. Because concepts of sacred and secular landscapes are culturally constructed, they clearly have different meanings to different people at different times. The temporality of landscape is not the analytical category devised by anthropologists to set distance between them and that which they study through the use of terms like *archaic, Stone Age, and primitive,* which are employed as distancing devices. This is not to say that there is not a duality to time. Like space, which can be experienced differently from emic or etic perspectives, the temporality of landscape also has elements of objective process and subjective representation. It is impossible to deal with the multiple ways humans interact with the social and natural world using only one particular concept of time.

Time can be a dynamic historical marker of place. In Fijian notions of landscape, place is both a location and a temporal identifier. Historical time is marked by the succession of locations for villages occupied in the past, each named for an apical ancestor. Social forms have ways of extending into time and space, which creates forms of time and space that are socially conditioned. For the Wakuénai and other indigenous people of the Upper Río Negro of Venezuela and Columbia, space and time can be transcended in powerful ways. The playing of sacred musical instruments in different places can resituate centers of social power present in indigenous mythohistorical accounts. The relationship between landscape and temporality has been the subject of numerous specific studies, most of which utilize phenomenological interpretations. These studies focus on the way landscape has a synergy among its parts that make up the whole.

Sacred landscapes are often associated with political interests, especially in cases where ritual space becomes a location where human agency is integrated with divine activity. Ritual mapping of territory through naming is done in Northwestern Amazonia, where political Wakuénai mythic narratives and ritual performances continue to emphasize the ethnopolitical centrality of this headwater area as sacred and political space for Arawak-speaking peoples who live north of the Amazon River. This is a complex issue that articulates itself differently in different places. In India, sacred space is often separate from political centers. In historical context, natural sacred spaces are often the focus of political interests, not the locus: Political capitals may change location, even within a territory, while sacred locations maintain stability over time.

— *Keith M. Prufer*

Further Readings

Bakker, H. (1992). Introduction. In H. Bakker (Ed.), *The sacred centre as the focus of political interest* (pp. vii–xi). Groningen, The Netherlands: Egbert Forsten.

Hill, J. (2002). Made from bone: Trickster myths, musicality, and social constructions of history in the Venezuelan Amazon. In G. Schrempp & W. Hansen (Eds.), *Myth: A new symposium* (pp. 72–78). Bloomington: Indiana University Press.

Hirsch, E., & O'Hanlon, M. (Eds.). (1995). *The anthropology of landscape: Perspectives on place and space.* Oxford: Clarendon Press.

Morphy, H. (1995) Landscape and the reproduction of the ancestral past. In E. Hirsch & M. O'Hanlon (Eds.), *The anthropology of landscape: Perspectives on place and space* (pp. 184–209). Clarendon Press, Oxford.

Thomas, J. (1993). The politics of vision and the archaeologies of landscape. In B. Bender (Ed.), *Landscape politics and perspective* (pp. 19–48). Providence, RI: Berg.

Toren, C. (1995). Sign into symbol, symbol as sign: Cognitive aspects of a social process. In P. Boyer (Ed.), *Cognitive aspects of religious symbolism* (pp. 147–164). Cambridge: Cambridge University Press.

Ucko, P. J., & Layton, R. (Eds.). (1999). *The archaeology and anthropology of landscape: Shaping your landscape.* London: Routledge.

Counseling

The profession of counseling is dynamic, adaptive, and centered on meeting the needs of individuals in their particular environment. The goals of the counseling profession are directed toward assisting individuals to become self-sufficient and capable of managing their problems in efforts to lead productive, fulfilling lives. Moreover, the counseling process provides a therapeutic context to help individuals recognize and effectively use unused or underused resources and opportunities. Hence, through the process of counseling, individuals become effective and empowered self-helpers as they learn how to manage problem situations and develop life-enhancing opportunities. Counseling is a collaborative, two-way process that involves active involvement between client and counselor. According to Gerard Eagan, the process of counseling represents an "-ing" word that illustrates active engagement and involvement in a series of therapeutic activities or interventions that will create and elicit constructive change. The art of counseling involves a process in which skilled counselors assist individuals to develop tailored programs that will encourage constructive change in efforts to live more fully. Individual counseling is driven and determined by client needs and is effective to the degree that the needs and concerns of clients are successfully met.

According to Carl Rogers (1902–1987), the counseling relationship is characterized as a relationship in which one person has the objective to promote growth, development, and maturity in another person with the goal to assist the other person to learn how to effectively cope with life. The counselor's role is to facilitate self-growth in individuals and to make individuals aware of possible alternatives or choices available in their lives. Counselors have the responsibility to ascertain by means of conducting a thorough assessment which counseling interventions, services, and treatment modalities will most likely lead to positive outcomes. In particular, competent counselors will amalgamate research with practice in efforts to afford quality service to clients. The goals of counseling, regardless of the occupational setting, involve behavioral, cognitive, and lifestyle change; insight and self-knowledge; and amelioration of suffering and symptomatolology. Professional counselors provide an array of services that promote mental health and well-being through a variety of counseling practices that range from individual counseling, to couples and family counseling, to group counseling.

The profession of counseling is rooted in a variety of disciplines, which has led to the development of a variety of counseling specialties, in the fields of marriage and family counseling, school counseling, rehabilitation counseling, college counseling, and addiction counseling, to name a few. Hence, counselors work in a variety of occupational settings, from private practice; to community mental health agencies; to medical, educational, jail, and prison settings; to business settings, and they offer a wide range of services to a diverse population of individuals.

Historical Perspective of Counseling

The profession of counseling is considered to be a relatively new occupation. Prior to the 1900s, professional

counseling took the form of advice or deliverance of information. The evolution of counseling can be traced back to important historical events of the 20th century. The counseling profession developed and emerged consequent to the convergence of societal problems that plagued the United States at the turn of the 19th century, most notably the Industrial Revolution and the urbanization of America. Other factors that contributed to the growth and advancement of counseling in America include the advent of World War I and World War II, the Great Depression, the science and development of psychology as an occupation, the mental hygiene movement in the early 1900s, the mental health movement in the mid-1940s, the vocational guidance movement in the late 19th and early 20th centuries, and continued emphasis in vocational counseling. Government involvement also influenced the course of professional counseling by means of government-sponsored counseling services.

Theories of Counseling

Psychoanalytic Theory

Psychoanalysis evolved from the work of Sigmund Freud (1856–1939), founder of psychoanalytic therapy in the late 19th century. A dedicated student, Sigmund Freud completed medical school at the University of Vienna in 1881. Freud's initial occupational endeavors and contributions to the medical profession consisted of neurological research that focused on the brain and spinal cord. However, Freud's research focus shifted as he became interested in the work of Josef Breuer, a famous physician who practiced in Vienna, Austria. Breuer specialized in treating individuals who suffered from emotional disorders and implemented the use of hypnosis and verbal expression as methods of treatment. During this time, Freud began to invest his professional energies into the study and treatment of neurotic disorders. As Freud began to involve himself in researching and counseling clients who suffered from psychological disorders, he eventually came to emphasize the importance of human sexuality, sexual expression, as well as dreams as key to understanding human nature.

Prior to Freud, the discipline of psychology was regarded as both a philosophy and a study of psychophysiological processes. The notion of scientific thinking as it related to the study of the human mind and human motivation began to define the practice of psychology with the commencement of psychoanalysis. The historical timeline of psychoanalysis can be divided into three periods, dating from the late 19th century and continuing into the present day. The initial period that marks the beginning of the psychoanalytic movement was dominated by Freud in the late 19th century and continued until the end of World War I. To understand the fundamental tenants of psychoanalysis that developed out of the work of the early psychoanalytic pioneers, it is first essential to recognize the social context the dominated Western Europe and Viennese society in the late 19th century. During this time, Victorian society was governed by strict adherence to defined social norms, particularly as they related to human sexuality. Above all, female expression of sexuality was strictly confined and governed, which, in turn, encouraged repression or denial of sexuality among women. At the turn of the 20th century, the first psychoanalytic society was organized in Vienna; shortly thereafter, psychoanalysis began to gain momentum and recognition, which led to the formation of the International Psychoanalytical Association.

The second historical period of psychoanalysis began shortly after World War I, from 1918 to 1939. The emergence of psychoanalytic training institutes and psychoanalytic societies worldwide mark this period. It was during this time that scientific literature and case studies that demonstrated the work of psychoanalysts began the expansion of psychoanalytic thought and study. The third period of psychoanalysis began post–World War II (1945–) and continues into the present day. The significance of this period is marked by continued international expansion of psychoanalysis, as well as an expansion of psychoanalytic thought beyond Freud's traditional psychoanalysis. New theories of ego, object relations, and self psychology have emerged as contemporary, modern theories of psychoanalysis.

Psychoanalysis is recognized and defined as a *depth psychology.* The goals of psychoanalysis are aimed at resolving conflicts that reside at the unconscious level in efforts to change personality. Furthermore, psychoanalysis places emphasis on problem resolution and enhancement of coping resources in order to equip individuals to learn how to effectively manage their lives and to live in relation to others in a meaningful way. Intervention strategies that comprise the psychoanalysis process revolve around working through unresolved developmental problems. Interventions that are widely employed in psychoanalysis involve free association, analysis of dreams, analysis of transference,

resistance, interpretation, and the study of the dynamic relationship between client and counselor. Other analytic techniques include interpretation, which involves bringing into conscious awareness of unconscious material, confrontation, clarification, and working through. The process of working through is a significant analytic procedure and refers to the continued analysis of resistance (form of psychological defense) once clients gain insight and awareness of their well-established unconscious conflicts. The procedure of working through helps clients to unblock and erode unconscious repressive or defensive mechanisms in efforts to create lasting change in personality and character structure.

Recent developments in the delivery of health care in the United States have had a well-defined impact on the current practice of professional counseling. Most notably, the rise of managed care has created significant changes in the funding and delivery of mental health treatment. A salient implication in how the practice of counseling has been impacted by managed care rests in the increased use of time-limited brief therapies and solution-focused interventions. Given that psychoanalysis is recognized as an extended, long-term depth psychology that requires both time and money, the practice and incorporation of psychoanalysis has lost popularity and favorability in the United States.

Cognitive-Behavioral Theories

Cognitive-behavioral theories are a set of related theories that have emerged from the clinical experiences, scholarly writings, and empirically based studies that were conducted by psychologists who studied and conceptualized human behavior from both behavioral and cognitive theoretical orientations. Cognitive-behavioral theories represent an extensive theoretical system within the profession of counseling. Theories that are cognitive-behavioral represent an amalgamation of both cognitive and behavioral oriented approaches to counseling people. Cognitive-behavioral theoretical orientations place emphasis on the mutual influence between cognitions and behaviors within individuals. These theories do not place importance on clients' feelings, insight, or the exploration of unconscious processes. Furthermore, cognitive-behavioral theories are concerned with present issues and place little value on exploring childhood issues or on past histories of individuals. The basic philosophy that underlies the cognitive-behavioral approaches suggests that cognitions are mediators of behavior.

Since cognitive-behavioral theories represent an amalgamation of behavioral and cognitive theories, the evolution and development of cognitive-behavioral treatment modalities trace back to the 1950s, with the earlier works of behaviorists and cognitive therapists. Behavior therapy was defined, shaped, and prevailed as an approach to counseling and psychotherapy from the contributions and works of three leading behaviorsts: John B. Watson (1878–1958), an American psychologist who is also referred to as the "father of behaviorism"; B. F. Skinner (1904–1990), an experimental psychologist; and Joseph Wolpe (1915–1997), a South African psychiatrist. By the 1980s, behavior therapy had gained status and recognition among the mental health profession. Albert Ellis (1913–), an American psychoanalysis, and Aaron Beck (1921–), an American psychiatrist, are considered to be two of the most influential contributors in the development of cognitive therapy. Cognitive-behavior theories emerged as a result of the integration of both cognitive and behavioral theories.

Just like there are a wide range of cognitive-behavioral theories, there are a number of cognitive-behavioral treatment interventions. Cognitive-behavioral interventions are considered to be structured, goal directed, didactic, and time limited in nature. Cognitive-behavioral strategies may include the use of humor, homework, risk-taking exercises, systematic desensitization, bibliotherapy, and stress inoculation training. The application of cognitive-behavioral interventions incorporate both behavioral (reinforcement, positive reinforcement, negative reinforcement, extinction, shaping, and stimulus control) and cognitive interventions (identifying distortions in thinking, thought stopping, positive self-statements, cognitive restructuring) that emphasize the importance of cognitive processes and behavior mediation. In essence, cognitive-behavioral theories place emphasis on identifying cognitive and behavioral deficits and excesses.

Family Therapy Theories

According to Samuel T. Gladding, a *family* is defined as individuals who are bonded through historical, emotional, or economic connections and who perceive themselves as being biologically and/or psychologically related to each other. This definition of family encourages a wide conceptualization in

defining who comprises a family unit as well as acknowledging the varying compositions of family life.

Family counseling is considered to be a relatively new profession in the mental health field. The evolution of family theory can be traced back to the mid-20th century. Prior to the 1940s, family theory was nonexistent within the counseling profession due to the popularity and preeminence of individual psychoanalysis and behaviorism. The fruition of family theory evolved as a result of multiple historical events that transpired in American life during and after World War II. In the advent of World War II, many families experienced considerable stress and systemic changes as family members were geographically separated from one another. World War II also challenged traditional gender-specific roles as women were expected to work outside the home in factories to support the war efforts. In addition, mass casualities, as well as physical and emotional disabilities, added further strain to family life. Post–World War II, women began to reject their roles as housewives and began to reevaluate their status in society, which marked the advent of women attending college. It was during this time that courses in family life education gained popularity. Another hallmark event that influenced the evolution of family therapy was the development and appreciation of professional marriage counseling.

The practice of family therapy began to flourish in the 1970s. Consequently, as family theory and family counseling gained momentum and professional recognition in the United States, mental health professionals began to have new ways to conceptualize human behavior and individual psychopathology. The advent of family counseling marked a shift in the way that individual pathology and symptomatic behavior were explained and understood. Family theories emphasized the etiology and maintenance of pathology as existing within a larger social system, that being within the family. Such a systemic perspective invited a shift from treating the individual family member to treating the entire family.

The practice of family therapy is based in systems theory, which conceptualizes families as living social systems who seek to maintain homeostasis through patterned and predictable transactional patterns. Systems theory contends that change in any part of a system subsequently creates deviation from the status quo and, in turn, affects the entirety of a system. When applied to family counseling, systems theory recognizes that family dysfunction is meditated by maladaptive interactions between family members that subsequently have an effect on the whole family system. Family counselors incorporate techniques throughout the course of family counseling in efforts to elicit the process of change that will accordingly transform the basic structure of the family system.

There are several family therapy theories and approaches to counseling families. The majority of family theories focus on interpersonal dysfunction and maladaptive interactional patterns, whereas individual counseling targets intrapersonal dysfunction. The primary goal of family theory is best perceived as eliciting structural change within the whole family system. This concept of systemic familial change represents a sharp deviation from that of individual counseling, in which the primary objective is intended to initiate behavioral, cognitive, and affective change of an individual. The term *family theory* houses a wide variation of distinct family therapy approaches, with each ascribing its own family counseling theory and approach to counseling families. In general, the application of family counseling consists of identifying dysfunctional communication and relational patterns within the family system, as well as ascertaining issues related to hierarchy, power dynamics, and problems within the family structure. Furthermore, family counseling identifies boundary problems, dysfunctional transactional patterns, and family role conflicts.

To date, there are a number of family therapy theories, such as conjoint theory, strategic theory, structural theory, transgenerational theory, and narrative theory, which all approach family counseling from different frames of reference. Each theory integrates different techniques and interventions when counseling families. It is important to note that no matter what family theory a family counselor is counseling from, the fundamental goal of family therapy is the restructuring of some part of the family system.

Brief-Therapy Theories

Toward the late 20th century, the counseling profession and practice of counseling began to shift and embrace the use of brief therapies in response to the limited mental health resources and pressures from managed care organizations to contain rising costs of mental and medical health care. The advent of managed-care systems has created substantial implications for professional counselors, most notably in the

number of counseling sessions that are allotted and approved and in the selection, deliverance, and implementation of clinical duties and counseling interventions. Brief therapy can be quantified as time-limited treatment that typically consists of 8 to 12 counseling sessions.

Brief, time-limited counseling is an all-encompassing topic that incorporates many different theories. It will be illustrated through the time-limited counseling modality of brief solution-focused therapy (BSFT). The practice of BSFT is considered a time-limited, cognitive-behavioral treatment orientation that focuses on individual strengths and resources. The process of BSFT is collaborative in nature between client and counselor in efforts to assist clients in developing solutions to resolve personal difficulties. Key constructs of BSFT illustrate the creation of meaning, use of language to assess how individuals perceive and create the world around them, responsibility for self, and utilization of unused resources.

Counselors who practice from a BSFT modality believe that individuals create meaning in their lives and construct reality through the use of language. A fundamental belief of BSFT is that objective reality is nonexistent, since the construction of reality and mere act of describing experiences require interpretations that are rooted in the subjective. Brief solution-focused therapy counselors ascribe to the beliefs that individuals are the experts of their own lives, are capable of initiating change, and espouse self-corrective inclinations. The clinical practice of BSFT places emphasis on competence rather than on pathology or character deficits. Furthermore, BSFT acknowledges that focusing on problems is not beneficial nor is it helpful for individuals; rather, counselors collaborate with individuals to help them define and create solutions. In doing so, the change process pivots around solution talk rather than problem talk.

Current Trends Within the Counseling Profession

The profession of counseling is an ever-evolving occupation that is constantly changing and shifting to meet the growing demands and needs of society. Societal issues that continue to be salient to the counseling profession in the early 21st century are advancements in media and technology; issues pertinent to wellness, health promotion, spirituality, social justice, diversity, and advocacy; and issues related to managed care and health maintenance organizations. Other current trends within the counseling profession that highlight prominent concerns and shed light on complex societal and multifaceted issues include poverty, violence, and social unrest. In response to heightened incidents of school violence in the forms of school bullying and school shootings, counselors are becoming increasingly concerned with the need to develop crisis plans and methods of intervention that will stop acts of violence and bullying within school settings. Hence, issues of promoting and maintaining school safety represent pressing issues for counselors in the 21st century.

Of these noteworthy issues that have had a pervasive impact on the delivery of counseling services, one of the most defining moments that has shaped the course of the counseling profession was the terrorist attacks on September 11, 2001. This momentous event has had a profound impact on the mental health community, most notably, the demand and large-scale need of crisis intervention services. Following the aftermath of September 11, 2001, when terrorists crashed commercial airliners into the World Trade Center in New York City and into the Pentagon in Washington, D.C., issues pertinent to immediate responsive actions to traumas, tragedies, and crises took on a new meaning within the mental health community. Specifically, such a defining moment highlighted the need for counselors to be trained and competent in implementing and delivering crisis services to individuals affected by large-scale trauma and tragedy.

Other noted salient issues within the counseling profession in the new millennium include dealing with poverty, family discord, workplace violence, funding of mental health services, and caring for the aging.

Wellness

Wellness is not a new concept. Dr. Halbert Dunn first coined the term *wellness* in 1961, and he defined it as unified functioning directed toward maximizing an individual's potential. Dunn defined complete well-being by focusing on the interrelatedness among mind, body, family, and community. The concept of high-level wellness is conceptualized as optimal functioning of the individual.

Wellness is a basis of life quality and involves embracing health-enhancing values and lifestyle behaviors that promote health or illness-free states.

The tenant of wellness revolves around the concepts of health promotion, disease prevention, and well-being. Furthermore, the concepts of wholeness, integration, purposeful living, and good health are used to conceptualize the construct of wellness. Perhaps the most salient aspect of a wellness philosophy is that it challenges the long-established belief of repairing something only when broken. A wellness approach attempts to move beyond such a reparative conceptualization by focusing on prevention rather than on remediation. Wellness is viewed as pertaining to the total person and is conceptualized as existing on a continuum throughout the life span. Thus, wellness is a lifelong, continuous, and proactive process rather than a one-time prescription. Such a deliberate health-conscious process is construed as an ideal, dynamic, fluctuating state of being. Positive wellness is to be attained through concerted, purposeful efforts to promote optimal functioning, rather than a state that exists succeeding reparative work related to a deficit in one's state of wellness. The notion of "well-being of the many" underscores the holistic perspective of wellness and gives emphasis to the idea of wellness of individuals, community context, and societal structures.

A wellness movement has gained momentum across the United States as a result of the pressing realities of increasing health care costs and alarming rates of premature morbidity and mortality due to unhealthy lifestyle behaviors. The wellness movement signifies a cost-effective and humane paradigm shift that is a distinct departure from a medical system that has exhausted the nation's financial resources.

A contemporary paradigm of wellness has emerged within the last decade that has provided a refreshing approach to health and wellness. During the late 20th century, Dr. Jane Myers and Dr. Tom Sweeney considered the notions of prevention and well-being as they related to individuals' overall total health. These two researchers and counselor educators have proposed and created several wellness models in efforts to view wellness from a holistic, multifaceted frame of reference. Most notably, their *indivisible self* model of wellness represents a contemporary, evidence-based model of wellness that highlights the reciprocal interactions between environmental factors and human behavior. The indivisible self model of wellness conceptualizes wellness across the life span and consists of 17 discrete dimensions of wellness; 5 second-order factors, identified as the essential self, social self, creative self, physical self, and coping self; and 1 higher-order wellness factor. The essential self consists of 4 dimensions, including spirituality, self-care, gender identity, and cultural identity. The creative consists 5 factors, including thinking, emotions, control, positive humor, and work. The social self consists of friendship and love. The physical self consists of exercise and nutrition. The last factor is the coping self, which consists of realistic beliefs, stress management, self-worth, and leisure.

Counseling and Wellness Promotion

Inherent to the role of professional counselor is the promotion of wellness and enhancement of quality of life. The American Counseling Association (ACA) in 1992 underscored the significance of wellness promotion as the foundation to the counseling profession. Counseling for wellness pivots around the salient belief that wellness constitutes purposeful choice and decision making regarding lifestyle and healthy living; individuals who make healthy lifestyle choices will experience greater happiness, life satisfaction, longevity, and overall well-being.

A primary function that counselors have in the promotion of wellness is to encourage and endorse the process of client self-awareness, self-acceptance, and responsible living in efforts to promote a healthy lifestyle. By espousing and introducing a holistic wellness approach to the counseling process, professional counselors can further perpetuate the guiding philosophy of wellness, that being an acknowledgment of the whole person. The profession of counseling is rooted in a strength-based approach when working with clients, much like the underpinnings of wellness paradigms that also focus on engendering a sense of self-empowerment and optimal functioning. The nature of the counseling profession requires that counselors create and maintain a safe and supportive therapeutic environment that will encourage positive growth and desired change. Moreover, professional counselors are committed and obligated to enhance and increase clients' knowledge base regarding holistic health, wellness, and creative living.

The emerging paradigms of health and wellness embrace prevention, early intervention, and alternative interventions. With the growing importance on wellness and holistic health care in the 21st century, the popularity of complementary and alternative medicine has significantly increased among U.S.

adults in recent years. More Americans are relying on alternative paradigms in health care in efforts to treat ailments, promote wellness, delay aging, and protect against illness.

Perhaps the first mental health professionals who embrace and adhere to a wellness approach in understanding, designing, and implementing a preventive orientation that focuses on positive human growth, optimal functioning, holistic health, and well-being are professional counselors. Counselors are in a leading position to promote health and affect wellness among a diverse population of individuals.

— *Holly Tanigoshi*

See also **Ethnopsychiatry; Psychology and Genetics**

Further Readings

Ardell, D. B., & Langdon J. G. (1989). *Wellness, the body, mind, and spirit.* Dubuque, IA: Kendall/Hunt.

Capuzzi, D., & Gross D. R. (1999). *Counseling and psychotherapy.* Upper Saddle River, NJ: Prentice Hall.

DeJong, P., & Berg, I. K. (1998). *Interviewing for solutions.* Pacific Grove, CA: Brooks/Cole.

Eagan, G. (1989). *The skilled helper.* Pacific Grove, CA: Brooks/Cole.

Ellis, A. (1995). *Better, deeper, and more enduring brief therapy.* New York: Brunner/Mazel.

Gladding, S. (2002). *Family therapy: History, theory, and practice.* Upper Saddle River, NJ: Prentice Hall.

Gladding, S. T., & Newsome, D. (2004). *Community and agency counseling.* Upper Saddle. River, NJ: Prentice Hall.

Myers, J., Sweeney, T., & Witmer, J. M. (2000). The wheel of wellness counseling for wellness: A holistic model for treatment planning. *Journal of Counseling and Development, 78,* 251–266.

Cousteau, Jacques-Yves (1910–1997)

Jacques-Yves Cousteau (1910–1997) was the father of modern underwater exploration as well as a pioneer of underwater photography. A marvelous visionary and inventor, he designed the first underwater breathing system, the *aqualung,* as well as depth record-breaking submarines and underwater research stations. A passionate and groundbreaking filmmaker, Cousteau created over 100 films, winning him three Academy Awards for best documentary, including for his debut underwater documentary, *The Silent World* (1956). Cousteau's foremost passion, the flame that sparked all other interests in his life, was for the preservation and exploration of marine environments. Cousteau envisioned and created technology that allowed him to explore previously unreachable marine worlds and shared his love for these places with his films, books, and philanthropic endeavors. He opened the doors for humanity to discover and understand the previously misunderstood and underappreciated ecology and biodiversity of marine life.

Cousteau's passion for exploration and travel began from childhood, when he often accompanied his father on his many seabound travels. His love for film was also rooted in his childhood, as he made his first film at age 13 and went on to produce several more short melodramas, in which he always has the role of the villain. By the age of 22, Cousteau had joined the French naval academy and was traveling all over the world aboard the *Jeanne d' Arc,* all the while filming the cultures and peoples me met. At 25, he enrolled in the aviation school, but after a car accident that nearly cost him an arm, he was forced to leave and return to the naval academy. Once returned, he avidly swam and snorkeled to help recuperate his arm with several of his academy friends. Even here, Cousteau was not without a camera, and he soon makeshifted one he could use for underwater filming. He was, however, frustrated at his time limitation for having to swim up for air. This inspired him to design a device that would make extended underwater exploration for individuals possible. With the help of an engineer, Cousteau brought his design to life and in 1943 successfully tested and filmed the first scuba equipment, then called the aqualung.

During World War II, the aqualung was at first used for military purposes, but after the war, Cousteau used it primarily for scientific exploration. The invention would be the beginning of a new era in marine exploration, with Cousteau at the helm.

In 1950, he acquired an old converted minesweeper called the *Calypso.* The ship would serve as his primary research vessel for 46 years and became the

Source: Courtesy of the Library of Congress.

mascot of his travels. Aboard the *Calypso,* Cousteau came across the first extensive underwater archeological dig, led countless scientific dives, submerged and tested scientific submarine prototypes, and filmed his award-winning television series, *The Undersea World of Jacques Cousteau.* He directed the engineering of numerous submarines and underwater research stations, all designed to help scientists better study marine life.

In 1958, Cousteau first became aware of the negative human affects on marine ecosystems when he revisited a site where some of his first filmings had taken place along the French Riviera. He reacted by forming the Cousteau Society, a nonprofit organization aimed at the conservation of marine ecosystems, in 1974. The Cousteau Society leads important efforts in international lobbies for better marine conservation as well as scientific evaluations of marine wellness all over the world. Cousteau's environmental efforts did not go unnoticed, as he received the U.S. Medal of Freedom from President Ronald Reagan and the National Geographic Gold Medal for Exploration from President John F. Kennedy.

Through his inventions, films, and books, Jacques Cousteau not only created the modern world of marine exploration but brought it to the eyes and ears of millions across the globe. His efforts to raise awareness over conservation issues reached and inspired people all over the world and played an essential role in modern environmental issues, both politically and culturally. Cousteau envisioned and sought after a global society that would collaborate on all issues, including environmental. He helped catalyze this process by raising awareness and concern over marine health endangerment. Such environmental issues fall under no political boundaries and, so, called for international cooperation. Cousteau's love for the sea showed him the necessity for a global society and thus spurred his life's efforts toward this goal. After his death in 1997, French President Jacques Chirac noted Cousteau as being "a great Frenchman who was also a citizen of the world."

— *Andrew P. Xanthopoulos*

See also **Environmental Philosophy**

Further Readings

Cousteau, J. (1985). *The ocean world.* New York: Abrams.

Cousteau, J. (2004). *The silent world.* New York: National Geographic Adventure Classics.

Cousteau, J., & Sivirine, A. (1983). *Jacques Cousteau's Calypso.* New York: Abrams.

Craniometry

The technique of measuring the human body for the purpose of describing or comparing individuals and groups of individuals is known as *anthropometry.* Anthropometry includes four basic subject matters: somatometry, cephalometry, osteometry, and craniometry. Craniometry is the measurement of the skull (cranium and mandible), especially measurements on dry bone. Craniometry has a long history in the biological sciences, as some of the earliest works on skeletal biology focused on measurements to complement descriptions of materials.

At the end of the 19th century, Anders Retzius created the cephalic index, sparking large-scale efforts

to measure populations of living people. The cephalic index is a simple formula that divides the maximum head breadth by the maximum head length, and multiplies by 100. The cephalic index is used on living individuals and is distinguished from the cranial index, which is the same measurements on dry bone. On the basis of these measurements, attempts were made to differentiate between local populations from which an individual was descended. The basic premise underlying this methodology is that individuals with shared ancestry share similar cranial shape, due to morphology being strongly determined by genetics.

The data accrued from such studies was used for a variety of purposes, ranging from genuine scientific inquiry to justifying racial stereotypes, immigration laws, and arguments of racial superiority. There were even attempts to relate the shape of one's head to criminality, and pseudosciences such as phrenology gained widespread use as a "civilized" tool for justifying racism. A backlash against misuse of biomeasurements led to many works that sought to dispel these notions, such as the research of Franz Boas and Ales Hrdlička on Eskimo skeletal morphology. In the early 20th century, Boas published his seminal work, *Changes in Bodily Form of Descendents of Immigrants,* which compared cranial measurements of thousands of immigrants to those of their children, who had grown up in the United States. He concluded that the children of immigrants did not show sufficient affinities to their parents to support the notion that genetics played the major role in determining the shape of the skull of individuals. This work was a major blow to biological determinism and to the importance of cranial measurements as a distinguishing characteristic between populations.

Despite criticisms from various fronts, Boas's work became a fundamental part of anthropology and modern society, underpinning such documents as the first United Nations Educational, Scientific, and Cultural Organization (UNESCO) statement on race. However, while his research has remained a strong component of the argument that the environment is the primary determinant of morphology (rather than genetics), the validity of craniometrics has become well established in the field of forensic anthropology, paleoanthropology, and archaeology. Forensic anthropology has developed a number of statistical methods using craniometric data that distinguish both sex and racial affiliation, and these interpretive frameworks have been used extensively in paleoanthropology to sex and type specimens and distinguish between closely related species. In addition, archaeological research uses these methods in the determination of group affiliations of skeletal material, in order to map migration patterns in prehistory.

Rather than simple measures of cranial length versus breadth, researchers have developed a suite of osteometric points that correspond to functional features of the cranium. Measurements are taken as chords between points, and multivariate analysis of the resulting measurements compares the shape of the skull with known samples in order to evaluate probably ancestry. The inherent limitation of this method is context, meaning that when particular regional variations (not necessarily correlated to "races") have not been sampled, correct identification is impossible. Normal population variance also results in individuals that do not fit particularly well, since identification is based on probability rather than qualitative characters. In addition, individuals of mixed ancestry often do not fit well into a particular category when looking at cranial measures. Despite such limitations, craniometry remains extremely useful in forensic contexts for identification of human remains.

Craniometry is a probabilistic method of discriminating between possible ancestries of an individual. The utility for identification of human remains in forensic contexts has resulted in the continued refinement of formulae and procedures over more than a century, and the principles have extended into related aspects of physical anthropology, such as archaeology and the discrimination of paleontological species.

— *Christopher David Kreger*

See also **Anthropometry; Osteology, Human**

Further Readings

Bass, W. M. (1987). *Human osteology: A laboratory and field manual.* Columbia: Missouri Archaeological Society.

Buikstra, J. E., & Ubelaker, D. H. (1994). *Standards for data collection from human skeletal remains.* Fayetteville: Arkansas Archeological Survey.

Gill, G. W., & Rhine, S. (1990). *Skeletal attribution of race.* Albuquerque: University of New Mexico: Maxwell Museum of Anthropology.

CRANIOMETRY

For centuries, anthropologists have studied the craniometry of humans in order to determine whether or not brain formation can be used to identify race, sex, intelligence, criminal tendencies, and other physical characteristics. The science of craniometry has been particularly helpful in allowing scientists to identify human remains in the study of anthropology. Scientists have also used craniometry to unlock the secrets of fossils. In August 2004, scientists reported that brain X-rays of an archaeopteryx, one of only nine such fossils to exist, has revealed that this winged and feathered creature may have been able to fly, making it the world's oldest known bird. The archaeopteryx, which lived some 150 million years ago, has also been identified as a dinosaur. While the archaeopteryx's brain and inner ear displayed characteristics similar to birds of contemporary times, other traits such as a full set of teeth and a long, bony tail placed the archaeopteryx solidly in the dinosaur family. In the early 1990s, ornithologist Alan Feduccia of the University of North Carolina announced that his examination of the claws of the archaeopteryx had revealed that they were tree dwellers rather than ground dwellers, offering the information as additional evidence for the theory that the archaeopteryx was a bird and not a dinosaur.

In 2004, paleontologist Timothy B. Rowe and his team at the University of Texas at Austin used computerized tomography (CT) to scan the brain of an archaeopteryx to try to solve the puzzle. The more than 1,300 images they produced provided the necessary information to workers at the Natural History Museum in London, who reconstructed the brain of the fossil. Paleontologist Angela C. Milner guided the efforts that resulted in the discovery that the cerebellum of the archaeopteryx covered nearly half of the animal's brain. The information gathered from the CT scans also led scientists to believe that the archaeopteryx possessed excellent eyesight and hearing, in addition to well-developed muscle coordination, characteristics shared by all birds. This information, coupled with a 2003 discovery by Larry Witmer of Ohio University at Athens that pterosaurs also possessed large brains and optic lobes, has excited those who are interested in the origin of flight. Pterosaurs have been identified as flying reptiles that lived some 235 million to 65 million years ago. In 2003, while doing postgraduate work at the University of Calgary, Nick Longrich discovered evidence that the archaeopteryx used its legs to help it fly, leading to some speculation that birds glided before they actually flew.

Both the British Museum in London and the Berlin Museum in Germany have nearly completed skeletons of the archaeopteryx, which when full grown is approximately the size of the contemporary magpie or grackle. Other archaeopteryx fossils have been partially reconstructed. Since the first fossilized archaeopteryx was discovered in 1861 in the Solnhofen region of Bavaria in southern Germany, scientists have been unsure whether more than one species of this dinosaur existed. They had been tentatively identified as the *Archaeopteryx recurva,* the *Archaeopteryx siemensii,* the *Archaeopteryx bavarica,* and the *Archaeopteryx lithographica.* In April 2004, Phil Senter and James Robins of Northern Illinois University applied regression analysis to compare six skeletons, determining that all known specimens of the archaeopteryx should be identified as *Archaeopteryx lithographica.*

— Elizabeth Purdy

PHRENOLOGY

Although phrenology has been discounted by anthropologists now, there was a time in the early 1800s when many people believed it was a science. Phrenology, sometimes known as cranioscopy, was the study of the structure of the human skull in order to read the person's character and mental capacity. Phrenologists believed that mental

faculties were located in brain "organs" on the brain's surface, which could be felt if you ran your hands over the person's head. It was believed that brain organs grew larger as they were used, so those who used the organs a lot would create bumps on their skulls.

Phrenology came from the theories of Franz Joseph Gall, a Viennese physician in the late 1700s and early 1800s. He stated that the size of an organ in the brain was a measure of its power and that the development of various organs dictated the shape of the brain. Therefore, the surface of the skull was an accurate index to a person's psychological aptitudes and tendencies. From the mid 1790s to approximately 1810, Gall and his disciple, J.G. Spurzheim, were the only practitioners of the science. The English-speaking world learned about phrenology from a review condemning it in the prestigious *Edinburgh Review.* Many people became interested. A phrenological society was founded in 1820 in Edinburgh. Many others followed throughout Britain and America in the next few decades. During the 1830s and 1840s, phrenology was very popular in America.

Phrenology was always controversial, and never widely accepted as an actual science. By the middle of the 19th century, it had been almost totally discredited as a science in Europe, although the idea continued to flourish in America for quite some time. Phrenology was subscribed to by such illustrious people as Ralph Waldo Emerson, Horace Mann, and Thomas Edison. Even as late as 1934, many people still believed in the pseudoscience. Henry C. Lavery and Frank P. White invented a machine, called a psychograph, that did a phrenological reading with a printout. The psychograph was made up of 1,954 parts and measured 32 mental faculties. The owners of one of the machines netted about $200,000 with the device at the 1934 Century of Progress Exposition in Chicago.

Phrenology did have some correct assumptions about the human brain. Such things as intellect, emotions, and perception are located in the brain. Also different parts of the brain are responsible for different functions.

— Pat McCarthy

Creationism Versus Geology

Creationism is the belief that our universe came into being in exactly the way described in the Bible's book of Genesis. This literal interpretation of the Bible's accountings of our beginnings has been embraced by some—but not all—Protestant Christians and Catholics. Many levels of the Catholic Church give Genesis a more allegorical or symbolic meaning, and Pope John Paul II publicly accepted the theory of evolution.

A History of the Debate

Since antiquity, humankind has tried to apply science to the Bible's description of creation, eventually giving rise to the *science of origins* and a *natural theology*, which considered that the marvels revealed by science through nature confirmed religion. In 1748, Count Buffon proposed that the Earth could be millions of years old, an idea that outraged the theological authorities at Sorbonne, who forced him to publicly recant. Buffon went on to define seven geological eras, in accordance with the days in Genesis.

In the first part of 19th century, naturalists such as Louis Agassiz, Georges Cuvier, and Alcide d'Orbigny supported the idea of a series of successive extinctions and creations. Their *catastrophism* was used to integrate and reconcile the scientific discoveries of geology with the Bible's doctrine. But the Archbishop Ussher had established that the date of creation was 4004 BC, and the new data demonstrated that the Earth was many years older. Today's creationists consider the Great Flood responsible for all fossils, but early catastrophists did not.

By the middle of the 19th century, James Hutton's *actualism* and Charles Lyell's *uniformitarism* began to overtake catastrophism. Geology was an emerging science, and its paradigm questioned some of the constructs of creationism: the Great Flood, the direct creation of all animals by God, and the creation of human beings from clay. Lyell, particularly, presented theoretical foundations that set the stage for Charles Darwin's *natural selection* in the transformation of species and the theory of evolution. Only a few fossils were known in Darwin's time, and scientists could not find support to corroborate the evolutionary process using palaeontology until Simpson demonstrated the value of fossils to document the *synthesis theory* of evolution.

Acceptance of Darwin's theory of evolution has been gradual. At the end of the 19th century, some renowned scientists remained opposed to the theory. Some, such as the geologist James D. Dana, defended evolutionism but supported the specific creation of human beings and the comparison between day and geological era. Others, including Arnold Guyot, a naturalist from Princeton, and the Canadian geologist John W. Dawson not only compared day and era, but attempted to harmonize science and the Bible by invoking a singular creation for matter, life, and humankind.

In 1909, C. I. Scofield published a version of the Bible that enforced Thomas Chalmers's idea that there were long intervals of time between the events described in verse 1 and verse 2 in the first chapter of Genesis. This explanation allowed the time required by earth sciences between the first destruction and a new creation. At the same time, geologist and Protestant minister George F. Wright began a text on Christian opinions about evolution. In the 1920s, evolutionists in some parts of the United States were persecuted, and various professors resigned.

In 1923, a geology textbook by George McCready Price gave the Great Flood credit for producing all the rocks and fossils at the same time through catastrophe. Price, a Seventh-Day Adventist, also wrote other books disputing the theory of evolution, the first time that a creationist took on evolution through a scientific—rather than Biblical—approach. Today, we consider Price a pioneer who inspired the scientific creationists of the 1960s, especially Henry M. Morris.

The Debate in the United States

In the United States before 1925, 37 states approved laws that prohibited teaching evolution in public schools. In 1925, professor John Thomas Scopes went on trial in Tennessee for teaching the theory of evolution. In a case that would become known as the Monkey Trial, the conviction carried so light a sentence that creationists could claim no victory. Still, writers of school textbooks feared an antievolution backlash, and the theory of evolution nearly disappeared from texts. It took 40 years for the antievolution laws to be declared unconstitutional and repealed.

Particularly in the U.S., creationists organized and formed societies to fight evolutionary theory. These included the Religion and Science Association (1935), the Society for the Study of Creation, the Deluge, and Related Science (1938), and the American Scientific Affiliation (1948). At the latter's convention in 1953, Henry M. Morris, a professor of hydraulic engineering, gave a speech on "Biblical Evidence of a Recent Creation and a Universal Flood" based on Price's geology of the Great Flood. In 1957, the theologist John C. Whitcomb wrote *The Genesis Flood.* In 1958, the Seventh-Day Adventists created the Geoscience Research Institute in Loma Linda, California to study the scientific evidence about our origins. In 1961, Whitcomb, in collaboration with Morris, published a well-received work of scientific creationism. In 1963, creastionists formed the Creation Research Society in Michigan based on a committee of scientific experts and nonscientific members (such as Whitcomb). This society's members believed that the Bible was the written word of God and historically and scientifically true.

In 1970 in San Diego, California, the Creation-Science Research Center directed by Morris and Gish was formed to spread the idea that evolutionism and creationism are two concurrent scientific hypotheses. In his book *Evolution, the Fossils Say No!* (1972), Gish attempted to discredit the value of fossils in what amounted to an attack on paleontology. In Whitcomb's 1972 book *The Early Earth,* he revives the idea of long time intervals for the days described in Genesis. This time-interval approach led to the 1981 laws passed in Arkansas and Louisiana that granted equal treatment in the schools for the theory of evolution and the science of creationism. When many American scientists protested the enactment of similar laws in other states, these laws were rescinded in 1987.

In the U.S. today, polls show that half the population believes that God created human beings in our current form less than 10,000 years ago. In 1996, members of the education committee of the State of New Mexico eliminated all references to evolution in the *State's Standards for Science Education* in public schools. Creationists continue to publish antievolutionary works: The Geoscience Research Institute alone publishes *Origins,* a magazine about the history of the Earth; *Geoscience Reports,* a newsletter for the general public; and *Ciencia de los orígenes* for the Hispanic community. The Creation Research Society, still directed by Morris and Gish, publishes the magazine *CRS Quarterly* and the bimonthly newsletter *Creation Matters.*

The Debate in Australia

In Australia, in 1989 Rhondda E. Jones warned about the dangers of creationism in teaching science and proposed that scientific creationism was one of the best illustrations of pseudoscience. In 1994, the director of the Department of Geology at the University of Newcastle, R. Plimer, wrote *Telling Lies for God, Reason vs. Creationism* and soon filed suit against a creationist who claimed to have found Noah's Ark through scientific analysis; Plimer's case was rejected.

The Debate in Europe

In Europe, the Catholic sect *Cercle Scientifique et Historique* was created to spread the word of the diluvian leader, Fernand Crombette. One of the sect's most outspoken members, French sedimentologist Guy Berthault, in 1988 discredited evolution by denying the main principle of the superposition of strata. In 1991, another active leader, Dominique Tassot, concluded that evolutionary prehistory is illogical, irrational, and a permanent fraud. Furthermore, Tassot claimed that only the Bible's trilogy of the Creation, the Descent, and the Flood is simple, complete, and factual. In Spain, creationists may remain Catholic but sympathize with scientific creationists. Professor of geology Indalecio Quintero published *Adam and Eve Were Alive* in 1986 in an attempt to integrate scientific data and the Bible. In 1996, Alejandro Sanvisens Herreros, a Catholic professor, published *The Whole Truth About Evolution* through the University Publishing House of Barcelona. It attacks evolution using the same arguments as Morris and Gish. The creationist publishing house founded in Tarrasa (Barcelona) and directed by Santiago Escuain has translated and published many articles and books written by U.S. creationists.

The Geological and Paleontological Perspective

Historically, data from geology and paleontology have not well served creationists. Scientists such as Kitcher, McGowan, Berra, and Birx, as well as geologists and paleontologists such as Newell, Gould, Gastaldo and Tanner, Eldredge, and Molina have defended evolutionism. Recent data indicate that the Earth is thousands of millions of years old, and that, over this time, slow geological processes—almost imperceptible in the short length of a human life—have molded the Earth's surface, giving rise to the current geological and geographical configurations. Paleontology has demonstrated that, throughout these millions of years, life has evolved from the smallest and most simple cells, in the Precambrian, to the most complex and intelligent animals. In addition to the biological data, fossils are the best evidence of evolution and its mechanisms.

— *Eustoquio Molina*

See also **Big Bang Theory; Darwin, Charles; Evolution, Arc of; Evolution, Disbelief in; Fossils; Monkey Trial (1925)**

Further Readings

Eldredge, N. (Ed.). (2000). *The triumph of evolution and the failure of creationism.* New York: Freeman.

Gillispie, C. (1996). *Genesis and geology. A study in the relations of scientific thought, natural theology, and social opinion in Great Britain, 1790–1850.* Cambridge, MA: Harvard University Press.

Molina, E. (2000). Evolution and "scientific" creationism in the earth sciences. Geological and paleontological arguments. In H. J. Birx & E. I. Kolchinsky (Eds.), *Science and society* (pp. 246–252). St. Petersburg: Russian Academy of Sciences.

Creationism, Beliefs in

Creationism is a surprisingly complex and diverse position that has had resurgence in the first part of the 21st century. Initially a stance taken in response to the development of evolutionary sciences in the 19th century, Creationism is usually based on three fundamental positions:

- A superior being created all out of nothing.
- The doctrine of the essentialism of species.
- A divine being creates individual human souls.

While creationism is most often cited as a position held by certain Christian groups, there are also a number of non-Christian, Jewish, Islamic, Vedic, and indigenous groups that maintain creationist positions. And, although creationism has often been

reduced to a simple antiscientific stance, it is an area that actually contains a wide range of ideas and formulations. These can be divided into Christian-based beliefs, non-Christian, and "great tradition" beliefs.

Christian-Based Creationism

1. One of the oldest associations of creationists is the *Flat Earth Society.* While a seeming anachronism today, the Flat Earth Society maintains a lively discussion based on a literal translation of the biblical account of Noah and the Flood. Their view is that the earth is covered by a solid dome (firmament) and that attempts to "prove" the earth is round are biased, politically driven propaganda.

2. *Geocentric creationists* have had a resurgence in the past 20 years, notably led by Tom Will's movement to reform the Kansas school system curriculum. This version of creationism posits the earth as spherical but argues that the Earth, and not the sun, is the center of the universe. Using a literal interpretation of the Old Testament Hebrew cosmological assumption, the geocentric creationists have lobbied extensively to ban references to evolution, earth history, and scientific methods from public school textbooks and classrooms.

3. A controversial but influential work by the famed English naturalist, P. H. Gosse, *Omphalos,* published in 1857, united *Christian fundamentalism and uniformitarianism.* Gosse argued that our perception of age influences the way we see the earth. Predating Darwin's work by 2 years, Gosse maintained that the earth appears old to us but is really quite young. While he managed to affront both fundamentalists and scientists with his theories, it remains a work that is discussed in literature (Borges) and in science (Stephen Jay Gould) and by creationists.

4. *Restitution creationists,* or "gap creationists," interpret the two creations of Genesis (Gen. 1 and Gen. 2) to account for the age of the Earth, and the relatively recent creation of life. According to this tradition, God created the ancient world in Genesis 1, and millions of years passed. Genesis 2 is God's recreation of the world, accomplished in a literal 6 days. This would then account for the age of the earth geologically, and for the recent arrival of human beings.

5. *Day-age creationists* interpret the 6 days of creation as a metaphor. Rather than a literal 24-hour day, each day stands for millions of years. In this way, they account for God's ongoing creation as well as the age of the earth.

6. *Progressive creationists* view modern science as providing evidence of God's power at work in the universe. The big bang theory is accepted in that it explains the Creator's immense grandeur. However, modern biology and evolutionary sciences are viewed with extreme skepticism, and this school maintains an essentialist position concerning the development of species.

7. An extremely influential book published by William Paley in 1802 has formed the basis of much creationist thought in what is termed *intelligent design.* In *Natural Theology: or, Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature,* Paley laid out the nature of intelligent design in the universe, or natural theology. The work echoes elements of Thomistic theology, adding to the spiritual philosophy elements of microbiology, mathematics, and logic. This area of creationism is especially adroit in its attacks on evolutionary science and scientific methodology and maintains that evolutionary sciences are in fact a form of materialist philosophy. Some influential groups that argue this position include the Discovery Institute and The Center for Renewal of Science and Culture.

8. *Evolutionary creationism* is yet another Christian-based school of thought that is based on a literal interpretation of the story of Genesis. It adds to this an acknowledgment of scientific objectivity. However, while all of nature depends on the will of God for its beingness, Creation took place before time as, we now experience it, was in place. Thus, there were biological human creatures prior to Adam and Eve, but Adam and Eve were the first spiritually aware beings.

9. *Theistic evolution* is a Christian position that is held by the larger Protestant denominations and by most Roman Catholics. In their creationist account, God created and is present in the evolutionary process. Most of contemporary scientific method and theory is acceptable here, as these disciplines shed light on how God works in human history. The Bible is generally used as an interpretive document that needs to be explained in light of new discoveries and insights. Thus, these creationists still posit a God that is outside the realm of science, and is unknowable in some areas (e.g., the creation of human souls).

10. *Young Earth* creationists are often referred to as "scientific creationists." This can cause some confusion, as their methodology is not scientific. Again, they rely on a literal interpretation of the Bible and follow Bishop Ussher's calculation of a 4,000-year-old Earth. And while they accept the concept of a heliocentric solar system, all of the Earth's processes are reduced to (a) the result of Noah's flood and (b) the sin of Adam and Eve.

The term *scientific creationism* is derived from the work of George McCready Price, a Seventh-Day Adventist who was deeply influenced by the visions of the prophetess, Helen White. Gaining a wide audience in the 20th century by melding science with Biblical interpretations, Price remains an important icon long after his death (ca. 1963). The basics of scientific creationism are similar to the above schools; that is, God created the universe, and biological life was created in its essential form. The first humans were a special creation at a certain point in time. Again, the evidence of geological history is proof of the Great Flood of Genesis. And while nature must obey fixed laws, the Creator can intervene at any time. The science of this form of creationism is essentially a study of teleology; humans are supposed to study creation in order to understand our ultimate destiny. In most cases, this is posited as a finite Earth and an apocalyptic ending.

Summarizing the major points of most Christian creationists, the following points are pertinent:

1. Creation is the work of a Trinitarian God.
2. The Bible is a divinely inspired document.
3. Creation took place in 6 days.
4. All humans descended from Adam and Eve.
5. The accounts of Earth in Genesis are historically accurate records.
6. The work of human beings is to reestablish God's perfection of creation though a commitment to Jesus.

Christian creationism was most infamously displayed in the Scopes Trial of 1925. Clarence Darrow defended John Scopes, the high school biology teacher, from the fundamentalist position of William Bryan. The national attention that this brought to evolution is usually overshadowed by the fact Scopes was convicted and fined for teaching evolutionary theory. The political nature of the creationist position continues today in numerous constitutional challenges to scientific teaching in public schools. Most often cited in recent debates in the Schemp Opinion (1963, *Abington School vs. Schemp*), which ruled that evolutionary teaching could represent overt antagonism to religious ideals. The revival of creationist efforts to influence public education in the 21st century has been seen in challenges in Georgia and Oklahoma school systems.

Non-Christian Creationism

It would be a mistake to classify all creationists as Bible-based or Christian-based positions. For example, *methodological materialists* argue that while God did start creation, God does not actively interfere with evolutionary process. Agnostic in a sense, this school uses scientific methodology for explaining the creative influences in natural developments and denies the activity of a supernatural entity in natural processes.

Other examples of non-Christian creationists are *Raelians,* who claim life came from another planet. They attribute alien scientists and UFOs for life that we have on earth. The *Panspermians* claim that bacteria and other microorganisms were carried here from other solar systems by meteors and other naturally occurring phenomena. And *catastrophic evolutionists* maintain that evolution was quick, driven in quantum leaps by extreme conditions in the very recent past. Each of the above theoretical positions has produced cultlike followings, such as Heaven's Gate and Solar Temple, that lie outside most organized religious creeds.

Great Traditions Creationism

Other major world religious traditions exemplify a wide spectrum of creationist thought. While Christianity has dominated the arena for some time in the West and has used its political power to influence public discourse on theory, science, and evolution, Islam, Judaism, Hindi, and indigenous religions also have commented on, and are concerned with, creationist ideals and discussions.

In the Hebrew tradition, a strict literal interpretation of the Torah is difficult to maintain. Unlike the fundamentalist translations that are part of the Christian tradition, Hebrew tradition maintains the importance of four levels of interpretation. Referred

to as "PRDS" (garden, or paradise), creation in the Hebrew tradition is viewed as a complexity of (a) *Pshat,* the literal meaning and intent of the verses; (b) *Remez,* the particular grammar, spelling, syntax, and sentence structure that indicates deeper meaning; (c) *Drash,* the homiletical level of interpretation (on this level the metaphorical potential of the verse for each individual life is important); and (d) *Sod,* the secret, mystical level of interpretation. Therefore, in the Hebrew tradition of creationism, a weaving of theology and philosophy can coexist with pure science in a manner that does not explicitly deny evolutionary explanations. Still, the explanation for all life is attributed to Yahweh and to the special relationship of Yahweh to the Hebrew people. Creation, then, took place outside of ordinary time, and the Genesis story exists to relate a story about relative values.

For the Islamic community, Genesis does not have the moral ascendancy as does the Koran. So, while Islam can tend to a more literal tradition of scriptural interpretation, it is not as rigid as Christian creationism. The Koran accounts of creation are quite vague, allowing a representation of diverse interpretations. The essential notion is that Allah created all, and Allah is all-good. Thus, the Islamic creationists exhibit a wide spectrum, from literalistic to the more liberal, especially depending on the area where the particular Islamic tradition is practiced.

Since much of the Islamic world remains an area where the theory of evolution has not yet taken hold, traditional Islamic beliefs regarding creation remain dominant. As more Western influences penetrate traditional areas, however, elements of intelligent design creationism are allied to Islamic teachings and science. Some fundamental Islamic groups have attached themselves to the Turkish writers Harun Yahya and Fethullah Gulen, who criticize Western evolutionary sciences as leading to moral corruption. Areas that illustrate particular allegiance to more Koran fundamental creationist ideals are Indonesia and Malaysia, citing the decadence of Western culture and society as evidence of the dangers of evolutionary thought.

According to the Hindu Vedic texts, the Earth is ancient, undergoing periodic transformations lasting billions of years. While the science of evolution and the Vedic teachings of creation appear to be conflicting, actually, the Avatars of Vishnu are viewed as close to Darwin's theories of evolution. The theological/philosophical basis of Hindu cosmology is based on a cyclical notion of time, with periodic creations, rebirths, and deaths. While the above major religions have shown evidence of sometimes quite volatile reactions to the concept of evolution, the creationism of Hindu is accepting of the theories within their own traditional way of knowing.

Indigenous Creationism

Various indigenous groups voice a strong challenge to the sciences of evolution today. In North America, the contemporary Native American movement criticizes the scientific community as being racist and biased toward a Eurocentric explanation and worldview. Calling upon their own tribal traditions of creation, many Indians maintain that they have always been in North America and were specially created to care for the Earth. In particular, many Indians discard the out-of-Africa notion and the spread of human beings through Asia, Europe, and the Pacific as an example of European control and domination. Along with this critique are arguments that the Ice Age and Beringia theories are scientific myths. For Native Americans, in general, the Great Spirit created the first people here, and they have always been here in order to care for the world. Vine Deloria Jr. has been particularly vocal about what he views as the ongoing colonization of thought by Western science and the abuse of indigenous epistemologies of creation.

Creationism, then, is a multifaceted epistemology that seeks to find the roots of human existence and the Earth's existence in a spiritualized, nonscientific milieu. The strength of the movement has been particularly strong in the West, where scientific-style analysis of the Bible has taken place in the last 100 years. For while many denominations had for centuries viewed the Bible as the literal, unerring word of God, the critical analysis opened the door for a more systematic interpretation of the documents. This, in addition to the ascension of the scientific paradigms, brought concern about cultural changes and the seemingly atheistic turn to secularism. Among indigenous peoples, the influence of Nativistic movements has raised consciousness about their own traditional ways of knowing and skepticism about the ability of Western paradigms to provide essential answers to their ways of life. The creationists are united in their common cause to keep a sense of the mystical, nonscientific explanation for existence in the public discourse.

Creationism beliefs can also be viewed as reactionary movements to maintain a place within the rapidly shifting cultural environments today. As noted above, many Christian-based creationists are returning to a literal interpretation of Scripture and a call to return to older sets of biblically based values. Similarly, the creationist movements in Islam and Judaism tend to be fundamentalist reactions to the secularization of world cultures. And in the case of indigenous peoples and their need to maintain sovereignty and to maintain a critical place within a globalized culture, the recalling of creationist myths establishes their unique place in world history.

Creationist studies can be appropriate to the field of anthropology on several levels. For one, the examination and analysis of creation stories have consistently been an important area of folklore scholarship. Understanding the cosmology and cosmogony of a culture provides an insight into the way a society structures its institutions. In addition, the literary nuances of creationist concepts provide scientists with alternative ways of examining the merits of evolution over a wide spectrum. For example, Native American criticism of the ice-free corridor and the Clovis-first theories have continued to bring about alternative theories to new evidence of very ancient human occupation of the Americas. On the other hand, the scientific theoretical models that are integral to evolutionary sciences do not attempt to answer the same sorts of questions that the creationists are concerned with, such as the existence of God and a spirit world. Thus, while science is a powerful paradigm for explaining facts, it remains very important for anthropologists to be aware of and conversant with creationist accounts of existence, as well. This will enable the discipline to adapt to alternative worldviews and to continue to be sensitive to a wide spectrum of cultural phenomena.

— *Ted Fortier*

See also **Big Bang Theory; Darwin, Charles; Darwinism, Modern; Evolution, Arc of; Evolution, Disbelief in**

Further Readings

Deloria, V. Jr. (1995). *Red earth, white lies: Native Americans and the myth of scientific fact.* New York: Scribner.

Eve, R. A. (1990). *The creationist movement in modern America.* Boston: Twayne.

Kaiser, C. B. (1991). *Creation and the history of science.* Grand Rapids, MI: Eerdmans.

Moore, J. A. (2002). *From Genesis to genetics: The case of evolution and creationism.* Berkeley: University of California Press.

National Academy of Sciences, Committee on Science and Creationism. (1984). *Science and creationism: A view from the National Academy of Sciences.* Washington, DC: National Academy Press.

Zabilka, I. (1992). *Scientific malpractice: The creation/evolution debate.* Lexington, KY: Bristol Books.

Crete, Ancient

A stunning civilization arose in Crete between 1950 BCE and 1200 BCE, only to collapse for reasons that are as yet not clearly understood. What caused this civilization to flourish, and then mysteriously disappear? What were its links to events on the mainland of Greece? Since the early 1900s, archaeologists have uncovered monumental buildings and evidence suggesting that Crete presents a clear case of early state formation. What remains unclear is who the people were and what language they spoke. Also found were three prealphabetic writing systems, two of which remain to be deciphered. The third writing system, Linear B, is derived from the first two and proved to be early Greek; it was deciphered during the 1950s by the English architect Michael Ventris. The information received from the Linear B clay tablets forced scholars to rewrite the history of early Greek civilization. The other two represent an unknown language: If deciphered, what would they tell us?

Crete was a mysterious place for the ancient Greeks as well: It was believed to be the birthplace of their god Zeus. Minos, the legendary king of Crete, was the son of Zeus and Europa, a princess kidnapped from Asia Minor. Minos later became a judge in the underworld. According to Athenian legend, the Minotaur, a bull-like creature, lived in the labyrinth and demanded human sacrifice: Seven maidens and seven young men had to be sent on a yearly basis. Finally, the cycle was interrupted by the hero Theseus, who seduced Minos's daughter Ariadne into helping him out of the maze. Crete was also the dwelling place of Daedalus, the

Source: © iStockphoto/Paul Cowan.

clever artist and the first man to fly: Unfortunately, his son Icarus came too close to the sun and fell into the sea en route to Sicily.

Geography and History

Crete is a mountainous island in the eastern Mediterranean, extending along an east-west axis. It is approximately 160 miles long and 40 miles wide in the middle, narrowing toward both ends. A number of valleys crisscross the island, facilitating communication from the earliest times. The highest mountain is Mount Ida, at approximately 8,000 feet.

Crete was first occupied during the Neolithic (ca. 7000 BCE), as archeological finds have shown. The first inhabitants are believed to have come from Anatolia; they brought agriculture and sheep and goats. For the first three millennia, settlements remained quite small, no more than 50 individuals, and relied on agriculture; between 4500 BCE and 3500 BCE, there were population increases, possibly due to immigration from the Cyclades, a group of islands to the north, which were slowly being populated for the first time. The number of inhabitants at Knossos, a settlement located in the center of the north coast, could have been as high as 1500. Burials in circular graves *(tholoi)*, which were often used for centuries, indicate an egalitarian lifestyle.

During the early Bronze Age, between approximately 3000 BCE and 1900 BCE, a complex civilization began to develop simultaneously at several sites. This period is commonly referred to as the "Prepalatial era." Settlements at Knossos and Phaestos, a community located to the southwest of Knossos near the southern coast, and several smaller ones grew in size and importance.

A second period, the "Protopalatial," lasted from approximately 1900 BCE until 1700 BCE, when the palaces were destroyed, possibly by earthquakes. Generally, the palaces consist of many rooms around several paved courtyards. The palaces had large storage facilities for agricultural surpluses. Clay tablets have been found in one of the earliest hieroglyphic scripts (still not deciphered), which are assumed to be inventory lists. Numerous seals to secure storage rooms have also been found, some bearing the same script. Burials of the Protopalatial period show social stratification, perhaps under the influence of increased contacts and trade with the civilizations of the eastern Mediterranean.

Trade with the surrounding areas intensified during this period, establishing Crete as one of the first *thalassocracies*, a term first used by the 5th-century BCE Greek historian Thucydides (ca. 460–400 BCE) to indicate absolute power over the seas. The historian Strabo (63 BCE–24 CE) uses the term directly to explain the early supremacy of Crete. Metals were imported from the Greek mainland, Anatolia, and Syria; gold, ivory, and precious stones came from

Egypt; and one mention is found in the palace at Mari on the Euphrates about goods expected from a place called Kaptara: cloths, a fine inlaid sword, and a pair of shoes for the King of Mari to give to Hammurabi of Babylon. According to the tablets of Mari, a Cretan tin buyer also seems to have been living in Ugarit, which was an important transit station for the tin trade.

Craft production, such as weaving and goldsmithing, also seems to have been located at the palaces. Cretan Kamares (bright polychrome) pottery has been found in Egypt, near Elephantine and in Byblos. Minoan pottery was also found at Ugarit, Beirut, Qatna, Hazor, and Cyprus. It is also thought that wood, grain, wine, oil, and textiles may have been exported on Cretan ships, but no traces of those perishable products remain. The influence of Cretan pictorial art has been found in Egypt and in the Near East; Egyptian influence can also be seen in the frescoes on Crete.

Rebuilding took place during the "Neopalatial" period, 1700 BCE to 1450 BCE. The walls of these new palaces were handsomely decorated with paintings of everyday scenes and religious events. The famous "bull-leaping" frescoes date from this era, in which youth (it is unknown whether male or female) are shown to be somersaulting over the backs of bulls, either grabbing the horns of an oncoming bull or leaping between the horns to land on the back and vault off. It is not known whether this formed part of initiation rites or was a sport or part of a cult. Bull leapers also appeared on seals, on boxes, on gold rings, and on pottery; one bronze statue depicting a youth on the back of a bull is at the British Museum. Bull-leaping scenes are also found on the Greek mainland; the last ones most likely were created during the decline of Mycenae. During the Neopalatial period, villalike buildings started to appear in the countryside, suggesting that the control of the palaces may have weakened somewhat. The Linear A script was now used everywhere on the island for administrative purposes. A second era of destruction followed, perhaps again caused by earthquakes combined with foreign invasions.

The final and "Postpalatial" period lasted from 1450 BCE until ca. 1200 BCE, the end of the Late Bronze Age. The original inhabitants appear to have sought refuge in the mountain areas, which leads archeologists to believe that foreign invaders (most likely mainland Mycenaeans) are to be blamed. Others suggest internal conflict may have caused the destruction of all inhabited sites: In fact, Knossos remained undamaged for about a century after the other centers were destroyed. Whatever may have been the causes, many inhabited areas were abandoned, and the population seems to have crashed. The writing systems fell into disuse, not only on Crete but also on the Greek mainland (Pylos), where tablets with the same Linear B script were found by the archeologist Carl Blegen in 1939. The entire area was plunged into a Dark Age, which lasted until 800 BCE.

Dating of Events and Periods

Scholars continue to adjust the dating of events in Crete, a difficult task, because a difference of several decades can change the presumed causes of the mysterious destructions of the palaces and Minoan culture. For instance, archeologists believe that the cataclysmic volcanic eruption that destroyed the flowering civilization of Thera (present-day Santorini), the southernmost island of the Cyclades, just 60 miles north of Crete, took place around 1520. They assume that the explosion was also responsible for the decline of agriculture on Crete and augured the subsequent collapse of the Neopalatial period. Scientists, however, put the date for the cataclysm at around 1628, too soon to explain the destruction of the palaces. Absolute dating has also been attempted by comparisons with Egypt (Crete is mentioned in some Egyptian records), by the sorting of local pottery and pottery styles, Mycenaean events, C14, and tree ring analysis, as well as the chronology of developments on the nearby Cycladic islands, whose inhabitants may have migrated to Crete on occasion.

Religion and Cult Sites

Mountaintops and caves were important cult sites from the beginnings of Cretan civilization, and numerous terracotta statues (mostly representing slim-waisted goddesses in long skirts), typical double axes, horns of consecration, and other offerings have been found in those locations. Many frescoes in the palaces show depictions of human figures, who may or may not have represented gods and goddesses, in peaceful nature settings, surrounded by animals and flowers. The palaces are thought to have been important cult sites or to have contained shrines and rooms where rituals were carried out. Other sites offer some

evidence of human sacrifice: The crushed bodies of a victim, a priest, a female attendant, and one other person were found at Anemospilia, near Knossos. They were apparently surprised inside the building when it collapsed during an earthquake, the same one that may have caused extensive damage around 1700 BCE.

The cave on Mount Ida where Zeus was believed to have hidden from the murderous intent of his father Kronos was an especially sacred place; religious tourists visited the site at least until the Roman era.

Archeology

The civilization of Crete was called "Minoan" by Sir Arthur Evans, the first excavator of the city of Knossos, after the mythological king Minos. His aim was to distinguish Cretan civilization from the one discovered by Heinrich Schliemann on the Greek Peleponnese, which was called "Mycenaean" after the city of Mycenae, the stronghold of (the mythical) King Agamemnon. Evans chose this name to emphasize his belief that Cretan civilization was non-Greek and non-Mycenaean: He believed that the palaces, the storage rooms, and the necessary quest for copper and tin (required to make bronze) indicated that Cretan civilization must have been more closely related to the countries of the Middle East than the Greek mainland. Evans turned out to be only partially right: The tablets found at Pylos on the Peloponnese show that the Mycenaeans had close contact with the inhabitants of Crete during the Postpalatial period, even though their civilizations show differences. At the same time, their records written in Linear B showed that the Mycenaeans were Greeks, as were the people that inhabited the Cretan palaces during the last phase of Minoan civilization. Until the discovery and the decipherment of the Linear B tablets, it was commonly believed that the Mycenaeans were non-Greek.

— *Thérèse de Vet*

Further Readings

Dickinson, O. (1994). *The Aegean Bronze Age.* Cambridge: Cambridge University Press.

Fitton, J. L. (2002). *Peoples of the past: Minoans.* London: British Museum Press.

Marinatos, N. (1993). *Minoan religion: Ritual, image, and symbol.* Columbia: University of South Carolina Press.

Robinson, A. (2002). *The man who deciphered Linear B: The story of Michael Ventris.* London: Thames & Hudson.

Crime

Crime, in the strictest sense, is the willful commission and/or omission of established codified laws of a society, nation, or culture. A less formalized understanding of crime includes the committing of any commonly recognized prohibited act worthy of punishment as established by the norms, mores, and values of a given population. Crime has been widely studied because it is considered a phenomenon when members of a community knowingly commit offenses either against another citizen or against the community or state. The study of crime is essentially grounded in two different perspectives, which are environmental based and biological based. Biological-based theories are concerned with all potential influencing external forces endemic to the social world.

To better understand crime, one must have some understanding of the fundamental social-based theory regarding the power dynamics behind the creation of law and how laws impact crime. Most people think of laws as a means to create fairness and equality for all members of law; however, law may also reflect the controlling interests of the sovereign (government) or those with influence in that society. For an act to be relegated to the status of a crime, it must generally have the condemnation of the majority or those in authority to mandate it into law. In any society, there are those who have greater personal power, due to their wealth, class, official position, or social affiliations. Such persons have the ability to influence the creation of laws that satisfy a personal need or augment and strengthen their social status. This is to say, laws can favor the powerful and actually serve to keep other members of a society at a disadvantage. An act or specific behavior cannot be a criminal offense and the offender cannot be punished unless the act has formal criminal status.

The creation of laws or governing rules within any population of people must therefore be understood as

a social process with potentially complex interrelationship and motivations. Consequently, committing crimes and casting certain members of a society as disobedient offenders can have very serious outcomes. Consider how the Christians were effectively labeled as both social deviants and enemies of the state by the ancient Romans. The wholesale persecution and execution of an entire group of people followed solely due of their spiritual beliefs. Such persons, in the current common parlance of criminology, are referred to as a criminal "subgroup." Many contemporary studies of deviants as a criminal subgroup have been examined as an outcome of social power with respect to who does the labeling, who generates the label, and how the labeled persons are affected. One of the findings is that a key determinant of the labeling process is how effectively those in power can apply the deviant label so the majority population reacts to and the subgroup in question accepts the label.

Source: © iStockphoto/Liv Friis-Larsen.

Consistent with the influence of social power differences is the effect of social structure. Social structure theories maintain that members of the lower class are involved in more crime than those of the upper or middle class. Social structure theories are divided into three areas: strain theory, cultural deviance theory, and social disorganization theory. Strain theory emphasizes that persons of the lower class are unable to attain higher goals or values and this restriction is due to their economic limitations. Their inability to achieve these goals causes strain, which leads some people to reject the established social standards of behaviors. The inability to cope with strain causes some individuals to proceed through life without norms or values to guide their behavior, leading to eventual criminal transgressions. Social disorganization theory maintains there are geographic areas within urban centers that are far more transitional with respect to establishing a sense of community. Such transitional neighborhoods are characterized by light industry and lower-class worker residences that tend to be in a deteriorating and disorganized condition. The disorganization leads to juvenile delinquency and juvenile gangs and ultimately to increased levels of crime. Cultural deviance theory holds that criminal behavior is simply an act of conformity to lower-class values based upon their differences with the dominant cultural norms and standards. For members to obey the laws and rules of the dominant culture, lower-class members (usually racial and ethnic minorities) are placed in conflict with their class peers.

Social interaction theories address crime from four perspectives: social learning, social control, symbolic interaction, and labeling. Social learning theories maintain criminal behavior is the result of socialization, where peers are taught criminal acts are not only acceptable, but preferable to socially approved acts. Social control theories begin with the belief that human nature is the motivating force behind criminal behavior. The presence of some form of social control keeps humans within the range of acceptable social behavior. However, in the absence of suitable controls, humans are permitted to engage in criminal conduct. Symbolic interaction theories place emphasis on the perception and interpretation of situations, which influence the response. It is theorized that humans will respond in the role or demeanor that others have characterized them. Within the scope of this theory, then, all behavior is a function of self-perception as individuals believe others perceive them.

Biological theories address factors that are not within the environmental-based family of explanations of crime. Beginning with the work of Richard Dugdale in 1877, researchers have sought a biological explanation to criminal behavior. Dugdale's early studies focused on heredity to establish a genial connection of family degeneration. He researched families with

histories of criminal involvement, poverty, and mental health problems. His belief was that the family lineage was defective and persons of degenerated criminal stock would produce similar socially defective offspring. His work was sharply criticized as incomplete and unreliable.

An Italian physician named Cesare Lombroso developed a theory known as *atavism,* which held that criminals are predisposed at birth to criminal behavior. Criminals were considered genetic throwbacks to primitive man, with underdeveloped brains. In addition, Lombroso identified several physical characteristics that were indicative of a distinct "criminal type." Some examples of these include large jaws or cheekbones, unusually small or large ears, abnormal teeth, long arms, fleshy lips, and receding chins. Following Lombroso, Charles Goring conducted comparisons of English convicts and noncriminal citizens. He concluded that criminals were shorter and weighed less. This research was challenged because Goring failed to account for the differences in environment. In 1939, Ernest Hooten's study found that convicts tended to have physical characteristics such as low foreheads, long necks, and crooked jaws. Like Goring's research, Hooten's work was criticized for being methodologically flawed.

The efforts of William Sheldon to establish a biological connection to crime is especially significant because it was the first time that a quantitative grading system was developed to gauge the physical traits of criminality. Sheldon found that all people have some elements of three distinct body types: endomorphic, ectomorphic, and mesomorphic. The mesomorphic qualities or traits were determined as especially representative in criminals. His quantitative approach assigned a number on a scale with a 7-point maximum. The three body types were each assigned a number depending on how strongly or significant traits were exhibited in a given individual. This quantification is called a *soma type* and might look like this: 4.6 2.1 5.4. The center figure is always the mesomorphic figure. Naturally, the shortcoming of this approach is that the body type assessment is very dependent upon the interpretation of the assessor and is therefore subjective and unreliable.

There have been a number of other approaches to studying potential biological relationships to criminal behavior. One that was popular for a while was the belief that those who committed crimes were less intelligent than other individuals. This generated research into the intelligence test scoring of delinquencies. The standard IQ test score comparisons created a great deal of controversy because the tests were considered invalid across racial and class lines. Studies also explored chromosome abnormalities with respect to the "XYY" syndrome's relationship to violent crime. It was theorized that the Y chromosome is the designated "male" chromosome and that males are far more violent than females; the extra Y chromosome in some males may reveal an increased proclivity toward violent behavior. However, the studies were unable to confirm any such relationship.

— Richard M. Seklecki

See also **Aggression; Deviance; Eugenics; Norms**

Further Readings

Denno, D. (1985). *Biological, psychological, and environmental factors in delinquency and mental disorders.* Westport, CT: Greenwood Press.

Downes, D. (1982). *Understanding deviance.* Oxford: Clarendon Press.

Guenther, A. (1976). *Criminal behavior and social systems.* Chicago: Rand McNally.

Johnson, E. H. (1974). *Crime, correction, and society.* Homewood, IL: Dorsey Press.

CRIMINOLOGY AND GENETICS

During the 20th century, it was not only the Nazis of Adolf Hitler's Germany who embraced the doctrine of eugenics, which held that some groups of people were genetically superior and others genetically inferior. Eugenics had its diehard adherents in the United States as well. One of these was the influential American scientist Henry Goddard. To further actual social policy, Goddard wrote about the Kallikak family. They lived in a region of the country still mysterious to many, the Pinelands, or the Pine Barrens, of New Jersey.

According to Goddard, some 200 years earlier, the Kallikaks had split into an uplifted half and a morally and socially degraded clan. The split came when Henry Kallikak impregnated a degenerate tavern girl. Thus, he combined two of the era's greatest "hot button" issues: eugenics and

prohibition against alcohol. According to Goddard, Henry Kallikak's progeny descended into a social morass of immorality, depravity, and crime. The last of the "bad" Kallikaks, a woman, was living confined in the Vineland, New Jersey, School for Feeble-Minded Boys and Girls. The Kallikaks seemed to be a living representation of what George William Hunter had written in his 1914 *A Civic Biology,* "It is not only unfair but criminal to hand down to posterity" such an unwholesome set of genes. The only remedy was to sterilize those who were considered as being such genetic "carriers." In the cause of eugenics, untold hundreds, perhaps thousands, of patients were sterilized in mental institutions throughout the United States—all without their consent.

Goddard's account became an accepted part of American sociology and psychology textbooks as late as the 1940s. There was only one problem, however: Goddard had fabricated the entire story to prove his point. There never had been any Kallikaks. Goddard's prostitution of science to serve his own theories rings even more true today. Increasingly, powerful psychiatric drugs have been prescribed for apparently disturbed young people, both here and in the United Kingdom. A major category has been antidepressant medications. Yet, in the early 2000s, a frightening wave of suicides caused Great Britain to virtually enact a legal ban on the use of such drugs for young people, and a movement is afoot toward the same goal in the United States. (On February 13, 2005, a policy was announced to further study the risk of suicide among adult users of the antidepressant drugs.)

— John F. Murphy Jr.

FORENSIC ARTISTS

Forensic artists, it can be said, are those who truly enable the dead to speak to the living and bring their murderers a critical step toward final justice. The pioneer in the field lived almost a century ago, the Swiss Wilhelm His. He was presented with a skull that was supposed to be that of the composer Johann Sebastian Bach. His did such a superb job and the likeness was so good that the skull was declared to be definitely that of Bach. No one knows for sure at this point whether it really is.

Sometimes, however, forensic artists can work in the opposite direction: They can produce images of the murderers themselves. On December 7, 1971, in New Jersey, the murder of the List family shocked the state. As reported in newspapers such as the *Atlantic City Press,* police found a massacre at the List house in Westfield, New Jersey. Helen List, 45; Patricia List, 16; John List Jr., 15; Frederick List, 13; and Alma List, a venerable 85, were all found brutally murdered. Suspicion soon centered on the father, John List, the only family member not found in the slaughterhouse that was now 431 Hillside Avenue.

The police investigation unveiled that List had cleverly conceived the murder plot and had shot his entire family on November 9, 1971. He had informed his pastor, Reverend Rehwinkel at Redeemer Evangelical Lutheran Church, after he slaughtered his family, that they were in North Carolina and that he would be joining them there. Then, John List disappeared—for over 15 years. By 1985, Police Captain Frank Marranca had inherited the "cold case" file of the List murders in Westfield. In 1988, Marranca took the extraordinary step of contacting the executive producer of the television show *America's Most Wanted,* Frank Linder. Linder contacted Philadelphian Frank Bender, who was a forensic artist who had reconstructed the images of murder victims. Working with Richard Butler, a forensic psychologist, Bender produced an image of John List, aged to how he would look at that time.

With the show's host John Walsh explaining the murders, the List story was aired on May 21, 1989. Some 300 calls came in to the television show's crime line, including one from Wanda Flannery, who had been for some time suspicious that her neighbor, Robert Clark, was indeed the missing fugitive. Flannery was right. Clark was arrested, and through fingerprints, he was positively identified as John List. On April 12, 1990, he was sentenced to four consecutive life terms for the murders he had committed almost two decades earlier.

— John F. Murphy Jr.

PHYSIOGNOMY

Physiognomy, a pseudoscience related to phrenology, is the practice of reading faces. Physiognomists believe they can determine personality traits by studying the features of a person's face. This is not a new development, but one that dates back to Aristotle, who is credited with writing a treatise on the practice. He believed that certain characteristics were derived from certain types of features.

In the 14th century, people such as Giambattista Della Porta and Barhele Cocles believed you could evaluate people's faces by determining what animal they most looked like. For example, if you looked like a pig, you were sloppy and brutish. Cocles believed physiognomy was a science. He said that "People with snub noses are vain, untruthful, unstable, unfaithful, and seducers."

Physiognomy is sometimes associated with astrology and has been used as a method of divination. In 1743, when King George II was king, Parliament passed a law forbidding the practice of physiognomy. Those caught practicing it could be publicly whipped or imprisoned. Novelists of the 18th century used physiognomy when creating characters for their novels. Physiognomy can be used as a form of fortune-telling, along with graphology, phrenology, and palmistry. Proponents of physiognomy used it as a method of detecting criminal tendencies in the 18th and 19th centuries. Racists still use it to judge character and personality.

Dr. Edward Vincent Jones, a U.S. Superior Court judge in the 1920s, began studying physiognomy. Fascinated by similarities in people he met in the courtroom, he developed a list of 64 physical traits that he believed were accurate indicators of a person's character. Jones believed that tolerant people had a space equal to the width of an eye between their eyes. These people he believed were good-natured, easy-going, and inclined to procrastinate. He thought a fold of skin over the eye identified a person with an analytical mind. An exacting person had a small line or two between the eyes. Intolerant people had eyes close together and were perfectionists.

Also in the early 20th century, Holmes Merton believed he could match a person's character to a suitable job with his Merton Method. Many large corporations used his system in the first half of the 20th century. Although physiognomy is now considered a pseudoscience, many people still believe in the practice of face reading.

— Pat McCarthy

Critical Realism

Critical realism is best understood as the philosophy that maintains that we can know things about the world because we can gain reliable knowledge about it, although always with the proviso that we must not be overly confident or naive about the quality of the information we bring in. *Critical realism* as an identifiable term arose in the United States as an answer both to idealism and to earlier rejections of idealism. Critical realism was first identified and articulated as a coherent philosophy by the American philosophical naturalist Roy Wood Sellars (1880–1973), in a book called *Critical Realism*, published in 1916. The same year, a collection of essays began to take shape to develop the idea. The book was delayed by the exigencies of war and was published in 1920 under the title *Essays in Critical Realism* (1920). Several prominent American thinkers, or people who went on to become prominent thinkers, contributed to this work: As well as Sellars, contributors included George Santayana (1863–1952), Arthur O. Lovejoy (1873–1962), and Durant Drake (1878–1933).

Durant Drake, whose essay was placed first, argued that critical realism escaped the problems of both "epistemological monism and epistemological dualism." The critical realists agreed with the pragmatists, for instance, that evidence for the existence of the external world was overwhelming, primarily because the evidence "worked." But they were suspicious of the monists' quest for too certain a link between the external world and our knowledge of it. The critical realists were naturalists without being reductive materialists. As Sellars put it: "Physical things are the objects of knowledge, though they can be known only

in terms of the data which they control within us." Several of the contributors to *Essays in Critical Realism* went on to articulate further their ideas, the most notable results being Lovejoy's *The Revolt Against Dualism* (1930) and Sellars's *A Philosophy of Physical Realism* (1932).

But if the critical realists knew what they were against, they were less clear what they were for. The contributors to *Essays in Critical Realism* straddled a variety of opinions across the metaphysical, social, and political divide. And during the 1930s, the focus shifted away from the epistemological questions of the *Essays* toward social and political questions. And after World War II, the intellectual trends moved further away from critical realism when philosophy took the so-called linguistic turn. An important voice for critical realism, without using the term, was the American philosopher Marvin Farber (1901–1980), the latter part of whose philosophical career was spent criticizing some of the more extravagant implications of phenomenology. In the United Kingdom, critical realism has been championed by the philosopher Roy Bhaskar (1944-), who was also instrumental in the establishment of the International Association for Critical Realism in 1997. The IACR seeks to further the aims of critical realism and facilitate contact between critical realists around the world.

The foundation of the IACR is one manifestation of the reemergence in the 1990s of critical realism as an important philosophy. Once again, it has emerged largely as a reaction to the excesses of earlier trends. Today's critical realists are reacting to the perceived follies and excesses of postmodernism. A worthwhile example of the recent styles of critical realism can be found in a collection of essays edited by José López and Garry Potter. Heavily influenced by Bhaskar, the critical realism as outlined by López and Potter claims that we can have good, rational grounds for believing one theory rather than another. It is not simply an arbitrary choice, as postmodernists argue. Furthermore, we can have these grounds because some theories give better accounts of reality than others do. Critical realists accept that knowledge is constructed in society and that it is built up with language and that all these construction methods are fallible. But it refuses to then leap to the conclusion that no objective knowledge or truth is possible. And notwithstanding all the objections that could be made about the ways science gathers its knowledge, the fact remains that is does have the best track record of producing reliable knowledge about the world and that we ignore this at our peril.

Another, stronger, version of critical realism has been advanced by the philosopher John Searle, when he spoke of "external realism," which he defines as the view that there is a way things are that is logically independent of all human representations. Searle calls facts about the external reality "brute facts," which have logical priority over what he calls "institutional facts," which are about the institutions human beings create, such as marriage or money. External realism functions as part of the taken-for-granted part of our surroundings. Searle argues that the very first step in combating irrationalism is to defend the notion of external realism and refute arguments against it.

More recently still, Susan Haack has spoken of "critical common-sensism," which is even closer to critical realism than Searle's external realism. Haack outlines critical common-sensism as referring to the idea that there are objective standards of better and worse evidence, that observation and theory are independent, that scientific theories are either true or false, and that the determinants of evidential quality are objective even when the judgments of them are perspectival or dependent upon situation or context.

Searle and Haack, López and Potter, are all reacting against the radically skeptical, even nihilist implications of the postmodernist attacks on objectivity, science, and reason over the past 30 years. And as several commentators have noticed, the epistemological questions raised by critical realism are very relevant to the discipline of anthropology, cultural anthropology in particular. Many commentators have noted the serious divisions over questions of the construction of social reality, the evaluation of rival claims, and the politics of research. Lawrence Kuznar is one among many who has articled what could be described as a critical realist appeal for an anthropology that takes science seriously. Related to the epistemological challenge articulated by Kuznar, anthropologists like H. James Birx have spoken of what he calls "dynamic integrity" as the motivational agent behind the critical realist approach.

— *Bill Cooke*

See also **Critical Realism in Ethnology; Postmodernism**

Further Readings

Archer, M., Bhaskar, R., Collier, A., Lawson, T., & Norrie, A. (1998). (Eds.). *Critical realism: Essential readings.* London & New York: Routledge.

Haack, S. (2003). *Defending science—Within reason.* Amherst, NY: Prometheus Books.

Kuznar, L. A. (1997). *Reclaiming a scientific anthropology.* Walnut Creek, CA: Alta Mira.

López, J., & Potter, G. (2001). (Eds.). *After postmodernism: An introduction to critical realism.* London & New York: Athlone Press.

Searle, J. (1996). *The construction of social reality.* London: Penguin.

Critical Realism in Ethnology

Critical realism is a social science metaphilosophy that offers ethnology an ontological grounding necessary to realize its full potential as the study of humanness. Humanness is a feature of the world derived from, but not reducible to, evolution by natural, sexual, and kinship modes of selection. An emergent feature of humanness is the ability to glean, winnow, and trade on information for sustenance in natural and social environments. Thus, any philosophical grounding of ethnology must explicitly accord due roles, in the interaction of matter and ideas, to both evolutionary structure and personal and social agency. The interaction of structure and agency, or dialectical process, centers on human experience. Experience, in turn, has a nature. It has certain properties and powers not derived from, or limited to, particular culturally specific worldviews. Critical realism intends to describe both the precultural world and the dialectics of sociocultural forms, that is, to delineate the real conditions that make ethnology possible. Because critical realism has emerged in part to surmount ills of positivism on one hand and hermeneutics on the other, describing it is inherently historical and contrastive.

Ethnology's Ambivalence Toward Ontology

The Absence of Ontology From Culturism

A significant strain of some but not all ethnology has for many decades lacked grounding in a defensible ontology. In place of an ontological basis for human affairs, this strain has tried to pose culture, and for this reason, it may be referred to as *culturism*. The term applies to any ethnology that either (a) neglects to theorize reality or (b) denies it, tacitly or explicitly, in any of three general ways: (1) regarding the world as unknowable or irrelevant, (2) believing the only referent of any proposition is some further aspect of culture, not the world, or (3) denying the capacity of evolved experience to access truth about reality. In addition, this disparate school often blurs the definition of culture, sometimes characterizing it in such ways as "traits," "traditions," elements," or "the meaningful world." This last phrase illustrates the problem, for does "culture is the meaningful world" mean that culture comprises those limited parts of the world certain subjects find meaningful? Or is it that the meaningful world is the only one knowable by them? Is culture the meaning? Or is culture the world itself, which is found meaningful, or even created by meaning?

Culturism typically does not probe such ontological distinctions, and large bodies of ethnological hermeneutics, reflexivity, constructionism, poststructuralism, and postmodernism all circle around it. These tend to see culture as a local mode of epistemology, that is, as meanings, ideas, and values. While not wrong in itself, the view is, in addition, hypostatized so that culturalized epistemology is placed in opposition to philosophical and scientific ontology. It claims that culture is an irreducible filter between people and any possible real objects of perception or conception. In such presentations, these objects themselves thus fade from consideration, to be replaced by representations without due links to concrete referents. The existence of culture is thus, self-contradictorily, said to preclude pursuit of knowledge about ontology; culture intercedes between humankind and whatever reality might lie behind it and ends up replacing reality with particular cultural views. These views then become the primary object of ethnological study, which turns out to investigate culture at the expense of the very people that culture informs. As a leading ethnologist of this persuasion recently wrote, ethnology should be the "genealogy of secondary descriptions." That is, ethnology should concern texts and their relations, not people.

This culturist view misses two points emphasized in critical realism. First, ideas and culture are not wholly epistemic merely because they do concern knowledge. They also have an ontic status in their own right. Ideas themselves are real, as known from

their possible and actual observable effects on humans and the world. For example, the idea of personal honor can underlie people's structuring of many highly consequential behaviors, cooperative and agonistic. Likewise, the idea of justice can motivate people to redistribute social and economic goods. To claim that the ideas behind these effects are not real is to render the motivation behind the effects, and thus the effects themselves, partly causeless and unexplained. Second, ideas can be referred to as such. Were they not real, this would be impossible. When one person cites, however tacitly, what another just said as a reason for his or her own part in a dialogue, that person acknowledges the statement's reality and renders the dialogue coherent. So, ideas are real conceptual tools with which real people really leverage reality.

To draw the sharpest heuristic contrast here, critical realism notes a contradiction within culturism, that it first hypostatizes culture by denying its connection to independent reality, then at the same time tries to locate culture in place of the world. The culturist freezing of culture above the flow of dialectical process amounts to theorizing the primacy of worldview over practice. Since worldviews are variable and fractious, humanness has almost gotten lost in the debacle, the breakup of ethnology, known as "cultural studies." Cultural studies expressly rejects any possible grounding in theorized reality. To the extent that some warmer versions of culturism do melt into reality, they only prove its inescapability and the need for due theorization. But whether such engagement is even possible is a topic some try to rule out of court. The introduction of evidence concerning reality existing in its own right is often equated with reductionism, scientism, biologism, progressivism, racism, sexism, conservatism, empiricism, and/or Westernism. Culturism actually wishes to preserve humanness for humans, but the attempt to do so by isolating culture from anything material turns culturism instead into a kind of spiritualism, in which people are defined by something absolute, ineffable, essential, unassailable, and immaterial. Culture itself is placed beyond critique. So, culturism generally skirts the crucial issue of what the precultural world must be like for ethnology itself to be possible. Yet we know there is such a world precisely because the capacity to develop and use knowledge evolved in it.

Though stressing worldview, culturistic ethnology nonetheless remains haunted by the sub-rosa realization that viewpoints can and often do have consequences. It therefore sometimes hedges on the question of reality, invoking untheorized presuppositions about it when an argument calls for them, yet discounting this very move by putting "reality" in quotation marks. The most ardent culturists even contend that there is no reality, that all is just viewpoint, interpretation, discourse, and politically motivated self-interest. Such reverse absolutism, that absolutely no view can access truth about the world, leads culturism to routinely commit three additional sorts of errors, as noted and avoided by critical realism: (a) self-contradiction, (b) theory-practice inconsistency, and (c) the epistemic fallacy. The self-contradiction appears in culturism's declaring what is possible in a world it denies. The theory-practice inconsistency lies in proclaiming all knowledge cultural, while casuistically admitting precultural reality ad hoc. Also inconsistent is culturism's presupposition that its own views are indeed materially consequential, for if they weren't, they literally wouldn't "matter." Then, culturism would have no reason to argue them. Critical realism, by contrast, holds that if views can matter, there must be a world they matter in and it should be theorized.

Finally, the epistemic fallacy is the claim that what is real about the world can be adequately reduced to what is known, that knowledge alone establishes what is effectively real. The world as posited by a given cultural view is the only one relevant to it and may exist in epistemically grounded contrast to neighboring worlds. That claim is easily refuted by the mere fact that knowledge, as a general human capability, evolved in the matrix of reality as it was obtained in the environment of evolutionary adaptation, not vice versa. Knowledge is an adaptation; it is humankind's occupation of the epistemological niche in nature. Nature itself contains information for creatures able to access it, and intelligence, the use of knowledge, evolved to exploit that possibility. A creature capable of accurately inferring the existence of a far-off edible carcass from the mere sight of wheeling vultures has a great advantage over one not so capable. But there's the rub. Many ethnologists do not acknowledge evolutionary theory, hoping that humans can be shown to be exempt from its constraints.

Culturism's Errors Regarding Evolution

The misgivings culturism has about evolution, coupled with its misunderstanding of evolutionary theory, together explain its weaknesses regarding reality and ontology. Such doubts first arose around the

turn of the century, especially among Franz Boas and his students, who opposed an errant social Darwinism trying to co-opt the power of evolution by means of natural selection on behalf of social engineering. Social Darwinism posited group and even "racial" survival as an index of group "fitness," and fitness as an indication of rightness in the moral sense. Rightness, in turn, implied a "natural" entitlement. Its conclusion was that more powerful groups should, by one means or another, weed out the less powerful. This provided an ostensible justification for some of colonialism's and national socialism's most heinous depredations.

But it only did so by profoundly distorting the evolutionary notion of fitness. Properly understood, "survival of the fittest" is an utterly amoral, nonevaluative, purely descriptive, nonprescriptive statement that notes the ex post facto contingent results of selective processes. It is neither good nor bad, in the hypothetical eyes of nature, that any life form should exist at any given time. Most that have ever existed are now extinct, including three genera and perhaps 10 species of pre-*sapiens* hominids. Evolutionary theory shows that which traits contribute to fitness always depends on the actual existing environment, and environments change. Thus, the adaptiveness of any specific traits may wax or wane. Because the detailed characteristics of future environments with which humans might be forced to cope are uncertain, we cannot accurately foresee what future fitness will entail. Thus, we do not now know with any precision what specific traits will be adaptive and selected for, other than general, basal, reality-linked intelligence, mobility, and creativity. For this reason alone, it is not justified to presume, with social Darwinism, that the aggrandizement of some present modes of power is "morally" enjoined.

But social Darwinism also fails a second time, and again on evolutionary grounds. We do know that future human environments will contain humans and that all humans have basic rights founded on nothing more than their humanness per se. Human rights are not culture dependent—though not all cultural practices are equally defensible in the court of human rights. Rights must be adjudicated, for intentions and outcomes vary. But it is indubitable that the legitimate idea of legitimate rights exists and that all peoples have a sense of natural entitlements. Moreover, though the full content of the category, "rights" can be argued; and critical realism holds two human rights to be grounded in the reality of humanness. They are liberty, that is, the right to be free of oppression, and the right to learn. Liberty inheres in humanness because social categorical distinctions between individuals are cultural impositions, despite often being propounded on the basis of supposed links between certain people and natural forces. Such suppositions can be attributed to personal merit evinced by good fortune, long tradition, class privilege, racial ascription, divine right, and so on, none of which prove essential to humanness. If such categorical distinctions are not natural, then rights ostensibly deriving from them cannot be natural either. Thus, liberty is the natural right to choose the social constraints under which one agrees to live. Learning, in turn, is essential to humanness because *Homo sapiens* evolved precisely as an information-seeking creature. By their very nature, humans exploit real information by means of evolved intelligence. Thus, to structurally deny anyone the opportunity to learn is to block the realization of his or her own humanness and violates a fundamental human right. Together, liberty and learning go far toward eudemonism, or pan-flourishing, which humanness itself thus enjoins as the final aim of human endeavor.

In this way, humanness is seen to have an inherent moral component, which establishes the real basis for rights to liberty and learning. It is important to demonstrate the ontic nature of morality per se, its existence prior to being given particular content, for only by so doing can the culturist claim that all morality is cultural, and none ontological, be thwarted in principle. This is done as follows: Humans are conscious; consciousness entails the ability to envision alternate actionable possibilities; mutually exclusive alternatives must be selected between; intentional selection demands, and implies the existence of, evaluative criteria; and criteria necessarily entail notions of preferable and not preferable, approach and avoid, "better" and "worse." Thus, morality per se inheres in humanness. And two of its aspects, the twin rights of liberty and learning, also qualify as ontic, that is, existing prior to any culturalized inflection of humanness. Beyond liberty and learning, however, the ethical content of criteria informing any given strategy is not given in nature. Even the two natural rights are often more than a little difficult to operationalize. But all humans know that rights and wrongs exist as a categorical reality, regardless of the content variably ascribed to them. So although in prehuman

nature, doing the "wrong" thing is not possible, because morality does not exist in prehuman nature, its possibility emerges when humanness does. Morality is an emergent property of the world, and its existence, the reality of moral naturalism, delegitimizes any attempt to exterminate people, whose right to liberty may be justifiably restricted only to the extent that they, by committing crimes, say, thwart the liberty and learning of others.

This evolutionarily grounded delegitimization of social Darwinism accomplishes two important things for ethnology. First, it allays fears that it might be evolutionary theory per se that, by "biologizing" people, robs them of their humanness. Quite to the contrary, it is precisely evolutionary theory that accurately describes humanness and its moral place in nature. By denying human nature, culturism unwittingly subverts its own best means of establishing rights. Second, to clarify the relation between humanness and reality is to free ethnology for its true task, the description of intelligibilia and their relation to consequential, morphogenic processes. "Intelligibilia" includes anything graspable by the human mind, anything intelligible, and it is the critical realist definition of culture. Culture, through agents' appropriation and refashioning of intelligibilia, interacts morphogenically with real conditions to engender subsequent new conditions of either continuity or change.

Boasian objections to social Darwinism spawned the culturist, antibiology backlash that still distorts the culture concept itself. It tries to put culture in place of biology as humanity's prime mover, when the solution in fact lies in realism, the dialectic of biology and culture, what has been called "coevolution." This concept was first most clearly articulated by William Durham, and though the details of cases are highly complex, the prima facie contention that ideas and matter are coconstitutive in humanness is incontestable. But early 20th-century Boasian culturism and its latter-day adherents held and hold that everything from warfare to gender relations, childhood development, and religion are functions of culture unmodified by any proclivities rooted in nature. Now many ethnologists treat such tenets as received wisdom. The sole alternative seems reduction of humans to creatures of base instinct, incapable of channeling their appetites. Yet there aren't even any animals that fail to channel their appetites, and humans obviously do channel them routinely.

By midcentury, another purported reason to eschew evolution appeared to an ethnology already committed to the hegemony of culture. Culturism's stance against social Darwinism convinced it of the utter insupportableness of any mode of selection above or below the level of the individual. Thus, when William Hamilton posited his model of kin selection, culturism ruled it anathema. Kin selection shows that selection operates at both the level of specific genes and genetically related individuals (i.e., small groups). The new term *sociobiology*, used to describe the interaction of biology and culture in human affairs, was wrongly taken to imply that social circumstances were all mere epiphenomena of inviolable biological mechanisms. Such misunderstandings, and misrepresentations by some of sociobiology's early proponents, created the impression that sociobiology intended to reduce humanness to biological drives. Again, that humans obviously do alter their behavior and conditions in light of many considerations should have sufficed to allay such fears. But in an overreaction to sociobiology's attention to our species' evolutionary background in nature, culturism sought to denature humans by discounting evolution's role in shaping humanness. Conversely, it also sought to make nature a purely human construct, something dependent on culture for its existence. Again, that such a thoroughly plastic world is, by all evidence, not the one we inhabit should have warned culturists off this course.

Learning, Liberty, and Practice

Thus, the implications of culturism are the very opposite of what most culturists intend. The antidote to totalitarianism is not culturism but eudemonism, pan-flourishing, the fostering of conditions that support the common weal through learning and liberty. These are natural rights and are conjoined very simply: Humans are information-seeking creatures that naturally wish to absent constraints on their happiness. Our innate craving to learn is a conative adaptation to the need to exploit information in the social and natural environments, motivating us to be active seekers of information. When drinking water is scarce and thirst creates dissatisfaction, humans seek information in and about the world. They mentally construct virtual models that hypothesize as to water's possible whereabouts. Such basic approaches to human needs are not dependent on culture, though culture may constrain who in a group seeks water

where, how, and when. But no humans willingly brook what they regard as unwarranted constraints on their liberty.

Even beyond this level of basic needs, a great deal of everyday practical behavior is also comprehensible to humans by virtue merely of their being human. A person of Culture X seeing a person of Culture Y paddle a canoe will already understand much of the paddler's present and near future experience, even though the person of Culture X may never before have seen a canoe. He will understand that the canoeist is an intentional being, the canoeist is male or female, he or she is of an approximate age, she wants to go a certain direction, he exhibits a certain level of accomplishment, the boat is floating, the river has a current, it's easier to paddle with the current, the water will rise if it rains, rain comes from above, if the paddler falls out she will get wet, he will not be able to breathe under water, when the canoe disappears around the bend it disappears for everyone (not just those of a certain worldview), when night falls it will be harder to see, paddling will then be more difficult, the canoe will have to be secured for the night, the canoeist will likely be tired and hungry, and on and on. Such practically based knowledge comprises by far the better part of what is necessary for both successful paddling and the understanding of it. For this reason, critical realism highlights the primacy of practice and rejects the purported, culturist primacy of worldview. Culturally particular worldviews are irrelevant to the basic practice of getting a canoe upriver, precisely because intentionality, sex, age, floating, the current, rain, wetness, breathing, darkness, the laws of motion, gravity, fatigue, and so on are the same for everyone. This does not deny culture its own importance.

Dialectics and Reflectionism

But general flourishing, eudemonism, can be a guiding principle only under the recognition that both what flourishing entails and how to achieve it are subject to constant dialectical revision, and for two reasons. Both have to do with the philosophical, critical realist description of the pre-cultural world. First, both natural and social systems are inherently open. They are not experimentally closed to limit variables; they are subject to input from outside local systems; and they are subject to the emergence within them of novel properties and powers. This means that the best descriptions of them are always provisional and cannot be reified, for they must change with changes in the systems themselves. Second, human concepts and strategies are inherently fallible. We can make mistakes, these being our constant reminder that reality does indeed lie behind all possible conceptions of it. Eudemonism is thus not to be conceived as an absolute condition, for it is predicated on both the ongoing dialectic of structure and agency and the dialectic's companion feature of reality, the human ability to learn.

One thing most humans learn quickly is that some models of reality are better than others precisely because they fit it better. The best matches make the best models, and so they also work the best, a fact of which no practically inclined indigene needs to be convinced. This position thus directly contravenes the absurd but prevalent culturist contention that knowledge does not, and cannot, "reflect" reality. This error results from the fallacy that a model must be perfect in every respect, that reflection must be an utterly undistorted image of reality, to be any adaptive good at all. But because errors are in fact part of the game, no model meets such specifications. Culturism mistakenly inflates this feature of models, that they are inherently imperfect, into the notion that all models must be completely arbitrary. Culturism thus adheres to a stanch antireflectionist philosophy. To debunk this position, just one telling difficulty will suffice: that people operating under grossly faulty descriptions of reality eventually fail to thrive.

In fact, a hypothetical reliance on errant views of real conditions in the environment of evolutionary adaptation would have prevented hominid intelligence from evolving in the first place. The grasping hand reflects the structure of tree branches for brachiating and, fortuitously, also that of stones that can be turned into tools. The grasping mind is ultimately no less beholden to real conditions for its adaptiveness. For evolutionary reasons, then, it is patently not the case, as Richard Rorty, a culturist philosopher, has put it, that no description of the world can be invalidated, on the grounds that the supposed invalidation would be just another redescription, under which no real world reposes. For Rorty and this school, the world is just texts all the way down. But from a due evolutionary position, it is obvious that any human group grounding its attempts to adapt to real conditions on arbitrarily selected descriptions of them, on the premise that no description can possibly be better or worse than any

other, would soon be trying to comprehend the all-too-real speed of its demise. It is only because culturism has repressed the adaptive imperative, and repressed adaptation because culturism irrationally eschews evolution by natural selection, that it could paint itself into such a corner.

How Real? Why Critical?

Critical realism is realism because it theorizes the real social and natural dimensions of the world that exist apart from human knowing. As critical realism's founder, Roy Bhaskar, describes it, the social world consists of a three-layered ontology, each with its own properties and powers: structural tendencies, as known by their effects; causally engendered events in time and space; and personal experience. The natural world consists of a four-layered ontology comprised of chemical, physical, biological, and conscious reality. Each layer is derived from, but not reducible to, prior layers. Emergent features are common, as when automobility emerges from life and cities emerge from productive socioeconomic structures. Sociocultural processes in which structure and agency relate dialectically are summed by Margaret Archer as "morphogenesis." In morphogenic processes, agents deploy and/or invent concepts to exert leverage on existing structures on behalf of their perceived interests. Such sociocultural phenomena are not culturally particular, for humans have agentive powers merely by virtue of being human, and they deploy them in and on the conditions they face.

Next to such matters—for matter is indeed what grounds practice—culture appears as a later and secondary development, which is exactly what it is in the evolutionary sense. Hominids did not suddenly lose their existing, practical, adaptive skills when and as culture emerged. Rather, culturally inflected values also evolved alongside practical activities that had sufficed on their own as adaptive schemes for millennia prior to culture's emergence. Still, when culture emerges and is deployed, duly modified structures of society and nature become the real preexisting conditions that future agents will have to contend with. And at the conceptual level, ideas themselves have structural relations of compatibility, as in capitalism and market expansion, or incompatibility, as in mysticism and empiricism. Beyond this, critical realism theorizes many additional conceptual relations independent of culture, and demonstrates their possible sociopolitical correlates for interested agents. Both people and society have notable, emergent, culturally nonspecific properties and powers, and the details of the morphogenic model are to be found in Archer's works.

Immanent Critique

Critical realism is critical because it recognizes that inherent in the best, most accurate descriptions of existing conditions lies an immanent critique of them. Right within a fact, an accurate description, is often expressed a value. This widely accepted observation is yet little known in ethnology, which still largely clings to the Humean posit that fact and value are utterly disjunct, that no "ought" can be derived from any "is." Were this true, cultures could establish their own unassailable values and projects, in utter independence of the very world that makes them possible. Here lies another culturist self-contradiction. Yet most ethnologists are quite familiar with the prototypical immanent critique, Karl Marx's description of capitalism. Marx simply showed that owners of capital were co-opting the surplus value of worker's labor. This social and economic fact, in and of itself, both implied and violated an implicit value, that of fairness. It also implied an agentive course of action: redress. Critical realism argues the moral imperative of producing the best possible descriptions of social and natural conditions, so that the immanent critique of conditions contrary to eudemonism can be expressed and acted on.

Scholarly sociocultural models that allow either structure or agency to predominate misrepresent actual sociocultural process. Structures dominating agency reduce people to mere bearers of culture, making them its pawns. Despite Claude Lévi-Strauss's immense contribution to ethnology, his overall model exhibits just this bias. Real people are missing from it. On the other hand, if agency dominates structure, conditions become largely irrelevant; indeed, would-be agents could encounter no real, resistant conditions on which their programs, strategies, or intentions could even be applied. This is the trap that hermeneutics, cultural relativism, and postmodernist discourse theory together all step into. They imagine culture as an omnipotent bellwether capable of leading docile conditions into any and every pen. A third error regarding the relation of structure and agency is found, for example, in Anthony Giddens's "structuration." This concept tries to conflate structure and agency, positing each as

immediately constitutive of the other, to account for the influence of both in actual behavior and cognition. But conflation precludes the analytical disentangling of the respective roles of agency and structure, and confounds the processual dialectic of material and idea as people use ideas in the attempt to work their will.

Philosophical Anthropology

Once anthropology itself was just philosophy. Philosophy was the investigation of humanness at a prescientific time when knowledge was still developed by deduction from first principles. Such a deductive principle was that humans are sinful, soul-bearing, instantaneously fabricated, immutable creatures of God. The span of this deductive approach to humanness, even outside the church, centered on the Enlightenment but stretched from well before it to the Victorian era just prior to the ethnographic revolution led by Bronislaw Malinowski. Philosophers from Descartes to Hegel pronounced on the nature of humankind. Cartesian dualism, Hobbesian strife, Rousseauian isolation, Lockean contracts, Humean experience, Kantian idealism, and Hegelian dialectics of the spirit all posited a kind of human being philosophically deduced. Such accounts remained clouded by the long shadow of medieval scholasticism. This largely precluded an investigation refigured, from the bottom up, as ethnographic description, to be followed by the induction of testable covering laws. Even Lewis Henry Morgan, Herbert Spencer, Edward Tylor, and James Frazer, despite a notable turn to the actual social world to enrich their models, were still essentially deductivists. They posited the nature of humanness, then adduced evidence cohering with the position.

Eventually, the naturalism of nascent science, powered by awareness of the ineluctability of natural and sexual selection, did induce investigators to take up the challenge of fieldwork. If it were true that humans are creatures subject to the same natural laws of selection as others, it called for the investigation of social forms as adaptive means. So, although anthropology was still philosophy, it had become philosophy by other means. The nature of humanness could no longer be deduced; nor, on the other hand, could ethnology be the mere acknowledgement of theory demanded by the force of raw data. The human study of humanness is dialectical, for our own understandings themselves become real and have real effects on the very social and ecological relations we study. Humanness evolved as the increasingly intelligent exploitation of available resources. This led to the eventual emergence of technological capacities geared to modifying reality in the interest of extracting yet more resources from it. Through fieldwork, in other words, the early ethnographers discovered culture.

Referential Detachment and Reflectionism

As we now would say, humanness is the adaptation that exploits the epistemological niche in reality. In 1872, the same year Charles Darwin published *The Descent of Man,* and well prior to the ethnographic revolution, A. Lane-Fox Pitt-Rivers appropriately defined culture as "emanations of the human mind." Such a view accepted that things can be known about the world, that people can know them, and that knowledge comprises humankind's chief adaptive tool. However, the fact that culture does emanate from the mind, that it leaves the mind, and that culture escapes its creators and takes on properties of its own creates the vexing problem of referential detachment. The links between culture and the world become problematic because no logical necessity demands that culture—ideas—must fit nature like glove fits hand. People can devise understandings and create social forms that turn out to be maladaptive because they do not match reality. The possibility of maladaptive behaviors, taken by itself, makes humans no different than any creature. But the human capacity to comprehend has an entailment that cultural forms, though their evolutionary emergence was initially prompted by selective pressure from the hominid natural and social environment, become referentially detached objects of knowledge in their own right. Cultural forms are real in the three senses that they have observable effects, can themselves be objects of reference, and their effects, even when maladaptive, can reveal truth about both humanness and the world.

The discovery of culture and its property of referential detachment thus became for ethnology very much a two-edged sword. It enabled ethnology to flourish as an independent mode of inquiry and to contribute greatly to the store of human knowledge. At the same time, the seductions of referential detachment created the possibility of culturism. This soon became no longer the investigation of human adaptation to the real world, but the courting of notions

detached from any possible reality. War, gender, adolescence, personality, religion, and much else were held, especially by still influential Boasianism, to be strictly functions of culture, behaviors that could and would change if socialization did. It was thus akin to behaviorism, its congener in psychology, and did not contravene positivism as it claimed to do.

Positivism explored the possibility that causation in social forms could be reduced to mechanics akin to chemical reactions. Though culturism despised the reduction of people to imitations of molecules, its own platform of socialization, or enculturation, presupposed just such a mechanical notion of cause in human affairs. Culturists seeking to free people from material constraints ended up fixing them to enculturation processes. The elaborate particularization of cultures did not change this central error, though it became a hallmark of culturism for the second half of the 20th century. Now, in partial recognition of the erroneous relegation of reality to the status of an epiphenomenon, some cultural relativists are backtracking, and emphasize only methodological relativism, the due suspension of judgment about alien lifeways in the interest of accurately describing them. Nonetheless, culturism has yet to theorize the reality it thus furtively lets in the back door, having long ago turned it away from the front.

What this antiscientism misses is that no adaptation need be perfect to prevail. It need only offer its bearers a competitive advantage, however slight, and it will spread through a socializing and/or breeding population. In the final analysis, it is culturism's posited impossibility of reflectionism that is impossible. Knowledge could not have evolved did it not provide a sufficiently accurate, and fallible, model of reality. Critical realism recognizes that fallibility is not merely an incidental feature of human modeling, but essential to it. Without fallibility, neither critique nor effective revision could obtain.

Of late, some culturism, finding no escape from its self-contradictions, has sought refuge in postmodernist irony. It avers that there is no truth, and no reality about which truth claims can be made. Culture is said to be the veil that humans create between themselves and whatever untheorized something it might once have been that prompted the rise of knowledge in the first place. Some maintain as a first principle that truth is but culture's attempt at self-validation, behind which no reality resides. Thus, the human capacity for judging the merits of alternative views—a capacity inhering in consciousness, and not subject to dismissal—is dismissed. Critical realism, by contrast, maintains that the truly liberatory resides in dialectically pursued eudemonism, in which judgmental rationalism is essential in deciding what values have merit and what courses to them are worth pursuing.

The Inner Conversation and Experience

If, as critical realism maintains, there is indeed some central link between humans and the world, communities and landscape, persons and place, word and world, past and present, structures and agency, how are we to conceive of it? The process in which these linked facets of reality are processually coconstitutive is capsulized as morphogenesis, the dialectic of structure and agency. Archer identifies the central link as the individual's internal conversation. In silent inward deliberation, constraints and volition briefly meld in informing thought and action, after which newly modified personal and social constraints and possibilities obtain. This formulation can profitably be augmented by John Dewey's notion of natural experience.

Archer holds that all conscious humans have an inner domain of mental privacy, where the intentionality necessary to drive sociality is generated. Agents have a silent say in what strictures and strategies they will deem actionable. This life of the mind is essentially private, not amenable to "extrospection." Even "introspection" inadequately describes the phenomenon, because it is not a matter of passively gazing into internal darkness to see what glimmer of self might catch the mind's eye. The self is, in fact, the inner conversation. This belies the culturist tenet that all varieties of human selves are entirely matters of cultural artifice, such that some humans may not have selves at all. But however it might be culturally inflected, the phenomenological self is actively deliberative, and shot through with evaluations of practical and moral import. "What should I do?" is no mean aimless rumination, but the most fraught consideration anyone faces.

As most ethnologists recognize, it is insufficient to claim that in traditional societies, culture largely answers this question on behalf of the individual, who thus could get through life robotically. Even those who are normally compliant must continually decide whether and how earnestly to be so. Not infrequently,

some decide to opt out one way or another, as when disgruntled hunter-gatherers leave the parent group to found a new settlement. No intentional, practical activity would be possible for a creature that did not have a sense of itself as an ongoing, agentive being with certain properties and powers. This is the universal, accurate sense that the individual is both distinct from his or her environment and can also affect it. The actual inner conversation merely comments on this reality and on the options it engenders.

Archer notes that all agents must respond to perceived conditions, assess their own aims and ambitions, and consider likely consequences for social stability or change. That is, being human, all people inwardly exercise discernment, deliberation, and dedication. Though modally subjective, the inner conversation is an ontic feature of human existence. It is the dialogical, dialectical realization of the relation of mind to world, for all humans must negotiate realities pertaining to nature, practice, and society. Yet the concrete situations deriving from these overlapping spheres of reality do not impinge mechanically on agents. They are mediated by the agent's own concerns and processed in the internal conversation, the nexus of structure and agency. This mediation works to dialogically bring structure and agency together in the interests of individuals, as they understand them. It does not work, as would culture as posited by culturism, to first barricade people from, and then obviate, the world. It is precisely real consequences that people are concerned with and on which they inwardly deliberate. Agency meets structure both in the internal conversation and in practice. By addressing the work of Charles Sanders Peirce and William James, Archer duly considers the natural links this mature practice theory has with pragmatism. Other recent work in critical realism suggests that the pragmatic linchpin of morphogenesis is experience as Dewey, another pragmatist, has theorized it.

In this view, the priority and centrality of experience derives from the fact that it is precisely about experience, had and likely, that the inner conversation takes place. Dewey was often at pains to disabuse his critics of the misconception that he equated experience with sense impressions, the psychological usage of the term. He meant, instead, the conjunction of humanness and the external world as realized in and through a given individual. Such a view of experience may be characterized, on Dewey's behalf, as the personalized register of what takes place, and clarified as follows. The personalized register of what takes place is not limited to the particular consciousness of the hypothetically self-contained individual; it leaves room for shared experience, the sociality that in turn informs an individual's consciousness. The register need not even be fully conscious, for input and output via the unconscious are also real, as known from their effects. The phrase "personal register" encompasses corporeal modes of registration, though in some ways, these may bypass cognition, for their effects will bear on future experience.

Finally, the fact that experience is the personal register of what happens duly recognizes the many parameters conditioning personhood. These include evolution, history, sociality, culture, the environment, and life course development. With these qualifications, experience becomes the crux of sociocultural process, that is, of morphogenesis. This recognizes that the inner conversation takes place with regard to experience and that practice, in part, is the result. Though it is indeed the individual who is the experiencer, of necessity, the strings of experience are tuned also to social and natural refrains.

Ethnological Investigations of Reality

Because philosophy and anthropology have the investigation of humanness as their common axis, there is a continuum from one to the other that takes as its parameter the adaptationist imperative. Adaptation is a tacit, post hoc imperative, because failure to adapt is ultimately failure to exist. It does not imply that any and all particular human endeavors are adaptive or that humans can necessarily know the difference between what may or may not prove adaptive in the long run. But sooner or later, in Archer's phrase, reality will have its revenge. And because humanness is adaptively informed, evolutionary theory underwrites many subdisciplinary modes of ethnology. Critical realism's embrace of the evolutionary paradigm makes it largely compatible with any anthropological mode of inquiry that grounds humans in reality. But more than mere compatibility is at stake. Critical realism intentionally theorizes what is often taken for granted, that conditions of the real world structure human endeavor. Thus, it accommodates social science to naturalism. Paleoanthropology, primatology, population genetics, and archaeology all implicitly exploit knowledge of the stratified ontology critical realism describes. Here follows a brief sample

of modes of inquiry also immediately relevant to ethnology and the bearing of critical realism on them.

Evolutionary Epistemology

The plain conjunction of evolution and philosophy yields evolutionary epistemology. This field recognizes that knowledge exists because it evolved, and evolution can thus be presumed to have left its mark on the general structures of human knowing. As Dewey also emphasized, knowledge must be capable of being about the world, because the world spawned it. Just as the light-sensitive motility of a paramecium models the reality of sunlight and the bird's wing models the resistance of air—those realities do have the properties from which such adaptations as motility and flight derive—so the representations made possible through consciousness also reflect pertinent structures of reality. These include space, time, location, motion, relation, contrast, cause, event, change, vitality, growth, and death. Thus, where Immanuel Kant posited a transcendental idealism in which categories of thought, such as space and time, imposed themselves on reality, which was thus rendered utterly inaccessible, critical realism properly sequences the real horse and the ideal cart it pulls. It is the world that shapes the structures of consciousness, a view that evolution substantiates. So, critical realism is a transcendental realism.

Beyond the basic structures of the world and human knowing, evolutionary epistemology theorizes that ideas evolve under the same selective principles as do life forms, namely, variation, selective retention, and transmissibility. In the long run, ideas that perdure are those experience shows to have been the most apt reflections of reality. Throughout this process, conceptual and theoretical mistakes are legion, as are vital "mistakes" in nature. The workers of the Soviet Union, let alone those of the world, never did meaningfully unite, because people's primary attachments are not to class distinctions, and no amount of reculturalization could make them so. People's primary attachments are to familiars and locale, as predicted in the evolutionary model of humanness. Richard Dawkins has advanced the concept of "memes," on an analogy with genes, to account for the apparent attractiveness and consequent transmissibility enjoyed by certain ideas. Such features may be explained at least in part by the mind's evolutionary preparedness to hold and convey them, a preparedness grounded in their previous adaptive effects. Pascal Boyer has usefully applied a similar model to the particular nature of religious ideas as found cross-culturally. He thus accounts for the attractiveness of notions that posit ostensible phenomena that are salient because unusual, yet not so bizarre as to be preposterous, at least by the terms of a given cultural milieu.

Evolutionary Psychology

A step closer to ethnology per se is evolutionary psychology, a vibrant and expanding subdiscipline descended from an earlier sociobiology. Like everything evolutionary, it has dedicated opponents of its recognition that key determinants of human affect, cognition, and behavior are not pure products of utterly malleable socialization but are also proclivities inherited because the genes underwriting them got transmitted at higher rates in the environment of evolutionary adaptation. The idea was first outlined by Darwin, who by the principle of sexual selection accounted for the existence of the apparent adaptive liability that peacocks carry in their cumbersome, unwieldy, energy-consuming, predation-inviting tails. The answer lies in peahens' preferential selection of such long-tailed males as mates. Handsome tails are informational proxies for a healthy inheritance; females mating with such males tended to produce more surviving offspring.

Despite much research intending to demonstrate that female humans, to the contrary, select mates on principles that vary haphazardly with culture, the vast preponderance shows that they too tend to select males for traits associated with vigor and power. Likewise, young men tend overwhelmingly to select mates on the basis of due female proxies for healthy genes, these being lush hair, clear skin, prominent breasts, a high waist-hip ratio, and the absence of visible disease and deformity—all components summarized as "beauty." These observations largely hold true across cultures, for all such signs suggest a female's fitness to bear and nurse children. Beauty has evolved to be inherently attractive to a male because mating with a healthy woman affords his genes a selective advantage. Power is attractive to females because mating with a good provider affords her genes a selective advantage. Because men often compete for preeminence, critics have uncomprehendingly faulted evolutionary psychology, or sociobiology, with justifying violence. The further irritant to such critics is that is has partly been female choice over the millennia that

has produced male humans more than ready to indulge in violent competition, as witnessed by the near ubiquity of war.

But the sociobiological, evolutionary psychological claim is neither that men cannot control themselves, which in general they obviously can, nor that women are forced beyond measure to beautify themselves. The evolutionary theory only accounts for the obvious cross-cultural proclivities in play, understanding that can help establish such sociopolitical constraints as may be deemed appropriate. By many such examples, including the contribution to group fitness made by otherwise problematic phenomena such as depression and phobias, evolutionary psychology demonstrates that the human psyche is a product of evolution and that reality-based evolutionary theory is pertinent to everyday behaviors affecting societies in general. Its pertinence to critical realism is that it demonstrates the morphogenic process, as soma, psyche, and sociality coevolved.

Prospect–Refuge Theory and Cultural Ecology

Both prospect–refuge theory and cultural ecology capitalize on realities of the human–world relation. Prospect–refuge theory derives from Jay Appleton's work in human geography. It predicts that humans will show marked preferences for landscapes that signify the availability of exploitable resources, exploitable refuges from potential danger, or the possibility of safe exploration for either. Thus, the response to narrow defiles is expected to be averse, to protected promontories favorable, and to winding paths through open country one of enticement. Psychological research has born this theory out, as the anthropologist would expect, given that humans evolved in hazardous environments to be omnivorous, hunting, information-seeking, colonizing, conflict-prone creatures. To say that humans are by nature colonizing creatures is only a due description of the fact that humans have, through exploration and the intelligent use of information gleaned from dispositional properties of reality, colonized every corner of the globe. It neither celebrates colonialism nor holds sociocultural aggrandizement to be an uncontainable passion.

While it is no doubt true that many people simply prefer familiar landscapes to unfamiliar ones, the principle of familiarity does not obviate people's selective preference, within a given environment, for features promising prospects or refuge. In fact, it would be virtually impossible for intelligent creatures not to have developed discerning capacities due to selective pressures at work on their forebear's choices of landscapes within which to provision, travel, or dwell. The dispositional, informational properties of nature, transformed into knowledge and exploited by humans as they occupy the epistemological niche, lie immediately in features of nature themselves. People do not give landscape its property of being able to conceal a person or reveal a resource; those properties are in the landscape. Humans turn such information to account by realizing, in both senses of the word, what those properties are. Caves can protect; defiles can trap. Intelligence realizes such properties first by becoming aware that they exist—independent of anyone's knowing—and second by enabling humans to practically avail themselves of them. This ability to recognize and use information about reality, in particular, abilities involving high perspicacity in the assessment of landscape affordances, has duly evolved in humans. It is the ability Dewey described as experience, the pragmatic phenomenon of mining reality for practical information regarding its real dispositional properties.

Cultural ecology uses the principle of adaptation to describe, assess, and compare various human modes of production and sociopolitical organization. It is the socioeconomic perspective on the human–world relation, albeit one that readily incorporates both beliefs and history. Cultural ecology is in some ways the offspring of models of cultural evolution advanced in midcentury by Leslie White and Julian Steward. Such models have been considered both sophisticated and, nonetheless, problematic. Although they take an adaptationist view, the clear trend they reveal is one of increasing socioeconomic complexity, which can be misconstrued. White, for example, related cultural evolution to the amount of energy that a mode of production could harness and intentionally deploy. Since this amount has, in general, clearly increased through time, it leaves the impression that more-powerful societies are more adaptively advanced and less-powerful ones "backward."

In fact, less-powerful societies usually have a quite viable adaptation of their own. Absent the intrusion of extrinsic forces, such systems most often exist in a cybernetic balance both with natural resources and neighboring socioeconomic systems. In the 1960s, Roy Rappaport showed that multiyear cycles of ritual, warfare, and pig production in highland New Guinea

coincided in a cybernetic system that, overall, effectively related population size to carrying capacity. Today, cultural ecologists produce some of the most substantive studies of human adaptive modes, with clear implications for the future of humanity at large. The many instances of socioecological collapse, for example, as documented in the archaeological record, and ongoing processes of ecological degradation that can be studied now should give pause to advocates of policies for continued increases in resource exploitation.

Moral Naturalism and Material Culture

Moral naturalism has been arrived at independently by both philosophical critical realism and anthropology, which thus complement each other. The critical realist argument for moral naturalism has been given above and resides in the ontic ineluctability of choice, and thus justification, on the part of intelligent creatures. Evolutionary anthropology approaches the problem from the analysis of altruism, the apparent prevalence of other-benefiting, self-jeopardizing behaviors among humans and some other species. If genuinely altruistic behavior aids another to the actor's own detriment, how could genes underwriting its continued behavioral manifestation be preserved? Altruists and their behavioral proclivities should be weeded out by natural selection, but they aren't. Aside from the problem that what may appear altruistic from one perspective might actually be self-serving from another, the answer to the real problem that altruism poses lies in kin selection.

In the environment of human adaptation, bands of hominids would largely be comprised of kin in the first place. And specific, close kin recognition, evident among nonhuman primates, can be accomplished by a juvenile merely noticing to which other individuals its own mother provides care. Individuals do not need to be able to mathematically calculate degrees of relatedness in order for their behaviors benefiting kin to perdure, for those kin share some of the altruist's genes, quite apart from any knowledge of the fact. So genes underwriting altruism can get passed on even if altruists die as a result of their own behavior. Such proclivities are not tantamount to biological reductionism, for humans can obviously choose, in the moment, whether to act altruistically or not. But altruism remains a genetically possible behavior because genes underwriting it pass collaterally through kin whom altruism benefits. Culturists have not answered the question of how morality divorced from matter could matter. And if morality does have material consequences, those consequences must have selective entailments.

At the other end of the naturalistic spectrum from moral naturalism lies material culture. This consists of objects, artifacts, buildings, tools, artwork, trash, icons, texts, roads, and all sorts of tangible products of consciousness working on reality. Such objects manifest and exemplify the leverage exerted by intelligibilia derived through reality-based experience. Items of material culture easily become objects of cathexis and in their embodiment of intelligibilia thus morphogenically exert further leverage on sociocultural conditions. Possessions shape the behavior of their possessors and so in a sense turn around to possess the possessors. This phenomenon remains just as true of people such as hunter-gatherers, who have very few possessions. If one's only tool is a stone axe and it is lost, one either makes another axe or has an immediate, serious, existential problem. This contradicts the widespread culturist premise that materialism is a Western cultural phenomenon. The focus on materials for survival is a human trait; capitalism merely capitalizes on it, albeit in an extreme and often damaging form.

Critical realism is not without its limitations. The first is the difficult writing style of its chief exponent, Roy Bhaskar. This may have discouraged many from deciphering his reality-based model of human sociality, which does repay the effort. The second is a recent "spiritual turn" by some critical realists, which may have more to do with desired realities than ones demonstrably inhering in the world.

— *Derek P. Brereton*

See also **Critical Realism; Evolutionary Epistemology**

Further Readings

Archer, M. (2000). *Being human: The problem of agency.* Cambridge: Cambridge University Press.

Archer, M. (2003). *Structure, agency, and the internal conversation.* Cambridge: Cambridge University Press.

Bhaskar, R. (1975). *A Realist theory of science.* London: Verso.

Bhaskar, R. (1989). *Reclaiming reality.* London: Verso.

Brereton, D. P. (2004). Preface for a critical realist ethnology, Part I: The schism and a realist restorative. *Journal of Critical Realism, 3,* 77–102.
Collier, A. (1994). *Critical realism: An introduction to Roy Bhaskar's philosophy.* London: Verso.
Sayer, A. (2000.) *Realism and social science.* Thousand Oak, CA: Sage.

Croizat, Leon C. (1896–1982)

As one of the last great Victorian naturalists and iconoclasts of the 20th century, Leon C. Croizat explored conceptual and methodological questions in the fields of botany, zoology, biogeography, anthropology, evolution, taxonomy, archeology, linguistics, and philosophy. Few other 20th-century biologists have had such a significant impact on the integration of evolution, systematics, and biogeography, the three principal elements of the historical sciences. Born in Turin, Italy, Croizat seemed destined for a life of jurisprudence, although his lifelong interest was in the natural sciences. During his early years, Croizat was exposed to a prominent circle of local Italian naturalists, including the early exponent of cladistic systematics Daniele Rosa.

In 1924, to escape the rise of Italian fascism, Croizat immigrated to the United States, where his formal training in Italian jurisprudence provided him with few professional opportunities, particularly during the Great Depression. He eventually became acquainted with Elmer Drew Merrill, director of the Arnold Arboretum, and was employed there as a technical assistant. Croizat availed himself of the arboretum's extensive research library, where he was able to review the research fields necessary to write on biogeography, evolutionary theory, and botanical evolution. In 1947, Croizat's position was terminated when Merrill lost a power struggle with the botanist Irwin Widmer Bailey, who was intolerant of Croizat's heterodoxy. Croizat emigrated once again, this time to Venezuela at the invitation of Henri Pittier. In the 1950s, Croizat retired from teaching to devote his time to research, while his wife took up professional landscape gardening. In 1972, the Croizats moved to Coro, where they were appointed codirectors of the new *Jardín Botánico Xerófito "Dr. León Croizat."* While developing the *Jardin,* Croizat continued his research and publishing until his death at the age of 89.

Often at radical variance with prevailing and popular views about evolution and biology, Croizat's writings are often ignored by prominent and influential scientists. However, they have withstood the test of time, with many of his ideas either being adopted or reflected in later research. Croizat is best known for his new approach to biogeography. In the 1950s, he did what no one else had ever thought of doing before. He tested Darwin's theory of evolution through biogeography. In so doing, he was able to demonstrate that Darwin's theory of centers of origin and dispersal failed to predict global patterns of distribution and their correlation with tectonics. Long before continental drift and plate tectonics became the accepted worldview for geologists and evolutionists, Croizat used animal and plant distributions to successfully predict the geological structure of regions such as North and South America and the Galapagos Islands. The subsequent corroboration of his predictions by geologists demonstrated the progressive nature of panbiogeography over the prevailing Darwinian theory.

As an alternative to Darwinism, Croizat proposed the biological synthesis known as *panbiogeography.* This evolutionary framework rested on the foundations of biogeographic analysis to understand species, speciation, and biological differentiation in space, time, and form as a single synthesis rather than as the disparate conglomeration of disconnected hypotheses exemplified in Darwinism. His panbiogeography also provided for a concept of biological evolution that did not require natural selection or any form of teleology to "explain" organic differentiation and speciation. Adopting the term *orthogenesis,* Croizat, like Rosa and other biologists before him, viewed the generation of novel variation as a process biased by the existing genetic and developmental types of organization. Adaptation was seen as a consequence of evolution rather than a cause, and his orthogenetic approach eliminated the unscientific narrative approach to evolution prevailing then, as now, in Darwinian theory that explains the origin of an adaptation by its ability to meet a future goal such as the resulting advantage or utility. Croizat's orthogenetic framework also anticipated subsequent developments in molecular and developmental genetics.

Far less recognized are Croizat's contributions to anthropology and archeology, particularly for biogeographic aspects of human evolution and cultural

development. He proposed a biogeographic context for the origins of modern humans along a sector ranging between South Africa, Europe, and East Asia, which contrasted to Darwinian notions of an original birthplace followed by a concerted and sequential outward dispersal. Croizat saw human evolution as a combination of migration and stabilized differentiation around two principal focal areas: what he called "Cro-Magnon" in Africa and Europe and "Austro-Melanesian" in East Asia. In the 1970s, he also produced a comprehensive analysis of the biogeographic origins of American Indians that anticipated current theories by proposing seafaring colonization (coastal theory) by people who were not modern Asians in appearance (now implicated in studies of skulls such as the Kennewick Man), and arrival before the Clovis culture (upward of 40,000 years ago that compares well with the 20,000–30,000 now predicted by some anthropologists). He also predicted the American Indians are principally derived from seafaring coastal Asian Austro-Melanesian people rather than from continental Asians.

— *John R. Grehan*

See also **Biogeography**

Further Readings

Craw, R. C., Grehan, J. R., & Heads, M. J. (1999). *Panbiogeography.* New York: Oxford University Press.

Croizat, L. (1964). *Space, time, form: The biological synthesis.* Caracas, Venezuela: Author.

Cross-Cultural Research

Almost by definition, cultural anthropology *is* cross-cultural research. The search for an understanding of what culture is has meant undertaking research with an eye for comparing ethnographic data generated in different societies. Anthropological fieldwork has been driven as much by the desire to test a particular theory about culture as it has been about documenting another unknown group of people.

In current convention, however, *cross-cultural research* refers to a specific approach to cultural anthropology, namely, using data from multiple cultures to test hypotheses using statistical methods. This quantitative approach developed out of the *culture and personality school* of anthropology and grew through the work of George P. Murdock, who first organized the Human Relations Area Files (HRAF), a database that today consists of nearly 400 different ethnographies of cultural groups, indexed by over 700 different topics.

The lasting value of the statistical cross-cultural comparison using HRAF has been that it has allowed cultural anthropologists to ask the "big" questions that other kinds of research are ill-equipped to handle: What are the causes of warfare? Why do states form? Why do states collapse? What are the causes of social inequality?

The very earliest anthropologists interested in cross-cultural comparative work were out of the evolutionary mold: E. B. Tylor, Herbert Spencer, and Lewis Henry Morgan. These late-18th-century anthropologists compared cultures and ordered them in an evolutionary sequence, called *unilineal evolution,* based upon their presumed level of development. In analytical and methodological terms, Morgan was the most sophisticated. He conducted actual fieldwork (with Seneca Indians) and collected data from nearly 70 other American Indian tribes in the United States. Indeed, one of his main contributions to comparative cross-cultural research was the discovery of classificatory kinship systems. As might be expected, then, Morgan's evolutionary scheme was the most sophisticated, based upon a culture's technical capacity and material technology.

Nevertheless, the rejection of evolutionism and the kind of comparative work it engendered by Franz Boas and his students pushed cross-cultural comparative work into the background of cultural anthropology for nearly 40 years. When comparative work reemerged in American anthropology, it was the intellectual descendants of Morgan and Tylor who were responsible for it.

Another source of the contemporary statistical model of cross-cultural comparison emerged out of the *basic and modal personality* school of anthropology. This brand of cultural anthropology included scholars such as Ralph Linton, Ruth Benedict, Edward Sapir, Cora Du Bois (all Boasians), and Abraham Kardiner (a psychoanalyst). This orientation toward culture and personality studies was essentially the application of psychoanalytic theory to the study of culture: Cultural anthropologists presented their fieldwork data, and Kardiner provided a profile of that particular culture.

The working assumption of the approach was that every society had a "basic personality," a common denominator of personality types. There was a clear understanding that basic personality was formed based on the cultural institutions involved in child socialization. Cultural patterns, such as mythology, marriage patterns, and gender relations, were believed to be projections of basic personality.

The problems with the approach were that all of these "studies" were conducted after the fact, so there was no real testing of data. Cora Du Bois, however, conducted fieldwork with the Alorese during 1937 to 1938, collecting data specifically to test basic personality. Her work refined the understanding of culture-personality relationships. Unfortunately, the methodological improvements in her research design and execution were lost on most culture and personality anthropologists, who later became enamored of the national character studies.

At Yale, however, the methodology for investigating psychology using anthropological approaches did become more sophisticated, through the interaction of psychologists John Dollard and Clark Hull and anthropologists Edward Sapir, George P. Murdock, and John Whiting.

George P. Murdock was the most influential figure of cross-cultural analysis, a student of William Graham Sumner, which makes Murdock one of the rare American anthropologists of the early 20th century to be trained by someone outside of the Boasian tradition. Indeed, Murdock's intellectual ancestors were from the line of Tylor, Morgan, and Spencer. Murdock first developed the Cross-Cultural Survey during the 1930s and 1940s, which in 1949 became the HRAF. Murdock is best known for this work and for his studies of kinship systems.

Whiting earned his PhD at Yale in 1938 and returned there following military service during World War II to conduct, with Irvin Child, a large-scale, systematic study of child training and personality using Murdock's Survey. Published in 1953 as *Child Training and Personality,* the work was noteworthy because it tested a model very much like basic personality on a sample of 39 different cultures, using basic statistical procedures to analyze the data. The results were not all that encouraging (the correlation between child training and personality was not strong), but the method led to a number of other examinations of child training and personality, among them Barry, Bacon, and Child's classic *Relation of Child Training to Subsistence Economy,* which demonstrated that subsistence mode and environment were important influences in how children were raised.

There were, however, notable problems with HRAF. One of these problems was that studies tended to lose information through the coding process. That is, coding a society for a particular trait ignores any variability that might have existed within that society. A second problem was that large-scale, complex societies were either underrepresented or ignored entirely, simply because most anthropological fieldwork was done with small-scale, primitive societies. A third problem was that not all ethnographies were of equal value.

Whiting was aware of all of these problems, but most especially the last, because many ethnographies made no comments at all on child training and child development, Whiting's primary research interest. To address this issue, he and his wife, Beatrice, devised the Six Cultures Project, a study designed to collect similar, directly comparable data from six cultures: the United States (in Massachusetts), Philippines, Japan, Kenya, Mexico, and India. Research results began to be published in 1963, but the project is most famous for *Children of Six Cultures,* published in 1975.

The HRAF have, however, been consistently upgraded, improved, and expanded. Significant work using the HRAF has expanded the anthropological understanding of complexity, kinship, marriage, and descent; the social correlates of particular subsistence modes; socialization; religion; warfare; and numerous other subjects. A great deal of what cultural anthropologists teach in an introductory course in anthropology is based on work done using the HRAF.

— *Peter Collings*

See also **Anthropology, Cultural; Murdock, George Peter; Sumner, William Graham; Tylor, Edward Burnett**

Further Readings

Levinson, D., & Malone, M. J. (1980). *Toward explaining human culture: A critical review of the findings of worldwide cross-cultural research.* New Haven, CT: HRAF Research Press.

Murdock, G. P. (1949). *Social structure.* New York: Macmillan.

Whiting, B., & Whiting, J. W. M. (1975). *Children of six cultures: A psycho-cultural analysis.* Cambridge, MA: Harvard University Press.

Cuba

Cuba is an island nation known for its beautiful tropical beaches, intoxicating musical rhythms, and rich cultural heritage and diversity. Some 90 miles off the coast of Florida Keys and the largest island in the Caribbean, Cuba is 48,800 square miles, or 110,860 sq km, just a bit smaller than the U.S. state of Louisiana. Along with the main island, Cuba includes the *Isla de Juventud* and more than 4,195 small coral cays and islets, which makes up approximately 3,715 km. Cuba is a coveted strategic location, which has been fought over throughout its history. Situated at the convergence of the Atlantic Ocean, the Gulf of Mexico, and the Caribbean Sea, it is positioned along the most powerful maritime passage in and out of the Caribbean.

Geography and Nature

Approximately one third of the island is made up of forested mountains, including the Sierra Maestra in the Oriente, the Guaniguanco chain in the western province of Pinar del Rio, and the Escambrey to the south in the province of Las Villas. The remainder of the island is made up of plains used for cattle ranching and the growing of sugar cane. In addition, the island includes coastal regions of estuaries, swamps, and marshes, along with offshore islets and keys. Some 6,000 species of plants are on the island, over half of which are endemic. Forests include semideciduous, mangrove, pines, and tropical rain forest. Cuba's national tree is the royal palm *(Reistonea regia)* of which there are 20 million in Cuba, reaching up to 40 m tall. Cuba has an abundance of reptiles, including crocodiles, iguanas, lizards, and snakes. The largest indigenous mammal is the tree rat or the *jutía,* measuring approximately 60 cm long. Also, Cuba is home to some 350 species of birds, including the world's smallest bird, the bee hummingbird, or *zunzuncito;* the males weigh only 2 g, with the female slightly larger.

The capital, Havana, or *La Habana,* is the largest city in the Caribbean and an important port city, home to some 2.2 million people. Havana is the country's center of government, education, medicine, trade, tourism, and communication. Many of the houses in the city are in a state of charming disrepair. The second-largest city is Santiago de Cuba, located in the Oriente province, which also serves as an important political, economic, military, and cultural center of the island.

Demographics and Identity

Presently, Cuba is home to 11 million people. The majority of Cubans speak Spanish exclusively, in a dialect typical of other Caribbean islands. Nearly 51% of the people are considered mulatto (both African and European descent), about 37% are considered White, while 11% are Black. The remaining 1% of the population are the descendents of the Chinese-indentured servants, who replaced the labor lost after the cessation of slavery in 1853. Much of the culture is strongly influenced by West African traditions brought over by slaves during the mid- to late 1800s. Slaves became an important labor resource with the rise of the sugar industry and loss of indigenous labor. The largest population imported to Cuba came from the Yorubá people of Nigeria.

Music and Dance

There are strong expressions everywhere of Afro-Cuban art, religion, music, and dance. To be Cuban means many things to many people, and the idea of "Cubanness" is difficult to define. Cubans are comfortable regarding close bodily space, and physical contact and affection are readily displayed. Socialization and dancing take place in streets and in lines for food, goods, or ice cream. Afro-Cuban cultural forms of music and dance dominate the modern conception of Cuban identity. Cuban music is the island's most well-known export worldwide. Cuban music is a blending of West African rhythms and ritual dance with the Spanish guitar, further fused with American jazz. The most popular Cuban music today is *Son,* first created in the Oriente region, combining string instruments, bongos, maracas, and claves. Mambo, bolero, salsa, and cha-cha all contain elements of Cuban *Son.*

Cuban dance has important links to Santeria, an Afro-Cuban religion, which combines West African deities, beliefs, and rituals with Catholicism. Catholic saints, especially the Virgin Mary, are associated with Yoruban *orishas.* In this way, early slaves were able to

Source: © iStockphoto/Arjan Schreven.

keep their traditions while ostensibly practicing the Christian faith. The religion consists of male priests, *babalawo,* who cure the sick, offer advice, and protect their petitioners. Offerings of food, herbs, and blood are presented to stones in which the spirit of the *orisha* resides, and rituals are performed at religious gatherings.

Cuban History

Columbus first spotted Cuba in 1492, and it was quickly colonized by the Spanish. By 1511, the first permanent settlement was established near Baracoa, on the eastern tip of the island. Pre-Columbian populations numbered 112,000 and comprised mainly Arawaks or Taino and sub-Taino peoples. Earlier populations of Guanahatabey and Siboney are said to have reached the island approximately 5,000 years ago from South America. Their primary subsistence strategies included fishing, hunting, and gathering. The later arrivals of Tainos were horticulturalists, who introduced the cultivation of sweet potatoes and manioc. During this time, the greatest concentration of people was centered around the Bahía de Nipe, on the eastern part of the island. By the time Columbus arrived in the late 15th century, most people who inhabited the island were Taino-speaking Arawaks.

The indigenous population was quickly exterminated or forced into slavery by the Spanish. Those enslaved were made to work in mining and agricultural projects. This system of *encomiendas* entitled Spanish landowners to the indigenous labor force in the region in return for their Christianization. Prospecting for gold was also an important agenda for the Spaniards, but proved to be inadequate. Those who wished that Cuba would bring them instant wealth were quickly disappointed because the island did not hold large deposits of gold or other minerals. Meanwhile, the unhappy indigenous labor force organized many uprisings against the conquistadors.

Spain referred to Cuba as the "Fortress of the Indies" and the "Key to the New World," acknowledging the island's influential position in controlling the development of the New World. The Caribbean was an arena for European rivalries, including England, France, and the Dutch, who went to war to protect their strategic and economic interests. Caribbean islands became the pawns in international conflicts and were captured in times of war and returned at the peace table. In the case of Cuba, this meant disruptions in trade, increased taxation, and great human suffering.

In the late 1800s, the great poet and statesman José Martí, the "father of the Cuban Nation," who is considered the country's most famous literary figure, became a national hero for both his liberal ideals and

martyr's death. He represented a great human rights figure, who spoke out against inequality and is sometimes compared to Martin Luther King Jr. Martí worked from the United States, where he was in exile, to form a revolution to remove Spanish occupation from Cuba. The United States supported Cuba's freedom from Spain only because it wanted the island to be defenseless against an economic invasion by capitalists. Since the late 1400s, when Columbus reported the existence of Cuba, it remained a colony of Spain until the invasion in 1898 by the United States. Consequently, Cuba became a de facto colony of the United States, which had both military and corporate interests there.

The war began in the Oriente in 1895, when the population rebelled against the colonial government. For 3 years, guerilla warfare ensued. However, an explosion that sank the *U.S.S. Maine* in the Havana harbor incited the United States to declare war on Spain and invade Cuba. In 1898, under the Treaty of Paris, the United States claimed the remaining Spanish colonies of Cuba, Puerto Rico, and the Philippines. The imminent victory of Cuban freedom fighters was stolen by the colonial power of the United States, and the Cuban people protested to no avail.

The United States agreed to withdraw from Cuba in 1901, keeping a 99-year lease on the Guantánamo naval base in the Oriente, along with other demands drawn up in the Platt Amendment. In the early 1900s a U.S. corporation called the "Cuban Colonizing Company" also sold lands to non-Cubans, much to the dismay of the majority of the inhabitants of the island. In 1924, without U.S. protest, Gerado Machado y Morales made himself dictator of the island and led a corrupt and violent government until 1933. In 1934, and again in 1952, Fulgencio Batista seized power and ruled Cuba under his dictatorship, with the support of the United States. During this time, the United States corporate and military interests dominated Cuban government, corporate expansion, and life until the triumph of the revolution on January 1, 1959, liberating Cuba for the first time in its history.

The first attempt to overthrow the corrupt government of Batista came on July 26, 1953, at Moncada and was led by Fidel Castro, a brazen man who had organized and trained a guerrilla army after Batista's coup d'état the previous year. The rebels were defeated, and almost half of the men died in battle, while more were subsequently executed. Despite their defeat, the revolutionaries reorganized and named their movement *Movimiento 26 de Julio*. In 1955, Castro and his brother Raul organized members, who were set to sail from Mexico to Cuba for another rebellion. It was during this time that Castro met Ernesto Che Guevara, the 27-year-old revolutionary from Argentina, who was trained in medicine and known for his intelligence and his considerable knowledge of Latin American social and political movements. On December 2, 1956, the group assembled off the coast of Santiago in a small ship named *Grandma*. Many of the revolutionaries were captured, but some managed to escape into the Sierra Maestra mountains in the Oriente, where they were joined by thousands of other Cubans. The rebel army with the support of the local population and knowledge of the terrain launched an attack on the Batista regime. In 1959, the guerrillas and supporters of Castro toppled Batista's government, and he fled to Miami with more than $300 million (U.S.) of embezzled funds.

Fidel Castro and the Revolution

Before 1959, Cuba was considered a stable Latin American country. It ranked third in life expectancy, fourth in electricity consumption per capita, and fifth in per capita income, $353 (U.S.) in 1958. The people of Cuba owned consumer products, such as televisions and cars, and by economic indicators, it appears that Cubans lived well. However, the distribution of wealth and quality of life was heavily skewed in favor of the rich class. The actual income was $270 and lower per year. Moreover, racial discrimination was rampant and Blacks found it more difficult to earn a living before the revolution. In the rural regions, more than one quarter of the people were landless peasants. Land ownership was held by a few rich families with large land holdings or by North American companies, and 8% of the population held 79% of the arable land. Farmers could work for months on these plantations and still not have enough money to buy food for their starving families. The rural population represented extreme poverty, with 25% of the people unemployed, 45% illiterate, 84% percent without running water, and 54% without indoor plumbing.

From a balcony in Santiago de Cuba, on January 2, 1959, Fidel Castro delivered his first speech. The choice of this city was deliberate and designed to

evoke memories of the humiliation inflicted upon Cuba in 1898 by the United States. Castro announced "the Revolution begins now," and "this time it will not be like in 1898 when the North Americans came and made themselves masters of our country. This time, fortunately, the Revolution will come to power." It is said that two white doves landed on Castro's shoulders during this speech, reinforcing the idea for many Cubans that he was divinely guided.

Fidel Castro is considered to be a fascinating figure of his generation; in his youth, he was a successful athlete and a brilliant orator destined for politics. Castro has proven to be one of the most intriguing men of the 20th century. The bearded revolutionary, sporting his signature combat fatigues, went against the most powerful nation in the world and was successful. More than 40 years later, the struggle of power has continued, as the George W. Bush administration tightened U.S. sanctions and Castro rejected the U.S. dollar in an economic countermove. Today, both Fidel Castro and Che Guevara are viewed by many Latin American libertines as heroes, who fought against economic imperialism. One has only to scratch the surface of U.S. and Latin American economic policies to understand their emotions.

North-American-owned oil and fruit companies have gone into many regions of Central and South America and taken the natural resources, polluted the soils and rivers, and exploited the people for their labor. Consequently, the populations have been left in far worse economic and social situations than they were before the arrival of the companies. Though the companies made promises, their ultimate aim was to create a large profit despite the adverse affects on the locals. For example, in Ecuador, Texaco ignored safety precautions and polluted enormous portions of the Amazon Basin, leaving the indigenous people disease ridden and unable to continue their subsistence farming because of the contaminated air, water, and soils. In a recent study of health in the Amazon region, the population rated 30% higher than the national average in diseases such as cancer and respiratory infirmities.

There are, however, many people unhappy with Castro's policies. The majority of those who oppose him were the wealthy business and landowners of Cuba, whose assets were seized and redistributed after the revolution. These people eventually left the island to settle in the United States. Two of the most populated states of exile communities include Florida (Miami) and New Jersey. Of the 1,500,000 Cuban immigrants who live in Cuba, 700,000 of them live in southern Florida. Powerful lobbyists, who strongly influence U.S. policies toward Cuba, these communities hope to return to a "Castro-Free" Cuba one day.

The Bay of Pigs Invasion

Since the inauguration of Castro's Revolution, the U.S. government, along with Cuban exiles, has tried without success to overthrow Castro's government. For instance, in April of 1961, Cuban exiles with the backing of the U.S. Central Intelligence Agency (CIA) launched the Bay of Pigs Invasion, *Bahía de Cochínos* (named for the wild pigs that roamed the region), on the south side of the island, west of Trinidad. Castro knew that an attack was inevitable after the destruction of a sugar mill in Pinar del Rio and the bombing of a department store in Havana called "El Encanto" by counterrevolutionaries from within the island. It was at this point that Castro leaned toward his Soviet Union alliances and in a speech following the attacks described his government as a "socialist revolution," defining the nature of the revolution for the first time. Two days later, on April 17, exiles landed on the shores of Playa Girón and Playa Larga. Castro's militia attacked by air and land in defense of the island and defeated the invaders, leaving 100 exiles dead and 1,200 captured. Cuba lost 160 defenders in the attack. The invasion has become known in U.S. history as a poorly organized major blunder that only reinforced the momentum of Castro's movement.

The Cuban Missile Crisis

In the aftermath of the Bay of Pigs disaster, the Kennedy administration appointed General Edward Landsdale in charge of "Operation Mongoose" to help the exiles bring down the Castro regime, including plotting the assassination of Castro. Castro learned of the conspiracy, and to end the threats to his Revolution, he formed an alliance with the Soviet Union to arm the island against possible U.S. invasion. In October 22, 1962, the United States woke up to the reality of the threat of a nuclear missile attack. For several months, the United States had detected through the surveillance of military spy planes that Cuba was building Soviet-style nuclear arms installations on the island. With the help of Nikita Khrushchev, in what is known as code name "Operation Anadyr,"

Soviet missiles and troops were assembled on the island throughout the summer of 1962, with the nuclear warheads arriving in October. Castro urged Khrushchev to make a public announcement about their plans to let the United States and the world know that they were taking steps to arm themselves and that the two countries had signed a defense treaty. Castro sent Guevara to convince the Soviet leader to go public, but Khrushchev refused, assuring him that everything was on schedule.

On the night of October 22, 1962, Kennedy appeared on television to inform U.S. citizens that there was a Soviet buildup of nuclear weapons on Cuba, with warheads capable of striking Washington, D.C., and other cities in the United States. During this "Cuban Missile Crisis," President Kennedy, along with his brother, Robert, met with defense secretary Robert McNamara to discuss their options of dealing with the situation. McNamara discouraged an operational air strike, citing the possibility of thousands of casualties. Instead, President Kennedy decided to implement a naval blockade and during his television speech stated, "All ships of any kind bound for Cuba from whatever nation or port will, if found to contain cargoes of offensive weapons, be turned back." Kennedy concluded by saying: "To the captive people of Cuba, your leaders are no longer Cuban leaders inspired by Cuban ideals, but are puppets and agents of an international conspiracy." Castro went on television the following evening and responded to Kennedy's comments:

> Our progress, our independence, and our sovereignty have been undercut by the policy of the Yankee government. The Americans had tried everything: diplomatic pressure, economic aggression, and the invasion at Playa Girón. Now they are trying to prevent us from arming ourselves with the assistance of the Soviet camp. The people should know the following: we have the means to which repel a direct attack. We are running risks, which we have but no choice to run. We have the consolation of knowing that in a thermo-nuclear war, the aggressors, those who unleash thermo-nuclear war, will be exterminated. I believe there are no ambiguities of any kind.

Tensions between the two countries' leaders mounted, and finally on October 26, Khrushchev sent a letter to Kennedy, stating that he'd sent missiles to Cuba to prevent another exile invasion like the Bay of Pigs. He would withdraw the weapons if Kennedy agreed not to invade. The U.S.-Soviet agreement also stipulated that the United States would remove U.S. missiles in Turkey. By the end of November, Kennedy announced that the crisis was over; the naval blockade was lifted, and "Operation Mongoose" was dismantled.

The Special Period

The fall of the communist states of Eastern Europe put unimaginable strains on the Cuban economy. Prior to the collapse, the Council of Mutual Economic Assistance (COMECON) of the Soviet Union had subsidized the Cuban economy by selling them oil at below-market prices and allowing them to resell for a profit. In addition, the Soviet Union purchased 63% of Cuba's sugar, 95% of its citrus, and 73% of its nickel, which constituted the three main industries. The economic disaster created when this excessive contribution ended and the country was forced to rely on its own unstable industry was without precedent. Cuba was now forced into the global economy based on cash transactions that did not create allowances for their idealistic policies. Though the island had experienced economic slumps in the past, during the depression of the 1930s, after the revolution, and during the time of economic transformation of the early 1960s, none could compare with the disintegration of the economy in the 1990s. Exiled Cubans living in the United States believed that this was the end of the Castro regime—but not so.

Both fuel and food were in desperately short supply. Agricultural lands were being used for cattle ranching and sugar, and Cuba had relied on imported foods supplied by Eastern Europe. The country now had to seek out immediate ways to grow crops at home and become self-sufficient. Food programs were introduced, along with new means of restarting the economy. Two important industries came out of this transitional period: investing in biotechnology or medical products and the tourist industry.

Industry and Commercial Activity Today

Under the extreme conditions of the Special Period (after 1989), the state found it necessary to decentralize economic activities and encourage private enterprise on a small scale. In the early 1990s, constitutional amendments recognized more than 100 new

categories of privatization. Today, commercial activity is a mixture of both private and commercial ownership of the major economic industries. For example, lands are owned in small parcels by individual agriculturalists, but larger farms are operated by the state. The result of this new configuration is a return of social stratification that had been equalized by Castro. With new markets opening, those able to capitalize on them have become a marginally privileged class with access to luxury items.

Though sugar has historically been the mainstay of the economy, tourism has become an important industry. Another impact of the Special Period was the opening of Cuban borders to foreign visitors, as President Castro declared that tourism would become its main source of income. Now it accounts for more than 50% of its hard currency, and more than 2 million foreign vacationers were expected to visit the island in 2004. Cuba has much to offer to foreign travelers in the form of natural resources, and culturally, Cuba is imbued with a combination of West African and Spanish traditions that offer a rich authenticity of music, dance, food, arts and crafts, and unique worldview. All of these resources have been harnessed to promote Cuba as a world traveler's destination.

The tourist industry gave a much-needed boost to the economy during the Special Period but left gross disparities of earning among Cubans. Where a bellhop or waiter can make between $150 and $1,000 (U.S.) per month, a physician or lawyer is making only $30. These differences in income have caused resentment among Cuban professionals, and today it is not uncommon to see a doctor working for a hotel to earn cash.

Because the local currency, the Cuban peso, is not convertible on the world market, the state adopted the U.S. dollar in 1994. However, 6 days after President George W. Bush was reelected, in 2004, and sanctions were tightened on Cuban trade, Castro converted to a national peso that would be easily exchangeable with the Eurodollar. Previously, though, pesos were sold on the black market, along with other goods, such as agricultural products, for American dollars.

Political Structure

Cuban government structure is based on a Marxist-Leninist theory, combined with a struggle for sovereignty and social justice. José Martí was an integral figure who shaped Cuban history and influenced the great socialist thinkers by writing about the importance of forming national unity by creating the Cuban Revolutionary Party (*Partido Revolucionario Cubano,* or PRC). Martí's observations from living in the United States led him to the conclusion that corrupt capitalist elections were "bought" by large corporations that supported candidates who represented only the elite. His ideas called for a new political party that represented the majority of Cubans. Martí believed the working masses were necessary for change. Castro, in his famous speech, "History Will Absolve Me," outlined the goals of national independence and social justice, which shaped his more than 40-year revolution.

The Constitution of 1976 created a National Assembly of the People's Power *(Asamblea Nacional del Poder Popular),* whose members are elected every 5 years. In 1992, the electoral system was amended to facilitate more efficient popular participation and decision making. Half the candidates are nominated by mass organizations, and the other half of the candidates are chosen by elected municipal delegates. In the past, all candidates were nominated by the Communist Party committees. The National Assembly is the sole body with legislative authority. There is only one candidate for each assembly seat, and a negative vote of 50% is enough to reject a candidate. The National Assembly elects a 31-member Council of State, and the council's decisions must be ratified by the National Assembly. The Council of the State determines the composition of the Council of Ministry, and both bodies constitute the executive arm and cabinet of government.

Cuba is divided into 169 municipalities, including the Special Municipality of Isla de la Juventud, and 14 provinces. The municipal assemblies are elected every 2½ years, and these, in turn, elect their own executive committees.

Land Tenure and Property

The society does not value private space as in the United States, because Cubans are accustomed to living in cramped quarters. Few new constructions have been built since 1959, since construction materials are always in short supply. Since 1970, the construction of new homes has been carried out by "microbrigades," or groups of 30 people who assemble prefabricated high-rise buildings for apartment-complex-style housing. Since 1960, rents were converted into mortgages, and

nearly half a million Cubans gained title to homes and lands. The sale of houses is prohibited, but exchange without currency is admissible. In the rural regions, land reforms such as the Agrarian Reform Law of 1959 divided lands and redistributed them to 200,000 farm workers without land. In 1975, the National Association of Small Farmers worked at creating cooperatives, and by the mid-1980s, three quarters of private farmers were cooperative members. Membership incentives include goods such as seed, fertilizers, machinery, social security, and tax breaks. In addition, small farmers no longer lived with the threat that they would be kicked off of their lands.

The Future of Cuba

Cuba will remain throughout history as a country of intrigue and fascination. Painted indelibly with a colorful past, dominated by three colonial powers, each of which has left their mark, has influenced the culture and way of life. The Revolution has changed the status of the country by marking it as an independent nation, and today, Cuba has emerged a self-determining country with a unique sense of identity. The world is waiting to see what will happen to Cuba "after Fidel Castro." Raúl is next in line to lead. He is already in charge of the armed services, and has been since 1959. In addition, Ricardo Alarcón, president of the National Assembly of the People's Power, has served as Cuba's political expert in negotiations with the United States. Over the past 15 years, members of the Cuban government have been selected from the younger generations, people in their 30s who follow socialist philosophy. Cuba has already been ruled for many years by a post-Castro government, competent individuals who are capable of successfully running the island. Castro, in the autumn of his life, presides over the government that he has created—still an idealistic man with remarkable conviction.

— *Luci Latina Fernandes*

See also **Communism**

Further Readings

Gott, R. (2004). Cuba: *A new history.* New Haven, CT: Yale University Press.

Perez, L. A. Jr. (1995). *Cuba: Between reform and revolution.* New York: Oxford University Press.

Saney, I. (2004). *Cuba: A revolution in motion.* Manitoba, Canada: Fernwood.

Stanley, D. (1997). *Cuba: Survival guide.* London, UK: Lonely Planet.

Suchlicki, J. (1997). *Cuba: From Columbus to Castro and beyond* (4th ed.). Washington, DC: Brassey's.

Cultivation, Plant

Plant cultivation includes a whole range of human behaviors, from watering, to weeding, to the construction of drainage ditches, which are designed to encourage the growth and propagation of one or more species of plants. Cultivated plants are distinguished from domesticated plants, which show morphological changes, indicating that they are genetically different from their wild ancestors. In many cases, early domesticated plants are so different from their wild progenitors that their reproduction depends on human interference. For example, in wild cereal plants, the rachis, the axis of the plant to which the grains are attached, is brittle. When the cereal grains ripen, the rachis shatters, allowing the grains to disperse and the plant to reseed itself. Early domesticated cereals have a nonbrittle rachis and depend on humans for their propagation. While plant cultivation is certainly an early stage in the process of plant domestication, plant cultivation does not always lead to domestication.

Recovery of Archaeological Plant Remains

To study plant cultivation and plant domestication, archaeologists must be able to recover plant remains from archaeological sites. A technique known as *flotation* is generally used to recover archaeological plant remains. Flotation, or water separation, uses moving water to separate light organic materials, such as seeds and charcoal, from archaeological soils. Most flotation machines include a large tank with a spout that pours water into a fine mesh strainer. A large tub with a screened bottom fits inside the tank. The screen, which is often made of window screening, is used to catch heavier artifacts, such as stone tools and pottery shards. When a measured sample of archaeological soil is poured into the flotation machine, the light

organic materials floats to the top of the tank. Moving water carries this material down the spout and into the fine mesh strainer. The resulting material is known as the light fraction and generally includes small fragments of carbonized seeds, other plant parts, and wood charcoal. The plant remains recovered through flotation are usually studied by specialists known as *archaeobotanists.*

Archaeological and Ethnographic Examples of Plant Cultivation

One of the best-known archaeological examples of plant cultivation comes from the site of Netiv Hagdud in the West Bank. The site originally covered about 1.5 hectares and has been dated to between 9,900 and 9,600 uncorrected radiocarbon years BP. Three seasons of excavation at Netiv Hagdud, under the direction of Ofer Bar-Yosef and Avi Gopher, produced the remains of several small oval houses with stone foundations, as well as storage pits. The stone tools and other artifacts from Netiv Hagdud indicate that it was occupied during the Prepottery Neolithic.

The excavations at Netiv Hagdud also yielded over 17,000 charred seed and fruit remains, including the remains of cereals, legumes, and wild fruits. Barley was by far the most common cereal recovered from Netiv Hagdud, making up about 90% of the remains of grasses. However, the barley remains from Netiv Hagdud were morphologically wild. Based on the large quantities of barley remains that were recovered, the excavators of the site have suggested that Netiv Hagdud's economy was based on the systematic cultivation of wild barley. In this case, plant cultivation represents an intermediate point between the plant-gathering economies of the Late Pleistocene and true plant domestication. Morphologically domesticated barley has been recovered from many later Neolithic sites in the Near East, and domesticated barley and wheat became the dominant cereal grains throughout later Near Eastern prehistory.

Ethnographic studies of traditional Aboriginal plant use in northern Australia provide similar examples of what might be termed plant management, or even plant cultivation. When Australian Aborigines in the Cape York province region of northern Australia harvested wild yams, they often replanted the tops of the tubers in the holes. The top of the yam is the portion of the plant from which regeneration takes place. Yams were also planted on islands off the coast of Australia, to extend the range of these plants and to serve as stores for visitors who might be trapped on these islands. These essentially horticultural behaviors were observed among people classified by anthropologists as hunter-gatherers.

Australian Aborigines also used fire to increase the productivity of cycads, whose seeds were collected for food. Many of the dense stands of cycads seen in northern Australia today may be a result of Aboriginal burning. The use of fire to control the distribution of plants (and animals) is well documented in the ethnographic and archaeological record of Australia. Other prehistoric hunter-gatherer populations who used fire to control the distribution of plants and game include the Mesolithic foragers of northern Europe and the Archaic hunter-gatherers of eastern North America.

From Foraging to Farming

The transition from hunting and gathering to agriculture is one of the most important changes in all of human prehistory. Archaeological evidence from sites such as Netiv Hagdud suggests that plant cultivation may have represented an important stage in the transition from foraging to farming. However, hunter-gatherers sometimes practiced behaviors that may be interpreted as plant cultivation, since they were designed to encourage the growth of favored plants. These data suggest that plant cultivation may not always have led to plant domestication.

— *Pam J. Crabtree*

See also **Agriculture, Origins of; Horticulture**

Further Readings

Bar-Yosef, O., & Gopher, A. (Eds.). (1997). *An early Neolithic Village in the Jordan Valley, Part I: The archaeology of Netiv Hagdud.* Cambridge, MA: Peabody Museum of Archaeology and Ethnography, Harvard University and American School of Prehistoric Research.

Cowan, C. W., & Watson, P. J. (1992). *The origins of agriculture: An international perspective.* Washington, DC: Smithsonian.

Lourandos, H. (1997). *Continent of hunter-gatherers: New perspectives in Australian prehistory.* Cambridge: Cambridge University Press.

Sobolik, K. D. (2003). *Archaeobiology: Archaeologist's toolkit.* New York: Alta Mira.

Cults

The term *cult* stems from the Latin *cultus,* to worship. The term is difficult to define, as it is used to denote various actions and situations. In common parlance, cult brings to mind specific groups or sects who hold unorthodox religious beliefs. In anthropology and archaeology, the term *cult* tends to be conflated with ritual and religion. A study entitled "an archaeology of cult" will invariably discuss religion and ritual, while an anthropological study by the same title is likely to focus on religious and magical rituals.

Colin Renfrew defines the *archaeology of cult* as the system of patterned actions in response to religious beliefs, noting that these actions are not always clearly separated from other actions of everyday life. Indicators that may point to cult and ritual archaeologically are attention-focusing devices, a boundary zone between this world and the next, the presence of a deity, and evidence of participation and offering.

Thus, Renfrew notes that ritual locations will be places with special and/or natural associations (for example, caves, groves, and mountaintops) or in special buildings set apart for sacred functions (temples). The structure and equipment used will have attention-focusing devices (altars, special benches, hearths, lamps, gongs, vessels, and the like), and the sacred zone is likely to contain many repeated symbols (i.e., redundancy). In terms of boundaries, while rituals may involve public displays, they may also have a hidden aspect. Ruth Whitehouse focuses on this hidden dimension of ritual in her study of Neolithic caves in Italy. The sacred area may often show strong signs of cleanliness and pollutions (pools and basins).

The deity may be reflected in the use of cult images or represented in an abstract manner. Ritual symbols will often relate to the deity and associated myths. These may include animal and abstract symbolism. Rituals generally involve prayer and special gestures. These are rarely attested archaeologically, except in iconography, and it is anthropology that provides information on dances, music, the use of drugs, and so on.

Other rituals may involve the sacrifice of animals and humans, the consumption of food and drinks, and votive offerings. All of these have been attested to both archaeologically and anthropologically. The equipment and offerings may reflect a great investment of wealth and resources, although this is not always the case.

To assist in elucidating the problems involved in such analyses, which range from attribution in cultures without direct ethnographic parallels to being self-referential, archaeologists have traditionally turned to anthropology. Here, studies of cult focus on religious and magical rituals, in particular shamanism and specific aspects of rituals (termed a cult, for example, a fertility cult). Following Émile Durkheim and Mircea Eliade, such studies focus on the sacred (as opposed to the profane). The sacred is set apart from the normal world and may entail knowledge that is forbidden to everyone but the cult leaders. This knowledge is generally associated with

magical forces, spirits and deities, and the distinction is often blurred.

While it is no longer fashionable to classify belief systems, there are a few important key concepts. Animism is the belief in spirits inhabiting mountains, trees, rivers, and so on. Next is totemism, a complex concept that broadly means the symbolic representation of social phenomena by natural phenomena. There are various kinds of totem, for example, individual totems, clan totems, and sacred-site totems. Their significance varies cross-culturally, and some anthropologists (for example, Claude Lévi-Strauss) maintain that there is no such thing as totemism because it is not a single phenomenon. Yet one of the most debated topics in both archaeology and anthropology remains studies of shamanism. Briefly, a shaman is a type of religious expert who mediates between the human and spirit world. In archaeology, there has been plenty of work on shamanistic practices with relation to rock art, for example, the work of David Lewis-Williams and Anne Solomon in South Africa.

Cargo cults, on the other hand, are another widespread phenomenon, which deals with the end of the world. These beliefs are especially found in Melanesia and the Pacific, where people believe that at the dawn of a new age, their ancestors will return with a "cargo" of valuable goods. The story of Captain Cooke has been explained in this manner; his arrival corresponded to the belief of the arrival of a powerful god. Cult studies may also include witchcraft (a malevolent magical practice), sorcery (similar but is learned rather than inherited), sacrificial cults, and various rites of passage.

In dealing with monotheism, cults assume another nature, and attention is devoted to specific aspects of a religion that is deemed a cult. Examples include Ancient Egyptian cults (for example, the cult of Isis) and, in the modern world, certain Christian groups (for example, those following the neo-Catechumenal way; adherents and other sectors of the church deny that this is a cult or sect). Which brings us to "cult" as used in common parlance, an often controversial term. By defining cults as unorthodox, they are immediately placed into the category of "the other." To noncult members, cults are groups that generally practice mind control, demand total submission, and, most often, take a member's money. To cult members, a particular cult is generally seen as either the "one true way" and/or a safe haven.

There is no agreement on which particular group is a cult or not (for example, Jehovah's Witnesses). However, there are three main features of any given cult. The first is the need for a charismatic leader (for example, David Koresh, leader of the Branch Davidians). Second is a philosophy of "us versus them." Cults generally demand that members alienate themselves from the outside world. Finally, cults are strictly hierarchical, and leaders employ varying degrees of indoctrination and demands of strict obedience.

Many cults are known to be dangerous and subject members to stress, fatigue, and humiliation. Isolation, peer pressure, and the causing of fear and paranoia are used to control and manipulate subjects. Cults may harm both members and nonmembers; for example, the Aum Shin Rikyo cult masterminded a deadly gas attack on the Tokyo subway system in 1995.

Common misconceptions on cults include that followers must be mentally instable and/or mad. However, while a leader may exhibit signs of mental instability, there is no prerequisite for followers to do likewise. Indeed, followers find a sense of belonging and protection in a particular cult. Very often, a member may feel this is the only way to salvation.

Whichever way one defines cult, what is important is to state at the outset is how the term will be used. While in archaeological and anthropological literature, usage is taken for granted, neither has offered a satisfactory distinction between cult and religion.

— Isabelle Vella Gregory

See also **Animism; Religion and Anthropology; Religious Rituals; Totemism**

Further Readings

Barnard, A. (2000). *Social anthropology: A concise introduction for students.* Taunton, MA: Studymates.

Novella, S., & DeAngelis, P. (2002). Cults. In M. Shermer (Ed.) & P. Linse (Contributing Ed.), *The skeptic encyclopedia of pseudoscience* (Vol. 1). Santa Barbara, CA: ABC-CLIO.

Renfrew, C., & Zubrow, E. B. W. (Eds.). (1994). *The ancient mind: Elements of cognitive archaeology.* Cambridge: Cambridge University Press.

Cultural Conservation

Cultural conservation refers to systematic efforts to safeguard traditional cultural knowledge, customs, and materials and the natural resources on which they are based. The primary goals of cultural conservation projects are to sustain cultural and ecological diversity within modernizing communities and landscapes, to promote the active engagement of community members in local resource management, and to mobilize government support for the preservation of regional heritage. Anthropologists, folklorists, historians, and cultural geographers have advanced these goals in recent years by assessing the relevance of expressive traditions among social groups and by encouraging an appreciation for the cultural heritage within the communities they study.

Traditional cultural resources may be tangible, such as vernacular architecture, sacred landmarks, ethnic foodways, and folk arts. Others are intangible, such as regional music and dance, storytelling, games, and expressive oral traditions. While heritage preservation is concerned with the continuation of all aspects of traditional culture, it extends beyond the restoration of historic sites and the documentation of social customs. Cultural conservation is a highly cumulative, multidisciplinary process that entails the careful assessment of the consequences of industrialization and relocation of cultural traditions with symbolic and historic significance.

Over the past three decades, the conservation of traditional culture has become increasingly urgent. This is particularly true in the rural United States, where urbanization is rapidly changing the character of traditional lifestyles, and in some cases accelerating the decline of folklife altogether. Frequently, rural people relinquish folk traditions in favor of more cosmopolitan goods and services. Anthropologists call this process "delocalization," and one of the tasks facing scholars interested in cultural conservation is to identify the socioeconomic factors responsible for the erosion of cultural heritage and folk technology. Subsequent efforts by state and federal historic preservation agencies can benefit from this information by creating sensible strategies to maintain traditional innovations for the benefit of future generations.

A number of federally funded programs, such as the National Endowment for the Humanities and the American Folklife Center, are active supporters of cultural conservation research. Cultural conservation is most successful when implemented on a community level, using a "grassroots" approach to identify local pathways to heritage preservation. For example, cultural knowledge of medicinal plants in the Ozark Mountains is most endangered in communities that have shifted from subsistence farming to more progressive, service-based economies. While urbanization has brought modern health care services to underserved areas, economic development has hastened the abandonment of valuable folk medical expertise in exchange for more conventional approaches to health care. By working locally to promote ecological awareness of medicinal flora through educational workshops and by developing programs to encourage health care practitioners to integrate traditional healing alongside scientific medicine, the preservation of folk medical knowledge can ultimately be possible in modernizing communities of the rural Ozarks and elsewhere in regional American cultures.

Cultural resources are malleable, and as such, they can be reconstituted and presented to the public as nostalgic expressions of "living history." Region-specific customs and materials have persevered as tourist commodities, such as sea grass baskets in coastal South Carolina, Amish-made quilts in central Pennsylvania, maple syrup in upstate Vermont, or woven blankets sold on Navajo reservations. Visitors to folk cultural regions can now visit theme parks and museums demonstrating romantic and mythical images of past ways of life. While the promotion of cultural resources for mainstream consumption may seem to undermine their authenticity, "heritage tourism" can indeed reaffirm cultural cohesiveness and thus help ensure the rejuvenation of living traditions and expressions. Accordingly, the manipulation of tradition is not degenerative to cultural continuity, but an adaptive response to commercialization.

Some scholars have surmised that folk technologies can and do undergo revivification for more cerebral reasons. The eminent anthropologist John Roberts, for example, has surmised that that folk knowledge and skills are frequently held on "ready reserve" as functional alternatives, should modern technology eventually fail to serve the community's needs for survival. People also retain historic innovations as a way to reconnect with their collective past and as powerful expressions of cultural identity.

Numerous examples of cultural resource revival can be found in regional cultures in the United States,

such as the widespread popular appeal of traditional hunting and fishing methods in the upper South. Here, as in other regions of the United States, people are returning to more historic approaches to wild game hunting, despite the industry-driven attempts to promote expensive and complex equipment for wildlife procurement. Examples of these techniques include traditional longbow archery, the use of muzzleloading black-powder rifles, and anachronistic angling methods such as cane-poling and handfishing. The recent implementation of these traditional techniques is evidence of a renewed appreciation for the guardianship and continuity of folk creativity and craftsmanship.

Despite the recent progress in heritage revitalization projects, there are a number of challenges to cultural conservation. The agendas of social scientists occasionally conflict with those of community members, particularly with regard to environmental policy and stewardship. Federal land managers may envision forests as aesthetic resources or national parks where wildlife and woodsmanship can flourish as part of the local recreational culture. Conversely, native people may prioritize industrial and economic development over ecological preservation of natural landscapes. Such conflicts, however, can engender a much-needed awareness among policymakers of the need to reconcile public and private agendas in cultural intervention programs.

For cultural conservation projects to succeed, they must culminate with sensible models that link natural resource conservation with the survivorship of cultural traditions. This can ultimately be made possible if anthropologists collaborate effectively with community members and listen closely to their concerns and remain sensitive to their needs. Through the realization that cultural and ecological conservation are interdependent processes, social scientists can continue to discover how living traditions are imagined, maintained, and rendered meaningful by people in their daily lives.

— *Justin M. Nolan*

See also **Cultural Ecology; Folk Culture**

Further Readings

Feintuch, B. (Ed.). (1988). *The conservation of culture: Folklorists and the public sector.* Lexington: University of Kentucky Press.

Howell, B. (Ed.). (1990). *Cultural heritage conservation in the American South.* Athens: University of Georgia Press.

Hufford, M. (Ed.). (1994). *Conserving culture: A new discourse on heritage.* Urbana: University of Illinois Press.

Cultural Constraints

Anthropologists Clyde Kluckhohn and William Kelley claim that by "culture," we mean those historically created selective processes that channel men's reactions, both to internal and to external stimuli. In a more simplistic way, culture is the complex whole that consists of all the ways we think and do and everything we have as members of society. Culture may thus be conceived of as a kind of stream, following down to the centuries from one generation to another. When we think of it in this way, culture becomes synonymous with social heritage. Each society has its own culture. The process of acquiring the culture of a different society from one's own is called "acculturation." We popularly refer to this process as the "melting pot." The culture of all people includes a tremendous amount of knowledge about the physical and social world. Even the most primitive societies have to know a great deal simply in order to survive. Their knowledge is more practical, like knowledge of how to obtain food and how to build shelters. In advanced societies, sciences and technologies create complex and elaborate cultures.

Although culture is abstract and intangible, its influence is far from superficial. A food *taboo* can be internalized so deeply that the digestive system will revolt if the taboo is violated. The involuntary physiological responses to embarrassment—blushing, stammering, and so on—are, in effect, controlled by culture, because the proper occasions for embarrassment are culturally defined. Thus, culture puts constraints on human behavior, thinking processes, and interaction. *Cultural constraints* are either prescriptive (people should do certain things) or proscriptive (people should not do certain things). Cultural constraints go a long way toward telling people what they can do; where they can choose; and with whom, where, and how they can interact; and they also help solve the problem of having to compare things that are seemingly

incomparable. In addition, traditional constraints on choice may tell people in which domains of their lives the principles of rational choice are allowed to operate. Thus, cultural constraints serve as a kind of preventive medicine, protecting people from themselves. Cultural constraints affect not only the choices individuals make but even how the individual—the self—is constituted. The boundaries that separate the self from others are very much culture dependent. In cultures such as the United States, the self is construed as an independent entity. The boundaries between the self and others are clear and distinct. Independence, autonomy, and self-determination are prized, and the values and preferences of each individual are given a status that is independent of the values and preferences of others. However, in other, even industrial cultures such as Japan, the self is construed as an interdependent entity. Significant others form a part of the self, and their values and preferences are one's own.

Biologist Jacob Von Uexkull has noted that *security is more important than wealth* to explain how evolution shaped organisms so that their sensory systems were exquisitely attuned to just those environmental inputs that were critical to their survival. Thus, biology seems to supply the needed constraints on choice for most organisms. For human beings, those constraints come from culture. The interference of cultural constraints in the developmental process of the young humans, particularly the cognitive-ordering processes entailed in naming and word association, have worked to release the grip of instinct over human nature and to break up its fixed patternings, which carry significance in the world. In other words, cultural constraint through the process of internalization of habit and externalization of ritual is mostly indirect constraint that remains mostly subconscious, below the level of our conscious awareness. Such indirect constraints channel our lives along the grain because they confer a sense of regularity, predictability, subjective inevitability, and efficacy to all that we think, say, and do and without which our lives would be made to seem haphazard, chaotic, uncontrollable, and somewhat contrived. Cultural constraints include sanctions, laws, and taboos.

Sanctions: Sanctions are the supporters of norms, with punishments applied to those who do not conform and rewards given to those who do. Negatively, they may be anything from a raised eyebrow to the electric chair; positively, they may be anything from a smile to the honorary degree. There are more or less subtle ways in which disapproval of action may be expressed. One of the less subtle ways is ridicule. However, it is a powerful social sanction because no one likes to be considered to be ridiculous by those whose opinions he or she values. One likes to stand in well with others, especially with those who constitute his or her intimate groups, and such a sanction, therefore, has an immediate and direct effect when promptly applied to those who do not conform. Thus, ridicule is so effective in some primitive groups, it is the only negative sanction needed to induce people to abide by the customs of the society. The ultimate negative sanction for both the mores and folkways is ostracism, a studied refusal to communicate with violators, the banishment of offenders from the groups to which they want to belong, sending them to coventry. Individuals do not like to be exiled from groups they consider their own, from their circle of intimates and friends. Ostracism is thus one of the cruelest social punishments known to men.

Laws: There are legal constraints, too, which are the negative sanctions applied to violators of the laws. These constraints are clear, familiar, and stated in the laws themselves. They include fine, imprisonment, deportation, and, for some offenses, death.

Taboos: Taboo means prohibition against an item, person, or type of behavior. In religious taboos, the forbidden item is believed to be unclean or sacred, and the taboo is imposed for protection against the item's power. Prohibition against incest and marriage within certain groups are examples of behavioral taboos. The most universal prohibition of such taboo is that on mating among certain kinds of kin: mother-son, father-daughter, brother-sister. Some other taboos are more concerned with social relationships, as in the obsrvance of caste or class rules or use of language among family members.

— *Komanduri S. Murty and Ashwin G. Vyas*

See also **Incest Taboo; Law and Society; Taboos**

Further Readings

Chick, G., & Dong, E. (2003, April 6–8). Possibility of refining the hierarchical model of leisure constraints through cross-cultural research. *Proceedings of the 2003 Northeastern Recreation Research Symposium,* Bolton Landing, NY.

Lewis, H. (1993). *Anthropologia.* Whitter, CA: Lewis Micropublishing.

Nanda, S. (1994). *Cultural anthropology* (5th ed.). Belmont, CA: Wadsworth.

Cultural Ecology

Cultural ecology is the study of the adaptation of a culture to a specific environment and how changes in that environment lead to changes in that specific culture. It also focuses on how the overall environment, natural resources available, technology, and population density affect the rest of the culture and how a traditional system of beliefs and behavior allows people to adapt to their environment. Interplay between any population and their environment is the subject of *ecological studies.* Cultural ecologists study how humans in their society and through specific cultures interact with the larger environment. In the case of human beings, much of the behavior involved in interaction with the environment is learned behavior that has become part of the reserve of learned skills, technology, and other cultural responses of a people in a society.

Marx

Much of cultural ecology was founded on Marx's methodology. Marx claimed there are real regularities in nature and society that are independent of our consciousness. This reality changes, and this change has patterned consistencies that can be observed and understood. Tensions within the very structure of this reality form the basis of this change. These changes add up until the structure itself is something other than the original organization. A new entity is then formed with its own tensions or contradictions.

When studying a society, the research should begin with a people's interaction with nature. Humans, through their labor, produce the means of their own survival. The environment, natural and social, in which people provide the basis of their own survival, becomes central to the analysis of a society.

Through the means of production, which includes technology, environment, population pressure, and work relationships, a people are able to take from nature what they need to survive; this, in turn, creates what is possible for the various parts of the *superstructure.* Any study of the historical change of a people must assume economic factors will be of first importance. The economic primacy is not absolute, however, because each of the various parts of a society has its own continual influence on the social whole.

Researchers who study noncapitalist societies become aware that major differences do exist between individual noncapitalist societies. One major difference that is noticed by social scientists is the degree of complexity in social structures between one society and another. It is argued that the differing degrees of complexity of the social relations are directly related to different productive levels, including how efficiently a technology can utilize a particular environment to support the people of that social structure.

With changes in the organization of labor, there are corresponding changes in the relationship to property. With increasing complexity of technology and social organization, societies move through these diverse variations to a more restrictive control over property, and eventually, with a state society, there develop restrictions on access to property, based upon membership in different economic classes.

A social system is a dynamic interaction between people, as well as a dynamic interaction between people and nature. The production for human subsistence is the foundation upon which society ultimately stands. From the creation of the specific methods of production of an economic system, people, in turn, establish their corresponding set of ideas. People are the creators of their social ideologies. People are continually changed by the evolution of their productive forces and of the relationships associated with these productive forces. People continuously change nature, and thus continually change themselves in the process.

The study of history begins with the material or objective organization of people living their everyday lives. This is set into motion by means of a people's relationship with nature, as expressed in their social and cultural lives. Through these relationships, humans produce their own *means of subsistence.* Each generation inherits and reproduces this means of subsistence and then changes it to fit their changed needs. This historically and culturally specific setting shapes individual human nature. This means that how people are organized and interact is determined by production.

Production molds all other social relations. This includes the relation of one nation to another as well as the internal social structure of a single nation. With every new change in the forces of production, there exists corresponding change in the relations of production. These changes lead to changes in the division of labor. With changes in the division of labor, there are changes in the property relations of the nation. Ultimately, this means ideological changes as well.

The first historical act is the production to satisfy material life. Following the first historical act is the

production of new needs that are the practical result of satisfying the needs of material life. People reproduce themselves, their families, and their culture daily. These acts of production and reproduction are prearranged by the historical past of a people, but this very activity changes both the people and their culture. With the changes, the needs of a people are changed; old needs are redefined or eliminated, and new needs are created. With these ever-changing needs, the development of human life is both social and natural. Humans are both the animal creations of nature and the social creations of society. With this, each society creates its own social organization based upon its own historical *mode of production.* The nature of society is based upon the mode of production and consciousness. People's relations to nature mold their relations with each other. People's relations with one another affect their relations to nature. Borrowing from Marx, then, production, human needs, population pressure, and change make up cultural ecology.

Julian Steward

Julian Steward coined the term *cultural ecology*, which is a continuation of his theory of *multilinear evolution.* Multilinear evolution searches for regularities in cultural change. Cultural laws can be defined that explain these changes. Determinism is not the issue, but patterns of historical change follow patterns of an interaction between parts of a society and the larger environment. Cultural traditions have distinctive elements that can be studied in context. Similarities and differences between cultures are meaningful and change in meaningful ways. The evolution of recurrent forms, processes, and functions in different societies has similar explanations. Each society has its own specific historical movement through time. This prefaces cross-cultural studies.

Cultural ecology is the adaptation by a unique culture modified historically in a distinctive environment. With this definition, Steward outlined a creative process of cultural change. Steward focused on recurrent themes that are understandable by limited circumstances and distinct situations. This helps to establish specific means of identifying and classifying cultural types. *Cultural type* is an ideal heuristic tool designed for the study of cross-cultural parallels and regularities. This analytical instrument allows assembling regularities in cultures with vastly different histories. This type of classification is based upon selected features. It is important to pick out distinctive configurations of causally interdependent features of cultures under study. These features are determined by a particular research problem within its own frame of reference. The researcher chooses specific physiognomies that have similar functional interrelationship with one another.

For example, economic patterns are important because they are more directly related to other social, cultural, and political configurations. This is the *cultural core.* These comparative associations are the particular attributes of patterned organization in an evolutionary sequence. Universal evolutionary stages are much too broad to tell us anything concrete about any particular culture. The changes from one stage to another are based upon particular historical and cultural ecological arrangements unique for each society. Exceptionalism is the norm. Global trends and external influences interact with a locally specific environment, causing each society to have a unique evolutionary trajectory.

Cultural ecology is a look at cultural features in relation to specific environmental circumstances, with unique behavioral patterns that are related to cultural adjustments to distinctive environmental concerns.

Cultures are made up of interrelated parts. The degree of interdependence varies in the ways in which some traits have more influence than other characteristics. The *cultural core* is grouped around subsistence activities and economic relationships. Secondary features are more closely related to historical contingencies and less directly related to the environment. Cultural ecology focuses upon attributes immersed in the social subsistence activity within the specific environment in a culturally directed fashion. Changes are in part alterations in technology and productive arrangements as a result of the changing environment. Whether these technological innovations are accepted or not depends upon environmental constraints and cultural requirements. Population pressure and its relative stability are important. Also, internal division of labor, regional specialization, environmental tension, and economic surplus create the cultural conditions in which technological innovation becomes attractive, leading to other cultural changes. These social adaptations have profound effects upon the kinship, politics, and social relations of a group.

Culture, according to Steward, is a means of adaptation to environmental needs. Before specific resources

can be used, the necessary technology is required. Also, social relations reflect technological and environmental concerns. These social relations organize specific patterns of behavior and its supportive values. A holistic approach to cultural studies is required to see the interrelationship of the parts.

The researcher begins with the study of the relationship between technologies of a people and how they exploit their environment for their survival. To use these technologies within an environmental setting, certain behavior patterns are established. The interaction between labor (behavior patterns) and the connection between technology and the environment has a reciprocal relationship with other aspects of culture, including ideology.

Cultural Materialism

Marvin Harris expanded upon cultural ecology and called his approach "cultural materialism." Human communities are fused with nature through work, and work is structured through social organization. This is the basis of the industry of all societies. Social science must reflect this if it is to understand the deeper underlying connections between specific social actions and global trends. In this, industry, commerce, production, exchange, and distribution establish the social structure, which, in turn, gives birth to the ideological possibilities of any culture. Along these lines, social-economic classes are determined by the interaction between technology and social organization in a particular environment. The needs of every society and the individuals in that society must be met; this, in turn, creates its own ideological support. With the development of capitalist society, for example, science develops to meet the needs of its economic requirements. Even more important, science is established as the integrating principles of modern industrial capitalism. This is possible because the principal ideas of any class society are that of the ruling class. Those who control the material forces of society also define the values and beliefs of that society. Workers are subject to those ideas, while the dominant ideology reflects the dominant material relations of the society. In this, Marxism, cultural ecology, and cultural materialism have similar thoughts on the subject.

The complex relationships between the material base of technology, the environment, population pressure, and the ideological superstructure are a constant factor in studying social change. The *social consciousness,* while being the product of real material relations of society, in turn has an impact on those social relations. This feedback loop is central to understanding the historical dynamics of society. Social consciousness becomes the collective reflection of *social relations.* Through social consciousness, people become aware of and act upon nature and society. Even though forms of social consciousness reflect a specific social existence, this social whole is not a static or passive relationship. The *ideological superstructure* is different in each community and changes as the economic relations of that society change. More precisely, there is an interactive relationship of all the parts of society. Economics is the most important of all these interactive parts. From this, the forms of commonly held feelings, religious expressions, ways of thinking, and, over all, worldview, including the different forms of property relations, are established. The ideology of a society reflects the social conditions of its existence.

Through the means of production, which includes technology, environment, also called *infrastructure,* and work relationships, called *structure,* a people are able to take from nature what they need to survive. This interaction, in turn, creates what is possible for the various parts of the superstructure. The superstructure includes not only the ideology but also the social psychology of a people. The superstructure and structure are ultimately molded and limited by the infrastructure. The infrastructure sets the limits of what is possible for both the structure and superstructure.

The interaction between social organization (structure) and the use of a technology within an environment (infrastructure) can be used to understand many particulars about the total culture. The evolution from band-level society to tribal-level society, tribal to chiefdom, and chiefdom to state-level society has to take into consideration changes in the organization of labor, including the growing division of labor and, ultimately, changes in the technology used by a people. With changes in the organization of labor, there are corresponding changes in the relationship to property. With increasing complexity of technology and social organization, societies move through these various stages to a more restrictive control over property, and eventually, with a state society, there develop restrictions on access to property, based upon membership in economic classes.

Marxism, cultural ecology, and cultural materialism all agree that a social system is a dynamic interaction

between people, as well as a dynamic interaction between people and nature. The production for human subsistence is the foundation upon which society ultimately stands. In producing what people need to live, people also produce their corresponding set of ideas. People are the creators of their ideologies, because people are continually changed by the evolution of their productive forces; they are always changing their relationships associated with these productive forces. People continuously change nature and thus continually change themselves in the process.

Cultural Core as Used After Steward

Cultural core is the central idea of cultural ecology. Current scholars in the field add the use of symbolic and ceremonial behavior to economic subsistence as an active part of the cultural core. The result of cultural beliefs and practices leads to long-term sustainability of natural resources. The symbolic ideology becomes as important as economics in the cultural core. Through cultural decisions, people readapt to a changing environment. This opens the door for a critical anthropology; the anthropologist can act as an advocate for groups threatened by corporate agricultural concerns. The humanistic approach does not negate anthropology as a social science. The new anthropology has a new activist approach by recognizing that different agents may have competing interests in resource management. Any historical analysis of important issues must include indigenous knowledge in maintaining not only long-term sustainability but also protecting the rights of those most vulnerable.

— *Michael Joseph Francisconi*

See also **Anthropology, Economic; Cultural Conservation; Culture Change; Economics and Anthropology; Marxism; Materialism, Cultural; Steward, Julian H.**

Further Readings

Bodley, John H. (1999). *Victims of progress* (4th ed.). Mountain View, CA: Mayfield.

Bodley, J. H. (2000). *Anthropology and contemporary human problems* (4th ed.). Mountain View, CA: Mayfield.

Foster, J. B. (2000). *Marx's ecology: Materialism and nature.* New York: Monthly Review.

Harris, M. (1980). *Cultural materialism: The struggle for a science of culture.* New York: Vintage Books.

Harris, M. (1998). *Theories of culture in postmodern times.* Walnut Creek, CA: Rowman & Littlefield.

Netting, R. M. (1977). *Cultural ecology.* Menlo Park, CA: Benjamin/Cummings.

Steward, J. H. (1955). *Theory of culture change: The methodology of multilinear evolution.* Urbana: University of Illinois Press.

Cultural Relativism

Cultural relativism is the idea that beliefs are affected by and best understood within the context of culture. It is a theory and a tool used by anthropologists and social scientists for recognizing the natural tendency to judge other cultures in comparison to their own and for adequately collecting and analyzing information about other cultures, without this bias. Cultural relativism was born out of and can also be applied to epistemology, which is the philosophical study of human knowledge. Empiricism is the theory that knowledge and understanding come from experience with the world. Cognitive relativists claim that differing belief systems are equally valuable, such as theories about what exists and how people interact with the world. Epistemological relativism acknowledges the role one's environment plays in influencing an individual's beliefs and even the concepts behind the words contained in a language.

Moral relativism is often mistakenly assumed to be the same concept as cultural relativism. While there are similarities, there are also key differences. Relativistic moral judgments are determined relative or according to the values and beliefs held by a particular culture. In the extreme sense this implies that there is no universal right and wrong in ethics. Most ethicists consider relativistic theories to be inferior to stricter normative, or rule-directed, theories that prescribe how a person ought to act. (If there is no absolute right and wrong, then there is no purpose in debating ethical questions. Morality would be empty and instead just describe how people act rather than how they *ought* to act.) Many people operate with a relativistic approach, however, in an effort to avoid

the dangers of ethnocentrism—the same pitfall that anthropologists sought to correct through cultural relativism. Ethnocentric thinkers focus on the values of their own group as superior to those of others. Behaviors and beliefs in a different culture are compared and judged according to a narrow idea of what is normal. Cultural relativism—also sometimes called "pluralism"—cautions against unfairly condemning another group for being different and instead respects the right for others to have different values, conduct, and ways of life. Cultural relativism approaches awareness of cultural differences as a tool for appreciating and analyzing other cultures without assuming one's own group to be superior.

The concept of cultural relativism was developed by Franz Boas (1858–1942) and his anthropology students. Boas sought to study cultures of people in terms of how they interacted with their environment, and he acknowledged that rather than holding a single set of unchanging core beliefs, the ideas valued by most cultures changed over time. He observed that individual members of a community both affect and are affected by the larger whole. The implication of this changed the way anthropologists approached what were formerly understood to be distinctions between modern and traditional cultures. Because the interactions between the individual and the society were active in both directions, there was no longer a basis for assuming traditional cultures to be unchanging and modern cultures exclusively dynamic, or in motion. Boas proposed that there was room for both progress and enduring values in both types of society. Furthermore, because of the potential for rapid change, his theories encouraged anthropologists to conduct their studies from within the culture itself, or ethnographically. Thus began a new paradigm for methods of collecting and analyzing cultural data.

In addition to ethnography, the method of ethnology was inspired by cultural relativism in anthropology. Ethnology is the study of a wide collection of cultural subjects within the same study. In-depth data are collected detailing the unique characteristics of each culture and then considered as part of a larger pool of several cultures. By expanding the distribution or range of cultures studied, a new picture of human history began to develop. Anthropology shed the centuries-old ethnocentrism that celebrated particular Western-focused societies, no longer presuming one's own group to be the most advanced and all others primitive. Subsequently, with this broader purview, anthropology emerged as the unique field that studies the overall development of human culture.

Anthropologist Ruth Benedict (1887–1948), a student of Boas, saw the role of anthropology as studying human cultures from an unbiased perspective, much in the same manner that an astronomer studies stars or a biologist studies cells. The role of the scientist is that of objective observer; however, there is also a deeper understanding of one's own culture to be gained in the recognition of how values are instilled in other cultures. Her 1934 book *Patterns of Culture* advanced the term *cultural relativism* and compared three distinct groups in search of the universal trait that all cultural groups have in common. Her work with the U.S. government during World War II identified distinct differences in the attitudes of Japanese and American soldiers and civilians. Cultural relativism in this manner serves as an instrument of diplomatic relations.

A potential difficulty with cross-cultural comparison is incompatible values. It is possible that a phenomenon occurring in one group is so unique that is does not have a parallel in another culture, or as Margaret Mead (1901–1978) realized following her studies of Polynesian teenaged girls, the values revealed through anthropological study can be controversial. In 1928 her Western readers were shocked to learn that premarital sexual exploration was widely practiced in Samoa among even respectable members of society. Such a reaction demonstrates ethnocentric tendencies; in this case, religious-inspired American views saw anything other than sexual abstinence as immoral. The reaction also demonstrates the challenge of cross-cultural comparison. There is a universal feature of each culture having particular codes of acceptable social and sexual behavior. Where they differ is in the application, in what specific behaviors are acceptable for whom at certain times. Adolescent sexual activity in these two diverse societies could appear to represent conflicting values. Cultural relativism instructs the anthropologist to consider the cultural context instead of judging. The beliefs of either group are necessarily affected by the individuals and the evolving community itself. The cultural relativist steps outside the home group's perspective to gain a less biased understanding of the cultural dynamics of the subject group.

— *Elisa Ruhl*

Further Readings

Boas, F. (1928). *Anthropology and modern life.* New York: Norton.

Mead, M. (1934). *Patterns of culture.* Boston: Houghton Mifflin.

Rapport, N., & Overing, J. (2000). *Social and cultural anthropology: The key concepts.* London: Routledge.

CULTURAL RELATIVISM

While cultural convergence implies the merger of the cultures of two or more groups, most often because one of them is dominant and coerces the merger, cultural relativism on the other hand could stand for the acceptance of what is best and most valuable in each of the cultures. The famous anthropologist Franz Boas may have been the first to use the term after his work among the Eskimo (Inuit) on Baffin Island. In a sense, where cultural convergence would create a cultural melting pot, cultural relativism would lead to a cultural mosaic. An interesting case of this took place in the American West in the latter half of the 19th century, among both laymen and Catholic and Protestant missionaries serving with the Native American tribes of the western Great Plains. By this time, the messianic fervor for conversion among European Americans had begun to give way to an appreciation, in no small part to the work of anthropologist Boas, of the intrinsic worth of Native American religion and customs. Long gone were the days when Puritan divines in Massachusetts Bay had urged the slaughter of the indigenous population as demons in the 1630s.

Representative of this "new wave" of European Americans was John G. Neihardt. Born near Sharpsburg, Illinois, in 1881, Neihardt went to teachers' college at the Nebraska Normal School, where he graduated with a Bachelor of Science degree at the age of 16. It was in Nebraska that he began work among the Omaha Indians. Not until 1930, as Neihardt writes, did he become acquainted with Black Elk, a holy man, or *wasicu,* of the Oglala clan of the Sioux tribe on the tribe's Pine Ridge reservation in South Dakota. From that meeting, one of the most creative collaborations in the history of American anthropology began. Black Elk immediately recognized in Neihardt a kindred spirit. As Black Hawk said of Neihardt, "He has been sent to learn what I know, and I will teach him." It was a charge that Neihardt did not take lightly; as he explained, "Always I felt a sacred obligation to be true to the old man's meaning and manner of expression."

Being illiterate, Black Elk dictated his thoughts and memories to Neihardt, who published their collaboration as *Black Elk Speaks* in 1932. Although at first reaching a small audience, it soon even gained the attention of the famed psychologist Carl Jung. Eventually, during the decades to come, *Black Elk Speaks* was republished in many editions. It is a landmark in the development of cultural relativism, and an appreciation that all men and women—of all cultures—are bonded together by the same hopes, loves, and dreams.

— John F. Murphy Jr.

Cultural Traits

Culture is that complex whole that includes knowledge, belief, art, morals, law, customs, and other capabilities acquired by man as a member of society. Culture consists of abstract patterns of and for living and dying. Such abstract patterns are learned directly or indirectly in social interactions of two or more people. In anthropological theory, there is not what could be called closed agreement on the definition of the concept of culture. However, for the present discussion, we want to note three prominent key elements. First, the culture is transmitted. It constitutes a heritage for social tradition. Second, the culture is learned. It is not a manifestation of man's genetic constitution. Third, the culture is shared. It is, on one hand, the product of and, on the other hand, the determination of systems of human social interaction. When talking about a very small bit of culture,

anthropologists use the terms *trait* or *item.* A sparkplug, for example, is an item of material culture; the notion the world is round is an item of ideational culture; and the practice of shaking hands with acquaintences is an item of nonmaterial culture classified as *norm.* Anthropologists are inclined to use the term *item* when referring to material culture and *trait* when referring to nonmaterial culture. There is nothing precise about this usage, nor is it standardized in the literature.

Cultural Traits

Norms: A norm is a rule or a standard that governs our conduct in social situations in which we participate. It is a social expectation. It is a cultural specification that guides our conduct in society. It is a way of doing things, the way that is set for us by our society. It is also an essential instrument of social control. A norm is not a statistical average. It is not a mean, median, or mode. It refers not to the average behavior of number of persons in a specific social situation, but instead, to the expected behavior, the behavior that is considered appropriate in that situation. It is a norm in our society, for example, to say "Please" when requesting a favor and "Thank you" when a favor is received, but no statistical count of the actual frequency of occurence of these polite expressions is available. Nor would such a count be relevent. The norm is considered the standard procedure, whether or not anyone confirms to it, follows it, or observes it in a specific situation. The principle function of the norm for the individual is thus to reduce the necessity for decision in the innumerable social situations that he or she confronts and in which he or she participates. Without them the individual is faced from moment to moment with an almost intolerable burden of decision. Norms are both prescriptive and proscriptive—that is, the norms both prescribe or require certain actions and proscribe or prohibit certain other actions. We are required to wear clothes in our society and forbidden to go naked in the street. Frequently, the prescriptions and proscriptions come in pairs; that is, we are required to do something and forbidden not to do it, or forbidden to commit an act and required to omit it. Proscriptive norms when they are not legal prohibitions are known a *taboos.* There are many kinds of norms, such as folkways, mores, traditions, belief system, rules, rituals, laws, fashions, manners, and ceremonies, some of which are discussed here.

Folkways: It is a term introduced by the late William Graham Sumner. The term means literally the ways of the folk, the ways people have devised for satisfying their needs, for interacting with one another, and for conducting their lives. Folkways are norms to which we conform because it is customary to do so in our society. Conformity to the folkways is neither required by law nor enforced by any special agency of society. And yet we conform even without thinking. It is matter of custom, matter of usage. Each society has different folkways, and they constitute an important part of the social structure and contribute to the order and stability of social relations.

Mores: The mores differ from the folkways in the sense that moral conduct differs from merely customary conducts. Our society requires us to conform to the mores, without, however, having established a special agency to enforce conformity. The word *mores* is a Latin word for *customs* and it is also the Latin source of the word *morals.* Sumner introduced this word into the sociology literature as those practices that are believed conducive to societal welfare. Folkways, on the contrary, do not have the connotation of welfare.

Laws: Laws are associational norms that appear in the political organization of society. Asociations other than the state have their rules and regulations, too, and these requirements are also classified as associational norms.

Belief System: Cultural belief systems can be divided into two parts. One is *existential beliefs,* which include (a) empirical-science and empirical lore, (b) nonempirical-philosophical and supernatural lore, and (c) specialization of roles with respect to investigative interests. Second, *evaluative beliefs* include (a) ideologies, (b) religious ideas and traditions, and (c) role differentiation with respect to responsibility for evaluative beliefs. Religious beliefs are nonempirical ideological beliefs. By contrast with science or philosophy, the cognitive interest is no longer primary, but gives way to the evaluative interest. Acceptance of religious beliefs is then a commitment of its implimentation in action in a sense in which acceptance of a philosophical belief is not. Thus, religious beliefs are those concerned with moral problems of human action, the features of human situations, and the place of man and society in the cosmos, which are most relevant to his moral attitudes and value-orientational patterns.

People of a society conform to normative traits for various reasons. One is that people have been indoctrinated to do so. From earliest childhood, they are taught to observe the norms of their society. Second, people have become habituated by norms. Habituation reinforces the norms and guarantees the regularity of conformity. Third, norms have utility value. As reflective individuals, we can see that norms are useful, that they enable us to interact with others in a way conducive to the best interest of all, and that they contribute to the ease of social exchange. Finally, norms serve as means of group identification. This is the phenomenon of what Robert Merton called "reference group."

— *Komanduri S. Murty and Ashwin G. Vyas*

See also **Cultural Constraints; Enculturation; Folkways; Norms; Taboos**

Further Readings

Bierstedt, R. (1970). *The social order* (3rd ed.). New York: McGraw Hill.

Johnson, H. (1966). *Sociology: A systematic introduction.* Bombay, India: Allied.

Merton, R. K. (1957). *Social theory and social structure.* Glencoe, IL: Free Press.

Parsons, T. (1951). *The social system.* New York: Free Press.

Cultural Tree of Life

Within anthropology, the "tree of life" concept can be viewed from either a biological or a cultural perspective. The cultural tree of life is generally linked to religious beliefs and actions. Symbolic reference to trees as sacred entities can be found in Christianity, associated with the Garden of Eden and with the cross of crucifixion. In Viking myths and legends, according to Kenneth Johnson in *Jaguar Wisdom,* the shaman is said to have "hung like a sacrifice in search of wisdom" from a tree limb.

In the Americas, the ancient Mayan civilization made great use of their own version of the life-giving tree. With the Maya, the tree of life was interpreted on several levels, one being as a conduit or umbilical cord linking one area of space with another. The Mayan lords traveled inside the tree to reach destinations in the sky and also into the underworld of Xibalba and death. As Linda Schele and David Freidel set forth in *A Forest if Kings,* supernatural spirits moved freely from one realm to another via the sap of the trees, much as human blood, upon which they devoted much religious ritual, coursed through the human body. On the great sarcophagus lid of the Maya Palenque, Lord Pacal is carved traveling up the great world tree called *Wacah Chan.* Pacal is depicted as being in transition, moving up from the dark world of Xibalba and the Maw of the underworld, through the realm of earthly existence, to the celestial bird positioned at the top of the great tree, where he will next move up into the sky. The tree is laden with blood bowls and spirit-reflecting mirrors, representing the link between the natural and supernatural worlds.

Moojan Momen in the text *The Phenomenon of Religion* shows that in Siberia, the Buryatia are known to elaborately decorate sacred trees with pieces of ribbon and paper upon which they have written wishes, dreams, and desires, in hopes that they may influence spirits, residing in specific trees, to grant their requests. Momen also includes a description of the often convoluted and weblike structure of the Sephiroth tree of the Kabbalist, within which is formulated its 10 interconnected circles where the "unknowable godhead" representing the "horizons of eternity" resides.

Anthropomorphized deities are included, such as the Buddha Amitoyus, who is known as the "tree of life" and is illustrated with a tree for a body. On several occasions, the great God Zeus, as described in Van Der Leeuw's writing *Religion in Essence and Manifestation,* was drawn with the body of a tree. The Egyptian sycamore tree was known to encircle supernatural gods or have the limbs that serve as a throne for the gods.

James Frazer devoted an entire section in *The New Golden Bough* to life-giving embodiment and life-taking qualities of trees and their resident spirits depicted in a cross-cultural perspective. Included is the belief that contact with specific tree species can increase changes of female fertility capabilities and the ability of tree spirits to ensure abundant crop growth, also connected to fertility. Within the Māori Tuhae tribe, there is the belief that trees are the umbilical cords of mythical ancestors. The Tanga coastal peoples of East Africa believe that specific tree spirits can cause or cure illness and misfortune.

Philip Peek in *African Divination Systems* shows how for the African Yaka, the tree is a symbol of marital bonding across lineage lines, where households simultaneously both deliver and hold onto their fertile females when physically transferring them to other tribes. Each limb and branch of the life-giving tree reflects the interconnectedness of the continuing alliances across lineage lines and the transmission of continued tribal life as grandmother, mother, and daughter each produce successive generations.

Whether symbolizing Germanic myths of the Oden as shaman, the power of the Garden of Eden, the Mayan conduit or the Hindu and African fertility rites, the life-giving tree is a powerful cross-cultural symbol connecting life, death, time, and space and is worthy of further exploration.

— *Beverly J. Fogelson*

See also **Anthropomorphism; Fertility**

Further Readings

Johnson, K. (1997). *Jaguar wisdom.* Minneapolis, MN: Llewellyn.

Momen, M. (1999). *The phenomenon of religion.* Oxford: OneWorld.

Peek, P. M. (Ed.). (1991). *African divination systems.* Bloomington: Indiana University Press.

Schele, L., & Freidel, D. (1990). *A forest of kings.* New York: Morrow.

Van Der Leeuw, G. (1986). *Religion in essence and manifestation.* Princeton, NJ: Princeton University Press.

Culture

Culture is a system created by human activity comprising spiritual, organizational, and material items and expanding within the Earth's nature at the expense of this very nature. People mostly understand human culture in several ways: (1) as an acquired characteristic of human behavior, (2) as a spiritual culture, (3) as a better view of civilization, and (4) as a continuation or refinement of nature. These various understandings are supported by the original antique meaning of the Latin words *colo, colere*, which signified, approximately, the same as the current words *till, educate, grow, cultivate.* The understanding of culture as a spiritual culture, as an acquired feature of human behavior or as a cultivation of nature, becomes perplexing and hardly tenable in the confrontation with the current environmental situation. Culture should be rather understood evolutionally, as a system, that is, as a result of the Cultural Revolution, as an artificially constituted system within the biosphere. Cultural evolution, ignited by humans, is the other possible means of the new ontical (real) structure origination on the Earth, besides the natural, cosmic evolution.

Culture is then a human-created, artificial system with its own internal information—the spiritual culture, that is, human knowledge, opinions, convictions, values, and beliefs. Spiritual and material cultures belong one to another; they are two sides of the same open, nonlinear system of the regional or global culture. The relationship between the spiritual and material cultures is therefore analogous with the biological relationship between the genotype and phenotype in spite of the variant ontical character of cultural and live systems. Understanding culture as a system opposing nature and containing its own internal information and evolution makes it possible to distinguish not only the origins and characteristics of the current environmental crisis but also ways for the alleviation and resolution of this crisis. So far the cultural expansion within the biosphere has resulted in an ever-faster retreat of the original nature and a decrease in the original order of the Earth.

Essential dependence of culture upon nature is primarily determined by the fact that the cultural evolution within nature is generated by humans as a biologic species. Yet culture is dependent on nature and opposes nature and it is also comparatively young and time limited. Humans have not been on the Earth from its beginning and they will not be here until its end. Due to a biologic predisposition to an aggressive adaptive strategy, humans are the only universally active animal species that have managed to ignite another evolution on the Earth occupied with life: This was the cultural evolution—the competitor of the natural evolution. And this artificial evolution, structuring nature differently from the inside, has started not only the conspicuous human era but, unfortunately, also a critical period in the Earth's history. Human artifacts are "baked from the same flour" as natural structures. And since this imaginary flour (elements of the periodic table) has been embedded in live and inanimate structures of

the Earth's surface by the natural evolution, the expansion of the cultural existence causes destruction and replacement of this natural existence—it causes a reduction in the natural order of the Earth, including a mass extinction of biologic species.

Source: Photo provided by www.downtheroad.org,The Ongoing Global Bicycle Adventure.

A serious problem with the currently fast-expanding culture on this finite Earth, leaving aside the raw material and fuel exhaustion and waste and pollution matters, lies in the retreat of and damage to the biosphere, in the loss of the territory occupied by life. Spatial expansion of the elements of the material culture (for example, fields, highways, factories, and cities), which are as material and spatial as the natural ecosystems, is realized only by means of destroying or limiting the evolutionally established natural order. Even though the cultural order expansion doesn't directly change the genetic information in live systems, it shatters and destroys the original environmental order, impairs living conditions for many populations, and is the main cause for the current mass extinction of biologic species. In comparison to the natural ecosystems, which do not contain any free natural information, the cultural ecosystems are much more integrated, systematically more resistant, and therefore also more life destructive. Culture is therefore not only a reconstruction of nature that is rather advantageous for our species, but it is also a shortsighted supplant of the original natural existence that used to be in harmony with humanity.

Ontical opposition of culture against nature mostly results from the fact that culture is a system containing different internal information than nature. Culture, as well as any open nonlinear system with internal information, originates by means of materialization of its own constitutive information, its specific "genome," its spiritual culture. The biologic carrier of the spiritual culture is not the highly objective genetic memory (DNA) but the less specific and rather species-colored (selfish) human epigenetic, neuronal memory. Yet only a channeling, development, and language encoding of the human, natural, neuronal information give rise to the actual genome of the cultural system, to the social, spiritual culture.

A deeper understanding of the opposition between culture and nature requires answering the following question: What is the connection between the character of the current culture and humans, their neuronal knowledge, and the contents of the spiritual culture? It is clear that the direct connection with humans as a biologic species is determined by a special structure of human body and human psyche, by the aggressive type of the social adaptive strategy of humans as a species. Lack of human biologic specialization, determining the universality of human interests, transforms humanity's external environment not only into the subject of satisfying their biologic needs, language-encoded learning, and aesthetic evaluation but also a subject of ownership and unlimited exploitation. Humans, as a species with an aggressive adaptive strategy, experienced the world primarily for the purpose of surviving by means of reproduction and development of their own nonbiologic body—the culture. And since culture is a system with its own internal information, the conflict between culture and nature is "causally" connected with the contents and purpose of the social spiritual culture. This social spiritual culture, as internal information of the cultural system, as its genome, determines and reproduces the form of the current antinatural culture. A change in the cultural genome

Source: Photo provided by www.downtheroad.org,The Ongoing Global Bicycle Adventure.

(contents of the spiritual culture) is therefore the key requirement for the alleviation and resolution of the current crisis. If we want to change a system with internal information (memory), we will have to change its information, because the old constitutive information of the system is able to reverse any phenotype changes.

The cultural system, as well as other natural ecosystems, includes strictly information-specified elements (for example, technics, structures, and consumer objects), but as a whole it cannot be a strictly information-specified system. Even though it also originates through succession (in the course of time sequence), it significantly differs from the natural ecosystems: Besides the integral constitutive information, it also contains the free information—the dispersed spiritual culture. This spiritual culture, as a memory permitting information changes, holds out hopes that the current antinatural culture could be transformed in a biofile way, that it could be naturalized.

Yet it isn't easy to discover the roots of the antinatural character of culture, which is connected with the structure of the human psyche. To achieve that goal we would have to admit that our culture has originated as a materialization of the spiritual culture and that the conceptual interpretation of the world, which we establish by means of the neural equipment of our animal ancestors, is not a true reproduction of reality. The cognitive component of the human psyche, which was the fastest to develop during our species evolution, has never been independent: On the one hand, it has defended the valid claims of human organism, and on the other hand, it has submitted to system requirements of various cultures. Only today do we come across evidence that all human interpretations are influenced by hidden pragmatic motives, not only the individual and group ones, which is a generally accepted fact, but also the generally cultural and species-specific ones, which is a suppressed fact.

Therefore, even the scientific conceptual knowledge, which currently so strictly specifies, as far as information is concerned, the elements of the microelectronic technics and of the developed material culture, doesn't describe the world in its objective order, ontical creativity, and complexity. It shows, for example, that science is still connected with the prescientific division of the world, with language and experience. Yet to survive with our special biologic equipment, we have had to see and interpret the world in a species-biased way from the time of the first hominids. The world was mostly what we were interested in, what we could learn through our conservative biologic constitution and through our culture in the particular epoch. And since we were evolutionally adapted to the external reality with our bodies and genomes, we have never needed to know what nature and life were, what was culture, and what was the position of culture within nature. Such knowledge, an adequate theoretical model of the development of culture within the biosphere, is needed only today. You can find the reason for this in the comparison between the evolution of the biosphere and culture: the development of the planetary life was able to gradually wipe out the abiotic conditions that had caused its origination, yet the development of culture, its whole future existence, will always depend on the preservation of the biologic conditions that had been required for the origination of the very culture. Until the end of its existence, the human culture will depend on the faultless biologic reproduction of humanity; it will be bound to a sufficient scope and structure of the quaternary biosphere supporting this reproduction.

Source: © iStockphoto/Santiago Batiz Benet.

The current highly technical global culture is spiritually anchored in a partial scientific rationality is well as in harmony with some cognitive functions of the human psyche, but it irretrievably destroys those natural structures that the whole human constitution had been adapted to. This significantly consumer culture is based on a technological experience of nature, and it doesn't really care about the value, integrity, and claims of the natural development of the biosphere. Even though there come into existence technologies that are less environmentally aggressive and more energy and waste efficient, the general human approach toward nature remains unchanged. The speed of establishing more environmentally friendly manufacturing processes is equaled by the speed of the environmentally reckless consumption—the new common characteristic of the current human lifestyles. This focus is in harmony with the traditional liberal right of individuals to own their properties, their right for an unlimited personal consumption.

Physical globalization of the human culture, that is, the material-energetic and information interconnection of formerly isolated regions, accompanied by a planetwide migration of people, fast exchange of technologies, goods, inventions, services, and so on, has brought about a situation humanity has never encountered before. Inside the global biosphere, at the expense of this biosphere, there grows a global technosphere, global economy, global division of labor, and global cooperation. This not only deepens the cooperation between physically distant people and cultures, but it also disturbs the beneficial effects of the biosphere upon the globalized culture that had once optimized the local cultural structures and eliminated social disturbances and crises. And therefore the globalization finally turns not only against nature but also against culture. It multiplies its pressure upon nature and it forces the destabilized biosphere—if we can put it like this—to change its strategy: If the live nature cannot defend itself by means of dominance and force, it will do so by means of its vulnerability and fragility. It doesn't have enough power anymore to maintain its most complicated structures, but it can establish a new system integrity and get rid of those live forms that are no more "needed" in the new context. Humanity and

culture can be just an easily removable obstacle for the continuing natural evolution.

For the first time in history, humanity and their culture are endangered by the weakened maternal environment of the planet that had once made their origination possible. Even politicians, who are mostly interested in power, economic growth, and conditions of human liberty, will be soon forced to make decisions under the pressure of the endangered future. They will have to leave the narrow anthropologic, social, and technologic viewpoints and accept a global evolutionally ontological view of the world: For the first time they will be responsible for the human existence as a species.

The antinatural cultural system originated from the essence of the human constitution; it had originated spontaneously, and its development had taken a comparatively long time. The program of the aggressive cultural strategy therefore not only materialized in this system, but it has also entered the ethnical languages, human education, and upbringing. Its resistance to the biofile social-cultural information feels like an interspecies information barrier or an immunity system: Since our current cultural system didn't originate as a materialization of the environmental social-cultural information, people have been ignoring it, refusing to listen to it, and they don't understand its future significance and cultural self-preservation contents.

The planetary solution of this crisis, which is not based in a change in the human constitution but in a philosophic identification of its roots and the possibilities of a biofile cultural strategy, must be therefore prepared by a high theory. Therefore, the positive environmental transformation of the existentially endangered culture by means of its new constitutive information represents an unprecedented attempt of humanity to end the unchecked stage of the antinatural cultural evolution. It could start an intentionally biofile-anticipative stage of the antinatural cultural evolution. Our hope in the success of this attempt is supported by the fact that the conditions for the environmental change automatically ripen due to the crisis development of the current antinatural culture. Yet this crisis must become even more pronounced; the habitability of the Earth must unfortunately become even more complicated to force the current shortsighted party politics to accept the program of the necessary changes that is currently definitely better understood by common people than by bankers, businesspeople, and political representations.

Since we were not prepared for such changes in the reactions of nature either by our natural or our cultural development, we are failed in the confrontation with the wounded nature not only by our biologic constitution: We are failed also by our basic cultural archetypes. No culture can cooperate with a weakened and destabilized biosphere. No political subject could possibly handle it in a delicate way in the current, economically competitive environment. And since there is no adequate philosophical concept of the crisis, even the intellectuals don't understand what has actually happened and what will have to be done to secure human survival on the Earth. If humanity is to survive, it will have to deliberately surrender to nature, and the antinatural spiritual and material cultures will have to be naturalized.

People appeared on the Earth teeming with life at the end of the Tertiary period. They couldn't have philosophically understood the live nature they were evolutionally adapted to. The human psyche, which managed the process of conquering nature, was adapted to the fight for survival and not to compassion with life and care for other species. Spontaneously originating cultures following up the human species' predispositions broke up the natural ecosystems and occupied the Earth. This Earth is currently conquered by culture, the tissue of its life is disturbed with tilled soil, it is encircled with highways and cities, pushed back with buildings, concrete, and pavement. There can be no nobler task for science and philosophy, together with ethics, law, and politics, than preparing an irreversible future change: a rescue of the natural order of the planet, the indispensable condition for a long-lasting and feasible culture.

— *Josef Šmajs*

Further Readings

Barkow, J. H., Cosmides, L., & Tooby, J. (1992). *The adapted mind.* New York: Oxford University Press.

Blackmore, S. (1999). *The meme machine.* Oxford, UK: Oxford University Press.

Capra, F. (2003). *The hidden connections.* London: Flamingo.

Eagleton, T. (2000). *The idea of culture.* Oxford, UK: Blackwell.

Edgar, A., & Sedgwick, P. (Eds.). (2002). *Cultural theory. The key concepts.* London: Routledge.

Mulhern, F. (2000). *Culture/Metaculture.* London: Routledge.
Pinker, S. (2002). *The blank slate.* London: Allen Lane.
Ridley, M. (2003). *Nature via nurture.* London: Fourth Estate.
Šmajs, J. (1997). *The threatened culture.* Dobromysl: Slovacontact.
Smith, M. J. (2000). *Culture.* Buckingham, UK: Open University Press.
Sperber, D. (1996). *Explaining culture.* Oxford, UK: Blackwell.

Culture and Personality

"Culture and personality" has been perhaps the most mythologized and misunderstood of American anthropology's interdisciplinary endeavors. Ruth Benedict and Margaret Mead, the two anthropologists most closely associated with "cultural and personality," have often been understood to equate culture with personality.

While views of this sort are common, there is little, if any, evidence in Mead's writings or papers supporting such contentions; Mead used the rubric seldom, and then descriptively rather than methodologically. Despite clearly articulated differences in temporal scale, at best Benedict's writings show an analogy between personalities and cultures. Furthermore, such views are not easily reconciled with Benedict's and Mead's differing concepts of deviance.

Lawrence Frank, a sociologist at the Rockefeller Foundation, seems to have coined the phrase "culture and personality" for an interdisciplinary conference Mead attended in Hanover, New Hampshire, during the summer of 1934. Nonetheless, in April 1935, Mead wrote to John Dollard that Frank's phrasing seemed "ridiculous." In a 1946 overview of the cultural study of personality, Mead held that the "and" that had been used to join the two distinct subjects had introduced a number of "methodological embarrassments."

Instead of "culture and personality," Mead preferred to discuss the "individual in culture." As early as 1928, her work was replete with discussions of named individuals living in specified, described societies. Mead taught a seminar entitled "The Study of the Individual in Culture" in 1935. This emphasis upon the individual in culture should rightly be traced back to Edward Sapir.

In 1925, Sapir sought to keep Mead from undertaking research in Samoa, and she, equally resolutely, went off to her first fieldwork. This falling-out between Sapir and Mead along with Benedict continues to influence the development of psychological anthropology. To the extent that the writing of the history of anthropology is closely tied to the work of A. Irving Hallowell, this falling-out has also shaped anthropology's useable past.

Hallowell was an associate of Sapir's. His assessments of the field largely ignored Mead's contributions; Mead was not among those invited to contribute to a volume edited by Hallowell, among others, dedicated to Sapir's memory. Concomitantly, Mead elided the contributions of Hallowell, as well as others of Sapir's students and protegées, in her 1946 encyclopedia article.

Edward Sapir

In 1917, Sapir responded to A. L. Kroeber's essay "The Superorganic," wondering whether anthropology required such an idea at all. But if culture is not superorganic, as Hegel's Spirit and Durkheim's Society are, then the psychological processes of cultural life only arise as real (that is, organically singular or individual) people live and act together. Those individuals influence the course of their cultures, even as that culture will be for them genuine or spurious in Sapir's terms (i.e., emotionally sustaining or not).

In bringing the notion of the individual in culture to the fore, Sapir also transformed the meaning of the term *psychological.* Previously, American anthropology had used the term *psychological* to describe cultures considered synchronically rather than historically. After Sapir, it became possible to think of cultures and personal or dynamic psychologies together.

Primarily a linguist, Sapir felt that for human beings, language was the "medium of expression for their society." Their specific language was not merely a means of communication or reflection, but rather an essential means to their adjustment to the world and to social activity; languages, as both signs and phonemes, were psychological realities. Hence, as languages differed, so too psychologies could differ. Benjamin Lee Whorf would subsequently develop this line of Sapir's reasoning.

Besides his much praised linguistic work, Sapir's outstanding contribution was to begin a critique of the concept of culture that attended to the psychological lives of individual people. In conjunction with Harry Stack Sullivan and Harold Lasswell, Sapir sought to bring anthropology, sociology, and psychology together in mutually informative ways, particularly through a series of conferences in Hanover funded by the Rockefeller Foundation; the conference Mead attended in 1934 followed from those Sapir had earlier taken part in.

In the summer of 1925, Sapir taught a seminar on the psychology of culture. He reprised this seminar several times at Yale before his death in 1939. Many who would later teach psychological anthropology were either Sapir's students or the students of his students; as his interdisciplinary activities faded, these protegées and students became Sapir's legacy.

The examples in Sapir's lectures and essays on the subject may have come from his social milieu and that of his students, but Sapir did not provide explicit cultural context for the examples he used or use examples from other cultural worlds; these luminous works contain no real people living real lives in real cultures.

However, these lectures, like Sapir's ostensible "last testament" on culture and personality, included attacks upon Benedict and Mead. According to Sapir, Mead and Benedict not only relied on too few persons but also conflated their informants' subjective, even idiosyncratic, views of social interaction with broader cultural patterns.

Ruth Benedict and Margaret Mead

Benedict and Mead were closely associated for many years; their respective work owed much to the other's influence. This has contributed to a general tendency to treat these two as if they agreed on all or most matters, with Benedict's work being largely more fashionable. It is equally important to understand how Benedict and Mead disagreed on two crucial topics: deviance and the open or closed set of possible configurations.

The term *configuration* was a translation of the German *struktur,* a technical term brought into the American intellectual world in 1925 with the translation of Kurt Koffka's *The Growth of the Mind,* a classic of Gestalt, rather than idealist or behaviorist, psychology. For Koffka, such structures initially arose as the infant's nervous system adapted itself to the wider world and its shifting stimuli through the infant's active perceiving of that world. The structures themselves were organizations of apperception including both the perceiving individual and the stimulative world into a single whole not reducible to its parts.

Benedict first used the term *configurations* in the early 1930s. In *Patterns of Culture* of 1934, citing the Gestalt school, but not Koffka personally, Benedict dissented from earlier views of cultures as amorphous, anomalous sets of traits haphazardly brought together through diffusion. While not a foregone conclusion, some cultures succeeded in transforming a slight preference into a largely integrated, articulated whole not reducible to the selected traits. In ways analogous to persons, cultures tended to select from the traits available to them, making use of some and not others; here, Benedict prefigured Claude Lévi-Strauss's notion of *bricolage.*

As Clyde Kluckhohn noted, Benedict was not so much interested in inductive analysis of a given society as in using behavioral details illustratively, to exemplify a configuration and its influence on local life or as a counterpart to an ideal pattern. As such, common criticisms of Benedict that took her to be writing about invariant patterns of behavior were inapt.

Benedict intended her four descriptive terms—apollonian Hopi, dionysian Plains Amerindians, paranoid Dobuans, and megalomaniac Kwakiutl—to sum up her expositions. While she borrowed the terms *apollonian* and *dionysian* from Friedrich Nietzsche, Benedict's Hopi and Plains accounts were largely based on her own researches; she used materials from the work of Reo Fortune and Franz Boas for the Dobuans and the Kwakiutl, respectively.

Not all the behavior manifest in a given society necessarily accorded well with that society's accepted standards, whether that society was well integrated or otherwise. From the vantage of a particular society, such discordant, unacceptable behavior was deviant; those who behaved in deviant fashions locally understood could often be subject to stigmas locally applied. Benedict's best-known example compared homosexuality in the West of her day and the *berdache,* men who dressed and lived as women, among some Amerindian groups.

Where Benedict's notion of deviance concerned discordant, unacceptable behavior at odds within a specific cultural gestalt, Mead's notion, though often

expressed behaviorally, concerned personalities at odds temperamentally or characterologically with the ethos of a given society.

Neither Benedict nor Mead gave any indication that deviance or its local contraries were statistical matters; nor did Mead, in particular, understand either neurosis or psychosis as deviation from a society's statistical norms. Their notions must be distinguished from other ideas such as A. F. C. Wallace's understanding of a modal personality and Abram Kardiner's notion of a culturally basic personality structure. Whatever the theoretical problems posed for Wallace by the presence of multiple modal personalities among the Tuscarora, to Mead or Benedict, Wallace's Tuscarora would likely have appeared as a not terribly well-integrated society.

Benedict repeatedly commented upon the sheer variability of elements upon which one society or another could elaborate an integrated pattern. Where Benedict perceived endless combinations, however, Mead's thought concerned a limited set of types.

Both approaches allowed for a rigorously comparative anthropology. Strictly speaking, however, Mead and Benedict were not comparing quite the same phenomena. Benedict's patterns were akin to Oswald Spengler's destiny ideas or Wilhelm Dilthey's notion of *Weltanschauung:* a worldview that is also a philosophy of or feeling for life. Such a view is psychological insofar as it implies a human interiority. But Benedict's was neither a particularly nor necessarily dynamic psychology. Where Mead had little feel for what Bateson called *eidos,* or the structure of ideas, Benedict similarly had little feel for Freudian and neo-Freudian genetic psychologies organized around a set of stages, focused upon some portion of the body and the individual's mode of engagement therewith.

Both Mead and Benedict have been criticized for empirical lapses. Similarly, some have held that deviance was effectively a catchall category into which anything that did not fit their analyses could be consigned. These latter views largely ignore or misrepresent Benedict's and Mead's understanding of deviance arising integrally out of local social concerns.

Margaret Mead and Gregory Bateson

For Sapir, no amount of familiarity with the psychological literature could undo the flaws in Mead's work.

Mead received both her bachelor's and master's degrees in psychology. She was trained in many aspects of psychology, including the development of psychological tests, before she took up anthropology. Late in life, Mead thought she had remained within psychology's ambit ever after.

Many of the ideas she developed derived from the psychology of her student years. She reworked William McDougall's notions of temperament (innate, heritable constitutional predisposition) and character (the pattern of learned habits developed over a lifetime). Mead remained particularly fond of June Etta Downey's idea of load (psychological inertia) and freedom therefrom. These ideas are no longer familiar to many psychologists and were perhaps never that familiar to most anthropologists.

Mead was a dedicated, methodologically innovative fieldworker; she undertook studies in Samoa, Manus, among the Omaha, in New Guinea among the Arapesh, Mundugumour (now Biwat), and Tchambuli (now Cambri), as well as in Bali and among the Iatmul, all initially between 1925 and 1939. Her Omaha study was perhaps the first ethnography to portray a North American Native society as largely broken in the wake of its colonial encounter; her New Guinea ethnographies introduced the notion of the "Big Man" and portrayed several peoples as part of a larger mytho-ceremonial order: the tamberan. Mead's and Gregory Bateson's Balinese and Iatmul researches of 1936 to 1939 made greater use of photography than any others to that date, while integrating those materials, more conventional field notes, and both Balinese and Iatmul language texts into an unusually extensive and deep body of ethnographic materials.

Perhaps influenced by Boas's resistance to grand theory, the young Mead sought more to test psychological ideas in various cultural contexts than to debunk them. Mead's early fieldtrips to Samoa and Manus involved explorations against the background of work by G. Stanley Hall on adolescence, as well as Sigmund Freud and Jean Piaget on the purported similarities between the mentality of primitives and children. Mead thought the Freudians and neo-Freudians largely correct about psychological mechanisms but that these mechanisms were much more variable than the psychoanalysts imagined. She explicitly rejected any equation of culture with the superego, but had praise for Geza Roheim's work among Australian Aborigines.

Mead and Bateson began developing their unpublished theory of the so-called squares while among the Tchambuli during March of 1933. The terms of that hypothesis organized the arguments in *Sex and Temperament in Three Primitive Societies* of 1935, a

book better known now for its discussion of gender *avant la lettre,* the rationale for Mead's and Bateson's research among the Balinese and their restudy of the Iatmul between 1936 and 1939, as well as *Balinese Character* of 1942. Mead's debt to Bateson's epistemological concerns, contributions to learning theory as well as his evolving emphasis upon both the generative and destructive qualities of interactive encounters, manifest in his work on schismogenesis, steady states, and eventually double binds, should not be underestimated.

Mead and Bateson recognized four primary types of temperament, each constituting a pole of one of two axes. The two types opposite one another on a given axis were dialectically related to each other. One axis (in Mead's diagrams running north to south) emphasized the qualities of relations with other people she termed "possessing" and "being possessed." The other axis (running east to west) emphasized the individual's relations with the broader world, or introversion and extroversion. They also recognized four intermediate types, each combining qualities of the adjoining primary types and dialectically related to its opposite. Perhaps following Erich Fromm, in some 1935 versions of the squares, Mead also distinguished a central position, which combined qualities of all the other types. Taken together, these types formed a structural set that Mead and Bateson utilized to compare and contrast individual temperaments as well as cultural ethoi.

For the Mead of this period, the individual's personality was a temporary phenomenon arising within the conjunction of constitutional or temperamental inheritance each person receives from their direct ancestors, the operations of the so-called genetic process, the order and accidents of their upbringing, as well as the particular culture in which the person lived. In ways similar to Erik Erikson's notions, Mead and Bateson understood the genetic processes generally characteristic of our species to unfold differently for people of differing temperaments in differing cultural environments. These divergent patterns of human development posed variable demands upon and difficulties for a person's character, hence various life problems, especially for people of one temperament living in a culture whose ethos was more congruent with another temperament. Mead's interest in and debts to the Gestalt psychologists are most apparent here.

Under some circumstances, a given society could stabilize a particular conjunction of temperament and character such that this conjunction provided an organizing pattern for emotional life in that society or, in Bateson's terms, the society's ethos. The society would have to be reasonably endogamous; problems posed by recessive genes, and their influence upon possible temperaments, would have to be limited; the population would have to have become well adapted to the local foods and diseases; the society would have to be able to withstand the economic and military threats posed by outsiders; new forms of knowledge and technological advances or their inverses would have to be more or less consistent with the preexisting social order.

For Mead, such stabilizations were fragile cultural achievements, easily disturbed as well as difficult to produce and reproduce. Any event, personal or more broadly societal, that affected the lives of adults affected the lives of the developing children those adults raised.

Mead explicitly disavowed any theory advancing a mechanical reduction of later adult character to local child-rearing practices. While the external techniques of child rearing prevalent in a given society (swaddling, premastication, and so forth) influenced the course of a child's development, both its health and especially the attitude of the child's caregivers were more important. In this sense, but with a firm recognition of temperament as an integral element of personality, Mead and Bateson agreed with Sapir that psychology arises only in the interactions of individuals.

Not all aspects of the phenomena postulated by the squares hypothesis were observable using ethnographic methods. The biology of the period did not as yet have an adequate theory or the methods necessary to contribute to any such study. As the America of the period was still largely legally segregated and racism was common, Mead, following the advice of both Benedict and Boas, chose not to publish their theory explicitly. This choice contributed greatly to the misunderstanding of Mead's work, including Derek Freeman's characterization of Mead as an extreme cultural determinist.

Aftermath

Sapir, Benedict, Mead, and Bateson were not the only anthropologists interested in psychological matters broadly conceived. W. H. R. Rivers, Bronislaw Malinowski, John Bayard, and the Seligmans all had psychological interests; the psychologist Frederick Bartlett had serious anthropological interests. Among the Americans, aside from those previously

mentioned, John Whiting undertook a study of the Kwoma; Cora DuBois worked among the Alorese; Ralph Linton collaborated with Kardiner, DuBois, and Kluckhohn, though the Apache as described by Kluckhohn did not easily fit Kardiner's models; Paul Radin translated works by Alfred Adler.

By the late 1940s, two volumes of readings on the subject had been brought out. But the rigors of professionalization and the differences between the disciplines Sapir and Frank had hoped to bring together began to tell. Sapir, Sullivan, and Benedict were dead, as were several of the major Gestalt psychologists. Bateson had left anthropology to work among schizophrenics, and eventually on animal communication. Mead was not teaching and had further become embroiled in misunderstandings attendant upon national character studies, especially Geoffrey Gorer and John Rickman's swaddling hypothesis. Melford Spiro and Harold Orlansky had written essays critical of the earlier work.

Sapir's students and protegées were ascendant. Of these, Hallowell was probably the most important. In Hallowell's hands, Sapir's ideas and Koffka's influences, reconfigured as "the behavioral environment of the self," began to prefigure anthropological semiotics as he studied self and perception among the Ojibwa. Most of his work appeared well after the heyday of so-called culture and personality studies.

Bateson, and particularly his notion of *eidos,* would influence cognitive anthropology. Perhaps because her psychology largely concerned worldview without necessarily being dynamic, Benedict could appeal to the more semiotically minded. Like Sapir's, Mead's influence is everywhere and nowhere at the same time.

— *Gerald Sullivan*

See also **Benedict, Ruth; Mead, Margaret; Sapir, Edward**

Further Readings

Bateson, G., & Mead, M. (1942). *Balinese character.* New York: New York Academy of Sciences.

Benedict, R. (1934). *Patterns of culture.* Boston: Houghton Mifflin.

Haring, D. G. (Ed.). (1956). *Personal character and cultural milieu* (3rd ed.). Syracuse, NY: Syracuse University Press.

Kluckhohn, C., Murray, H. A., & Schneider, D. M. (1953). *Personality in nature, society, and culture.* (2nd ed.). New York: Knopf.

Mandelbaum, D. G. (Ed.). (1949). *Selected writings of Edward Sapir in language, culture, and personality.* Berkeley and Los Angeles: University of California Press.

Mead, M. (1946). The cultural approach to personality. In P. L. Harriman (Ed.), *Encyclopedia of psychology* (pp. 477–488). New York: Philosophical Library.

Spier, L., Hallowell, A. I., & Newman, S. S. (Eds.). (1941). *Language, culture, and personality: Essays in memory of Edward Sapir.* Menasha, WI: Sapir Memorial Publication Fund.

Culture Area Concept

The culture area concept was developed in the early 1900s, at a time when American anthropology was in its infancy. Franz Boas and his students were collecting enormous amounts of data about the "disappearing" native cultures of North America. There was no framework for organizing this data, however. The concept of the culture area was first applied by ethnologist Clark Wissler in order to provide a theoretical framework for the information being generated. A culture area was defined as a geographical/cultural region whose population and groups share important common identifiable cultural traits, such as language, tools and material culture, kinship, social organization, and cultural history. Therefore, groups sharing similar traits in a geographical region would be classed in a single culture area. This concept has been vociferously criticized over the last century. The notion of the culture area has been viewed as being ethnocentric because it ignores adaptation or biology and appears to rely on diffusion as an explanation for similar cultural traits (especially inventions) in a single geographic area. The underlying idea of this concept is that by spatially tracing traits, it is possible to understand the history of an institution. By defining the idea of a "culture core," or the group in the culture area that produces the most complex traits and then shares those with other nearby groups, this concept provided a powerful explanatory tool. This concept, as defined, is therefore very selective in the kinds of traits on which it focuses. As a result, local and regional differences are virtually ignored, and the

concept of independent invention was often discarded. An additional criticism is that anthropologists cannot agree on the number of culture areas and how groups should be classified within those divisions. The current division of culture areas tends to be the most popular; however, there are certainly variations on this scheme: Arctic, Subarctic, Pacific Northwest, Northeast, Southeast, Great Plains, Southwest, Plateau, Great Basin, and California. This was readily apparent in archaeology, where culture areas were seen as archaeological equivalents to ethnographic "cultures" and this concept was used to narrowly define and explain similarities in material culture of the past. Similarly, museums organized data, catalogued artifacts, and created displays based on this concept.

Despite its apparent faults, anthropologists continue to use the culture area concept. As an explanatory tool, this concept falls short; however, the concept still provides a mechanism for organizing a multitude of data. In addition, the idea of a culture area certainly illustrates the interaction between neighboring groups of people. Comparisons of groups within and between culture areas allow anthropologists and archaeologists to examine those common environments and historical processes that may link groups or and create similarities and differences between them. The culture area concept also provides a common language for anthropologists working in a particular area. It is often the case that studies are focused by region, and the literature will be equally focused. In addition, research questions and theoretical issues tend to link anthropologists working in a particular culture area. This concept has therefore both divided and united anthropologists.

— Caryn M. Berg

See also **Anthropology, Cultural; Cultural Ecology; Wissler, Clark**

Further Readings

Erickson, P. A., & Murphy, L. D. (2003). *A history of anthropological theory* (2nd ed.). Peterborough, Canada: Broadview Press.

Kroeber, A. L. (1931). The culture-area and age-area concepts of Clark Wissler. In S. A. Rice (Ed.), *Methods in social sciences* (pp. 248–265). Chicago: University of Chicago Press.

Trigger, B. G. (1989). *A history of archaeological thought.* Oxford: Cambridge University Press.

Culture Change

Human beings are the bearers of culture; therefore, it is important to study how humankind has evolved over time as a basis to understand culture change. Periods of culture change indicate the direction in which the strengths and values of said cultures survive and maintain their existence. How to study culture change may be difficult at best because theoretical ideas concerning culture have created a schism among proponents and opponents of cultural evolutionism.

The literature suggests that Charles Darwin's theory of evolution was central to the understanding of how societies evolved over time. Darwin's main point focused on species survivals, that is, the individuals who were best suited to their environment transmitted cultural survivals from generation to generation. However, a biological framework is not progressive in that it can suffice to explain cultural survivals in terms of social structures, hierarchy, social justice, intergenerational poverty, and the like. To this end, rather than to rely upon biology alone, it became important to theorize about how humans "think." Therefore, it is equally important to examine the social world of humans and the coexistence of mental and material phenomena, perhaps in symbolic interactionism.

With respect to symbolic interactionism, symboling and socialization are inextricably linked. Human beings make sense of their reality through symbol manipulations, and thus they behave accordingly. Both concepts can be viewed as a system of rules and regulations. As noted by Talcott Parsons, human beings must achieve compatibility and integration among cultural, social, personal, and biological systems. Therefore, culture and culture change can be examined and theorized through human interactions as well as human responses to environmental influences.

Environmental influences or the "web of life," as coined by Julian Steward, refers to other human communities, plants, animals, and climatic changes that impact and influence how human beings and nature participate in a dance of survival. Furthermore, the question is: Who or what wins the proverbial prize of the ultimate survivor?

For the purpose of this entry, I will use Leslie White's concepts regarding culture. For White, culture

has four key foci. First, it is ideological, in that humans relate to one another based upon shared knowledge, beliefs, and values that are transmitted from one generation to another. Second, it is sociological, in that it governs the laws and those institutions whereby codes of ethics are formulated and advanced in terms of appropriate and inappropriate behaviors. The third element of culture deals with the subjective expressions in human society, in other words, the attitudes or sentiments of the realities that are constructed through the ability to symbol. Finally, the technological aspect of culture explains how human beings developed tools in order to adapt to the environment as well as to survive the forces of nature. In summation, the four elements of culture as explained by White provide a holistic explanation of how culture is produced and changes over time due to a need to survive. White contends that human beings produce culture and that one's understanding of culture is through symboling or a sharing of values and meaning.

Culture change is inevitable. No matter how we as human beings resist or accept it, change of every kind is inevitable. Present-day society is experiencing an accelerated period of culture change. I will focus on technology as an agent of change. Technology has had an immense impact upon our society. The media (for example, television, radio, print media, and computers) tend to shape values and visions of the "self" in terms of what is acceptable and what is not acceptable (such as material wealth and/or physical attributes). Mental images are flashed before our eyes at a rate of speed too fast to compute, yet not fast enough that the mind does not absorb the intended subliminal messages of self-worth or lack thereof. Cell phones have largely replaced public phones. E-mail has replaced letters. The traditional means of communication, the U.S. Postal Service, has competition from the computer. Ironically, the religious community is adapting to the rapid changes in culture. Amazingly, nuns are selling products that are synonymous with beauty for the pure supplementation of personal finances. The Catholic Church now recognizes that the vow of poverty cannot withstand the medical and retirement needs of an aging population of clergy. In addition, cell phone users are not exclusive to people in the workplace, but include people from every strata of society despite social class, ethnicity, age, gender, occupation, or religion, all for the purpose of organizing the day-to-day activities.

Furthermore, religious communities reflect acceptance of changes that have occurred within our culture in order to keep up with the demands of a fast-paced and growing circle of people who are in need of quick fixes. Technology delivers messages of spiritual uplift through the use of the cell phone, the fax, and/or the computer at a rate faster than the speed of light. Technology is redefining the concept of "time." Operational "time" serves to regulate individuals' comings and goings. However, the cell phone user's interpretation of "time" is manipulative in that time can be saved by making a call to provide an explanation of what is late or early or on time. In fact, for some, technology has served to become a controlling device, in that one is forced or seduced into paying bills online rather than by standing in lines to remit. Moreover, cyber-promiscuity and child pornography are becoming uncontrollable vices.

As previously stated, technology has changed and is changing the face of society. It is, however, difficult to determine when technology became such a dominant cultural system, because the story of humankind and one's tools has a long history, dating as far back as before Christ (BC). Clearly, technology has served to preserve humankind in its struggles with nature and the environment. Nonetheless, the fundamental question is: To what extent has technology become a disservice to humankind? And how can there be a healthy balance?

An analysis of cultural change presents multiple interpretations and evolutionary stages and adaptations in and of society depending upon the focus. Technology, as a rule, has shaped and defined culture. In other words, how technology is used and how it serves humankind shape the attitudes surrounding it. White's theory of technological determination is relevant here. Within this theme, technology influences the ways in which people perceive and interact within their environment. In essence, technology in and of itself cannot explain emotions or the social elements of culture. However, the impact of technology upon the social elements of culture can be explained through observable behaviors brought about by the production and possession of materials. Accordingly, a second theme of importance is economic determinism.

In general, a distinctive way of life is determined by social and economic status. For example, Marxism produces an explanation for the impact that material production has had on the social consciousness of the individual. Regardless of privilege and power, the forces of production conflict with and complement

the needs of society. On one hand, technological materialism and the production of tools are specifically designed for the purpose of meeting human needs. On the other hand, material production impacts social relations positively or negatively, contingent upon the intent. Consequently, the more an individual or particular group experiences material wealth (capitalism), political power, and privilege, the less socially conscious one may become concerning others.

Modern conveniences, dependent upon the individual's position on the economic ladder, shape definitions of labor both inside and outside the home environment. In terms of employment, new technology equals increased output and savings over outdated technology. On a personal level, economic status dictates to what extent technology defines one's social image, and one's acquisition of advanced technology (for example, expensive modes of transportation, Internet access via personal computers, and even using a remote control to change the channel versus getting up to do so). Marxism provides a deeper understanding of economic relations; equally important, Marxism, like technological determinism, focuses upon human relations. Power and privilege within the context of social class relations provide a deeper understanding of social consciousness (i.e., there is a social divide between the haves, have-nots, and those who have least of all). As Marvin Harris notes, "materialism is what happens to you when you abandon your ideals and sell out." To put it differently, technological materialism serves to produce unequal relations among people rather than to strike a balance between humankind and nature for the sake of survival.

Modern conveniences have indeed changed survival modes. With a shift in physical labor came a preoccupation with self-image and thus understanding the authentic "self" and the soul's life purpose. The latter served to offset the pressures of succumbing to the emotional pressures to fit into an ideal that may or may not be attainable. Specifically, White correlates ideals of beauty (for example, with respect to women) to technology. In some cultures, where the food supply is not technologically driven and the stock is scarce, voluptuous women are regarded as beautiful; conversely, where there is an abundance of food, those same women in another culture would be deemed unattractive. There is also a correlation between social class and voluptuousness. In the first example, voluptuousness is an indicator of wealth, whereas the latter is regarded as poor to working class.

Burniske and Monke assert that online activities challenge the very notion of "self" and complicate issues of identity among the youth population. The youth population, like a blank canvas, is deficient in life experience and therefore falls victim to others' interpretations of them. Here, online activities breed isolation and the lack of critical thinking and critical analysis of the information presented via the Internet. Technological culture, in this sense a threat to collaboration, eliminates face-to-face discourse and guidance to facilitate authentic or possibilities of authentic self-definition. In other words, opportunities to seek truth, think out loud, or a space to mull over ideas in order to construct more satisfying answers to questions and more authentic definitions of "self" are nullified by technology.

The interrelationship between culture and technology has altered the spirit of collaboration. As Neil Postman informs us, the United States, for example, has evolved from a technocracy to become a "technopoly." As a technopoly (i.e., totalitarian technocracy) every realm of life is regulated through technology. For instance, most inquiries concerning the day-to-day activities that affect financial stability or instability are directed to computerized simulacra of humans without emotions ("Press zero if you'd like to speak to a customer service representative"). Interestingly, Postman equates technocracy with industrialization, inclusive of humankind and an enduring sense of spirituality. In other words, pretechnological man was loosely controlled by social customs and religious traditions. As an illustration, pretechnological man was less mechanical and more in touch with a moral dependency upon God (or the possibility of things coming into being due to a higher power) if not dependency upon one another. Accordingly, technology is chipping away at the human element that guides the emotions, leaving less regard for the human spirit. Technology is paving the way for a culture that is an insult to self-respect, such that the word "thank you" is becoming an anomaly. Postman argues that technocracy (tradition) and technopoly as two opposing worlds coexist (technology being the dominant worldview), and thus are redefining the symbols of culture (religion, community, politics, history, truth, and privacy).

Culture change takes place to accommodate human beings in their immediate environment. There is at times evidence of resistance to change and individuals who do their best to preserve elements of the culture through law enforcement. However, accommodations

for the changes that do occur within our culture shape our very survival. In the final analysis, technology is just one aspect of culture change, yet because people are highly dependent upon technology, its influence is felt in every aspect of daily living.

Burke and Ornstein refer to the talented people who changed our lives, presumably for the better, as the "axemakers." Furthermore, they argue that in exchange for their innovations, the axemakers gained control of our minds and redefined our beliefs and values. The very use of their innovations is seductive and addictive due to its image-producing powers.

In addition, Burke and Ornstein suggest that technology has both improved the quality of life in some societies, while generating a negative effect within and outside these societies. For instance, in Jamaica, in order to support tourism, businesses are eroding those spaces where individuals could once grow crops for individual and commercial use. Thus, natural resources that were once readily available for the taking are no longer accessible to the less fortunate. Here, opportunities for economic growth, while available for "big" business, deny the very livelihood of others. With respect to culture change, technology is the gift that packs such a deep sense of dependency and control that people feel as though without it, they cannot function. However, Burke and Ornstein inform us that the changes that are taking place within our world need not be beyond our control. The key to surviving periods of culture change is to become acquainted with the processes involved within the change. It is very important to be mindful of our most valuable resource, our children, and the environment in which their lives and minds are shaped and developed. Through our children, we stand to take back our power and reshape our future our way.

— *Virginia A. Batchelor*

See also **Cyberculture; Social Change; Steward, Julian H.; Technology**

Further Readings

Burke, J., & Ornstein, R. (1997). *The axemaker's gift: Technology's capture and control of our minds and culture.* New York: Putnam Books.

Burniske, R. W., & Monke, L. (2001). *Breaking down the digital wall: Learning to teach in a post-modern world.* Albany: State University of New York Press.

Harris, M. (1993). *Cultural materialism: The struggle for a science of culture.* New York: Vintage Books.

Postman, N. (1993). *Technopoly: The surrender of culture to technology.* New York: Vintage Books.

White, L. A. (1959). *The evolution of culture: The development of civilization to the fall of Rome.* New York: McGraw-Hill.

Culture of Poverty

Social scientists credit Oscar Lewis (1914–1970), an American anthropologist, with introducing the concept of a culture of poverty. He first suggested it in 1959, in his book, *Five Families: Mexican Case Studies in the Culture of Poverty.* The concept refers to the ideas and behavior developed by poor people in some capitalist societies as they adapt to urban circumstances. Lewis conceptualized the culture of poverty as having its own structure and rationale and as consisting of a way of life that is passed down from generation to generation along family lines.

The view advanced by Lewis emphasized that the culture of poverty in capitalist societies was not simply a matter of economic deprivation or the absence of something. Rather, it is also something that provides individuals with a framework for interpreting their lives and the problems they encounter in their daily existence. Furthermore, the culture of poverty transcends regional, rural-urban, and national differences to produce remarkable similarities in family structure, interpersonal relations, and value systems in different societies.

Poverty and the Culture of Poverty

Lewis recognized that there are degrees of poverty and many kinds of poor people. Not all societies have a culture of poverty. Lewis argued that a culture of poverty is more likely in societies with a certain set of conditions. First, these societies have a cash economy, wage labor, and production for profit. Second, they have a persistently high rate of unemployment and underemployment for unskilled labor. Third, there is the presence of low wages. Fourth, these societies fail to provide social, political, and economic organization

either on a voluntary basis or by government imposition for the low-income population. Fifth, there exists a bilateral kinship system rather than a unilateral one. In a unilateral kinship system, one traces descent either through males or through females. In a bilateral system, one traces descent through males and females without emphasis on either line. Sixth, the values of the dominant class stress the accumulation of wealth and property, the possibility of upward mobility, and thrift, and they explain low economic status as the result of personal inadequacy or inferiority.

The way of life that develops among some of the poor under these conditions constitutes the culture of poverty. Lewis described this way of life in terms of some 70 interrelated social, economic, and psychological traits. These traits represent a reaction of the poor to their marginal position in a class-stratified, highly individuated, capitalistic society. They represent an effort by the poor to cope with feelings of hopelessness and despair that develop from the recognition of the improbability of achieving success in the larger society. The number of traits and the relationship between them could vary from society to society.

Lewis theorized that the culture of poverty is not only a present adaptation to a set of objective conditions of the larger society. Rather, once it comes into existence, it tends to perpetuate itself from generation to generation because of its effect on children. For example, Lewis argued that by the time slum children are age 6 or 7, they have usually absorbed the basic values and attitudes of this culture of poverty and are not psychologically geared to take full advantage of increased opportunities that occur in their lifetime.

Traits of the Culture of Poverty

Lewis derived the essential features or traits of the way of life he termed the *culture of poverty* from an extensive collection of life histories and psychological tests with families. For example, in his classic work, *La Vida* (1966), he described the culture of poverty in terms of poor families in Puerto Rico and New York. From these studies, he suggested that social scientists could identify and study the traits that formed the culture of poverty from a variety of points of view: (a) the relationship between the culture of poverty and the larger society, (b) the nature of the slum community, (c) the nature of the family, and (d) the attitudes, values, and the character structure of the individual.

The Culture of Poverty and the Larger Society

Lewis argued that one of the crucial characteristics of the poor in a culture of poverty is their lack of effective participation and integration in the major institutions of the larger society. This characteristic results from a variety of factors, including lack of economic resources; segregation and discrimination; fear, suspicion, or apathy; and the development of local solutions for problems faced by the poor. While the poor "participate" in some of the institutions of the larger society as inmates in prison, as recipients of welfare, or as soldiers in the armed services, participation in such institutions perpetuates the poverty and sense of hopelessness.

The low wages and chronic unemployment and underemployment of the poor lead to lack of property ownership and an absence of savings. These conditions reduce the likelihood of effective participation in the larger economic system. In addition, a constant shortage of cash and inability to obtain credit results in borrowing at high rates of interest, use of secondhand clothing, and furniture and pawning of personal goods.

Lewis also reported that people with a culture of poverty have a low level of literacy and education, are not active members of political parties, and make very little use of community resources such as banks, hospitals, museums, or art galleries. Moreover, they have a critical attitude toward some of the basic institutions of the dominant classes. For example, they may dislike the police, hold a mistrust of the government and those in high positions, and display a cynicism that extends even to the church.

While people with a culture of poverty are aware of middle-class values, Lewis argued that they largely do not live by these values. For example, the poor typically do not marry, although they consider marriage an important ideal. Lewis thought that this was largely a consequence of their economic condition. Men with no steady jobs or other sources of income want to avoid the expense and legal difficulties of marriage. Women believe that consensual unions are also better for them. They believe that marriage ties them down to men who are immature, abusive, and unreliable, and, in addition, by not marrying, they have stronger ties to their children and exclusive

rights to a house or any other property they own.

The Nature of the Slum Community

Lewis referred to the place where the poor resided as "slum communities." Poor housing conditions, crowding, and a minimum of social organization beyond the level of the family characterizes slum communities. While one can find occasional voluntary associations or neighborhood gangs present in these communities, it is the low level of organization that gives the culture of poverty its marginal quality when contrasted with the complex, specialized, and organized larger society.

However, even in slum communities, one may find a sense of community or esprit de corps. The development of this sense of community depends on several factors, such as the size of the slum community, incidence of home ownership, low rents, stability of residence, ethnicity, kinship ties, and the slum's location in terms of the larger city. For example, Lewis's research indicated that when there are barriers that separate slums from the surrounding area, when rents are low and stability of residence is great, when the population constitutes a distinct ethnic or racial group, and when there are strong kinship ties, then a strong sense of community can develop. However, even when these conditions are absent, a sense of territoriality develops that demarcates the slum neighborhoods from the rest of the city.

Source: © iStockphoto/Mary Marin.

The Nature of the Family

Lewis's studies indicated that people with a culture of poverty tend to form common-law marriages or cohabiting arrangements. Abandonment of families by fathers is common, and consequently, there is a high incidence of female-centered families and strong ties with maternal relatives. Crowded living arrangements foster a lack of privacy, and scarcity of resources creates competition for limited goods. Sibling rivalry is common, as is rivalry for maternal affection.

Children in these families begin adult activities earlier in their life cycles compared with children from middle-class families. For example, they are more likely to have early initiation into sex and are less likely to complete high school, thus entering the job market sooner than their middle-class counterparts.

Attitudes, Values, and Character Structure of the Individual

Individuals living in a culture of poverty share a set of traits that differentiates them from the rest of society. These traits are behavioral or psychological; the family perpetuates these traits as it passes them down from generation to generation through its psychological impact on children.

Lewis argued that the major individual characteristics are a strong feeling of marginality, helplessness, dependence, and inferiority. People with a culture of poverty also display a sense of resignation and fatalism, present-time orientation, lack of impulse control, weak ego structure, sexual confusion, and the inability to defer gratification. They also are provincial, locally oriented, and have very little sense of

history. Typically, they are unable to see the similarities between their problems and those like them in other parts of the world.

Critique of the Culture of Poverty

The term *culture of poverty* became well-known in the social sciences and in the political arena as well. During the 1960s, for example, Michael Harrington utilized the phrase in *The Other America* to emphasize how the economy and social structure limited the opportunities of the poor and produced a culture of poverty that the poor did not choose. However, criticisms of the concept also emerged. Two criticisms are especially important.

First, the media and politicians frequently used the concept in a manner different from Lewis's initial conceptualization. The connection between the political economy and the culture of poverty was frequently absent in their descriptions of the poor. The behavioral, psychological characteristics of poor individuals were emphasized, as well as the problems created by the family structures of the poor. The larger society often blamed the poor for their circumstances because analysis of the poor presented only the culture of poverty. The ties to the economic and structural dimensions of society theorized by Lewis were frequently forgotten. Scholars and activists attacked this "blaming the victim" for being in poverty and continued to conduct research and present policy proposals that link the behavioral outcomes of the culture of poverty to social structural factors.

Second, Lewis presented a view of urban poverty that argued that the urban poor develop their own adaptation that is fundamentally different from the culture of the rest of society. However, an alternative point of view emphasizes that the urban poor share many values of the larger society around them. This view emphasizes that the "subculture" of poverty is part of the larger culture of the dominant society. While one may find in the poor the traits described by Lewis, one also finds that the poor may share values of the dominant society. For example, research reports individuals among the poor who possess a strong work ethic passed on through extended-family networks, only to confront the structural reality of limited job opportunities in the urban ghetto.

Poverty and Culture

The culture of poverty remains an important scientific idea. It refers to one way of life shared by poor people in given historical and social contexts. The concept enables us to see that many of the problems we think of as distinctively belonging to one society also exist in other societies. The concept also enables us to see that poverty can exist without the culture of poverty. Finally, Lewis argued that because the traits associated with the culture of poverty are passed on from generation to generation through the family, elimination of poverty per se may not be enough to eliminate the culture of poverty, which is a whole way of life.

— *Patricia E. Erickson*

See also **Economics and Anthropology**

Further Readings

Allen, V. L. (1970). *Psychological factors in poverty.* Chicago: Markham.

Auletta, K. (1982). *The underclass.* New York: Random House.

Gans, H. J. (1995). *The war against the poor.* New York: Basic Books.

Harrington, M. (1962). *The other America.* New York: Macmillan.

Lewis, O. (1959). *Five families: Mexican case studies in the culture of poverty.* New York: Basic Books.

Moynihan, D. P. (Ed.). (1968). *On understanding poverty: Perspectives from the social sciences.* New York: Basic Books.

Myrdal, G. (1965). *Challenge to affluence.* New York: Vintage.

Wilson, W. J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy.* Chicago: University of Chicago Press.

Culture Shock

Culture shock refers to feelings of uncertainty and discomfort experienced by an ethnographer during fieldwork in a different culture. Confronted by a new environment, strangers, and many new behaviors and ideas, almost all ethnographers react emotionally, some with unusual anxiety, anger, sadness, fear, or disorientation. Culture shock tends to resolve over time but may be reawakened when ethnographers return to their own cultures and discover that "the normal" now has become strange in light of their changed perspectives. For many cultural anthropologists, culture

shock is a necessary part of learning about culture's power to shape human experience. Understanding culture's influence directly shapes the ethnographer and is one reason ethnographic fieldwork is so significant to cultural anthropology.

Culture shock, defined broadly, includes adjustments to surroundings that are felt physically by ethnographers as well as psychological discomfort that results from more subtle differences to which they must adapt. Thus, ethnographers find new food and ways of eating, lack of Western-style plumbing, sleeping on the floor, wearing unwashed clothes for days, different modes of urination and defecation, constant insects, and even unexpected weather as annoying, exasperating, and tiring conditions that must be faced early in fieldwork. Often, it is not so much the conditions themselves as that ethnographers are unsure about correct behavior and are afraid they unwittingly may offend their hosts. The combination of physical adjustment and uncertainty or fear often dominates the initial fieldwork period.

Perhaps of greater long-term significance are various psychological accommodations that ethnographers often continue to make throughout the fieldwork period. These may enable ethnographers to realize how much they have integrated their own culture's values in their everyday lives and identities. Privacy and independence are difficult if not impossible to achieve when most people around them do not understand them and routinely live immersed in family and kin group loyalties. Ethnographic work itself with its associated values of education and literacy may be irrelevant or not comprehensible to informants. Often, culture shock leads to insights that challenge deeply held cultural assumptions. For example, U.S. ethnographers may hold notions of child rearing that emphasize egalitarianism and nurturing. Yet ethnographers may discover that favoritism of a first or last child is the norm in the culture being studied or that children are differentiated by gender as well as age in the form of care provided. Insights gained from culture shock often lead to the reformulation of research questions by the ethnographer in the field.

Many scientific accounts of other cultures traditionally contained impersonal descriptions of subsistence patterns, social organizations, and religious practices rather than discussion of culture shock and the emotional toll of fieldwork. Accounts of emotional upheaval were left to anecdotal conversation, the field diary, and occasionally to introductory remarks in the ethnography itself. The situation began to change by the late 1960s and even more so with the advent of postmodern ethnography in the last quarter of the 20th century. Bronislaw Malinowski's posthumously published diary provides an example of loneliness and discontent by the fieldworker often credited as the originator of modern participant observation.

— Audrey C. Shalinsky

See also **Ethnographer; Malinowski, Bronislaw; Participant-observation**

Further Readings

Bock, P. K. (Ed.). (1970). *Culture shock: A reader in modern cultural anthropology*. New York: Knopf.

Chagnon, N. (1996). *Yanomamö* (5th ed.). Fort Worth, TX: Harcourt Brace.

Malinowski, B. (1989). *A diary in the strict sense of the term* (2nd ed.). Palo Alto, CA.: Stanford University Press.

Culture, Characteristics of

The first complete definition of culture in anthropology was provided by Edward Tylor, who defined the concept as "that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society." This definition is taken from *Primitive Culture,* Tylor's 1871 cultural evolutionary account of human development. Though the 19th-century cultural evolution model has long been rejected by anthropology, the main elements of Tylor's definition of culture remains. Tylor defined culture in a much more open and holistic manner than his contemporary, Matthew Arnold, who defined culture in 1869 as "high culture," which is defined in terms of the "best that has been said or thought in the world." Most anthropologists would share with Tylor a definition of culture that examines ordinary daily life as opposed to the production of the "elite."

Though culture seems like a simple concept, the challenge is studying culture in all its complexity. Culture has both an ideational/symbolic axis as well as a material/behavioral axis. By ideational/symbolic, this refers to the fact that culture exists in

our minds: Culture includes the idealized norms and values that we hold in our minds and the symbolic nature of culture, which is understood and interpreted by individuals. Though culture could be conceived of as an ideal existing in thought, it is expressed through material production and direct human interaction. Culture is characterized, then, by what people think and what they do; that culture is based in symbols, both those that exist in thought and those that are expressed in material culture and social life.

Some of the common characteristics that are common to all definitions are the fact that culture is *shared,* that culture is *learned,* and that culture is an *integrated* whole.

By shared, this means that even though no two individuals will have exactly the same culture knowledge and life experience, both will share enough to make social life possible. That is to say, as cultural beings, individuals can predict and understand the behavior of others, thus enabling social life. Culture shock precisely occurs when all that is taken for granted (i.e., shared within your own culture) no longer applies.

Not only is culture shared, it is also learned. This recognizes the fact that humans do not live by instinct alone; rather, culture mediates our adaptation to the physical environment. To survive, humans acquire culture. By learned, this presumes that culture will be in large part acquired in the first years of a child's life (enculturation), but it does not imply that humans ever stop learning culture. As culture is constantly in a state of flux, humans have the ability to acquire new knowledge and to generate new culture over the course of their lifetimes.

Finally, culture is an integrated whole, or to paraphrase Clifford Geertz, a web of meanings and significance, whereby every element of culture is connected in this web of significance to everything else in that culture. On a more practical level, this means that culture is an interrelated whole and that to truly study culture, it is necessary to look at the larger context. This means that a study of political life would entail an analysis of kinship and marriage, looking at how authority and power are often transferred between generations; economics and the ways in which politics shapes production, distribution, and consumption as well as the ways in which large economic considerations shape the distribution of political power and authority; religion and the ways in which the sacred is called upon to justify or legitimate power; and finally, language and communication and ways in which power can be achieved through the use of metaphor and language.

Though contemporary anthropologists rarely write monographs that purport to describe an entire culture or population, anthropology will still seek to understand any aspect of culture or social life as existing in a much larger and complex whole whereby changes in one quadrant may possibly bring about unexpected changes elsewhere in that culture. Likewise, anthropology will not see culture as a shopping list of features or norms, rather as a continually changing mass of ideas and behaviors, in which culture is imperfectly shared between individuals in a social group, but equally between social groups.

— *Michel Bouchard*

See also **Anthropology, Cultural; Cross-Cultural Research; Culture Shock; Societies, Complex; Social Structures; Tylor, Edward Burnett**

Further Readings

Arnold, M. (1869). *Culture and anarchy: An essay in political and social criticism.* London: Smith, Elder.

Geertz, C. (1973). *The interpretation of culture: Selected essays.* New York: Basic Books.

Haviland, W., Fedorak, S., Crawford, G., & Lee, R. (2005). *Cultural anthropology* (2nd Canadian ed.). Montreal, Canada: Nelson.

Tylor, E. (1871). *Primitive culture: Researches into the development of mythology, philosophy, religion, art, and custom* (2 vols.). London: J. Murray.

CYBERCULTURE

The advent of the personal computer combined with the development of the Internet and easy-to-use, Internet-based computer applications has created a new virtual environment in which new forms of social interaction occur. Adding new technologies to social behaviors has created an environment that has changed individuals, cultures, and the world. Due to

the dynamic nature of the Internet, individuals can communicate with others who have the same interests worldwide. A new world culture has formed. The overlying culture is different from previous cultural development in nature and scope. The development is of a virtual nature and (or will) encompasses every individual worldwide. Never before have new global cultural forms emerged so quickly.

Culture is defined in several ways: (a) the totality of socially transmitted behavior patterns, arts, beliefs, institutions, and all other products of human work and thought; (b) the patterns, traits, and products considered as the expression of a particular period, class, community, or population; and (c) the predominating attitudes and behavior that characterize the functioning of a group or organization. *Cyber* refers to computers. *Cyberculture* can then be defined as the transforming of social behavioral patterns, arts, beliefs, institutions, and all other products of human work and thought in which humans interact with computers and computer networks.

Culture plays a role in society and societal issues. Barnouw stated that society is a more or less organized group of people of both sexes who share a common culture. Loosely "society," in this context, refers to issues such as meeting food, shelter, reproductive, and other basic needs. Das stated that a society typically has only one culture. Ember and Ember, and Nanda stated that two different societies cannot possess the same culture. Das again stated that this implied that if cyberculture is a distinct culture, then it should form one particular separate society. Cyberculture is unique in that it is essentially one distinct and separate subculture of many global societies. This societal cultural extension is the same globally but is connected to societies with different values, ethics, and morals. For instance, Europe, America, and Asia all have different societies, with each having its own unique culture. The culture of cyber, transported through the Internet, is identical regardless of physical location. Beliefs, behaviors, patterns, traits, and predominating attitudes are nearly identical whether the individual is in New York, London, Hong Kong, Moscow, or Munich. Cyberculture is then intertwined with the local culture and society, extending the physical world into the virtual world. North has called cyberculture a "pan-societal superstructure." Cyberculture, unlike traditional cultures, is freed of the responsibilities of providing a number of properties that can reasonably be expected from any mainstream society by virtue of the fact that its members are also members of the traditional mainstream societies that supply basic societal needs (food, shelter). According to Das, the Internet society has become a melting pot of different societal components, such as economics, socialization, politics, and entertainment.

The Internet and cyberculture have brought about a shift in values from those accepted in traditional societies. Although multimedia components such as audio, pictures, and video are becoming a more important (and more abundant) component of the Internet for the personal user, its first decade in existence was primarily based on simple text as a form of communication between the majority of users. When this form of communication is used, it removes the traditional way societies judge one another and places a new value on one's worth. Traditionally, societies judge people by appearance, gender, race, wealth, dress, occupation, and so on. In the Internet culture, individuals are judged on their contributions to the new culture. For instance, prestige is earned by what an individual writes or by performing some other service such as maintaining discussion groups or websites.

Another interesting benefit from the Internet and cyberculture is its reciprocity to the user. Traditionally, as the number of individuals in a society increases, the resources available to that society, per person, decrease. The opposite is true in the Internet culture. As more individuals use the Internet, each person brings more resources into the societal pool. These resources are of a humanitarian nature, such as providing information, advice, writings, and software. As a result, the larger the Internet grows, the more resources are available for individuals to use, which, in turn, attracts more users.

Just as in mainstream society, there are rules of use for the Internet. All users are expected to conform to these rules. *Netiquette* is the term used to refer to these rules. If members of mainstream society do not follow typical societal rules, usually, but not always, an authority figure (such as the police) is responsible for punishing the individual. In fewer and less severe cases, neighbors might ostracize a particular member of its local society for breaking societal rules. The Internet is interesting in that the authoritarian role is reversed. In cyberculture, unacceptable behavior is usually dealt with by the offending user's peers. This is primarily through

written chastisement, and converse to mainstream society, in a minimal number of cases, police action is sometimes taken if the infraction contains criminal activity. There are 10 basic Netiquette rules: Rule 1: Remember the Human; Rule 2: Adhere to the same standards of behavior online that you follow in real life; Rule 3: Know where you are in cyberspace; Rule 4: Respect other people's time and bandwidth; Rule 5: Make yourself look good online; Rule 6: Share expert knowledge; Rule 7: Help keep flame wars under control; Rule 8: Respect other people's privacy; Rule 9: Don't abuse your power; and Rule 10: Be forgiving of other people's mistakes.

There are negative aspects in all cultures and societies. Cyberculture has been criticized for its effect on individual socialization. Since the Internet is essentially a world of its own, many users become socially isolated from the physical society at large. These users spend the majority of their time online, with very little socializing in the traditional manner. Research has shown that these individuals are more likely to be depressed and are agitated and irritable when offline. Cyberspace can also lead to expensive compulsive behaviors, such as online gaming, online auctions, and pornography. Often, when individuals excessively use the Internet, problems with real-world relationships occur, resulting in counseling for the affected individuals. There are also physical dangers for those individuals who use the Internet excessively. Physical activity is important for human health. Excessive use of the Internet creates a sedentary lifestyle in which the individual is physically inactive. Physical inactivity leads to greater stress and increased risk of heart disease. There are resources available on the Internet that will assist with these issues.

The Internet is made up of many components, applications, and services affecting the culture of the net. Electronic mail (e-mail), instant messaging, chatting, and the World Wide Web (WWW) are important parts of the modern-day Internet.

There are several common communication methods in which users interact on the Internet using various types of messages. Electronic mail was the first widely used form of communication on the Internet. E-mail is a form of asynchronous communication by which a user enters a text message consisting of several sentences or paragraphs and sends it to another individual somewhere on the Internet. If the receiver is not currently online, the message will be held until the receiver picks up or retrieves his or her e-mail from the e-mail server. That individual can then respond at a time of convenience. Instant messaging usually consists of not more then a sentence or two. Both users must be online at the same time in order to communicate. The sender will enter the message and "instantly" send it to the receiver. Chatting requires that both parties be online at the same time. Users exchange messages in a synchronous environment, where all members in the "chat" can send text at essentially the same time. The information sent in this environment is usually a few words to a sentence. Discussion groups are another common method of communication on the Internet. A discussion list is like a bulletin board. One user "tacks" up a message on the board, and everyone can see it. In the online world, the users submit messages to a discussion list. Everyone who accesses the list can view the original message and respond to it. Usenet newsgroups are one of the oldest parts of the Internet. Originally, a message board/forum system was used mainly by academics and scientists. Discussion groups (newsgroups) are the modern-day message board systems and have become one of the most common forums for communication exchange. There are over 100,000 forums in use today on every topic imaginable with millions of users.

The WWW, an Internet-based hypermedia initiative for global information sharing, was developed by Tim Berners-Lee in 1989 while he was working at the European Particle Physics Laboratory (CERN). Berners-Lee wrote the first Web client (Web browser) in 1990, called "WorldWideWeb." After several years, this browser was renamed "Nexus." In 1991, there was just one Web server; by 1993, there were 50 Web servers worldwide. Mosaic, one of the first browsers with a graphical interface, was released in February 1993. Interest in the World Wide Web grew exponentially over the next year, with over 1,500 Web servers registered in June 1994 (1000% increase over January 1993). The following several years brought even more growth to the WWW and the releases of two of the most popular Web browsers, Netscape Navigator and Internet Explorer.

In simplest terms, the growth and ease of use of the WWW combined with communication technologies, such as e-mail, instant messaging, chatting, and discussion groups, has led to this new Internet-based culture. The resulting environment has enabled individuals across the globe to communicate and create

communities formed around common interests. The Internet has fostered the growth of personal and professional relationships that go beyond traditional geographical boundaries. The Internet has brought immeasurable quantities of information to the fingertips of users worldwide. The Internet is a cyber "neighborhood" and has become a virtual society. As in any society, a cultural identity forms. Cyberculture defines the social behavioral patterns, arts, and beliefs that individuals assimilate while using the Internet.

— *Shaun Scott*

See also **Computers and Humankind; Culture Change; Globalization**

Further Readings

Das, T. K. (1999, March 18). *The impact of net culture on mainstream societies: A global analysis.* http://in.arxiv.org/abs/cs.CY/9903013

Nanda, S. (1991). *Cultural anthropology* (4th ed.). Belmont, CA: Wadsworth.

North, T. (1994). *The Internet and Usenet global computer networks.* Masters thesis, Curtin University of Technology, Perth, Australia.

Silver, D. (2003). *Introducing cyberculture.* http://www.com.washington.edu/rccs/intro.asp

Cybernetic Modeling

Cybernetics is the study of control and self-organizing processes in systems, including living organisms, human organizations, and machines. Cybernetic modeling is the attempt to use math or visual symbolic representations of system components and processes to understand the effect of feedback on a given system's potential states of organization or performance.

The term *cybernetics* can be traced to Aristotle's metaphorical reference to ship navigation to describe political governance. The industrial revolution of the 1700s produced rapid technological advances in self-regulating machinery, especially James Watt's steam engine, and the notion of self-regulatory systems now permeates Western thought. In the 1940s, a group of engineers, biologists, psychologists, and others began to meet regularly to solidify disparate notions of systems theory and applied the term *cybernetics* to their work. Norbert Wiener, whose early interests included self-correction in antiaircraft guns and tanks, was perhaps the most influential. Anthropologists Margaret Mead and Gregory Bateson were core members of the group. The group's ideas were heavily influenced by the Austrian biological and social theorist Ludwig von Bertalanffy. Many of the group's early works were published in the *General Systems Yearbook.*

Among cybernetic principles, *homeostasis* is the tendency of a biological or social system to resist change and maintain itself in a state of equilibrium. The household thermostat is a common metaphor for *negative feedback,* which keeps processes in equilibrium. *Positive feedback* increases deviation from a goal or equilibrium. Cybernetic theory has strongly influenced social science, engineering and physics, psychology, mathematics, communications, organizational management, biology, artificial intelligence, and the computer revolution. The concept of "feedback" has become so pervasive it is now used in common parlance.

It is difficult to identify the complete effects that cybernetic theory has had on anthropology, because the idea of "social systems" is so prevalent in Western thought, but cybernetic theory is clearly discussed in psychological and ecological anthropology. Gregory Bateson influenced the emerging field of psychological anthropology through his theories of mental illness. Rather than treat the human mind as an individual entity, he considered it part of a culturally created system with positive or negative feedback. In the 1950s, Howard T. Odum and Eugene Odum applied cybernetic modeling to ecosystems research in ecology. Archeologists and cultural anthropologists adopted these tools to model human ecosystems. Perhaps best known is Roy Rappaport, who modeled Maring spirituality, nutrition, social organization, and natural resources as a system of feedback mechanisms that regulate ritual and warfare. Critics claimed that the focus on equilibrium precluded an explanation of how social systems change over time, artificial boundaries used to define systems were meaningless, and choices of which system components to model were arbitrary. Cybernetic theorists now focus more on system components that lead to change. New theories of complexity, chaos, and resiliency share

the notion that relationships between components of a system may determine the future direction of a system but specific outcomes are difficult to predict because the relative importance of initial conditions cannot be identified. Some anthropologists focus on the unique histories of social systems rather than universal components that should be modeled and are experimenting with computer models that include individual agency as a component of system complexity.

— David G. Casagrande

See also **Chaos Theory; Functionalism; Mead, Margaret; Rappaport, Roy; Societies, Complex**

Further Readings

Heims, S. J. (1991). *Constructing a social science for postwar America: The cybernetics group.* Cambridge: MIT Press.

Kohler, T. A., & Gumerman, G. J. (Eds.). (2000). *Dynamics in human and primate societies: Agent-based modeling of social and spatial processes.* New York: Oxford University Press.

Rappaport, R. (1984). *Pigs for the ancestors: Ritual in the ecology of a New Guinea people.* New Haven, CT: Yale University Press.

CYBERNETICS

One of the most important developments in cybernetics today is in *nanotechnology,* which may be to the 21st century what the discovery and exploitation of atomic energy and the computer were to the 20th century. According to the Institute of Nanotechnology, "A nanometer is a billionth of a meter, that is, about 1/80,000th of the diameter of a human hair, or 10 times the diameter of a hydrogen atom." It is on such a small scale that the future of cybernetics may be made. The institute notes that nanotechnology "encompasses precision engineering as well as electronics; electromechanical systems (known as lab-on-a-chip devices) as well as mainstream biomedical applications in areas as diverse as gene therapy, drug delivery, and novel drug discovery techniques."

In nanotechnology, there seems to be no limit to what can be envisioned or created. As the institute explains, "In 2000, the barrier between man and machine is as thin as a strand from the double helix. As computer equipment, surgical tools and communications pipelines shrink ever smaller, the next step in engineering is to merge biological and mechanical molecules and compounds into really, really small machines."

In the area of health care, nanotechnology provides, along with genetic engineering, the promise of a coming revolution in medical efficiency. Not too many years from now, heart pacemakers will be able to communicate electronically with hospitals in order to help health care professionals monitor the hearts of those patients. By being able to keep closer watch on such patients, not only will the health of the patients be better monitored, but also health care and insurance costs may be limited as well.

With such new advances in medicine through nanotechnology, there will also be new questions raised in bioethics, that field that studies the effect growing medical technology has on the individual and society. The institute notes, "Ethical issues in merging with computers go beyond the 'weird' factor into a whole new kind of problem: What happens if human beings are made from nonhuman parts? Is a baby made from cloned DNA, gestated in a bubble, and connected to a cellular phone still human? The answer matters because it is no longer obvious what it means to call something or someone 'normal' or a 'person,' even in the world of medicine." Indeed, nanotechnology is heading truly to a "brave new world," to use the title of Aldous Huxley's famous novel. Not only will nanotechnology present us with an amazing new technology—but also ethical questions on how to use it.

— John F. Murphy Jr.

Danilevsky, Nikolaj Jakovlevich (1822–1885)

The main place amongst Russian antagonists to Charles Darwin's theory of evolution, and especially his conception of descent of man, belonged to Nikolaj Jakovlevich Danilevsky (1822–1885), the prominent Russian naturalist, economist, historian, philosopher, a head of the late Slavophils, and the author of the original conception of exclusive types of mankind cultures and natural laws of their development. His two-volume work *Anti-Darwinism* (1885, 1889) directly split the biological community by giving rise to heated controversy between advocates of the evolutionary theory and its antagonists. Twenty years earlier, his book *West and East* (1869) predetermined, to a great extent, further development of the theory of "cultural-historical types" that had been, for the first time, formulated by the German historian Henrich Rükkert.

The work of Danilevsky, in the environment of prerevolutionary Russia, supported the official religion and monarchy as the most suitable for the existing cultural-historical type of Russian ethnos, taking into consideration all forms of religious, political, social, economic, and cultural activities.

From Socialism to Rational Use of Natural Resources and Preservation of the Environment

Nikolaj Jakovlevich Danilevsky was born in November 28, 1822, in his father's village, Oberets, in Orlovskaya province. The beginning of his life was traditional for noble families of his time. In 1842, Danilevsky graduated from the privileged Tsarskoselsky Lyceum and was appointed to the Military Ministry Office. He could not be satisfied with a military career, though, and, at the same time, without having the formal status of student, he began to attend university, natural department of the physics and mathematics (1843–1847). Having achieved the status of candidate, Danilevsky successfully passed master exams in 1849, and prepared to defend his dissertation on flora of the Black Sea zone of the European part of Russia.

While studying at the university, Danilevsky began to visit Mikhail V. Petrashevsky, who organized Friday gatherings at his home, where participants were making close study of the works of French socialists and exploring the possibilities of revolution in Russia. Danilevsky was considered an expert on the works of Charles Furrier. In 1849, all the participants, including the well-known writer Fyodor M. Dostoyevsky, were arrested, and the most active of them were sentenced to death, replaced at the last minute by imprisonment for life.

Danilevsky was arrested, too, and, after 100 days of imprisonment in the Peter and Paul Fortress, sent to Vologda, where he had to live under surveillance of police, and where from May 1850 he worked for province administration. In 1852, he was sent to Samara and appointed to take part in the expedition to explore the conditions of fishery on Volga and Caspian Sea (1853–1857). The supervisor of the expedition was Karl E. Baer, the prominent zoologist, embryologist, geographer, and anthropologist.

Acquaintance with Baer was crucial for Danilevsky, who was assigned in 1857 to the Agricultural Department of the State Property Ministry. After that, for more than 20 years, Danilevsky supervised expeditions exploring fishery and seal trade on the White Sea, Black Sea, Azov, and Caspian Seas, and Arctic Ocean.

Thus, he examined almost all the waters of the European part of Russia and became the biggest expert on rational use of natural resources. Accumulated by Danilevsky, materials were published in the book *Examination of Fishery Conditions in Russia* (1872), later underlying Russian fishery law. Danilevsky headed the commission for working out the rules for use of running water in Crimea (1872–1879), Nikitsky Botanical gardens (1879–1880), and in 1880s was a member of the commission for combating grape plant louse (philloxera). As a member of Geographical Society, Danilevsky published in its papers quite a few articles devoted to climatology, geology, geography, and ethnography of Russia. He was awarded with a Big Golden Medal. However, in due course, his positivism was slowly growing into objective idealism and providentialism.

Anti-Darwinism and Divine Origin of Man

Danilevsky's views on evolution were strongly influenced by his collaboration with Baer, who had already formulated, in the 1820s, a teleological conception of evolution under the influence of some inherent factor *Zielstrebigkeit,* and in 1873 criticized the theory of Darwin. In the1880s, Danilevsky himself joined the critics of Darwinism. He called his views "natural theology." In his monumental work *Darwinism: Critical Research* (1885), more than 1,200 pages length, Danilevsky made an attempt to summarize all the arguments against Darwinism collected during 25 years of its existence. Unfortunately, he did not manage to redeem his promise to present his own arguments in the second volume of this work. His death in 1885 prevented Danilevsky from fulfilling his plan and giving the picture of evolution a unity of substance and spirit. The second volume, published after the death of the author (1889), presented only some preparatory work on the problem of the descent of man, which he explained as an act of supreme reason.

The criticism of Darwinism by Danilevsky was not essentially new; he merely summarized the points that already existed in literature: (a) the analogy between variability of wild and domestic animals is not correct, because the variability among domestic animals is much higher; (b) varieties could not be considered as new species, because varieties have quantitative and not qualitative distinctions; (c) variability among domestic animals never oversteps the limits of species; (d) Darwin exaggerates the role of artificial selection in the origin of new breeds; (e) struggle for existence is not so violent in the natural world and cannot produce new forms; (f) natural selection cannot accumulate useful changes, because of "blended inheritance"; (g) Darwin's theory does not explain the appearance of useless or even harmful traits; and (h) there are no transition forms in paleontological chronicles.

To explain evolution, Danilevsky adopted Baer's concept, *Zielstrebigkeit*; also, he attached religious meaning to this concept. He contended that there was intellectual reason behind the creation of the world; evolution is predetermined and conforming to the will of the Creator—while Darwinism is based on the belief in "blind chance." Having replaced static expediency with dynamic expediency, Danilevsky proposed ontogenesis as a model of phylogenesis, using Baer's research of ontogenesis, which implied that in processes outside of organisms and also inside an egg or womb, some forms develop into other forms and both supplement and substitute for each other.

The Theory of Historical-Cultural Types

In 1869, Danilevsky published in the journal *Zarja* his treatise of "Russia and Europe: A Look at the Cultural and Political Relations of the Slavic World to the Romano-German World," which was republished many times as a separate book, making him a world-famed thinker, historian-philosopher, and culturologist. In this book, he disproved of the idea of existence of the commonality of all mankind/civilizations. He developed a conception of exclusive "cultural-historical types" of mankind, that is tribes and nations united by common language and culture, with their own civilization that could not be passed to another "type," or borrowed from it. For Danilevsky, mankind was abstraction, and the nation was reality.

Danilevsky determined 4 categories of cultural-historical activities (religious, political, sociopolitical, and cultural) and 10 cultural-historical types (Egyptian, Chinese, Assiro-Babilonian, Jewish, Greek, Roman, Muslim, Slavic, Romano-German). He applied the biological idea of predetermined evolution of each type going through certain stages to his theory, assuming that each civilization had periods of youth, adultness, and old age; the last period would once and for all exhaust the cultural-historical type.

Danilevsky believed that the Slavic type was in youth period, in the making. In connection to this

thinking, he considered the reforms of the Emperor Peter the Great as attempts to impose alien, European values on Russian culture; he stood for liberation from "paralyzing and inimical European influence." For Danilevsky, supremacy of the common cultural type (Romano-German) meant degradation. That is why, he thought, unification of the Slavic world was more important than freedom, science, and education. To fulfill this plan, it was necessary to create a pan-Slavic union, with the capital in Constantinople, a historical center of Eastern Christianity, headed by an Orthodox Emperor who would guarantee the cultural balance and secure against Western aggression. Here pan-Slavism by Danilevsky develops into an apology for monarchism.

Although this theory was politically engaged, it was based on Karl Baer's theory of four main types of animals and predetermined evolution within these types. It is not accidental that Danilevsky limited the terms of existence of these types and that their development looked like ontogenesis.

Danilevsky died on November 7, 1889 in Caucasus, Tiflis (modern Tbilisi, the capital of Georgia), and was buried in his own estate, Mshanka, on the south coast of Crimea, directly opposite Constantinople.

Danilevsky's Works

The works of Danilevsky gave rise to lively discussions in Russian literature. Those philosophers who adhered to the position of teleology and idealism took the part of Danilevsky, one of them being Nikolaj N. Strakhov (1886, 1889). At the same time, he was criticized by Alexander S. Famintsin (1889) and Kliment A. Timirjazev (1887, 1889). The articles of these two leading biologists among supporters of evolutionary theory produced a strong impression on the scientific community and even convinced it that objections to Darwinism were, using the words of Nikolaj A. Kholodkovsky (1889), "absolutely groundless." Later, however, one could find the ideas of Danilevsky in the theory of nomogenesis by Lev S. Berg (1922), historical biogenetics by Dmitrij N. Sobolev (1924), typostrophism by Otto Schindewolf (1936, 1950), works by Pierre Teilhard de Chardin (1965), and some other contemporary supporters of orthogenetic and saltationistic conceptions of evolution.

The book *Russia and Europe* also provoked heated controversy. It was spoken about enthusiastically by world-famed writer Fyodor M. Dostoevsky, who considered himself a student of Danilevsky, and philosophers-Slavophils Konstantin S. Aksakov and Konstantin N. Leontjev. The famous writer Leo N. Tolstoy was also sympathetic with this work. On the other hand, representatives of the "western wing," historians and sociologists Nikolaj I. Kareev, Piotr N. Miljukov, and Nikolaj M. Mikhailovsky, criticized the book using sharp words. Nevertheless, the book became a prototype for subsequent conceptions of exclusive, cyclically developing cultural types: the two-volume edition of *The Decline of Europe,* by Oswald Spengler (1918–1922), and the 12-volume edition of *A Study of History,* by Arnold J. Toynbee (1934–1961). Nowadays, the influence of the book can be traced in the theory of the multipolar world and antiglobalism.

It is worth emphasizing that biological ideas about the existence of certain stages in the development of civilizations were later used to give proof to different philogerontical theories and explain that any taxon passes the same stages of youth, adultness, old age, and death, as an individual. Interestingly, there was a visible correlation between the increasing popularity of these theories in biology and philosophy and the crises of the 20th century, such as wars, revolutions, and economic disaster.

— Eduard I. Kolchinsky

See also **Biological Anthropology and Neo-Darwinism; Darwinism, Social; Evolution, Models of; Teleology**

Further Readings

Danilevsky, N. (1995). *Russia and Europe.* St. Petersburg, Russia: Glagol.

Toynbee, A. J. (1935–1961). *A study of history* (12 vols.). London: Oxford University Press.

Daoism

Daoism is a Chinese way of thinking that is best understood as being composed of two traditions, philosophical Daoism and religious Daoism. Both traditions are primarily derived from texts of archaic antiquity. Among them are the *Dao De Jing* (Classic of the Dao and Its Power) and the *Zhuang Zi* (Master Zhuang).

As the major inspiration and authoritative source of Daoism, the *Dao De Jing* is a combination of poetry, philosophical reflection, and mystical speculation that is composed of some 5,200 words. Given its present form, this classic was probably completed in the third or fourth century BC. However, its original title is *Lao Zi* ("Old Master"), which attributes the authorship to a legendary figure who was born around 602 BC. It is likely that a good part of the book was edited from much older texts at the time of rendition and put in the mouth of *Lao Zi.* Profound and abstruse, this philosophical treatise is the most translated of all classics, next to the Bible.

Central to Daoism is the notion of *Dao* (*Tao* as in non-pinyin romanization, which also yields *Taoism*). The profound revelation that grew out of Daoist elaboration on the *Dao* or "the Way" is the key to a real appreciation of the Chinese worldview on the universe, society, and life. It impacted all other Chinese belief systems, including Confucianism. In expounding the meaning of the *Dao,* Daoism and Confucianism ran through Chinese thought like two powerful streams side by side until modern times. If Confucianism concentrates on social order and active duties, Daoism focuses on individual life and tranquility. While the former preaches conformity to a man-made social order, the latter emphasizes conformity to natural order. Daoism contrasts Confucian worldliness with a transcendental spirit that is by no means escapist. Not only does Daoism have a social, political ideology that rivals that of Confucianism, but its discourse also goes much deeper into the Way of life.

Philosophical Daoism

Two themes stand out in the *Dao De Jing*—life and government. Philosophical Daoism is concerned with how to live a meaningful life and institute a sage rulership. In addressing the issues that arise from these two questions, Daoism subscribes to a philosophical approach that puts more faith in nature than in humanity. This naturalism finds expression in a number of principles whereby the *Dao* is to be discovered, appreciated, and followed.

Simplicity of Life

To live simply and plainly is to exist close to nature, where the *Dao* rules without any interference from man-made social, moral, and political orders. It is a state in which people have direct access to the observation of the Way. Simplicity of life, or *pu,* also purifies the mind so that it becomes a clean mirror to capture everything clearly and enhance the reflection of the *Dao* in human awareness. For the mind to be purified, however, it must be emptied of social self, traditional wisdom, and mundane desires. Therefore, the *Dao De Jing* urges people to "return to the state of childhood," "discard wisdom," and be "free of desires."

Lao Zi is literally "old child" in Chinese. In fact, all humans are believed to be the children of the *Dao.* To discover the *Dao,* people should return to their natural conditions as found in infancy or childhood. The journey is not going to be easy. It involves self-effacement and the practice of asceticism before a state of tranquility that is free from desires, passions, and moral distortions can be restored. The *Dao De Jing* condemns all learning that leads people to become self-important and impose their will on nature; the only learning encouraged is of the laws of nature.

Simplicity of life is the gateway to sagehood. A sage is a Holy Person (*shengren*) who identifies with the *Dao,* knows its principles, respects its power, and behaves accordingly. The liberation gained from such union with the *Dao* caught the seminal imagination of Zhuang Zi (ca. 369–286 BC), another major founder of philosophical Daoism. The opening chapter of the *Zhuang Zi* exalts the ecstasies of transcending the limited experience of man, the narrow bounds of conventional knowledge, the fragility of man-made standards, and the artificiality of logic to roam freely across the universe with the Creator. Notwithstanding the poetic license of the *Zhuang Zi* to fantasies, Daoist sagehood is naturalistic, stressing *Dao*-centered ethics. The *Dao De Jing* is scornful of the human-centered Confucian ethics, such as humanity or benevolence. Human behavior becomes moral if and only if it acts in harmony with the will of nature. Humanity has no place in Daoist morality, as natural operations are not meant to feel benevolent or show preference for humans.

The Relativity of Opposites

How does *Dao* operate? Attention is called to the workings of *yin* and *yang,* which generate everything in the universe. This process is known as the "*Dao* with name," meaning the *Dao* manifested in operation. It is important to note that as two material forces, *yin* and *yang* are polar opposites. The former is typically feminine, dark, cold, and debilitating,

whereas the latter is typically masculine, bright, warm, and invigorating. Their opposition is self-evident. But in Chapter 2 of the *Dao De Jing,* it is stressed that no opposition is absolute and that invariably, opposites are complementary:

> Difficult and easy complete each other;
>
> Long and short contrast each other;
>
> High and low distinguish each other;
>
> Sound and voice harmonize with each other;
>
> Front and back follow each other.

Much as the opposites contrast categorically, they also are in a symbiotic relationship. What is *difficult* is meaningful only relative to what is *easy,* and vice versa. By the same token, *front* and *back* have meaning only in relation to each other. Semantically, there is mutual causality between two opposites. One cannot exist meaningfully without the other. It is in this sense that the opposites "complete" and "follow" each other as much as they "contrast" and "distinguish" each other.

From the mutual causality of opposites, the doctrine "relativity of opposites" is inferred. Each state of being is relative in the sense that it will change to its opposite in due time, just as day is bound to become night and the young are bound to grow old. Because everything in the universe eventually produces its opposite, cyclic change is characteristic of the way that *Dao* operates. Furthermore, opposites coexist rather than exclude each other during cyclic change. To bring about prosperity in life or society is not a nonstop drive to replace *yin* with *yang.* Rather, it involves achieving a combination of *yang* and *yin* in their right proportions so that harmony will prevail. Then again, there are elements or seeds of discordance in harmony, and sooner or later they will grow, causing harmony to change to its opposite: dissonance.

With the doctrine known as the "relativity of opposites," Daoism entertains a dynamic worldview, recognizing that nothing stands still and that the whole universe is in a constant flux of change. The relativity doctrine is also incorporated into the Daoist cosmogony. It is assumed that the universe began as a primordial mass and took shape only after the two material forces *yin* and *yang* were born and started to interact in the presence of *qi,* or "cosmic energy," to generate everything in the universe. As the evolution of the universe followed the laws of a natural *Dao,* it had nothing to do with divine creation. Were it not for the Daoist belief of cyclic change that creates an impasse for the metamorphosis of species, this cosmogony would be more in tune with evolutionary thinking.

Being and Non-Being

The *Dao* is knowable by the human mind. But it exists in two forms: the *Dao* that can be named and the *Dao* that is nameless. The former is *being,* and the latter is *non-being.* As being, the *Dao* with name is phenomenal, gives form to everything, and lends itself to observation and naming. As non-being, the *Dao* without name is obscure to observation and defies naming and description. In the opening chapter, the *Dao De Jing* remarks:

> The *Dao* that can be told of is not the eternal *Dao;*
>
> The name that can be named is not the eternal name;
>
> The nameless is the origin of Heaven and Earth;
>
> The named is the mother of all things.
>
> Therefore let there always be non-being, so we may perceive its subtlety,
>
> And let there always be being, so we can observe its outcomes.
>
> Everything under Heaven is born of being, and being is born of non-being.

Attainment of the *Dao* boils down to grasping the principles and laws of non-being that accompanied the beginning of time and are eternal. In non-being lies the ultimate reality, which resembles a void, seemingly empty but replete with contents and potentials. The principles and laws of non-being are deeply embedded in the products of being. This is why the *Dao De Jing* goes on to note, "Being and non-being produce each other."

The dichotomy of being and non-being became a focal point when scholars pored over philosophical Daoism to look for its "affinity" with Confucianism during the Period of Disunity (221–589). In an influential commentary, Wang Pi (226–249) argued that non-being was actually pure or imperceptible being. Known as "Mystery Learning," such revisionist attempts are held to be beside the point by some contemporary scholars. Confucianism seeks to find a constant *dao* that guides social behavior infallibly. But

in Daoist thought, a constant *dao* requires constant naming. Since there are many possible standards, it is arbitrary to pick out one of them as the constant guide to naming. The Daoist notion of non-being is not necessarily asocial. Rather, it rejects any arbitrary *dao* in favor of a natural *dao* that is truly profound.

Nonaction

The *Dao* is to be translated into behavior through the sage, who makes an ideal ruler and practices nonaction (*wuwei*). Nonaction means taking no action against the flow of Nature. Almost a third of the *Dao De Jing* is devoted to the art of government and sage rulership. Repeatedly, the role of nonaction in statesmanship is defined as "acting without competing (against the will of nature)," and the text of the *Dao De Jing* also ends its last chapter on this note. If Daoist nonaction is meant to refrain from interference in the operations of nature, it does not mean withdrawal from society.

In practice, nonaction is symbolized by the flow of water, which takes the path of least resistance. Meddlesome behavior is pointless in the sense that other than endangering oneself, it achieves nothing in its attempt to change the natural law. Therefore, the sage ruler "governs without governing" and delegates the duties to his ministers, who are expected to do the governing by rejecting arbitrary and calculated decisions in favor of spontaneity *(ziran)*. Under this laissez faire approach, decision making is made in harmony with the *Dao,* interference in the natural course of things is minimized, and the government is kept lean.

The Daoist advocacy of nonaction had its precursor in the political ideology attributed to the mythical *Huangdi* (Yellow Emperor). In recognition of contributions from both *Huang Di* and *Lao Zi,* the doctrine of nonaction is known as the *Huang-Lao* art of government. It was adopted by the early rulers of the Han Dynasty (206 BC–AD 220) and had a considerable impact on the Legalists, who, in arguing for the rule of law, agreed that the ruler should be detached, but remain perfectly aware and responsive.

Religious Daoism

As an indigenous religion, Daoism has its roots in the classical religion of the Zhou period (1122–221 BC), which featured popular practices of shamanism, ancestor worship, occult arts, magical cults, and the veneration of Heaven as the supreme power commanding a pantheon of deities.

However, Daoism did not emerge as a voluntary and organized religion until the 2nd century, when it received formative impact from two peasant uprisings. One was the rebellion of "Great Peace Daoism" (*Taiping Dao*), which broke out in AD 184 in what is now Hopei Province of northern China. It united a large number of communities under a Daoist hierarchy of governance. This politico-religious movement quickly spread to a large part of the country under the leadership of its founder Zhang Jue (ca. AD140–188). Known as the "Yellow Turbans" because of its distinguishing headdress, the rebel army was eventually crushed. The year AD 189 saw another rebellion erupt under Zhang Daoling or Zhang Ling (34–156), who had founded the Five-Bushel Sect of Daoism in Sichuan. This movement soon came to be known as "Celestial Masters Daoism" (*Tianshi Dao*) and was able to establish a local rule that would last over two decades.

The Rise of an Organized Religion

Unlike the classic religion that was communal, Daoism was a voluntary religion. Its membership was no longer ascribed by inherited affiliation with a community, but based on voluntary conversion of the individual believer. In the midst of the two aforementioned rebellions, Daoism was transformed into an organized religion complete with a system of theology, a set of teachings and rituals of its own, and a hierarchical priesthood.

The "Yellow Turbans" were inspired by the theology of the *Taiping Jing* (Scripture of Great Peace), which prophesized a messianic and millenarian restoration of the utopian reign of Great Peace. "Celestial Masters Daoism" developed its theology based on the *Dao De Jing* and a revelation from *Lao Zi* that preached universal brotherhood in opposition to the existent social order. Its local rule was administered by a hierarchy of priest-officials. As they regularly held masses for spiritual purification, faith healing, and the redemption of sin, a liturgical tradition of the community was initiated. Individual ritualistic practices included the performance of magic cults that promised invincibility in the battlefield and the exercises of dietary and sexual hygiene that promised to deliver meritorious men from the finality of death to immortality. When "Celestial Masters Daoism" surrendered its local rule in AD 215, it was

allowed to disseminate its teachings peacefully, and its hierarchy of Daoist priesthood was officially recognized in China.

With the rise of Daoism as an organized religion, its philosophical stock was profoundly changed. Different magical, religious, and philosophical traditions were grafted to it. This process featured two strategies: a syncretism with borrowings from rival belief systems and a continual accommodation of indigenous practices. After all the dust had settled, religious Daoism came to possess three distinct dimensions: mystical, liturgical, and canonical.

Mystical Dimension

Religious Daoism claims efficacy in providing direct connection with the supernatural beings or cosmic forces. Technically, its practices can be divinatory, respiratory, gymnastic, meditative, hygienic, sexual, or alchemical. Functionally, its aim is either to enact communication with the supernatural or to nourish life. A repertoire of mystical practices was developed to cater to the desire to have one's life energy preserved and nourished. These practices, in turn, are attributable to two beliefs.

One relates to the Daoist philosophy that urges a return to the state of childlike simplicity and the land of the *Dao.* But this spiritual quest is reinterpreted as a way to recover life energy. Using meditative or other means, Daoist adepts envisage the process of their gestation as a new embryo to their rebirth as an infant. By so doing, it is believed, one's lost energy would be recovered. A second belief relates the human body as microcosm to the universe as macrocosm. Since one is the replica of the other, the human body can rejuvenate itself as nature does. In both cases, life thrives on the concentration of *qi,* or cosmic energy. Mystical Daoist practices are supposed to provide a way of enriching life-rejuvenating *qi* and helping the human body to tap into its sources.

The quest for immortality is an epitome of Daoist mysticism. In Chinese, an immortal is called *xian* or *xianren* (divine-human), who could choose to remain invisible to the human eye or appear in mortal form to enlighten the virtuous and punish the wicked. There were two approaches to the attainment of immortality, external alchemy and internal alchemy. The end product of external alchemy was an elixir made primarily from gold and cinnabar. External alchemy gave way to internal alchemy during the Song Dynasty (AD 960–1279). An internal elixir was to be generated by the inner circulation of *qi* according to the Daoist microcosmology of the body. In a meditative mood, one circulated one's *qi* in such a way that it went through channels supposed to connect the vital parts of the body. This would enhance one's Essence (*jing*) and Spirit (*shen*) to bring about longevity of life. To enrich one's *qi,* the observance of calisthenic exercises and dietary practices must also be included.

Daoist meditation is typically employed to achieve a mystic union with one's true Self: the inner child who has direct access to the *Dao* and cosmic forces. The skill is passed on from master to disciple through an apprenticeship that is based on teaching without words. The transmission of instructions is intuitive, going from mind to mind without the intervention of rational argumentation in conceptual terms. This antilanguage teaching is thought to have inspired the *Chan* (Zen) tradition, a religious school that shuns scripture learning and subscribes to intuitive meditation as a principal means to attain enlightenment. *Chan* is a transliteration of the Sanskrit *dhyāna,* but its tradition is distinctively Chinese. Drawing on Daoist mysticism, this religious school emerged as a reaction to the scholastic and formalistic preoccupations of Mahayana Buddhism and contributed to the rise of *Chan* Buddhism subsequently.

Liturgical Dimension

The two main functions of the Daoist master are the protection of the mundane world against the attacks of evil spirits and the performance of rituals on behalf of individuals, families, and communities. Both functions are liturgical. They turn religious Daoism into the liturgical organization of the country and make its rituals and rites most visible at the grassroots level of society.

In the Daoist theology and liturgy, the highest divinity consists of five gods: the "Three Pure Ones" (a triad of the Heavenly Venerables of the Primordial Origin, the Numinous Treasure, and the *Dao* and its Power), Jade Emperor (who is the Supreme Celestial Sovereign), and his deputy, Purple Empyrean Emperor. The basis for the Daoist priest's control over these gods and a pantheon of deities is a form of "name magic." Assisted with a performance of ritualistic chanting and dancing, he can summon and dismiss the divinities by virtue of his knowledge of their names, descriptions, and functions.

Symbolism is an integral part of the Daoist liturgy. One most important symbol is *fu,* the talisman or

magical charm that is enacted into efficacy by cabalistic writing. A sort of moral contract is implied with the writing of *fu.* People pledge not to sin in return for the assurance that they would never become ill or fall victim to evil spirits. Another important symbol is *dou,* meaning "bushel" or "container," which symbolizes the Big Dipper constellation and, by extension, the Great Ultimate *(taiji).* As the Dipper is a heavenly clock marking the cycle of days, seasons, and major turning points in life, it is ritualistically potent and often invoked symbolically in Daoist dancing. Representing the Great Ultimate, the symbol is present everywhere, on the Daoist's sword and crown and in the naming of vital bodily parts. Turning to the Daoist *dou,* it is a receptacle in which ritual instruments are purified, and votive oil and rice are consecrated. Then there is the "Step of Yu." Legend has it that this dance enabled Yu the Great, a legendary hero, to gain command over spirits of nature when he was out there saving his people from the Deluge. Through this dance, the Daoist outlines a celestial constellation to take possession of its power.

The Daoist liturgy offers two major services, *zhai* (fasts) and *jiao* (offerings). Each may last 3 days or longer, and both have four components: rituals for the consecration of ritual space, rituals for obtaining merits through penitence (rites of fasting), rituals of communion and covenant (rites of offering), and rituals for the dispersal of sacred space. The rituals involved may differ in contents from *zhai* to *jiao.* The *zhai* service is more somber, for it is designed to cleanse the living of their sins or to deliver the souls of the dead and bring them salvation as a part of the funerary rite. The *jiao* service is always communal and designed to petition for favors, such as, rainfall in time of drought, or offer thanksgiving for favors received. Invariably, it also performs rituals to appease lonely spirits and hungry ghosts lest they harass the living.

It is small wonder that exorcism has a role in both *zhai* and *jiao* services. The priest who officiates at this rite undergoes self-transformation to become one with the Dao. Then, he takes a symbolic journey to the heavens for an audience with the gods. To overpower demons, he summons the assistance of deities and dances the "Step of Yu," in synch with the counting of his thumb on finger joints, and brandishes his sword to make the decisive strike. When embedded in *zhai* and *jiao,* all this is done to the accompaniment of acolytes burning incense, chanting hymns, and playing instruments.

Canonical Dimension

Religious Daoism has a classical canon that provides a standard of orthodoxy and a basis for Daoist religious practices. The Daoist Canon is immense, containing 5,385 volumes under about 1,500 titles. Only three complete sets of the 1445 edition of this Canon appear to have survived the vicissitudes of time and the anti-Daoist rule of the Qing Dynasty (AD 1644–1911). Each set has an addendum that was published in 1607. The Canon is entitled *Daozang,* in emulation of the Buddhist Tripitaka *Sanzang.* First compiled by Lu Xiujing (AD 406–477) in AD 471, it was the response of Daoism to the growing challenge and competition of Buddhism. The corpora of the Daoist Canon are divided into "Three Grottoes" and "Four Supplements."

The first Grotto is based on texts of the Mao Shan School or *Shangqing* (Supreme Purity) tradition, and the most significant of these texts is the visionary experiences revealed to and transcribed by Yang Xi between AD 364 and AD 370. The second Grotto features scriptures of the *Lingbao* tradition, *Lingbao* (Sacred Treasure) being the Daoist name of "holy books." This school incorporated the psalmody of holy books into the liturgical ritual in the belief that deities, who were not pure enough to behold holy books, had heard them recited by the Heavenly Venerable of the Primordial Origin, the highest anthropomorphic emanation of the *Dao.* The third Vault is built around scriptures of the *Sanhuang* tradition, *Sanhuang* (Three Sovereigns) being the cosmic lords of heaven, earth, and humans. The Three Grottos are taken to represent different stages of initiation that form a progression of increasing spiritual purity from the *Sanhuang* to the *Shangqing.*

Each Grotto of the Canon is divided into 12 sections so that the basic texts, such as talismans, commentaries, diagrams, genealogies, and rituals, are grouped under separate categories. But over the centuries, there were substantial departures from this ideal arrangement. The confusion worsened when more texts were included, and the catalogue was edited and reedited, not to mention the vicissitudes that the Canon went through in the course of history. It gave rise to the well-known lack of organization in the Daoist Canon.

The Four Supplements were added in the 6th century, containing works related to the established traditions, except for the last Supplement. At the core of each of the first three Supplements are the *Dao De*

Jing, the *Taiping Jing*, and alchemical texts, respectively. The fourth Supplement is devoted to scriptures of the *Zhengyi* (Orthodox One) school, which is the oldest Daoist religious tradition dating back to Celestial Masters Daoism of the 2nd century. However, a large amount of materials collected in the Daoist Canon are neither spiritual nor religious. Their inclusion merely underscored Daoism as an indigenous religion vis-à-vis Buddhism as an alien one. Among these materials is the *Bencao Gangmu* (Pharmacopoeia of the Flora), attributed to the mythical ruler *Shen Nong* (Divine Farmer). Such materials are highly valuable for research into the history of Chinese natural sciences and philosophies.

Religious Daoism and Popular Religion

Religious Daoism is often regarded as a degenerate form of philosophical Daoism. Confucian scholar-officials not only tended to equate religious Daoism with superstition but also thought that it was politically dangerous. After Daoism spread to Korea and Japan between the 4th and 7th centuries, its religious practices were put under government control. The early Daoist temples in Korea and the bureau of Daoist divination in Japan were state sponsored. Daoism never established itself as an organized religion in Korea or Japan, and its impact found expression mostly in their folk beliefs and popular religions.

Religious Daoism has a much closer tie with Chinese popular religion. Its liturgy plays an important role in the religious life of the community and in more recent decades has provided the framework that enables local cults to expand and develop in Mainland China. Through the shared use of indigenous divinatory arts, such as the *yin-yang* cosmology, the hexagrams, and the Five Elements ideology, religious Daoism has an affinity with fortune-telling, physiognomy, and geomancy. Daoist masters, for instance, are likely to be skillful geomancers. Furthermore, they readily perform rites and rituals to assist in individuals' quest of fortune, wealth, and longevity of life in this world. Nevertheless, Daoist masters seek to transcend the mundane desires themselves, and they are members of a religion that is organized and other-worldly oriented.

— *Zhiming Zhao*

See also **Buddhism; Confucianism**

Further Readings

Chan, W.-T. (1963). *A source book in Chinese philosophy.* Princeton, NJ: Princeton University Press.

de Bary, W. T. (1960). *Sources of Chinese tradition.* New York: Columbia University Press.

Dean, K. (1993). *Taoist ritual and popular cults of southeast China.* Princeton, NJ: Princeton University Press.

Hansen, C. (1992). *A Daoist theory of Chinese thought: A philosophical interpretation.* New York: Oxford University Press.

Largerwey, J. (1987). *Taoist ritual in Chinese society and history.* New York: Macmillan.

Maspero, H. (1981). *Taoism and Chinese religion* (F. A. Kierman Jr., Trans.). Amherst: University of Massachusetts Press.

Schipper, K. (1993). *The Taoist body* (K. C. Duval, Trans.). Berkeley: University of California Press.

Darkness in El Dorado Controversy

Late in the year 2000, an intellectual tsunami hit anthropology in America and beyond. It was generated by the controversy surrounding the publication of a book by Patrick Tierney called *Darkness in El Dorado: How Anthropologists and Journalists Devastated the Amazon.* Five years after its publication, this unprecedented controversy was still rife with debate and far from settled. Moreover, it goes to the very heart of anthropology, with broad implications for every anthropologist. Primarily, it is a matter of professional ethics and more generally, of values.

Values have been a sincere concern of various practitioners of anthropology since its beginnings about 150 years ago. For example, many anthropologists have demonstrated their humanitarian commitment through advocacy work in promoting the survival, welfare, and rights of indigenous societies struggling under the pressures of Western colonialism and the genocide, ethnocide, and ecocide often associated with it. On the other hand, to this day, many anthropologists pursue science as if it were entirely amoral and apolitical.

The largest professional organization of anthropologists in the world, the American Anthropological

Association (AAA), was established as early as 1902. However, the articulation of formal guidelines for professional ethics came decades later and grew only intermittently, through a succession of occasional declarations beginning with the brief "Resolution on Freedom of Publication," issued in December 1948; then, a more extensive "Statement on Problems of Anthropological Research and Ethics," in March 1967; next, the "Principles of Professional Responsibility," in May 1971; and, most recently, the "Code of Ethics," in June 1998. It was not until 1971 that the AAA finally established a standing Committee on Ethics, although by 1996, its function was reduced mostly to education. Usually, any concern with professional ethics within American anthropology has been more reactive than proactive, and more a matter of defensive maneuvering than constructively grappling with the issues head-on. Ethical concerns, and sometimes even actions, arise mostly during periods when scandals or controversies erupt, especially if they reach the public to threaten the image of the profession; but soon they decline, if not disappear completely, except if a publication record remains and/or through the research of historians. Many of these tendencies are exhibited in the most recent ethical crisis in the AAA, although it goes to the very heart of the discipline, with some enduring implications for every anthropologist.

This crisis exploded in late 2000, only partially subsided by the middle of 2002, and then erupted again in early 2005. It is characterized by unprecedented magnitude, complexity, difficulty, and ugliness. (An extensive archive is available on the Douglas W. Hume Web site.) The crisis arose in response to investigative journalist Patrick Tierney's book, with its provocative title and subtitle, *Darkness in El Dorado: How Anthropologists and Journalists Devastated the Amazon.* His painstakingly detailed book is based on more than a decade of field and archival research. Tierney tried to document numerous and diverse allegations of violations of professional ethics and even of human rights by Napoleon A. Chagnon and his associates in their field research with the Yanomami. Some points in the book were challenged after investigations by various individuals and organizations. Nevertheless, many other points were confirmed by the AAA Task Force on Darkness in El Dorado and other researchers.

This task force was established at a meeting of the AAA Executive Board, February 3–4, 2001. The AAA had no choice but to initiate a serious inquiry because of the firestorm that erupted around the book in the international media and cyberspace, which became a public relations disaster. (Tierney's publication received several prominent awards, from the *Boston Globe, New York Times,* and *Los Angeles Times* as well as a finalist for the National Book Award.) After more than a year of systematic and meticulous inquiry into selected issues on May 18, 2002, the task force issued a final report that subsequently was posted on the Web site. Members of the task force included Janet M. Chernela, Fernando Coronil, Raymond B. Hames, Jane H. Hill (Chair and former AAA president), Trudy R. Turner, and Joe E. Watkins. However, at a late stage of the inquiry, Hames resigned to avoid any appearance of a conflict of interest, because he was a former student of Chagnon and is a long-term associate in his research, grants, and publications.

This scandalous controversy pivots around Chagnon, who accumulated a total of about 5 years in the field with Yanomami, in the Venezuelan Amazon, over a period of nearly three decades, starting in 1964. Through various publications and films, he garnered a reputation in the United States and beyond as the primary ethnographer in the study of the Yanomami, whom he depicted as one of the most traditional "primitive" cultures surviving in the whole world. However, usually ignored is the fact that several other anthropologists lived with the Yanomami much longer, such as Kenneth R. Good for more than a dozen years, and Jacques Lizot for about a quarter of a century.

Unlike many other anthropologists who have worked with the Yanomami in Venezuela and Brazil, Chagnon persistently characterized them as "the fierce people," in a manner reminiscent of Thomas Hobbes's caricature of "savages" with nasty and brutish lifeways. Many of the other anthropologists who have lived with the Yanomami, such as Good and Lizot, have opined that Chagnon became obsessed with the violence in that society and exaggerated it to the point of gross distortion. Moreover, Leda Leitao Martins in a book edited by Robert Borofsky exposes irrefutable evidence that this image was publicized in the Brazilian media and then used by some unscrupulous government and military officials as part of the rationalization for their efforts to undermine the rights of the Yanomami to their ancestral territory. This became, and remains, a major ethical issue, since Chagnon failed to speak out about the

misuse of his statements and to defend the human rights of the Yanomami in Brazil, according to the Brazilian Anthropological Association and other critics. Moreover, after some 4 years of controversy, Chagnon has yet to really speak out in his own defense, although he has had numerous opportunities to do so.

When the controversy over this and many other serious allegations in Tierney's book exploded in the world media, a small but vocal group associated with Chagnon quickly came to his defense. Among his defenders in various degrees and ways are James S. Boster, Lee Cronk, Irven DeVore, Jeffrey D. Ehrenreich, Kent V. Flannery, Robin Fox, Thomas A. Gregor, Daniel R. Gross, Raymond B. Hames, Kim Hill, William G. Irons, Jane B. Lancaster, A. Magdalena Hurtado, Andrew D. Merriwether, Stuart Plattner, Lionel Tiger, John Tooby, and Trudy R. Turner. Some of Chagnon's defenders have repeatedly disseminated misinformation and disinformation, even when repeatedly challenged with contradictory facts. Some defenders, like Gregor and Hurtado, have asserted that the controversy and AAA inquiry ignore the sources of the more serious suffering among the Yanomami. However, Tierney's book was mostly about the alleged abuses committed by Chagnon and his associates, and the executive board charged the task force to conduct an inquiry about them. Other avenues within the AAA, such as the Committee for Human Rights, have taken action repeatedly, although Hurtado disparaged that in an earlier article in the March 1990 *AAA Anthropology News*. Also, the Pro-Yanomami Commission, an anthropological advocacy organization in Brazil, has been the most effective organization in addressing Yanomami health problems, this, in collaboration with the French group Doctors Without Borders.

Defenders of Chagnon have accused his critics of being merely jealous, failed anthropologists, anti-science, antievolution, antisociobiology, and/or post-modernists. Among the critics of Chagnon who have worked most closely with Yanomami for many years are Bruce Albert, Gale Goodwin Gomez, Kenneth R. Good, Jacques Lizot, and Alcida R. Ramos. Other critics of Chagnon over the decades variously include Nelly Arvelo Jimenez, Timothy Asch, Gerald D. Berreman, Manuela Carneiro da Cunha, R. Brian Ferguson, Carolyn Fluehr-Lobban, Clifford Geertz, Marvin Harris, Timothy Ingold, David H. P. Maybury-Lewis, Laura Nader, Jacob Pandian, Linda Rabben, Marshall D. Sahlins, Nancy Scheper-Hughes, Leslie E. Sponsel, and Terence S. Turner. The publications and reputations of these various critics do not accurately reflect the accusations of Chagnon's defenders. More important, many of the points these critics raised over a period of three decades never attracted serious attention from the AAA and many individual anthropologists until Tierney summarized them in his book. Had the various criticisms been given serious consideration by the profession and Chagnon as they arose, then Tierney's investigation and the subsequent public scandal and ensuing embarrassment to the AAA and profession might well have been avoided.

The main political tactic of Chagnon's defenders has been to distract attention from questions about the abuses of professional ethics, and thereby violation of Yanomami human rights in some of the instances, by focusing mostly on the causes of the measles epidemic during the 1968 expedition of Chagnon and his associates. During that expedition, the scientists attempted to continue to conduct research despite a rapidly spreading epidemic of measles. Geneticist James V. Neel was the leader of the expedition. He sacrificed only a small portion of the research time for himself and the other medical doctors on the team to administer some limited health care to sick and dying Yanomami. The defenders claim that this medical attention saved numerous Yanomami lives. Probably it did so, although this has never been documented. However, as some critics have pointed out, by the same reasoning, probably many more lives would have been saved had the medical doctors fully honored their Hippocratic Oath and along with other team members temporarily suspended all of the data collection to give their full time and attention to the needs of the Yanomami in this dire medical emergency. In any case, although by now more than 4 years have transpired since Tierney's book, most of the defenders of Chagnon have yet to seriously address most of the questions about the violation of professional ethics and human rights.

To date, the AAA and profession in general have yet to adequately address many of the allegations made by Tierney. Yet as mentioned before, many of his allegations are not new by any means. Only when Tierney summarized and amplified them and added others in his book did the AAA and profession in general begin to be concerned. For instance, 5 years before Tierney's book, in a meticulous systematic analysis of the

political history of the Yanomami, R. Brian Ferguson asserted that Chagnon increased intervillage aggression by giving large concentrations of steel tools to selected villages in payment for cooperation in his data collection during brief visits. No uproar followed. Later, Tierney discussed this issue, but the task force neglected to investigate it, even though it was among his most serious allegations, and the fifth of the five general allegations that the executive board requested be pursued in their inquiry.

There has also been much constructive discussion and debate among other anthropologists who were able to transcend the particulars, including any personal differences and animosities, to deal forthrightly with the serious implications for the Yanomami as well as the broader ramifications for professional practice and ethics. Some of this discussion even transpired within the AAA. For instance, a very useful set of six briefing papers developed by the Committee on Ethics is available on the association's Web site. A far more expansive and useful arena for discussion on this controversy is the Web site for Public Anthropology developed by Borofsky.

The top leadership of the AAA claimed that the association did not have any formal procedures to legally sanction, morally censure, or reprimand an American anthropologist for serious violations of ethics, unlike the professions of law and medicine. Nevertheless, in late spring 2002, the AAA Executive Board publicly denounced Chagnon's proven violations of professional ethics and abuses of the human rights of the Yanomami by accepting the final report of the AAA Task Force on El Dorado. The AAA disapproved of Chagnon's conduct regarding at least five matters: (1) He failed to speak out against misuses by others of his negative characterization of the Yanomami as "the fierce people" to block the Yanomami reserve in Brazil and thereby undermine their ancestral territorial, land, and resource rights. (In fact, this reflects an ethical principle already enunciated at least as early as 1948 in the AAA "Resolution on Freedom of Publication"); (2) he failed to obtain adequate informed consent for taking blood and other biological samples from the Yanomami, and he failed to honor the promise that these would provide future medical benefits; (3) he made unfounded and damaging public attacks, including in the Brazilian press, on Yanomami leaders and spokespersons as well as on advocacy anthropologists and nongovernmental organizations assisting the Yanomami and promoting their human rights, this, in the midst of the catastrophic illegal invasion of gold miners into the southern territory of the Yanomami; (4) he collaborated with corrupt politicians in Venezuela engaged in criminal activities designed to create a much-reduced Yanomami reserve to facilitate illegal mining and to develop a private territory for his own research; And (5) he repeatedly transported groups of outsiders with Venezuelan public funds into Yanomami communities without proper quarantine precautions, thereby risking and probably causing outbreaks of serious illnesses among the Yanomami.

This final report and the controversy in general had at least seven positive effects: (1) The AAA proved to be capable of carrying out an inquiry into violations of its Code of Ethics by particular individuals and their specific actions, despite initial denials by the leadership and partisans of the alleged violators; (2) an aroused and engaged membership overcame attempts by the AAA leadership to whitewash, cover up, and otherwise divert the investigation. For instance, the AAA administration was forced to provide a Web page on the association's Web site for open discussion following the release of the preliminary report of the task force, from February 10 to April 19, 2002 (that report was removed from the Web site after the final report was posted); (3) the release of a public document by a research unit of professional colleagues reporting findings of unethical conduct negated the protestations that the AAA could not apply meaningful sanctions (at the time of this writing, that report is being challenged by a referendum to rescind it introduced by Gregor and Gross for a vote on the March ballot of the AAA); (4) the misrepresentation of ethnographic and historical reality in the service of an anthropologist's theories that demean the Yanomami culture and people was held to have negative consequences that fall under the Code of Ethics; (5) the responsibility of anthropologists to speak out publicly against uses of their work by others to damage the interests of their research subjects was affirmed; (6) it was explicitly recognized that science, as an anthropological project, not only deals with objective facts and building theory, but is a social activity with effects on the research subjects and host community that may have ethical implications; and (7) a more general constructive outcome of the controversy has been a flurry of several edited books on professional ethics in anthropology. However, some contain contents that further propagate misinformation

and disinformation, thereby generating additional ethical problems.

It should also be noted that other inquiries into Tierney's allegations were conducted by the American Society of Human Genetics, the International Genetic Epidemiology Society, the National Academy of Sciences, the Society for Visual Anthropology, and overseas, by a medical team of the Federal University of Rio de Janeiro in Brazil and a special commission of the Venezuelan government. However, these inquiries were much more limited in scope and duration than that of the AAA; they produced conflicting conclusions regarding the few allegations by Tierney that they pursued; they did not take into account the AAA inquiry, since they were conducted and reported prior to the release of the final report of the task force; and the inquiry in Venezuela remains incomplete and therefore inconclusive. Albert edited the report in Brazil, and the others can be found through links at the Web sites of the AAA, Chagnon, and Hume.

Another central figure in this controversy besides Chagnon has remained almost completely silent in the years following the initial explosion of discussion and debate: Tierney. Various inquiries have exposed problems with many points in his book, although many other points have been confirmed. To date, Tierney has not addressed all of the problems by revising the book for a new third edition, although this may be forthcoming. Science, academia, and other fields progress through a cumulative process of identifying and correcting errors, discovering gaps and addressing them, noting weaknesses in an argument and strengthening them, and so on. Nevertheless, undoubtedly Tierney has made a major contribution to anthropology by generating ethical awareness, concern, discussion, and debate in the profession like never before. It is embarrassing that the catalyst came from outside of the profession and that this transformation has been obstructed by some of Chagnon's defenders and by the apparent apathy of a silent majority.

In 1996, more than 4 years before the El Dorado controversy exploded, Myron Perez Glazer asserted that any anthropologist genuinely concerned with professional ethics must inquire about the ethics of power, reciprocity, respect, and accountability. In his perceptive review of professional ethics in anthropology, Glazer raises these penetrating questions: Are researchers invariably exploiting the people they study, and if so, how can this be minimized? Do the subjects benefit from the research in ways that they themselves consider meaningful and fair? Does the researcher adequately respect the integrity of the subjects' culture, avoid undue interference, and minimize disturbance? How are anthropologists held accountable for their behavior, research, and publications?

The above and many other ethical questions have yet to be adequately explored, let alone resolved, in the case of the controversy over Tierney's multitude of diverse allegations. However, a new book is by far the most thorough, penetrating, balanced, and fair assessment of the entire controversy. The editor, Robert Borofsky, provides an overview not only of the controversy but also of its broader implications and ramifications. This is followed by a series of detailed roundtable discussions by six authors who have had various lengths and types of experience with the Yanomami and who reflect the opposing sides in the controversy: Bruce Albert, Raymond B. Hames, Kim Hill, Leda Leitao Martins, John F. Peters, and Terence S. Turner. The book is also unique in its pedagogical devices, which assist students and other readers in wrestling with the numerous and diverse questions and issues involved in this convoluted controversy. This book is intended to generate some genuine deep soul-searching in the profession and perhaps even some fundamental transformations. Meanwhile, the Yanomami continue to suffer from threats to their land and resource base as well as disease and epidemics, among other serious problems. Borofsky writes that any royalties from the book will go to a health fund for the Yanomami, a very rare ethical consideration that more anthropologists might well emulate.

This unprecedented scandalous controversy will probably simmer for decades and occasionally boil over, and then subside, like others such as the supposed hoax involving the Tasaday in the Philippines. In any case, by now, there is ample literature on professional ethics, including case study material as well as on the El Dorado controversy in particular. Thus, there is absolutely no excuse for any future researcher, teacher, or student to not be familiar with these subjects and to not seriously consider various ethical guidelines in their own work. Still, seldom can anyone actually specify to an individual precisely what to do in any particular situation; that must be left to the professional maturity, moral character, and common decency of the individual. On the other hand, it should be obvious that some actions are just plain unprofessional and unethical, as revealed by instances in this El Dorado controversy.

There are many lessons to be learned from this controversy that also have much broader relevance for the profession. Perhaps the most important one of all is the lesson that many ethical problems might have been avoided had the dignity and rights of the Yanomami as humans been fully recognized and respected. Instead, clearly, they were viewed as some "primitive" survivors of the evolutionary past. Among several other places, this attitude is documented in the film by Neel, Chagnon, and Asch, called *Yanomama: A Multidisciplinary Study.*

Ultimately, the bottom line for professional ethics in anthropology, as elsewhere, is to avoid harm, and to do good. Fortunately, many other anthropologists have been ethically responsible and socially relevant in their work with the Yanomami. For instance, in 1991, President Annette Weiner and the Executive Board of the AAA established a special commission to investigate the situation of the Brazilian Yanomami. The members of this international commission included Bruce Albert, Jason Clay, Alcida Rita Ramos, Stephan Schwartzman, Anthony Seeger, and Terence S. Turner (Chair). Special consultants included Claudia Andujar, Manuela Carneiro da Cunha, and Davi Kopenawa Yanomami. The report of this Commission; an OpEd in the *New York Times* by Turner on June 18, 1991; and a letter protesting Brazilian government policy drafted by Schwartzman and signed by eight U.S. Senators, which was sent to President George H. W. Bush, all combined to influence a positive change in the policy of the Brazilian government, especially its proposed archipelago scheme. (The latter was to be a series of 19 separate minuscule reserves that would markedly increase Yanomami community size, while greatly reducing the natural resource area available to each as well as facilitate penetration of miners, together guaranteeing a catastrophe for the Yanomami.) Thus, the Yanomami commission's action may have helped to make the difference between survival and extinction of the Yanomami in Brazil. This commission was the largest single case of intervention that the AAA has ever undertaken in the defense of the cultural rights of an indigenous group. Another example of ethical responsibility is provided by Bruce Albert and Gale Goodwin Gomez, who together researched and authored a bilingual Portuguese-Yanomami health manual to aid medical personnel to more effectively communicate with Yanomami in treating their medical problems. Such initiatives demonstrate that the pursuit of scientism and careerism alone is (or should be) an anachronism that is no longer tolerable and honorable in anthropology. When people are suffering and dying from epidemic diseases and/or have other serious problems, then "research as usual" is simply untenable. Science without conscience is a monstrous pursuit in any situation. Fortunately, a tectonic shift may be in the making for professional ethics in anthropology.

— *Leslie E. Sponsel*

See also **Chagnon, Napoleon; Ethics and Anthropology; Yanomano**

Further Readings

Asch, T., Chagnon, N., & Neel, J. (1971). *Yanomama: A multidisciplinary study.* Washington, DC: U.S. Atomic Energy Commission Film.

Berwick, D. (1992). *Savages: The life and killing of the Yanomami.* London: Hodder and Stoughton.

Borofsky, R. (Ed.). (2005). *Yanomami: The fierce controversy and what we can learn from it.* Berkeley: University of California Press.

Chagnon, N. A. (1997). *Yanomamo* (5th ed.). Fort Worth, TX: Harcourt, Brace, Jovanovich.

Ferguson, R. B. (1995). *Yanomami warfare: A political history.* Santa Fe: School of American Research Press.

Fluehr-Lobban, C. (Ed.). (2003). *Ethics and the profession of anthropology: Dialogue for ethically conscious practice.* Walnut Creek, CA: Alta Mira Press.

Good, K., with D. Chanoff. (1991). *Into the heart: One man's pursuit of love and knowledge among the Yanomami.* New York: Simon & Schuster.

Gregor, T. A., & Gross. D. R. (2004). Guilt by association: The culture of accusation and the American Anthropological Association's investigation of *Darkness in El Dorado. American Anthropologist, 106*, 687–698.

Ramos, A. R. (1995). *Sanuma memories: Yanomami ethnography in times of crisis.* Madison: University of Wisconsin Press.

Salzano, F. M., & Hurtado, A. M. (Eds.). (2004). *Lost paradises and the ethics of research and publication.* New York: Oxford University Press.

Sponsel, L. E. 1998. "Yanomami: An arena of conflict and aggression in the Amazon." *Aggressive Behavior*, *24*(2), 97–122.

Sponsel, L. E. (2001). Advocacy in anthropology. In N. J. Smelser & P. B. Baltes (Eds.), *International encyclopedia of social and behavioral sciences* (Vol. 1, pp. 204–206). Oxford: Pergamon Press.

Tierney, P. (2000). *Darkness in El Dorado: How anthropologists and journalists devastated the Amazon.* New York: Norton.

Tierney, P. (2000, October 9). The fierce anthropologist. *New Yorker,* 50–61.

Turner, T. (2001). *The Yanomami and the ethics of anthropological practice* (Latin American Studies Program Occasional Paper Series, Vol. 6). Ithaca, NY: Cornell University Press.

Turner, T. (Ed.). (2005). *Biological anthropology and ethics: From repatriation to genetic identity.* Albany: State University of New York Press.

Darrow, Clarence (1857–1938)

During the peak of his career, Clarence Darrow was the most well-known criminal lawyer in the United States. It is a fact that not one of Darrow's clients ever received the death penalty under his defense, including the infamous murder trial of Leopold and Loeb, sons of rich socialites. A brilliant maneuver at the last minute of the trial and a two-day long summation spared the two boy's lives. Also in Darrow's extensive résumé was his defense in the "trial of the century" where he defended John T. Scopes for teaching evolution and the thoughts of Charles Darwin to his students; this case has been nationally remembered as the "Monkey Trial" and was the cornerstone of the transformation from traditionalist ideals to the recognition of scientific evidence.

Clarence Darrow's origins were, at best, humble. He was born in Kingsman, Ohio, on April 18, 1857, the fifth child of Amirus and Emily Eddy Darrow. The town of Kingsman had only 400 inhabitants and was not even labeled on contemporary maps of the area. Amirus Darrow manufactured and sold furniture and was the town's undertaker. Emily Eddy Darrow played the traditional role of running the household; she died when Clarence was only 15 years old. Although the Darrows lived a meager existence in the smallest of towns, they had a love for books; they read Jefferson, Voltaire, and Thomas Paine, and this love of books was force-fed to their children.

Despite Clarence Darrow's humble origins, he went to Allegheny College, from which he graduated. After a brief time of fruitless jobs, he attended the University of Michigan Law School, where he gained his juror's doctorate in law. Darrow did badly in school, mostly because he was not disciplined; he failed to prepare for and to contend with unexciting works, which would hurt him in his future legal career. He relied on luck, inspiration, and his uncanny ability to "rise to the occasion."

Clarence Darrow laid claim to many victories in court, but none were more recognized than the "Leopold and Loeb" case and the "Monkey Trial." The Leopold and Loeb trial happened in the summer of 1924, in the city of Chicago. Richard Loeb, age 17, the son of the vice president of Sears, Roebuck, and Company, and Nathan Leopold, age 18, also the son of a wealthy family, conspired to commit the perfect murder. They lured a friend into a rented car. Once in the vehicle, the two boys proceeded to stab the young boy with a chisel and strangle him with rope. After dumping acid on the boy to make identification difficult, Loeb and Leopold disposed of the body in a swamp. After the body was disposed of, they proceeded to mail a letter to the murdered boy's family and asked for a ransom, with the promise that the boy would be unharmed. Although the young murderers thought they had pulled it off, they soon found out that their scheme was far from perfect.

Police discovered the young boy's body soon after Loeb and Leopold disposed of it, and were able to identify the body. A crucial mistake by the boys was that Nathan Leopold had dropped his spectacles where the body was disposed; these spectacles had special hinges on them that were sold to only three people in all of Chicago, one of those being Nathan. Ten days after the murder, Loeb and Leopold were brought in for questioning; both cracked under pressure and confessed to the murder, though both confessed that the other did the actual killing.

The murder attracted national media attention due to the defendants' social status as sons of upper-class families. The common belief was that only uneducated, poor, and vile people committed these types of crimes—yet two young boys from "good," wealthy families had committed this atrocious premeditated offense. Clarence was called in to represent Loeb and Leopold. The media immediately criticized Darrow for defending these two boys solely for materialistic gain. With a full-fledged confession by both

boys and an insurmountable amount of evidence against them, Darrow was hired to save their lives from the death penalty, which in Illinois was death by hanging. Darrow, who was an avid spokesperson against the death penalty, had almost an impossible case to win.

From the beginning, Darrow knew that the only way to attain a sentence of life imprisonment for Leopold and Loeb was to try the case before a judge in a bench trial, because there was no possibility of attaining an unbiased jury. Darrow originally had the boys plead not guilty, with the intention of changing this plea to guilty, which would force the judge alone to sentence Loeb and Leopold to death, and use the element of surprise to throw off the prosecution.

In a dramatic two-day summation, Darrow downplayed the murder, while focusing on the boys' mental abnormality as well as the fact that the crime was senseless, motiveless, and mad. He also attacked the prosecution because of their persistence for the death penalty in light of his clients' economic class and the national exposure to the case. When he made his verdict, Judge John Calverly disagreed with many of the points that Darrow made, but was swayed nonetheless by the summation and especially the boys' young ages. He gave them both life sentences for kidnapping and murder. Although Darrow was criticized for materialistic gain in this case, the families of Leopold and Loeb at first refused to pay Darrow any money; after much debate, the families paid Darrow a total of $100,000, which in no way compensated Darrow as well as his staff for the time and work they had put into the case.

The trial of John T. Scopes took place in July 1925. Clarence Darrow defended Scopes for free, and it was the first and last time he would ever do so in a case. He waived his fee and defended Scopes only because the prosecutor in the case was William Jennings Bryan, a well-known rival. Bryan was the nation's leading fundamentalist, and three-time presidential candidate. John T. Scopes was arrested for teaching evolution and the theories of Charles Darwin at Dayton High School, in Dayton, Tennessee. Scopes was not actually a biology teacher, but rather a physics teacher; only after Scopes had substituted in the biology class and gave a reading assignment dealing with evolution was he charged.

The jury in the "Monkey Trial" had never heard of Charles Darwin, and all but one were fundamentalists. Bryan was considered a "man of God," while Darrow was disliked as "the devil." The prosecution led by Bryan motioned that no expert testimony be allowed for either side of the trial. The judge ruled in favor of the prosecution, almost crippling the defense's case. Although not his idea, Darrow called Bryan himself to testify on his religious beliefs and evolution. Bryan agreed to this blindly and took the stand before Darrow. Clarence humiliated Bryan by subjecting him to question after question, targeting the many miracles and inconsistencies of the Bible while Bryan testified unwavering to his strict beliefs. The judge ultimately threw out the testimony, but Bryan was embarrassed and was criticized throughout the nation for his behavior.

Darrow, along with his defense team, consisting of Dudley Field Malone and Arthur Garfield Hays, knew that because they were not allowed to introduce expert testimony and Bryan's testimony was thrown out, there would be no way to win the case against a fundamentalist jury. To save face and not allow Bryan to fight back against the humiliating display, Darrow chose not to make a closing statement—in Tennessee, the law stated that the prosecution must also waive closing statements along with the defense.

John T. Scopes was convicted under the antievolution law, but the guilty verdict was later reversed by the Supreme Court of Tennessee on nonconstitutional technical grounds. Although Darrow was unsuccessful with this case, this led to other cases dealing with the unconstitutionality of the teaching of evolution. The "Monkey Trial" actually stimulated other states to pass anti-evolution laws, which had not been established before. This case was about the freedom of expression and the value of scientific evidence. The whole country knew that John T. Scopes broke the law, but the question was whether the law was just. And more important, was the law constitutional? In 1968, the U.S. Supreme Court ruled that statutes prohibiting the teaching of Charles Darwin's theory of evolution were unconstitutional because it violated the prohibition on the establishment of a state religion. Clarence Darrow died on March 13, 1938, but his legacy will remain because of his unwavering defense of those who would not be heard because of prejudice and bigotry.

— Eric C. Chadwick

See also **Creationism, Beliefs in; Law and Society; Monkey Trial; Scopes, John**

Further Readings

Boyle, K. (2004). *Arc of justice: A saga of race, civil rights, and murder in the jazz age.* New York: Henry Holt.

Cowan, G. (1993). *The People v. Clarence Darrow: The bribery trial of America's greatest lawyer.* New York: Time Books.

Darrow, C. (1932). *The story of my life.* New York: Grossett's Universal Library.

Tierney, K. (1979). *Darrow, a biography.* New York: Fitzhenry & Whiteside.

Dart, Raymond A. (1893–1988)

Australian anatomist and anthropologist Raymond Dart was known for his discovery and analysis of the fossil hominid *Australopithecus africanus.* Born in Toowong, Brisbane, Australia, Dart was one of nine children born to strict and religious parents. Living and working on his parents' Australian bush farm, Dart's pioneer life and naturalistic inclinations would influence both his decision to leave the farm and to pursue a course of relevant academic interest. After attending Ipswich Grammar School, Dart won a scholarship and attended the University of Queensland, where he studied zoology. Proving his academic merit, Dart won a residential scholarship to St. Andrew's College in Sydney, where he studied biology.

After his graduation in 1917, Dart went to wartime England to serve in the medical corps. This would give Dart the opportunity to study in London, England. While at University College, London, Dart studied anatomy under Elliot Smith. During this period of study, Dart was presented with an opportunity to study in America. Due to the generous contributions of the Rockefeller Foundation, Dart went to Washington University, St. Louis, United States, to study histology. Between studies and research, Dart met and married Dora Tyree, before returning to England in 1921. Upon returning to University College, Dart was appointed head of histology. During his remaining time at University College, the influence of neurologist Dr. Kulchitsky, former Russian Minister of Education and political refugee, served to strengthen Dart's ability in both microscopic and gross anatomy. With the encouragement of Elliot Smith and Arthur Keith, Dart accepted the chair of anatomy at the University of Witwatersrand, Johannesburg, South Africa, in 1922. However, accepting the chair was not tantamount to his research and position at University College. The city of Johannesburg was thriving, but the department at the university was not. Since the University of Witwatersrand severely lacked both equipment and literature, Dart renewed his interest in anthropology.

Contributions and Perspectives

During the time when Asia was thought to be the cradle of humankind, the discovery at Taung in the Bechuanaland Protectorate rekindled the Darwinian speculation that Africa was the origin of our species. Recovering fossils lying in limestone (through the aid of both Dart's students and miners at the Taung mines), Dart began to evaluate the specimens that were sent. One of the first specimens was an endocranial cast that was bigger than a baboon or chimpanzee (with a cranial capacity around 520 cc) but less than what can be considered as primitive for the human species. With small canine teeth and a more forward *foramen magnum,* the morphological features would indicate that the specimen could be considered as the "missing link" between the human species and the common ape. When comparing and contrasting any significant features, what was of real importance was that the specimen possessed two distinct furrows, *lunate* and *parallel sulci,* the latter of which are found in primitive humans. Given the geographic location, this species would indicate a deviation in the previous thought concerning the habitat of our early ancestors. What was more striking and controversial than the origin was the possibility concerning the depth of the australopithecine's Osteodontokeratic culture.

Finding and correctly interpreting behavior via material culture is problematic at best. Facing conflicting theoretical constructs and related terminology, the possibility for a conclusive definition may seem elusive, whether it is applied to either our remote ancestors or our living cousins, the chimpanzees. The imposing question remains: Does the manufacturing of tools become a sole indicator of hominid intelligence and related culture? Or may the possibility of utilizing, and perhaps slightly modifying, preexisting material for intentional be seen as a cultural indicator? For Dart, this question was not

Source: From the R. A. Dart Collection, University of Witwatersrand Archives.

problematic. The australopithecines did possess a rudimentary form of culture. The implication concerning hominid behavior was staggering: No longer were our ancestors seen as passive and humble creatures of the forest canopy. Rather, they were depicted as aggressive and intelligent hunters on the open plains and grassy savannas. This translated into a unique view of this hominid form.

According to Dart, the South African man-apes utilized many existing bones as tools. Similar to the evidence found at Choukoutien, Dart came to the conclusion that this hominid form expressed its behavior in the same way. Using an antelope thigh bone or arm bone as a club or sharp ends of broken bones as daggers, the australopithecines became a formidable predator. Although the evidence at Taung was attempted to be dismissed as being a product of hyenas (which itself is a myth), the faunal remains (buffalo, saber-toothed tiger, and giant porcupine) suggest that these hominids must have had the ability to effectively communicate and execute complex maneuvers. Such dangerous confrontations would have had to necessitate both higher forms of technology (beyond arbitrary implements) and social structure. However, the world of academia would be reluctant to extend many of the attributes to the Osteodontokeratic culture.

The contribution made by Dart was considerable. Besides his insights into anatomical evaluation of the specimen at Taung (especially in viewing the endocranial cast), the extending of human qualities continues to raise philosophical questions. This can be divided into two issues, one being taxonomical and the other being cultural. In view of the morphological characteristics of the australopithecines, the adoption of an erect posture promoted bipedality. This fact, along with an increase in cranial capacity and the free use of hands, made the australopithecines more reliant on their larger brains (some past the "Rubicon" of 750 cc) than brute strength. Although this "missing link" was not capable of articulate speech, the physiological characteristics of their brains do suggest greater complexity than was seen in earlier hominid forms. The placement of these hominids among the array of other hominid forms provided the Darwinian view of gradualism and continuity. With their more complex brains and bipedal gait, the development of culture becomes a necessity. The defining attributes of culture, similar to that of characteristics in general, become subjective to the anthropocentric evaluation of our species. The reluctance to credit this hominid form, as with our primate cousins, tends to obscure the evolutionary progression of our own humanity. Granting that the extent by which this can be called culture is not great as compared to the advancements of modern humankind, Dart's evaluation forces us to reevaluate humankind's place within nature.

— David Alexander Lukaszek

See also **Australopithecines; Hominids; Hominization, Issues in; Missing Link**

Further Readings

Dart, R. (1956). The myth of the bone-accumulating hyena. *American Anthropologist, 58,* 40–62.

Dart, R. (1958). Bone tools and porcupine gnawing. *American Anthropologist, 60,* 715–724.

Dart, R. (1960). The bone tool-manufacturing ability of *Australopithecus prometheus. American Anthropologist, 62,* 134–143.

Dart, R. (1982). *Adventures with the missing link.* Philadelphia: Institutes for the Achievement of Human Potential.

Darwin and Germany

We can analyze Charles Darwin's influence in Germany by examining four connections. These include, first, Darwin's relationship to social Darwinism and, in particular, to Hitler and the Third Reich, as many people still tend to see a strong link between these two movements. While we cannot regard Darwin as connected to the cruelties of the Third Reich, there is a relationship between Ernst Haeckel, the main defender of Darwin's theory of evolution in Germany, and some aspects of Third Reich politics. The second connection is Darwin's influence on two major German zoologists, August Weismann and Ernst Haeckel. Third, we can focus on the influence Darwin has had on the ideas of German philosophers and philosophical anthropologists, including David Friedrich Strauss, Karl Marx, Friedrich Engels, Friedrich Nietzsche, Georg Simmel, Ernst Cassirer, Max Scheler, Nicolai Hartmann, Helmuth Plessner, Arnold Gehlen, and Vittorio Hoesle. Fourth, we can examine how Darwin is seen in Germany today.

Darwin, Social Darwinism, and the Third Reich

When the name "Darwin" comes up in discussions in Germany, it still happens that people mention Social Darwinism and Darwin's influence on Hitler and the Third Reich. Therefore, there is the necessity of making two brief remarks about this issue.

First, it has to be said that Hitler, like Darwin, saw himself as a defender of the "will of nature." However, Hitler linked the concept of the "will of nature" with a particular people and infers from this the necessity of aggressive behavior toward inferior races ("Aryans" versus "Jews"). Such an element cannot be found within Darwin's theory.

Second, it needs to be said that Darwin does not promote measures against contraselection. Contraselection takes place within a civilization when the struggle for existence cannot be active in an appropriate manner, as inferior, weak, and lazy people are supported and are taken care of, and such circumstances are supposed to lead to the transmission of weak hereditary dispositions. Of course, it is a matter of dispute whether there is such a phenomenon as contraselection or not. Measures against contraselection were demanded by Ernst Haeckel, further promoted from some race hygienists *(Rassenhygieniker)* and later on carried out by Hitler and the national socialists. I say more about this in the section on Haeckel. At this point, it has to be stressed that first, contraselection cannot follow from Darwin's theory of selection, as the individuals who win the struggle for existence within his theory are by definition the most suitable whatever the cultural conditions are; and second, Darwin never demanded that one should refrain from helping the weaker.

Given the above comparison between Darwin's and Hitler's ideas, we must conclude that Darwin should not be seen as an intellectual precursor of the German national socialist movement.

Darwin and Two Major German Zoologists

The first zoologist I deal with here is August Weismann (1834–1914). At the 100th anniversary of Darwin's birthday, Weismann pointed out the importance of Darwin by stressing that before Darwin zoology, botany, and anthropology existed as separate sciences, but with Darwin's theory of evolution, a connection between these various sciences was established. Weismann is regarded as the first proper Darwinist and as the founder of neo-Darwinism, although originally he believed in Lamarck's theory of the transmission of acquired traits. What is significant for neo-Darwinism is that it combines our knowledge of genetics with Darwin's theory of selection. Weismann combines the theory of cells, embryology, and genetics with another, and interprets the result by means of the theory of selection. He transfers the principle of natural selection from the macroscopic to the cellular perspective, which implies that the cellular plasma *(Zellplasma)* is transmitted from generation to generation and thereby becomes potentially immortal. The cellular plasma is also the basis for the soma or bodily plasma. Today, we would use the expressions *genotype* and *phenotype*. To clarify this position a bit further, we could say that for the neo-Darwinists, the genotype is the basis for transmission and the phenotype follows from it, whereas for a Lamarckian, the phenotype is the basis and the genotype develops from this. In addition, I wish to make clear that it was important for Weismann to stress that given the theory of selection, it does not follow that the beastly tendencies should govern human

Source: © iStockphoto/Michael Blackburn.

beings, but that for human beings it is particularly the mind or spirit that matters, rather than the body.

The next scientist we discuss is the zoologist and philosopher Ernst Haeckel (1834–1919). I have already alluded to some of his ideas in the first part of this article, and I return to them later in this section. Before comparing Haeckel's ideas to Darwin's I need to point out that in 1863, Haeckel wrote a letter to Darwin informing him that he wished to dedicate his life to Darwin's theory of evolution, which he did by taking the theory of descent and the principle of selection for granted, and then applying these theories to the various areas of biology.

First, I wish to mention that Haeckel clearly expressed that none of the living great apes is the ancestor of the human race, as they died out long ago. Today, we believe that the last common ancestor of human beings and great apes lived about a couple of million years ago. It seems to me that even today, many people believe that the living apes are actually our ancestors. Haeckel clearly recognized this problem of understanding. Second, Haeckel managed to relate phylogenesis and ontogenesis to one another. According to him, the ontogenesis is a short and fast repetition of the phylogenesis, which means that an embryo passes through the various phases of our ancestors via fishes to higher mammals. One can find this relationship between ontogenesis and phylogenesis already within Darwin's works, yet it comes out clearly for the first time in the writings of Fritz Mueller (1822–1897), Johann Friedrich Meckel (1781–1833), and in particular Ernst Haeckel.

All of Haeckel's abovementioned observations were very perceptive, yet it also has to be noted that he and some other German scientists, like Carl Vogt or Fritz Mueller, were far more extreme and axiomatic than Darwin. For example, Haeckel boldly and loudly expressed his opinion: "There is no God, and no immortality." Considering this aspect of Haeckel's personality, we can now return to the topic of the first part, where Haeckel was already mentioned. According to Haeckel, it is the most important task of the practical philosophers of his times to develop and bring about a new ethics. The only ethics that he was able to regard as consistent with Darwinism was neither democratic nor socialist, but aristocratic. Given this belief, it makes it easier to understand why Haeckel was in favor of measures against contraselection, such as recruiting ill people for the military, the death penalty for criminals, or murder of ill and weak children. Twenty years later, his ideas with respect to contraselection were taken up again by race hygienists *(Rassenhygienikern)* such as Wilhelm Schallmyer (1857–1919), who wrote the first book dealing with the hygiene of a race in 1891, and Alfred Ploetz (1860–1940), who in 1895 created the notion "hygiene of a race" *(Rassenhygiene)*. Both refer directly to Haeckel. In numerous publications after 1933, Haeckel is seen as a thinker closely related to national socialism, his demands concerning eugenics were praised, and indirectly via the race hygienists, he influenced the ideology of the national socialist. One can even find related ideas in Hitler's *Mein Kampf*.

To make the orientation easier for someone interested in the German reception of Darwin within the fields of biology and anthropology, I mention the most important German biologists and anthropologists who were significantly influenced by Darwin in this section. The most notable German biologists in the 19th century besides the one already mentioned were Naegeli, Hermann, and Fritz Mueller. For the 20th century, E. Baur, Rensch, Timofeef-Ressovsky, Zimmermann, and Schindewolf have to be mentioned. The most important German anthropologists in the 19th century were Rudolph Wagner, Carl Vogt, Hermann Schaaffhausen, Karl Ernst von Baer, Robert Hartmann, and Gustav Schalbe. Rudolf Virchow and Johannes Ranke Extremely were critical of Darwin. Concerning 20th-century anthropologists who were significantly influenced by Darwin, Hermann Klaatsch, Gerhard Heberer, Winfried Henke, and Hartmut Rothe have to be mentioned. In addition, one should not forget the Social Darwinists Alfred Ploetz, Wilhelm Schallmeyer, and Otto Ammon. After having shown Darwin's influence on two major German zoologists, and having mentioned the most important 19th- and 20th-century German biologists, and anthropologists who were significantly influenced by Darwin, I now come to the relationship between Darwin's theory of evolution and the ideas of German philosophers and philosophical anthropologists.

Darwin, Philosophers, and Philosophical Anthropologists

Within this section, I progress in chronological order, starting with the earliest thinkers influenced by Darwin and ending with the last notable thinker. It has to be noted that most of the thinkers listed were active during the first half of the 20th century.

The first thinker I wish to mention is the theologian David Friedrich Strauss (1808–1874). He was the author of the famous book *The Life of Jesus,* which was very influential, especially in the 19th century. David Friedrich Strauss admitted that Darwin's theory was irresistible to those who thirsted for "truth and freedom."

More famous and influential than Strauss are the next two thinkers, namely Karl Marx (1818–1883) and Friedrich Engels (1820–1895). The following story has often been told when the relationship between Darwin and Marx was discussed. "And when Marx proposed to dedicate to him [Darwin] *Das Kapital,* he firmly refused the honour, explaining that it would pain certain members of his family if he were associated with so atheistic a book" (Himmelfarb, 1962, p. 383). However, in recent times, doubt has been shed on the truth of this story. Bowler (1990), for example, said, "It is perhaps worth noting that the once popular story that Karl Marx offered to dedicate a volume of *Capital* to Darwin is based on a misinterpretation of the relevant correspondence" (p. 206).

What is certain is that both Engels as well as Marx had been deeply impressed by Darwin's theory of evolution, as the topic comes up very often in their correspondence, and both Engels as well as Marx were usually full of praise for it. Engels once wrote that Marx's theory of history can be compared to Darwin's theory of evolution, whereby it has to be assumed that he was referring to the scientific value of both theories. In another letter, which Engels wrote to Marx in November 1859, he praised Darwin for destroying the then still very strong teleological worldview. Here, he was referring to the principle of selection, which is indeed consistent with a mechanistic description of the world. In December 1860, Marx says in a letter to Engels that although Darwin's works are very English, he regards them as containing the basis for their own work. Of particular interest has to be Engel's letter to the Russian journalist Lawrow (1875), who was a strong opponent of Darwinism. In this letter Engels makes clear that he accepts Darwin's theory of evolution, although he has doubts with respect to his methodology. For Engel, it was not possible to base all activity within this world on the "struggle for existence," and he compared Darwin's theory in this respect to the positions of Hobbes and Malthus. Engels believed that all worldviews containing the idea of the "struggle for existence" theory must have come about by means of the following mistake. The respective thinkers must have observed the realm of plants and animals and expanded the observed forces to the human world. This, however, cannot be done, according to Engels, as human beings have developed the capacity to produce things, and this capacity cannot be found anywhere else in nature except in human beings. Therefore, it cannot be justified to apply observations of the realm of plants and animals to the human world. This seems to have been Engel's main point of criticism.

After having dealt with the relationship of Marx and Engels to Darwin, I now come the most important philosopher of the second half of the 19th century in

Germany: Friedrich Nietzsche (1844–1900). Birx (2000) correctly pointed out that "The scientist Charles Darwin had awakened the philosopher Friedrich Nietzsche from his dogmatic slumber by the realization that, throughout organic history, no species is immutable (including our own)" (p. 24). In addition, Birx also explained, "As with Thomas Huxlex, Ernst Haeckel and Darwin himself, Nietzsche taught the historical continuity between human beings and other animals (especially the chimpanzees)" (p. 24). However, Nietzsche was not unconditionally affirmative of Darwin. Nietzsche's most important criticism was, like Engel's, directed toward Darwin's "struggle for existence" theory. He did put forward many types of arguments against the theory of the "struggle for existence," and he also explains why he regards the aspect of power as more important than the aspect of pure existence. One of the better arguments can be found in an aphorism titled "Against Darwinism." Here, Nietzsche pointed out that Darwin overestimated the outer situation and forgot to take the inner form giving force into consideration. This creative force leads to the feeling of becoming stronger, which again is what human beings are after. This is one of the reasons why Nietzsche did not regard the "struggle for existence" but the "will to power" as the basis of all human actions. Finally, concerning the relationship between Darwin and Nietzsche I wish to mention that Nietzsche did not read much by Darwin himself, but a lot of secondary literature about him.

Georg Simmel (1858–1918) is the next thinker with whom I am concerned. He is a philosopher and one of the founders of sociology, and besides many other subjects, he also dealt with evolutionary epistemology. This theory of knowledge considers that human beings are the result of a long natural process of evolution, since it regards this fact to be relevant for our way of understanding and getting to know the world. Through Simmel and the Austrian ethnologist Konrad Lorenz who was heavily influenced by Darwin, the idea of an evolutionary epistemology was transmitted to the present, in which it has become an influential stream of philosophy that is the subject of intense philosophical debates.

Another philosopher of culture deeply indebted to Darwin's ideas is Ernst Cassirer (1874–1945). This neo-Kantian philosopher has often referred to the role of 19th-century biology with respect to the breakthrough of historical thinking within the field that is concerned with knowledge of nature. The 17th century was dominated by a mathematical ideal of the natural sciences. However, in the 19th century, the historical approach became more and more important, according to Cassirer. Especially because of Darwin's theory, the historical approach to knowledge of nature has been able to reach a new level of importance, and it has become obvious that scientific and historical thinking do not have to be contradictory, but can complement one another, to attain a useful symbiosis of these two streams of thinking.

The Catholic Nietzsche and founder of philosophical anthropology Max Scheler (1874–1928) is the thinker with whom I deal with next. He studied with Ernst Haeckel in Jena, who influenced him significantly with respect to Darwin's theory of evolution. Within his mature philosophy, he accepted that with respect to their "physis," human beings are constructed according to the same fundamental plan as animals. However, with respect to the mind, there is an enormous difference between men and animals. Yet it is not the case that animals do not have a mind, according to Scheler, but they have it to a much lower degree. This difference alone would not grant human beings a special status in the world. It is because of something else that men have such a special status, which I explain soon.

From the above remarks alone, one can see that Scheler's thought was closely linked to the sciences. Yet he was not the only one who was so strongly influenced by the natural sciences. According to him, all educated Europeans think within the tradition of the following three cultures when they are asked what comes to mind when they think about human beings: the Jewish-Christian tradition, the ancient Greek cultural realm, and the field of modern natural sciences, particularly the theory of evolution and genetic psychology. However, these three realms exist parallel to one another within our civilization without there being a link between them. Scheler tried to find a solution to this problem, and Cassirer in 1944 took up the same problem but without accepting Scheler's solution. Scheler's solution goes as follows. According to him, given the theory of evolution that Scheler accepts, human beings (men as *Homo naturalis*) cannot have a special status within nature, as mentioned before. He developed a model where the organic realm is separated into various stages, yet this cannot justify that men have a special status, as human beings and animals do form a strict continuum. However, Scheler thought that there is something that separates

us from the natural realm. Here, the notion of *Weltoffenheit* (openness to the world) comes in. By this notion, he means our ability to be relatively free from our instincts and forces, and therewith our ability to choose for ourselves which type of life we wish to live. In this way, he introduced a dualism within his philosophy, which was rejected by the later philosophical anthropologists Helmuth Plessner and Arnold Gehlen.

Often, Darwin's theory has been criticized on the grounds that selection is a tautology and, as such, cannot be regarded as a scientific theory, as it cannot be falsified. While this was reason enough for many people to doubt Darwin, Nicolai Hartmann thought the plausibility of this principle revealed its status as a priori knowledge. Spencer, too, had emphasized the a priori status of the principle of selection.

After Hartmann, we can come back to the philosophical anthropologists again, and so we reach Helmuth Plessner (1892–1985). Although he agrees with Darwin on many points—like the one that there is only a very small difference between men and animals, but not a substantial difference, only a gradual one—he is very critical of Darwin as well. For example, he does not accept that at the basis of all actions is the "struggle for existence." It also needs to be mentioned that Plessner grants the principle of selection also an a priori status.

Another important philosophical anthropologist who was influenced by Darwin is Arnold Gehlen (1904–1976). There are quite a few similarities in their theories. Darwin regarded the biological weakness of human beings as probably their greatest strength, as it brought about that men work together and form communities, and it enabled men to adapt themselves to the various possible situations and to develop great spiritual capacities. Gehlen referred to the same phenomenon with the expression *Maengelwesen* (defective creature), whereby he alluded to Nietzsche, who in the "Gay Science" described human beings as "wayward animals." Human beings need culture, and, as Gehlen says, institutions in order to be capable of living well, as they are lacking the appropriate instincts. Like Darwin, Gehlen held that there is only a gradual difference between men and animals. However, he neither attributed a lot of importance to the "struggle for existence" nor granted any relevance to the principle of selection.

The last great philosopher who has dealt with Darwin is Vittorio Hoesle (1960-). Together with the biologist and philosopher Christian Illies, he wrote the very philosophical and clear introductory book titled *Darwin* (1999). However, within his own understanding of history, he is much closer to Hegel than to Darwin.

Darwin in Germany Today

The attitude toward Darwin in Germany today is still ambiguous. The following two aspects have to be stressed. On one hand, there is the "bad Darwin," who is related to Social Darwinism and eugenics, and on the other hand, there is the "good Darwin," who is the great observer of nature, clear writer, and role model for any natural scientist. Two recently published articles represent good examples for each of these attitudes.

The first article, "*Reine Rasse*" ("Pure Race") (Franke, 2001), deals with the questions of gene diagnosis, cloning, and euthanasia. It was mainly inspired by the fact that just before Easter, the Dutch Parliament passed a law that legalized active mercy killing, or euthanasia, which brought about a massive and emotionally charged discussion in Germany. Within this article, Darwin was mentioned as someone who realized the problem of a surplus population but accepted that nothing can be done about it. However, it was also said that many of his followers have taken a different view, and it was implicitly expressed that the danger of a solution different from Darwin's was clearly contained within Darwin's ideas, as he himself had realized the problem of a surplus population. Although the author could have given a much worse description of Darwin, here one can still find the picture of the rather "bad Darwin."

The second article, "Mit Darwins Augen" ("With Darwin's Eyes"), was written by Durs Gruenbein (2001), a famous German writer. In it, Darwin was portrayed as the role model of a natural scientist. His ability to express the results of his research to the public was praised, and positively compared to the capacities of the present generation of natural scientists. It was made clear that he had the calmness, the perseverance, the patience, and just the right eye for being a clear and rigorous observer of nature, from whom all natural scientists could learn something.

It is fair to say that although we can still find the "good" and the "bad" Darwin within German contemporary culture, it seems that the positive aspects dominate. What we must consider, however, is that even in Germany, we find creationists with posts at good universities again, a fact that should make us

question whether creationism will become more influential.

— *Stefan Lorenz Sorgner*

See also **Biological Anthropology and Neo-Darwinism; Creationism, Beliefs in; Darwinism, Modern; Neo-Darwinism, Origin of; Selection, Natural**

Further Readings

Birx, H. J. (2000, October/November). Nietzsche & evolution. *Philosophy Now, 29.*

Bowler, P. J. (1990). *Charles Darwin: The man and his influence.* Cambridge: Cambridge University Press.

Darwin, C. (1998). *The descent of man* (Intro. by H. James Birx). New York: Prometheus Books.

Darwin, C. (1999). *The origin of species: By means of natural selection or the preservation of favoured races in the struggle for life.* New York: Bantam.

Franke, K. (2001). Reine Rasse [Pure Race]. *Der Spiegel, 29,* 128–134.

Gruenbein, D. (2001, June 23). Mir Darwins Augen [With Darwin's Eyes]. *Frankfurter Allgemeine Zeitung, Bilder und Zeiten,* p. 1.

Himmelfarb, G. (1962). *Darwin and the Darwinian revolution.* New York: Norton.

Sorgner, S. L. (1999). Metaphysics without truth: On the importance of consistency within Nietzsche's philosophy. In N. Knoepffler, W. Vossenkuhl, S. Peetz, & B. Lauth (Eds.), *Muenchner Philosophische Beiträge.* Munich: Herbert Utz Verlag.

Darwin and India

Charles Darwin (1809–1882) was the British naturalist who became famous for his theories of evolution and natural selection. He believed that all the life on earth evolved over millions of years from a few common ancestors. He went on expeditions around the world from 1831 to 1836, studying and collecting plants and fossils. Upon his return to London, Darwin conducted thorough research of his notes and specimens. Out of this study grew several of his related theories: (a) Evolution did occur; (b) evolutionary changes were gradual, requiring thousands of millions of years; (c) the primary mechanism for evolution was a process called *natural selection;* and (d) the millions of species alive today arose from a single original life form through a branching process called *specialization.* Darwin's theory of evolution holds that variation within species occurs randomly and that the survival or extinction of each organism is determined by that organism's ability to adapt to its environment. Although he avoided talking about the theological and sociological aspects of his work, other writers used his theories to support their own theories about society and humankind.

Darwin's theory of evolution is rooted in a philosophical commitment to naturalism or materialism, which assumes that all reality is ultimately physical or material. Thus, in his theory, mind or spirit is reducible to material reality, and God and religion are vanished to the land of irrelevance. This contradicts India's Hindu philosophy of life, its existence, and development.

Hindu philosophy believes in different types of origins of humankind than what Darwin prescribed. In one of the earliest literatures of Hindu social thought, *Purushasukta,* a reference has been made to the four orders of society as emanating from the sacrifice of the primeval being. The names of those four order are given there as *Brahmana, Rajanya, Vaisya,* and *Sudra,* who are said to have come respectively from the mouth, the arms, the thighs, and the feet of the creator. This origin of the four classes is repeated in most of the later works with slight variations and interpretative additions. For example, the *Taittiriya Samhita* ascribes the origins of these four classes to the four limbs of the creator and adds an explanation. The *Brahmins* are declared to be the chief because they are created from the mouth. The *Rajanyas* are vigorous because they are created from vigor. The *Vaisyas* are meant to be eaten, referring to their liability to excessive taxation because they were created from the stomach, the receptacle of food. The *Sudra,* because he was created from the feet, is to be the transport of others and to subsist by the feet. In this particular account of the creation, not only is the origin of the classes interpreted theologically, but also a divine justification is sought to be given to their functions and status. The creation theory is here further amplified to account for certain other features of their social classes. In Hindu social thought, God is said to have created certain deities simultaneously with these classes. The *Vaisya* class, the commoners, must have been naturally very large, and this account explains that social fact by a reference to the simultaneous

creation of *Visvedevas,* all and sundry deities, whose number is considerable. Also, no deities were created along with the *Sudra*, and hence, he is disqualified for sacrifice. Here again, the social regulation, which forbade *Sudra* to offer sacrifice, is explained as an incidental consequence of the creation.

The theory of the divine origin of the four classes is often repeated with special stress on the origin of the *Sudra* from the feet of the creator. In the *Mahabharata,* a slight material change is introduced in this theory, where we are told that the first three classes were created first and the *Sudra* was created afterward for serving others. In the *Bhagavadgita,* the creator is said to have apportioned the duties and functions of the four classes according to the inherent qualities and capacities of individuals. This theory of origin, even though it fails to explain how the individuals at the very beginning of the creation came to be possessed of peculiar qualities and capacities, tries to provide a rational sanction for the manifestly arbitrary divisions. God separated people into four classes not merely because they were created from different limbs of his body, nor again out of his will, but because he found them endowed with different qualities and capacities.

Darwin explains the concept of sexual selection by examining one of the social customs practiced in India. He maintains that infanticide was probably more common in earlier times, practiced by "Barbarians" who killed off children they were not able to support. Darwin gives many examples of tribes formerly destroying infants of both sexes. He further notes that wherever infanticide prevails, the struggle for existence will be less severe, and all the members of the tribe will have an almost equally good chance of rearing their few surviving children. In most cases, a larger number of female than of male infants are destroyed, for it is obvious that the latter are of more value to the tribe, as they grow up and aid in defending it. This was a practice in some tribes of India, particularly in a village on the eastern frontier, where Colonel MacCulloch found not a single female child. However, practice of infanticide in India, unlike Darwin's argument, did not stem from the struggle for existence. Rather, it was rooted in the traditional customs and spiritual practices. It was believed that when natural calamities, such as droughts and epidemics, took a toll on (tribal) communities, it was their moral duty to offer sacrifices to God to gain his mercy and blessings. Female infants were preferred over male infants for sacrifices because of their purity and superior quality as the source of creation. In ancient Hindu epics, one female infant is equated with three male infants—indicating that God will be pleased as much with the sacrifice of one female infant as he would be with three male infants. Thus, female infants were thought to be the premium offerings to God. Not all infants were qualified for sacrifice. There were certain criteria in selection of an infant for sacrifice—such as, the chosen infant must be healthy, beautiful, and belong to a noble family of the tribe. In this practice of sacrifice, the strongest and fittest infant was the one more at risk of being sacrificed than the weakest and nonfittest, contrary to the Darwin's theory of the survival of the fittest. These sacrifices were conducted in an orderly form for the noble cause of the welfare of the entire tribe, rather than as a routine practice of mere killing of infants for the struggle for existence.

Darwin further contemplates that the practice of infanticide created scarcity of marriageable women, which, in turn, resulted in polyandry. Whenever two or more men, whether they are brothers or strangers, are compelled to marry one woman, such a marriage system is referred to as *polyandry.* Darwin gives the example of the Toda tribe of India who practiced polyandry. However, there is convincing evidence that this was never a common form of marriage practiced in India. In India, the polyandry form of marriage is supposed to have once been a trait of the culture, from the classic instance of *Draupadi* having the five *Pandavas* of the *Mahabharata* fame as her husbands, and some vague allusions to polyandry in the *vedic* mythology. However, *Draupadi's* case does not appear to be as clear evidence of polyandry as it is generally supposed to be. According to the *Mahabharata,* the five *Pandava* brothers, after the death of their father, King *Pandu,* found themselves at odds with their cousins, the *Kauravas.* The long-drawn enmity between them compelled the *Pandavas* to stay hidden after their escape from the palace. During their exile, they lived on alms, which they collected and shared with their mother. One day, the sage *Vyasa* came and informed them that King *Drupada* of Panchala had invited kings to make their claims for the hand of his daughter *Draupadi.* The king had pledged her hand to the hero who successfully performed the feat of piercing a fish suspended on a post by taking his aim looking at its shadow in the water. *Vyasa* further asked them to attend the function in the guise of Brahmans. *Arjuna,* the third among the *Pandavas,* successfully

performed the feat and became the suitor of *Draupadi.* The *Pandava* brothers, on their return home with *Draupadi,* found the house door closed. They merrily asked their mother to open the door and receive them who had returned with pretty alms that day. Not knowing what alms they referred to, she asked them from behind the door to divide it amongst themselves. *Draupadi* thus became the common wife of the five *Pandavas.* When mother *Kunthi* saw *Draupadi* instead of alms, she realized the blunder she had committed and was taken aback. *Draupadi's* marriage to the five brothers raised a storm of protest from her relatives. Her father could not think of his daughter being the wife of five brothers, and he denounced it as irreligious, being against the *Vedas* and usages. Her brother attacked it with vehemence and asked *Yudhishtira* how he, as an elder brother, could marry the wife of his younger brother.

Thus, polyandry seems to have been discredited as a cultural trait from the time of the *Aitareya Brahmana* (800 BC), when it was said that a man could have many wives but a woman could have only one husband. The *Mahabharata* reiterates that this tradition to have many wives is no *adharma* (injustice) on the part of man, but to violate the duty owed to the first husband would be great *adharma* in the case of a woman. To sum up, polyandry has been found with the joint family not only among the *Todas,* as claimed by Darwin, but also among the *Kotas, the Coorgs, the Iravans, the Nairs, and the Khasa* community in India, but it was in different contexts and with different significance. Some of these communities considered *Pandavas* as their Gods and embraced the tradition of *Pandava* polyandry.

— *Komanduri S. Murty and Ashwin G. Vyas*

See also **Biological Anthropology and Neo-Darwinism; Creationism, Beliefs in; Darwinism, Modern; Hinduism; India, Philosophies of; Neo-Darwinism, Origin of; Selection, Natural; Polyandry**

Further Readings

Darwin, C. (1859). *On the origin of species.* London: John Murray.
Darwin, C. (1871). *The descent of man* (2 vols.). London: John Murray.
Ghurye, G. S. (1957). *Caste and class in India.* Bombay: Popular Book Depot.
Kapadia, K. M. (1958). *Marriage and family in India* (2nd ed.). Bombay: Oxford University Press.
Ruse, M. (2001). *Mystery of mysteries: Is evolution a social construction?* Cambridge, MA: Harvard University Press.
Satguru, S. S. (1997). *Dancing with Siva: Hinduism's contemporary catechism* (5th ed.). Kauai, HI: Himalayan Academy.
Vyas, A. (1991). *Social stratification and third world countries.* Berkeley, CA: Folklore Institute.

Darwin and Italy

The history of the interrelation between Charles Darwin and Italy begins long before Darwin's main works were published. In 1814, the Italian natural scientist Gianbattista Brocchi published his *Concchiologia fossile subappenina con osservazioni geologiche sugli Appenini e sul suolo adiacente,* in which he supported the theory that species can disappear and do actually become extinct, based on his detailed examination of the fossilized remains of crustaceans. With this theory, he contradicted Carl von Linné, J. E. Walch, Georges Cuvier, and Jean Baptiste Lamarck, who all, in their different ways, ruled out the possibility that a species could disappear entirely. Brocchi explained the disappearance of species by analogy with the life cycle of an individual. Just as an individual is born, grows old, becomes weaker, and finally dies, he believed that species became increasingly weaker down the generations. Brocchi believed he could prove that before they disappeared, extinct species had become smaller and smaller from one generation to the next and then finally died out. In this way, Brocchi saw the tiny spiral snail as the last stage of development of the originally much larger ammonites. Strangely, although Brocchi drew these parallels between the life of the species and the life of the individual, he did not use them as the basis to explore further what would seem the next obvious question about the origin of the species. He therefore accepted a gradual aging of species irrespective of exceptional external changes (catastrophe theory) but rejected Lamarck's theory that one species could develop into another.

Through Charles Lyell's *Principles of Geology* (1830–1833), in which Brocchi's theories were examined at

length, Charles Darwin came into contact in the 1830s with Brocchi's theory that species could change independently of external influences and gradually disappear. This caused him to doubt the claim made in *Natural Theology* (1802), by William Paley, that the species were contrived to be perfectly adapted, and eventually brought him to the theory of transformism.

In 1830, the famous dispute between Cuvier and Isidore Geoffroy Saint-Hilaire took place at the Académie des Sciences in Paris about whether there were several designs in nature (Geoffroy Saint-Hilaire) or just one basic design (Cuvier), a debate behind which was the fight between fixism (Cuvier) and Lamarckism (Geoffroy Saint-Hilaire). In 1859, Darwin's *On the Origin of Species* was published. In the period between these two important dates, the question of the origin of the species played only a minor role among natural scientists in Italy. This was because, with a few exceptions like Franco Andrea Bonelli and Carlo Porro, they were occupied mainly with questions of systematics and classification. Bonelli, Francesco Baldassini, F. C. Marmocchi, and some others responded positively to Lamarck's theories, while natural scientists like Camillo Ranzani and Filippo Parlatore rejected them with the arguments previously produced by Cuvier against Geoffroy Saint-Hilaire as "pantheistic" and therefore unchristian. As early as 1856, Carlo Luciano Bonaparte, on the other hand, claimed the variability of species within a geological period and classified human beings in the order of the apes. Faced with the choice between fixism and Lamarckism, many natural scientists in the Italian states chose to tread a third path: Returning to the model of a "Great Chain of Being," which had already been discussed in the 18th century, they assumed a gradual difference and consequently a relation between the species, but without regarding this as chronological evolution. Among others, Filippo De Filippi Parlatore and Gabriele Costa also advocated a nonevolutionary, systematic connection of this kind between the species, although in a different form. It is important to remember that many extremely different evolutionary theories inspired by natural philosophy were circulating at that time within the scientific community in the Italian states. These theories bore reference to Johann Wolfgang von Goethe, Friedrich Wilhelm Joseph Schelling, Georg Wilhelm Friedrich Hegel, and Carl Gustav Carus, among others. This demonstrates that numerous attempts were made to reconcile creationism and evolution.

The publication of Darwin's *On the Origin of Species,* which had already been circulating in Italy since 1862 in French translation, was at first received with relative composure, since the innovativeness of Darwin's approach was not initially recognized among natural scientists. Rather, Darwin's theory was received simply as one of many that were circulating at the time. He excited interest mainly with regard to the possibility he suggested of a genealogical system of species.

The public discussion about Darwin began in Italy in 1864, with De Filippi's famous lecture on *L'uomo e le scimmie* (Man and the Apes), in which he attempted to reconcile Darwinism with Christian dogma by classifying human beings in a separate fourth kingdom of nature alongside the mineral, plant, and animal kingdoms. Although this was after the appearance of Thomas H. Huxley's *Man's Place in Nature* (1863), Lyell's *The Antiquity of Man* (1863), and Carl Vogt's *Vorlesungen über den Menschen* (1863), it was 7 years before Darwin's *The Descent of Man* (1871) was published. In the same year, Giuseppe Bianconi gave a lecture at the Accademia delle Scienze in Bologna, in which he assumed an "independent emergence" of human beings and took the view that there was absolutely no genealogical relationship between man and animals. Alexander Herzen's lecture *Sulla parentela fra l'uomo e le scimmie* (On the Relationship Between Man and Ape), in 1869, in Florence, then also caused a sensation. Raffaello Lambruschini and Niccolò Tommaseo opposed Herzen. In response to the accusation that Darwinism was attempting to degrade humans by making them into apes, Herzen pointed out in his reply that neither he nor Darwin had ever claimed that man originated from the apes, but only that both man and ape originated from the same ancestor. The dispute between Herzen and Lambruschini also had more of a political character, since Lambruschini supported the theory of the "Great Inquisitor" in Dostoevsky's *The Brothers Karamazov,* namely, that it was not right to deprive the people of their belief in religious myths as it would cast them into despair. Herzen, on the other hand, insisted that scientific truth by its inherent merit must not be concealed.

After 1859, numerous natural scientists declared their support for Darwin, including Michele Lessona and Leonardo Salimbeni. One of the most important supporters of Darwinism in Italy was the natural scientist Giovanni Canestrini, from Trento, who had

translated *The Descent of Man* into Italian with Salimbeni in 1864. Strangely, the translators from English corresponded with Darwin in French and German, and peculiarly, there are several errors of translation in the Italian version that can also be found in the French translation of 1862. One example is the incorrect translation of the English word *metaphorical* in Darwin's explanation of the term *natural selection* into *metafisico* (i.e., metaphysical). As in the French version, *selection* was also translated into the Italian *elezione,* which is approximate to "choice or election," which encouraged an interpretation with problems.

In 1866, that is to say, 5 years before Darwin's *The Descent of Man,* Canestrini's monograph *L'origine dell'uomo* (The Origin of Man), dedicated to the same subject, was published. In this work, he defended Darwin against criticism, by Giuseppe Bianconi for example, in Italy. On the other hand, he deviated from Darwin's opinions in several areas. Unlike Darwin, who had been much more cautious in this area, Canestrini believed that evolution was a process of advancement to things more complex and elevated. As far as systematics is concerned, Canestrini does not classify man in the same order as apes. He claims that man is not descended from apes, but that ape and man are descended from one common ancestor.

In the same year, Geminiano Grinelli attacked Canestrini in his publication *L'origine divina e non bestiale dell'umanitá* (The Divine and Not Animal Origin of Man), and in 1874, Giuseppe Bianconi published in French his book opposing Darwin's theory of descent, *La théorie Darwinienne et la création dite indépendant*e (Darwin's Theory and the So-Called Independent Creation). In this work, the dispute surrounding Darwin is not so much about the dispute between creationists and evolutionists as about the fight between an "idealistic" evolutionism inspired by "natural philosophy" and Darwin's evolutionism, which is considered to be empirically materialistic. In his work published between 1872 and 1875, in Bologna, *I tipi animali* (Typology of the Animals), the Hegelist Angelo Camillo De Meis summed up the situation at the time perfectly when he wrote: "Even non-Darwinians admit to evolution, but they understand it as a necessary and rational process since, according to them, mutation first occurs ideally in the substantial form and then subsequently in the natural form." Augusto Verra also objected to Darwin's "empiricism" in his *Il problema dell'Assoluto* (The Problem of the Absolute), which was published in Naples in 1882.

Two years after Darwin was appointed a member of the Accademia dei Lincei in 1875, Luigi Bombicci published his *Il processo di evoluzione nelle specie minerali* (The Evolutionary Process of Minerals), in which he describes evolution as a general process of both animate and inanimate nature. In the same year, the work by Pietro Siciliani, *La critica nella filosofia zoologica del XIX secolo* (Criticism in the Philosophical Zoology of the 19th Century), appeared, which was somewhat more critical about Darwin. In 1880, Giacomo Cattaneo published his *Saggio sull'evoluzione degli organismi* (Essay on the Development of Organisms) and 2 years later, the Darwin obituaries by Paolo Mantegazza and Salvatore Tommasi appeared. The latter had already published an important essay, *Sul moderno evoluzionismo* (On Modern Evolutionism) in 1877, in the periodical *Rivista Europea.* Now, in his obituary, he summed up the decision for or against Darwin in this way: "either evolution or miracle."

In 1883, a few months before his death, Francesco de Sanctis, one of the most important intellectuals in the new Italy, also took up the cause of Darwin and emphasized his extreme importance, not only in the field of natural science but also in all levels of human life. This makes De Sanctis one of the first people to realize the significance and the possible consequences of Darwin's theory. In his lecture *Darwin e l'arte* (Darwin and Art), given by De Sanctis in 1883 in several Italian towns, he said: "There may be people who do not know his books and have never heard the name of Darwin but still live surrounded by his teachings and under the influence of his ideas."

Francesco de Sarlo covered at length possible "applications" for Darwinism in chemistry, astronomy, philology, and sociology in his *Studi sul darwinismo* (Studies on Darwinism), published in 1887. In his essay *Darwinismo ed evoluzionismus* (Darwinism and Evolutionism), which appeared in 1891 in *Rivista di Filosofia Scientifica,* Enrico Morselli also spoke in favor of an extension of Darwinism into other disciplines. In this article, Morselli attempted to link Darwin and Herbert Spencer and demonstrate the broad applicability of Darwinism. Not only this, he also supported the irreconcilability of Darwin with a "mystic, theological and finalistic evolutionism" as argued by Antonio Fogazzaro in Italy and Asa Gray in the United States. Morselli described the United States in this connection as "a country that tends

towards every form of abstruse mysticism." Among others, Alberto Sormani and Achille Loria examined the political consequences of Darwinism. In 1894, Enrico Ferri published his work *Socialismo e scienza positiva, Darwin-Spencer-Marx* (Socialism and Positive Science, Darwin-Spencer-Marx), in which he describes socialism as the logical extension of Darwin's and Spencer's theories. Of great importance in the question of the relationship between Darwinism and Marxism in Italy are Antonio Labriola's *Saggi sul materialismo storico* (Essays on Historic Materialism), published in 1896.

In his work *La teoria di Darwin criticamente esposta* (A Critical Account of Darwin's Theory), published in 1880, Giovanni Canestrini not only opposed Darwin's theory of "sexual selection," he also, and above all, opposed Darwin's theory of pangenesis as expounded in his *The Variation of Animals and Plants Under Domestication* (1868). Despite his admiration for Darwin, Canestrini preferred Lamarck's theory of inheritance, which he considered proven by numerous reports and observations.

Federico Delpino, Darwin's most important direct contact in Italy, also disputed the theory of pangenesis. In 1869, Delpino's essay *Sulla darwiniana teoria della pangenesi* (On Darwin's Theory of Pangenesis) appeared in the Italian periodical *Rivista contemporana.* This impressed Darwin so much that he had Delpino's text translated in the same year at his own cost and published in the English periodical *Scientific Opinion.* Referring to empirical assumptions about the unbelievably large number of "gemmules" that an organism would have to pass on in reproduction, Delpino, who took a spiritual position, objected that this would only be possible if the "gemmules" were immaterial substances. Assuming the empirical refutation of pangenesis, Delpino attempted in this way to reconcile Darwin's theory of evolution with a spiritual finalism. According to Delpino, the evolution of the species did not take place gradually, but rather erratically and teleologically. He believed a "forming principle" governed evolution and guaranteed the harmony of nature, which could be seen, for example, in the parallel development of blossom and pollinating insects.

Finally, as far as the notorious "Anthropologia criminale" by a certain Cesare Lombroso is concerned, this is based entirely on pre-Darwinian theories and cannot, as Lombroso himself stated, be attributed to Darwin in any way.

Darwin last appeared in the headlines of the Italian newspapers in 2004, when it was announced that the Ministry of Education intended to remove the theory of evolution from the school curriculum, where it had not even been introduced until 1978, because it apparently placed excessive demands on children. However, the ensuing outcry by the general public and the scientific community finally led to a withdrawal of this suggested reform, and Darwin's theory of evolution has remained a fixed part of the school curriculum.

— *Martin G. Weiss*

See also **Biological Anthropology and Neo-Darwinism; Creationism, Beliefs in; Darwinism, Modern; Neo-Darwinism, Origin of; Selection, Natural**

Further Readings

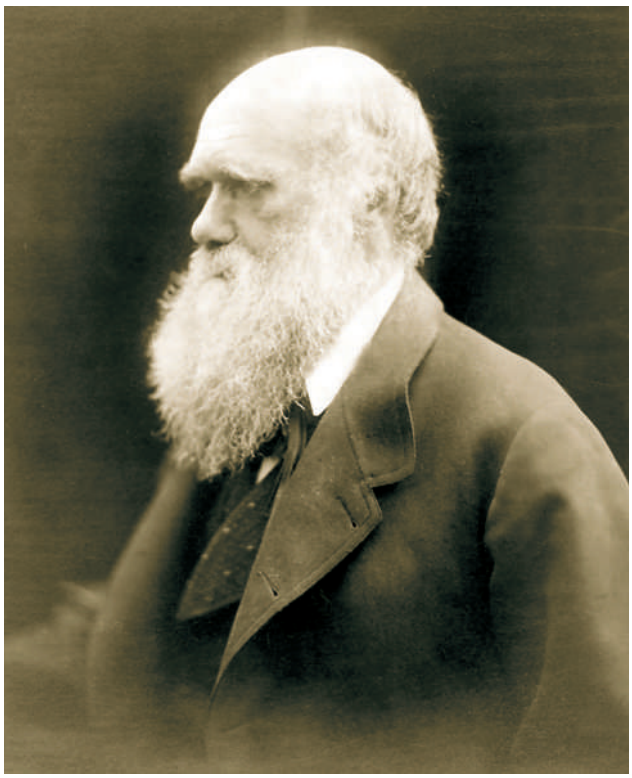
Corsi, P., & Weindling, P. (1984). The reception of Darwinism in France, Germany, and Italy. A comparative assessment. In D. Kohn (Ed.), *The Darwinian heritage: A centennial retrospective* (pp. 683–729). Princeton, NJ: Princeton University Press.

Giuliano, P. (1991). *Darwin in Italy: Science across cultural frontiers* (Rev. ed., R. B. Morelli, Trans.). Bloomington: Indiana University Press.

Paul, H. W. (1974). Religion and Darwinism: Varieties of Catholic reaction. In T. F. Glick (Ed.), *The comparative reception of Darwinism* (pp. 403–436). Austin & London: University of Texas Press.

Darwin, Charles (1809–1882)

Charles Robert Darwin (1809–1882) is one of the greatest naturalists in the history of science. His theory of organic evolution delivered a blow to traditional thought by offering a new worldview with disquieting ramifications for understanding and appreciating the human species within natural history. The geobiologist had presented his conceptual revolution in terms of science and reason (i.e., his evolutionary framework is based upon convincing empirical evidence and rational arguments). As a result of Darwinian evolution grounded in mechanism and materialism, philosophy and theology would never again be the



Source: Courtesy of the Library of Congress.

same; just as the human species is now placed within primate history in particular and within the organic evolution of all life forms on this planet in general, religious beliefs and practices are now seen to be products of the sociocultural development of human thought and behavior.

The implications and consequences of biological evolution for the human species were both far-reaching and unsettling. It is no surprise that the brute fact of organic evolution disturbed Darwin himself, because he had been trained in theology at Christ's College, Cambridge, where he had become interested in William Paley's *Natural Theology* (1802). A strictly mechanistic and materialistic view of the emergence of humankind in terms of evolution challenged the most entrenched religious beliefs, for example, the existence of a personal God, human free will, the personal immortality of the soul, and a divine destiny for moral persons: If evolution were a fact, then the human animal would be an evolved ape, not a fallen angel.

Naturalists were becoming aware of the unfathomable age of this planet. Incomplete as they were (although ongoing scientific research is closing the gaps), the geological column and its fossil record argued for the heretical idea that species are, in fact, mutable throughout organic history.

For the theist, this universe was created by, is sustained by, and will be completed by a personal God, a perfect being that loves our species as the cosmic center of His divine creation. It is impossible, however, to reconcile materialistic evolution with traditional theology; science and reason have challenged the belief that earth history and the process of evolution are the result of a preestablished plan within the alleged order and design of this dynamic universe. Consequently, it is not surprising that some biblical fundamentalists and religious creationists reject the scientific theory of organic evolution and desire to discredit it and prevent both evolutionary research and the teaching of evolution. For others, it takes an extraordinary leap of faith and speculation to believe that a personal God could be both the beginning and the end of cosmic evolution. Biological evolution is a process that is long and complex, with pain and suffering as well as death and species extinction (five recorded mass extinctions on a global scale) pervading organic history, not to mention the endless appearance of deleterious mutations involving physical characteristics and behavior patterns. Surely, philosophy and theology now have a difficult time in maintaining teleology and essentialism as built-in aspects of cosmic evolution in general and the emergence of life forms (including the human animal) in particular.

Darwin was the pivotal thinker in establishing the fact of evolution. His heretical theory shifted an interpretation of this world from natural theology to natural science, a direct result of giving priority to empirical evidence and rational argumentation rather than to faith and belief. It was Darwin's naturalistic orientation that led him to explain evolving life forms in terms of science and reason, an interpretation independent of theology and metaphysics.

Discovering Evolution

The young Darwin was interested in geology and entomology; he enjoyed studying rocks, collecting beetles, and taking field trips with accomplished naturalists. But over the years, his primary interest would shift from geology to biology, and he came to doubt both the fixity of species and the biblical account of creation. There was no early indication of his genius for descriptive and theoretical science. Yet a convergence of ironic and fortuitous events over a period of

7 years would result in his theorizing that all species are mutable in nature and slowly evolve (or become extinct) due to natural causes over vast eons of time.

How was Darwin able to deliver this blow to traditional thought in terms of evolution? For one thing, the young naturalist had a free, open, curious, and intelligent mind that had not been indoctrinated into any religious creed or philosophical framework. That is to say, he was able to reinterpret the living world in terms of his own experiences (unique events that were critically examined in terms of science and reason). Darwin also had an exceptional ability to analyze natural objects (orchids, barnacles, and earthworms), as well as to synthesize vast amounts of empirical evidence into a comprehensive and intelligible view of organic history. Furthermore, he had an active but restrained imagination that allowed him to envision the process of biological evolution gradually taking place over vast periods of time as a result of natural forces.

Besides his unique psychological makeup, Darwin was greatly influenced by the writings of Charles Lyell, whose three-volume work, *Principles of Geology* (1830–1833), placed historical geology on a scientific foundation. While reading the entire work during his trip as naturalist aboard the HMS *Beagle,* Darwin slowly accepted Lyell's sweeping geological framework of time and change within a naturalistic viewpoint of earth history. One may even argue that Lyell was the single most important influence on Darwin because without this vast temporal perspective, the geobiologist might never have questioned the eternal fixity of species or, subsequently, thought about life forms in terms of their mutability throughout organic history. Simply put, the dynamic framework of Lyellian geology, with its changing environments, implied a process view of plants and animals. Having become convinced that Lyell was right, Darwin then began both to doubt a strict and literal interpretation of Genesis and to question more and more the alleged immutability of flora and fauna types on this planet. Briefly, Lyell's dynamic interpretation of rock strata throughout geological history clearly argued for an evolutionary interpretation of life forms throughout biological history.

Another major influence on Darwin's worldview was, of course, his voyage of discovery on the HMS *Beagle*. During this 5-year circumnavigation of the globe (1831–1836), the young naturalist experienced the extraordinary diversity of plant and animal species in the Southern Hemisphere (particularly the insects of a Brazilian rain forest) as well as the provocative discovery of giant fossils in the geological column of Argentina. Slowly, he began to imagine the tree or coral of life throughout organic history. Of special importance was Darwin's comparing and contrasting life forms on oceanic islands with their counterparts on the mainland of South America. He was struck not only by their differences but also even more so by their similarities. These similarities suggested that groups of species share a common ancestor. Thus, throughout space and time, Darwin envisioned the historical continuity and essential unity of all life on this planet. Certainly, in retrospect, it was his 5-week visit to the Galapagos Islands (September 15 to October 20, 1835) that caused this naturalist to acknowledge the crucial relationship between the physical characteristics and behavior patterns of an organism and its specific habitat.

No doubt, Darwin was puzzled by the belief that a personal God had created so many different species of a specific animal form for the same archipelago: Why would there be different species of finches, mockingbirds, tortoises, and iguanas throughout the Galapagos Islands? For Darwin, the obvious answer, supported by the empirical evidence, is that there was neither a single divine creation only 6,000 years ago nor a sequence of special creations over this same period of time. Instead, science and reason argued for a natural (not supernatural) explanation for the origin, history, diversity, and extinction of life forms on the changing earth.

Darwin was willing to doubt the myth of Genesis, while taking seriously both the new facts and the new concepts in several earth sciences (geology, paleontology, biogeography and comparative morphology). At the end of the voyage, he was convinced that species are mutable and began to keep notebooks on his theory of "descent with modification"—an evolutionary interpretation of organic history. Unfortunately, he did not as yet have an explanatory mechanism to account for biological evolution in terms of a naturalistic framework. Nevertheless, he steadfastly committed himself to the mutability of species as an incontrovertible fact of the living world.

In 1838, by chance, Darwin read Thomas Malthus's scientific monograph, *An Essay on the Principle of Population* (1798, 1803), which described life as a struggle for existence. According to Malthus, this ongoing struggle for survival in nature results from the discrepancy between the arithmetic increase of

plants and the geometric increase of animals (especially the human species). Malthus's book gave the naturalist his major explanatory mechanism of natural selection or the "survival of the fittest" (as the philosopher Herbert Spencer had referred to it). Now, Darwin had both a theory and a mechanism to account for the history of life on earth: The scientific theory is organic evolution, while the explanatory mechanism is natural selection. This was a strictly mechanistic and materialistic interpretation of the biological world.

Admittedly, Darwin himself was concerned neither with the beginning of this universe and the origin of life nor the future of our species and the end of the world. He left it to other thinkers to grapple with those philosophical questions and theological issues that surround the scientific fact of organic evolution.

Darwin's Thoughts

In the first and second editions of *On the Origin of Species* (1859), Darwin did not refer to God as the creator of the world. But encouraged to do so by the geologist Lyell, the last four editions of the *Origin* volume contained only one simple reference to God:

> There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved.

Nonetheless, Darwin's *Autobiography* makes it perfectly clear that he was publicly an agnostic (if not privately an atheist). Briefly, Darwin's own cosmology is agnostic, while his theory of evolution is atheistic.

Realizing how disturbing his epoch-making *Origin* book would be, Darwin did not wish to add to the growing controversy surrounding biological evolution by writing about the emergence of our own species. Interestingly enough, then, Darwin does not discuss human evolution in his major work on the theory of evolution. In fact, one may argue that it was the devastating ramifications of organic evolution for the human animal that actually caused the uproar over Darwinian evolution.

Grappling with the implications of evolution, Thomas Huxley in England coined the word "agnostic" to express his own noncommittal position concerning the existence of God, while Ernst Haeckel in Germany advocated pantheism to express his dynamic worldview free from religion and theology. In doing so, both naturalists had acknowledged that the scientific fact of organic evolution has wide-ranging conclusions for those entrenched values of Western civilization that are grounded in traditional philosophy, religion, and theology. At Harvard University, the botanist Asa Grey supported theistic evolution.

For over a decade, even Darwin himself had been reluctant to extend his theory of evolution to account for the origin and history of the human species. After 12 years, he published his other major work, *The Descent of Man* (1871). It is in this book that the naturalist writes about human evolution, although both Huxley as comparative morphologist and Haeckel as comparative embryologist had already lectured on and written about the evolution of our species within the history of the primates.

Darwin wrote that the human animal is closest to the African pongids, the chimpanzee and the gorilla (the existence of the bonobo was unknown to the naturalists of that time). He held that our species and these two great apes share a common ancestor, which would be found in the fossil record of that so-called Dark Continent, which has, since the middle of the 20th century, shed so much light on the history of humankind. Moreover, Darwin claimed that the human species differs merely in degree, rather than in kind, from the pongids, there being no structure or function in the human animal that does not already exist to some degree in the three great apes known to him (orangutan, gorilla, and chimpanzee). That is to say, even intelligence and emotions exist to some degree in all the pongids, which now include the bonobo.

For Darwin, it was the moral aspect in the human being that elevates it above—but does not separate it from—the apes. Even so, this moral aspect has also evolved throughout primate history from even lower beginnings, in earlier animals. Philosophers and theologians cannot ignore the reality that human beings themselves have created ethics, morals, and values within a natural environment and sociocultural milieu; one may speak of a human being as the evaluating animal, thereby distinguishing the human species from all the apes and monkeys.

Likewise, Darwin claimed that the naturalistic basis of human morality had had its origin in those social instincts and altruistic feelings that have

enhanced the adaptation and reproduction of evolving fossil apes, and later protohominids, followed by bipedal hominids. These instincts and feelings are visible in the behavior patterns of living primates, particularly in the great apes.

The Evolutionary Worldview

Clearly, scientific evolution both challenged and superseded the ideas and frameworks of Plato, Aristotle, Aquinas, Descartes, Kant, and Hegel (among many others). The certainty of previous values grounded in God-given laws or divine revelations could no longer be upheld by rigorous naturalists. As a result, the Darwinian conceptual revolution in science resulted in the emergence of both evolutionary ethics and pragmatic values in modern natural philosophy, as well as an evolutionary interpretation of the origin and history of human societies and their cultures (including languages and beliefs).

For the rigorous scientist, evolution requires at least reinterpreting or rejecting the old beliefs in God, free will, immortality, and a divine destiny for our species. For decades, ongoing evolutionary research in the areas of paleoanthropology and primate ethology has clearly supported the fact of human evolution, as well as a naturalistic explanation for the so-called brain/mind problem in philosophy.

It is not surprising that Darwin was an agnostic, but he did not deal directly with the religious implications and theological consequences of the fact of evolution. No doubt, he himself was disturbed by the ramifications of evolution for Christianity. The power of science and reason had demolished the traditional beliefs concerning this universe, life on earth, and the place the human species occupies within dynamic nature. Neither this small planet nor the human animal on it could still be held to be absolutely unique within cosmic reality.

In summary, Darwin developed his theory of evolution as a result of the convergence of three important events: accepting Lyell's geological perspective, reflecting on his exceptional experiences during the global voyage of HMS *Beagle,* and benefiting from Malthus's insightful theory of population growth. It is to Darwin's great credit that his analytic abilities were supplemented by a rational imagination. Through abduction, the creative interrelationship of facts and concepts, he was able to elevate his own methodology above a strictly empiricist approach to investigating the natural world in terms of the earth sciences. This open orientation of synthesis allowed him to bring about a conceptual revolution in terms of the biological evolution of all life on this planet.

There is a crucial distinction between evolution and interpretations of this process. Darwin was able to replace myopic opinions and naive superstitions with science and reason. For him, vitalism and theism were no longer needed to explain human existence in terms of organic evolution. As such, the theory of evolution has provoked philosophers and theologians alike to accept a dynamic interpretation of this universe and a new conception of the creation and destruction of life throughout organic history.

Darwin's scientific writings make no appeal to a personal God to account for organic evolution or the emergence of our own species. Darwin was an agnostic in a cosmological context but an atheist within the evolutionary framework. We might wonder what his thoughts on religion and theology were when, as an aged naturalist, Darwin took those daily strolls down the Sandwalk behind his residence, Down House, in Kent, England. His reflections on scientific evidence must have caused him to doubt every aspect of theism, and perhaps in his later years, he was a silent atheist who kept his disbelief to himself, just as his own free-thinking father, Robert Waring Darwin, had kept his atheism from influencing the other members of the Darwin family.

It may be argued that Darwin himself demonstrated a failure of nerve in his own unwillingness to clearly state an atheistic position. Nevertheless, as an iconoclastic scientist and transitional naturalist, he paved the way for the pervasive materialism of modern times.

Consequences of Evolution

Although a shy and gentle apostate in science, Darwin had opened the door onto a universe in evolution. Of the countless millions of species that have inhabited this planet, most of them now extinct, only one life form has been able to philosophize on both its own existence and the natural environment: We may speak of *Homo sapiens sapiens* as this evolving universe conscious of itself. More and more, through science and technology, the human species is capable of directing its ongoing evolution as well as determining the future destiny of plant and animal forms on the earth and elsewhere. Today, we witness emerging teleology as a result of human intervention. This incredible

power of control over life dictates that human beings make value judgments that could affect their adaptation, survival, enrichment, and fulfillment. What we may learn from evolution is that, as a species-conscious and evolution-aware form of life, humankind needs other plants, animals, and a suitable environment for its ongoing existence. And the inevitability of extinction is a brute fact for all life.

Clearly, Darwin had both intellectual and personal integrity; he was willing to change his scientific interpretation of nature as the integration of empirical evidence and rational concepts dictated. He exemplifies an open-minded and courageous naturalist whose commitment to organic evolution challenged both the engrained Aristotelian philosophy of fixed species and the Thomistic theology of divine causality.

In his autobiography, Darwin writes about his extraordinary global voyage on the HMS *Beagle* and subsequent productive life at Down House, despite chronic illness. Five chapters focus on the preparation, publication, and critical reviews of *On the Origin of Species* (1859), the naturalist's major contribution to evolutionary thought. Interestingly, his wife Emma Wedgwood Darwin had deleted the references to God and Christianity from the posthumously published *Autobiography.* Not until 1958 did an unexpurgated version of this significant work appear in print.

In Chapter 3, Darwin presented his final thoughts on religion and theology. It is clear that this evolutionist and materialist was reticent to express his own beliefs. Even so, his personal thoughts neither verify nor falsify the evolved claims of religionists and theologians. It suffices that Darwin's theory of evolution is strictly naturalistic, both in principle and intent.

— *H. James Birx*

See also **Creationism, Beliefs in; Evolution, Models of; Selection, Natural**

Further Readings

Browne, E. J. (1996). *Charles Darwin: Voyaging.* Princeton, NJ: Princeton University Press.

Browne, E. J. (2003). *Charles Darwin: The power of place.* Princeton, NJ: Princeton University Press.

Darwin, C. (2000). *Autobiography.* Amherst, NY: Prometheus Books. (Original work written May–August 1876, first published in 1887, first unexpurgated edition published 1958)

Dennett, D. C. (1995). *Darwin's dangerous idea: Evolution and the meanings of life.* New York: Simon & Schuster.

Mayr, E. (1991). *One long argument: Charles Darwin and the genesis of modern evolutionary thought.* Cambridge, MA: Harvard University Press.

Moorhead, A. (1969). *Darwin and the Beagle.* New York: Harper & Row.

Ridley, M.(Ed.). (1996). *The Darwin reader* (2nd ed.). New York: Norton.

Weiner, J. (1995). *The beak of the finch: A story of evolution in our time.* New York: Vintage.

Darwinism, Modern

Modern Darwinism, also known as the "modern synthesis" or "neo-Darwinism," is a comprehensive theory of evolution that combines Darwin's theory of natural selection with principles of Mendelian genetics. Although the theory was established in the 1920s to 1940s and biology has undergone profound and rapid changes since that time, neo-Darwinism is still considered to be a generally accepted paradigm of biological evolution.

A basic idea of neo-Darwinism is that it is a two-step process. The first step is a random generation of genetically determined variance in population of individuals, followed by second step, the selection of those individual variants by environments that are relatively more successful to survive and reproduce. In recent years, we have been witnessing an expansion of neo-Darwinian principles beyond biology: to cosmology, medicine, economics, computing, neurology, psychology, psychiatry, modeling of cultural development, and history of science. Neo-Darwinian algorithm is applicable not only to living organisms but also to any system (whether made of molecules, organisms, digital strings) if the following conditions are satisfied:

1. There is a population of entities capable of multiplication and variation.
2. There is a process of selection by a limited environment in which better-adapted entities multiply faster than others.

The Reconciliation of Mendelism and Darwinism

Soon after the publication of *On the Origin of Species,* the Achilles heel of the whole theory of evolution via natural selection was recognized in an inheritance theory used by Darwin. Darwin worked with the blended-inheritance theory commonly accepted by his contemporaries, which, however, logically undermines the very nature of the evolutionary mechanism as suggested by Darwin, an accumulation of a small inherited adaptive changes through a long time. If inheritance is blended, any accumulation of inherited variations, which is a key element in the gradual building of complex adaptive structures, is impossible. For if heredity is of a blending type, any new variation is halved in every generation, and in fact it disappears very soon. Darwin tried to answer the problem by his own ad hoc theory of heredity (called *pangenesis*), a totally speculative one. He flirted with his own version of the inheritance of acquired characteristics (despite the fact that he was strongly critical of Lamarckian theory of evolution), but he never was happy with it. Paradoxically, at the same time, the right answer was already there—in Gregor Mendel's theory of inheritance. Mendel came up with the idea of hereditary "atoms" (he called them "factors"), which cannot blend, but can only combine in a particular rations. Mendel's work was published in 1865, but unfortunately it remained unknown (although not inaccessible to Darwin, as well as to almost all his contemporaries) until it was rediscovered two decades after Darwin's (1882) and Mendel's (1884) deaths at the beginning of 20th century.

German biologist August Weismann (1834–1914) is now known as a forerunner of neo-Darwinism, since he recognized that the Darwinian mechanism of evolution can work perfectly without any kind of Lamarckian inheritance of acquired characteristics, and all it needs is a generation of random changes in hereditary material and selection of those individuals who carry not the best possible adaptations, but better than their competitors.

When principles of Mendelian genetics were rediscovered and accepted by biologists during the first two decades of the 20th century, they were first completely misunderstood as a crucial argument not in favor but (paradoxically from today's perspective) against Darwinism. The argument went like this: Mendelian ratios of inherited characteristics display nonblended discrete inheritance, which is also responsible for discrete differences not only between individuals within a species but also between species. New species are generated by a big change in hereditary material, which is responsible for large differences in phenotypes, and therefore natural selection is not needed to explain speciation.

However, the schism between Mendelian genetics with mutational saltationisms at one side and natural selection with gradualism at the other side did not last for a long time. A reconciliation between Darwinism and Mendelism was achieved by the independent theoretical works written around 1930 by Ronald A. Fisher (1890–1962), John B. S. Haldane (1892–1964), and Sewall Wright (1889–1988). As early as 1918, R. A. Fisher published a paper in which he showed that continuous character distribution in populations as observed by biometricians can be explained by discrete Mendelian genetics. He expanded his mathematical exploring of evolution in the book *The Genetical Theory of Natural Selection* (1930). In a similar way, J. B. S. Haldane summarized a series of his theoretical papers on evolution in his book *The Causes of Evolution* (1932), and S. Wright published a long paper called "Evolution in Mendelian Populations" in 1931.

These works inspired other biologists in the 1930s to 1940s from a variety of different biological disciplines to contribute to this project of reconciliation: from field and laboratory studies in population genetics (T. Dobzhansky, E. B. Ford), paleontology (G. G. Simpson), and systematics (E. Mayr). The reconciliation is now known under several names: neo-Darwinism, the synthetic theory of evolution, and the modern synthesis.

Changes of Gene Frequencies in Gene Pools

The key concept for the modeling of evolutionary dynamics is the gene pool, a concept that comes from quantitative population genetics and became a main conceptual tool of reconciliation between Mendelism and Darwinism, mentioned above. A gene pool is a collection of all genes, in fact, all gene variants (alleles), shared by all members of population. From a philosophical point of view, Darwin is thought to have brought population thinking into species conceptualization in order to replace traditional typological species concept. For him, species were populations of different individuals.

A gene pool is a scientific abstraction, since genes do not actually exist freely in some sort of pond, but they always exist within living organisms. As with every abstraction, the gene pool model presupposes a set of ideal conditions, which are hardly met in nature. Despite this, the model is no less successful than other useful population models in descriptions of a real population of organisms and in predictions of the dynamics of its change, as for example, a concept of ideal gas in physics. In fact, ideal conditions of the gene pool helped biologists to recognize quantitative limits for stability and evolutionary change of real populations. These conditions are as follows: the absence of mutation; no migration of genes from other gene pools; the population size is large enough (effectively infinite), so there is no a sampling error in a process of setting up a new gene pool by reproduction; combinations of gene variants into genotypes (as result a of mating) are random; and finally, there is no selection—all gene variants have the same probability to have their own copies in next generation. As it was shown independently in 1908 by English mathematician G. H. Hardy and German physician G. Weinberg, if these conditions are met, frequencies of gene variants in gene pool are stable through generations and there is no evolution, the statement known as the Hardy-Weinberg theorem. It can be demonstrated that the stability of gene frequencies in successive gene pools is a result of bionomic distribution.

Slower or rapid changes in gene frequencies of population are the results of parameter values of processes destabilizing the Hardy-Weinberg equilibrium: mutation, migration, nonrandom mating, limited size of population, and selection.

An objection can be raised that all changes of allele frequencies in a gene pool are only of small importance for evolutionary theory, because they explain what is called "microevolution," or changes within borders of the same species. But "true" evolution has to do with the origin of a new species, and big changes. The neo-Darwinian answer to this objection is that gradual accumulation of microevolutionary changes over a long period of time leads to big changes, so big that new species arise. For example, a new gene pool can be set up by the gradual accumulation of microevolutionary processes after an original population divides into two subpopulations that are isolated geographically. In such a way, they in fact form two separate gene pools, which differ in their gene compositions so much that they cannot fuse together later when geographic barriers disappear and populations physically unite (allopatric speciation). Or a breeding barrier can arise within the original population in a way that a new gene pool is set up inside the old one (sympatric evolution), without geographic isolation. Evolutionary biologists spent some time quarreling over which type of speciation is the right one, until they found that both are present in nature.

Impact of Molecular Approach to Modern Darwinism

Since early the 1970s, the use of modern molecular biology techniques such as gel electrophoresis, restriction fragment length polymorphism (RFLP) analysis, and recently, DNA fingerprinting with the help of polymerase chain reaction (PCR), protein, and mostly DNA sequencing, all together with the use of computer power, have revolutionarized our understanding of past evolutionary history and Darwinian mechanisms of the evolutionary process.

Molecular phylogenetic studies have helped to settle some issues of phylogenetic relationships that were impossible to solve using traditional methods of comparative morphology, anatomy, physiology, or behavior. The range of molecular approaches in reconstructing phylogenies is incredible—from very rapid recent evolution of viruses like HIV to the origin of the three domains of life (bacteria, archea, and eukaryotes). New phylogenetic trees based on protein or DNA sequence homology were constructed. In many cases, they were in good agreement with trees constructed by traditional methods; however, in some important cases, they revealed surprising differences, as, for example, in the case of human evolution. Based on various molecular data, scientists estimated that African apes and humans diverged from each other about 5 million years ago, not 15 or even 30 million years ago, as it had been estimated from fossil record evidence. These data suggest that human lineage diverged after the separation of the orangutan lineage, but before the separation of chimpanzees and gorillas.

Analysis of sequence differences in mitochondrial DNA coming from recent human populations from around the world led to a reconstructed phylogenetic tree with a single root, which represents a common maternal ancestor ("mitochondrial Eve"), living 120,000 to 300,000 years ago. A new powerful

technique (mostly PCR) enables scientists late in the 20th century to isolate fragments of mitochondrial DNA from the Tyrolean Ice Man, an Egyptian mummy, or a Neandertal skeleton (so-called molecular paleontology). Since Neandertal DNA differs from human DNA about 4 times more than the difference between living humans, it is reasonable to conclude that Neandertals must have diverged from a common ancestor with humans about 550,000 to 690,000 years ago, which means that Neandertals were probably a separate species.

Although there is still an ongoing debate about the methodology of molecular approach (for example, how accurate is "a molecular clock"), and much more data are needed, there is no doubt that molecular anthropology is receiving growing respect among scientists as their methods are rapidly improving.

Neutralist-Selectionist Controversy Over Molecular Evolution

One of the most important conceptual challenges to neo-Darwinian paradigm came from the theory of neutral molecular evolution proposed by Japanese geneticist Motoo Kimura (1924–1994) in November 1967, and published a year later. It started with the controversy over how to interpret available first indirect estimates of genetic variability based on protein polymorphism, which had started to be measured by gel electrophoresis. According to Kimura, the level of measured protein variability was too high to be explained by natural selection, and he believed that the overwhelming majority of genetic variability at the molecular level (DNA, RNA, and proteins) is due to random accumulation of selectively neutral mutations. With the help of population mathematical models, he tried to demonstrate that the way these neutral mutations are lost or fixed in gene pools is due to a sampling-error process (called "random genetic drift"). It has been known before that sampling errors are at work when offspring gene pools are created from gene pools of parents, but it was thought that it is significant only in small populations undergoing population bottlenecks. But Kimura pointed out that sampling errors are significant even in large but finite populations. He was not rejecting the role of natural selection on genes responsible for adaptations to the environment. But according to him, a process of neo-Darwinian selection is responsible for only a small fraction of observed genetic variability and the great majority of mutant substitutions at the molecular level are due to random fixations of selectively neutral mutants.

The support for the theory of neutral molecular evolution came later from the revealing of noncoding sequences of DNA as introns (nontranslated spacers within genes) and pseudogenes (a sort of gene wreck). These DNA sequences ignored by natural selection are accumulating mutations at a higher rate than coding sequences, as it was predicted by neutral theory. At present, the neutral theory is a widely accepted theory for the evolution of those parts of DNA that are selectively neutral.

Punctuated-Equilibrium Theory

In 1972, American paleontologist Niles Eldredge and Stephen Jay Gould opened the discussion about the tempo of macroevolutionary changes. They argued that the paleontological evidence does not support a classical Darwinian view of gradual transitions. They insisted that what is actually seen in fossil records are long periods of morphological stability *(stasis),* which are punctuated by short (in geologic terms) periods of rapid changes. They believed that this pattern cannot be explained in a satisfying way, referring to gaps in fossil records, but that in fact this fossil pattern reflects an evolutionary process itself in which new forms appear rather suddenly. They proposed a new model of evolution called "punctuated equilibrium."

In the debate that followed, biologists discussed whether "revolutions" in phylogeny caused by micromutations (small changes in DNA sequences like base-pair substitutions, deletions, and insertions) or larger genetic changes (macromutations), such as various chromosomal rearrangements or movements of transponsable genetic elements across a genome, are needed in order to explain large morphological changes. Critics of the punctuated-equilibrium model argued that revolutionary changes are not in fact revolutionary and it all is a question of scaling. They were theoretically demonstrating that periods of "sudden" changes are long enough to be explained by the accumulation of micromutations and that gaps in fossils series really reflect incompleteness of the records.

A new perspective was brought to the debate by a recent advance in interdisciplinary research in evolutionary developmental biology, or "evo-devo." On one hand, it supports the view that very small genetic changes can become amplified during organismal

development into major morphological differences at the order of higher taxons. On the other hand, it also started to provide growing evidence showing how various macromutational changes, such as gene duplications, chromosomal rearrangements, and genome reshapings, could be responsible for major evolutionary events.

Neutral theory and punctuated-equilibrium theory were proposed as theories of "non-Darwinian" evolution, and they are a fundamental challenge to neo-Darwinism if we understand it in the narrow sense of a few limited ideas. But if we understand modern Darwinism in the sense of a broader framework for the evolutionary theory that combines randomness with selection, then both challenging theories can be incorporated into it. Randomly generated micro- or macromutations are fixed in gene pools either randomly, if they are selectively neutral, or by natural selection.

— *Peter Sykora*

See also **Biological Anthropology and Neo-Darwinism; Genetics, Population; Selection, Natural**

Further Readings

Lewin, R. (1997). *Patterns in evolution.* New York: Scientific American Library.

Majerus, M., Amos, W., & Hurst G. (1996). *Evolution: The four billion year war.* Edinburgh: Longman.

Ridley, M. (2003). *Evolution.* Oxford: Blackwell Science.

Strickberger, M. W. (2000). *Evolution.* Sudbury, MA: Jones & Bartlett.

Wen-Hsiung, L. (1997). *Fundamentals of molecular evolution.* Sunderland, MA: Sinauer.

DARWINISM VERSUS LAMARCKISM

In the sometimes almost fratricidal debate between Darwinians (proponents of gradual evolution over many generations) and Lamarckians (proponents of evolution who believe traits acquired during the lifetime of an organism can be passed on to offspring), Charles Darwin had few champions as persistent or superb as Ernst Mayr, who died in February 2005. Mayr had, during his career, become perhaps the foremost interpreter of Darwinism in Europe. In his obituary (posted by Michael Ruse on the academic Internet site "Philosophy of Biology"), it was noted that Mayr had "met and became close friends with a group of men who were determined to put evolutionary studies on a new and proper foundation. Most important of all was the Russian-born geneticist Theodosius Dobzhansky, closely followed by the brilliant paleontologist George Gaylord Simpson."

Mayr, who was converted to Darwinism at least in part by Dobzhansky, wrote his own opus, *Systematics and the Origin of Species* in 1942, at a time when the theory of Social Darwinism was being put to a brutal test by the fascist dictatorships of Europe during World War II. As the obituary explained, "His main contribution was to demonstrate beyond doubt the variation that exists in nature, and how everything points to gradual change—a key plank in the Darwinian program. Particularly important was the evidence of groups that range all the way from good species (interbreeding populations, isolated from others), to

species-in-the-making, with subgroups starting to break apart, and on to fully defined separate species."

Moreover, much of the work at systematizing evolution and making it a permanent part of scientific inquiry was done by Mayr as well. As the founding editor of *Evolution* magazine, he provided a public forum for a discussion of the discipline. As one who had been educated in philosophy in his native Germany, he also saw the links between evolution and other sciences and worked greatly in his later career to bring scientific disciplines closer together to collaborate more and compete less. Perhaps the most significant achievement of this part of his career was his role in the foundation of the Department of the History of Science at Harvard University. As Ruse wrote of Mayr, "Above all, Mayr was a holist, meaning that he thought breaking things down to small components is not only not necessarily the right way to go in biological science, it is often positively exactly the wrong way to go."

— John F. Murphy Jr.

Darwinism, Social

Social Darwinism is the theory that human beings have a natural tendency to compete and that the strong will overcome the weak. The name comes from its association with Charles Darwin's (1809–1882) biological theories of evolution and natural selection. Like many social theories that attempt to explain human behavior, Social Darwinism can best be seen on a continuum; that is, the application of the ideas in actual practice range between extremes, some well-intentioned and others discriminatory. Generally, the label of "Social Darwinism" is not a positive one, though there have been some prominent defenders and the principles still present themselves in contemporary socioeconomic theory.

It is misleading to reduce all of the ideas that were advanced by Charles Darwin to a single theory of "Darwinism." Through the biological study of humans and other animals, he drew several conclusions, including that organisms in the world are constantly evolving, have descended from common ancestry, and abide by a natural selection process that considers genetically inherited traits and adaptation to the environment. It is equally misleading to presume that Social Darwinism is a deliberate extension of his theories. Social Darwinism was not developed by Darwin himself, but represents the social attitudes of many people from his time, especially the decades following the 1859 publication of *On the Origin of Species*. The common aspect between Darwin's work and Social Darwinism is natural selection.

Background

The English philosopher Herbert Spencer (1820–1903) in the years before Darwin's fame developed a theory of social evolution whereby the best form of society is one where individualism prevails. Spencer, not Darwin, coined the phrase "survival of the fittest," and he applied this concept to human beings and societies, not just to particular plant and animal species. For humans to prevail in nature, the society must be as strong as it can be; this leaves no room for weak members. If this theory is descriptive, it observes that this is the state of nature and attempts to explain what happens on its own. Spencer, however, used the theory prescriptively; that is, he endorsed the application of eliminating the weakest links as a theory of ethics. What is morally right, in this view, is what advances the species as a whole. Society is strengthened when composed of the strongest individuals. Those too weak to fend for themselves, those who suffer from illness or disability, even those who find themselves in disadvantaged social circumstances such as poverty would best serve humankind if left behind. Spencer extended this principle to a liberalist political view that valued the rights of individuals over government power. He was influenced by the French philosopher Jean-Baptiste Lamarck (1744–1829), who proposed that environmentally inspired human traits were transferred from parents to children during their own lifetimes through the theory he called the "inheritance of acquired traits."

Most noted for his support of social contract theory, English philosopher Thomas Hobbes (1588–1679) similarly emphasized the importance of the individual. For Hobbes, human beings are naturally self-interested. Every action and decision is based upon what will ultimately serve the best interests of the

individual. Society is a collection of individuals who agree to give up some of their personal rights and liberties in order to benefit all individuals within the group. In agreeing to abide by social laws, each citizen agrees to a "contract." In addition, Hobbes proposed that without government, humans would compete against one another in a brutal "state of nature" not unlike the struggle Social Darwinists claim to be natural. Hobbes was rebuffed by French philosopher Jean-Jacques Rousseau (1712–1778), who asserted that good and bad behavior are both attributable to one's civilization, an emphasis of nurture over nature that would present itself again over the next centuries. Spencer nevertheless recognized the self-interested human nature that Hobbes observed but placed it in evolutionary terms. The most effective contract would be with oneself and representative of those interests to the point of disregarding the weaker members of society. Spencer believed that this is the way of nature: that the strong will survive through competition and by disregarding, rather than helping, the weak.

Like Hobbes, the English mathematician, minister, and economic theorist Thomas Robert Malthus (1766–1834) believed that individual restraint could serve to benefit society. He saw this less through social contract, however, than through individual commitment to avoiding vice, such as excessive reproduction (he advocated abstinence). The betterment of the world's human population could only arrive by limiting its growth. In fact, Malthus predicted that overpopulation would lead to increased demands for resources that society would be unable to produce. A shortage of food, in particular, would result, he claimed, as the population needs outgrew the supply, and the weakest members of society would die of starvation. To avoid famine, civilization would regress to subsistence level with an emphasis on agriculture—producing just enough food to survive—in what has come to be known as a "Malthusian catastrophe." There is a balance that must be maintained in nature. The evolutionary cycle of society offers a means of controlling human excess and weakness of will.

Social Application

The theories of Hobbes and Malthus are considered the predecessors to Social Darwinism. They influenced both Darwin and Spencer; Darwin himself accredited Malthus with inspiring *On the Origin of Species.* Successors have endorsed similar philosophies in more of a social application than Darwin's biological account of human evolution. The American entrepreneur Andrew Carnegie (1835–1919) hosted Spencer in a visit to the United States and implemented the ideas of Social Darwinism into his extensive philanthropic projects (by the time of his death, he had donated over $350 million). While Carnegie was not above providing financial assistance to others—in fact, he believed that those with wealth had an obligation to support their societies—he was selective in choosing the recipients. In his 1900 book, *The Gospel of Wealth,* he expressed the Social Darwinist idea that money should be used for cultural enrichment rather than charitable handouts to the poor. Most of his public projects provided services for the intellectual growth of individuals, such as libraries, music halls, and institutions of higher education. He insisted on local accountability and maintenance of these projects, and his approach would be recognized today as a merit-based, rather than entitlement, system. The individual was responsible for his or her education. Carnegie encouraged access to tools for growth, but only those with the desire to improve their own lives would truly benefit.

This same principle—that individuals should be responsible for their own welfare and accomplishments—is associated with the laissez-faire political theory, where the government intrudes as little possible and leaves individuals to their own resources. This concept is applied in economics, social policy, and ethics; any behavior is acceptable until it infringes on the rights or welfare of others. Economically, the motivation is to inspire accountability, and this is the driving force behind capitalism. Critics complain that Social Darwinism can lead, however, to economic exploitation and class divisions. The wealthy become wealthier by profiting from the work of the labor force. Because the working poor need money, they work menial, sometimes dangerous jobs, for excessive hours and with substandard benefits. Strong individuals achieve further success, while those who are weak remain in the working class. Social Darwinism claims this is not a bad thing, that unfavorable finances are motivation for self-empowerment, and that those who do not rise above disadvantage do not deserve to enjoy the benefits of the higher classes.

Discrimination

Because labor distinctions are often drawn along ethnic lines—with minority populations working

low-wage jobs—there is potential for discrimination that follows racial lines. The National Socialist Party that rose in Germany before World War II began with the hope for a unified Germany and economic prosperity for workers amidst industrial and technological change. A poor economy, however, was blamed on minorities and foreigners, particularly Jewish immigrants who did not share German ancestry. In a vivid display of Social Darwinism taken to an extreme, the Nazi regime under Adolf Hitler (1889–1945) sought to improve German society by first ejecting, then eliminating, what were considered to be inferior races. The Jewish people were considered so weak, so low among the classes of humans, as to be no more valuable than animals. Social Darwinism here provided justification for seizing property, imprisoning without cause, using humans involuntarily as test subjects in gruesome mutilations and medical experiments, and ultimately exterminating approximately 6 million human beings. This was done with the intention of weeding out the weak, the members of society considered an obstacle to the progress of German culture and the master human race that was destined to rule the world.

Racist ideas were not uncommon to American thought in the late 19th century, with intellectuals such as John Fiske (1842–1901) and Darwin himself publicly endorsing racial supremacy. Fiske said that the domination of British and American Caucasians over the rest of the world, be it civilized or what was understood as "barbaric" at that time, attested to the superiority of the Anglo-Saxon race. Darwin believed that women were inferior to men and that Blacks (or African Americans) were among the least evolutionarily developed human beings. Social Darwinists frequently referenced this assertion when defending the application of their theory to justify racism, including later Nazi efforts to advance the perfect race and Jim Crow laws that endorsed discrimination through segregation in the southern United States through the 1960s, 100 years following the official end to slavery in this country.

Racial purification is only one possible end of *eugenics,* the term Darwin's cousin, Sir Francis Galton (1822–1911), gave to the concept of improving human society through reproductive controls. Galton was a pioneer in studies on hereditary traits, researching genetic patterns in traits such as fingerprints. *Eugenics* is from the Greek word *eugenav,* which means "well-born." In its least controversial forms, this could mean choosing partners for procreation who have particular desirable traits, such as strength, health, and intelligence. It becomes more questionable when individuals and then groups of people are categorically denied the right to reproduce, such as through the sterilization of mental patients. Social Darwinism, in seeking to eliminate the weaker members from the gene pool, justifies denying these individuals the right to reproduce. A healthy society would be free of disease. If certain diseases, temperaments, and even work ethic and productivity habits are determined to be heritable traits, then denying these traits from being passed on to future generations would be toward the improvement of the society as a whole. If the weak are destined to be eliminated through natural selection regardless, then actions toward this end are neither contrary to nature nor outside of the right of stronger individuals to impose. The evolutionary account of human development places people within the animal kingdom biologically. Humans are not outside of nature. People are agents who can act and make decisions according to their own will, but anything we do is within the bounds of nature, regardless. Social Darwinism sees eugenics as simply hastening the inevitable natural selection process.

Biology and Culture

Darwin's ideas were revolutionary because they radically altered the way most sciences proceeded from that point forward. They also were taken as an affront to many who were religious, because human evolution seems to conflict with creationism, the belief that humans were designed by the intelligent being recognized as God. Many critics reduced Darwinism to a theory that failed to distinguish humans from apes. In fact, his main claim was that animals, including humans, had evolved, based upon the biological evidence he had collected through fossils.

Social Darwinism looked to biological features as an explanation for social behavior. If it was natural for only the best-suited traits to be passed on to offspring—or even for one species of plant or animal to eliminate another—then it was also natural for the best-adapted humans to survive, thrive, and dominate the weaker members, who were naturally destined to die off. Inheritable traits were determined to be the cause of physical conditions, good and bad, through the theory that is called "genetic determinism." Developmental theories were inspired, some more

legitimate than others. Phrenology mistakenly attempted to identify criminal behavior according to the shape of the human head. Psychology justly looked to neural connections in the brain to explain emotional and affective states.

Anthropologist Franz Boas (1858–1942) reemphasized the cultural component of social research, however, encouraging science not to disregard the historical aspects of the human experience individuals and societies cannot be explained purely in terms of biological features or evolution. Rather, Boas and successors noted the extent to which individuals are affected by their environment, and society by the actions of the individuals. Boas's approach advocated the abandonment of one's own bias when studying other cultures. In this regard, it is the opposite of the Social Darwinist trend of emphasizing the qualitative differences between individuals and groups of people. The idea of not relying solely on genetics and, rather, recognizing the dynamic influence of culture was shared by the 20th-century behaviorist psychological movement, which observed the ways in which one's society could profoundly affect, or condition, individual patterns of response.

The 1950s work of James D. Watson (1928-) and Francis Crick (1916–2004) again swung the scientific emphasis back toward Darwin's biological foundations with their proposal for the double-helix structure of DNA and their studies of the genetic code. Certain human traits, after all, can to an astonishingly intricate degree be attributed to genetic inheritance. With the understanding of genetic structure on the molecular level, medical science now can take a new direction in the path of eugenics: therapeutically altering gene structure to prevent and treat genetic diseases. Where rabid Social Darwinists endorsed a "live and let die" approach to human ailments and frailty, natural biology now has the tools to combat genetic flaws, not just for future generations, but within the individual. Somatic gene therapy in this way treats only the cells recognized as being dysfunctional. Gametic or germline therapy corrects only the hereditary components, thus preventing the particular dysfunction from being spread through reproduction. Opponents claim that gene therapy, particularly gametic therapy, reeks of the ruthless social cleansing practices enacted by early Social Darwinists and proponents of eugenics. There is the threat of a slippery slope, that allowing some forms of genetic manipulation, even with the best of intentions for helping to treat patients who currently suffer from disease, is only steps away from the trail blazed by Nazi scientists and others. Social Darwinism becomes complicated here, with two possible applications to contemporary genetics. If it is natural for society to move toward constant improvement through survival of the best-adapted traits, then perhaps somatic gene therapy is wasteful in the same way that Social Darwinists claimed we should exert neither money nor energy on weak or inferior individuals. To be consistent with this thought, most medical treatment would be equally wasteful, since essentially it gives artificial assistance to people nature is not inclined to favor. At the same time, however, genetic manipulation, particularly gametic, works toward improving overall society by eliminating undesirable traits. Carriers of an affliction would reserve the right to reproduce, but the offending condition would not be passed on to future individuals. An extreme Social Darwinist view might claim nonetheless that disease carriers—treatable or not—do not serve the best interests of future humanity.

—Elisa Ruhl

See also **Darwin, Charles; Eugenics; Genocide; Hobbes, Thomas; Selection, Natural**

Further Readings

Carnegie, A. (1962). *The gospel of wealth and other timely essays.* (E. C. Kirkland, Ed.). Cambridge, MA: Belknap Press. (Original work published 1900)

Darwin, C. (1964). *On the origin of species.* Cambridge, MA: Harvard University Press. (Original work published 1859)

Darwin, C. (1997). *The descent of man* (2nd ed.). Amherst, NY: Prometheus Books. (Original work published 1871)

Dawkins, R. (1990). *The selfish gene* (2nd ed.). Oxford: Oxford University Press.

Degler, C. N. (1992). *In search of human nature: The decline and revival of Darwinism in American social thought.* Oxford: Oxford University Press.

Hofstadter, R. (1944). *Social Darwinism in American thought.* Boston: Beacon Press.

Kevles, D. J. (1995). *In the name of eugenics: Genetics and the uses of human heredity.* Cambridge, MA: Harvard University Press.

Spencer, H. (1967). *The evolution of society: Selections from Herbert Spencer's principles of sociology* (R. L. Carneiro, Ed.). Chicago: University of Chicago Press.

SOCIAL DARWINISM

Social Darwinism has come to represent a conservative stance in the debate on human nature and society. Although the term was coined at the end of the 19th century, it still serves today to describe aggressive individualism, racism, laissez-faire capitalism, and social determinism. The label of Social Darwinism has been used to describe phenomena as distant in chronological terms as the free-market economy, Nazi eugenics, and sociobiology. Therefore, social Darwinism is best described not as a homogeneous school of thought, but rather as a worldview assigning biological factors a leading role in the creation and collapse of species and in shaping social and psychological features of humankind.

As defined by cultural historian Richard Hofstadter in his study *Social Darwinism in American Thought* (1944), social Darwinism applies to human affairs key ideas derived from Charles Darwin's *On the Origin of Species* (1859), such as the struggle for existence, the survival of the fittest, and natural selection. To leading social Darwinists such as Herbert Spencer (1820–1903) and William Graham Sumner (1840–1910), human beings followed the same laws as animals and plants. Both theorists misused Darwin's ideas to justify economic individualism and to call for minimal state interventions in social matters. The controversial social conditions of the period were natural and could not be changed. To Sumner and Spencer, the rapid growth of an impoverished working class, the huge gap between rich and poor, and the spread of urban slums were factors that highlighted that society was functioning. Social Darwinists like Sumner claimed that social existence was a competitive struggle among individuals possessing different natural capacities and traits. Those with better traits, the fittest, succeeded, becoming wealthy and powerful, while those who were unfit were condemned to poverty. Government intervention in economic and social matters must be minimal. Improving the condition of the poor would only preserve bad traits: To Sumner, the only alternative to the survival of the fittest was the survival of the unfittest.

Social Darwinism was again in the spotlight after the rise of free-market economics during the 1980s. Media started to use the phrase with reference to capitalist abuses and racial discrimination. Some scholars have also challenged the notion that social Darwinists misinterpreted Darwin's ideas. In his controversial *Darwin's Metaphor* (1985), Robert Young claimed that Darwin's theories themselves drew on capitalist, racist, and imperialist assumptions, thus making him the first Social Darwinist. The reviving of social Darwinism has prompted a renewed focus on the urgency of constructing community movements at both local and global levels.

— Luca Prono

Dating Techniques

Dating is nothing more than ordering time. Time is the quintessential sorter of events. All living beings go through life being on occasion acutely aware of its transient yet eternal, ceaseless yet tenacious quality. Time is the omnipresent judge that indicts all life for existence and condemns it to death. Thus, for the greatest portion of human history, time was seen in terms of an individual or series of lifetimes, with a clear beginning and a clear end. This view of the world applied as much to the wonders of nature as it did to the human being, with such phenomena as the rising and setting of the sun, the moon, and important stars and the passing of the seasons. The ancient Egyptian proverb, "All things fear time; but time fears the pyramids" summarizes the essence of time's role in human history. Time has always been an enigma somehow understandable to the individual but incomprehensible and unexplainable to others. With the advent of high civilization, time was ordered by the actions of leaders, and a number of king's lists have survived in the written record to assist the modern scholar in the very difficult task of attaching dates to events of the near-distant past.

This ordering of time throughout the ages serves a purpose, to answer the question: "What is the age?" Or, "How old is it?" In anthropological research, time

has always been the great sorting mechanism. Collectors and travelers of classical times, such as Herodotus, studied historic monuments and produced speculative accounts of prehistory. In fact, several dozen classical authors in the first millennium BC ordered time as a succession of ages based on technological progress. A three-age system encompassing the Stone, Bronze, and Iron Ages was the most common time-sorting methodology, but there were variations with copper and gold. Lucretius (95–53 BC) summarized these Western views of dating the past. Yuan K'ang (ca. AD 50), a Han Dynasty Chinese scholar, wrote an account of the historical development of toolmaking, from the use of stone/ jade through bronze to iron.

The principle of a systematic organization of ex situ archaeological materials started with the understanding of the three-age system in the 16th century by Michael Mercati (1541–1593), who was the superintendent of the Vatican gardens and adviser to Pope Clement VIII. The combination of his Renaissance education, his substantial mineral and fossil collections, and his access to the newly acquired American ethnographic artifact collections permitted Mercati to formulate the foundations of modern archaeology. His observations, which were not easily accessible until the 18th century, are all the more remarkable when one considers the intellectual milieu of that era. In Europe during this era, inquiry into the prehistoric past was discouraged, because the Bible was regarded as the supreme authority on human history and the early history of the earth. For example, creationism dominated scholarly writings on the origin of the universe and humanity, and during this period, fossils of marine organisms that were sometimes found in mountains were described as being washed up by the Great Flood. Ancient arrow points and other prehistoric stone tools were thought to have been produced by thunderbolts and other natural phenomena. Prehistoric stone arrow points and axes were believed to have fallen from the sky at the moment when thunder stuck. These implements were called thunderstones, *ceraunia,* or *pierre de foudre.*

It generally was believed that all living plant and animal species were survivors of the Great Flood and that with careful biblical research, especially on the book of Genesis, it was possible to calculate the age of the earth. For example, in 1642, Dr. John Lightfoot, the vice-chancellor of Cambridge University, calculated that the universe was created in 4004 BC, on October 23, at 9:00 am, coincidental with the beginning of the Fall Term. Later in 1658, Archbishop James Ussher refined this estimate and suggested that the earth was actually created on the evening preceding October 23, 4004 BC. This is the kind of pedantic (to us) debate that took place, so that although historical sites were being studied, prehistoric archaeology was being interpreted in light of the Bible.

It was only in the early part of the 19th century (1837) that Mercati's concepts were applied rigorously to a museum collection in Denmark by Christian Thomsen (1788–1865). The material culture in "cabinets" and museums could be now sorted relatively. But, in situ materials also required theory for relative sorting, and this was provided by the Danish atomist and geologist Bishop Nicholas Steno (1638–1686). He was the first to clearly state the three principles of stratigraphy, which have come to be known as Steno's Laws. They are: the Principle of Superposition: In a sedimentary sequence, the older beds are on the bottom, and the younger beds are on the top; the Principle of Original Horizontality: Sediments tend to be deposited in flat, horizontal layers; and the Principle of Original Lateral Continuity: a flat layer will tend to extend for a considerable distance in all directions. The first principal (superposition) is the one employed in conjunction with fossil markers by early geologists William "Strata" Smith (1769–1839) and Charles Lyell (1797–1875) and archaeologists Pitt Rivers (1827–1900) and Boucher de Perthes (1788–1868) to sort materials stratigraphically, with an assumption of a time progression.

Through human ingenuity, the last 150 years have been witness to great number of techniques for sorting time applicable to the scientific study of the past. These various dating techniques fall into one or more of three categories: absolute, relative, and radiometric. Absolute techniques of varve analyses and dendrochronology are only such when they can be clearly calibrated to a known year; in all other cases, they are relative dating techniques. Relative dating techniques permit chronological relationships to be ascertained through physical and/or chemical seriation (cation exchange ratio, fluorine dating, patination, pollen analysis) based on spatial relationships (stratigraphy and cross-dating), differential abundances, technological variations, or combinations thereof. Some techniques (for example, obsidian hydration, archaeomagnetism) require a radiometric technique for calibration; all benefit from their use. Other relative dating techniques require dated historical information (astronomical dating).

Basic information on some dating techniques, sorted from most to least reliable.

Technique	*How it Ticks*	*How it Is Set*	*How it Is Read*	*Basic Assumptions*
Dendrochronology	Tree ring and width pattern	Growth in life, ring	Count rings and measure	1 ring = 1 year; no duplication or missed rings; regional comparability
^{14}C	Radioactive decay and atom counting	Wound in life Set in death	Count beta decay or ^{14}C per unit volume	$t^{1/2}$; $^{14}C/^{12}C$ is known. Exchange with atmosphere and production rate are constant
$^{40}K/^{40}Ar$ & $^{40}Ar/^{39}Ar$	Radioactive decay & buildup of daughters	Rock formation heating	Measure ratios of $^{40}K/^{40}Ar$ or $^{40}Ar/^{39}Ar$	No ^{40}Ar to start; none lost
U/Pb	Radioactive decay and buildup of daughters	Rock formation	Measure U and Th and Pb isotope ratios	No U, Th, or Pb loss
Varve, Ice, and Deep Sea Cores	Systematicdeposition	Deposition	Count layers and measure	Assume annular deposiition and rate are constant
U Series	Radioactive decay and buildup of daughters	Rock formation differential solution	Measure U & Th	No losses in series radon gas not an issue
Fission Track	U fission to I and Br	Last heating	Count tracks per unit volume	There has been no track annealing
Archaeomagnetism	Field intensity & direction	Cooling	Measure field direction	Field is responsible; object not moved; last firing is known
Geomagnetism	Magnetic field reversals	Cooling to where the field is "frozen"	Measure field direction	One knows the age of the reversals [All?]
Thermolumin-escence [TL]	U, Th, and K decay energy trapping	Last heating or formation	Heat sample and measure light output	Energy stored in linear manner; no secondary heating; no bleaching
Obsidian Hydration	Water diffusion	New surface by material removal	Measure hydration layer thickness	Diffusion rate constant; temp. of burial known; at least 1 date ^{14}C known
Archaeo-Astronomy	Alignment and movement	Alignment when constructed	Compare alignments	Assume alignments were used
Electron Spin Resonance [ESR]	U, Th, and K decay energy trapping	Heating or formation	Measure the length of time trapped electron takes to relax	Traps filled in linear manner; there is no loss from traps
Geochemical [U, F, N]	Diffusion degradation	Determined rate begins at time of deposition	Absolute measurement of relative amt. or amount vs depth	One can know the physical, chemical, biological conditions
Patination	Chemical alteration on object surface	Begins at time that fresh surface exposed	Depth &/or intensity	Sample in same environment throughout life
Calcium Diffusion	Chemical diffusion	Construction of clay/cement interface	Measure depth into clay of Ca diffusion	Assume diffusion rate is independent of environs
Glass Layer	Hydration	Chemical change at the surface	Thickness and/or number of layers	Assume layer per year & a constant environment
Cation Exchange	Soil chemical process	Begins with soil formation processes	Measure, e.g., Na concentrations as a function of depth	Assume constant rate of movement of e.g., Na need ^{14}C date to cal
Amino Acid Racemization	Biochemical transformation	Wound in life Set in death	Determine L and R Isomer ratio	Racemization is constant temp constant [rare]

Materials, time ranges, and limitations for dating techniques.

Technique	*Material*	*Range (Ky)*	*Limits*
Carbon-14 [^{14}C]	organics		sampling
beta decay		35	contamination
atom counting		65	backgrounds
$^{40}K/^{40}Ar$ or $^{40}Ar/^{39}Ar$	volcanic rock or minerals	unlimited coarse calibration	availability preparation contamination
U Series [^{234}U, ^{230}Th, ^{231}Pa]	coral, molluskas travertine	30-300	few facilities very controversial contamination
Fission Track	minerals U content	unlimited coarse	technical problems
Geomagnetism	undisturbed seds. or volcanic	unlimited but coarse	limited facilities
Archaeomagnetism	kilns & hearths	2	calibration limited application
Obsidian hydration	obsidian tephra	~35	calibration regional framework
Thermoluminescence [TL]	pottery, stone, and bone	1,000	range of error few facilities
Geochemical dating	[F & U]	relative	site specific
Amino Acid Racemization	bone, shell	~200	experimental few facilities
Varves, Ice, Deep Sea Cores	sediments	150	limited
Dendrochrology	tree rings	13.5	region specific
Archaeoastronomy			stratigraphic sequences
Patination Cation Exchange Calcium Exchange Calcium Diffusion ESR		supported by	cross-correlations seriations typologies index artifacts botanical dating phase botany vertebrate palaeontology volcanic action playa lakes soil zones & hard pans

Contrary to popular belief, radiometric dating techniques, whether they are based on the exponential decay of a radioactive element or the ionizing damage effects of radiation, are only relatively absolute as they can only give a statistical approximation of an absolute age. Radiometric dating techniques that rely on radioactive decay include potassium-argon dating, radiocarbon dating (Carbon 14), and uranium-thorium dating. Radiometric dating techniques that rely on the buildup of damaging ionization from radioactive decay include thermoluminescence dating, optically stimulated luminescence, electron spin resonance (ESR), and fission track dating.

Basically, all dating techniques can be seen as clock types. The analyst must know some basic information about each clock: How does the clock tick? How is the clock set? How is the clock read? With these fundamentals, all dating clocks have the potential to provide a chronological framework. Some dating techniques are shown in Table 1 with respect to their clock functions. Unfortunately, not all dating procedures are created equal, and some methods are more reliable than others.

All dating techniques have limitations with respect to the material within which they function and the age range over which they are applicable. Table 2 lists material and limits for some dating techniques.

— *L. A. Pavlish*

See also **Dating Techniques, Radiometric; Dating Techniques, Relative; Dendrochronology; Potassium-Argon Dating**

Further Readings

Göksu, H. Y. (1991). *Scientific dating methods.* New York: Kluwer Academic.

Gräslund, B. (1987). *The birth of prehistoric chronology: Dating methods and dating systems in nineteenth-century Scandinavian archaeology.* Cambridge: Cambridge University Press.

Herz, N., & Garrison, E. (1998). *Geological methods for archaeology.* Oxford: Oxford University Press.

Rutter, N. W., & Catto, N. R. (Eds.). (1995). *Dating methods for quaternary deposits.* St. John's, Canada: Geological Association of Canada.

NEW DATING TECHNIQUES

Some dating techniques have been in use for hundreds of years and are still used today. They work well for certain time periods. Dating techniques are divided into two types: relative dating and absolute dating. Absolute dating determines the actual age of an object or stratigraphic layer, while relative dating puts artifacts and layers into sequence, without determining an actual date. Until the 20th century, only relative dating techniques were available.

Radiocarbon dating has been widely used since 1949, when it was developed by J. R. Arnold and W. F. Libby. It provides a means of absolute dating, without taking into account artifacts or local stratigraphic sequences. An unstable isotope of carbon, Carbon 14 (or C-14) is formed when nitrogen is broken down by cosmic radiation. This carbon is absorbed by plants and the animals eating them. After a plant or animal dies, the ratio of C-14 to the stable C-12 begins to decrease. Scientist know the rate for this decrease, so are able to determine the age of an object by finding the ratio of C-14 to C-12 contained by that object.

Luminescence dating was developed in North America in the 1950s and 1960s. In 1985, scientists developed optically stimulated luminescence dating techniques, using laser light. These techniques are used for dating sediments.

The potassium-argon method also relies on measuring radioactive emissions. It was first used at Olduvai Gorge, and more recently a modification of this method, known as argon-argon dating, was used at Pompeii.

Obsidian hydration is used to determine dates in volcanic glass. After a new fracture, the new break is covered with a rind, which grows at a constant rate. This is only useful for dating older fractures, as it takes several centuries for a detectable rind to grow.

Archaeomagnetism and paleomagnetism dating techniques were originated by geologists. These methods were first used in the United States in the 1960s and have been useful in the American southwest.

Oxidized carbon ratios is one of the newest methods. This is a chemical procedure, developed by Douglas Frink. It has recently been used to date the construction of Watson-Brake.

Another recently discovered technique is electron spin resonance, which measures the decay of uranium that has soaked into buried bones and teeth from groundwater. Another newer technique, amino acid racemization, studies decay of proteins encapsulated in hard tissues of fossil animals. Since the introduction of new dating techniques, many sites and fossils in Africa have been determined to be older than previously thought.

— **Pat McCarthy**

Dating Techniques, Radiometric

Radiometric dating became a possibility with Becquerel's discovery in 1896 of natural radioactivity. Rutherford postulated that radioactivity could be used to determine the age of the Earth. His and Soddy's discovery (1902) of the transmutation of the atom became the basis for understanding exponential decay and the evolution of decay products ("daughter" elements). Age estimates for the Earth that had been determined by rate of heat loss (Lord Kelvin) now had to make allowances for the heat energy associated with radioactive decay. Thus, scholars were able to argue for great antiquity of the rocks on Earth. It was really with the advent of data collection technologies after World War II that the radiometric dating field began to develop with rapidity.

Radiometric dating must be viewed as having two forms: (1) techniques that rely on the decay of an isotope of an element, the production and decay of daughter decay products (radiocarbon dating, potassium-argon, argon-argon, and uranium-lead, uranium series) and (2) the techniques that rely on the crystal damage that is generated by the ionizing radiation generated by the decay of radioactive elements (thermoluminescence, electron spin resonance, and fission track).

All radiometric-dating determinations are a function of a statistical distribution of one or more sets of decay data that must be viewed as a probability result, approximating a particular age with an error attached to it. These errors in age determinations are usually expressed as standard deviations from a mean age value. These standard deviations are probability statements that a determined age actually will fall somewhere within the age distribution defined by the standard deviation. One standard deviation, often termed *one sigma,* means that 68% of the time, the determined age will fall between the range defined by that standard deviation. In the same manner, two- and three-sigma standard deviations mean the determined age will fall somewhere between the defined age range 95% and 99.6%, respectively. Therefore, it is immediately apparent that it would be a misnomer to suggest that these radiometric dating techniques were methods of absolute dating.

Radiocarbon-14 is the best known of the radiometric techniques and is in fact an established method that relies only on the decay of an isotope (14C) formed from the outer-atmosphere comic-ray-generated neutron bombardment of Nitrogen-14 (14N) without reference to daughter production. In this respect, it is the most straightforward of the radiometric dating techniques. Living organisms incorporate 14CO2 and maintain an equilibrium until death, at which time the radiocarbon clock begins to tick as the 14C decays exponentially with a rate known as the *Libby half-life* (5,568 years). A simple ratio measurement of the amount of 14C remaining versus the amount present when the organism left the living biomass yields a radiocarbon age, which can be converted to calendrical years with a dendrochronological curve that corrects for the cosmic ray fluctuations that have taken place in the past. This ratio of original-to-remaining 14C is obtained in one of two ways: (1) The direct decay of the 14C back to 14 yields a beta ray that can be detected in a shielded Geiger counter; and (2) the actual counting of the individual 14C atoms present in a sample compared with the stable 12C in that sample and an accompanying standard. The atom-counting method affords an advantage in some dating situations (for example, shorter counting times, smaller sample sizes, no cosmic ray backgrounds, and the extension of the age range from less than 40,000 years to 70,000 years). Potassium-argon (40K/40Ar) and argon-argon dating (40Ar/39Ar), uranium-lead dating (U/Pb), and uranium series dating are all dependant upon both the exponential decay of a "parent" radioactive isotope and the buildup of one or more "daughter" isotopes, which may or may not themselves be radioactive. The ratio of the "daughter" to the "parent" permits an age estimate to be made. These techniques tend to have an age range orders of magnitude greater than radiocarbon (for example, age of the Earth), because they use half-lives that are very long in comparison to radiocarbon (t½ for–40K: 1.28 × 109 yrs; 238U: 4.47 × 109 yrs; 235U: 7.038 × 108 yrs; 232Th: 1.41 × 1,010 yrs), though uranium series disequilibrium dating has a dating range of a few days to about 20 million years.

Thermoluminescence (TL), electron spin resonance (ESR), and fission track are dating techniques that rely on the accumulation of radiation damage in materials from the decay of radioactive isotopes. TL and ESR depend on the #945, #946, and #947, decay of 40K, 238U, 235U, and 232Th in the natural environment and the consequent buildup of age information in the form of trapped electrons

removed from their valence bands by the ionizing radiation. TL recovers this information by heating the sample or by optically measuring the trapped energy, or optically stimulated luminescence (OSL). ESR identifies radicals that have been formed by ionizing radiation in liquids and solids and electron traps in minerals. ESR measurement is accomplished by applying a microwave frequency to the sample that permits the amount of radiation damage to be quantified. The radiation environment within which a sample was exposed must be known well for both TL and ESR to be effective techniques. Both OSL and ESR techniques do not destroy the signal, as does the TL heating, permitting remeasurement of a sample multiple times. These techniques assume that there is a direct linear relationship between the ionizing radiation flux and the quantity of trapped electrons or radicals and that there are no secondary losses.

Fission track relies on the spontaneous fission of 238U into two heavy elements that travel through the mineral, creating track damage. The number of tracks present is a function of the original 238U concentration and the time that has elapsed since the mineral was formed or last heated. Once the tracks are counted, the mineral is heated to anneal the tracks and irradiated with neutrons to induce spontaneous fission in the 235U. By counting these induced tracks to determine the 235U content, the 238U concentration can be deduced and compared with the original track count to determine the age of the mineral. The method's success assumes the fission tracks have not been subject to partial annealing.

— *L. A. Pavlish*

See also **Dendrochronology; Potassium-Argon Dating**

Further Readings

Göksu, H. Y. (1991). *Scientific dating methods.* New York: Kluwer Academic.

Herz, N., & Garrison, E. (1998). *Geological methods for archaeology.* Oxford: Oxford University Press.

Rutter, N. W., & Catto, N. R. (Eds.). (1995). *Dating methods for quaternary deposits.* St. John's, Canada: Geological Association of Canada.

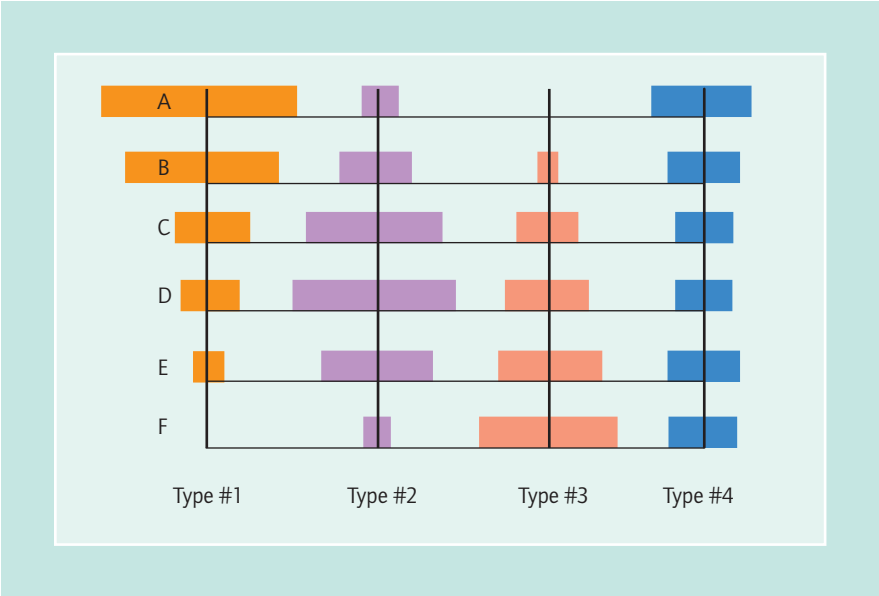
Dating Techniques, Relative

The oldest and the simplest relative dating method is stratigraphic dating. Relative dating, properly applied to sedimentary materials, carries no implied rate of change in time. An isolated event can only be deemed to have occurred either before or after another isolated event. This situation obtains because rates of deposition are rarely constant over long periods of time. There will be breaks in the buildup of sediments, and there may be differential removal of material. These depositional activities create unconformities that are understandable when one considers that the physics of any geomorphic process is the result of two physical laws of Nature (gravity and Bernoulli's principle) as they apply to sediment particles in two media of transport (water and wind). The complexity of geomorphic dynamics precludes long-term constant depositional rates and any accompanying assumptions that relative time can be calculated in any other manner than relationally.

Prior to the 20th century, research in the fields of archaeology, paleontology, and geology was based on and limited by this general form of dating that relied on the inferred, time-based, relative relationships that were perceived to exist between phenomena or entities of interest. In other words, the sorting of time was a very subjective exercise, strongly influenced by the mental template of the practitioner.

Both before and after the invention of writing, there were undoubtedly countless attempts to date absolutely events that occurred before recorded history. Without a factual method of quantifying time, these endeavors were doomed to failure. The ever-changing four-season year, based on nature's rhythms, the king's lists, logging parts of human lives, and the "age systems" that were founded on assumed technological and cultural progression, were all employed at one time or another by classic scholars throughout the world. These approaches, which were often clouded by religious dogma, gave a functional, if imprecise, perspective of the past.

It was with the coming of the Renaissance and the Age of Enlightenment that a real attempt at the understanding of dating in a relative sense was undertaken. Objects by themselves and those still within a relational context could now be sorted chronologically. There were two contributions that led the way for this dating improvement: (1) Michael Mercati's



(1541–1593) systematic organization of ex situ archaeological materials in the Vatican collections based on an understanding of the "three-age system," which had its origins in the classical literature, and (2) Nicholas Steno's (1638–1686) treatise, known today as the "three principles of stratigraphy" or Steno's Laws, which is directly applicable to the relative dating of in situ materials.

Christian Thomsen (1788–1865) applied the three-age system to museum collections in Denmark in the early 19th century, demonstrating that cultural materials could be now sorted relatively and, most important, he publicized the approach. When this concept was combined with the Steno-based advances in geological understanding taking place at the same time, non-biblically based estimates of relative time sequences became possible.

In this way, early geologists like James Hutton (1726–1797), William "Strata" Smith (1769–1839), and Charles Lyell (1797–1875) and archaeologists like Pitt Rivers (1827–1900) and Boucher de Perthes (1788–1868) were able to employ the principle of superposition in conjunction with fossil or cultural markers to sort materials stratigraphically, with an accompanying assumption of a time progression. In this manner, practical relative dating had been developed. A vertical fossil succession now placed its encapsulating rock in a relative sequence in a manner analogous with a series of vertically buried cultural materials. The ability to meaningfully associate totally independent stratigraphic sections with similar fossil or material culture sequences permitted a wider application of the relative dating concept known as cross-dating. When the index fossils or artifacts were not totally distinct in unrelated stratigraphic sections, the relative abundance of an index item might be used in many instances to relatively date the sections based on the assumption that natural or cultural materials have a lifetime of their own, in which they begin at a point in time and become popular and eventually fall out of use. These distributions are called "battleship curves" and are a form of seriation dating (see Figure 1). Over the last century and a half, a great number of techniques have been developed for the relative sorting of past events. These relative dating techniques permit chronological relationships to be ascertained through physical and/or chemical seriation (such as cation exchange ratio-http://www.mnsu.edu/emuseum/archaeology/dating/dat_florin.html, patination, or pollen analyses) based on spatial relationships (stratigraphy and cross-dating), differential abundances, technological variations, or combinations thereof. Some techniques (e.g., obsidian hydration, archaeomagnetism) require a historic event or a radiometric technique for calibration; all benefit from their use. Other relative dating techniques require dated historical information. Astronomical dating requires that an event be recorded both spatially and chronologically, but there are usually several historical events as well as celestial ones that can be made to fit a particular set of criteria. Paleography is based on the relative changes that take place in writing styles through time and has application in authenticity as well as dating. Codecology is a relative dating technique that is based on the way in which scrolls and books are assembled. For example, two millennia ago, scrolls that had been bound in vertical pages were bound horizontally from right to left. Therefore, it is apparent that any artifact or event that can be placed in a context in relationship to other artifacts or events can be relative dated.

This figure graphically depicts seriation, showing a series of idealized "battleship curves" with relative time being shown as the abundances of artifacts, with

the oldest at the bottom and youngest at the top. We may view this as the differential distribution of Artifact Types #1 to #4 through stratigraphic layers A though F at one sampling site (archaeological or paleotological) or as the ordering of differentially distributed Artifact Types #1 to #4 obtained from sampling sites A through F. In both the single and multisite results, the relative sequencing of the Artifact Types provides a method of relative dating based on their differential abundance. Artifact Type #1 appears in layer or site E and continues through A, becoming relatively more abundant. Artifact Type #2 shows a classical "battleship" abundance distribution covering an almost complete cycle from inception to discard. Artifact Type #3 shows a consistent decrease in abundance with a final cessation. This distribution would suggest that digging deeper or finding other sites may provide the other half of the curve. Artifact Type #4 shows a constant abundance through the section or sites.

— *L. A. Pavlish*

See also **Dating Techniques, Radiometric; Dendrochronology; Potassium-Argon Dating**

Further Readings

Pavlish, L. A., & Litherland, A. E. (2003). Physics and archaeometry (Foreword, special issue). *Physics in Canada, 59*, 222–225.

Zeuner, F. E. (1946). *Dating the past.* London: Methuen.

Dawkins, Richard (1941–)

An English ethnologist and evolutionary biologist, Richard Dawkins was born in Nairobi during the onset of World War II. Spending his formative years in a biologically diverse environment of Africa, the young Dawkins probably cultivated his naturalistic perspectives in East Africa until his family returned to England in 1949. After what can be considered as being a traditional English education, Dawkins continued his education at Oxford, whereby he graduated in 1962. After graduating from Oxford, Dawkins remained and received his doctorate in ethnology under the eminent ethnologist Dr. Niko Tinbergen. Pursuing a career in teaching, Dawkins was appointed to an assistant professorship of zoology at the University of California at Berkeley in 1967. Upon completion of this appointment, he returned to Oxford in 1969 as lecturer in zoology and was elected a fellow of the New College in 1970. Dawkins holds the Charles Simonyi Chair of Public Understanding of Science (1995).

Richard Dawkins is noted for his ability to relate highly scientific knowledge, such as genetics, to the general public. His most noted books include *The Selfish Gene* (1979), *The Extended Phenotype* (1982), *The Blind Watchmaker* (1986), *River out of Eden* (1995), and *Climbing Mount Improbable* (1996). He has also published multitude of articles, coauthored books, and book reviews. Dawkins has lectured internationally and has received multiple awards and honors. He also received honorary doctorates in both science and literature.

Contributions and Perspectives

In the area of science, particularly concerning the processes of biological evolution, the general public has been given an array of theoretical interpretations concerning the biological mechanisms that explain the diversity of life on this planet. Acknowledging the cultural influence on these interpretations (e.g., religious or vitalistic beliefs), Richard Dawkins continues to provide the public with an understandable materialistic explanation of complex scientific knowledge that was attained during the last century. Although he is not considered a philosopher of science, his materialistic interpretation of biological processes has caused severe criticisms, essentially labeling him either a biological determinist or an extreme reductionist. Being a defender of Darwinian evolution, Dawkins poses a plausible relationship between biological processes and expressed behavior within an evolutionary framework.

Taking a purely materialistic view of concerning the processes of evolution, the process of adaptive radiation and speciation has accounted for both the diversity and complexity of organic life found on this planet. Although Dawkins himself supports a Darwinian gradualist's view of the evolutionary process, he does hold that a momentary punctuation in evolution could be supported by several factors,

among them being mutations, extinctions, and exponential growth of more suitable organisms within an ecological niche. Though in this manner, life may seem to possess a creative teleology stemming from a complex design, the implications from the deoxyribonucleic acid (DNA) molecule dissolves any remote theological plausibility. The four base units, adenine, thymine, cytosine, and guanine (A, T, C, G) is the first cause and only cause from the outgrowth of the symbiotic relationship among the various cells and/or tissues within an organism. Essentially, we are replicators (vessels) for our genes. Within the processes of life, the DNA is beyond the scope of good or evil; their existence drives us to action and replication.

With the concept of the *Selfish Gene* (1976), Dawkins illustrates the extensive and influential role that biology has on behavior. The strategy is simple; establish a productive cost-benefit analysis that would increase the chances for both survival and reproduction. Since an organism has only a limited amount of energy, any expenditure of energy would ultimately dictate an organism's behavior. Examples could be seen through out the diversity of life, including our species. For a "moral" species, the implications become evident; there are no metaphysical dimensions with altruistic intentions. This would certainly have great philosophical and theological implications. We do not act out from either natural law or some Kantian sense of duty, rather, our uncanny ability to recognize the genetic proximity of our genes and related acts of reciprocity that follow (cost-benefit analysis). The symbiosis between cells and the underlying genetic foundation within phenotypic expressions are critical within this process. Genes influence more than the organic material in which they inhabit and control.

Indirectly, genes influence the external world in which the organism exists. This directly opposes the traditional view of our species speculated by Aristotle (theologically by Thomas Aquinas) or by Immanuel Kant (1724–1804). This mechanistic view, by which our species operates, along with a real united view of our species in relation to nature, redefines our ontological and teleological status, which is currently held as being philosophically or theologically infallible. It is the biologically based emotive/psychological properties (for example, desires for immortality) and cultural capabilities that create the reluctance for a philosophical shift. This fact withstanding, it is the driving intention that forces our species to be in control of any perception or perceptive qualities that becomes a point of our consciousness. Essentially, it is the individual's psychological components that become an adaptive mechanism that accounts for the continuous "strategy" based on environmental interaction and modification. The adaptive response indicates an ongoing reciprocal relationship between the encapsulated genes and their extended environment.

Every organism has an impact on the ecology in which they live. Our species, by comparison of other species, has the greatest impact on the global environment. The reason for this global impact is due our species' ability to adapt and survive in most environments found on this planet; all impart to the cultural capabilities of our species. In Dawkins's theory on *The Extended Phenotype* (1982), he makes a clear point on how our genes have the ability to influence the environment around them. This is done through culture. Culture and cultural transmissions can be seen in terms of memes. *Memes,* units of imitation, are bits of information transmitted from brain to brain through human interaction. In this manner, memes are exposed to the same theoretical principles of evolution. The replication vessels of information, for example, both memes (resulting in complex thought) and their respective physical representations, are exposed to various selective forces. These selective processes can be either cultural (e.g., philosophically ritualistic) or random propagation of mutated memes. Although the implementation of the written word has reduced the possibility concerning the change in the original transmission, the creative ability and personal interpretation can itself become cultural adaptation (e.g., cultural transformation of mythology and various technologies). With the ability for greater ability for contemplation, the greatest implication resides in our species' epistemology and resulting ontology and teleology.

The subtle underlying theme concerning the epistemology of our species becomes evident. Though there maybe behavior that is indicative of a biological nature as opposed to behaviorism, our species' resulting behavior does not come into existence with either previous knowledge or knowledge separate from the biological components within the human brain. It is human consciousness that emerges from organic matter that allows for the ability for free acts of creativity and disposition for control. This position negates the claim of biological determinism that is often attributed to him by critics. The bases of the objections are not from critical analysis or the exploration of other

possible suggestive scenarios; rather, the objections rendered are from the implications that severely question and nullify both the claims of spiritual dimension and the dualistic influences from René Descartes (1596–1650). Questions pertaining to mind and behavior can be explained in purely materialistic explanations. Cultural complexity, as seen with biological complexity, does not have any spiritual dimensions, even though it may have metaphysical connotations. The uncovering of motives or intensions within a biological framework (e.g., selfish memes), threatens the psychological stability of a sensitive creature within a dynamic and violent universe. This, in turn, somehow challenges the perception of our humanity in a qualitative manner, especially in terms of personhood, aesthetics, and emotion. Erroneously, it is claimed that our species loses its humanity by accepting what science has already deemed as being highly probable. The philosophical implication for psychology, and to a greater extent theology, denies the mind/body dualism or the existence of the soul. It is in the human manipulation of these memes, especially in their propagation, that makes the natural selective process of evolution precarious (from the human standpoint), for overspecialization can lead to either personal or specieswide extinction.

Our species, which remains locked into an endless cycle of inquiry, seeks out answers that are more psychologically comforting than what is scientifically plausible. While acknowledging the impossible claims given by traditional religions and accepting the evidence given by science, some individuals seek untraditional answers that provide the same results given by traditional religions, an ontological and teleological design by an unknown, perhaps unknowable, designer. Their belief structures stem from the complex and creative processes, indicating complexity itself reflects a greater process that entails and encompasses the unknown. For these individuals, complexity is itself an indicator of something more grand and complex. Both design and designer have replaced Descartes's mind and body and traditional theological answers concerning the philosophical implications for scientific discovery.

With the rise of human consciousness, the resulting cognitive processes have entailed our species to posses a greater degree of self-awareness. This greater self-reflective ability has resulted in the progressive concepts of the soul. Based on both metaphysics and human desire to transcend death, the resulting ontological and theological memes are resilient. As innovations and scientific discoveries are made, human imagination and creativity become apparent. For the theists and vitalist, the argument for design (ultimately, a designer, e.g., God) has become the answer to the materialistic interpretation of Darwinian evolution. In *The Blind Watchmaker* (1986) and *Climbing Mount Improbable* (1996), Dawkins gives an evolutionary account for complexity (e.g., the human eye), without any teleological sediment. Just as with organic evolution, the complexity found within nature is the expression of genetic information. Accumulative selection and intricate symbiotic relationships have resulted in the human eye, bodily development, and perhaps more important, consciousness rising from the human brain. All life on this planet owes its existence to the immortal coils of DNA.

In viewing Dawkins's approach for our species, it is understandable why his critics erroneously label him a determinist or reductionist. The implications of his writings, as with Darwin, have far-reaching consequences for our species ontology and teleology. Challenging the traditional cosmologies, Dawkins gives a united materialistic account for life on this planet. His unique perspective concerning culture and behavior has brought our own species back to a naturalistic and evolutionary framework. When comparing our species' behavior with other species, the traditional and sometimes spiritual position of our species within nature has greatly diminished. No longer can our species' position be deemed separate and completely unique in nature. Our species, when compared, only differs in degree and not in kind. This implication can be seen stemming from Darwin's scientific discovery of organic evolution. With the evolution of the human brain and memes, artificial intelligence has become more than a source of science fiction. This artificial intelligence may someday contribute or succeed our species for existence in this universe and beyond. As illustrated by Dawkins, no matter what will be involved, whether it is DNA or programmable microchips, the resulting product will always be subjected to the never-ending process of evolution.

— David Alexander Lukaszek

See also **Dennett, Daniel C.; Evolution, Molecular; Evolutionary Epistemology**

Further Readings

Dawkins, R. (1989). *The selfish gene.* Oxford: Oxford University Press.

Dawkins, R. (1995). *River out of Eden.* New York: Basic Books.

Dawkins, R. (1996). *The blind watchmaker.* New York: Norton.

Dawkins, R. (1996). *Climbing Mount Improbable.* New York: Norton.

Dawkins, R. (1998). *Unweaving the rainbow.* New York: Houghton Mifflin.

Dawkins, R. (1999). *The extended phenotype.* Oxford: Oxford University Press.

Dennett, D. C. (1991). *Consciousness explained.* New York: Back Bay Books.

Dennett, D. C. (1995). *Darwin's dangerous idea.* New York: Touchstone.

Sterelny, Kim. (2001). *Dawkins Vs. Gould: Survival of the fittest.* Cambridge: Totem Books.

DE ANGULO, JAIME (1887–1950)

Jaime de Angulo (1887–1950), the eccentric amateur anthropologist, helped to move the field of anthropology away from armchair theorizing with decades of intense linguistic fieldwork among, most notably, the Achumawi or Pit River Indians of Northern California. De Angulo collected and studied a wide range of severely endangered languages from the American West and Mexico during the 1920s and 1930s, a period of time during which formally trained, and funded, anthropologists were scarce. Through the study of American Indian languages and the collection of folklore, de Angulo attempted to elicit the worldview of those he studied and preserve their cultural identity.

Born to Spanish parents in Paris, France, de Angulo became disillusioned by his strict Jesuit upbringing and struck out to make his fortune in the United States at the age of 18. De Angulo worked a grueling life as a cowboy in the Western United States and underwent a series of misadventures in South America before pursuing formal education in medicine. While at Johns Hopkins University, de Angulo took an interest in anthropology after reading works by Lewis Henry Morgan and Franz Boas. Later, while de Angulo was living with his first wife, Cary Fink, in Carmel, California, he met his earliest anthropological mentor, Alfred Kroeber. In 1920, de Angulo accepted Kroeber's offer to teach two summer classes at Berkeley on Levi Brühl's notion of the primitive mind and the use of psychoanalytic theory in studies of primitive culture.

De Angulo was impacted greatly by Edward Sapir's introductory text, *Language,* and began a lifelong correspondence with him concerning his own linguistic research. With support from wealthy friends, his first, and his second wife, Nancy Freeland, de Angulo investigated various linguistic research projects among the Achumawi, whom he first met during a ranching venture in Alturas, California, and Taos Indians without university support. In 1922, with recommendation from Kroeber, Sapir, and Boas, de Angulo began working for the Department of Anthropology of Mexico, under Manuel Gamio, investigating the languages of the Zapotecan region. Organized in 1927, the Committee on Research in Native American Languages, headed by Franz Boas, Edward Sapir, and Leonard Bloomfield, granted de Angulo paid research projects to record those American Indian languages they thought to be nearest to extinction. De Angulo received more funding from the committee than any other researcher and was appointed to the advisory board in 1929. During his years of fieldwork, de Angulo studied 30 Native American languages and attempted to devise writing systems for the Pomo and Taos Indians in order that each may transcribe their own language.

De Angulo is best known for his ethnography of the Achumawi, *Indians in Overalls,* in which he detailed their present way of life and his introduction to the structure of their language. De Angulo used his Spanish heritage and cowboy experience to his advantage during his fieldwork; his informers equated his Spanish background with his being Mexican and were impressed by his rugged nature. He enthusiastically participated in their rituals, gambling bouts, singing, and heavy drinking, to the shock of many professional anthropologists at the time. De Angulo's work reveals a genuine appreciation for the language and culture of the Achumawi.

De Angulo's *Indian Tales,* a unique collection of folklore texts of the Northern California Indians seamlessly bound within de Angulo's fictional narrative, was first broadcast over the radio in 1949 as a series of "Old Time Stories" read by de Angulo himself. While much of de Angulo's salvage linguistic research and his exploration of language titled *What Is Language?* remain unpublished to this day, readers

of *Indians in Overalls* and *Indian Tales* can appreciate de Angulo's bold fieldwork strategies and profound reverence for the American Indian way of life.

— *Katherine Lamie*

See also **Language and Culture; Native Peoples of the United States; Sapir, Edward**

Further Readings

de Angulo, G. (1995). *The old coyote of Big Sur.* Berkeley, CA: Stonegarden Press.

de Angulo, J. (1953). *Indian tales.* New York: Hill & Wang.

de Angulo, J. (1990). *Indians in overalls.* San Francisco: City Lights Books.

Leeds-Hurwitz, W. (2004). *Rolling in ditches with shamans: Jaime de Angulo and the professionalization of American anthropology.* Lincoln: University of Nebraska Press.

De Waal, Frans B. M. (1948–)

Source: Courtesy, Frans B. M. de Waal. Photo by Catherine Marin.

Frans De Waal was born in the Netherlands in 1948. He received his training as a zoologist and ethicist from three Dutch universities, earning a PhD in biology from the University of Utrecht in 1977. De Waal moved to the United States in 1981, accepting a research position at the Wisconsin Regional Primate Research Center in Madison. In 1991, de Waal moved to the Psychology Department at Emory University in Atlanta, where he is currently a Charles Howard Candler Professor of Primate Behavior.

In 2004, De Waal received one of the most prestigious honors in the scientific community by being elected to the National Academy of Sciences. He is also the director of the Living Links Center for the Advanced Study of Ape and Human Evolution at the Yerkes Primate Research Center (YPRC), established in 1997. The YPRC of Emory University is a National Primate Research Center, which is funded by the National Institutes of Health. It is at the forefront of biomedical and behavioral studies with nonhuman primates.

De Waal has several published scientific articles and books, which include *Peacemaking Among Primates,* a 15-year study of conflict resolution and reconciliation among the captive chimpanzees *(Pan troglodytes)* of the YPRC, for which he received the *Los Angeles Times* Book Award. De Waal's research has had an unquestionable effect on understanding the complexity of human social behavior and the evolution of morality in humans, as well as in other animals. His studies investigate the development and complexity of ethical behaviors and morality with results that suggest animals other than humans have an innate awareness of what is considered right or wrong.

De Waal has also challenged the idea of human culture by showing different adaptive strategies to conflict within various communities of the same species, suggesting that other animals have the ability to evaluate the situations they are presented with rather than being completely driven by instinct. This is well demonstrated by a study of combining a juvenile group of rhesus monkeys *(Macaca mulatta)* and stump-tail monkeys *(M. arctoides)*. The more aggressive rhesus monkeys learned to be more passive from interacting with the stump-tail monkeys, which dominated the group. The two species became friends, interacting and grooming on a much less aggressive level than is usual for the rhesus monkey. De Waal is also interested in food sharing and social reciprocity.

While De Waal is best known for his behavioral research and theories on the origins of morality,

the recognition of right and wrong in humans and other animals, he has also helped to shed light on the fascinating lives of bonobos *(Pan paniscus)*. The bonobo is the chimpanzee's lesser-known, yet seriously endangered, counterpart. Although there are several international experts on the bonobo, de Waal and photographer Frans Lanting have published the most comprehensive study of bonobos to date.

De Waal continues his research in Atlanta but has also traveled the world in order to make cultural reflections on the nature of humans and nonhuman primates in other cultures. He has been funded by such esteemed organizations as the National Science Foundation, the *National Geographic* Society, the National Institutes of Mental Health, the National Institutes of Health, and the Wisconsin Regional Primate Research Center in Madison.

— Jackie L. Orcholl

See also **Bonobos; Primatology**

Further Readings

De Waal, F. (1989). *Peacemaking among primates.* Cambridge, MA: Harvard University Press.

De Waal, F. (1996). *Good natured: The origins of right and wrong in humans and other animals.* Cambridge, MA: Harvard University Press.

De Waal, F. (1997). *Bonobo, the forgotten ape.* Berkeley: University of California Press.

De Waal, F. (2000). *Chimpanzee politics: Power and sex among apes.* Baltimore: Johns Hopkins University Press.

De Waal, F. (2001). *The ape and the sushi master, cultural reflections of a primatologist.* New York: Basic Books.

De Waal, F. (2002). *Tree of origin: What primate behavior can tell us about human social evolution.* Cambridge, MA: Harvard University Press.

De Waal, F. (2003). *My family album: Thirty years of primate photography.* Berkeley: University of California Press.

Death Rituals

Death is a universal inevitability, but human responses are different. How people deal with death has always been closely studied by anthropologists. Death-related beliefs and practices provide a window for viewing a society's social organization, cultural values, and worldviews. With a long-term perspective, this window can also allow us to see mechanisms of culture change and cultural adaptation to new socioeconomic circumstances.

Ethnographic record shows that there exist a wide variety of death rituals in the world. Death rituals usually start when a person stops breathing or is pronounced dead culturally. The body may be first washed, shaved, combed, painted, or perfumed. Then, it may be dressed or left naked, covered with blankets or adorned with jewelry. Finally, it may be buried, cremated, kept in the house, preserved by smoking or pickling, dismembered to feed animals or birds, thrown into river or sea, exposed as carrion, or even eaten, raw or cooked. Family, friends, and neighbors may get together to express grief by weeping, wailing, singing dirges, beating the breast, or tearing the hair. How the body is treated and disposed and how family, friends, and neighbors should behave for a specific period of mourning are all determined by cultural guidelines.

Anthropological Perspectives of Death Ritual

The study of death-related beliefs and practices has been of crucial importance to anthropology from its beginning. In archaeology, remnants from burials are often the only data surviving from early paleolithic cultures. They have provided evidence of cultural activities for the world's oldest civilizations and religious practice of prehistoric people. Mortuary structures have produced impressive and revealing evidence about ancient ways of life. The huge pyramids in Egypt and the magnificent tombs in Greece and China have yielded a plethora of information about the ideologies and values of ancient societies in those countries.

In sociocultural anthropology, interest in death-related beliefs and practices can be traced to the cultural evolutionists of the 19th century who attempted to construct grand evolutionary schemes of social development in the world. Edward Tylor and Sir James Frazer, for example, focused their attention on beliefs associated with death and existence thereafter. They argued that early humans' contemplation of death and deathlike states, such as sleeping and dreaming, was the origin of the concept of the soul

and that the belief in its continued existence after death lead to the origin of all religions.

The evolutionary approach of Tylor, Frazer, and others has been discredited because of its ethnocentric scheme of universal cultural evolution, its faulty use of the comparative method, and its unsupported speculations concerning the origin of various institutions, beliefs, and practices. However, the subject of death-related behaviors continued to play an important role in the anthropological study of religion. In the 20th century, anthropologists interested in the study of religion shifted their attention from its origins and evolution to the study of basic functions that religion serves in human society. The functional approach to religion had its origin in the works of French sociologist Durkheim, developed further in the works of his students such as Robert Hertz, and in the works of British social anthropologists such as Radcliffe-Brown and Malinowski. These functionalists, through the analysis of death-related behaviors, attempted to demonstrate how a religious system serves to affirm and preserve the social system by establishing equilibrium and maintaining social solidarity.

Émile Durkheim in *The Elementary Forms of the Religious Life* (1912) put forth the theory that funeral rituals, and other rituals as well, are expressions of the unity of a society. He asserted that the function of those rituals is to recreate the society or the social order by reaffirming and strengthening the sentiments on which social solidarity and therefore social order itself depend. His student, Robert Hertz, in his study of the second burial in Indonesia (particularly the island of Borneo), also pointed out that the continuity and permanence of a society is threatened by the death of one of its members and that at the death of a member, the society, disturbed by the shock, must gradually regain its balance. It is only through the performance of death rituals during the period of mourning after the death that the society can recover its peace and triumph over death. For Hertz, death ritual is a long transformative process consisting of different stages.

The works of the Durkheimian school strongly influenced British functionalists. Radcliffe-Brown wrote in 1933 in his study of the funeral customs of the Andaman Islanders that a person's death constitutes a partial destruction of the social cohesion. The normal social life is disorganized. The social equilibrium is disturbed. After the death, the society has to organize itself anew and reach a new condition of equilibrium. This view was also clearly expressed by another British anthropologist, Malinowski, who pointed out that death in a "primitive society" was much more than the removal of a member. The ceremonial aspect of death counteracted the centrifugal forces of fear, dismay, and demoralization caused by the death and reintegrated the group's shaken solidarity.

The functional approach has been seriously criticized for its excluding not only a large range of data such as indigenous interpretation of ritual acts but also important theoretical questions, such as how rituals convey meaning. It has been criticized for ignoring the role of the individual in society. It has also been criticized for being incapable of dealing with the dysfunctional components of religious behaviors and their contribution to the transformation of cultural systems.

In 1908, a French social anthropologist Van Gennep published *The Rites of Passage,* in which the funeral is regarded as one of a large class of rituals concerned with transitions from one state to another. He argued that all these rites of passage share a common tripartite structure, involving, first, separation from one status, then a transition or liminal period, followed by reincorporation into a new status. He pointed out that in death ritual, transition plays a dominant role.

Victor Turner brilliantly elaborated Van Gennep's notion of liminality. Building on Van Gennep's concept that the transitional phase sometimes acquires a certain autonomy from the rest of the ritual, Turner developed a view of a "state of transition," in which the inhabitants are "betwixt and between" normal social status. Based on his intensive study of life crisis rituals among the Ndembu of Zambia, Turner regarded this liminal or transitional phase as ambiguous, inversive, ludic, and a source of the intensive, effervescent camaraderie that he described as "communitas."

Turner's works represent a trend in anthropological studies of ritual that shifted emphasis from seeking for function to meaning in 1960s and 1970s. Symbolic and interpretative anthropology developed out from this trend and have had tremendous influence on anthropological studies of death ritual. They have sought to understand symbols and rituals primarily through the indigenous interpretation of the society in question. Victor Turner defined ritual as an

Source: © iStockphoto/Nicholas Belton.

Clifford Geertz advocated an interpretive approach to the study of symbols and rituals. He argued that the analysis of culture is not an experimental science in search of law but an interpretive one in search of meaning. He believed that culture should be understood to consist of socially established structures of meaning embodied in systems of symbols. It is through these structures of meaning, these webs of significance, that we order our experience and make sense of the world we inhabit.

aggregation of symbols, with the symbols being the smallest unit of ritual that still retains the specific properties of ritual behavior. From this definition, we can see a crucial feature of his methodology, which works from discrete ritual symbols ("storage units," "building blocks," and "molecules of ritual") to their incorporation in ritual systems, and then to the incorporation of such systems in the whole social complex being studied. He stressed the common diachronic profile or processual form in rituals, that is, the sequence of ritual acts in social contexts. He treated ritual symbols not as static, absolute objectifications but as social and cultural systems, shedding and gathering meaning over time and altering in form. This emphasis on social process distinguishes him sharply from his own background in British social anthropology, which focused primarily on structure and static functionalism.

Turner outlined a method to analyze symbols. Symbols, according to him, should be examined in terms of three levels of meaning: exegetical, operational, and positional. Exegetical meaning consists of how indigenous people consciously understand a symbol, as well as the symbol's linguistic derivation, social history, and material substance. Operational meaning centers on how a symbol is used—in what institutions, by what groups, and so on. Positional meaning has to do with a symbol's relationship to other symbols both within a particular ritual and within the framework of a total ritual system.

Ritual, according to Geertz, is such a system of symbols, which stand for values, codes, and rules. Ritual interpretation is a process that integrates theorists' abstract conceptual categories and the cultural particularity of a rite. The theorists' conception should be based on the natives' view. Their perceptions and knowledge are melded to those of the indigenous people. Geertz believed that what we call our data are really our constructions of other people's constructions of what they and their compatriots are up to. In a word, Geertz's model in ritual study illustrates that ritual participants act, whereas those observing them think. The observers' understanding of the ritual behavior should be based on the performers' own emic views. The title of one of Geertz books, *Local Knowledge,* signifies his view of seeking knowledge by starting from the base of indigenous knowledge and combining it with that of the observer.

The influence of Turner and Geertz can be seen in two anthropological books on death rituals: *Celebration of Death,* by Huntington and Metcalf, and *Death and the Regeneration of Life,* edited by Bloch and Parry. The first book, based on the authors' ethnographies of the Bara of Madasgascar and the Berawan of Central Borneo, attempts to interpret the relationship between the symbols of death and sexuality and rebirth. The second book contains seven articles that incorporate the sociological, symbolical, and psychoanalytic approaches to explain the significance of symbols of fertility and rebirth in death rituals.

Death Rituals in Sanyuan Village, China

Sanyuan Village lies at the northeast edge of Chongqing Municipality of China. It is an administrative unit, consisting of 10 natural villages or hamlets. Four of them are located on the plain over the Dahong River Valley, and the rest are down in the valley by the river, whose fields are often submerged by the flooding river in spring and summer. Its economy depends on rice farming.

In Sanyuan Village, every family holds elaborate funerals for its members who die, except children who die before reaching adulthood. They are regarded as *gui erzi* or *gui nuer* (son or daughter of devils) and are doomed to die. Any family who gives a deceased child a full formal funeral will suffer from misfortune or even the death of other members in the family.

Preparation for Death

Preparation for death usually starts when a person is over 60 years old. A coffin may be made or purchased for him or her, or coffin money may be collected from his or her children for future use. Aged villagers may have their *shouyi* (grave clothing) sewn in the eventuality of their death. A *shouyi* consists of a coat and a pair of pants. The number of the *shouyi* depends on the wealth of the family. It is always an odd number, varying between three and nine pieces. Seven is considered the ideal, because *qi* (seven) is a homophone for the abundance of descendants, harmony, and prosperity of the family. The color of the *shouyi* is either black or white for all, regardless of gender difference. But the outerwear is always black. With the coffin purchased and *shouyi* made, the predeath preparations for funeral are completed.

Initial Ritual

When a person is seriously ill and near death, his or her *houren* (offspring) will be summoned and gathered around him or her. Before he or she breathes the last breath, the patient will be moved into a chair in his or her room, facing the door. To die in bed is considered as harmful because the soul of the newly deceased cannot easily leave the bed. To die in a chair is considered as the most dignified death, with all the descendants kneeling down around the chair and the spouse, brothers, and sisters standing around. The oldest son holds the ill person upright. Last words are exchanged between the dying and the surrounding persons. The local terminology for this process is *songzhong* (sending off the dying).

As soon as the dying person breathes a last breath, the descendants, especially women, burst into a loud wailing. Firecrackers are set off to scare away hungry ghosts who might be wandering around the house. The loud wailing and firecrackers also inform the community that a death has occurred, so that the other families can take proper measures to eliminate bad effects of the death. *Daotou fuzi* (paper money bound in small rectangular bundles with the names of the deceased and donors written on the cover) is burned to provide the deceased with traveling expenses on the way to the world of the dead. Messengers are sent out immediately to inform other relatives of the death in the family.

Treatment of the Body

After a person dies, he or she is placed on a wood board in the *tangwu* (living room) and is prepared for *mahang* (ritually washing the deceased). *Aishui,* which literally means "love water" (water boiled with eucalyptus leaves or tea), is prepared. The sons' clothes are soaked in the *aishui.* It symbolizes the *ai* (love) of the descendants to the deceased. This specially boiled water is to clean the dead body ritually and to drive away any evil spirits that might have possibly attached to the body.

Two or three elders in the village are invited to wash and dress the deceased. They soak a piece of white cloth in the *aishui* and move it across the body three times from head to feet. The cloth does not necessarily touch the body. After this, they dress the deceased with *shouyi* (grave clothes), tie up the deceased's feet and waist with black threads, put the corpse into a coffin set up on two benches in the *tangwu,* and fix the corpse tightly so that it will not shift when the coffin is moved out of the village to the grave site. A *shoubei* (a very small cotton-wadded quilt) is put on top of the body. The coffin is half closed, with only the head end open, so that the face of the deceased can be seen. A piece of white cloth is laid over the face. An incense pot and a kerosene lamp (called *changming deng*) are set on the top of the coffin. A ceramic pot or iron basin is put under the coffin for burning paper money.

Preparations by Specialists

A funeral in Sanyuan Village involves several groups of specialists. A bereaved family needs to hire Daoist priests to conduct funerary rituals, a funeral

band to play mourning music, a feng shui master to look for a grave site, a local scholar to write a eulogy, and one or two craftsmen to make a miniature paper house, paper furniture, and other items of daily necessity for the deceased to use in the otherworld.

Priests usually arrive at the bereaved house in the afternoon. They generally spend the afternoon preparing for their rituals. The most important items they make for the funeral are a *lingpai* (soul tablet) for the deceased, a *fan* (a lanternlike object), passports to the otherworld, written documents addressed to certain deities in the otherworld, five tablets representing east, south, west, north, and center directions, a *xiao dan* (a list of all filial descendants), and many bundles of *fuzi* (paper money).

After making the soul tablet, *fan,* and other items, the priests set up a *tan* (altar) with two dining tables in the *tangwu* against the wall facing the door. Four benches are placed by the two sides of the altar for the priests to sit on. A tablet for the ancestors of the bereaved family, the soul tablet of the deceased, two kerosene lamps, and incense holders are placed on the altar. With the altar set up, the priests are ready to start their ritual performance.

Ritual Performance

All the rites performed by priests are accompanied by percussion music, produced by drums, gongs, *mu yu* (wooden sound boxes), and brass ringing bowls, and by chanting of scripts by the chief priest alone or by all the priests in chorus with their percussion music. Their performance usually lasts all night. Though different priests may conduct rites in different order and in various styles, their performance consists of the following rites:

1. Rite of *Pobai* (breaking the white). After the sun sets, priests start their performance. They chant their scripts first. Their chants point out that life is hard and death is unavoidable. They inform the deceased that the descendants are all heartbroken. They ask the *xiaozi* (filial descendants) to kowtow toward the soul tablets. Then, they tell the *xiaozi* to put on *xiaofu* (mourning clothes, usually a long piece of white cloth) to show their filial piety to the deceased. As soon as the *xiaozi* put on mourning dresses, they officially enter the mourning stage.

2. Rite of *Qingshui* (fetching water). The priests lead all the *xiaozi* to a well or a river nearby, accompanied by the funeral band. When the troupe reaches the well or the riverside, the priests plead to the dragon and guardian spirits of the water for permission to fetch their water. Paper money and incense sticks are offered to them by being burned. The eldest son or other siblings in his absence then fills a bottle with water. The burning of paper money suggests that the water is purchased from its sacred guardians. So it is *shengshui* (sacred water) and is used by the priests symbolically.

3. Rite of *Jingzao* (worshipping the Stove God). The priests lead the *xiaozi* into the kitchen. The soul tablet, a passport, and a copy of a written document are put on the top of the stove. Incense sticks are burned on the stove. The chief priest chants scripts. He pleads the Stove God to report the death to the Jade Emperor. *Xiaozi* then kowtow to the stove. Paper money is burned. The purpose of this rite is to inform the Stove God of the death and to appeal for his protection for both the deceased in the *yinjian* (the underworld) and the living members in the *yangjian* (this world) by providing them with abundant food. It is believed that this rite facilitates admittance of the soul of the deceased into the world for the dead.

4. Rite of *Kai Wufang* (opening the way). There are two kinds of *kai wufang:* a grand one and a little one. For the former, at least six priests are needed; for the latter, one to three priests. The priests lead all the *xiaozi* into the courtyard to dance around five tables that stands for five directions in the universe: east, south, west, north, and center. Paper money, incense, and food are offered, respectively, to five gods who are in charge of those directions. Five paper tablets of the directions are burned one by one, suggesting the gods have received the offerings and have opened up all the directions for the deceased to travel. Then, the priests lead all the *xiaozi* to cross a bridge built in the courtyard. The bereaved family can choose to construct *gao qiao* (high bridge) or *ping qiao* (flat bridge). For the high bridge, 11 to over 40 square tables are needed. The tables form a pyramid-like shape, with one on the top. The flat bridge can be built with three or five tables placed on the same level. Under the bridge, the priests put a bronze snake (actually made of bamboo), an iron dog (made from bamboo and paper), a paper boat, and a blood basin (basin with red color water). They symbolize the bloody river that separates the living world and the world of the dead. The bridge is called *Laihoqiao* that symbolically connects the two worlds. The priests and all the *xiaozi* (with the

eldest son carrying the soul tablet of the deceased) will cross the bridge three times, suggesting crossing three bridges. If the little *kaifang* is chosen by the family, the priests will let the eldest son move the soul tablet across three paper tablets on a long bench that symbolizes *Laihoqiao.* Crossing these bridges suggests that the deceased has entered the world of the dead and will be judged by the gods there.

5. Rite of *Yingwang Anwei* (welcoming back the soul of the deceased). A priest puts a kerosene lamp at the front door of the house to light the way for the soul of the deceased to return home. A temporary bathtub is improvised by using a bucket or basin full of water. The sacred water purchased from the gods earlier is poured into the tub. The tub is enclosed by a straw or bamboo mat. The soul tablet of the deceased and another red tablet representing ancestors are moved over the bucket of water, indicating that the deceased and his or her ancestors have taken a bath before entering home. The bath washes away dirt they carry and refreshes them up. Then, the two tablets are set at the head of the altar, ready to receive offerings and prayers. Food and liquor will be placed in front of them.

6. Rite of *Tuanfu* (praising the deceased). First, the eulogy writer reads his writing with great emotion in the *tangwu.* All the *xiaozi* should kneel down on the ground, while other senior relatives stand around listening. The eulogy usually covers the whole life of the deceased, from the birth to the death, emphasizing his or her contributions to the family, the sufferings and achievements in his or her life. Then, the chief priest reads *Shi Yue Huaitai* (Ten Months of Pregnancy) or *Shi Er Xifu Bu Xiao Niang* (Ten Daughters-in-Law Don't Observe Filial Piety to Their Mother-in-Law) for a female client. The first is a rhymed account of the happiness and sufferings that a mother has experienced in her 10 months of carrying a baby and in nursing the baby for the first 3 years after the birth. The second one describes various unfilial behaviors of 10 daughters-in-law and the great sufferings their mother-in-law has experienced. If the deceased is a man, the priest reads *Shier Dian* (Twelve Large Houses). It is a story about the sufferings of a father who strives all his life to build houses for his 12 sons.

7. Rite of *Baican* (praying to gods for the deceased). The bereaved family invites old women from the village to sing laments in the *tangwu.* They kneel down on cushions or mats on the ground in front the altar in the *tangwu.* They kowtow toward the altar as guided by the priests. They sing laments (a combination of weeping, singing, and speaking) to mention many good deeds the deceased has done in this world and to pray for the gods to release him or her from all of his or her crimes or misdeeds committed in this world. It is believed that the deceased at this time is going through the 10 courts in the *diyu* (the hell or underworld) and is being judged by magistrate, secretary-attendants, and demonical monstrous underlings of each court. *Baican,* and *tuanfu* as well, are intended to seek mercy for the deceased so that he or she may not be punished too severely and can go to the Western Heaven of Paradise.

8. Rite of *Chushang* (the funeral procession). Early in the following morning, the bereaved family checks the coffin and the body. If the deceased is a woman, her brother or relatives from her own natal family are invited to make the final check to make sure that the body is set at the right place and no unwanted object such as nails are placed inside the coffin. Then, the chief priest knocks at the coffin with an ax, without chopping it, while chanting scripts to wake up the soul of the deceased. He uses rooster blood to write a few magic spells on the coffin to drive away any hungry ghosts and evil spirits. After the priest's performance, the coffin is closed and sealed by old men from the village. Eight selected villagers carry the coffin on their shoulders. Firecrackers are first set off to scare away ghosts and give courage to the deceased on his or her way to the Western Heaven of Paradise. The funeral parade sets out for the gravesite. At the head of the parade is an old villager carrying a torch, which symbolizes a light in the otherworld for the deceased. Next is the *fan* carried by a son or nephew of the deceased. The soul tablet of the deceased is at the third position carried by the eldest son. The funeral band follows the soul tablet. Next comes the coffin. Following the coffin are the *xiaozi,* relatives, friends, and neighbors. Relatives and friends carry *jizhang* (pieces of cloth offered to the deceased by relatives and friends, which are put up on bamboo sticks like flags and on which the names of the donors and the deceased are written). The priests and the feng shui master are at the end of the parade. At the gravesite, the feng shui master first drops some rooster blood into the pit to drive away any hidden ghosts and demons, and then cleans the pit with a few drops of

the sacred water before the coffin is moved in. He then orients the coffin in the most beneficial direction to secure the best feng shui that will determine the future prosperity of the bereaved family. He shovels some soil on each corner of the coffin before the *xiaozi* throw dirt on the coffin with their hands. With this done, the *xiaozi* hurry home, taking a different route in order to evade the soul of the deceased in case it follows them. Two or three villagers stay behind to fill the grave pit with soil first and then pile up the soil into a cone-shaped tomb. Later, the bereaved family will cover up the tomb with a layer of stone to prevent the mound from erosion. They may set up a stone monument in front of the tomb with the deceased's name and the time of birth and death.

9. Rite of *Shao Huotang* (burning paper house, the *fan,* and the soul tablet). Returning from the gravesite, the bereaved family provides a final feast to all the participants. Food and drink are offered to the soul tablets of the recently deceased and the ancestors at the altar in the *tangwu.* This is the last meal for all of them at home. After the feast, the priests ask the *xiaozi* to remove the two soul tablets out of the house to an open space. A miniature replica paper house made by craftsmen is also moved there. The soul tablets are placed inside the paper house. The *fan* is placed against the paper house. Paper furniture, paper TV sets, and any other paper objects are placed either inside the paper house or outside. They are set on fire. Measures are taken to ensure that they are completely burned up. This is called *ciling* (sending away the souls of the deceased and other ancestors). Burning the two tablets suggests that the deceased now has joined his or her ancestors. After burning down the paper objects, the chief priest asks for a rooster, some food and liquor, and a bundle of sorghum heads. Having chanted scriptures, the priest puts a drop of rooster blood into a bowl of liquor and read the patterns to see if the deceased is pleased with the funeral. He then picks up the bundle of sorghum heads and uses it as a broom to symbolically sweep the floor for the bereaved family and the village. This drives away all hungry ghosts that wander around the house and the village after the death, and the villagers can resume normal life. This marks the end of the funeral.

Postburial Ritual

Burial does not end the descendants' obligation to the deceased. The bereaved family observes a period of mourning for 49 days. On every 7th day, the family members go to the tomb to offer food and paper money to the deceased. Locally, this is called *shaoqi.* On the last 7th day (the 49th day after the burial), the bereaved family prepares a banquet and invites relatives and friends for the banquet. Priests are hired to chant scripts. This marks the end of the mourning period for the bereaved family. After that, the bereaved family makes offerings to the deceased on the 100th day after the burial, the deceased's birthday, the death anniversary, and festivals such as the Chinese New Year.

Significance of Death Ritual

The death ritual in Sanyuan Village serves to reinforce family and kin group cohesion. It enhances cooperation and harmony in a community. It facilitates grieving and helps reduce fear and anxiety. It teaches villagers to observe filial piety to their parents and to take good care of their children. It provides principles to regulate human behaviors and interpersonal relationship. It displays economic and social resources that a bereaved family can utilize at a time of crisis. It transforms the discontinuity of biological death into social continuity and the corpse into an ancestor. It helps the deceased to adjust to the new environment and helps the living to understand that the deceased has become one of their ancestors. It ensures harmony between the living and the dead, and between the dead and supernatural beings. It celebrates death.

— *Gang Chen*

See also **Geertz, Clifford R.; Religious Rituals; Rites of Passage; Tylor, Edward Burnett**

Further Readings

Bell, C. (1997). *Ritual: Perspectives and dimensions.* New York: Oxford University Press.

Doty, W. G. (1986). *Mythography: The study of myths and rituals.* Tuscaloosa: University of Alabama Press.

Geertz, C. (1983). *Local knowledge: Further essays in interpretive anthropology.* New York: Basic Books.

Huntington, R., & Metcalf, P. (1991). *Celebrations of death: The anthropology of mortuary ritual.* Cambridge: Cambridge University Press.

Malinowski, B. (1954). *Magic, science and religion and other essays.* Garden City, NY: Doubleday Anchor Books.
Tylor, E. B. (1871). *Primitive culture.* New York: Putnam.
Watson, J. L., & Rawski, E. S. (1988). *Death ritual in late imperial and modern China.* Berkeley: University of California Press.

Degenerationism

There have been elements of degenerationist thinking for many centuries, although the term only arose in the 19th century in a specific context of evolutionary theory. Many ancient cultures understood their times as degenerate remnants of a golden age. For example, traditional Chinese history spoke of the golden age of the philosopher-king who is said to have ruled China with exemplary wisdom in ancient times. The name and dates of the philosopher-king differ according to which school of Chinese philosophy one consults, but they all agree that subsequent ages are ages of decline. Egypt, India, Greece, and Rome all had variations of the myth that current ages are degenerate survivals from a long-lost golden age. For example, Hesiod, the Greek poet and contemporary of Homer, outlined the classical Greek view of a golden age of gods and men living in harmony, which was followed by the silver, bronze, and iron ages, each one successively more grim for humans. The Christian religion continued this myth with the story of the expulsion of Adam and Eve from the Garden of Eden, and all subsequent humanity living with the consequences of their sin.

Variations of these mythologies of degeneration held the field with little change until the 19th century, when a new crop of degeneration theories arose. The Swiss historian Jacob Burckhardt (1818–1887) became an influential proponent of the idea that most of the ideas and trends characteristic of modern civilization were harbingers of a leveling barbarism. Friedrich Nietzsche (1844–1900) took Burckhardt's pessimism further, seeing the degeneracy as endemic to European civilization as a whole.

But it was developments in science that stimulated the most original variations on the old theme of degeneration. Evolution, particularly as it was expressed in the first half century after Darwin, was overwhelmingly progressionist in tone, being widely regarded as a process whereby organisms, including humans, move from simple to more complex forms of organization. When this was applied to human evolution, many people assumed that this meant history operated in a linear progression from backward states toward civilization. Furthermore, this progression upward was widely held to be a permanent condition.

The scientific variation of degeneration theory was, on the surface at least, a respectable enough idea: While most species move from the simple to the more complex, some move in the opposite direction toward more simple, or degenerate, forms. This idea was applied for a while to the study of ants and microorganisms and had a brief vogue in the 1870s before falling away in the face of the overwhelming consensus that evolution involved progress.

It was in the application of degeneration theory to human evolution that it had found a more congenial home. Degenerationism soon found an important role in the non-Darwinian brands of evolutionism now known as *Social Darwinism.* It was suggested, for instance, that the races held to be the most primitive, the Fuegians, Bushmen, and Australian Aborigines, had all at some time degenerated from more advanced forms. Social Darwinists were prone to appeal to the White races to adopt some attitude or other so as to avoid a similar fate. Variations of degenerationism also had a brief vogue among supporters of eugenics, and among those who studied criminology. The Italian criminologist Cesare Lombroso (1836–1909) was particularly influential in this area. Another early exponent of aspects of degenerationism was the German biologist Anton Dohrn (1840–1909). Dohrn's legacy, it has to be said, was far wider than his digression into degenerationism; he made important contributions to several areas of experimental biology. But degenerationism among scientists declined as Social Darwinism and eugenics declined as credible aspects of evolutionary theory.

In the English-speaking world, the most comprehensive 19th-century attempt at a theory of degeneration came from Phillip Gosse (1810–1888). In *Omphalos* (1857), Gosse, who was a biblical literalist, divided time into what he called diachronic, or historical time, and prochronic, or unreal or virtual, time. Gosse argued that even 20 minutes after the

Creation, the Garden of Eden would have shown signs of the passage of time that in real time had not taken place. In this way, the trees would have had annual rings commemorating years that had not passed, and Adam would have sported a navel from a birth that had not taken place. This bedrock of prochronic time, Gosse argued, was a necessary foundation for subsequent diachronic time to proceed from.

Gosse's book failed entirely to convince people, even other Christians concerned with the consequences of evolutionary theory. It was soon recognized that the arguments in *Omphalos* were unscientific in that they were quite untestable.

Gosse's book had been motivated in part by his religious orthodoxy, but his failure to harmonize religion and science did not deter other defenders of religious orthodoxy from employing variations of degeneration theory to support their religious beliefs. For instance, a noteworthy minority of 19th-century missionaries spoke in degenerationist terms with regard to subject peoples. Not only were the "savages" degenerate by virtue of beings descended from the sin of Adam, as all humans were thought to be, but they shared an extra helping of degeneracy by virtue of their very savagery. Unlike the Christians, savages had degenerated still further into devil worship, cannibalism, and all the other horrors that confronted the missionaries. Classified in this way, the missionaries were able to see their role as entirely beneficent and kindly.

While degenerationism came and went within two generations in the areas of science and religion, perhaps its most long-lasting legacy can be found in literature. Two early examples would include Robert Louis Stevenson's *Dr. Jekyll and Mr. Hyde* (1886), which explored the notion of an evolutionary duality in man, with modern man being confronted with an atavistic, inner-savage alter ego, and H. G. Wells's hugely influential *The Time Machine* (1895), which told of a future world where most humans have degenerated into Morlocks, living a spectral existence as toilers and providers for the ruling Eloi. The cultural pessimism that is so influential in much of contemporary literature and social theory is a direct descendant of the degenerationism of the 19th century.

— *Bill Cooke*

See also **Darwinism, Social; Eugenics; Gosse, Philip**

Further Readings

Bowler, P. (1992). *The non-Darwinian revolution.* Baltimore & London: Johns Hopkins University Press.

Gosse, E. (1970). *Father and son.* London: Penguin Books. (Original work published 1907)

Gosse, P. (1998). *Omphalos: An attempt to untie the geological knot.* Woodbridge, CT: Ox Bow Press. (Original work published 1857)

Herman, A. (1997). *The idea of decline in Western history.* New York: Free Press.

Deleuze, Gille (1925–1995)

Deleuze was a philosopher deeply influenced by his French predecessor Henri Bergson and early on by philosophical phenomenology, though he moved away from the latter in his most famous work. The pattern of his most influential work emerged in *Nietzsche and Philosophy* (first published in 1962), where he read Friedrich Nietzsche as the opponent of dialectic and negativity in Hegelianism. What Nietzsche offered as an alternative was an approach based on the affirmative, on forces, and on chance. After this, Deleuze's work becomes more individual and quirky, less systematic and formal in approach. His style now gives the impression of forces overflowing conceptual boundaries and in which he practiced the philosophical theory he had put forward in relation to Nietzsche. In accordance with Nietzsche, he tries to overturn the Platonist-metaphysical heritage in Western thought. He questions Plato's hierarchy of ideal forms, objects as imitations of forms, and our perceptions as imitations of those objects, by suggesting that such a hierarchy makes the forms dependent on their being copies of the forms. If the existence of the forms rests on the possibility of there being copies of them, then the metaphysical priority of forms over objects and perceptions is undermined. If Platonist metaphysics is undermined by the possibilities of difference and repetition of metaphysical forms, then all conceptual rigidities are undermined by the way that sense always runs into contradictions. I cannot even name anything without being caught in the contradiction between claiming that the name is connected

uniquely with what it names and claiming that names and objects are distinct entities.

Deleuze was able to advance into a rich affirmative alternative to logical-metaphysical philosophy through a collaboration with the psychoanalyst Félix Guattari. The central result was the project *Capitalism and Schizophrenia,* which appeared as two books: first. *Anti-Oedipus* (first published in 1972), and then its sequel, *A Thousand Plateaus* (first published in 1980). It is the latter book that has become the standard reference point for Deleuzians. *Capitalism and Schizophrenia* superficially seems to weave together Freudianism and Marxism, but it is at least as much an attempt to collapse the Marxist and Freudian systems as it is an application of them. Deleuze and Guattari jump between literature, philosophy, psychoanalysis, anthropology, physical sciences, and all domains in an approach that takes force and the direction of force as its basis. Force appears in production, but production produces antiproduction as it forms itself into different kinds of machines. As in Bergson, there is an emphasis on constant flows and becoming in an approach that aims at being both transcendental and materialistic, "transcendental materialism." The materialism is transcendental because it does not refer to fixed forms, but to the constant transformations of forces. There is no deep structure behind what we sense, there are just endless multiplicities of levels, or plateaus, where energies appear, transform, and move between plateaus.

The social levels are defined through production of machines by machines and the ways in which that flow of force always breaks itself up, creating static despotic and paranoiac systems as we try to encode the Earth. As production encodes, the codes are unstable, interrupt production, and must collapse as codes are scrambled and new codes are produced. This approach is sometimes explained in terms of Benedict de Spinoza's philosophy of the complete immanence of being, that is, being as what exists only in the material world. It is also brought into discussions of literature, painting, cinema, and Michel Foucault. Foucault wrote the preface to *Anti-Oedipus,* but there was a later conflict and a critical though appreciative book by Deleuze on his old associate.

— *Barry Stocker*

See also **Bergson, Henri**

Further Readings

Gilles D. (1983). *Nietzsche and philosophy.* New York: Columbia University Press.

Gilles D., & Guattari, F. (1983). *Anti-Oedipus: Capitalism and schizophrenia.* Minneapolis: University of Minnesota Press.

Gilles D., & Guattari F. (1987). A thousand plateaus: Capitalism and schizophrenia. Minneapolis: University of Minnesota Press.

Deloria, Ella Cara (1889–1971)

Ella Cara Deloria, also known as *Anpetu Waste Win* (Beautiful Day Woman), was a noted Yankton Dakota (Sioux) anthropologist, linguist, educator, and novelist. With her intimate knowledge of the Lakota and Dakota dialects combined with an understanding and interest in her own culture as well as the world around her, she worked to preserve the riches of Native culture while representing those riches to outsiders in a dignified manner.

Ella Deloria's mother was Mary Sully Bordeau Deloria. Her father, Philip Deloria, grew up in the traditional camp circle and was educated in seminary. He became one of the first Dakota ordained an Episcopal priest. The family's roots were Yankton (central) Dakota, as well as Irish and French. Ella was born in the White Swan district of the Yankton reservation in eastern South Dakota. Both parents were previously married; each had two daughters, making Ella their first child in a family of five girls. The couple's other children were Philip, who tragically died at 10; Mary Susan, who became an artist; and Vine, who also became an ordained Episcopal priest.

Ella was raised at Wakpala on the Standing Rock Reservation, where she attended school at the mission founded by her father. Growing up, she spoke the Yankton dialect of Dakota at home and learned the Lakota dialect from her playmates on the Standing Rock Reservation. She also mastered the eastern dialect of Dakota, English, and later, Latin. She grew up immersed in traditional and Christian Lakota culture.

Ella continued her schooling in 1902 at All Saints Boarding School in Sioux Falls, another Episcopal institution. She attended the University of Chicago for a short time, won a scholarship to Oberlin

College, in Ohio, where she attended for 2 years, and then transferred to Teacher's College, Colombia University, in New York City, where she earned her bachelor of science degree in 1915. There, Deloria met the eminent anthropologist Franz Boas and began a fruitful though sometimes difficult collaboration, also working with Boas's students, anthropologists Ruth Benedict and Margaret Mead.

Ella Deloria saw the enactment of kinship roles as key to the integrity and continuation of Dakota society—an understanding that was not simply an intellectual construct, but a lived reality for her. After graduating from college, she returned to care for her aging parents and for her sister Mary Susan, who suffered from brain tumors. Committed to education, Deloria taught at All Saints beginning in 1915 until she went to Haskell Indian School in 1923, where she taught dance and physical education. In 1916, her mother died, and Ella took over the care of her sister Mary Susan and of her brother Vine, as well as her aging father.

Deloria began conducting formal research on Dakota language and culture in 1927. Sponsored by Franz Boas, she traveled between South Dakota and New York, making both geographical and cultural transitions as she had done from her earliest years. At Boas's request, she checked the work of James Walker, an early ethnographer of the Lakota, with contemporary Lakota people knowledgeable in the culture from 1896 to 1914. She translated the Lakota language texts of George Bushotter, a Lakota who moved from South Dakota to Washington, D.C., and worked at the Bureau of American Ethnology under James Owen Dorsey in 1887 and 1888. She also translated the Santee Dakota texts of missionary linguists Gideon and Samuel Pond and checked the accuracy of missionary linguist Stephen Return Rigg's Dakota dictionary. Deloria's collaboration with Boas lasted until his death in 1942.

At the same time, Ella Deloria had her own interests in studying language and culture and actively pursued them. Never formally trained as an anthropologist, as she was not able to muster the considerable financial resources and free time required to complete an advanced degree; most of her personal and financial resources were committed to the support of her family, a factor that sometimes brought her into conflict with Boas, who felt she should have been more available for research. Nevertheless, Deloria had a deep commitment to scholarship and to the documentation and continuity of her own culture and carried on an extensive correspondence with Boas, Benedict, and Mead. These documents are particularly interesting to anthropologists, as they transcend Deloria's writings about Lakota and Dakota culture and give vital insights into her own personal history, her understanding of her two worlds, as well as depicting her personal and scholarly struggles.

In addition to her anthropological research and to caring for her family, Ella Deloria worked at a wide variety of occupations. In addition to early teaching positions, she worked for the Campfire Girls and the Young Women's Christian Association and gave various lectures and demonstrations on Native culture. She collaborated on a study of the Navajo sponsored by the Phelps-Stokes Fund and the Bureau of Indian Affairs. She consulted with the Lumbee Indians in Pembroke, North Carolina, writing a pageant in consultation with them. She won the Indian Achievement Award in 1943, the highest honor at the time, from the Indian Council Fire in Chicago. She returned to St. Elizabeth's in Wakpala as an administrator from 1955 to 1958, and later became an instructor for the Nebraska Teachers Corps and St. Mary's Indian School for Girls in Springfield, South Dakota, with positions at the Sioux Indian Museum in Rapid City, South Dakota, and as assistant director of the W. H. Over Museum, in Yankton, South Dakota. At the end of her life, she was compiling a Siouan dictionary. In recognition of her considerable intellectual ability as well as meticulous scholarship, she received grants from the Wenner-Gren Foundation in 1948 and from the National Science Foundation in the 1960s. Ella Deloria suffered a stroke in 1970 and died the next year of pneumonia.

Today, her importance has grown, not only in her legacy of anthropological interpretation from a female Dakota perspective, but in the interpretation and translation of her own life and scholarly production generated by other scholars interested in Native and women's studies, marginality, postcolonial studies, literary criticism, cultural resistance and accommodation, and the contested ground between traditional and Christian beliefs. She is important not only for what she recorded, translated, and interpreted but also for who she herself was: a Yankton Dakota, a woman, and a member of an extended kinship group who both assisted and inspired her relatives (and was in turn inspired by them) and whose members include her artist sister Mary Susan; her Episcopal priest brother, Vine Deloria Sr.; her scholar/activist nephews

Philip S. Deloria and Vine Deloria Jr.; and her historian grand-nephew Philip J. Deloria.

Ella Deloria's published works included linguistics *Dakota Grammar* (published with Franz Boas), Native language folk stories, Dakota texts, ethnographies such as *The Sun Dance of the Oglala Sioux,* a popularized portrait of Dakota history and culture entitled *Speaking of Indians* (1944), and her novel *Waterlily,* published posthumously in 1988. The majority of her research and correspondence, yet unpublished, is archived in places such as the American Philosophical Society in Philadelphia; Vassar College Special Collections, Poughkeepsie, New York; and the Dakota Indian Foundation in Chamberlain, South Dakota. Beatrice Medicine, herself a Lakota ethnographer, knew Ella personally and has written on her life, as did Raymond J. DeMallie and her nephew Vine Deloria Jr. The most extensive biography of her life was written by Janette Murray. The written scholarship on Ella Deloria herself and her scholarly output continues to grow.

— *Raymond A. Bucko*

See also **Boas, Franz; Native Peoples of the United States; Women and Anthropology**

Further Readings

Deloria, E. (1998). *Speaking of Indians* (Introduction by V. Deloria Jr). Lincoln: University of Nebraska Press. (Original work published 1944)

DeMallie, R. (1980). Ella Cara Deloria. In B. Sicherman (Ed.), *Notable American women, the modern period: A bibliographical dictionary* (pp. 183–185). Cambridge, MA: Harvard University Press.

Medicine, B. (1988). Ella Cara Deloria. In U. Gacs, A. Khan, J. McIntyre, & R. Weinberg (Eds.), Women anthropologists: A biographical dictionary (pp. 45–50). New York: Greenwood Press.

Murray, J. K. (1974). *Ella Deloria: A biographical sketch and literary analysis.* Doctoral dissertation, University of North Dakota.

Dementia

The term *dementia* entered the English language from the French in a rendering of French psychiatrist Pinel's (1745–1826) word "démance" (from *Treatise on Insanity,* 1806). Its ultimate source is Latin, meaning "loss" (or out) of "mind" or "reason." Some forms of dementia are transitory, while others are neurodegenerative and fatal. Dementias may co-occur or present independently. They include Alzheimer's disease (AD) and vascular dementia (VaD) (formerly, multi-infarct dementia [MID]), the two most common; dementia with Lewy bodies (DLB); Pick's Disease (PD); and dementias due to other medical conditions such as HIV disease, Huntington's Disease (HD), Parkinson's Disease (PaD), and dementia due to Creutzfeldt-Jakob Disease. Dementias also derive from toxic substances and brain or head trauma.

Dementia, as opposed to delirium, which appears rapidly and fluctuates, denotes a progressive loss of mental powers in multiple domains, including memory, language, and reasoning from previous levels of functioning. Difficult behaviors and psychiatric symptoms (BPSD) also may develop. The brain/behavior contrast leads to conflict between psychiatry and neurology about which has proper authority over the disorder. Differential diagnoses may involve clinical and instrumental assessment, neuroimaging, laboratory, genetic investigation, and ultimately, brain autopsy. However, the neuropathology may not accord with clinical symptoms.

In the early 1900s, *senile dementia* was an unremarkable finding among seniors. The 1901 encounter between German psychiatrist, Alois Alzheimer (1964–1915), and his patient, Auguste D. (died 1906), led to a reformulation because of her comparative youth (51 years). Alzheimer's first papers concerning her (1906, 1907) led to the bestowal of the eponym "Alzheimer's Disease" by the eminent psychiatrist Emile Kraepelin. As a *presenile dementia,* so distinguished by Kraepelin, AD took some time to gain ground and did so in part by expanding its application from presenile to senile cases.

Today, AD is understood as involving the deposition of amyloid plaques and the development of neurofibrillary tangles in the brain, in line with Alzheimer's findings. These characteristic features have independent developments with little overlapping distribution. However, researchers have incomplete knowledge of their relationship to clinical symptoms. Here, we note that Alzheimer's second diagnosed case of AD, Johann F., did not exhibit the tangles.

The lack of specificity problematizes pharmacological research strategies, as well as the elucidation of

distinct disease etiologies even in the rare cases of the familial AD (about 2% of cases) and where there is an increased risk (e.g., with apolipoprotein 4). Increasingly, researchers suggest that AD is brain aging, not a disease process.

Social science interest in dementia centers on AD and sees related biomedical theory and research as cultural practice. Research areas include the decreasing clarity of disease differentiation and etiology; the promotion of ill-defined precursor states and their ethical challenge; the cross-cultural variation in the meaning and roles of cognition, memory, seniority, and caregiving; the evident sociocultural and political features of the development of AD as disease; gender issues in research and its interpretation; the role of pharmaceutical companies in disease conceptualization; dementia narratives, and the study of the medical sciences such as genetics within the cultural studies of science from medical anthropology.

— Atwood D. Gaines

See also **Medical Genetics**

Further Readings

Cohen, L. (2000). *No aging in India.* Berkeley: University of California Press.

Growdon. J., & Rossor, M. (Eds.). (1998). *Blue books of practical neurology series: The dementias.* Woburn, MA: Butterworth Heinemann.

Hinze, S. W., Atwood D. G., Lerner A. J., & Whitehouse, P. J (1999). An interdisciplinary response to the Reagan Center Report on women and AD. A*lzheimer Disease and Associated Disorders, 13,* 183–186.

Post S. G., & Whitehouse P. J. (Eds.). (1998). *Genetic testing for Alzheimer disease: Clinical and ethical issues.* Baltimore: Johns Hopkins University Press.

Whitehouse, P. J., Gaines A. D, Lindstrom H., Graham J., & ADWG (Anthropology and Dementia Writing Group). (2004). Dementia in the anthropological gaze: Contributions to the understanding of age-related cognitive impairment. *The Lancet Neurology 3*(12).

Whitehouse, P. J., Maurer K., & Ballenger J. F. (Eds.). (2000). *Concepts of Alzheimer disease: Biological, clinical, and cultural perspectives.* Baltimore: Johns Hopkins University Press.

Demography

Modern demography seeks to characterize populations or subgroups of populations based upon statistical commonalities or differences between them. Clearly, some of these may be largely cultural (e.g., age of marriage, total fertility, socioeconomic status) or largely biological (e.g., resistance to particular strains of malaria, skin cancer risk, mean height), while others may be almost entirely cultural (e.g., knowledge of contraceptive technology) or almost entirely biological (e.g., presence or absence of particular inheritable genes). The disentanglement of biology and culture in group characteristics has proved to be complex.

While human societies are always conditioned by demographic characteristics, thinkers such as Malthus or, later, Boserup have made sweeping claims for the fundamental role of population growth as the key independent variable. Malthus, famously, argued that population inevitably grew quickly to exhaust resources regardless of the rate of growth in the latter, due to the superior power of a geometric series compared to an arithmetic one. This flawed perspective was unfortunately used as the basis for population policies biased against the poor and aimed at protecting social surpluses for the upper classes. Many have long found this claim unconvincing both in its mathematical formulation as well as in its biological, sociological, and technological naïveté. Scientific claims mixed with an uncritical stance toward the power structure unfortunately characterized demographic writing long after Malthus.

Demographers, with few exceptions, have tended to be atheoretical or uncritical, from a social science perspective, and to decontextualize variables such as mortality rates and fertility rates or even to devise demographic models purportedly applicable to many times and places. By contrast, anthropologists and historians argued throughout the 20th century for the need to recognize the complexity of the interactions between demographic, epidemiological, cultural, political, and environmental factors.

Perhaps the most influential demographic model, that of the demographic transition (introduced in 1929 but tailored to address U.S. policy objectives in 1945), is a case in point. This model uses fertility rates and mortality rates as dependent variables, differentially impacted by a variety of other factors, to explain the major demographic growth displayed by many

societies since the advent of modern public health as well as the recent arrival at very low population growth levels by, for example, Germany or Japan. The demographic transition models the change from high fertility rates and high mortality rates (close to static population levels) to high fertility rates plus lower mortality rates due to public health measures (leading to longer average life spans and rapid population growth). It then charts a period of increasing prosperity and state social security policies motivating smaller household sizes, leading to another equilibrium (again roughly static population) at lower fertility and mortality rates.

The model seems to fit the trajectory followed by many modernizing countries but falls considerably short, even at the statistical level, of a universal model for industrial societies, as the significant differences between German and U.S. demographic trends in the 20th century would suggest. What it most particularly lacks is any critical reflection on the necessity or current or future desirability of conformity to such a model. Barely below the surface of the model is the Malthusian assumption that U.S. concerns about a third-world population explosion are beyond criticism and that public health, economic liberalization, democracy, and family planning efforts will have their primary justification in slowing population growth in the poorer regions of the world. Predictably, despite the historical evidence that changing economic conditions caused demographic changes in Europe, the focus for poorer countries was placed on family planning. The forced sterilization campaigns in India from the 1950s to the 1990s were linked to this policy yet supported by the Indian government. The parallels between this view and the more overtly racist views of many demographers earlier in the 20th century largely obviate the differences.

In the latter part of the 20th century, demographers moved away from the highly criticized transition theory to attempt to incorporate culture. With the exception of institutional demography, which focused on the influence of historical social institutions (family systems, community organization, patriarchy, and so on) on demographic variables such as fertility, demographers nevertheless continued to be largely Eurocentric, ahistorical, and apolitical building, on diffusion theory, a branch of modernization theory, to predict the spread of European technology for fertility control to supposedly less enlightened areas.

Demographic models by nondemographers have had different agendas. The problem of explaining historical increases in agricultural production (per unit area) led Boserup to argue that technical progress in agriculture was historically motivated by demographic pressure. Boserup proposed a universalistic model in which increasing population pressure led humans to gradually ratchet up the intensity of agriculture (equated with frequency of land use) from slash-and-burn through gradual stages to annual production, characterized at each stage by lower returns to labor (primarily due to soil exhaustion or the extra labor needed to maintain fertility). The model proposed that these diminishing returns to labor were acceptable only because higher returns per unit area were achievable and were necessitated by demographic pressure. Thus, demographic necessity was the mother of technological invention and individual maximization the driving force. Few believe matters are this simple. The ancient custom of flood recession agriculture, where nature annually renews fertility, followed a different trajectory, more easily fitting political economy models than demographic or individual maximizing ones. When irrigated agriculture obtained long-term multiplier impacts from infrastructure, this also necessitated complex political change enabling choices between long, and short-term benefits, not simple individual responses to population pressure.

If Boserup made politics a mere response to demography, Carneiro suggested that population pressure was the proximate cause of state formation. In his model, states occur where populations are circumscribed by ecology such that their eventual concentration leads to conflict, which, in turn, necessitates some form of higher organization. Provided that productivity is high, such as along navigable river systems, population growth brings ever-greater population pressure and ever-greater need for political resolution of conflict, and eventually this leads to state creation. Carneiro incorporated the idea that agricultural technology itself is relative and so levels of demographic pressure leading to conflict are themselves dependent on the capacities of the technology, as applied to the natural resources, to support population growth. While Carneiro proposed this model as a general theory of state formation, subsequent archaeological work has not sustained its specific premise that population pressure preceded the development of hierarchy, nor its general claim for the

foundational role for population circumscription and demographic pressure in state formation.

A contextualized historical demography brings specialized techniques that social scientists in many fields rely on to understand both human and animal populations. Ratios of males to females and age distributions can often be reconstructed and used to chart major economic and social change. Even tabulating household composition solely in terms of age and gender tells us a great deal about any society. If we add to this study of disease, nutrition, and DNA (human, animal, and microbe), also discernable from skeletal material, a vast array of insights into social structure, kinship, and migration of past societies can be gleaned from the most basic demographic materials.

Societies differ enormously in terms of the availability of ancillary materials of demographic importance, and these may vary from evidence of dwelling spaces, refuse heaps, or potshards all the way to several hundred years worth of birth and death records for each parish in a country (as in France). Surface surveys focusing on potshards in the Fertile Crescent (Mesopotamia) have provided one of the simplest reasonably reliable methods for estimating local population trends. Brinkman notes that although surface surveys are less than perfect, they provide one of the few ways to survey large geographic areas, and they exhibit enough internal consistency to support significant demographic arguments. Thus, they suggest that between 2100 BC and 625 BC, the population of lower Mesopotamia declined dramatically and did so differentially with an approximate 75% decline in the northern sector and a 25% decline in the southern regions. The same data also suggest that between 2700 BC and 625 BC a much larger percentage of the total population in lower Mesopotamia came to live in small towns and villages. These conclusions, and the associated details of regional patterns of habitation, obviously have many broad implications for an understanding of the period even if by themselves they raise more questions than they answer.

Anthropologists attempting to reconstruct historic or ancient population patterns have used demographic tools with their own research agenda without attempting a full scale rethinking of demography's assumptions or history. Recent attempts to reconstruct the peopling of the new world exemplify research driven by the assumption that in key respects, the indigenous inhabitants of the Americas resemble populations at similar technological levels elsewhere. In an attempt to gain precision on where these peoples came from, how (mainly but not entirely across Beringia, a land bridge existing in particular periods), and when (9–13,000 BC or substantially earlier), scholars have focused on genetic markers that distinguish particular subpopulations. This first step leads directly to a consideration of the many factors that may have influenced the fertility and mortality of each subpopulation.

The actual genetic analysis is heavily weighted toward the use of statistics gleaned from geographically based studies of modern populations in the Americas or Siberia to extrapolate to degrees of historical proximity. Little serious effort has been done to model the implications of culture specific marriage patterns in the Americas or to apply such models to past demographic analysis even though statistically significant parallel or cross-cousin marriage would impact the rates of change in genetic markers carried in male or female lines.

The Atlantic slave trade and the conquest of the New World, with its huge significance in increased mortality, brought major transformations to the Americas that in some sense obscure the dynamics of indigenous demographics. Both processes have thus directly tied research into ancient demographics in the New World to similar research in the historic period beginning with the conquest. The scarcity of precontact skeletal remains has meant that modern populations with indigenous ancestries need to be used as proxies. This raises many issues, since most Native Americans have their own origin stories, do not subscribe to an Asian origin, and view the enterprise as potentially weakening remaining rights to land.

While demographers and physical anthropologists now regularly use sophisticated statistical and biological techniques to study health, disease, migration, and nutrition among different populations, many social scientists still view the field with lenses colored by a perception of the field's history of apolitical or even overtly racist research. The modern preoccupation of private insurance companies with eliminating risk has raised a modern concern about the potential misuse of demographic statistics. This touches on the more general issue of human subjects protection within academia and the very real difficulties and risks, including legal risks to researchers, associated with collecting large databases of DNA even for the most worthy of causes. It may become increasingly difficult to do demographic research. If this leads to

critical reflection and debate on research agendas, it may have a positive outcome, while if demographic research is simply stifled, much of great value will be lost.

— *Thomas K. Park*

See also **Genetics, Population; Malthus, Thomas**

Further Readings

Crawford, M. H. (1998). *The origins of Native Americans. Evidence from anthropological genetics.* Cambridge: Cambridge University Press.

Greenhalgh, S. (1996). The social construction of population science: An intellectual, institutional, and political history of twentieth-century demography. *Comparative Studies in Society and History, 38*(1), 26–66.

McNicoll, G. (1994). Institutional analysis of fertility. In K. Lindahl-Kiessing & H. Lundberg (Eds.), *Population, economic development, and the environment* (pp. 199–230). Oxford: Oxford University Press.

Salzano, F. M., & Bortolini, M. C. (2002). *The evolution and genetics of Latin American populations.* Cambridge: Cambridge University Press.

Dendrochronology

Dendrochronology is the study of the dating of trees by their annual rings and, subsequently, other objects, both historical and environmental events and processes. Because of some tree species' long life spans and growth responses, a reliable pattern of temperature and precipitation has been recorded in their woody tissue. Just beneath the bark of a tree is a tissue called the vascular cambium, a thin layer of cells that is responsible for the growth in diameter of the trunk. This tissue rapidly divides in two directions, with the outer cells forming the phloem, the transport system that carries food from the photosynthetic tissues to the other parts of the tree and also provides storage and support. The inner cells produce the xylem cells, which are thick-walled cells with perforated or missing end walls, resulting in the continuous vertical transport of water. The size of these cells is dependent on the seasons of the year and its concomitant availability of moisture and fluctuating temperatures. In the spring, in temperate climates, when days are cool and soil moisture is more plentiful, the cambium layer produces large-diameter xylem cells. As the summer temperatures increase, it produces smaller cells. This cycle repeats itself each year, resulting in distinguishable growth rings of large, dark spring wood and the smaller, lighter summer wood. By counting these rings, the age of the tree can be determined.

The method of extraction, after locating appropriate trees and sites, is to use a borer, a threaded hollow tube that is screwed into the trunk of a tree and an extractor inside the borer shaft that enables the dendrochronologist to pull the sample from the tree. Generally, a second bore is made on the opposite side of the tree, taken to the laboratory, and sanded until the cell structure of the wood is visible under a microscope.

Astronomer Andrew E. Douglass, of the University of Arizona, is credited with the modern-day study of tree rings. While studying sunspot cycles, solar energy, and climate, he speculated that these cycles should be evident in the growth of trees. Further study established the pattern of the varying tree ring widths with climate. Subsequently, he used a process called *cross-dating* to establish exact dates of specimens in an historical perspective. By comparing the pattern of rings of trees in which life spans partially overlap, these patterns can be extended back in time, whether in the same region or in distant locations. Using intact and overlapping sections of living, recently, or long-dead trees or timbers, researchers have been able to construct an unbroken record, stretching back nearly 9,000 years, using the bristlecone pines in the American Southwest. In Europe, oak and pine chronologies reveal an 11,000-year-old record. With this information, scientists can accurately fix calendar dates to tree rings against a known chronological reference point.

Growth processes functioning within a geographical area are influenced by a variety of environmental factors, including water, temperature, slope, wind, sun, canopy removal, fire, and snow accumulation. Growth is at its best within a geographic area that is constrained only by the environmental factor that is most limiting. Trees with an ample supply of soil moisture show a minimal effect of climate on the ring width, but sites that have limiting factors favorable for growth show the largest degree of effect on the rings. The former rings are called *complacent,* and the latter

sensitive. For example, trees are more sensitive to changes in their environment along the margins of their natural range and, therefore, display the widest variations in their annual ring sizes. The bristlecone pine has been extensively studied because of its long life span and sensitivity to drought conditions. The oldest known living specimens are almost 5,000 years old, surviving in marginal habitats in the arid mountainous regions of California, Nevada, and Utah in the United States, at an elevation of over 9,000 feet. These locations, where water supply is the main limiting factor, result in extremely slow growth patterns and, therefore, provide data about the climate over past ages.

Wood is organic and, as such, is biodegradable, but certain conditions, such as dry climate, waterlogging in bogs and swamps, and fossilization, preserve the dead wood for hundreds and even thousands of years, thus providing a means to extend tree ring chronologies beyond living organisms.

In addition to the record of climates, tree ring chronologies have assisted in the interpretation of data from many archaeological sites. Douglass's early expedition to Pueblo Bonito, a prehistoric Native American settlement in the southwest United States, analyzed the wood used in its construction to determine its existence some 800 years before European arrival, exploration, and settlement on the North American continent. Exact dates of timbers, campfires, and artifacts from the ruins of many ancient sites have been established by tree ring study, together with evidence of the impact of natural events such as floods, fire, and droughts on Native human populations, history, and migration patterns. Cross-dating has also enabled the confirmation of times of construction of early structures of many buildings, barns, bridges, wells, and boats.

Prior to the study of tree rings, there was no way to independently confirm dates using radiocarbon methods. What was once an important assumption underlying radiocarbon dating, namely, that the amount of carbon 14 in the atmosphere had remained constant throughout history, had to be altered because tree ring evidence pointed to fluctuations in the amount of carbon 14 during different ages. While a green plant is alive, carbon 14 is incorporated into the organism by the photosynthetic reaction using carbon dioxide directly from the atmosphere. It stops when the organism dies because this atmospheric exchange ceases. The rate of decay is then calculated, but within a very large range. Instead of roughly dating an artifact within several centuries, scientists can use tree ring calibrated radiocarbon measurements that are within tens of years of the origin of organically derived archeological objects.

Fire scars are also evident in tree rings as a result of naturally occurring wild fires over the past centuries and have enabled scientists to reconstruct their frequency, extent, and effect on ecosystems and, subsequently, the impact on human populations.

Other recent areas of study using the principles of dendrochronology extend to solar variability, earthquakes, volcanism, erosion and deposition rates, glacial movement and moraine deposits, insect damage and geographic extent, and a variety of atmospheric pollutants, changes in the composition of the atmosphere, and other possible effects of hazardous wastes brought about by human interference with the natural processes.

— *Paul A. Young*

See also **Dating Techniques**

Further Readings

Douglass, A. E. (1920). Evidence of climatic effects in the annual rings of trees. *Ecology, 1*(1), 24–32.

Fritts, H. C. (1976). *Tree rings and climate.* New York: Academic Press.

Webb, G. E. (1983). *Tree rings and telescopes: The scientific career of A. E. Douglass.* Tucson: University of Arizona Press.

Dennett, Daniel C. (1942–)

American philosopher, Daniel C. Dennett focuses on the philosophical problems concerning science, particularly in the areas of mind and consciousness within an evolutionary framework. Born in Boston, Massachusetts, Dennett received his BA from Harvard in 1963 and his PhD in philosophy from Oxford in 1965. After graduation, Dennett taught at the University of California at Irvine as both an assistant professor (1965–1970) and associate professor (1970–1971) until accepting a position at Tufts University (1971). At Tufts University, Dennett was

promoted from associate professor to currently held position of professor (from 1975). During his tenure, he has held the position of chairman of the philosophy department (1976–1982) and received several distinguished positions, including both visiting associate professor/professor at other universities. Dennett has also lectured both nationally and internationally. Aside from lecturing, Dennett was both cofounder and codirector of the curricular Software Studio at Tufts. Amid his scholastic endeavors, Dennett holds memberships of several organizations (both national and international).

Throughout his academic career, Dennett has become a prolific writer with great philosophical contributions to science. He has published 11 books and multiple score of academic articles. Of his published books, *Content and Consciousness* (1969), *The Mind's I: Fantasies and Reflections on Self and Soul* (1981), *Consciousness Explained* (1991), *Darwin's Dangerous Idea* (1995), and *Freedom Evolves* (2003) reflect a historical account of cognition and implications it has concerning our species' epistemology, ontology, and teleology. Savoring the deepest philosophical questions, Dennett attempts to explain the implications stemming from a materialistic explanation of cognition. While searching for an inclusive paradigm, interests in computer design (developed from the computer revolution) and subsequent programming have become a point of special interest.

Contributions and Perspectives

Questions concerning epistemology and phenomenology have deep philosophical implications for our species ontology and teleology. These interdependent sources of human inquiry are the basis for our species cognitive existence. Drawing upon physical attributes with rational speculation, the ancient Greek philosophers Plato (ca. 428–348 BC) and Aristotle (384–322 BC) attempted to construct the processes by which human beings exist in the external world. Through this philosophical inquiry, the birth of metaphysics provided the necessary explanations that would replace both myth and superstition. After metaphysics became adopted and modified by natural theology, the Enlightenment provided an opportunity for explanations to be independent of religion and theology. The philosophical positions of both the rationalists and the empiricists movement provided fertile groundwork for all facets of psychology and their philosophical implications, especially in the area of cognition. With the advancements made both in biology and evolutionary theory, a deeper understanding of biological processes has replaced or modified previously held theoretical positions about all processes of cognition, including our species' derived ontology, epistemology, and self-directed teleology.

Dealing with these issues, Daniel C. Dennett attempts to provide answers for the questions that are derived from human consciousness. His blended intellectual inquiries span from the philosophical spectrum of old (e.g., epistemology, phenomenology, ontology, and teleology), with recent advancements in both the cognitive sciences and artificial intelligence (AI). In the process of contrasting today's philosophical perspective with scientific evidence, his resulting interpretation provides a unique staring point by which a holistic understanding of personhood can be attained. Strengthened by the understanding of Darwinian evolutionary theory, Dennett's philosophical perspective also gives a dynamic materialistic explanation of our species in relation to the rest of nature, resulting in philosophical controversies that give cues to the remaining influences of the philosophers of the Enlightenment.

The philosophical impact of René Descartes (1596–1650) upon psychology's theoretical foundation has been very profound. With the introduction of dualism, the separation of mind and body served to rationalize human cognition with spiritual implications. Although cognitive psychologists reject this idea of a separation of mind and body, the given materialistic explanation still has dualistic properties. This stems from the personal narrative or perspective of the self-aware individual (e.g., first person). It is both the singularity of incoming perceptions and first-person perspective, via centralized processing (e.g., central executive), that gives the phenomenological problem in what Dennett calls "Cartesian materialism." To neutralize this phenomenological problem, Dennett poses a third-person narrative or heterophenomenological stand that is similar to processes used in the scientific method. In this perspective, Dennett suggests that an individual, through the senses, creates multiple scripts by which the intentional stance of the individual can choose a point of focus (e.g., notional world). The initial discrimination of incoming stimulus need happen only once, whereby the resulting information creates the perception of a "virtual world" of continuous time and

space. This unique perspective may have solved the problems that cognitive theorists (e.g., Broadbent) have dealt with since the beginning of World War II. This would leave the primary filter factors to the physical limitations of the central nervous system and the focus of attention to intentions of the individual. It is the existence of intentions or intentional stance, in conjunction with the biological hardware, which may serve to both answer philosophical questions and give direction toward a united theory of cognition.

On a philosophical level, proving the existence of other minds by a priori means is impossible, not to mention promoting a sense of materialistic dualism. Though this Cartesian feat does nothing but to obscure and mislead areas of critical inquiry, evaluating intentions in an evolutionary framework starts to give a unique starting perspective. When dealing with the philosophical questions concerning whether other minds exist and aid in explaining the resulting behavior, Dennett utilizes an intentional stance of an object, whether human or machine (AI), to determine the teleological and to an extent ontological status. It is during this assessment of intentions that we attribute *belief* and *desires* to a particular organism or object by which varying degrees of rationality are expressed.

When addressing intentional systems, there are multiple orders of intentional systems. For example, zero order reflects the basic biological processes (e.g., fight/flight mechanism), often associated with basic survival. Beliefs and desires have no basis on this level. The first-order intentional system has beliefs and desires but has no reflections of these beliefs and desires. The second-order intentional system has reflective abilities concerning beliefs and desires. Third-order intentional systems have the capabilities, based on desires, of transmitting those beliefs in others. The fourth order is more complex. The fourth-order intentional system allows for the ability for understanding of these intensions. Although the construction of these orders is nebulous, whereby numbered class and characterization are moot, the orders by which these intensions are constructed reflect the biological designs and capabilities of the organism. These beliefs and desires, upon it being assumed, give the expression of freedom. Regardless whether freedom is an illusion, as sometimes portrayed in primate behavior, it is the ability of our species' syntax and semantic capabilities (internal and external) that enable and express this belief and desire in action, including the art of deception. Although both *design stance* and *physical stance* have certain objective benefits, it is the *intentional stance* that opens the "black box" of Skinner's behaviorism. In the long run, our species cannot be reduced to pure cause and effect. Just as culture (e.g., Dawkins's memes), thwarted our genetic disposition, the intentional stance frees our species from the blind deterministic outcome. Theoretically, the two are complementary, if not integrated by degree. The resulting processes, expressed in varying degree, are based on the predictive powers of rationality of the intentional system.

Throughout the history of philosophy, rationality has become a cornerstone of human ontology, teleology, and to an extent epistemology. As for Dennett, rationality is not some decisive and divisive deciding factor. Systems, by an evolutionary process, must operate by some principles of logic, even though it may not be readily apparent. Regardless if the system is biochemical or silicon based, rationality, though not total, is an adaptive strategy that allows for survival and reproduction in an environment. Though design and physical stance precede existence (evolutionarily speaking), it is the evolutionary-tested rationality of the intentional stance that allows for the possibility of prediction. Prediction is the key to understanding the intentional system of the object in question. For example, the a priori assumption of logic is given to Object A. If the object has been encountered prior, a posteriori cue in memory of past behavior gives behavioral predictability. If the object is new, perceptual cues within a logical framework (e.g., physical form and behavior) become encoded in memory in order for prediction to become possible. Evolutionary success is based upon the ability to predict such outcomes. The degree to which prediction can be utilized is based on the degree of physical (biological) complexity, signifying the evolutionary "leap" in the cognitive functions of our species. Although terms of belief and desires are expressions of freedom due to intentional systems, the inquiry nevertheless shows the complexity by which human systems operate in comparison to other species.

While treating systems as intentional systems, the mental processes by which human systems operate are a point of conjecture. The process of deriving the "mind" from organic matter boarder on determinism; after all, intention does not imply freedom of choice. As Dennett clearly points out, the algorithmic

process of mental activity, the same algorithmic process that can account for the evolutionary process of our species (including chance or random occurrences), may seem to leave little room for free will. Yet human action and interaction has the sensible qualities of freedom found within the array of beliefs and desires. The relationship among biology, mind, and the mind's intention are expressed within our species' unique expression of culture, above all, including language and materialistic expressions.

The impact of culture upon our species' ontology, and thus teleology, is essential to our own epistemological understanding. Just as natural selection (or as Dennett humorously depicts Mother Nature) produced our design, culture enables our species to modify it. Dennett, utilizing Richard Dawkins's storm of memes, realizes the impact that culture has on both the environment and phenotypic expressions, the resulting behavioral modification necessitated by changes in the environment (e.g., memes act as a selective factor). In the process of enculturation (the transmission of memes from one individual to another), the active processing of exposed memes tends to modify the individual's selectivity. Emotional responses to cultural, including aesthetical qualities, has an active role in behavioral expressions. Dennett, even while contemplating Dawkins's stance on the *Selfish Gene,* believes the behavioral characteristics of genetics can be subverted by the exposure of memes. Though not advocating blind determinism (the disappearing self) or behaviorism, Dennett provides the connection among these factors. Through logical progression (all that varies by degree) of mental activity, the overarching biological factors are either subdued or enhance by the cultural phenomenon. Directed by belief and desire, the opportunity for choice (even as simple as yes or no) is present, an indicator for existence of freedom. When viewed in its entirety, the combination produces something, evolutionarily speaking, unique—that being personhood.

Questions pertaining to personhood are just as problematic as proving the existence of other minds. Combinations of design stance, physical stance, and intentional stance interact with environmental factors that produce the dynamics of human personality. These characteristics, by which intensions can be revealed, possess a contextual element of value judgment. On a basic level, these value judgments are neither good nor evil (by traditional religious standards). They are amoral decisions that are utilized to promote the genetic welfare whereby these decisions are expressed by the variation (sometimes conflicting) of cultural expressions (e.g., mores and laws). The defining qualities or constituents of being a person have no magical or transcendental properties. The expressive use of language in practical reasoning can account for the necessitated views of ontology and teleology. In the course of human development, issues concerning causation and control over an individual's actions were given to free will via a divine source. With the discovery of organic evolution by Charles Darwin (1809–1882), the groundwork was set for a naturalistic explanation of human existence. In time, new scientific discoveries launched new areas of research and development. Dealing with these formable issues, Dennett continues to provide insight into the human condition. Advancements in AI and the cognitive sciences may someday aid in the evolutionary direction of our species. Through the views of philosophers such as Dennett, the "essence" of our humanity will evolve with great insights provided by science. In terms of personhood, our species will redefine its own ontological status in light of a self-directed teleology.

— David Alexander Lukaszek

Further Readings

Dennett, D. C. (1984). *Elbow room.* Massachusetts: Boston: MIT Press.

Dennett, D. C. (1987). *The intentional stance.* Boston: MIT Press.

Dennett, D. C. (1991). *Consciousness explained.* New York: Back Bay Books.

Dennett, D. C. (1993). *Brainstorms.* Boston: MIT Press.

Dennett, D. C. (1995). *Darwin's dangerous idea.* New York: Simon & Schuster.

Derrida, Jacques (1930–2004)

Derrida has become a figure of extreme fame and extreme notoriety, neither of which phenomena has aided the evaluation of his work. Despite a later reputation for purposeless obscurity or creatively going beyond conceptual truth, depending on the point of view taken, Derrida started off as a scholar of the very

formal and rigorous phenomenological philosopher, Edmund Husserl. His first notable publication was a long commentary on Husserl's short essay "Origin of Geometry." Derrida claimed that a close study of Husserl was bound to show contradictions between elements that emphasized the historical origin of geometry and the abstract structures of geometry as a discipline. For Derrida, the contradictions cannot be removed without destroying Husserl's position. This is not something unique to Husserl; all philosophy and all thought rest on contraction. Everything I say is an attempt to communicate the contents of my consciousness to another individual, who cannot grasp the contents of my consciousness. I cannot even grasp the contents of my own consciousness, since during the time of the act of grasping the contents of my consciousness, the contents of my consciousness have changed. The process of time means I may have died before my words have reached the listener or before I have finished grasping the contents of my own consciousness. The possibility of death always undermines claims to transparency of communication and consciousness for Derrida, and awareness of death is a constant factor in his philosophy, drawing on the discussion of death in G. W. F. Hegel and Martin Heidegger.

Philosophy, and all thought, have necessarily tried to ignore and repress contradiction in order to create systems of thought and stable ways of thinking. The repression of contradiction follows a pattern: One of the contradictory terms is regarded as superior, as truth, and the other is regarded as inferior. In the history of philosophy, being has been preferred to non-being, truth to falsity, oneness to difference, and so on. This may not look immediately harmful, but we cannot refer to being without referring to non-being and that gives non-being a being of some kind, as Plato recognized. We cannot escape from the lower term, as it must appear when we are discussing the higher term. The most important discussion in Derrida of this refers to speech and writing as aspects of language and meaning. He examines the privileging of speech over writing in Plato and Rousseau. Plato condemns writing as orphaned from its father, the originator of the words, who remains constantly present in speech. Writing has to be interpreted without reference to the original meaning and is therefore not a reliable expression of truth. Truth is only reliably present in speech, as we know what someone who is speaking means, and we can ask if we are not completely sure. For Derrida, the reduction of language to the presence of truth is "logocentrism," the centrality of "logos" as the living word of truth. The privileging of speech over writing is "phonocentrism," the centrality of the spoken word, and is a form of "logocentrism." "Logocentrism" is another word for metaphysics, and Derrida belongs to a tradition that questions the metaphysical elements of philosophy, while regarding them as unavoidable.

Derrida situates himself with regard to Friedrich Nietzsche and Martin Heidegger, both of whom he regards as precursors of his own deconstructive philosophy. Deconstruction aims to unveil the metaphysical oppositions and hierarchies underlying our thought, and then reverse the hierarchy in order to show its limits. Writing is therefore given priority over speech in Derrida's texts on that topic, but not with the intention of creating a new metaphysical hierarchy. There is a strategy that shows that all the negative things Plato attributed to writing are in speech, which can therefore be referred to a secondary form of writing, for strategic purposes. Nietzsche and Heidegger are taken as different aspects of deconstruction: Nietzsche as the playful affirmation of difference outside any possible unity in being, Heidegger as the nostalgia for being which can never be brought into presence but is always guiding our thought as an unavoidable presupposition. Jean-Jacques Rousseau has a similar role to Heidegger, in opposition to Nietzsche, as Rousseau's thought is dominated by a nostalgia for an always-absent nature. The questions of logocentrism and metaphysics are not restricted to philosophy at all. Derrida sees these questions as present in all thought and systems of knowledge. The particular target for him in this field was structuralism in the humanities. Structuralism in linguistics, literary studies, and anthropology are full of logocentric metaphysics, according to Derrida.

The most important work Derrida did on the social sciences is in *Of Grammatology* (first published in1967), which focuses on Rousseau and the relation of Rousseau with the linguistics of Ferdinand de Saussure and the anthropology of Claude Lévi-Strauss. He claims that Saussure's linguistics rests on assumptions on Rousseau's assumptions about language, in which the inside of language, what belongs to it metaphysically, is the naturalness of the spoken word. Derrida's discussion of Lévi-Strauss provides the opportunity to question the naturalness and the inwardness of speech compared with writing. Lévi-Strauss looks at "primitive" peoples as natural, which

includes a capacity for speech combined with a lack of writing. Lévi-Strauss's view of primitive tribes is read as following Rousseau's vision of natural self-containment. However, according to Derrida, Lévi-Strauss's own texts demonstrate that primitive individuals have writing of a kind and exteriority of a kind (the capacity to see themselves in objects of creation). Writing appears in the examples of wavy lines given by Lévi-Strauss, which are drawn on when the chance to use paper and pen is offered. These lines refer to marks on the body, so there has always been writing of some kind. Exteriority can be seen in the genealogies memorized by Levi-Strauss's primitives. The genealogies demonstrate that they cannot be living in the natural historyless immediacy of the present that Lévi-Strauss mentions.

For Derrida, all societies, all language, and any kind of self-aware consciousness require exteriority, time, and writing as preconditions. The opposition of nature to society is untenable, since if we can make this distinction, then we are presuming a movement from the natural to the social. If the social emerges from the natural, then there is something in nature that brings about the social. What brings about the social is already social. Derrida argued for this in detail through readings of Rousseau, Saussure, and Lévi-Strauss, by showing the necessary appearance of contradiction in the transition from the social to the natural.

Despite accusations that Derrida is an extreme relativist and a nihilist, the purpose is certainly not to deny the possibility of knowledge, but rather to show that contradictions are at the heart of knowledge and that the constitution of structures of any kind creates a transcendental system opposed to the differences inherent in the empirical. The empirical is full of the variety and transformations of material forces, which contradict any rationality, since rationality contains the transcendence of the empirical. Derrida aimed to challenge the transcendental aspects of philosophy, and all thought, with the empirical but not to deny that this rationalization and system building is necessary. We cannot define the empirical without reference to the transcendental, but we can say that the transcendental is never a pure transcendental universal, it is always a particular force acting on empirical, and is part of this irreducibility of difference.

— *Barry Stocker*

See also **Anthropology, Philosophical; Saussure, Ferdinand de**

Further Readings

Jacques D. (1978). *Writing and difference.* Chicago: University of Chicago Press.
Jacques D. (1989). *Introduction to Husserl's origin of geometry.* Lincoln: University of Nebraska Press.
Jacques D. (1997). *Of grammatology.* Baltimore: Johns Hopkins University Press.

Determinism

Determinism, from the Latin *determino* or define, is a basic philosophic theory about general interdependence and interconditionality of phenomena and processes. The idea was pronounced for the first time in ancient natural philosophy, in particular, in notions about primary origins and elements. Later, it was developed by Persian poet Omar Khayyam, Italian naturalist G. Bruno, and others who believed in existence of cause-and-effect rational consequence.

Laplace's determinism was the first attempt to generalize and theoretically interpret general deterministic ideas, proposed by Pierre-Simon Marquise de Laplace, the 18th-century naturalist and philosopher. According to his variant of determinism (sometimes called "strict" or "mechanistic" determinism), everything in the contemporary world (and human beings ourselves, taken as biological and social creatures) is caused completely by previous facts and events. He believed that unidirectional and dynamic connection of any phenomenon's states could be described with the help of laws of physics and mechanics. According to Laplace, the universe is utterly rational, and complete knowledge of any given situation permits us to experience with certainty the future and the past of any unit.

Further development of such kind of deterministic theory is connected with conceptualization of causality notion (Spinosa's ideas about inner causality, Leibniz monadology, Darwinian evolutionary theory, Hegel dialectic theory).

Geographic determinism as particular form of strict deterministic theory approves geographic environment as principal determinant of social layout and cultural development. As early as at the middle of 4th century BCE, it had been designed as peculiar

direction of philosophic thought (Hippocrates, Phoukidid, Xenofont) with at least two extreme schools: one of climatic psychology (Hippocrates, Aristotle) and one of climatic ethnology (Hippocrates, Polibius).

Enlightenment and modern ideology had given us the chance to reconsider these ideas in framework of establishment of general regularities of livelihood systems, social sphere, ideology, and political organization development in historical retrospection (Ch. Montesquieu, L. Mechnikov, H. Sample, E. Huntington).

During the 20th century, geographic determinism notion was concerned mainly with theories trying to explain the unevenness of social and cultural development of separate countries and peoples exclusively by peculiarities of their natural habitats.

Today, the influence of geographic space on political decision making is the subject of scientific modeling of geopolitics, regarded as a special discipline bordering anthropogeography, political geography, and political science.

Marxist determinism emphasizes total objectiveness, interdependence, and interconditionality of objects, facts and phenomena of the real world, which is based on the matter inner regular development. Apart from causal interrelations, Marxist determinism presumes the existence of a wide spectrum of interconnections of different kinds, such as spatial and chronological correlation, functional dependence, symmetry connection, system elements interaction, mutual determination of part and the whole, and connection of states in development and movement. In such contexts, social life regularities define the mainstream of historical process, but do not determine the whole diversity of individual and group activity. So, freedom in purpose formulation is ascribed to the human being and to the social group as well.

In its Marxist variant, economy is regarded as a sphere of human activity that determines or at least influences character and the essence of political and social processes. On this basis, we could conceptualize historical development through the series of socioeconomic formations (primitive, slavery, feudal, capitalistic, and communist). In such a context, state, ideology, politics, and culture are regarded as expression of economic basis, which, in its turn, reflects interests of dominative class and results from the mode of production.

Statistic and system determinism in the 20th century has brought new insight into deterministic ideas, thanks to statistic and probabilistic methods of scientific research. Statistic regularities had been revealed and conceptualized in the framework of a wide spectrum of probabilistic world theories. Statistic determinism is widespread in the context of sociology, demography, and other social sciences. It presumes that, in large sets of social phenomena, we can trace statistic regularity or the general tendency of development. In such a context, we interpret character of social connection as possibilistic and regular at the same time.

Determinism's oppositions: Deterministic ideas are withstanding indeterminism, which denies existence of objective causal regularities. Its origin at the first quarter of 20th century was stimulated by development of statistic methods of scientific prognosis. Another determinist's opposition is teleology, according to which all process flow is predestined by action of nonmaterial (ideal) purpose-defining principle.

— *Olena V. Smyntyna*

Further Readings

Darwall, S. (Ed.). (2003). *Deontology.* Oxford: Blackwell.

Krause, S. J. (1964). *Essays on determinism in American literature.* Kent, OH: Kent State University Press.

Von Wright, G. H. (1974). *Causality and determinism.* New York: Columbia University Press.

Deviance

Sociologists define *deviant behavior* as behavior that violates social norms. Norms are expectations or prescriptions that guide people into actions that produce conformity. Norms make social life possible because they make behavior predictable. While members of a society do not have to agree on all the norms of a society, conformity to norms rests upon agreement by most members of society. Therefore, deviant behavior is behavior that most people in a society find offensive or reprehensible. It generates disapproval, punishment, or condemnation of the behavior. Society

applies sanctions to deviant behavior to reinforce social norms.

Sociologists conceptualize norms into three categories: folkways, mores, and laws. Folkways are everyday norms based on custom, tradition, and etiquette, such as standards of dress and eating behavior. Violation of these norms does not generate serious condemnation but may cause people to consider the violator as odd. Mores are norms based on important societal morals. Upholding these norms is critical to the fabric of society because their violation threatens the social order. Drug addiction, for example, constitutes a moral violation that generates strong social condemnation. Criminal laws are the most serious norms of a society and are supported by formalized social sanctions. People who violate them are subject to arrest and punishment. A person convicted of robbery, for example, will usually serve a term of imprisonment. While criminal behavior and deviant behavior share some common features, they are not interchangeable terms. Clearly, some behaviors in a society, such as murder, are both criminal behaviors and deviant behaviors. However, not all deviant behaviors are criminal behaviors. Inappropriate eating behavior, for example, is not usually considered criminal behavior.

Explanations of deviant behavior are a central task of the field of sociology. In addition to sociological explanations, scholars have also formulated biological and psychological explanations. Biological, psychological, and sociological theories of deviant behavior try to answer one of two questions: (1) Why are some individuals more likely than others to engage in deviant behavior? and (2) Why do certain behaviors become defined as deviant, and how does society enforce nonconformity to norms? Sociological explanations attempt to answer both questions, while biological and psychological explanations focus on answering the first question.

Biological Explanations

Biological explanations attempt to identify characteristics of people that predispose them to engaging in deviant behavior. Primarily, these theories are concerned with attempting to identify those factors associated with criminal behavior. For example, physician and criminologist Cesare Lombroso (1835–1909) formulated one of the earliest biological explanations. Basing his explanation on the measurement of bodies of men in prisons, Lombroso theorized that criminals were atavists, or throwbacks, to an earlier stage of evolution. Lombroso's assumption that criminals were biologically defective influenced the work of anthropologist Earnest Hooton (1887–1954). Hooton also studied male prisoners and theorized that criminals are biologically inferior and should be sterilized and exiled to reservations. In 1949, William Sheldon (1898–1977) introduced his theory of somatology, theorizing that people's body shapes affect their personalities and therefore the crimes they are likely to commit. More specifically, Sheldon identified the body shape of the mesomorph as a type that is muscular and athletic and more likely to engage in criminal behavior. While scholars criticized the research methodology and conclusions of these early biological explanations, the assumption that criminals are biologically different continued to guide research on crime. Researchers noticed that crime runs in families and assumed that criminal tendencies are inherited. Their research included, for example, studying identical twins or nontwin siblings separated by birth and raised by different parents. However, these studies were not able to conclusively establish that a genetic basis for crime exists.

Biological research has also investigated chromosomal abnormalities as an explanation for criminal behavior. The pattern that has been of most interest to researchers is the XYY variety; however, the rarity of occurrence of this pattern means that it would account only for a small fraction of the crime that is committed. Other researchers have focused on neurotransmitters and hormones as the predisposing factors for violent criminal behavior; however, researchers have not reached any definitive conclusions regarding the biological role in offending.

Psychological Explanations

Psychological explanations of deviant behavior are concerned not only with criminal behavior but also with other kinds of deviant behavior, such as mental illness, sexual deviance, and substance abuse. Psychologists refer to deviant behavior as "abnormal behavior"; that is, it is behavior that is maladaptive to the culture in which it occurs. Psychology utilizes many perspectives to explain abnormal behavior; however, generally, these explanations emphasize the importance of negative childhood experiences, especially within the family, as the cause of later problematic behavior.

Sigmund Freud (1856–1939), the founder of psychoanalysis, developed one of the first explanations of the relationship between the human mind and behavior. Freud posited that all individuals have natural drives and urges repressed in the unconscious, which include abnormal or deviant tendencies; however, through the process of childhood socialization, individuals develop internal controls. The improperly socialized child may develop a personality disturbance that causes abnormal or deviant behavior. Contemporary psychoanalytic theory relies on case histories of individuals under treatment or samples of individuals in mental institutions or prisons as the basis for their conclusions about the causes of deviant behavior. Social scientists view the reliance on a patient or institutionalized population as a limitation of the conclusions from this research.

Psychological explanations of deviant behavior include an explanation of moral development proposed by Lawrence Kohlberg (1927–1987) that emphasized the role of reasoning in explaining deviant behavior. Kohlberg theorized that individuals pass through several stages of development in which they develop their ability to reason morally. He argued that not everyone completes all the stages of moral development and, because of that limitation, not all individuals develop what we refer to as a "conscience." Therefore, a lack of conscience explains why individuals pursue criminal and other kinds of deviant behavior. However, critics of this theory point to the fact that criminal behavior as well as other kinds of deviant behavior may result from other factors, such as peer pressure.

Contemporary psychologists have also formulated theories about the relationship between personality or temperament and abnormal behavior. Personality research uses inventories, usually the Minnesota Multiphasic Personality Inventory (MMPI) and the California Psychological Inventory (CPI). Psychologists administer these inventories to samples of incarcerated juvenile and adult offenders. These studies find differences between offenders and nonoffenders that psychologists assume are responsible for the offending behavior. However, as with psychoanalytic research, critics charge that since most research occurs in institutional settings, offenders' personality problems may be he result of their institutionalization.

Finally, contemporary psychological research also focuses on childhood temperament, examining the association between temperament problems during childhood and behavioral problems during childhood and also delinquency problems during adolescence. Psychological research demonstrates that children with temperament problems such as impulsiveness, hyperactivity, and coldness are more likely to become delinquent in unstable families marked by inadequate parenting, than in stable families. However, while this research often does not control for the factors of socioeconomic status and education, researchers believe that it offers a valuable understanding of deviant behavior at the individual level of analysis.

Sociological Explanations

Sociologists study deviant behavior from many different perspectives. They examine the forces in society that shape the creation of norms. They also examine deviant behavior in terms of what groups are likely to engage in deviant behavior and the reasons for their deviance. Finally, sociological explanations also may include an analysis of how society enforces nonconformity to norms. Embedded within these varied perspectives are two distinct approaches for studying deviance as a social phenomenon. In the first approach, sociologists view deviance as an objectively given phenomenon; in the second approach, sociologists study deviance as a subjectively problematic phenomenon.

Sociologists who study deviance as objectively given phenomenon assume that there is widespread consensus in society about what expectations constitute the norms of the society and, consequently, that it is relatively easy to identify what constitutes deviant behavior. They also assume that deviant behavior typically evokes negative sanctions, such as arrest and imprisonment for criminal behavior. Finally, they assert that the punishment given to the deviant serves to reaffirms the norms of the society. Therefore, the focus for sociologists who follow this approach is to examine the sociological conditions that are likely to produce deviant behavior.

Sociologists who approach the study of deviance as a subjectively problematic phenomenon focus on social definitions and social interaction. They emphasize that deviance is a label that is applied at a given place and time. The subjectively problematic approach espouses a relativist view of deviance and examines whether and why a given act is defined by society as deviant. It also emphasizes the process by which a person is defined and stigmatized as deviant. Rather

than studying the causes of deviant behavior, this approach tends to study the people, such as police, who define others as deviants, and its research often demonstrates that there is often a lack of consensus on whether a particular person should be treated as a deviant. This view also examines the perspective and reactions of the person defined as deviant.

Major Sociological Theories

There are many sociological explanations for deviant behavior that conceptualize deviance as either objectively given or subjectively problematic. The dominant sociological theories of deviant behavior include functionalism, social disorganization, anomie/strain theory, differential association theory, labeling theory, control theory, radical criminology, and feminist theory.

Functionalism

The functionalist approach to the study of deviant behavior is a perspective that posits that some behaviors that are widely condemned in society are in actuality functional or beneficial in terms of their effects. Sociologists credit Émile Durkheim (1858–1917) with developing the functionalist approach in sociology. While Durkheim understood that society must prohibit certain behaviors because they harm society and its members, he asserted that deviant behavior is also a normal phenomenon that occurs in every society. He argued that deviant behavior contributed to maintaining the social solidarity of society because punishment of deviant behavior clarifies social norms and reinforces social ties among societal members. Durkheim also believed that deviant behavior plays an important role in social change, because without deviant behavior, freedom of thought would not exist; hence, social change would not be possible.

Social Disorganization

In the 1930s, a sociological approach emerged at the University of Chicago that advanced a structural explanation of deviant behavior. Developed by W. I. Thomas (1863–1947) and Florian Znaniecki (1882–1958), it emphasized the relationship between crime and the social disorganization of certain neighborhoods in certain areas. This approach posited that as a city grows, its sense of community breaks down, and as social disorganization in an area increases, crime also increases. However, not all neighborhoods are equally disorganized; rather, those areas in which the population is geographically unstable, moves a great deal, is composed of a variety of different racial and ethnic groups, has a high proportion of immigrants, and lacks neighborhood controls are the neighborhoods in which deviant behavior frequently occurs. Robert E. Park (1864–1944) and Ernest W. Burgess (1886–1966), two other sociologists at the University of Chicago, advanced an ecological analysis of Chicago neighborhoods and identified the areas in which deviant behavior frequently occurs as zones of transition.

Anomie/Strain Theory

Émile Durkheim first utilized the term *anomie* to refer to disturbances in the social order that caused deviant behavior. In particular, Durkheim studied the relationship between anomie and suicide. In the 1930s, Robert Merton (1910–2003) further conceptualized anomie as a disjunction between culturally defined goals and structural available opportunities. Merton posited that culturally defined goals are ones that society expects all of its members to embrace. In Western societies, the primary culturally approved goals are monetary and material success. However, Merton argued that every society places limitations on how to achieve culturally defined goals. The conflict between cultural goals and the differential opportunity to achieve these goals creates pressure to commit deviance. Merton identified five different types of responses (modes of adaptation) that could result: conformity, innovation, ritualism, retreatism, and rebellion.

Differential Association Theory

In the 1930s, Edwin Sutherland (1883–1950) developed a major theory of criminology that he called the "theory of differential association." Its most important proposition is that criminal behavior is learned. Sutherland advanced nine propositions to explain how criminal behavior is learned. Among these propositions are the ideas that criminal behavior is learned through face-to-face interaction between people who are close or intimate with one another and that the earlier in one's life one is exposed to attitudes and values favorable to committing crimes, the greater the likelihood that one will in fact commit crime. Sutherland did not argue that it was necessary to associate with individuals who had committed criminal acts; rather, only exposure to definitions favorable to criminal actions is necessary.

Sutherland's theory posits that a person becomes delinquent or criminal because of an excess of definitions favorable to the violation of the law over definitions unfavorable to the violation of the law.

Labeling Theory

Labeling theory is an approach to studying deviant behavior that developed in the 1960s. Labeling theory does not try to explain why an individual initially commits deviant acts. Rather, labeling theory posits a relativist definition of deviant behavior; it assumes that there is nothing about a particular behavior that makes it deviant. Howard Becker (1899–1960), one of the originators of labeling theory, argued that deviance is not the quality of the act the person commits, but rather a consequence of the of the rules or sanctions applied by others. Labeling theory also argues that people in positions of power impose definitions of deviance on the behaviors of those without power. Therefore, some people and behaviors are more likely labeled than others. Labeling theory also stress that labeling someone deviant can produce a deviant self-image that may result in the individual committing more deviant acts.

Control Theory

Control theorists focus on criminal behavior and examine the role an individual's ties to conventional institutions play in discouraging the person from acting on criminal motivation. One of most widely known and researched control theories is Travis Hirschi's social control theory. This theory asserts that delinquency results when an individual's bond to society is weak or broken. Hirschi examined four interrelated elements of the social bond: attachment, commitment, involvement, and belief. In testing the theory, Hirschi found that attachment itself is critical in preventing delinquency. His most important finding was that there was no relationship between social class and delinquency. Other studies have focused on various aspects of Hirschi's conceptualization of the social bond. For example, in reexamining the issue of involvement and its relationship to delinquency, research indicates that leisure activities may influence all four elements of the social bond.

Radical Criminology

Radical criminologists focus on crime and propose that we can explain crime by examining the patterns of economic organization in a society. Many of the ideas contained in radical criminology have their roots in the works of Karl Marx (1818–1883) and Friedrich Engels (1820–1895). From this perspective, law, law enforcement agencies, and government itself are perceived as instruments of the ruling class designed to maintain the status quo. Radical criminologists also examine the disparity between the written law and law as it is actually applied. In this regard, radical criminologists especially emphasize the role of social class in the application of criminal law. Some radical criminologists, such as Richard Quinney, see crime as one of the many forms of violence perpetuated in American society. They argue that we must end suffering if we want to end crime and in order to end suffering we must fundamentally transform our social structure.

Feminist Theory

There are several feminist perspectives on crime. Although there is no single feminist perspective, all feminist theories share assumptions about the gendered nature of crime, criminal victimization of women, and the bias of criminal justice processing in patriarchal societies. Liberal feminism attributes gender differences in crime rates to the different ways men and women are socialized. Marxist feminism views women's subordination as resulting from the capitalist mode of production. Radical feminist criminologists are distrustful of the legal system because it is male dominated. They focus their research on the violent victimization of women. Socialist feminist criminologists examine how class inequality and gender inequality operate together to shape criminal opportunities, victimization experiences, and responses of the criminal justice system.

Sociologists study deviant behavior utilizing a variety of theoretical perspectives. Each seeks to present an explanation that relates deviance to norm violation. Whether the theory assumes deviance is objectively given or subjectively problematic, each theoretical perspective examines deviant behavior from a social process or social structural perspective. Research findings from each perspective enhance our understanding of deviance in society.

— Patricia E. Erickson

See also **Conflict; Crime; Durkheim, Émile; Functionalism; Norms**

Further Readings

Adler, P. A., & Adler, P. (2002). *Constructions of deviance: Social power, context, and interaction.* Belmont, CA: Wadsworth.

Barkan, S. E. (2001). *Criminology: A sociological understanding.* Upper Saddle River, NJ: Prentice Hall.

Goode, E. (2004). *Deviant behavior.* Upper Saddle River, NJ: Prentice Hall.

Pontell, H. N. (2002). *Social deviance: Readings in theory and research.* Upper Saddle River, NJ: Prentice Hall.

Renzetti, C. M., & Curran, D. J. (2001). *Theories of crime.* Boston: Allyn & Bacon.

Rubington, E., & Weinberg, M. (2004). *Deviance: The interactionist perspective.* Boston: Allyn & Bacon.

DeVore, Irven (1935–)

It's not often that a boy from a small town in Texas gets to become a renowned Harvard professor, but Irven Devore is one who was able to do this. His preparation for the academic world began at the University of Texas where he received his BA degree in philosophy and anthropology. He furthered his professional interests later by graduating from the University of Chicago with an MA degree and a PhD in anthropology.

After his university student days, Devore was able to make several important contributions to the discipline of anthropology not only by his extensive and interesting research concerns but also by other responsibilities associated with the academic profession. He is the recipient of impressive academic rewards and fellowships and has had the honor of being selected to participate in several professional organizations. Although he has served at Harvard as a professor and as chairman of the anthropology department, Devore has also lectured at a number of other prominent educational institutions, such as Stanford University and the University of California at Berkeley. A casual perusal of his impressive résumé makes one readily understand why he has such a prominent reputation in the field of anthropology.

His research interests have focused on animal behavior. In particular, he has focused on what we can learn from the behavior of monkeys and apes. Understandably, in order to conduct his research, Professor Devore has engaged in numerous field studies, which provided him with important insights about the subjects of his research. As a result of his research, he has produced a number of interesting articles, with titles such as the "Social Behavior of Baboons and Early Man," "The Evolution of Social Life," and "The Natural Superiority of Women." He is also the author of various scholarly books concerning his special interests within the discipline of anthropology.

After a long and productive scholarly career, he is presently continuing to make important contributions to the discipline of anthropology by serving as the curator at the Harvard University Peabody Museum. Hence, we can expect to hear more about his interests as time goes by.

— *William E. Kelly*

See also **Primatology**

Further Readings

DeVore, I. (Ed.). (1965). *Primate behavior: Field studies of monkeys and apes.* New York: Holt, Rinehart & Winston.

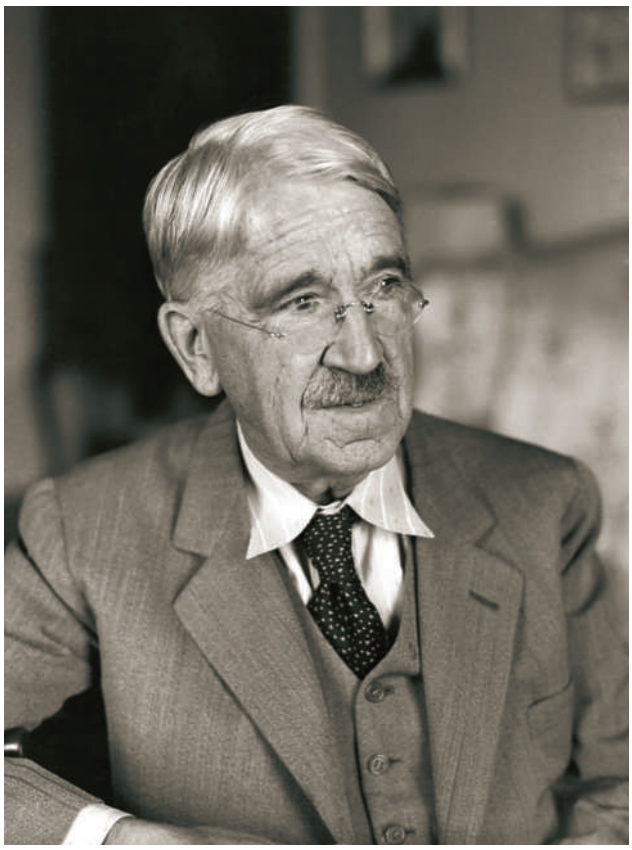
DeVore, I., & Eimerl, S. (1965). *The primates.* New York: Life Natural Library, Time.

DeVore, I., & Lee, R. B. (Eds.). (1968). *Man the hunter.* Chicago: Aldine.

DeVore, I., & Lee, R. B. (Eds.). (1976). *Kalahari hunter-gatherers.* Cambridge, MA: Harvard University Press.

Dewey, John (1859–1952)

John Dewey was an American philosopher, educator, psychologist, public intellectual, social critic, and political activist. He was a major figure in American intellectual history and one of the great minds, deserving, according to his biographer G. Dykhuizen, the title of the "spokesman of humanity." Born in Burlington, Vermont (1859), he died in New York City (1952). His multivolume works comprise writings from all areas of philosophy and also from psychology, education, political science, and the arts. As a philosopher, he is recognized worldwide as one of the founding fathers of the distinctively American



Source: © Bettmann/CORBIS.

philosophical school of pragmatism, with his own version, titled "instrumentalism." As an educator, he is renowned for his system of teaching through experimental observation (a progressive system in education focused on learning by doing), which in the 20th century has become internationally influential for decades in many countries, including Japan, China, Turkey, and the former Union of Soviet Socialist Republics. As a psychologist, he was a pioneer in functional psychology. As a public intellectual, social critic, and political activist, he was involved in numerous cultural, social, and political actions and movements, including founding and presiding over the American Psychological Association, the American Philosophical Association, the New School for Social Research, and the Commission of Inquiry into the Charges Against Leon Trotsky; issues of community and democracy; domestic and international political affairs, such as presidential elections and world peace; woman's suffrage; school reform; and academic freedom. All of these activities were directed by Dewey's reconstructed conception of philosophy as an intellectual enterprise, whose mission is to solve the problems of men and women, rather than the purely academic problems of philosophers themselves. Such a philosophy must be substantially practical in making human life and activity more creative and intelligent and serving the "construction of good," by which he means the shared communicative experience. By understanding democracy as a creative "way of life" rather than simply the method of government, he has earned the title of true "philosopher of democracy."

While from the start being interested in empirical psychology, Dewey's thought has undertaken an early move, according to his own expression, "from absolutism to experimentalism," after having dealt with German philosophers such as Leibniz, Kant, and particularly Hegel. The Hegelian flavor, stripped from idealism, has remained with Dewey for the whole subsequent career, in the sense of its unifying and organic character, and moreover its dialectics as a form of evolutionary paradigm. Dewey was an organic holist from the start. The idea of dynamic, open, evolving unity remained a guiding principle of his philosophy. His further move toward naturalistic experimentalism was substantially prompted by the revolutionary input of Darwinism. The theory of natural selection also continued to have a lifelong impact upon Dewey's thought, while he explicitly rejected Social Darwinism with its self-serving and antidemocratic rhetoric about the survival of the fittest. Thus, both Hegel and Darwin had become the particular and lasting sources of Dewey's antidualism, that is, the search for overcoming of all traditional philosophical dualisms, such as between culture and nature, subject and object, theory and practice, psychical and physical, mind and world, and individual and society. Dewey's critical stance toward past efforts in this area was expressed by his conceptions of "experimental experience," "experimental teaching," and even "experimental logic" in the middle stage of his career, which had provided him with an empirically based theory of knowledge that was in line with the developing American school of thought known as "pragmatism."

Darwinism had suggested the idea of interaction between the human organism and its environment when considering questions of psychology and the theory of knowledge. Dewey understood human thought naturalistically, as the product of the interaction between organism and environment, and knowledge

as having practical instrumentality in the guidance and control of that interaction. Hence, he adopted "instrumentalism" as the original name for his own pragmatist philosophy. Instrumentalism consists of taking ideas as tools or instruments with which to cope with a given situation. Moreover, various modes and forms of human activity are also instruments developed by human beings to solve multiple individual and social problems. Since the problems are constantly changing, the instruments for dealing with them must also change. Even the educational philosophy of Dewey reflects Darwin's theory of evolution. Education is also evolutionary. In a constantly evolving universe, it is an endless experiment wherein humans create ways of actively transforming themselves to secure the most complete and effective adaptation possible.

Dewey's contention that human life as a part of nature follows the patterns of nature is the core tenet of his naturalistic outlook. There is a "natural" continuity between nature and human experience. Humans are not the spectators of nature but active participants in it. We live in the world that is both precarious and stable, and we must help to survive the former with the aid of the latter. It is how our intelligence, whose purpose is the creative adaptation to natural and human condition, works. The intelligence, reflecting creatively on past experience, adapts as a means to new experiments in order to test their value. The search for absolute and immutable world and values as separated this world of process and events is, however, a futile old-fashioned business of classical metaphysicians that has to be abandoned. There is no such thing as changeless being. Dewey is an antimetaphysicist for whom the only reality is nature in its serial process of events. Also, truth, evolutionary in nature, partakes of no transcendental or eternal reality and is based on experience that can be tested and shared by all inquirers.

Such a Deweyan pragmatic approach to human affairs, showing that knowledge is a product of an activity directed to the fulfillment of human purposes, has ample important anthropological consequences. In the place of an example, let us take, for instance, his four-phase theory of human inquiry, which also serves as the theory of human problem solving. To begin with, humans encounter the problematic situation as a practical and experiential situation that triggers all further cognitive development in order to fulfill human needs and desires. In the second phase, humans gather all kinds of data available for clarifying the situation. The third phase involves the reflection and imagination in order to create all possible variants of solutions, which are also entertained in the abstraction. Finally, a practical solution is achieved by implementing the preceding. However, this is not completely the final phase, either, since action means "transaction" (rather than merely "interaction") between humans and their environment, meaning the transformation and change on both sides. Although this new situation contains elements implied in the former, it is richer because of its new meaning and greater complexity. Such human conduct, which enriches the life via transformation of natural condition and provides the growth of humanity, Dewey is not reluctant to call "art" in the broadest sense of a term.

Dewey applied the method of intelligence and an experimental approach to problems of practice also in the realm of human social existence. He insisted that the human individual is a social being from the start and that individual satisfaction and achievement can be realized only within the context of social habits and institutions that promote it. Even the human mind is a social rather than a purely biological phenomenon, according to Dewey. In one of his anthropologically most significant works, *Human Nature and Conduct* (1922), which provides a comprehensive statement of his conception of human nature, he focused on the key role of habits in forming the dispositions of action and the importance of reflective intelligence as a means of modifying them. Through creative intelligence, one of whose highest achievements is creative and evolutionary democracy, we can transform the world according to our desires. Dewey conceived of democracy as a primary ethical value, and he did much to formulate the working principles for such a democratic society.

Dewey's philosophical influence has been changing over the decades. While during the first half of the 20th century, he was a prominent figure of American and even international philosophical scene, his work, not exempt from misunderstandings, has provoked many critics (notably B. Russell among them) to raise objections against his theory of inquiry and logic. Dewey himself was not reluctant to develop the key concepts further in the course of time; one of the most anthropologically significant corrections he intended to accomplish concerned the substitution of the term *culture* for the term *experience* in the title

and content of his opus magnum, *Experience and Nature* (1925).

After the eclipse of the whole pragmatist philosophy around the middle of the 20th century, Dewey's influence began so have a considerable renaissance. Recent developments have shown many of his ideas to continue to be rich and inspiring into the 21st century. During his lifetime, the very first volume of the spectacular *Library of Living Philosophers* was devoted to him (1939), and *The John Dewey Society* was established in 1935. The Center for Dewey Studies at Southern Illinois University at Carbondale was established in 1961, whereby a 37-volume set based on Dewey's manuscripts was published from 1969 to 1991. Other resources for studies in Dewey's philosophy are being stored and offered to many Deweyan scholars all over the world. In addition to figures of contemporary world philosophy such as Richard Rorty, Jürgen Habermas, Hilary Putman, and others, the growing school of "neo-Deweyans" in philosophy and social thought represent the enduring relevance of his innovative and seminal version of naturalistic pragmatism.

— *Emil Visnovsky*

See also **Pragmatism**

Further Readings

Campbell, J. (1995). *Understanding John Dewey.* Chicago: Open Court.

Dewey, J. (1969–1991). *The collected works of John Dewey* (J. A. Boydston, Ed.). Carbondale and Edwardsville: Southern Illinois University Press.

Hickman, L. (Ed.). (1998). *Reading Dewey. Interpretations for a postmodern generation.* Bloomington and Indianapolis: Indiana University Press.

Hickman, L., & Alexander T. M. (Eds.). (1998). *The essential Dewey* (2 vols.). Bloomington and Indianapolis: Indiana University Press.

Rockefeller, S. (1991). *John Dewey: Religious faith and democratic humanism.* New York: Columbia University Press.

Ryan, A. (1995). *John Dewey and the high tide of American liberalism.* New York: Norton.

Westbrook, R. B. (1991). *John Dewey and American democracy.* Ithaca, NY: Cornell University Press.

Diamond, Jared (1937–)

As a social scientist, Jared Diamond is interested in how human societies have developed and fared over the millennia, and he has continually striven to understand the broad patterns of human behavior across the globe. For him, answering questions about how and why different human societies evolved over time under various environmental and social conditions is critical, and approaching these issues using data from a number of disciplines is essential.

Diamond was initially trained in the biological sciences and later began studying the ecology, evolution, and biogeography of birds in New Guinea in the 1960s. He subsequently led nearly 20 expeditions to New Guinea and nearby islands to study bird species (including the rediscovery of the goldenfronted bowerbird) and developed a conservationist plan for Indonesian New Guinea's national park system. His commitment to analyzing and preserving the environment led him to becoming a founding member of the board for the Society of Conservation Biology and a member of the Board of Directors for the World Wildlife Fund (USA).

Because of his efforts, Diamond was inducted into the National Academy of Sciences, the Academy of Arts and Sciences, and the American Philosophical Society. He is also the winner of several prestigious awards, including the National Medal of Science, a MacArthur Foundation Fellowship, and the Tyler Prize for Environmental Achievement. Perhaps most important, however, is his determination to make complex ideas and theories accessible to a wide audience.

During the 1980s, Diamond became fascinated with environmental history and began integrating the disciplines of anthropology, linguistics, history, biology, and history to investigate the technological advances of humans worldwide. In particular, he was concerned about the social and environmental factors that led to certain outcomes or disasters. One of Diamond's first major works to explore these issues was *The Third Chimpanzee: The Evolution and Future of the Human Animal.* In this book, he focused on how the human species (which shares much of the same genetic material as chimpanzees), developed the unique ability to form religious thought; create language, art, and science; and form complex civilizations. He noted the irony that these advancements

have also allowed humans to acquire the means to instantly destroy these achievements. He has authored eight books and hundreds of scientific articles, many of which have recently focused on the role environment plays in the rise and fall of ancient civilizations.

In his Pulitzer-Prize-winning book *Guns, Germs, and Steel: The Fates of Human Societies* (1999), for which *The Third Chimpanzee* is considered a precursor, Diamond explores the geographical and environmental reasons why some human groups have prospered more than others. His most recent book, *Collapse: How Societies Choose to Fail or Succeed* (2004), tries to explain why ancient societies such as the Anasazi of the American Southwest fell apart and what modern society can learn from the fates of others.

Although not specifically trained as an anthropologist, Diamond has contributed significantly to discussions of how human societies have evolved and the unfortunate outcomes that result when populations fail to see the errors of their ways. As one of the leading scholars in understanding environmental-human relations, he has brought many social issues into the forefront of public interest and inquiry and brought forth new ways of understanding how the evolution of our species took place and how we can use the past to teach us about both the present and the future.

— *Scott M. Fitzpatrick*

See also **Anasazi; Archaeology, Environmental**

Further Readings

Diamond, J. M. (1992). *The third chimpanzee: The evolution and future of the human animal.* New York: Perennial.

Diamond, J. M. (1999). *Guns, germs, and steel: The fates of human societies.* New York: Norton.

Diamond, J. M. (2004). *Collapse: How societies choose to fail or succeed.* New York: Viking Press.

Dictatorships

The 20th century certainly had its share of political problems. Some have come, some have gone, and some are still with us in a new century. Dictatorships have been a big problem for a number of reasons, including their effects on a people, a society, a country, and the international sphere. The 20th century saw a substantial number of dictators, such as General Noriega of Panama, Castro of Cuba, Ceausescu of Romania, Jean-Claude "Baby Doc" Duvalier of Haiti, Marcos of the Philippines, Pol Pot of Cambodia, and Quathafi of Libya. However, three of the most evident in history have been Benito Mussolini in Italy, Adolf Hitler in Germany, and Joseph Stalin of Russia. Mussolini and Hitler represented a fascist type of dictatorship, and Stalin represented a communist type of dictatorship. Both types represent a threat to the United States, Western democracies, and other societies that are trying to practice activities that conform to expected equitable norms.

It is interesting that not all individuals may refer to these persons as dictators. Perhaps that shows the reality of the fact that dictators have been viewed differently by citizens. For example, although the Americans have usually referred to Stalin as a dictator, he had a large number of supporters in his country until his death. Perhaps the same may have been said of Mussolini and Hitler if they had not had untimely deaths and political misfortunes such as lost wars.

A dictatorship need not just refer to one person. It may also refer to a country directed by a small group of persons. However, whether it is a dictatorship of one person or a dictatorship of a number of individuals, it seems to have a number of characteristics associated with it. For example, Carl Friedrich and Zbigniew Brzezinski in their work, *Totalitarian Dictatorship and Autocracy,* have identified six. They are (1) an official ideology, (2) a single mass party, (3) a system of terroristic police control, (4) a technologically conditioned near-complete monopoly of control, (5) a near-complete monopoly of control of all means of effective armed combat, and (6) a central control and direction of the entire economy. What a dictatorship appears to come down to is major control of society by a leader or leaders, little freedom for opposition to the ruling individual or people in political power, and a strong impetus from the government to conform to its norms or face serious punishment.

Obviously, a dictatorship is not always a continuing phenomenon in a country. It may come and go, as we have seen in some countries. However, there are a number of factors that may be cited to inhibit the

development of a dictatorship in a society. For example, the allowance of political opposition or the presence of political parties each advocating a different political policy would be methods of keeping the probability of a dictatorship from developing quite low. Along with this political situation is the allowance of free expression among the populace so that different views regarding government policy may be expressed and come to the attention of the mass of citizens. It would also be a good idea to have civilian control of the military, as is found in the United States, to prevent a coup and takeover of the government, as we have seen in many Latin American countries in the last century. Of course, a satisfied public has its advantages of preventing a dictatorship from coming about. This is especially true in situations where the general public realizes that all of us have the opportunity to improve ourselves in life without fear of prejudice based on race, religion, or political affiliation. Other factors that might inhibit the development of a dictatorship include a healthy economic situation in a country and the absence of international conflict that could result in a lost war. When people are hungry and frustrated, as they are in severe economic depressions, and see that their country has been defeated in war, as the Germans experienced after World War I, it is easy to understand that they might be more likely to accept a person like Hitler as their political leader. Perhaps it would have been much more difficult for a person like Hitler to obtain power in Germany if the economic and political situation had been different in that country following World War I.

The 21st century may be one in which we see a continuation of dictatorships around the world, as is evidenced by North Korea and China. If history has shown us anything about international politics, it is that dictatorships pose a potential and real problem for nondictatorships. Hence, countries have to be continually on guard so that they may not be unduly influenced by them. Yet, it is also important to keep the lines of communication open between those countries that are led by a dictatorships and those that are not. This is important because regular communication may lessen the negative impact of dictatorships. They are not immune from being influenced, and influence can come about in many ways. For example, it may be that international public opinion could be important to them. Hence, when their behavior is projected in a negative way on a worldwide basis, this may have the effect of weakening their role in an international sphere of activity. In addition, constant monitoring of their activity and military capabilities has value in that it may prevent such dictatorships from extending their political influence outside of their immediate environment.

As we progress in the 21st century, we can expect to encounter the presence of dictatorships. It would be ideal if they were to cease in existence and be replaced by democratic elements. However, the reality of the situation is that some old ones will continue to exist, some new ones will develop, and some will change their form of a government to a more acceptable type.

— *William E. Kelly*

Further Readings

Brooker, P. (2000). *Nondemocratic regimes: Theory, government, and politics.* Houndmills, UK: Macmillan.

Fulbrook, M. (1995). *Anatomy of a dictatorship: Inside the GDR.* New York: Oxford University Press.

Olson, M. (2000). *Power and prosperity: Outgrowing communist and capitalist dictatorships.* New York: Basic Books.

Diffusionism

Focusing on the notion that similarities among cultures resulted from components spreading from one culture to another, diffusionism is often seen as a reaction to the paradigm of classic unilinear evolutionism, which traced cultural development to the ability of cultures to innovate independently. The major names in the early years of diffusionism worked in the great museums of central Europe, studying the distribution of artifacts and coming to the conclusion that cultures were patchworks of traits, with each trait having its own origin and history. Grounded in museum empiricism and relatively modest in theory, diffusionism successfully attracted scholars away from evolutionism in the first few decades of the 20th century.

Some diffusionists, mostly German- and English-speaking, thought they could discover the earliest

forms of human behavior by mapping the distribution of cultural traits in non-Western societies; the most widely distributed traits would be the oldest. Some diffusionists were determined to prove that all human culture originated in one place and then spread through diffusion, such as Englishmen G. Elliot Smith (1871–1937) and W. J. Perry, who created what is often called the" pan-Egyptian" or "heliolithic" (sometimes known as the "heliocentric") school. The German-Austrian culture historical or culture circle (also known by the German word *kulturkreis*) school and the American historical particularists were more restrained. Since the North American school is usually discussed separately, the entry will concentrate on the English and German-Austrian approaches.

Heliolithic Hilarity

An anatomist distinguished for his work on the brain, Smith traveled to Egypt to study mummies. When he returned to Cambridge University, he noticed the triangular similarities between the English megaliths and Egyptian pyramids. He then observed that variations of the triangular form appeared widespread in many cultures, including Native American burial mounds.

Beginning in 1911, he published articles and books that concluded that all civilization had originated in Egypt and had diffused to the rest of the world beginning in about 4000 BC. Smith wrote that after observing seeds sprouting out of the fertile soils along the Nile River, the ancient Egyptians began planting seeds on their own. After learning to predict the river's floods and developing irrigated agriculture, they invented the technologies of civilization, along with cities, government, and a religion that centered on sun worship and burial of sun kings in pyramids. Seeking gems for these burials, they navigated the globe and brought their superior civilization to other cultures. Until the diffusion of the triangular form, and along with it all the accoutrements of civilization, prepyramid cultures were abjectly primitive.

Kulturkreislehre

Building on the work of the geographer Friedrich Ratzel (1844–1904), who suggested that traits had unique forms that would allow investigators to trace them, the early diffusionists constructed a worldwide template of trait routes and culture contacts. The major figures in the culture circle school were Leo Frobenius (1873–1938), Fritz Graebner (1877–1934), and Wilhelm Schmidt (1868–1954). A noted authority on prehistoric art, Frobenius led 12 expeditions into Africa between 1904 and 1935. Trained as a historian, Graebner worked in museums in Berlin and Cologne and developed a surprisingly accurate prehistory of Oceania that involved six successive cultural stages: Tasmanian, Australian boomerang, totemic hunters, two-class horticulturists, Melanesian bow culture, and Polynesian patrilineal culture. Each of these culture circles had counterparts in Africa and elsewhere, and as the traits migrated, they blended, disappeared, grew, borrowed, and accommodated. To describe these diffusions, Graebner constructed an elaborate and often arcane jargon consisting of primitive, secondary, and tertiary circles, each containing a variety of subcircles, such as marginal, peripheral, and overlapping subcircles. Graebner's 1911 *Methode der ethnologie* is the classic of the evolutionists (in English, however, there exists only a seven-page summary in V. F. Calverton's 1931 *The Making of Man*).

In a sophisticated way, the diffusionists combined data from biological anthropology, historical documents, historical linguistics, and stratigraphic archaeology to construct the culture circles, which were essentially aggregates of traits arranged spatial and temporally. An elaborate statistics program was applied to uncover significant associations among the traits. This impressive enterprise acknowledged the influence on diffusion of conquest, cultural predispositions, geographic barriers and conduits, personalities, religious proselytization, trade, socioeconomic differentiation, and a variety of other factors.

Although most diffusionists assumed that the culture circle would grow naturally out of an analysis of the data, Schmidt, who was a Jesuit priest, thought that all foragers believed in a supreme god and that this pristine Christian-like belief was later corrupted by animistic notions. Schmidt also believed that Pygmies represented the original humans and that they had populated the world by emigrating from Tasmania. He wrote a 12-volume work of world prehistory titled *Der ursprung der gottesidee,* published between 1926 and 1955 (which has not been translated into English except for a one-volume summary).

Legacies

In addition to its erroneous interpretation of data, the position of the heliolithic school rests largely on the

unacceptable notion that the simple triangle is a unique form that could be invented only once. Although the heliocentric approach no longer exists in anthropology, it is found in the folk models of Western societies, especially in England, where W. J. Perry popularized the approach in his 1923 book, *The Children of the Sun.*

The culture circle school generally has had bad press in the English-speaking world, though Clyde Kluckhohn and Robert Lowie gave it favorable reviews. Although Graebner and Schmidt conducted no fieldwork, they did inspired scholars to do serious research among Pygmies, such as that done by Paul Schebesta. Some of the diffusionist principles are used by art historians, and distribution approaches remain an important technique in archaeology. Anthropologists are still interested in studying the diffusion of ideas and innovations, especially as they spread from the major industrial powers to the rest of the world.

Pioneers in quantitative anthropology, the diffusionists also introduced a relativism that seeped rather unacknowledged into U.S. anthropology, for their patchwork, nonunilineal argument meant that there were no straightforward connections between, for example, technological and theological complexity. The diffusionists also emphasized detailed empirical investigations and comparative methods, both of which became hallmarks of modern anthropology.

— *Robert Lawless*

See also **Cultural Traits; Migrations**

Further Readings

Brandewie, E. (1990). *When giants walked the earth: The life and times of Wilhelm Schmidt, SVD.* Fribourg, Switzerland: University Press.

Graebner, F. (1931). Causality and culture. In V. F. Calverton (Ed.), *The making of man* (pp. 421–428). New York: Modern Library.

Koppers, W. (1952). *Primitive man and his world picture.* London: Sheed & Ward.

Lowie, R. (1937). *The history of ethnological theory.* New York: Holt, Rinehart & Winston.

Perry. W. J. (1923). *The children of the sun: A study in the early history of civilization.* London: Methuen.

Schebesta, P. (1933). *Among Congo Pygmies.* London: Hutchinson.

Schmidt, W. (1931). *The origin and growth of religion.* London: Methuen.

Schmidt, W. (1939). *The culture historical method of ethnology: The scientific approach to the racial question.* New York: Fortuny's.

Smith, G. E. (1915). *The Ancient Egyptians and the origin of civilization* (Rev. ed.). London: Harper.

Dinosaurian Hominid

Contemplating "what if" questions about the extinction of nonavian dinosaurs has long been a pastime of scientists and the general public alike. If the dinosaurs hadn't died out, how would they have evolved, and could they have developed sentience? It is just those questions that paleontologist Dale Russell and model maker/taxidermist Ron Séguin attempted to address in proposing a hypothetical hominid-like dinosaur they called a "dinosauroid." This musing appeared as an addendum to a 1982 paper that detailed the process of skeletal reconstruction and modeling behind the construction of a mount of the dinosaur *Stenonychosaurus* for the National Museum of Natural Sciences in Ottawa, Canada. From the beginning, Russell and Séguin frequently referred to hominid evolution, comparing *Stenonychosaurus* to the recently discovered hominid specimen "Lucy" in terms of completeness and importance. (This comparison overstates the case: there are more relatively complete theropod fossils than hominid fossils, and *Stenonychosaurus* did not add as much to paleontological knowledge.)

Stenonychosaurus is a theropod dinosaur belonging to a group called troodontids. Theropods are the group of predominantly carnivorous dinosaurs that include such famous members as *Tyrannosaurus, Allosaurus,* and *Velociraptor;* the omnivorous and herbivorous ornithomimids, oviraptorids, and therizinosaurids; and birds. Troodontids are small, gracile, possibly omnivorous theropods closely related to dromaeosaurs (such as *Deinonychus* and *Velociraptor*) and avialans (the lineage that includes *Archaeopteryx* and birds). Like dromaeosaurs, troodontids have enlarged claws on their second pedal digit and a semilunate carpal in the wrist. Troodontids also possessed elongate feathers on their hands and tails; in many ways, they were quite avian-like. *Stenonychosaurus* was

about 1.2 m long and probably weighed about 70 kg. It was bipedal and had a tridactyl hand, with a somewhat opposable first digit. It also had large eyes and a narrow muzzle, allowing for stereoscopic vision, and relatively enlarged cerebral hemispheres.

Four features of *Stenonychosaurus* impressed Russell and Séguin: its stereoscopic vision, its high encephalization quotient, what they took to be its opposable digits, and the fact that its bipedality freed the hands from use in locomotion. These are all features that might plausibly be thought to be required for intelligence in humans. On this basis, they suggested that if dinosaurs had continued to evolve, troodontids such as *Stenonychosaurus* were the most likely dinosaurs to attain a human level of intelligence. Hence, their hypothetical dinosauroid.

Regarding stereoscopic vision, nonavian maniraptor dinosaurs, such as troodontids and dromaeosaurs, do indeed have narrow muzzles, and troodontids couple that with very large orbits, suggesting large eyes. Furthermore, because of the narrow muzzle, the eyes can be directed forward, allowing for some degree of stereoscopic vision. However, this vision is not equivalent to that of primates because the long snout would have still obstructed their field of vision, giving them a stereoscopic vision more akin to that of dogs than primates.

Of all the evidence cited, the encephalization quotient (EQ) is most interesting. The EQ is the ratio of an animal's brain weight to the brain weight of a "typical" animal of the same body weight. Russell and Séguin calculated *Stenonychosaurus*'s EQ at about 0.34, comparable to that of galliform birds, armadillos, insectivores, and—most significant from their perspective—the Mesozoic ancestors of humans. But given the uncertainty about the weights of the body and the brain in fossil organisms, the calculations contain a large potential for error, and having a high EQ does not necessarily mean that an organism will evolve "intelligence" in a hominid sense.

Russell's proposal that *Stenonychosaurus's* first and third digits were opposable was incorrect, however. Functional studies of the hands of theropods show that they are incapable of the kind of digit opposability that we see in primates. Furthermore, the structure of the hand would make evolving true opposability unlikely, because the first metacarpal (which rotates in primate opposability) is tightly appressed to the second metacarpal and the fused distal carpals in *Stenonychosaurus* thus cannot move independently. The only joint free to evolve opposition would be between the first metacarpal and its first phalanx.

The most problematic part of Russell and Séguin's argument is bipedality. Assuming that the vertically bipedal form seen in hominids is the ideal form for sentient organisms, they conclude that selection for sentience would directly lead to a hominid-like set of body proportions in dinosaurs. While bipedality and sentience may be related, it seems unlikely that such hominid-like proportions would evolve in theropod dinosaurs, which start out with a body plan fundamentally different from that of nonhominid primates. In both theropods and hominids, the form that bipedality takes is the result of the skeletal structure (long bodies with proportionally short limbs in theropods, short bodies with proportionally long limbs in hominids). Hominid bipedality is the result of the body plan and proportions of arboreal apes that hang from branches and thus takes on the shape dictated by the skeleton. In theropod bipedality, the body is cantilevered between the legs, with the pelvis acting as a fulcrum and counterbalance provided by a long tail and neck. As detailed by Russell and Séguin, in order to assume a hominid-like bipedality, a theropod would have to shorten its tail and neck, reorient its skull articulation and its pelvis, reorganize its legs, and flatten its feet. This would take a large degree of skeletal and muscular reorganization, and since the intermediaries would be ungainly at best, the idea that theropod dinosaurs would give up the highly efficient counterbalanced bipedalism for the more inefficient vertical bipedalism of humans makes little selective sense.

In the end, Russell and Séguin's hypothesis was less science than science fiction, a congenial genre for such musings. The science fiction and fantasy literature has a number of examples of bipedal hominid-like dinosaurs, probably the most famous of which appear in Harry Harrison's *Eden* series, which features humans living alongside (and in conflict with) hominid-like dinosaurs. Eric Garcia's *Anonymous Rex* series features incognito dinosaurs wearing human costumes. Space-traveling hominid-like dinosaurs descended from hadrosaurs appeared in the *Star Trek: Voyager* episode "Distant Origin" (Season 5). It could be argued the "Sleestacks" of Sid and Marty Croft's 1970s television show *Land of the Lost* were hominid-like dinosaurs; they look a lot like Russell and Séguin's dinosauroids.

— Alan D. Gishlick

Further Readings

Dixon, D. (1988). *The new dinosaurs: An alternative evolution.* New York: HarperCollins.

Russell, D. A. (1969). A new specimen of *Stenonychosaurus* from the Oldman Formation (Cretaceous) of Alberta. *Canadian Journal of Earth Science, 6,* 595–612.

Russell, D. A. (1981). Speculations on the evolution of intelligence in multicellular organisms. In J. Billingham (Ed.), *Life in the universe: Proceedings of the Conference on Life in the Universe, NASA Ames Research Center, June 19–20, 1979* (pp. 259–275). Cambridge: MIT Press.

Russell, D. A., & Séguin, R. (1982). Reconstructions of the small Cretaceous theropod *Stenenychosaurus inequalis* and a hypothetical dinosauroid. *Syllogues, 37,* 1–43.

Diseases

The trajectory of the word "disease" in anthropology from the 20th century through to the present reflects as much about the constitution of the discipline as it does the discipline's transformation in focus and paradigms. Following World War II, anthropology began to move away from its conventional objects, and the resultant encounters with non-Western medical systems called anthropologists' attention to the intersection between medicine, culture, and health and led them to analyze the hegemony of biomedical systems in places where it is critical to understand the indigenous etiologies of diseases and illnesses. Anthropologists mapped out different etiologies and ethnotheories of diseases-illnesses in non-European countries and developed a hierarchy of etiologies from natural to supernatural and even mystical. This focus became the domain of medical anthropology. Biomedicine has always used the word *disease* to designate the physiological abnormalities or pathological states identified by its diagnostic strategies. Until the 1970s, it was common for medical anthropologists to rebuff the term to the domain of biomedicine while using the concept of illness to give account of individual symptoms and experiences of disease. For many professionals in the field, a clear understanding of the etiology of diseases provides a base for public health prevention, and, in the case of infectious diseases, some even challenged the view that the indigenous causes

Source: © iStockphoto/Elena Korenbaum.

attributed to contagious diseases are fundamentally different from Western allopathic medicine.

More recently, the division between disease and illness has led to substantial critique by some anthropologists who deconstruct these concepts on social and cultural grounds. Disease, they contend, is not merely a physiological disturbance but takes place in wider social, ecological, political, and cultural processes that are experienced by the whole body. This perspective has given rise to an important line of investigation of diseases in critical medical anthropology, a subsegment of medical anthropology. According to this model, disease is viewed within the larger framework of the political economy of health and what its proponents call "critical biosocial causality."

In this approach, diseases are located in terms of the loci of social inequality and power differentials within local groups or in the relationship between local groups and wider regional, national, or global structures. As part of this newer approach, the experience of the sufferer is central, and sufferer narratives have been mobilized in efforts to fight the hegemonic worldview of biomedicine. Others are concerned with understanding the underlying social processes that explain

the re-emergence of old diseases, as, for example, the appearance of multidrug-resistant tuberculosis, as well the contexts of emerging new pathogens, such as HIV, and their impact on the lives of socially vulnerable populations. With the advance of globalization, anthropologists are introducing new approaches for unveiling underlying processes of global inequities and local public inadequacies to deal with emerging plagues, as well as the intertwining of diseases in vulnerable populations, a phenomenon medical anthropologists call *syndemics*. Within the Western world, some anthropologists are taking the new vantage point offered by advances in various technologies and data collection (for example, the human genome project) to investigate configurations of genetic diseases. By moving away from traditional representations of the non-Western world and incorporating new analytical tools and strategies to account for diseases and their complex interconnections with the political economy of health and sociocultural contexts, anthropology is helping shape new understandings of situations of inequities and actively informing local as well as global health programs.

— *Louis Herns Marcelin*

See also **Human Genome Project**

Further Readings

Augé, M., & Herzlich, C. (1995). *The meaning of illness: Anthropology, history, and sociology.* New York: Harwood Academic Publishers.

Green, E. C. (1999). *Indigenous theories of contagious disease.* Walnut Creek, CA: AltaMira.

Singer, M., & Amityville, H. B. (1995). *Critical medical anthropology.* New York: Baywood.

Dispute Resolution

Dispute processes, those that initiate disputes and those that operate to resolve them, are cultural processes. These must be analyzed and understood within the social and cultural context of a community rather than as a matter of individuals' rights and wrongs according to a logical political system of standardized jurisprudence. The anthropological study of dispute resolution is not different from an ethnography of community life. Community life consists of relationships among neighbors and kin, and involving economic, political, religious, and environmental resources. And all of these can be the subject of disputes.

Disputes involve a contested interpretation of shared principles of community life. These principles, or structural elements, are themselves not contested. A dispute is related to the manner in which a person has acted in relationship to these principles, as this has impinged upon the interests and affairs of other community members. Thus, the members of a community may share the general belief that the products of a garden are the property of the person who worked it, that gardens should be fenced, and that pigs, watched by a swineherd, roam and forage freely. A person who has a garden raided by another person's pigs then may initiate a dispute with the pigs' owner. Neither may propose that pigs should be penned nor that garden products are not owned by their farmers. The gardener may argue that the pig owner, via the swineherd, did not watch the animals carefully, and the pig owner may argue that the gardener did not construct a durable fence.

Disputes are embedded in the recurring life events of a community; each dispute has a trajectory out of past events, including prior disputes, and proceeds encumbered with the baggage of a wider context of community affairs. The gardener and the owner of the pigs may be rivals for community resources and have been involved in prior disputes. The garden may be placed in an area where pigs are often taken by swineherds; this herd of pigs is usually taken to forage close to gardens, and so forth.

Moreover, it is likely that any dispute can be viewed as impacted by a supernatural agency. Pigs that overcome a well-built fence or that were able to eat an unusually large amount of produce may have been assisted by a supernatural agent. The gardener may have angered these and become vulnerable, or the pig owner may have facilitated their involvement.

Disputants, in a sense, must agree to dispute, and the community must agree that there is a valid dispute. A person who raises an objection to pigs roaming free to forage or who objects to farmers having ownership of the produce of their farm work would be ridiculed, or at least find no community support. One of the unsettling results of social change is the introduction of unfamiliar principles as a basis for disputes.

Are humans inherently contentious? There is no easy answer to this question. Humans are inherently social and socially sensitive creatures. We creatively construct our cultural behavior daily from our traditional experience and in concert with our fellow community members. And we mutually dispute our varying creative versions. It is unlikely that creatures as complex as humans and as adept at symbolic reinterpretation could live in a dispute-free condition. The continuous potential of disputing, however, does not lead to a continuing condition of social disruption.

The social organization of communities also enables the means to resolve disputes. These range from inaction, avoidance or relocation by the persons involved to formal processes of adjudication by authorities vested with sanctioning powers. These processes are themselves normative properties of the community's social system. The ways in which they are applied are often also the source of disputes. However, community members who do not abide by them in good faith may be viewed as less-than-desirable community members. The farmer whose garden has been invaded by another's pigs and who in response seizes and kills several of the pigs, or who goes in the night and takes a corresponding part of the pig owner's garden may likely be in violation of community values regardless of his apparent loss. Indeed, witchcraft or sorcery is usually viewed as an improper tactic by an aggrieved person. The response is often to identify the witch (witch "doctors" are skilled at reading patterns of community disputes) and then try to resolve, in appropriate fashion, the dispute at the root of the attack.

Anthropology has tended to examine resolution processes that are located within communities or within a superordinate entity accepted by the community, such as a chiefdom. This is in contrast to processes imposed on the community based on foreign concepts and administered by strangers (such as those established by European administrations and kept by those assimilated to European culture). However, given the reality that these processes are embedded firmly in new nations, more anthropologists include national resolution procedures, typically formal adjudication.

There is a range of resolution processes. Some involve the two disputants in personal negotiation, but more usual is some kind of mediation or arbitration with a third party directing or even deciding on the nature of a settlement. It is also common for the resolution process to be part of a ritual procedure. Ancestral figures, but also other supernatural agencies, are disturbed by disputing (especially if it has led to conflict). Community misfortune may result unless resolution, specifically in a ritual setting appreciable by the supernatural agency, is completed. Mediators are often religious specialists.

Is resolution effective? It may be, insofar as both parties believe that their positions have been justified and fairly dealt with. The "aggrieved" party should believe that restitution (even apology) has been made, and the "aggrieving" party should believe that their actions were held to be understandable, even though assessed as requiring some adjustment to the other party. The contemporary judicial approach of restorative justice holds that disputes (especially those involving injury) cannot be truly resolved unless all parties—victims, perpetrators, and other community members—participate, accept responsibility and work together to make the community's life right again.

In fact, resolution probably achieves only a temporary result. Compromise may leave both parties discomfited. An explicit judgment that one party has acted wrongly, even foolishly, leaves that person vulnerable to community approbation. The person awarded a judgment may not feel that it was sufficient. Ritual resolution, even with its powerful supernatural incentive for reconciliation, may not last. Given the human condition, resolution should not be expected to eliminate disputes, but rather to ameliorate them. The success of a community's dispute resolution repertoire must lie in its capability to provide continuing temporary remedies, whether or not these are completely acceptable.

— *John Rhoades*

See also **Conflict; Law and Society; Sorcery; Witchcraft**

Further Readings

Caplan, P. (Ed.). (1995). *Understanding disputes: The politics of argument.* Oxford: Berg.

Gulliver, P. H. (1979). *Disputes and negotiations: A cross-cultural perspective.* New York: Academic Press.

Nader, L. (1965). The anthropological study of law. *American Anthropologist, 67*(6, Part 2), 3–32.

DNA Molecule

DNA (deoxyribonucleic acid) is a complex molecule that expresses, stores, and replicates all of the genetic information that is contained in eukaryotic cells. This genetic information is responsible for all the characteristics expressed in a particular species (e.g., color, size, and gender). In addition to physical characteristics, information pertaining to behavior and intelligence is also stored in the DNA molecule.

The DNA molecule is composed of two long strands (which are sugar-phosphate) and repeating units called *nucleotides.* Each of these nucleotides has three components: a 5-carbon sugar (which is deoxyribose in DNA vs. ribose in RNA), a phosphate group, and a nitrogenous base. Four nitrogenous bases make up the DNA molecule: two purines, adenine and guanine, which are composed of two nitrogenous rings, and two pyrimidines, thymine and cytosine, which are composed of one nitrogenous ring.

By forming hydrogen bonds, adenine pairs with thymine, and guanine pairs with cytosine. These pairs are known as *base pairs* and are responsible for the structure of the DNA molecule. The two adjacent polynucleotides are wound into two spiral-shaped strands called a *double helix.*

These long stands of the DNA molecule are organized by various proteins into individual units called *chromosomes.* Chromosomes are located in the nucleus of all eukaryotic cells. There are 46 chromosomes in each human cell, except in the sex cells (i.e., the eggs and the sperm), which have 23 chromosomes. On the chromosomes, there are regions of DNA, called *genes,* which are responsible for individual inheritable characteristics. A gene carries the actual biological information and can be as short as 999 base pairs to as long as several hundred thousand base pairs. It was estimated in 1996 that 30,000 to 40,000 genes exist in the genetic make up of *Homo sapiens.* However, upon the completion of the Human Genome Project in 2003, it is now postulated that only 20,000 to 25,000 genes exist.

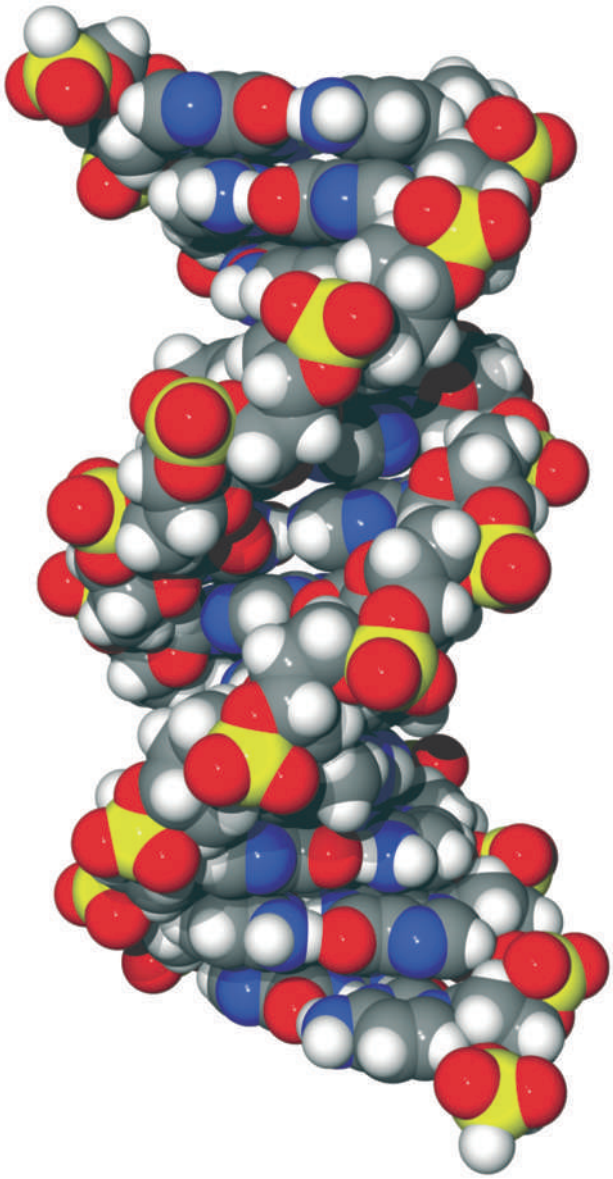
The history of the discovery of the DNA molecule is an interesting one. It first began with the idea that physical traits of species are actually inherited in a predictable pattern from the parents to offspring. However, it was not until the middle of the 20th century that scientists began to actually identify the mechanism of inheritance and its molecular basis.

Gregor Mendel, a mathematician, known as "the father of genetics," conducted many scientific experiments involving pea plants, which he began in 1857. The results of his experiments illustrated that pea plants distributed characteristics to their offspring in a mathematically predictable pattern. Mendel postulated that these characteristics (e.g., height of the plant) were inherited by the parent plant. However, at this time, the term *character* was used to define a heritable feature, such as the color of a flower. These characters vary among individuals. Each variant of a character is called a trait, such as purple or white. Even though he could not physically prove the biological foundation of this phenomenon, his work dramatically increased interest in the study of genetics.

In 1928, Frederick Griffith hypothesized that a molecule responsible for inheritance must exist. His work involved experiments using mice and the bacteria *Streptococcus pneumonia.* First, a virulent strain of *S. pneumonia* was injected into a mouse, and the mouse died. Second, a nonvirulent strain of *S. pneumonia* was injected into a mouse, and the mouse did not die. The next phase of his experiments involved heating up the virulent strain to denature and kill it; then, this killed strain was injected into a mouse, and the mouse lived. Finally, he injected a mouse with nonvirulent *S. pneumonia* that had not been heated up together with a virulent *S. pneumonia* that had been heated up, and the mouse died. Griffith postulated the killed virulent bacteria had passed on the virulent characteristics to the nonvirulent strand to make it virulent. He called the passing on of the inheritance molecule "transformation."

A scientist named Oswald Avery revisited Griffith's experiment 14 years later. Avery attempted to identify the inheritance molecule. In Avery's experiments, he selectively destroyed different molecules in the virulent *S. pneumonia* (e.g., carbohydrates, proteins, lipids, and ribonucleic acids). After the destruction of these molecules, transformation still occurred—until he destroyed deoxyribonucleic acid, and transformation did not occur. Avery had at last isolated the inheritance molecule, DNA.

In the 1940s, a scientist named Erwin Chargaff discovered that the DNA molecule is composed of four bases: adenine (A), guanine (G), cytosine (C), and thymine (T). In addition, he found that the amount of adenine is almost equal to thymine and that the amount of guanine is almost equal to the amount of



Source: © iStockphoto/Magnus Ehinger.

cytosine. Therefore, Chargaff postulated that A = T and G = C. This became known as "Chargaff's rule."

Two scientists named Rosalind Franklin and Maurice Wilkins attempted to crystallize and make an X-ray pattern of the DNA molecule, in order to understand its structure. Their results showed a pattern that appeared to have ladder-like rungs in-between two strands that were arranged side by side. In addition, the X-ray results showed an "X" shape and that the DNA molecule had a helical shape.

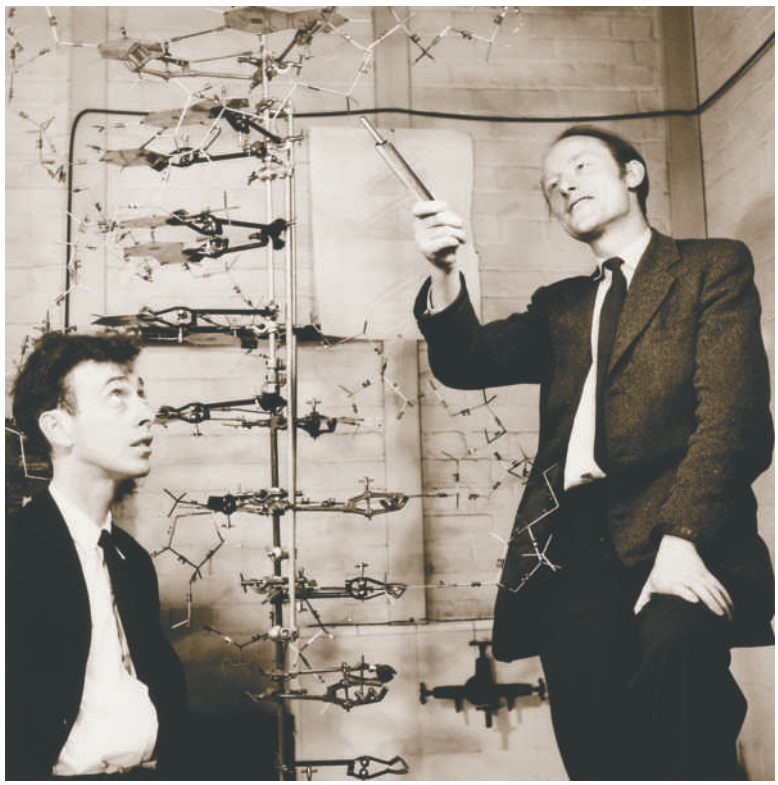
In 1953, two scientists, James Watson and Francis Crick, were working together and tried to put together a model of the DNA molecule. By examining the X-ray results of Franklin and Wilkins's picture, they produced a model of a double helix that had rungs connecting the two strands. The rungs were actually the bases of the nucleotides that were paired together using Chargaff's rule, so that all the adenine bases were paired with all of the thymine bases and all of the guanine bases were paired with all of the cytosine bases. These pairs are held together by a sugar-phosphate backbone, which makes up the double helix of the DNA molecule.

Watson and Crick also discovered that thymine and adenine each had two hydrogen bonds available and this is why they readily pair together. In addition, they discovered that guanine and cytosine each had three hydrogen bonds and this is why they pair together. Therefore, thymine can pair together only with adenine, and guanine can pair only with cytosine. Thus, one side (or strand) of DNA is a complement to the other side, which is made up of the corresponding base pairs.

The DNA molecule performs two functions: *replication,* where the DNA molecule "unzips" and makes an identical copy of itself (described below), and *transcription,* which is a process in which the DNA unzips and produces an mRNA molecule that ultimately produces a protein molecule (a process called *translation*).

These nucleotides are grouped side by side in threes (triplets), called *codons* (e.g., ATT or CGA); this is also known as "the triplet code." Each codon codes for a particular amino acid, and usually 2 to 4 codons will code for the same amino acid. Amino acids are the organic molecules that serve as the building blocks for proteins. Some codons initiate a start or stop point on a particular segment of DNA.

How exactly is protein produced from DNA (i.e., how do we go from gene to protein)? During the process of transcription, a molecule called *RNA polymerase* helps to unzip the two strands of DNA by breaking the hydrogen bonds between the base pairs. The RNA polymerase knows where to begin by locating the start codon (called "the promoter"); it does this with the help of other proteins called *transcription factors.* Once it attaches and separates the two strands of DNA, the exposed bases attach with newly available complementary bases, forming a complementary strand of "mRNA." This mRNA will continue to grow until the stop codon (and terminator sequence) is reached. Transcription ends after the RNA polymerase releases the newly made strand of mRNA and then detaches itself from the DNA after it has zipped it back up.



After transcription is complete, the mRNA molecule leaves the nucleus of the cell and makes its way to a ribosome, which uses the mRNA to synthesize protein. This process is called *translation.* During translation, mRNA slides through the ribosome, while a molecule called "tRNA" serves as an interpreter and brings the appropriate amino acid to the corresponding codon on the mRNA molecule. Each tRNA contains what is called an *anticodon,* which attaches to the codon on the mRNA; on the other end of the tRNA is an amino acid. The mRNA transcript is secured on the ribosome and will temporarily bond with the appropriate tRNA. Once this bond takes place, the tRNA transfers its attached amino acid to the chain of amino acids, which is growing as the mRNA is being read. This continues until the stop codon is reached, at which time termination of translation occurs, and a free polypeptide is released into the cytoplasm of the cell.

In addition to protein synthesis, it is important to note that the structure of the DNA molecule provides a reliable mechanism of heredity. This is based on the fact that genes carry important biological information. They must be copied accurately each time the cell divides, to form two identical daughter cells in order for successful transmission of inheritable characteristics to take place. This is done during *replication,* which is the process by which the DNA molecule replicates itself.

Replication begins when the DNA molecule is unwound and prepared for synthesis by the action of several types of molecules. Some of these are DNA gyrase, DNA helicase, RNA primers, and single-stranded DNA-binding proteins. These molecules work together to separate the two strands of the double helix, forming a "replication fork." Single-stranded DNA-binding proteins work to stabilize the unwound DNA. The replication fork moves in one direction, and only one strand, called the *parental DNA,* is replicated; the newly replicated stand is called *the leading strand.* This leading strand is synthesized in a continuous direction known as the *5 prime to 3 prime* direction, which is directed by DNA polymerase. The other strand called the *lagging strand* (travels in a 3 prime to 5 prime direction), which is not replicated continuously and produces short discontinuous replication products called *Okazaki fragments* (named after the Japanese scientist who discovered them). These fragments, which are formed by DNA polymerase, are usually 100 to 200 nucleotides long and are joined together by a molecule called *DNA ligase.*

During the replication of DNA, enzymes "proofread" the DNA and repair damage to existing DNA. This is done in two ways: Proteins proofread replicating DNA and correct errors in base pairing; this is called *mismatch repair.* The other way DNA is repaired is called *excision repair;* this is where repair enzymes actually fix DNA that is damaged by physical and chemical agents (including ultraviolet light).

The DNA molecule contains segments that are "noncoding." These sequences are called *introns* (short for *intervening sequences*). The regions that do code for the translation of protein synthesis are "coding regions" and are called *exons* (because they are expressed). The exons are separated from one another by introns (i.e., the sequence of nucleotides that codes for proteins does not exist as an unbroken continuum).

The DNA molecule differs from the RNA molecule in several ways. First, the DNA molecule is composed of two strands, or is "double stranded," whereas the

RNA molecule is composed of only one strand or is "single stranded." Second, the actual molecular compositions in their structure are different. The nucleotides that compose the RNA molecule are adenine, guanine, cytosine, and uracil, while in DNA, uracil is replaced by thymine. Like thymine, uracil is also a pyrimidine and pairs together with adenine during the processes of transcription and translation. Another structural difference between DNA and RNA is the type of sugar (a pentose sugar) found in the sugar-phosphate backbone. The DNA molecule contains deoxyribose, whereas the RNA molecule contains ribose. The final and most important difference between DNA and RNA is in their function. The DNA molecule makes RNA, and the RNA molecule synthesizes proteins.

Up to now, the DNA molecule has been presented as a highly organized unit that can replicate itself without error. However, a phenomenon called *mutation* can take place. A mutation is a change in the DNA of a gene; that is, the actual nucleotide sequence of the DNA is altered. An example of this would be if ATG changed to AAG. This change, no matter how small or drastic, will do one of three things: First, it could serve as a benefit by enhancing that specie's physical or biological attributes. This could increase a specie's ability to propagate and flourish, eventually becoming a permanent trait in that species. Second, it could cause an adverse effect in that specie's physical or biological attributes. This could hinder and decrease the specie's ability to survive or propagate an inferior version of the species, eventually leading to its extinction. Third, it could have no effect at all. Regardless of what effect a mutation has, it ultimately creates genetic diversity. All gene pools have a large reservoir of genetic mutations.

Because the DNA molecule is responsible for our genetic makeup and influences our physical totality all the way down to our cells, it in effect links all *Homo sapiens* together. The species *Homo sapiens* has a wide variety of genetic diversity, from height to skin and eye color. However, the common denominator of our species remains the similarity of our DNA molecules. DNA also in this effect links all biological life on this planet.

Due to the DNA molecule's many activities, which appear to be influenced by biochemical feedback, it appears to take on a life of its own. This new notion is becoming known as "molecular consciousness," or more specifically, "DNA consciousness."

It is also worth mentioning that even though we now know a great deal about DNA, there is still much that we do not understand. In addition, we also have to reserve anticipation for the possibility of life forms in other regions of the universe. What type of molecules will be at the root of their existence? Will they have a molecule similar to DNA or RNA, or will these other life forms possess an entirely different molecule?

Recent advances in bioengineering will have many fascinating implications in regard to the DNA molecule. For example, many genetic diseases can be detected with screening tests that can identify a very specific gene that is responsible for that disease. DNA testing can also be used to determine if an individual is or is not the father of a child with up to 99.9% accuracy in forensic anthropology. In the future, an individual's DNA will determine what type of medication will yield the maximum therapeutic results, increasing the quality of health in the population at large.

Finally, recombinant DNA technology, which involves techniques that can allow for the isolation, copying, and insertion of a new DNA sequence into a cell, could potentially give rise to new species or modified versions of existing species in the future. This is becoming more of a reality with the completion of the Human Genome Project.

— *John K. Grandy*

See also **DNA Testing; Genetic Engineering; Genetics, History of; Human Genome Project**

Further Readings

Alberts, B., Johnson, A., Lewis, J., Raff, K., Roberts, K., & Walter, P. (2002). *Molecular biology of the cell* (4th ed.). New York: Garland.

Butler, J. (2005). *Forensic DNA typing: Biology, technology, and genetics behind STR* markers (2nd ed.). New York: Academic Press.

Micklos, D., & Freyer, G. A. (2003). *DNA science: A first course* (2nd ed.). New York: Cold Spring Harbor Laboratory Press.

Watson, J. (2001). *The double helix: A personal account of the discovery of the structure of DNA*. New York: Touchstone.

Watson, J., & Berry, A. (2003). *DNA: The secret of life.* New York: Knopf.

DNA Testing

DNA (deoxyribonucleic acid) testing is a scientific method used to distinguish among living entities through the variations between strands of DNA. It is hard to believe that the use of DNA testing first entered the forensic world just 25 years ago. From the criminal cases shown by the media to the new popular television series *CSI,* the importance of DNA analysis is well-known.

The advancement in science and technology has allowed the development of DNA testing techniques, allowing scientists to solve questions once deemed unsolvable. Not only are we able to determine who the rightful father is in a parental dispute or the guilty party in a criminal investigation, but technology now has the ability to uncover the identity of thousands of body fragments from the September 11, 2001, terrorist attack on the World Trade Center, in New York City.

Furthermore, the use of DNA testing has played a significant role in tracing back human ancestry. By following mitochondrial DNA back through time, one is able to track the migration of specific genes through maternal lineages. DNA testing has greatly enhanced human curiosity and our understanding of the world in which we live.

Genetics and Molecular Biology

DNA is the foundation of life. Within each living cell, there is a nucleus that holds thousands of paired genes within structures called chromosomes. In human beings (who are considered normal), there are 46 chromosomes composed of strands of DNA, which include 22 pairs of non-sex-determining chromosomes (autosomes), along with one pair of sex-determining-chromosomes; an X chromosome from the mother and an X or Y from the father. The sex chromosomes determine whether the child will be male (XY) or female (XX). Except for sperm and egg cells and cells that do not have a nucleus, such as blood cells, the genetic makeup of our entire body is in every cell.

The double-helix "rope ladder" structure of DNA was discovered by James Watson and Francis Crick in 1953. They found that within each chromosome are strands of DNA, which are composed of long chains of base pairs: guanine (G), adenine (A), thiamine (T), and cytosine (C). The chemical properties allow Base A on one strand to pair with T on the other, and G to pair with C. Thus, depending upon the specific order and pairings, a gene that consists of various lengths of base pairs encodes for specific proteins. This instructional ability does not include every length of DNA, for the majority of DNA has no known function. The locus is the molecular location of a gene along a strand of DNA, and every chromosome contains a specific order of loci, which is the same in all humans. For example, on Chromosome 7 in every human, there is a gene that, if altered, may cause cystic fibrosis.

The Advancement in Testing Techniques

The first method of DNA testing used by forensic labs was restriction fragment length polymorphism (RFLP). Although it was first discovered in 1980 by David Botstein and coworkers, it was Sir Alec Jeffreys (English biochemist) who first discovered its application in "DNA fingerprinting." Jeffreys brought DNA fingerprinting into the criminal justice system to identify criminals and/or determine innocence of those wrongfully convicted. This technique is based on distinguishing variation in the length of DNA at particular loci (location on the chromosome). Thus, it is able to determine whether two different samples are from the same source. Although RFLP has the ability to discriminate a large number of loci, it has a number of drawbacks. It requires a large amount of DNA and has difficulty using degraded or old samples, which are quite common in forensics. In addition, it is a long and difficult task to perform; therefore, it will eventually be a technique of the past. Other early techniques included the human leukocyte antigen analysis (HLA DQAI), which examined only one locus; the AmpliType PM+DQA1 system; and amplification fragment length polymorphisms (AMFLPs).

With advancement in technology, new techniques were developed that were less strenuous, faster, and had the ability to target mitochondrial DNA, X and Y chromosome markers, and short tandem repeats. A variable-number tandem repeat (VNTR) is a region of DNA that differs in the number of consecutive DNA sequences that are repeated throughout a chromosome. The first of the two main techniques, VNTR typing, utilizes the extensive variation of VNTRs among individuals along with regions of identifiable

length to help differentiate humans. In 1983, Dr. Kary Mullis developed the polymerase chain reaction (PCR), in which large amounts of DNA can be replicated from a small sample of DNA (from a strand of hair or on a stamp). Once the DNA is amplified, the process continues similar to that of VNTR. The PCR method has a few drawbacks that can reduce its efficiency. Initially, if the genes are contaminated, then the process will amplify the wrong DNA. And second, because some of the loci used in PCR are functional genes, there is a higher probability that they would be influenced by natural selection, thus changing the frequencies of various genes throughout the human genome.

Typically, the DNA is amplified and then analyzed for specific characteristics. With the advances in technology and the Human Genome Project, a third method known as "DNA sequencing" or the "Sanger method" was developed. This technique is able to unravel specific DNA sequences base by base, to be used for making detailed comparisons to determine similarities and differences between strands.

Uses, Accuracy, and Limitations

The most common purpose for DNA testing is in criminal cases to identify and confirm a suspect's innocence or guilt. This is extremely important, because some cases would not be solved without DNA evidence. With enhanced techniques and decreased costs, testing is now used not only for murder and rape cases, but for everyday disputes, including pet ownership, burglaries, marital infidelities, and so forth. Parental testing for identifying the rightful father of a child is a common use in custody cases. In addition, preserving children's DNA in commercial kits will assist in helping to identify lost children who are found. Many more uses include following genetic disease incidence, prenatal testing, genetic mapping, the Human Genome Project, identifying human remains (soldiers, victims of the World Trade Center), among others. The use of DNA testing has proven crucial to many aspects of society today.

The world of forensics has assisted in the rapid improvement in DNA-testing techniques that are available today. In only a few decades, technology has advanced in such a way that DNA analysis has gone from taking months to conduct to being able to perform within a few hours. The technical aspect of DNA analysis has consistently proven itself; however, there are a few limitations. The primary weakness has been found through human error within procedure and lab methods. For example, there is error when testing two samples that are shown to originate from the same source when they actually are not from the same source. DNA testing may produce false positive or negative results. False positive results occur when testing results show a suspect sample is that of the forensic sample when it is not. False negative results are when testing results show suspect DNA is not the same as forensic sample when it actually is. However, there is no exact error rate, because error cannot be predicted, nor will it remain constant. The statistics show that in a trial, the source of the DNA is 1 million times more likely to be the suspect's than another random person's with the same genetic profile.

The FBI has strict standards and regulations on DNA testing and validity for "accuracy, precision, and reproducibility." These regulations include documents that characterize the loci of genes on a subject's DNA and the distribution of genes within the population from which to compare. Furthermore, evidence samples must be collected in an appropriate manner and handled according to procedure, while labs are to use reputable methods and techniques to analyze and interpret DNA samples. The FBI uses statistics to determine if DNA information is valid and unique to the suspect. Consequently, if the profile frequency of the suspect compared to the entire U.S. population is less than $3.9 \times 10(-11)$, it is 99% certain the DNA in question did not come from another individual.

Identifying Humans

In tragedies such as the World Trade Center attack, victims' bones and body parts are compared with DNA from their toothbrushes, hairbrushes, razors, and so forth, to allow DNA sequence comparison in order to be able to give remains to relatives. Also, DNA (along with proteins and lipids) from ancient organisms is able to be accessed through fossils, soil, and rocks to help bring greater understanding of biological history. This brings together the disciplines of archaeology, paleontology, molecular biology, geology, and chemistry.

If enough DNA from an ancient organism is discovered and the damage to the DNA was not severe, the possibility of cloning would still exist. The cloning process takes certain portions of DNA from one

species and inserts it into that of a host organism that is similar to the organism in question. Utilizing the host's natural ability to grow and reproduce, the organism could modify the donor DNA with the ancient DNA, creating a larger segment of DNA, and the organism can gradually "rebuild" the ancient organism. This can provide evidence to show relations of organisms to one another and help to rebuild species ancestry, a "phylogenetic tree."

Scientists also use DNA analysis to look at tissue remains on skeletons from mummified bodies. Since mummies underwent rapid drying, it was thought that rehydration of tissues could allow visualization of nuclei and subsequently genetic material could be extracted. For example, in 1981, nucleic acids from a preserved liver from a 2,000-year-old Han Dynasty corpse were isolated by G. Wang and C. Lu.

The mitochondrial (mt) DNA studies have had a significant impact on tracing human ancestry. These studies are based on the assumption that mtDNA is solely inherited from the mother and does not undergo genetic recombination. For example, the mtDNA analyses of the "Iceman" found in the Tyrolean Alps of Italy determined that he was an ancestor of current Europeans living north of the Alps. If the assumptions are true, then mtDNA studies will continue to increase our knowledge of maternal lineages and human evolution.

The most common use of DNA technology involves the collection of blood, semen, skin, and hair samples at crime scenes that are used to extract DNA and identify the donor. The DNA is first isolated, and amazingly, even if there is a trace amount of blood present at the scene, DNA can still be extracted and suspended in a liquid with the proper use of chemicals and heat. Once analyzed, DNA is stored in databases so that in the future, DNA profiles can be searched.

Criminal Investigations

After being convicted based on circumstantial evidence and/or eyewitness testimony, many criminals have been sent to prison or put to death. Within the legal system, there have been many cases in which the guilty have been set free and the innocent have been put behind bars or even placed on death row. Since 2002, there have been 102 cases in which men were wrongly convicted and freed from death row because of DNA technology.

Ronald Jones spent 10 years on death row after he was convicted of a 1989 rape and murder of a woman from Chicago. Jones was one of the first to be proven innocent by DNA testing. The trial almost did not occur because Judge John Morrissey dismissed Jones's request; however, the Illinois Supreme Court ordered DNA testing to take place, which proved his innocence. Another example is Robert Earl Hayes of Broward County, Florida, who was convicted of rape and murder and put on death row in 1991. The difference in this case is that it was due to faulty DNA technique that lacked proper validity. After Hayes had been on death row for 4 years, his DNA was retested using more acceptable methods of analysis. Hayes was finally acquitted in 1997. Furthermore, in 1987, in a rape case in which semen was tested from a victim's vagina, Tommie Lee Andrews became the first American to be convicted due to DNA evidence.

Future

Since the discovery of forensic DNA analysis, a new perspective has changed the history and future of mankind. This is clearly illustrated in a wide variety of cases, whether it is a "criminal" being freed from prison or the identification of passengers of the *Titanic*. It has reached a point where it is nearly impossible for someone to not leave physical evidence wherever they go.

For example, in cases where DNA samples do not include sperm and only the identification of the suspect as male is present, Y chromosome analysis can be used to find specific genetic loci specific to an individual. At the present time, labs have the equipment and expertise to look at more than 20 specific DNA loci; however, this number will increase with technological advances. It has been predicted that by the year 2010, one will be able to examine loci that determine physical traits.

Advances in technology may lead to handheld DNA devices for quick identification of a suspect for arrest. Furthermore, a research team consisting of scientists and engineers at the University of Michigan has developed a "lab on a chip" that electronically analyzes DNA samples. This inexpensive glass silicon chip is portable, extremely efficient, and is one of the latest advances in DNA technology.

Furthermore, genetic engineering and cloning have come together to be able to clone animals with specific traits. Once the gene for a particular trait is

discovered, then it is only a matter of time before the gene is manipulated to change or eliminate its effect. For example, the gene Fel d1 in cats that produces a protein that causes an allergic reaction in humans has been identified. Thus, alteration of that gene may one day help many people who suffer from cat allergies.

The formation of a completed national and world DNA database in the future will be of great assistance in solving crimes. It is certain that the future of DNA testing will continue to ride the wave of technology into the future.

With increasing knowledge and technology, the future of DNA testing will continue to influence mankind. Today, the use of DNA testing in criminal cases and paternal decisions has become widespread. For instance, if it were not for the advancement of DNA analysis, more than half of the World Trade Center victims would not have been identified. In addition, in the war against terror, DNA databases will continue to help track and capture members of al Qaeda, especially Osama bin Laden.

With the latest advances, one can only imagine the impact DNA testing will have on human life over the next century. Researchers have already begun putting missing pieces together to uncover some of the unanswered questions from our past. For example, DNA analyses have already been conducted on U.S. presidents such as Thomas Jefferson and James Madison in an attempt to determine whether they fathered children by female slaves.

The field of genetics is extremely fascinating, with new developments and discoveries happening everyday. However, being able to uncover the "blueprint of life" may also be frightening at times. Depending upon the views of society and the laws of the land, difficult issues that have an impact on individual privacy will continue to arise. As promising as a national database may seem, have we really thought about the ethical implications on members of society? Whether dealing with genetic diseases and biological warfare cases such as anthrax or putting criminals behind bars, DNA testing has and will certainly continue to become an important aspect of humanity.

— Joshua Zavitz and Carrie Wannamaker

See also **DNA, Recombinant; Evolution, Molecular; Genetics, Human; Human Genome Project**

Further Readings

Cohen, S. (2003). *The wrong men: America's epidemic of wrongful death row convictions.* New York: Carroll & Graf.

Jones, M. (2002). *The molecule hunt: Archaeology and the search for ancient DNA.* New York: Arcade.

Lee, H. C., & Tirnady, F. (2003). *Blood evidence: How DNA is revolutionizing the way we solve crimes.* Cambridge: Perseus.

Palmer, L. J. (2004). *Encyclopedia of DNA and the United States criminal justice system.* Jefferson, NC: McFarland.

Rudin, N., & Keith I. (2002). *An introduction to forensic DNA analysis* (2nd ed.). New York: CRC Press.

DNA, Recombinant

Recombinant DNA, also written as rDNA, is the combining of genes from two or more organisms. The procedure is to construct a DNA molecule in vitro and then insert it into a host cell or organism. The product of the procedure usually is defined as being *genetically engineered,* although the two terms *genetically modified* or *transgenic* are also used. Recombinant DNA is one of three types of cloning and often is mistakenly identified with one of the other two types: reproductive cloning and therapeutic cloning, although there is overlap.

Reproductive cloning (*cloning* is from the Greek word for twig) has been used for plants since ancient times, as a twig from a plant would be put in the ground and grow. But the first cloned animal, a tadpole, did not occur until 1952. Much popular attention has been given to reproductive cloning, largely since the cloning of a sheep, "Dolly," in 1997, by the Roslin Institute in Scotland. Since then, a number of other animals have been cloned (e.g., mice, cows, pigs); attempts to clone some other animals (e.g., monkeys, cats, dogs) have been unsuccessful; and the possible cloning of humans has become a major topic of concern, with much opposition. Mice are the main source of animal-cloning experiments, but cloning of pigs is a goal because their tissues and organs are similar to those of humans. Reproductive cloning is very expensive, and most experiments are not a success.

The most popularly known example of therapeutic cloning is stem cell research, which first became a controversial political issue in the United States during the 2004 presidential election, when President George W. Bush opposed the furtherance of the small amount of stem cell research the United States has sponsored and his Democratic challenger, John Kerry, supported an increase in stem cell research. Because an embryo is destroyed in the process, some people object to stem cell research on religious grounds, as being similar to abortion. Possibilities are cures for cancer, heart disease, Alzheimer's, and other serious medical conditions. In the same 2004 election, California voted to provide $3 billion over 10 years for stem cell research, 12 times as much annually as the nation's 2004 funding. The hope is that in the future, entire organs can be produced from single cells and be used to replace defective organs.

Recombinant DNA has not received the controversial emotional and political coverage received by animal cloning and stem cell research. However, it does exert an important role in the success of biotechnology and has led to many successful advances. Crucial vaccines are in the pipeline. Foods, for example, have been produced that can resist insecticides, pesticides, or viruses, provide more nutritional value, grow faster and larger, or resist bad weather conditions.

The 1953 discovery, by James Watson and Francis Crick, of the structure of DNA started the continuing explosion of genetic research, including recombinant DNA technology. In 1962, Watson, Crick, and Maurice Wilkins received the Nobel Prize for Physiology and Medicine. Rosalind Franklin, the fourth discoverer, had died in 1958 at age 37. Among other examples of the explosion, the genetic code was cracked in 1966. In 1972, Paul Berg pasted two DNA strands together, forming the first recombinant DNA molecule; and the following year, Stanley Cohen, Annie Chang, and Herbert Boyer produced the first recombinant DNA organism by splicing a recombinant DNA molecule into bacteria DNA. In 1975, at Asilomar, California, an international conference of scientists asked the government to regulate recombinant DNA experiments, and in 1976, many types of experiments were restricted. The recombinant DNA Advisory Committee was established by the U.S. National Institutes of Health. The same year, two famous scientists founded Genentech, Inc., a biotechnology company whose goal was to develop and market recombinant-DNA-based products.

The controversy over whether private businesses should be able to patent new knowledge would be bitter and long-lasting, but a very expensive and competitive entrepreneurial race had begun, largely by medical, pharmaceutical, and agricultural concerns. In 1977, the U.S. Congress failed at attempts to pass more regulations, and in 1980, the United States allowed Exxon to patent an oil-eating microorganism. In 1988, the first patent was awarded for a genetically altered animal, a mouse highly susceptible to breast cancer. In 1989, the National Center for Human Genome Research, with James Watson as head, was created to oversee the Human Genome Project's goal to map and sequence all human DNA by 2005. The center was formally begun in 1990, and that year, anthropologists and the public also saw the book, *Jurassic Park,* which increased public interest and concern through a story of bioengineered dinosaurs running amuck, with dangerous results. The book became a popular movie in 1993.

How will recombinant DNA affect the future? The possibilities are great for medical advances, for helping fight starvation, for improving the environment, and for other areas. There are numerous biotechnology companies, with many successful and unsuccessful research projects. But there are and will continue to be serious ethical controversies. A major amount of opposition will come from people who because of their religious beliefs view recombinant DNA technology as changing their supreme being's definition of life. A cultural lag between knowledge and allowable application of that knowledge will continue to exist in many areas. There also is a fear that unknown and very negative results might arise from combining different life forms.

Other concerns are over the treatment of animals, the tremendous knowledge and financial benefits that might go to a selected few individuals or governments, the probability that poorer countries might have their natural resources exploited but receive no benefits, the confusion that people will experience because of the complexities of new products and results, and the possibilities of unexpected negative medical reactions.

Despite concerns, biotechnology has been safe; recombinant DNA has more precise methods than traditional biotechnology; and oversight has become more flexible. The Human Genome Project was completed in 2003, ahead of schedule, and will

continue to provide much more helpful genetic information far into the future.

— *Abraham D. Lavender*

See also **DNA Testing; Evolution, Molecular; Genetics, Human; Human Genome Project**

Further Readings

Cranor, C. F. (Ed.). (1994). *Are genes us? The social consequences of the new genetics.* New Brunswick, NJ: Rutgers University Press.

Relethford, J. H. (2001). *Genetics and the search for modern human origins.* New York: Wiley-Liss.

Watson, J. D. (with A. Berry). (2003). *DNA: The secret of life.* New York: Knopf.

Douglas, Mary (1921–)

British social anthropologist Mary Douglas developed theories about human behavior and culture that have been influential in many disciplines, including anthropology, psychology, political science, religious studies, economics, literature, biblical criticism, risk analysis, and folklore. Douglas, a symbolic anthropologist, focuses on how people understand the world in which they live and how this understanding influences their cultures. Douglas is also concerned with the interactions between people and within their culture's institutions. She is notable for developing theories that can be applied to people in all cultures and societies.

In the early part of her career, Douglas's work centered on Africa, but by the mid-1960s, she began examining theoretical issues on a broader scale. In Douglas's book, *Purity and Danger* (1966), she outlined her theory that people organize their social lives based on categories of purity and impurity. Moreover, in societies where beliefs of pollution and cleanliness are particularly strict, Douglas argued there are also religious and other cultural practices and prohibitions to reinforce these ideals of purity, which apply not only to physical cleanliness but moral health as well.

In *Natural Symbols* (1970), Douglas outlined her grid/group theory, which has been particularly influential throughout many disciplines. Douglas believes that all societies can be understood and compared on the basis of both "grid" and "group." Grid refers to the extent to which the status of an individual in society is ascribed based on specific social distinctions and divisions, such as race, ethnicity, sex, descent, and caste status. Group, in this case, relates to the degree to which people in a particular society are motivated based on the good of the society as a whole or whether they are driven by their own individual beliefs. Therefore, in societies with a strong grid and group, the good of the group is used as an explanation to divide people in the society into clearly delineated structures. These social divisions, whether they are based on caste, age grades, or race, are believed to be necessary to sustain the society. In societies with low grid and low group, individuality has a greater level of importance, and an individual's role within society is variable.

In her more recent work, Douglas has focused on a variety of current issues, including HIV/AIDS, social justice and awareness, environmental issues, religious revivalism, and economics.

Douglas earned her PhD in 1951 from Oxford University. She was awarded honorary doctorates from University of Uppsala, University of Notre Dame, Jewish Theological Seminary, University of East Anglia, University of Essex, and University of Warwick.

Douglas has had an illustrious career in the field of anthropology that includes appointments at Oxford University, University of London, Northwestern University, Princeton University, and the Russell Sage Foundation, where she worked as the director for research on culture. Douglas continues her research as a professor emeritus at University College London. In addition to the two books mentioned previously, Douglas has published numerous books and articles exploring her theories and applying them to a wide variety of topics.

— *Kristine McKenzie Gentry*

See also **Cross-Cultural Research; Taboos**

Further Readings

Douglas, M. (1966). *Purity and danger: An analysis of the concepts of pollution and taboo.* London: Routledge & Kegan Paul.

Douglas, M. (1970). *Natural symbols: Explorations in cosmology.* New York: Vintage Books.

Fardon, R. (1999). *Mary Douglas: An intellectual biography.* New York: Routledge.

Dowry

Dowry is a custom practiced mostly by intensive agriculturalists with significant inequalities in wealth. It is a form of marital exchange occurring in 5% of the societies studied by anthropologists in Europe, Southern Asia, and the Middle East, the most well-known being the Indian Hindus. Generally speaking, it involves the transfer of property, money, or goods, such as household wares, jewelry, cars, and clothing from the bride's family to the bride, groom, or groom's family. The dowry is actually the daughter's inheritance and functions to mark the social status of both the spouses and their offspring and solidify the marriage contract. Much of the dowry is presented on the wedding day, but the bride's parents and maternal uncle provide gifts periodically throughout the marriage. In patrilocal societies, where the bride goes to live with the groom's family, dowry payments transfer money to the bride's new residence and are a public announcement of the new alliance between families.

In Hindu culture, dowry or *daan dehej* is considered a matter of religious duty, or *dharma,* referred to in religious texts, such as the *Manusmriti.* It creates an atmosphere in which women are seen as property, governed first by their father and later by their husband. Though there are some "love matches," in which couples ask for negotiations to begin between family representatives, marriages are usually arranged by the parents through kin and other networks but can also be established from want ads placed in the newspapers. These advertisements, placed by the parents, include attributes such as age, income, occupation, physical features, kinship ties, family background, place of residence, personality, consideration of dowry, time and type of marriage, and language, through which the families evaluate potential family alliances.

The institution of dowry in India has resulted in a high incidence of violence against women. Advances in medical technology that can determine the sex of the fetus have introduced the practice of selective female abortions. Because dowry payments are a drain on the bride's family, female children are less valuable and therefore considered expendable. Statistics from a 2001 census show that there are now 933 women to every 1,000 men. Furthermore, rates of female suicide have increased in cases where the families cannot afford to produce a dowry. However, most violent acts occur after the marriage has taken place, with additional demands from the groom or groom's family. If these demands cannot be met, the results are the abuse and torment of the wife, which ultimately end in her death. "Bride burning" is a practice during which the woman is burned to death in kerosene, the fuel typically used in kitchen stoves. A hospital in Delhi typically sees three to four burn victims a day who report having "fallen onto a stove" as the cause of their injuries. While in the hospital, the groom's family still harasses and threatens these women to keep them from telling the authorities what really happened.

In 1961, the Dowry Prohibition Act made the practice illegal; however, it has proven to be ineffective in combating this social issue. Because the victims rarely incriminate their attackers and the custom is entrenched in the society, the law is not easily enforced. There are some women who act out against the demands and call the police, and on these occasions the men are arrested and sent to prison.

Trends suggest that it is in the urban areas of Northern India that the occurrence of "bride burning" is the highest. Because of the lack of social controls that are more obvious in the rural areas, the groom's family is able to act with impunity. In smaller communities, the husband and family are held accountable for their actions. Also, women in these areas are more involved in the family's economic production and are consequently more valuable. This custom and the social issues surrounding it continue today.

— *Luci Latina Fernandes*

See also **Bride Price; Hinduism; India, Rituals of**

Further Readings

Bailey, G., & Peoples, J. (2002). *Essentials of cultural anthropology.* Belmont, CA: Wadsworth.

Murdock, G. P. (1949). *Social structure.* New York: Macmillan.

Van Willigen, J., & Channa, V. C. (2004). *Law, custom, and crimes against women: The problem of dowry death in India.* In N. F. Bellantoni & L. L. Fernandes (Eds.), *Anthropologists at work: An introductory Reader* (2nd ed.). Cambridge, UK: Pearson.

Dryopithecus

Dryopithecus is one of 40 genera representing up to 100 species of extinct apes that lived during the Miocene (22.5 to 5.5 million years ago). The fossils of *Dryopithecus* have been found in the region ranging from Spain to the Republic of Georgia. *Dryopithecus fontani* was the first fossil great ape discovered. It was discovered in Saint Gaudens, France, by Édouard Lartet in 1856.

Dryopithecus species (referred to as dryopithecines) flourished in Europe between 13 and 7 million years ago. About 9 million years ago, the climate became cooler and dryer, causing a disappearance of tropical regions in Europe. Many of the Miocene apes became extinct at this time. *Dryopithecus* was one of two lineages (*Sivapithecus* and *Dryopithecus*) that survived this climatic change. Dryopithecines presumably survived by migrating with their preferred ecological zones to Africa.

Many dryopithecine fossils have been discovered, and much of the skeleton is represented. Like all living apes, dryopithecines possessed relatively large brains. They also show apelike characteristics associated with a reduced reliance on smell and an increased emphasis on vision: they had shortened snouts and forward-facing eye sockets with overlapping fields of vision. Like all living apes, dryopithecines also lacked a tail. The skeletal remains indicate that dryopithecines were quadrupeds, walking on four legs. They also possessed adaptations to suspensory locomotion: Their stable yet fully extendable elbow joint allowed them hang and swing below branches. In addition, remains of the hands and feet show that they possessed powerful grasping capabilities. All of these characteristics suggest that *Dryopithecus* moved about the forest canopy in a way that is similar to modern great apes.

The lower molar teeth of *Dryopithecus* have long had significance for paleoanthropologists. Their five cusps are arranged in a pattern that is observed in all fossil and recent apes as well as humans. It is known as the *Y-5 pattern,* because the fissures separating the five cusps form a "Y." This is one of many characters that are used to distinguish apes from monkeys. The size and shape of the other teeth, including large incisors and bladelike canine teeth, suggest that dryopithecines were adapted to a diet of soft, ripe fruits. Aspects of the skeleton that reflect life history variables, including tooth microstructure and brain size, suggest similarities to living apes. Drypothecines apparently lived relatively long lives, matured relatively slowly, and gave birth to one large offspring at a time.

The place of *Dryopithecus* in human and ape evolution is still debated. A recent discovery (1999) of a new *Dryopithecus* skull from Hungary shows that the cranium is more similar to that of African apes and early fossil humans than to Asian apes. Thus, scientists suggest that *Dryopithecus* (or its close relative *Ouranopithecus*) was the likely ancestor of African apes and humans. If this were the case, the common ancestor of African apes and humans would have originated in Eurasia and later migrated to African to establish separate African ape and human lineages sometime during the late Miocene.

— *Shara. E. Bailey*

See also **Primate Morphology and Evolution**

Further Readings

Begun, D. (2003). Planet of the apes. *Scientific American, 289*(2), 74–83.

Kordos, L (2000). New results of hominoid research in the Carpathian Basin. *Acta Biologica Szegediensis, 44,* 71–74.

Kordos, L., & Begun, D. (2001). A new cranium of *Dryopithecus* from Rudabánya, Hungary. *Journal of Human Evolution. 41*, 689–700.

Dubois, Eugene (1858–1940)

A Dutch anatomist and geologist, Eugene Dubois was known for his discovery of *Pithecanthropus erectus.* Born in the Netherlands in 1858, Dubois cultivated his naturalism with interest in the natural sciences. With support from his family, he studied medicine at Amsterdam University, whereby he received his doctorate in 1884. After graduating, Dubois was appointed as lecturer of anatomy in 1886. It is believed that his interest in evolution developed rapidly during this appointment. Perhaps believing that Asia was the cradle of human evolution, Dubois began to critically assess the possibilities of moving to

the Dutch colony. The following year Dubois went to the Dutch East Indies (Indonesia) as a military surgeon. Although the island of Sumatra yielded few fossils, the move to the island of Java (Trinil) in 1890 would prove to be of great significance, ultimately yielding the fossil *Pithecanthropus erectus* (Java man) that would change both hominid taxonomy and secure Dubois's place in the scientific community.

After careful examination of the fossil evidence, Dubois published his findings 4 years (1894) after his arrival in Java. In 1895, he returned to Europe to discuss and defend his interpretation of the fossil evidence. Although the scientific community was open to new evidence concerning evolution, most disagreed with his methodology and interpretations concerning the placement of this hominid form. During this time, Dubois became a professor of geology at the University of Amsterdam. Lecturing and traveling throughout Europe, he continued to defend his analysis of Java man. Unwavering in his interpretation, Dubois remained firm in his belief that *Pithecanthropus erectus* was an intermediate form between simian ancestry and humankind. The similarities of the morphological features of then recent discoveries in Java had increased the Java controversy. Regardless of his scientific demeanor and interpretation, physical anthropology benefited from Dubois's quest for human ancestry.

Contributions and Perspectives

From 1891 to 1892, Dubois discovered a deposit of fossil bones at Trinil. In the strata that would date to the Pleistocene, the lapilli layer would yield a third molar (second molar found in October 1892), cranium, and a left femur. Besides the hominid evidence, other fossil remains of extinct creatures were recovered, among them being Stegodon, *Bos elephas,* rhinoceros, sus, felis, and hyena. Viewing the evidence as a whole, a picture of a bygone time emerged through the rock strata. Among the hominid fossil bones that were recovered, the interpretation of the thighbone and cranium led him to conclude that the specimen was an intermediate form between man and ape. Although he first referred to this new find as *Anthropithecus erectus,* he later renamed this hominid form as *Pithecanthropus erectus.*

Characteristically, Dubois (1896) assessed that the femur possessed both human and simian-like

Source: The New York Academy of Medicine Library.

qualities. The differences between a human femur and that of *Pithecanthropus erectus* involved the following characteristics: increased rounded form of the inner side of the shaft, a round convex popliteal area, and more simian-like trochanteric line. Although the femur does have humanlike characteristics, Dubois asserted that the evidence must be evaluated in its entirety, including the other simian-like (perhaps a giant gibbon form) fossil bones that were discovered along with the femur. The calveria is measured at 185 mm (length) and 130 mm (breadth). According to Dubois, the skull is also simian in character. The cranial capacity is estimated at being around 1,000 cc, receding forehead, *torus occipitals,* and the pronouncement of the frontal bone's orbital indicates a marked difference from human. Although similar to other anthropoid apes and some human characteristics (e.g., cranial capacity), Dubois continued to maintain that *Pithecanthropus erectus* was not a microcephalic idiot as some claimed, but a distinct and extinct hominid form between humankind and ape, an intermediate form that has Hylobatoid characteristics and is close to the genus *Homo.* The exact relationship and interpretation concerning the evidence was the center for agitated discussions, only to resurface with other hominid finds.

Discoveries of fossil hominids in both China (Peking man) and Java renewed interest in Dubois's

discovery and interpretation. According to the evaluations of then newly discovered evidence, the fossil remains appeared to be very similar to that of *Pithecanthropus erectus.* However, Dubois defended the independence of *Pithecanthropus.* Dubois claimed that the newly discovered fossil in Java was, in fact, *Homo soloensis.* Dubois stated that *Homo soloensis* is proto-Australian and that both Solo man and Rhodesian man are a primitive type of *Homo sapiens,* all of which are distinct from *Homo neanderthalensis.* Considering the cranial vault, low cranial capacity, pulp cavities of the teeth, and slender bones, the specimens of *Homo soloensis* and *Homo rhodesiensi,* and *Sinanthropus* are the most primitive type of *Homo* by which all human races can be derived. Any variation found among these types is due to cultural influences. In a reevaluation of *Pithecanthropus* in 1937, Dubois gave his reevaluation.

Dubois stated very clearly that *Pithecanthropus,* though not human, was a gigantic genus close to the gibbon. The morphological features of the calvaria are similar to anthropoid apes; however, the essential features of the femur indicates an erect position and gait. For these reasons, Dubois had given the name *Pithecanthropus erectus.* Furthermore, the lack of the parietal vertex and cranial capacity would be expected if a siamang gibbon had the body weight of *Pithecanthropus* (estimated using the dimensions of the femora). The increased cranial capacity, in Dubois's opinion, was a product of *progressive cerebration by great leaps* (his italics), a law of phylogenic growth of the psychencephalon. Last, Dubois alluded to the conclusion that *Pithecanthropus erectus* may have undergone a *transformation* (his italics) toward human organization, whereby slight modifications of form could result in greater transformations. However, he still retained that this form was unique as well as extinct.

Despite Dubois's academic and professional energies to maintain the distinctness of *Pithecanthropus erectus,* the expenditure was futile. Today, *Pithecanthropus erectus* is classified as *Homo erectus,* a hominid phase in human evolution that is 1.6 million years old. This phase in human evolution could be found in China, Indonesia, Java, Northwest Africa, Olduvai, and the Turkana Basin. Although there is still controversy concerning the defining characteristics, number of lineages, and rates of change, *Homo erectus* signifies a major segment in human evolution. It is unfortunate that Dubois, before his death in 1940, never accepted the diversity of *Homo erectus* that his specimen partly represented. Regardless of his known idiosyncrasies, Eugene Dubois had made important contributions in both discoveries and thought-provoking analysis to the understanding of human evolution.

— David Alexander Lukaszek

See also **Hominization, Issues in; Hominids; Homo Erectus; Missing Link; Primate Morphology and Evolution**

Further Readings

Birx, H. J. (1988). *Human evolution.* Springfield, IL: Charles C Thomas.

Dubois, E. (1896). On Pithecanthropus erectus: A transitional form between man and the apes. *The Journal of the Anthropological Institute of Great Britain and Ireland, 25,* 240–255.

Dubois, E. (1937). On the fossil human skulls recently discovered in Java and Pithecanthropus Erectus. *Man, 37,* 1–7.

Shipman, P. (2001). *The man who found the missing link: Eugene Dubois and his lifelong quest to prove Darwin right.* New York: Simon & Schuster.

Durkheim, David Émile (1858–1917)

David Émile Durkheim was a French sociologist and philosopher concerned with establishing the domain of sociology, that is, how sociology is different from other academic disciplines. He was also committed to establishing sociology as a science that could compare with the standing of the natural sciences. Scholars regard Durkheim as one of the founders of sociology and one of the most important sociologists in the history of the field of sociology.

Durkheim's central thesis was that sociology's domain lies with the study of social phenomena, that is, the study of society. Durkheim posited that social phenomena have an existence in and of themselves; they are sui generis. They arise when individuals create a reality that cannot be understood in terms of the properties of the particular individuals; that is, social phenomena are not reducible to psychological or biological explanations. Rather, social phenomena are

"social facts" and are caused by other "social facts." The role of sociology is to discover the laws or "social facts" that maintain societies. Durkheim further developed a functionalist approach to the study of "social facts." This approach emphasized the roles that institutions and processes play in maintaining social order.

Scholars describe Durkheim's approach as macrosociological, because he was concerned with studying the characteristics of groups and structures. Durkheim applied the macrosociological approach in such works as *The Division of Labor in Society* (1893), *The Rules of Sociological Method* (1895), *Suicide* (1897), and *The Elementary Forms of Religious Life* (1912). For example, in *The Division of Labor in Society,* Durkheim examined how social order is maintained in societies by focusing on differences in the division of labor in traditional and modern societies. Durkheim held that traditional societies have a simple division of labor and are held together by common values. There is a correspondence between collective consciousness and individual consciousness. Durkheim referred to this type of social order as "mechanical solidarity." Modern societies, however, are characterized by a complex division of labor in which specialization of labor and social roles create dependency that ties people to one another. Durkheim referred to this type of social order as "organic solidarity." Furthermore, in modern societies, the complex division of labor produces an individual consciousness that is distinct from collective consciousness. Modern societies may also experience rapid social change that can produce a breakdown of norms regulating behavior that Durkheim referred to as state of *anomie.*

In *Suicide* (1897), Durkheim examined the breakdown of norms regulating behavior by analyzing the suicide rates of different groups, such as Protestants and Catholics. He posited that differences in suicide rates are a function of differences in social cohesion. He demonstrated that suicide varies inversely with the degree of social cohesion. Durkheim explained that when people are well integrated into a group, they participate in activities and hold values that bind them together. Hence, their integration serves as a kind of buffer from the stresses of life, and they are less likely to commit suicide. Using this analysis, Durkheim explained the higher rates of suicide among Protestants when compared with Catholics by noting that Protestantism had fewer common beliefs and practices.

Source: © Bettmann/CORBIS.

— *Patricia E. Erickson*

See also **Norms; Social Structures**

Further Readings

Farganis, J. (Ed.). (2004). *Readings in social theory: The classic tradition to post-modernism.* New York: McGraw Hill.

Giddens, A. (Ed.). (1972). *Émile Durkheim: Selected writings.* New York: Cambridge University Press.

Nisbet, R. A. (1974). *The sociology of Émile Durkheim.* New York: Oxford University Press.

E

Ecology and Anthropology

The study of ecology and anthropology, here termed *ecological anthropology,* is at its most basic level the examination of the relationship between humans and the natural environments in which they live. Although the nature of how anthropologists approach this relationship has changed and varied considerably over the past century, ecological anthropology is best characterized as a materialist enterprise. Studies of ecology and anthropology have at their core an implicit assumption that human societies are the products of adaptation to specific environmental conditions. In addition, the human capacity for culture is most often seen as a primary mechanism for achievement of successful adaptation. Despite this general framework, however, contemporary approaches to ecological anthropology range from the very materialist application of evolutionary theory to approaches like historical ecology, which incorporate traditional humanistic approaches to the study of human-environment relations.

Ecological anthropology has a long history within anthropology, dating to the origins of the discipline. However, because the writers of the early 19th century believed that environmental conditions absolutely determined particular cultural constructions, a perspective called *environmental determinism*, the emergence of a rigorous approach to the study of culture through systematic data collection, championed by Franz Boas, virtually eliminated ecology as a worthy focus of anthropological investigation. Known as *historical particularism*, an approach devoted to the study of culture areas, it regarded cultures as unique and ultimately incomparable. Broad theorizing about culture origins and development was rejected outright.

Leslie White and Julian Steward, widely regarded as the fathers of contemporary ecological anthropology, were both trained within the Boasian paradigm. They were, however, led by their early professional experiences to reject the Boasian paradigm in favor of addressing the processes of cultural evolution and the principles that underlie cultural similarities and differences.

For White, appointment at the University of Buffalo in 1927 and subsequent work with local Seneca Indians led him to read Lewis Henry Morgan's writing about the Iroquois. For White, this entrée into 19th-century evolutionism fostered a deep interest in general cultural evolution. White believed that cultural evolution was driven by increased energy use per capita. His lasting contribution to ecological anthropology was the reintroduction of evolutionary thinking into anthropology.

Julian Steward's work with the Great Basin Shoshone in the 1930s demonstrated the direct relationship between environment, technology, population density, and social organization. His work ultimately led to the development of cultural ecology, an approach to the study of culture that advocated the investigation of the relationship between the culture core, which he defined as a society's environment, technological capacity, and social organization, and all other aspects of culture.

The deterministic nature of Steward's work stimulated new thinking about human-environment relationships. Pioneered by anthropologists Frederik Barth, Robert Carniero, Marvin Harris, Robert Netting, and Andrew Vayda, among others, the recognition of the ways in which ecology influences cultural formulations, especially the evolution of complexity, stimulated new interest in the interplay between ecology, politics, economy, and religion. This new perspective is perhaps best exemplified by Elman Service's *Primitive Social Organization* and Morton Fried's *Evolution of Political Society.*

Roy Rappaport's *Pigs for the Ancestors,* an examination of the relationship between ritual cycles, warfare, and ecology among the Tsembaga Maring of New Guinea, highlighted another interest among ecological anthropologists. Rather than being simply an adaptive tool, culture began to be recognized as a mechanism regulating the human-environment relationship, promoting homeostasis and long-term survival.

The neoevolutionary and neofunctional approaches of the 1960s and early 1970s, however, were criticized on numerous grounds. Neoevolutionary arguments were deficient either because of vagueness surrounding units of measurement and selection or because of a reliance on outdated evolutionary theory, such as group selection. Neofunctional approaches were criticized both for their lack of historical depth and their naive assumptions that culture and nature automatically tend toward stability.

Since the middle of the 1970s, then, what has been termed here as ecological anthropology has advanced in a number of seemingly disparate directions, although all have at their core a concern for understanding human-environmental relationships as a process that occurs over both short- and long-time scales, for example, the formation of specific adaptive strategies, for explaining variability not only between but also within cultural systems, and for forging links across traditional disciplinary boundaries.

Political ecology developed during the late 1970s and early 1980s as anthropologists combined ecosystem approaches and actor-based decision-making models with political economy models often used by anthropologists. The result has been a greater understanding of power relationships between state societies and local peoples, particularly regarding issues of sustainability, resource management, political and economic decision making, and subsistence economies.

Human behavioral ecology incorporates evolutionary theory from biology and ecology and applies it to the study of humans. The study of foragers using optimal foraging theory, the motivation for reciprocal sharing arrangements, human mating systems, mate choice and marriage transactions, and parental investment in offspring are some avenues of exploration. These kinds of investigations have provided new insights into traditional anthropological topics. The central concern of this work is in understanding how contemporary human behavior reflects our own history of natural selection.

Historical ecology perhaps pays the most attention to time scales and processes of change between humans and their environments. Much effort has been spent in understanding the processes by which humans develop new strategies for coping with dynamic environments. There is, however, equal attention paid to the impacts that human activity has on local ecology and to the effects that human-induced change has on ecology and on humans living in those altered environments. In particular, work in this direction focuses on questioning the degree to which a presumed natural environment has been artificially created, the impacts of environmental degradation on human societies, and how specific cultures conceptualize and interact with their particular habitats.

Environmentalism and anthropology parallel some of the work of the political ecologists through the examination of power relations between state societies, multinational corporations, developers, and local people. However, while issues of sustainability, conservation, resource management, and development predominate within this work, a keen interest in how local environmental movements have developed, and how these movements integrate with national movements is one avenue of exploration. Another topic of interest to anthropologists working within this domain is environmental rights. What are indigenous people's rights to particular territories? What rights of access do local and state agents have to particular resources? What is the nature of intellectual property law regarding rights to indigenous knowledge?

— *Peter Collings*

See also **Cultural Ecology; Environmental Philosophy; Rappaport, Roy**

Further Readings

Balee, W. (Ed.). (1998). *Advances in historical ecology.* New York: Columbia University Press.

Cronk, L., Chagnon, N., & Irons, W. (Eds.). (2000). *Adaptation and human behavior: An anthropological perspective.* New York: Aldine de Gruyter.

Netting, R. McC. (1986). *Cultural ecology* (2nd ed.). Prospect Heights, IL: Waveland Press.

Ecology, Human Behavioral

Human behavioral ecology (HBE) applies to principles of evolution by natural selection to explain behavioral and cultural diversity in human populations. It explores how features of social and physical environment constrain the suite of behaviors or "strategies" of individuals and applies the logic of optimization to make formal predictions about the conditions that favor or disfavor particular behaviors. The main focus of HBE is to explain behavioral variation within and among populations. Its intellectual forbears include developments in biology (evolutionary biology, animal behavior, population and community ecology, life history theory), anthropology (cultural ecology, hunter-gatherer studies), and economics (microeconomics of consumer choice). Since HBE's formulation in the late 1970s, it has been referred to as human sociobiology, Darwinian anthropology, evolutionary or behavioral ecology, and biocultural and biosocial anthropology. Currently, HBE shares common goals and foundations with evolutionary psychology and cultural transmission theory but differs in specific goals and methods. Initially focused on understanding foraging behavior among hunter-gatherers, HBE has expanded over the past 25 years to cover a wide scope of themes and problems, using a broad range of observational, ethnographic, and experimental methods.

Natural Selection and Behavior

Natural selection will influence the frequency of traits when there is sufficient phenotypic variation in traits across individuals, when such variation is inheritable, and when it has an impact on biological "fitness" or reproductive success, via the ability to differentially survive or reproduce in a specific environment and population. Heritability of traits occurs through genetic transmission from parent to offspring and through individual or social learning of information and behavior. HBE therefore focuses on behavioral and cultural "traits" that are likely to have fitness consequences. These include the suite of foraging, mating, parenting, and costly social behaviors found in all populations. People everywhere in all cultures develop ways to extract resources from their environment; find mates; defend access to resources; protect, feed, and care for offspring; and form and maintain social partners and alliances and must often trade off time and energy among these tasks. While evolution can also occur due to founder effects in small populations, random mutation, and gene flow, only natural selection can produce directional change or complex, adaptive design.

HBE treats observed behaviors or traits of interest (phenotypes) as if they were controlled by a simple genetic system, even though most behaviors are multicausal and involve networks of many genes and their interaction with stimuli from local environments. Biologist Alan Grafen has referred to this methodological tactic as the "phenotypic gambit." Behavioral ecologists usually assume that most fitness-related behaviors are sufficiently flexible, and so a safe working assumption is that behaviors can be examined without regard to the particulars of the form of inheritance.

Optimization

Most HBE research employs a hypothetico-deductive methodology, where explicit hypotheses are derived from theoretical models and tested using information collected from fieldwork among living populations. Models are usually mathematical formulations of fundamental adaptive problems. Models balance tractability with realism and specify key relationships among variables believed to best capture the theoretical dynamics of a problem. Two common approaches are optimality models and game-theoretic models. Optimality models examine conditions favoring an optimal behavioral "strategy" from a suite of available strategies, with the goal of maximizing some currency under a set of ecological constraints. The currency may be direct biological fitness, typically measured as the number of children surviving to some later age. The currency is often a proxy of direct fitness, such as foraging efficiency, growth rate, and fertility. While optimality models typically examine costs and benefits from the perspective of a single individual without any reference to what others in the population are doing, the success of strategies in game-theoretic models depends upon the frequency of other strategies in the reference population. For example, a lone cooperator may not fare well in a world populated by defectors.

Models are useful for generating qualitative or specific quantitative predictions. One of the first models used in HBE was the prey choice model (see below). This examines the set of food resources that should or should not be observed in the optimal diet of a

forager, who attempts to maximize the currency of net energy gained per unit time, given the finding rate and expected energetic returns from pursuing each specific resource type in the forager's environment. As with many optimality models, the currency used is not direct fitness, but rather a proxy, which is better suited for the specific problem at hand. More food per unit time or the same amount of food in less time each result in a higher rate of energy gain and in many circumstances should positively correlate with fitness.

HBE has been applied to an increasing number of broad topics, such as foraging and subsistence practices, altruism and cooperation, resource conservation, mating and marriage systems, parental care of offspring, status and resource competition, and short-term and long-term life history patterns. Several themes highlighting the HBE approach are outlined below.

Foraging Behavior

Studies of human foraging patterns focus primarily on the set of resources that compose diets and the choice of profitable resource patches and habitats. Group mobility and group size are also considered, as each has been modeled as flexible responses to ecological variables. The prey choice model predicts that, upon an encounter with any kind of food resource, a forager should attempt to acquire it if the expected gain from doing so outweighs the expected gain from continued search (i.e., the long-term rate of caloric gain). This simple model has been used to predict the suite of resources people target in local environments in ethnographic and archaeological samples. Adjustments to the models have been made to fit characteristics of many human groups. Recent model specifications emphasize the importance of consuming macro- and micronutrients, cognitive limitations of the forager, information gathering, and the division of labor by sex and age. Changes in technology that increase the average caloric return rate, such as shotguns instead of bows and arrows, or trucks and snowmobiles instead of on foot, have been shown to increase the number of resource types people acquire in their diet. Similarly, reduced processing or handling costs of certain resources such as seeds and grains raises the profitability of those resources, and so they enter the optimal diet. Declines in the abundance of very profitable resources, such as megafauna in North America, over historical time have been implicated as fundamental in the subsequent adoption of plant and animal domestication.

The patch choice model examines the suite of patches where individuals forage and the length of time they spend in each of these patches before moving on to the next. The qualitative prediction is that optimizing foragers should leave a patch and proceed to the next patch before the former is depleted. Rather than reflecting a strategy of conservation, such behavior is consistent with the goal of caloric-rate maximization. In a similar vein, foraging theory has recently been invoked to evaluate the validity of competing claims regarding the conservation ethic of indigenous populations. A conservationist might target fast-reproducing species, males, juveniles, and older animals, such that future long-term gain is maximized, whereas according to foraging theory, an individual is more likely to target whichever resources maximize more immediate energy gain.

Altruism and Cooperation

Altruism refers to the conferring of benefits upon others at personal cost. The prevalence of costly altruistic acts is a conundrum because exploiters, cheaters, or free riders should out-compete selfless altruists in a Darwinian world. Consistent with evolutionary theory, altruism is expected when donor and recipient are close biological kin (kin selection), when recipients today send return benefits as donors in the future (reciprocal altruism), when giving acts honestly advertise phenotypic quality or the intent to cooperate (costly signaling), when forced to do so by others (despotism), and when simultaneous mutual benefits can be gained (mutualism or trade). Altruism has been most studied in the context of collective production and distribution of food and services among small-scale hunter-gatherers and agriculturalists, group defense and warfare, wealth inheritance across generations, adoption of nongenetic offspring, and volunteerism and philanthropy in modern societies. Although evolutionary theory has shed much insight on the conditions that tend to favor more or less altruism in a particular context in small-scale societies, there is increasing evidence that some types of large-scale cooperation found in modern nation-states cannot be adequately explained by any of the above models. Alternatively, several forms of cultural group selection have been proposed where social norm compliance is enforced by punishment within cooperative groups.

Mating and Marriage

The widespread variation in the ways that mating is publicly formalized as marriage across the globe has been examined as a function of the ecological interplay between the benefits men receive from investing their time and energy into parental care versus the gains of staying in the mating market, as well as the level of variation in mate "quality." Because women usually benefit more from increased access to resources than from increased access to mates, it is usually assumed that women's primary interests are coincident with child welfare. Pair bonds are expected when both parents have large positive effects on child welfare and when extra-pair mating opportunities are few. These pair bonds should be monogamous when the wealth differences among men are few, and polygynous when some men monopolize valuable resources, such as arable land and cattle. Women in polygynous societies thus become second or third wives to rich men who own more resources rather than first wives to single men with few resources. Polyandry is rare and occurs only in extreme environments, where two or more men, usually brothers, share sexual access to one woman.

As described above, the payoffs to investments in parental care are an important feature of mating systems across and within societies. In environments where high parental investment can increase child fitness (via reduced mortality and increased likelihood of gaining necessary skills, education, and mating opportunities), and where paternity can be reasonably assured, higher paternal investment is likely. Higher investments by both parents in few children have been invoked as a crucial component in the fertility reductions so common in modern, industrialized countries and among the wealthy in poorer countries. Such "demographic transitions" are seen as consequences of declining mortality and a competitive skills-based labor market, where there are potentially few perceived diminishing returns to investments in a small number of children by educated and wealthy individuals.

Life History

The timing and development of important fitness-related events, such as birth, maturation, marriage, and death, constitute an individual's life history. At the species level, humans take a comparatively long time to become physical and functional adults, have large, costly brains, and have very long life spans, much of which is spent in a postreproductive state. Extended childhood has been explained as a time to develop the abilities and knowledge necessary to become an efficient adult food producer or a socially shrewd adult. These explanations explore how the complex human foraging or social niche requires a long time to master, and they help to explain the buildup and maintenance of our large, costly brain. Extended childhood has alternatively been described as a functionless artifact of humans having an extended life span. A long postreproductive life span is explained as a form of indirect reproduction, in which older individuals positively impact descendant kin via food provisioning, direct care, education, and reconciliation, at a cost of reduced investments in reproduction earlier in the life span. There is strong evidence that the transfer of resources across and within generations may be a critical feature that shapes the life histories of humans and other social animals.

Life history variation has also been explored among individuals reared in different environments or exposed to different sets of circumstances and opportunities. These differences can impact the ways that people trade off present benefits against future costs or present costs against future benefits. Thus, a life history perspective has been used to investigate topics such as age at marriage and first birth, teenage pregnancy, infanticide and abortion, exercise and drug use, time preferences, and cooperation.

Future Directions

Behavioral ecologists evaluate the adaptiveness of behavior given the set of constraints and options in the natural, social, and cultural environment. There has been a renewed appreciation for the ways in which cultural history can provide insight into the content and form of these constraints and help to explain behavioral variation among peoples living in similar ecologies. Cognitive aspects of human decision making have also received increased attention in helping to formulate the ways that people internalize, evaluate, and engage important parameters in typical models. Future directions will continue to integrate aspects of cultural anthropology and cognitive psychology with behavioral ecology.

— *Michael Gurven*

See also **Adaptation, Cultural; Anthropology, Cultural; Altruism; Collectors; Selection, Natural**

Further Readings

Alvard, M. (Ed.). (2004). *Socioeconomic aspects of human behavioral ecology*. Amsterdam: Elsevier.

Barrett, L., Dunbar, R., & Lycett, J. (2001). *Human evolutionary psychology.* London: Palgrave Macmillan.

Cronk, L., Chagnon, N., & Irons, W. (Eds.). (2000). *Adaptation and human behavior: An anthropological perspective.* Hawthorne, NY: Aldine de Gruyter.

Hill, K., & Hurtado, A. M. (1996). *Ache life history: The ecology and demography of a foraging people.* New York: Aldine de Gruyter.

Krebs, J. R., & Davies, N. B. (Eds.). (1997). *Behavioural ecology: An evolutionary approach* (4th ed.). Oxford: Blackwell.

Low, B. S. (2000). *Why sex matters: A Darwinian look at human behavior.* Princeton, NJ: Princeton University Press.

Economics and Anthropology

From the inception of the discipline of anthropology, ethnographic monographs have dealt with the economies of the people under discussion as a matter of course. The evolutionists were fundamentally interested in levels of technology and environmental "adaptations," and functionalists interpreted all social systems in terms of the satisfaction of basic human needs. Subsequently, anthropologists influenced by Marx would see a given society's "mode of production" as determinant, at least in the last instance, of politics, law, and ideology. Even though none of these theoretical paradigms dominates the field today, it is generally accepted that compelling accounts of social and symbolic behavior must relate them to the material organization of society. Ironically, it appears that economic anthropology loses relevance as a subdiscipline as the larger discipline concerns itself with economics.

Formalism Versus Substantivism

Malinowski's study of the Trobriand Islanders set the tone for an anthropological approach to economic phenomena with his functionalist analysis of the marvelous inter-island *kula* exchange system. He described this symbolically charged system of transacting shell armbands and necklaces in great detail, explaining *kula* practice in relation to cultural values other than material advantage. Malinowski used his Melanesian data to challenge the supposed universality of "economic man"—the egotistical schemer of Bentham's utilitarianism. As Firth pointed out, however, Malinowski's straw "economic man" was already an outmoded figure for economics by the time the latter was making his argument.

Firth argued that the distinctions Malinowski made were invalid: Economics was a question of means, not ends, and economic relations were simply a component part of the social relations that it was anthropology's job to study.

Anthropology has, clarified Burling, alternately taken the economy to be (a) a primitive society's technology and material culture or (b) that range of things that are priced by the market in our own society. There is nothing, he maintains, in the definition of economic behavior that limits it to material ends. There is nothing, to return to the Trobriander, to justify considering the choice to maximize reputation or adhere to custom as antieconomic. The idea that economics consisted in techniques for analyzing behavior regardless of its content—hence "formalist"—was articulated with increasing precision by both anthropologists and economists. It formed one pole of the heated "formalist-substantivist" debate that polarized economic anthropology for at least a decade and, it is argued, made the subdiscipline intellectually inhospitable.

The subject of economics, according to the formalists, is a kind of behavior—"economizing"—that is universally applicable to situations where only limited means are available for achieving a range of ends. Herskovits endorsed this position in the 1952 reissue of his 1940 text *The Economic Life of Primitive Peoples.* Scarcity, he maintained, is universal, as is maximizing behavior on the part of the individual. It is only the cultural matrix within which these occur that varies. The same means are everywhere applied to achieve different ends.

The opposing view was championed by Polanyi and a group of his students from Columbia University. Polanyi analyzed the identity of the economy in contemporary capitalist society and argued that the extent of its autonomy was an absolutely novel historic development. Therefore, not only could other societies not be assumed to have assigned the same independence to economic processes, but the

science premised on that independence was, *ipso facto,* only appropriate to our own society. The difference between the industrial capitalist economy of the West and both contemporary and historic premarket economies was one of substance—hence "substantivist"—and different forms of economy were not susceptible to analysis by a uniform method.

Polanyi defined the economy as "an instituted process of interaction between man and his environment, which results in a continuous supply of want-satisfying means." The "institution" of an economy or, more famously, its "embeddedness" is subsumed under three general "forms of integration": reciprocity, redistribution, and market exchange. Under systems characterized and provided stability by means of reciprocal exchange or redistribution, the rates of exchange are set by the imperatives of the larger social institutions—such as in the obligation in the Inca Empire for every subject community to make offerings to the son of the sun, which could then be redistributed by the center. Neale and Mayhew pointed to the ongoing tradition of institutionalist economics, which had long been considering nonmarket societies and mechanisms of economic change and noted that the formalism-substantivism distinction was operating within the discipline of economics as well.

Dalton was one of Polanyi's proponents, using his volume on *Markets in Africa* to work out Polanyi's ideas about the different social and political circumstances for trade and elaborating ideas about the separation of the various functions of money in nonmarket societies. He also devoted room in the volumes of *Research in Economic Anthropology* under his editorship to elaborations or defenses of Polanyi's ideas. Halperin is another former student who promoted and defended Polanyi's ideas. Sahlins labeled himself a "substantivist" in *Stone Age Economics* (1972), but, in fact, he employs neo-classical means to analyze the choices made by hunters and gatherers there.

Formalists bitterly disputed the substantivists' emphasis on the irreducible particularities of economic systems. At issue, in the claims of neoclassical analysis to be able to model economic behavior the world over, in part, was the authority to direct "development." Economists could initially dismiss anthropology's contributions to the larger practical task at hand because, "in addition to a lack of interest in social change, [Anthropology] has been marked by lack of a theory of change powerful enough to have practical consequences." Similarly, economists and anthropologists disagreed about whether development would be achieved by a given increase in productivity and consumption *tout court* or whether development involved the strengthening of institutions that could direct resources toward socially and culturally desired ends.

All sides to the debate had numerous chances to refine their theoretical apparatus as development schemes failed throughout Africa, Asia, and Latin America. However, the most potent critiques of "development" and its sociological version "modernization" theory were coming from political economy and development studies.

Marxist Anthropology

Although he had read Marx, Polanyi stopped short of identifying regular rules underlying the relationships between economies and different social institutions or attempting to account for the motors of social change. The Marxist anthropologists of the 1960s and 1970s made much more profound theoretical attempts to wrestle with noncapitalist economies.

Althusser's structuralist reading of Marx identified the analytic tools that might be extracted from Marx's study of the rise of industrial capitalism and applied to alternative social formations. Meillassoux is considered the first anthropologist to analyze a precapitalist society in Marxist terms with his study of the Guro of Côte d'Ivoire (1964). Rather than applying Marx's unsatisfactory prefabricated constructs of "Asiatic" or "slave" mode of production, he identified a lineage mode of production by analyzing the direction of surplus extraction in Guro society. In this work and in his subsequent *Maidens, Meal, and Money* (1981), Meillassoux pointed to the central importance of biological reproduction as a means of production in a situation of abundant land and relatively capital-poor technology. Terray commended Meillassoux for his breakthroughs but argued for a larger vocabulary of "modes of production." Terray made the historical materialist point that a kinship system is the reflection of social relations of production rather than (contra almost all of British social anthropology except Edmund Leach) a first-order principle.

Rey described the articulation of the capitalist mode of production with the lineage mode of production,

including in his analytical frame the world-historical changes taking place in the Congolese society he studied. In Godelier's work in Oceania, he attempted to show the inseparability of mental and material in both economic base and social superstructure—criticizing Althusser's layercake image and paralleling the cultural Marxism of someone like Raymond Williams.

From Cultural Ecology to Political Economy

With some exceptions, American anthropologists never adopted a Marxist problematic in the way that French and some British anthropologists did. There was, however, a turn to materialist principles of explanation in the 1960s and 1970s, as the ecological determinisms of an earlier period (Julian Steward, Leslie White) were revisited. Orlove categorized this work as neoevolutionist (Elman Service, Marshall Sahlins) and neofunctionalist (Marvin Harris, Andrew Vayda, Roy Rappaport). The latter group tended to view human societies and their environments as interactive systems, taking inspiration from the systems theory. Marshall Sahlins described a state of primitive abundance, calculating the resources required for hunters and gatherers to supply their needs and observing that their societies did not induce scarcity of want-satisfying means. Marvin Harris and Elman Service worked out different versions of the evolution of human society and culture in terms of adaptations to environmental constraints, the former tending to a techno-environmental determinism. Roy Rappaport derived the ecologically adaptive functions of various religious and ritual observances. Although materialist and evolutionary, none of this work was historical or dialectical.

Eric Wolf emphatically introduced history when he turned to dependency and world systems theory for a reappraisal of anthropology's modus operandi. Dependency theory had been elaborated by radical economists working in Latin America and Africa who argued, against development and modernization theory, that global integration was serving to underdevelop peripheral regions of the globe at the expense of the capitalist "core." Wallerstein examined the ways European imperialist expropriations had financed the industrial revolution at the expense of the colonies. The new attention to global interconnection took anthropology by storm. Though reactions to the top-down, center-out determinism of dependency theory were quick to appear, the emphasis on the global relations of power that intersect anthropology's "local" has been tremendously influential.

The move from economics to political economy paved the way for an analysis of the interrelation between power and value at even the most local level. Keith Hart identified the significance of the state in undergirding the value of exchange tokens. Parallel insights have enabled John and Jean Comaroff, James Ferguson, and Sharon Hutchinson to think about the value of cattle in relation to competing political economies.

Exchange and Value

In *The Social Life of Things,* Appadurai made an appeal for the utility of examining exchange independently of production (although it might be argued that this is what non-Marxist anthropology has been doing since Malinowski reported on the *kula* ring or since Paul Bohannan brought back proof of Polanyi's ideas about the social embeddedness of trade from the Tiv). For a Marxist anthropologist, to look at exchange without considering production is to participate in ideological mystification. For most anthropologists, however, exchange processes offer a rich field for examining the cultural construction of meaning and value. Much anthropological and ethnohistorical work has addressed the historical exchange of objects across cultural space, where the meanings of the objects transacted are a matter of contest.

In the early part of the century, Mauss drew widely on existing ethnographic sources to describe a kind of exchange in "archaic" societies that was essentially the opposite of the commodity fetishism of capitalist exchange. Anthropologists have taken up Mauss's ideas about the relationships of debt and obligation created through gift exchange as a fundamental mechanism of social cohesion. Apart from Gregory's attempt to ground gifting in specific social relations of production and reproduction, most of the theoretical impact of gifting seems to have been registered outside of the subdiscipline of economic anthropology.

In a general way, the concept of the gift has been helpful in providing insight into processes of incomplete or unstable commodification. The inability of "money" to fully shed its associations with particular people, things, or productive processes and, therefore, to fully close a particular transaction of the type C-M-C (in Marx's famous notation) has been usefully looked

at in terms of the *hau* of the gift in the nonmarket economy. Anthropologists have also revisited theoretical understandings of "money," turning to phenomenological philosopher Georg Simmel as well as to Marx and Polanyi to understand various ways in which money fails to operate as a perfect abstraction or fails to be correctly "fetishized." Taussig describes a case where the money commodity is seen to embody magically generative properties. Jane Guyer argues that precolonial African polities valued people, not as labor power, but as the bearers of unique and irreducible knowledge, who served as critical technologies of production and reproduction. She offers a description of a social imaginary in which value is not ultimately measured in terms of "money"—an abstract, quantifiable medium—primitive or otherwise.

Consumption

Consumption has also been looked at as a meaning-making practice. Veblen interpreted a wide range of behavior in turn of the century North America in terms of the concept of conspicuous consumption. Bataille proposed that the potlatch be viewed with sacrifice, rather than with trade, as the expression of a quasi-natural law of "expenditure." Douglas and Isherwood collaborated to produce a general theory about consumption as symbolic, communicative behavior. Bourdieu used the language of markets to analyze processes of cultural consumption as well as to analyze linguistic production, exchange, and accumulation.

The Subdiscipline of Economic Anthropology

Keith Hart argues that the first economic anthropologists—Karl Marx, Friedrich Engels, Vladimir Lenin, Rosa Luxembourg, Karl Kautsky, and Nikolai Bukharin—were anthropologists of the capitalist transition in the West. Certainly, the classics of economic anthropology were often meant as critiques of industrial capitalism, whether as explicitly, as in Malinowski and Mauss, or not.

Given this, it is perhaps ironic that as a subdiscipline, economic anthropology seems currently to be largely constituted by applied anthropology and development studies. A great deal of anthropological work on exchange, in particular, is not generally classified as economic anthropology, nor are studies that examine changes in consciousness that result from and underpin changes in political economy.

Some of this can be attributed to historical accident and terminology, but it seems that, in a larger sense, the science of economics has swallowed the subdiscipline of economic anthropology theoretically—and anthropology deals in its subject matter at the cost of conceding the term. The pages of economic anthropology texts are filled with attempts to understand entrepreneurial behavior across the globe in terms of calculations of marginal utility, opportunity costs, and game theory. When anthropology looks deeply and imaginatively at production, exchange, accumulation, distribution, and consumption, these become "symbolic," "linguistic," or just "cultural" phenomena.

— *Molly Roth*

See also **Anthropology, Economic; Malinowski, Bronislaw; Marxism; Political Economy**

Further Readings

Appadurai, A. (Ed.). (1986). *The social life of things: Commodities in cultural perspective.* Cambridge: Cambridge University Press.

Douglas, M., & Isherwood, B. (Ed.). (1979). *The world of goods: Towards an anthropology of consumption.* New York: Routledge.

Halperin, R. H. (1988). *Economies across cultures.* London: Macmillan.

Hutchinson, S. (1996). *Nuer dilemmas: Coping with money, war, and the state.* Berkeley: University of California Press.

Meillassoux, C. (1981). *Maidens, meal, and money: Capitalism and the domestic community.* Cambridge: Cambridge University Press.

Neale, W. C., & Mayhew, A. M. (1983). Polanyi, institutional economics, and economic anthropology. In S. Ortiz (Ed.), *Economic anthropology: Topics and theories* (pp. 11–20). Lanham, MI: University Press of America.

Schneider, H. K. (1975). Economic development and anthropology. *Annual Review of Anthropology 4,* 271–292.

Thomas, N. (1991). *Entangled objects: Exchange, material culture, and colonialism in the Pacific.* Cambridge. MA: Harvard University Press.

Valensi, L. (1981). Economic anthropology and history: The work of Karl Polanyi. In G. Dalton (Ed.), *Research in economic anthropology* (Vol. 4, pp. 3–12). Greenwich, CT: JAI Pre.

Education and Anthropology

Human beings are curious by nature. In that way, we are all anthropologists in the sense that we possess the universal trait of "curiosity." From the time that a child asks his mother, "Where did I come from?" human beings question why we were made, why we were born, and where we will go. We exhibit curiosity about the origin of humankind and how our early ancestors communicated, interacted, and survived. We reach out to learn from whence we have come and how life has changed and evolved over time.

Originating from the Greek words, *anthropos,* meaning "human or man," and *logia,* meaning "study," the term anthropology defines itself. Anthropology, then, can be understood as the study of humankind from the dawn of man to the present day. It explores early and modern human beings and their cultures, comparing their ways of living and their ways of learning. Anthropology allows us to uncover the roots of our common existence and the sources of our differences. Essentially, anthropology seeks to understand the total premise of human existence from the study of culture and social relations, to human biology and evolution, to languages, to music, to art, to architecture, and to the vestiges of human habitation.

Imagine, for a moment, living in a vanilla world. Surrounded by vanilla flavors and colors, we would be at a loss to understand vanilla in that we would have no grasp of the color or the flavor, nor would we have any means to compare vanilla with chocolate. For the anthropologist, the diversity of humankind provides a colorful basis for understanding any single facet of life or learning in any given individual or community. Among other variables, anthropologists note diversifications in size, shape, language, culture and customs, garb, religion, and worldview.

The Link Between Education and Anthropology

Consider the close link between education and anthropology. Both fields share common roots in their desire to decipher the human experience and our history as a species. Our common interests include, among other things, time, change, creativity, and diversity. Time is a precious commodity. Man is subject to the passing of time. He has attempted to harness time, recording it, and giving it shape and meaning. Time is the tooth that gnaws. Today's educators create curriculum guidelines, and, working against the clock, parcel out time for instruction to prepare for testing and assessment, certification and graduation. How much time is necessary for learning to take place remains a key question. Similarly, change or evolution is key to the anthropologist and to the educator in terms of history, immediacy, and destiny. Jean Baptiste Monet de Lamarck noted that traits are acquired through use and disuse. Simply stated, traits that are not used fall away, and traits that are used develop, thrive, and evolve. In education, effective teaching strategies are preserved, while less effective strategies are discarded. Over time, change and evolution are apparent in physical traits as well as in knowledge and educational processes.

Creativity has its origin in our primate ancestors. They were the ones who began using and later fashioning crude implements in order to simplify their lives. As an emergent species, man retained this ability and through our enhanced brain, imagined and designed better and more useful tools. Education is furthered as a result of imagination and creativity on even the most basic classroom level. At the classroom level, teachers are challenged to work with diverse populations, thus necessitating creative and imaginative approaches to delivering curriculum. New and innovative ideas for presenting information not only keep the course of study interesting for the student but also refresh the material for the educator. As each child comes to the classroom with his own history, belief system, and learning issues, it is inherent in the responsibilities of the teacher to diagnose and prescribe programming ranging from remediation to acceleration. Educating the public is a daunting task. While externally, it may seem that education and anthropology diverge, in application, they function in the same way; to better understand the human condition. Understanding our beginnings in both the anthropological and educational sense is an effective way to enrich our lives. Anthropologists have alerted us as to how our own culture has shaped our lives. To exclude others' cultures from our lives, or the lives of the students being taught, is a detriment to our society. Because our culture is changing and will continue to change, a cross-cultural environment open to curiosity, creativity, diversity, and tolerance is needed in American schools.

Areas of Anthropology

Traditionally, anthropology explores four main areas or branches that focus on how our species evolved and

revealed the differing strata of the human experience. The four areas may be classified as: (1) physical or biological, (2) archaeological, (3) cultural or social, and (4) linguistic. With the exception of physical anthropology, anthropology centers on self-initiated human characteristics. A fifth area, (5) is termed *applied anthropology*. Education is one aspect of applied anthropology that delves into the teaching/learning dynamic and is of paramount importance in the schools.

Physical and Biological Anthropology

Physical and biological anthropology supplement one another and assist in the study of our animal origins, evolutionary development, and genetic diversity. It is concerned with understanding the way humans have evolved from their hominid ancestors as well as the extent to which we share genetic characteristics with primates such as the great apes (gorillas and chimpanzees). This branch of anthropology extends to a study of human variations, human nature, and how people adapt to different environments. Of great interest to educators is the attempt to understand the evolution of the brain and the nervous system and how it impacts teaching and learning.

Archaeology

Archaeologists have been able to unearth human artifacts that go back almost 3 million years. From cave dwellers, to ancient Greece, Rome, and Egypt, to 21st-century America, archaeologists analyze, interpret, and evaluate small pieces or fragments of objects to determine their origins and their history. These researchers study cave paintings, pictographs, discarded stone tools, earthenware vessels, religious figurines, and baskets from long ago, many in tatters, remnants of ancient societies. Information gathered is evidence of our past, preceding and complementing the human record written in alphabets and books. Archaeology is of critical importance in the field of resource management and to governments interested in preserving architectural, historical, cultural, and thus, our educational heritage.

Cultural and Social Anthropology

Considered the largest branch of anthropology, cultural and social anthropology, simply stated, seeks to describe and analyze human knowledge, values, and learned traditions that have been passed on from generation to generation by way of words, concepts and symbols. A subdiscipline, termed *ethnography,* is practiced by anthropologists who venture out to observe, compare, and interpret what they see and hear as they study various cultures and societies, resulting in an understanding of behaviors that, on the surface, may seem bizarre or without meaning. Ethnology, a comparative and theoretical branch of anthropology, is concerned with cultures in their traditional forms and in their adaptations to ever-changing conditions in modern society. Dimension is given to hypotheses and theories concerning causes of past and present cultural similarities and differences. Ethnology attempts to describe culture, custom, language, and structures of people and their products. A holistic approach to understanding, ethnology impacts significantly upon education by examining all aspects of the school community as a whole in order to have a global understanding of students' institutional and instructional needs and desires. Moreover, by understanding each culture in its uniqueness, educators may ascertain students' different learning styles based upon their cultural backgrounds. Educators who desire to avoid the tendency to relate foreign customs to preconceptions embedded in their own cultures employ the holistic, multivariable collective process used by cultural and social anthropologists to understand their diverse school populations. As anthropologists analyze groups in distant settings in terms of material and economic conditions, social organization, intellectual life, and expressive traditions, so do teachers view students in these terms in order to address educational issues that relate to their students. Educators, like anthropologists, view learning in terms of individual process and collective behavior. It can be said that educators and anthropologists have very similar mind-sets. The perspective of anthropologists is to view and define societies as coherent wholes. Likewise, a teacher's goal is to understand and influence individuals so that they may become whole, rational, and productive citizens.

Linguistic Anthropology

Of great import to educators is linguistic anthropology. Language is the hallmark of our species. It is the responsibility of teachers to help transmit information across generations through written and verbal language. It is upon language that culture relies and within language that human knowledge resides. Linguistic anthropology attempts to trace the background of all languages spoken by human beings.

Anthropologists compare language forms and concern themselves with the relationship between the evolution of languages and the evolution of various cultures. Links between societies and contextual use and meanings of verbal concepts shed light on the social and political relationships among people being studied. Linguistic anthropologists work to make associations among language, brain, and behavior. Using their knowledge and insight derived from language study, anthropologists aim to understand the way people perceive, think about, and react to the world in which they live. Educators often behave as sociolinguists to study the social forces inherent in language in order to more successfully instruct African American students who speak Ebonics, Hawaiian students who speak Pigeon, or other students who are learning English as a second language.

Applied Anthropology

Applied anthropology is significant because it utilizes the findings of physical, archaeological, cultural, and linguistic studies to solve practical problems affecting the security, prosperity, health, and education of human beings within cultures. Applied anthropologists strive to discover the general principles of behavior that apply to differing human cultures and communities. From that perspective, education became an academic subfield of anthropology in the 1970s as it applies to different communities and cultures existing within the educational system. For example, students, parents, faculty, and administration represent different communities, and by using anthropological theories, we can understand the current conditions of education and conceive applications for the future. The importance of applied anthropology to education is spotlighted as we gain understanding of classroom dynamics with respect to an increase of diversity, special needs students, and technology in the classroom. Concepts of race, gender, ethnicity, and nationality are especially relevant as students develop their sense of identity as members of groups. These concepts are critical as schools look to deal with conflict and promote positive intergroup relations. As anthropologists cut across disciplinary boundaries and question conventional wisdom, educators also cut across curricular boundaries to make relevant connections in order for students to achieve an understanding of and an appreciation for the human experience. With insight extracted from anthropologists, education and anthropology work together to alleviate behavioral difficulties, dropout rates, violence, and other negative influences that potentially impact upon the school, and ultimately, the individual.

Education cannot be reduced to simple information processing and the classification of knowledge. The objective of education is to assist learners to construct meaning. Making meaning requires an understanding of the prevailing culture, whether the subject is literature, social studies, or science. Effective education is based upon positive social interaction among all those involved in the school community. Teachers who build their practice on anthropological understandings and methodologies will leverage this knowledge to improve student attitude and achievement.

Value of Anthropology to Education

The classroom environment is a microcosm of the larger society. There, students are active learners and participators within a framework of rules, codes, beliefs, and ethics. Teachers act like anthropologists in that they are asked to understand the "internal logic" of the classroom society. Teachers who develop an anthropological outlook foster a cooperative environment where students' similarities and differences are accepted and their interdependence is recognized. The anthropological societies established by teachers embrace their diverse members and manifest the sharing of ideas, experiences, theories, discoveries, and expertise. Teachers arm students with global information and thinking skills critical to following various career paths to success in 21st-century business, research, teaching, advocacy, and public service.

With this in mind, the connections between education and anthropology become extremely important, and the fields bear more in common than might be realized. Key skills that are taught and refined in the study of anthropology are germane to the study of education. These include seeking multiple perspectives, rational speculation, dialogue, scientific inquiry, analytical reading, data collection, comparing and contrasting, testing hypotheses, and applying theories. Attention is given to research methodology, logic and reasoning, detailed record keeping, and clear thinking. Notably, the analytical categories and processes that are used to understand tribal and small-scale societies can be useful in understanding the culture of schoolchildren and undergraduate students.

Anthropology has been applied to education dating back more than a century, when Hewett published his thoughts on education in the *American Anthropologist.* However, the connection between education and anthropology remains a relatively new frontier. To some degree, historically, the education profession revised old programs and practices, renewing and renaming them, and implementing them in what had been hoped to be a new way. A more anthropological approach to change is to study the old programs and practices in light of their relative success, break old molds, design innovations, and implement new and revolutionary practice based on the research. Clearly, this approach precludes that it is the responsibility of the educator to teach social skills and to interact with cultural and ethnic groups other than their own. In turn, this will allow students to study in collaborative situations leading to social acceptance, self-discovery, and the ability to take risks within the learning environment. More and more, education and anthropology aspire to similar goals and utilize similar methods of research and discovery.

Mutual Goals Promote Diversity

One area of anthropological research that has had great impact on education and inspired great innovation is seen in the programs that have recently been incorporated in American schools to celebrate human diversity, multiculturalism, and ethnicity. Strides have been made not only in the way that we teach children about ethnicity and diversity but also in the way we instruct children from other cultures. One excellent example is in a New Jersey high school where a program was developed by the school counselor to inform students and staff about human rights and tolerance. As a student advocate, the counselor created a six-page booklet concerning diversity within the school. A tolerance and diversity committee was formed, resulting in attention to Human Rights Week, Martin Luther King's birthday, Black History Month, Women in History Month, and workshops on "Critical Issues." Nonetheless, research continues to reveal statistical data, case studies, and analyses of how many Black and other minority students have become underachievers in the American educational system.

The complexity of humanity directs anthropologists and educators to work in concert. Equipped with a satchel of scientific and academic armaments, professionals are prepared to crack the smallest kernel of misinformation. Together, anthropologists and enlightened educators deploy devices such as scientific inquiry and logic and creative reasoning to go about "solving" the problems that we face in our lives, studies. and classrooms. A huge mutual goal is to determine how we can consistently and successfully manipulate such tools, challenging America's youth and changing how American youth process their inherent positions and perceptions. A typical United States public school classroom houses many nationalities. It is of utmost importance to educate all students to understand differences: cultural, socioeconomic, psychographic and demographic. By expanding the horizons of our students, we are likely to invest in the notion that we are all different despite not being similar in appearance, ability, or possessions.

Prejudice and ethnocentrism are the products of fear caused by a lack of knowledge and lack of understanding of differences. These conditions have shaped society. Throughout the ages, an attitude of "banish or perish" has launched attacks of humanity upon humanity. In the middle of the 20th century, the development of third-world countries was seen as a precursor to positive interethnic relations. Melting-pot theorists predicted that as poor nations advanced in their development, ethnicity would become obsolete and peace would follow. This view was challenged by conflictual modernization theory, and development was seen for a time as a cause of conflict. As the world approached the 21st century, development was again considered to be a precondition for peace. Today, bias, prejudice, bigotry, conflict, and ethnocentrism continue to contaminate society, and these hazards trickle down into the classroom.

The teaching of scientific inquiry, therefore, is significant when students learn to question circumstances and problems as they arise. Students need be taught to question and respond profoundly, beyond transactional or procedural questions or the typical short answers to teachers' questions. It is suggested that a learner's questions identify both naive and complex thinking as they focus either on conceptualizations or minutiae and detail. Helping children to question situations may make a student successful, but bringing students to understand that different people think of different ways to question is the greater lesson. This lesson brings with it an appreciation that people of other ethnicities and cultures may bring drastically different questions to bear on a given situation. Situations of small or large consequence

may be solved collaboratively and skillfully when participants accept and appreciate the contributions of others.

Charles Darwin

Charles Darwin recalled his father once telling him, "You care for nothing but shooting dogs and rat-catching, and you will be a disgrace to yourself and all your family." It was an inauspicious indictment of one of history's greatest thinkers. Born in 1809 in Shrewsbury, England, young Darwin did poorly in a traditional school setting and preferred to collect specimens of animals, plants, and minerals that he would experiment upon in his brother's chemical laboratory. He was, by today's definition, a hands-on, tactile-kinesthetic learner. At age 16, with urging from his father, Darwin entered the School of Medicine at Edinburgh University, where he found lectures boring, cadaver dissections horrible, and surgeries, without benefit of anesthesia, gruesome. After graduation, the reluctant Darwin enrolled in Cambridge with the notion of becoming a clergyman. While at Cambridge, Darwin was inspired by the "personal narrative" of Alexander von Humboldt, the German, who wrote about his travels in South America and his discoveries in geology, geography, and mineralogy.

Having been invited to set sail on HMS *Beagle,* a frigate designed for scientific research, Darwin embarked on a 5-year expedition to chart the coastlines of South America. Onboard ship, he read intently and was influenced greatly by the geological systems described by Charles Lyell. The *Beagle* reached Brazil in February 1832, and Darwin began to answer the call of the wild. He spent months observing and collecting plants, animals, minerals and fossils and keeping careful and detailed records of his discoveries. Moreover, he was astounded to find marine fossils high in the Andes Mountains, thus hypothesizing that the land had once been covered by water. Earthquakes in Chile, experienced by Darwin, satisfied his belief that the earth's topography is always changing. Subsequently, arriving in the Galapagos Islands, Darwin discovered many life forms that were not found anywhere else in the world. He was intrigued by the numerous species of birds found there, and he noticed how various species of finch had developed specialized beaks that aided them in gathering and consuming food. Darwin further noted that organisms on the island seemed similar, yet different, from those on the mainland.

From his experiences on HMS *Beagle,* Charles Darwin began to question the idea of creationism and the belief that a supreme god created immutable organisms to populate the unchanging world. He used the comparative method to challenge concepts, introduce new facts and values, and construct his extraordinary evolutionary framework. In brief, all living things compete for space and sustenance while being constantly challenged by threats from their changing environment. Later, in *On the Origin of Species* (1859), Darwin explained his theory of natural selection as "grounded in the belief that each new variety, and ultimately each new species is produced and maintained by having some advantage over those with which it comes into competition; and the consequent extinction of the less-favored forms almost inevitably follows." Essentially, he implied that all life on earth, including human life, is the result of evolution over millions of years of adaptations to changing environments. Darwin concluded, "having been originally breathed by the Creator into a few forms or into one, and that, whilst this planet has gone cycling on according to the fixed laws of gravity, from simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved."

Darwin and Education

Charles Darwin saw the magnificence of all living things, including man, and his theory impels us to respect one another despite any or all differences. The convergence of Darwin's evolutionary framework points to the precarious position of our species and the essential need for mutual respect, global understanding, and planetary interdependence. As a species, we are constantly competing for space and sustenance. Opposing forces such as insurrection, disease, poverty, ethnocentrism, and racism threaten us. Shifts in the environment, climatic changes, depletion of natural resources, and pollution challenge us. For these reasons, we must come together as one unified, diversified species, evolved from a common ancestor and aware of the interconnectiveness of the global society.

Educators have been influenced profoundly by Charles Darwin, his research, his methodologies, and his theories. Far from being a disgrace, in the 200 years since his birth, Darwin has become a model of optimism, unification, and hope for the future as we look ahead through his penetrating eyes. Darwin tells us: "It is a world of wonderful similarity and change among all living things; where the tiniest flea

is directly, organically related to the most massive elephant; where the struggle and even death make for progressive evolution in which good useful characteristics develop to benefit every species." Thanks to Darwin, present-day teachers respect the similarities and differences in their students more than ever and view them as an "evolving species," which will grow and develop into productive adults. Teachers also consider themselves to be an "evolving species," capable of adapting teaching styles and strategies to meet the diverse needs and desires of their students. Through the intersection of education and anthropology, humanity has its greatest hope of survival as we advance scientifically, morally, philosophically, technologically, and academically.

Darwin and Dewey

In the same year that Charles Darwin published his seminal work, *On the Origin of Species,* John Dewey (1859–1952) was born into a Burlington, Vermont, family. Son of a Civil War veteran and an evangelical congregationalist mother, Dewey grew to become the most influential philosopher of modern times. His influence is most viable in political and educational forums. The founder and renowned "father of progressive education," Dewey built his philosophy around his own life experiences as well as the emerging philosophy and scientific thought of the times.

Upon graduation from the University of Vermont in 1879 and unsure of his future, John Dewey was tutored in philosophy for 3 years while he earned his living as a high school teacher. He then applied to and matriculated at Johns Hopkins University for graduate work. Studying under George Sylvester Morris, who followed Hegelian philosophy, Dewey wrote his dissertation on Hegelian idealism and earned his PhD in 1884. In time, Dewey rejected absolute idealism, which suggested that fact and thought are connected in that facts develop from thought. However, Dewey evolved a more naturalistic, pragmatic philosophy that was refined and supremely influenced by the works of Charles Darwin. Darwin's theory of natural selection provided a form for Dewey's naturalistic approach to the theory of knowledge. *On the Origin of Species* introduced a mode of thinking that would ultimately transform the logic of knowledge and hence the treatment of morals, politics, religion, and education. Rejecting supernatural explanations for the origins of species, Dewey adopted Darwin's naturalistic account and then considered the development of knowledge as an adaptive response (i.e., the product of the interaction between man and his environment). Dewey saw knowledge as having a practical instrumentality in the dominion and administration of that interaction. He termed his new philosophical approach "instrumentalism." Clearly stated, if problems are constantly changing, then the instruments for dealing with problems must change. It follows, then, that if truth is evolutionary in nature, it does not have an eternal reality.

The influence of Charles Darwin on John Dewey's philosophy of education was immeasurable. In his own practice, Dewey taught at the University of Minnesota and then at the University of Michigan. He achieved greatness as chairman of the department of philosophy, psychology, and pedagogy at the University of Chicago. He became president of the American Psychological Association in 1889 and the president of the Philosophical Association at Columbia University from 1905 until his retirement in 1930.

John Dewey's philosophy of education has had far-reaching effects on teaching and learning. His pragmatist stance suggested that schools should prepare individuals for participation in community life and overcome barriers between school and community to provide education that satisfies the needs of a truly participatory democracy. Dewey favored practice over theory, based on his belief that learning best occurs when students are free to generate their own experiments, experiences, questions, and creations. He believed that under the direction and guidance of a good teacher, children could learn ways to cope with situations and conditions that might occur in the unpredictable future. Dewey believed strongly that schools should take on societal responsibilities. He was convinced that acculturation of immigrants was the responsibility of the schools. Therefore, like Darwin, Dewey showed respect for diversity and saw individuals as valuable contributors to society.

In 1896, John Dewey established laboratory schools where he highlighted the scientific method for problem solving and where students, in workshop settings, took ownership of their own learning. The role of the teacher was that of facilitator, not director or instructor, designers of educational experiences that guided learning through doing in areas of children's real interests. Dewey's pedagogy contrasted sharply with traditional teacher-centered methods of isolation, study, and recitation. Dewey's theories

became very popular. However, progressive education began to take on tangential forms. Dewey's Laboratory School in Chicago and Manhattan's The Lincoln School both closed primarily because progressive education was misinterpreted and secondarily because the cold war advanced conservatism and the rigorous study of math and science. Today, applications of the progressive movement are flourishing in many American schools as well as international schools, and action research, open classrooms, schools without walls, multiage groupings, looping, block scheduling, and cooperative learning are integrated forms of this movement. Emphasis on multiculturalism, hands-on learning, and participation in authentic learning experiences with real-world audiences reflect the pedagogical contributions of John Dewey. Notably, as Darwin inspired Dewey, so have Dewey's contributions inspired other movements of import to education (contextualism, empiricism, humanism, and naturalism). A study of Deweyan philosophy is especially relevant in the postmodern age as we come to terms with immigration, globalization, and extensive cultural diversity. Clearly, Dewey stands with Darwin as one of the greatest thinkers of our time.

Vygotsky

In 1896, when John Dewey was opening the laboratory schools where group work was fostered as a meaningful way to learn, another teacher was born in present-day Belarus, a place that would later become part of the Union of Socialist Soviet Republics. A Russian educational psychologist, Lev Semenovich Vygotsky was recognized early on to be a brilliant and original thinker, and his novel ideas about teaching and learning were respected by the intelligentsia within the Soviet Union. Vygotsky spent his short life in Marxist Russia, but his theories did not conform to communist ideology. The Soviet government banned the publication of Vygotsky's work after his untimely death from tuberculosis in 1934. Unfortunately, Vygotsky's work remained in obscurity until his books were printed in the West during the 1960s.

Vygotsky's views on teaching and learning are founded on the premise that human intelligence is not a fixed characteristic, but instead, it is a dynamic entity that can be enhanced by social interaction and collaborative work. Central to Vygotsky's views on learning is the belief that knowledge is not directly transferable from teacher to learner. Rather, through social interaction, the learner constructs his or her own meaning. This constitutes the theoretical basis for cooperative learning, a method that has now found favor throughout the United States, Canada, and other countries around the world. To comprehend Vygotsky's views as they relate to cooperative learning, it is necessary to understand his concept of the zone of proximal development (ZPD). The ZPD may be described as the dynamic range of intelligence that characterizes any individual. If we were to envision two concentric circles, or double rings, then the large space in the center of the inner ring would represent an individual's current developmental ability to solve a problem while working alone. This area or zone may be likened to what would be measured by an intelligence test. The space between the first and second rings represents where an individual solves a problem when being guided or coached by a more capable peer or a teacher. This, according to Vygotsky, represents the ZPD. As individuals solve problems with assistance, this zone is expanded, and another ring encircles and defines a new ZPD. What did lie within the original zone of proximal development has been subsumed into the initial, and now expanded, current developmental level of abilities (the enlarged center of the circle) and is encircled by a new and enlarged ZPD. Naturally, there are problems that cannot be solved despite the best help from others, and some tasks lie outside of the individual's current zone of development. However, those tasks remain proximate and may be learned with more experience, or they may be found to be unattainable.

Cooperative Learning

When assigning problems for cooperative-learning groups to solve, it is essential that they be within students' ZPD. If the task is too simple, then it poses no challenge to the group. The work could be done independently and so does little to enhance intelligence. A task that is too complex for any member of the group lies outside the boundaries of the ZPD and cannot be solved with any amount of appropriate assistance. In that situation, all the students would be functioning at the frustration level. Ideally, tasks should be assigned at the outermost area of the ZPD for the most capable students in the group, where everyone on the team may be challenged to produce a solution to the problem. The newly discovered knowledge is shared within the group, and each

group member constructs meaning according to his or her understanding of the information. In this manner, all team members increase their zones of actual development and their ZPDs. Continual expansion of the ZPD is accomplished by a process that is often termed "scaffolding." Scaffolding involves reaching out and sometimes down to assist another member of the group to broaden his or her level of understanding. Through scaffolding, students are able to accomplish more complex assignments as the ZPD evolves and expands.

Undoubtedly, cooperative-learning classes are progressive, and students are encouraged to interact, share experiences, and participate in their own learning. In effective cooperative-learning settings, thought is continually being expressed through language, and students are engaged in a social-constructivist process, creating concepts through conversation. Teachers fill the role of facilitator, circulating among the learners to provide assistance as needed. Cooperative-learning classes minimize the time that students spend sitting passively and taking notes while their teacher solves problems for them. Conversely, cooperative-learning classes maximize the time that students spend interacting with others to solve problems for themselves. A sense of optimism, hope, and power is infused in Vygotskian theory when we realize that what children can do with assistance today, they can do independently tomorrow. It remains uncertain whether Dewey influenced Vygotsky directly, yet their philosophies of education are compatible and are found at the heart of anthropological and educational thought and practice.

Howard Gardner

A prominent leader in the field of education and brain research, Howard Gardner extensively investigated and documented cross-cultural studies on human intelligence. Gardner employs anthropological methods, and his research reflects a respect for science, the value of experience, and an acceptance of change that was intrinsic in the work of Charles Darwin, John Dewey, and Lev Vygotsky. Currently a psychologist and professor at Harvard University School of Education, Howard Gardner developed the theory of multiple intelligences. In *Frames of Mind,* published in 1983, Gardner theorized that there are seven equally important components of intelligence. In 1999, two additional components of intelligence were introduced in *Intelligence Reframed,* and recently Gardner revealed a ninth intelligence.

Traditionally, intelligence has been seen as cognitive capacity, established at birth, "fixed" and uniform across a lifetime. Like Dewey and Vygotsky, Gardner disputes that intelligence is fixed, and his research illustrates that individuals exhibit unique variations of intelligence. If we were asked who is most intelligent—William Shakespeare, Albert Einstein, Salvador Dali, Condoleezza Rice, Jesse Owens, Igor Stravinsky, or H. James Birx—we would be prone to name Shakespeare or Einstein. Our own thinking, however, tells us that all of the individuals listed are geniuses in their respective fields, and they exhibit superior mental abilities in the areas of language, mathematics, art, leadership, athletics, music, and philosophical anthropology. Inappropriately, intelligence was and continues to be measured in terms of verbal-linguistic and logical-mathematical concepts. Most schools test students' competencies through the administration of short-answer standardized tests. Often, students qualify or fail to qualify for gifted programs on the basis of these largely verbal and mathematical scores. Howard Gardner suggests that educators broaden their traditional and narrow conception of giftedness.

Gardner conducted his research through intensive interviews and in-depth analyses of the brain function of hundreds of subjects including stroke victims, prodigies, autistic individuals, and individuals who are classified under the heading of "autistic savant." While involved in Harvard University's Project Zero, Gardner studied the cognitive development of average, gifted, and brain-damaged children. As a result, Howard Gardner views intelligence as consisting of three specific components: (1) ability to invent a useful product or offer a service that is valued within a culture, (2) skill to solve real-life problems, and (3) potential to find or postulate new problems for consideration in the light of new knowledge.

Multiple Intelligences

Gardner delineates his theory of pluralistic intelligence into what are, at this point in time, nine ways of knowing. Criteria for identifying the existence of an intelligence is grounded in neuroanatomy, developmental psychology, cognitive psychology, and anthropology. An intelligence, therefore, has a developmental pattern and a base in the physiology of the brain; it is ignited by stimuli native to the particular intelligence, and it depicts ideas in a universally symbolic manner, as with music, words, or formulae. To date, Gardner

has revealed nine intelligences, of which two, intrapersonal intelligence and interpersonal intelligence, are person related. Four others, mathematical-logical, visual-spatial, naturalist, and bodily-kinesthetic intelligences, are object related in that they are activated by objects in the environment. Verbal-linguistic, musical-rhythmic, and existentialist intelligences are not connected to objects.

Howard Gardner hypothesizes that individuals are born with and possess a unique compilation of all nine intelligences, which may be strengthened through experience and effort. Realistically, students learn more readily when instruction is geared to their strongest intelligences. Gardner's understandings have had an immediate and dramatic effect on how curriculum is designed and delivered. Educators are internalizing a more flexible perception of intellectual development, and they are striving to incorporate some of the intelligences into each of their lessons as entry points to facilitate learning. Teachers who construct brain-compatible classrooms anticipate future findings resulting from the research of Howard Gardner and others who realize that intelligence is definitely not fixed at birth.

Looking to the Future

Anthropology is both a mirror and a window for education. The mirror reflects our common humanity: our wants, our needs, our desires, our conflicts, and our resolutions. Anthropology reflects the human condition and offers the tools to ensure our survival as a species. The window opens to the future. Through science and technology, the world is becoming increasingly more interconnected. The "global village" is experiencing the migration of people around the world. In the centuries to come, anthropology will continue to be relevant to education due to man's acute curiosity about cultural differences. New directions will be taken as educators stay abreast of all the research that impacts upon their pedagogy. Overall, it is evident that taking a holistic anthropological approach to education has greatly benefited in the improvement of students in terms of academic achievement. It allows educators to look at all aspects of teaching and learning in a critical manner and to adjust or change methods as needed.

Both anthropologists and educators enthusiastically welcome change. Instead of debating the legitimacy of their theories, they progress. As researchers, they are task specific, and they anticipate the further evolution of science and technology, psychology, and neuropsychology. Educators are cognizant of the impact that Charles Darwin has had upon science and education down through the generations. John Dewey said that Darwin's influence on philosophy came from having conquered the phenomena of life for the principle of transition, thereby freeing us to apply logic to "mind and morals and life." The new logic inspired Dewey to invest in schools as centers for social responsibility and interaction, thus providing the intersection of education and anthropology. Darwin's understanding of the earth and its populations to be ever evolving and never fixed in nature underlies the philosophies of Lev Vygotsky and Howard Gardner. It stands to reason that if man evolves, then his intelligence will evolve and expand through experience. Vygotsky based his notion of the ZPD on the theory that an individual's zone of actual development can be enlarged by working with others. Gardner, in developing his theory of multiple intelligences, recognized the new logic inspired by Darwin when he defined nine equally important components of dynamic intelligence.

As we look into the future and the possibility of life on other planets, both educators and anthropologists will have to develop a wider cosmic perspective of culture that will engulf our current earthly perspective. Differences among earth's peoples will be trivialized, and all traces of anthropocentric conceits will evaporate as we encounter the rise of comparative exoevolution. *Exovolution* is a term coined by H. James Birx, to "complement the notion of exobiology, which is the search for the existence of life elsewhere in this universe." Birx theorizes that if exobiology exists, then exoevolution exists also. It is incumbent upon us to develop what Birx terms an attitude of dynamic integrity as we actively aspire to understand the enormity of the universe and our relatively miniscule role as agents of change. As we develop creatively and grow intellectually, we become living evidence of the evolutionary process. As agents of change, anthropologists and educators can affect our small but colorful world. It is advances in education that will guide our species as it further evolves on earth and among the stars.

— *Suzanne E. D'Amato*

See also **Darwin, Charles; Dewey, John; Vygotsky, Lev Semenovich**

Further Readings

Birx, H. J. (1991). *Interpreting evolution.* Amherst, New York: Prometheus Books.

Bruner, J. (1999). *The culture of education.* Cambridge, MA: Harvard University Press.

Darwin, F. (Ed.). (1958). *Autobiography of Charles Darwin and selected letters.* New York: Dover.

Dewey, J. (1956). *The child and the curriculum* and *the school and society* (Combined ed.). Chicago: University of Chicago Press.

Gardner, H. (1993). *Multiple intelligences: Theory in practice.* New York: Basic Books.

Ianni, F., & Storey, E. (1993). *Cultural relevance and educational issues: Readings in anthropology and education.* Boston: Little, Brown.

Lee, C., & Smagorinsky, P. (Eds.). (2000). *Vygotskian Perspectives on literacy research: Constructing meaning through collaborative inquiry.* Cambridge, UK, New York: Cambridge University Press.

Ornstein, A. C., & Levine D. U. (2003). *Foundations of education.* New York: Houghton Mifflin.

Schumar, W. (2004). Making strangers at home: Anthropologists studying higher education. *The Journal of Higher Education, 75*(1).

Egypt, Ancient

Ancient Egyptian civilization lasted from approximately 3000 BC until the date of the last known hieroglyphic inscription in 395 AD. Though many cultures invaded and at times ruled Egypt, its character survived largely the same until the Roman Period, and many aspects of ancient Egyptian civilization remained through the Coptic Period. Egypt did not attain international prominence until the time of the Old Kingdom (ca. 2686–2125 BC) and increased in power until its height of the New Kingdom (ca. 1550–1069 BC), when its empire stretched from present-day Sudan to the Euphrates River and eastern Turkey. The fortunes of Egypt have always been intertwined with the Nile River and its canals, along with expeditions to gain precious resources in remote neighboring regions.

Egyptology as a discipline did not fully develop until Jean-François Champollion's decipherment of ancient Egyptian in 1822, and since then, it has dealt with all aspects of ancient Egypt, including language and literature, architecture, archaeology, art, and overall historical developments. Major finds, such as the tomb of Tutankhamun, the workmen's village at Giza, and, more recently, the origins of the alphabet have fueled public interest in Egyptology and the field as a whole. With archaeologists and historians making great discoveries every year, the perceptions of key issues in ancient Egyptian civilization continue to change.

History of Egyptology

Ancient Egypt has never been completely lost to the world, and the concept of its rediscovery is largely through Western eyes. It remained a popular place to visit during Roman times, with many items on the ancient itinerary remaining the same today, including the pyramid fields and the ancient capital city of Memphis. Numerous pilgrims visited St. Catherine's monastery, in South Sinai, during medieval and crusader times. Many early Muslim scholars held ancient Egypt in high regard and wrote treatises on its language and architecture. Though largely incorrect, these papers give insights into the importance of ancient Egypt long after its hieroglyphic system of language went out of use.

European crusaders returned with many stories of their travels, inspiring others to take the same journey to see the wonders of the ancient Near East. The idea of the pyramids as the "granaries of Joseph" has its origins in the writings of Julias Honorus and Rufinus, as well as a 12th-century depiction in one of the domes of St. Mark's Cathedral in Venice. This and other tales renewed interest in the history of the pagans during the Renaissance. With the creation of the printing press and increased protection for travelers after Egypt fell under Turkish Ottoman rule in 1517, travelers soon became antiquarians, collecting artifacts and manuscripts for libraries and museums.

Egyptology has its roots in the Napoleonic expedition to Egypt in 1798, when Napoleon's army, accompanied by engineers, draftsmen, artists, botanists, and archaeologists, mapped the whole of Egypt. Along with documenting modern and ancient Egypt, they collected artifacts and specimens over a 3-year period and produced a series of volumes entitled the *Description de L'Egypte.* With Champollion's decipherment of hieroglyphs and increasing interest in

Source: Courtesy, Wikipedia.

the culture of ancient Egypt, numerous collectors flocked to Egypt, including Henry Salt, Giovanni Belzoni, and Bernardo Drovetti, all of whom contributed to the growing collections of the British Museum, in London; the Musée de Louvre, in Paris; and Museo Egitzio, in Turin.

Archaeological expeditions increased in frequency as well, with investigations led by Auguste Mariette, Gaston Maspero, and Eduard Naville. William Mathews Flinders Petrie, considered by many to be the father of Egyptian archaeology, pioneered detailed recording methods in the late 19th and early 20th centuries. American and European scholars conducted numerous other studies, and Egyptology experienced increased interest after the discovery in 1922 of a virtually intact tomb of a relatively minor 18th dynasty pharaoh, Tutankhamun, in the Valley of the Kings, in Luxor, by Howard Carter and his patron, the Earl of Canarvon. Today, over 400 foreign expeditions work in Egypt alongside many local excavations, under the auspices of the Supreme Council for Egyptian Antiquities.

Geography

Egypt is characterized by the Nile river floodplain between harsh desert lands composing its eastern and western frontiers. Long considered the breadbasket of the ancient world, Egypt relied upon Nile floods to sustain its agricultural economy. Even during ancient times, Egyptians called their country *kemet,* meaning "black land," referring to the rich silts deposited annually by the Nile inundation. The harsh desert world, dominated by chaos and inhabited by liminal creatures, was known as *deshret,* or "red land." The interplay of the dual concepts of black land and red land, order and chaos, symbolize parts of ancient Egyptian religion and mythology.

The Nile River is 6,670 km long and covers 34 degrees of latitude, from 2 degrees south of the equator to 32 degrees north in Egypt's delta, and then drains into the Mediterranean. The waters of the Nile come from Lake Tana in the Ethiopian plateau (at 1,830 m elevation) and Lake Victoria in East Africa's lake district (at 1,134 m elevation). These lakes connect to the Blue and White Nile basins in sub-Saharan Africa and before the phases of Aswan high dam construction (in the early 1900s and 1960s) relied on annual monsoon rainfalls to fill these basins for good flood levels. Higher flood levels meant a good harvest, good fishing, and better grass for grazing. Floods were so important to the ancient Egyptians that they connected the annual flood to the religious myth of the wandering eye of the sun, which told the story of the goddess Hathor bringing annual inundation waters from the south. The rise and fall of different aspects of ancient Egypt are also closely connected to flood levels. Predynastic material culture first starts to appear after a period of high then low floods around 4,200 BC to 4,000 BC. The end of the Old Kingdom was potentially connected with a series of disastrous flood years followed by drought. Ancient Egyptians measured flood levels by a series of Nilometers, several of which survive to this day.

The eastern and western deserts represent outside areas with many mines and trade routes. The eastern desert has many mines, including alabaster and quartzite quarries, and numerous rock inscriptions. The western desert contains the oases of Dakhla, Farafra, Kharga, and Bahiriyah, which contain important trading settlements and outposts guarding the western desert from invading forces. Sinai represents an important region for copper and turquoise mining at Serabit el-Khadim and Wadi Magahra, while north

Sinai existed as part of the "Way of Horus," an ancient fortification route connecting Egypt to Syria-Palestine.

History and Chronology

An Egyptian priest named Manetho in the 3rd century BC divided ancient Egypt into 30 dynasties, which current Egyptologists generally retain in their historical analyses. Though this method of dating continues, it is slightly passé with current discoveries in ancient Egyptian chronology and the utilization of radiocarbon dating. More emphasis has been placed on socioeconomic trends and less on political events. Periods are no longer understood only in historical events, but in terms of material culture shifts. Three approaches mark the way in which Egyptologists deal with ancient Egyptian chronology, which include relative dating methods (such as seriation with pottery or coffins, or stratigraphic phases), absolute chronologies (including astronomical and calendrical events in ancient texts), and radiometric methods (radiocarbon dating and thermoluminescence).

A unified Egyptian state did not appear until 3200 BC, but it had its origins in the preceding Naqada culture, which lasted from about 4000 BC to 3200 BC and lay to the north of present-day Luxor. Petrie found 3,000 graves dating to the Naqada I Period. They represented simple burials in pits with wooden or ceramic coffins. The Naqada II Period saw an increase in funerary offerings, as well as painted pottery, showing the early development of ancient Egyptian art and artisans. During the Naqada III Period, Egypt unified into a large state with major political consolidation, and there were increases in cereal production with improvements in the irrigation system. The unification between Upper and Lower Egypt took place through a combination of warfare and alliances, yet throughout ancient Egyptian history, an emphasis was placed on the divided nature of the country, with one of pharaoh's titles being "King of Upper and Lower Egypt." Important artifacts showing warfare and kingship around the time of unification include the Narmer Palette and Macehead, and early international relations can be seen at tomb U-j at Umm el-Qa'ab, Abydos, with 40 imported jars, possibly from Palestine.

Egypt's early dynastic state emerged about 3200 BC, with Memphis as an important political center and Abydos as a central cult center. Though evidence for some early cities survives, most of Egypt would have existed as small settlements during this time. Basin irrigation gave way to large state-controlled irrigation, allowing for increased crop growth. Writing was introduced during this time, used in art, administration, and for the economy, and the iconography of power and kingship developed as well. Cult centers linked towns and regions, while the tombs of the Dynasty 1 kings developed in form and function at Abydos. Archaeologists discovered early body preservation techniques at Saqqara, with an increase of the use of wooden coffins seen at the end of Dynasty 2. Taxation and increase of state power led to more expeditions being sent to Nubia, Sinai, Palestine, and the Eastern Desert for acquisition of goods. This led to a formalization of the bureaucratic structure that formed the basis of Egyptian society for much of its history.

Egypt's Old Kingdom (Dynasties 3–6) did not differ much politically from the early dynastic period, with the royal residence still located at Memphis, yet architectural innovations reveal the overall growth and consolidation of state power. The construction of Djoser's step pyramid complex at Saqqara and the development of the true pyramids at Giza, Medium, and Abusir demonstrate the internal organization and power of kingship needed to effectively join its people and resources. Artisans, scribes, architects, and skilled laborers became essential parts of ancient Egypt's societal fabric, and religion developed, with royal mortuary cults and increasing importance of the god Ra. Nomes began at the start of the Old Kingdom and divided the country into regional administrative units, with 22 nomes in Upper Egypt and 20 nomes in Lower Egypt led by nomarchs, or regional governors. A breakdown in royal administration with the 94-year rule of Pepy II (ca. 2278– 2184 BC) and growth in the power held by the nomarchs led to the "collapse" of the Old Kingdom, as well as important environmental factors, including a period of drought.

The following First Intermediate Period (ca. 2160–2055 BC), Dynasties 7/8 to mid-11, represents a time of political upheaval and unrest in ancient Egypt. The royal residence shifted from Memphis in the north to Herakleopolis in central Egypt, with an opposing band of rulers emerging at Thebes in the south. Although the overall political structure may have changed, development took place on a local level, with tombs, pottery, funerary models, and mummy masks. War raged between the Theban and Herakleopolitans (who connected themselves to the Memphite court traditions) for control of Egypt, with local rulers taking the place of pharaohs for care of

Deir el-Bahri

their people. The Theban "royalty" took over the Herakleopolitans stronghold at Asyut, followed by their capital at Herakleopolis, and thus the beginning of the Middle Kingdom and late Dynasty 11.

While late Dynasty 11 ruled from Thebes, the court of the 12th Dynasty and the first half of Dynasty 13 moved to the Fayoum in the period known as the Middle Kingdom (ca. 2055–1656 BC). Known as the "renaissance" period in ancient Egyptian history, the Middle Kingdom had many developments in art, architecture, and religion. Nebhepetre Montuhotep II (ca. 2055–2004 BC) reunited Egypt and increased construction projects, including his mortuary temple at Deir el-Bahri and developments in art, and dispatched commercial expeditions once again into Sinai and Nubia. His son, Mentuhotep III, sent the first Middle Kingdom expedition to Punt (eastern Sudan and Eritria) for incense. In Dynasty 12, the capital moved to Ijtawy, near the Fayoum, under the reign of Amenemhet I, to administer a reunited southern and northern Egypt. The government became more centralized, with a growth in bureaucracy and in town organization. Osiris became an increasingly important god, and mummification became more widespread.

In the succeeding Second Intermediate Period (ca. 1650–1550 BC), Egypt divided into two kingdoms, with the capital in the Fayoum moving to Thebes (southern Egypt), while an Asiatic kingdom (The Hyksos) arose in the Delta through graduated migration, settlement, and some invasions in the east. Evidence exists for a widespread Asiatic (Hyksos) material culture in Lebanon, Syria, Palestine, and Cyprus, as early as the Middle Kingdom. They ruled from Avaris in the eastern Delta during Dynasties 14 and 15, while a rival Egyptian kingdom (Dynasties 16 and 17) ruled from Thebes. The Hyksos controlled northern Egypt from the Delta to Hermopolis, with Cusae in Middle Egypt marking the southern frontier. Military might grew again in Thebes, with the ruler Kamose controlling the gold routes to Nubia and incorporating mercenaries into his army. Kamose began a 30-year war against the Hyksos, continued by his son Ahmose, who attacked Tell el-Hebua (the eastern military headquarters) and then Avaris, to drive out the Hyksos for good.

Ahmose initiated the New Kingdom (ca. 1550–1069 BC), a period of great renewal and international involvement. The New Kingdom saw additional military action and colonization in Nubia, and campaigns to the Euphrates River in Syria under Thutmose I. These campaigns intensified under Thutmose III, who consolidated Egypt's empire in the Levant. Improvement in mummification occurred, and the Valley of

Deir el-Medina

the Kings became the location for royal burials. The village of Deir el-Medina housed the workmen for the Valley of the Kings. Karnak temple and the cult of Amun-Re grew in size and prominence during the reign of Hatshepsut, daughter of Thutmose I; she built her famous mortuary temple at Deir el-Bahri. Additional military successes in Nubia and Syria-Palestine brought additional wealth pouring into Egypt's coffers, allowing Amenhotep III to build on unprecedented levels during his reign. His son Amenhotep IV, or Akhenaten, broke away from a polytheistic religious tradition to found a new capital city at Tell el-Amarna, in Middle Egypt, and implemented a worship of primarily one god: the Aten (the sun's disk). This move and religious shift affected cultural and religious traditions for a long period of time. Tutankhamun moved the capital back to Memphis, reinstated the cults of other gods, and returned Thebes and the cult of Amun to their positions of prominence. Late Dynasty 19 and 20 represented the Ramesside Period, during which Seti I built new temples and conducted several large military campaigns against a new enemy, the Hittite empire. Ramses II led campaigns as well, and built a new capital at Pi-Ramses in the eastern Delta. Egypt's Levantine empire and other east Mediterranean cultures fell to a mass migration of Sea Peoples, sea raiders, and displaced refugees, with Ramses III saving Egypt from invasion. Egypt declined slowly under Ramses IV through XI, losing its empire, power, prestige, and cultural unity.

Foreign incursions and economic weakening led to civil war, and the start of the Third Intermediate Period (ca. 1069–664 BC). When the viceroy of Kush (governor of Nubia) invaded Egypt, Dynasty 21 began in the north at Tanis under Smendes (ca. 1069–1043 BC), while the high priest at Thebes effectively ruled in southern Egypt, albeit acknowledging the sovereignty of Dynasty 21. Sheshonq (ca. 945–924 BC), a Libyan, started Dynasty 22 and reaffirmed the political power of the king. Dynasties 22 through 24 are called the Libyan Period, which ruled primarily from the western Delta. Dynasty 25 started when the Kushites invaded from Nubia and took over Egypt through military might. The Kushites reverted to more traditional religious practices and copied Old Kingdom art in a form of archaism, to reaffirm their rule.

The period of the Assyrian empire and sporadic invasions of Egypt spanned Dynasties 25 through 26 and the beginning of the Late Period (ca. 664–332 BC). Dynasty 26 covers the Saite reunification of Egypt

under the rule of Psamtik, who made Sais his capital in the western Delta. After a brief period of Saite imperialism, the first Persian occupation of Egypt, Dynasty 27, took place when Cambyses defeated Psamtik III in the Battle of Pelusium in around 525 BC. In Dynasties 28 through 30, Egypt gained independence from around 404 BC through 434 BC. Increasing Persian threats added to the growing instability of ancient Egypt. In the second Persian occupation period, from around 343 BC through 332 BC, Artaxerses III assaulted Egypt and fought against and defeated Nectanebo I and II, the last pharaohs of dynastic Egypt.

Alexander the Great invaded Egypt in around 332 BC and founded Alexandria, a major center of wealth, knowledge, and intellectual activities. After his death, control of Egypt went to his general Ptolemy, which began the Ptolemaic Period (ca. 332–30 BC). This period was marked by a series of short-lived rulers, of whom Ptolemy I was the only ruler to die of natural causes. The great Rosetta stone, later responsible for allowing the deciphering of ancient Egyptian, was a decree written during the reign of Ptolemy V in 196 BC, describing homage paid to the ruler after he endowed Ptolemaic temples.

The native Egyptian culture and accomplishments declined after the reign of the famous queen Cleopatra VII, a brilliant and shrewd leader who spoke many languages (including Egyptian). Her affairs with both Julius Caesar and Marc Antony led to Egypt's defeat by Rome at the Battle of Actium in September of 31 BC. Though the Romans controlled Egypt, its culture continued, with additional temples constructed and its religion becoming a Romano-Egyptian hybrid. This culture lasted until Christianity was adopted in the 3rd century AD, and by the time of the Islamic invasion in AD 662, it had ceased to exist.

Language

Egypt's language went through many stages in its development, and continuing advancements in textual and grammatical studies are helping to elucidate key historical issues. Muslim scholars in medieval times correctly identified 10 letters in its alphabet, while attempts to translate the language in the 1600s and 1700s produced a broad range of theories, many of which had humorous results. Despite serious studies by a Jesuit scholar, Athanasius Kirchener, the first serious efforts to translate the language took place with Thomas Young and Jean-François Champollion. Champollion, a linguistic genius who had long been a scholar of Coptic, studied what became known as the "Rosetta stone," discovered by Napoleon's army in the western Delta. This stone has three inscriptions, in Greek, Demotic, and Egyptian hieroglyphs. Champollion used his knowledge of Greek to translate the names of Ptolemy and Cleopatra in hieroglyphs, and proceeded to hieroglyphs based on his newly found knowledge of the alphabet. His results allowed scholars access to a language that had been dead for over 1,400 years.

Proto-Egyptian hieroglyphs have been found on seals from tomb U-J at Abydos, with the language developing Old, Middle, and Late Egyptian forms. There are 24 letters in the ancient Egyptian alphabet, with the language using alphabetic, phonetic, and ideographic signs as well as determinatives at the end

of words. In total, there are over 4,000 hieroglyphic signs. The cursive form of ancient Egyptian, known as Hieratic, became the script used in business matters, while Demotic developed in the 5th century BC. Coptic was the last stage in the development of ancient Egyptian, though the form spoken by the ancient Egyptians, the Sahidic dialect, has now been replaced by the Bohairic dialect. The language survives today in numerous forms: on temple and tomb walls, on ostraca (usually limestone and pottery fragments), and on papyrus, in religious, economic, and political documents.

Religion

Ancient Egyptian religion took many forms, including formal state religion maintained by priests in temples and in annual festivals, and more regional and personalized religious traditions in village shrines and homes. Ancient Egypt had several creations myths; in one, Egypt began by rising out of a watery nothingness as a primeval mound, upon which life sprouted forth. Another myth involves the god Ptah creating the world, while another myth related that the god Amun-Ra had created the world beginnings. Priests played important roles in temples to the gods and deified kings, while the pharaoh represented a living embodiment of the god Horus on earth, acting as an intermediary between the gods and humanity.

A number of ancient Egyptian religious documents survive, providing a religious code and enabling the deceased's soul to safely and successfully journey to the afterlife. These books are known as the Pyramid Texts, Coffin Texts, and Book of the Dead (the mortuary texts from the Old, Middle, and New Kingdoms), while the New Kingdom religious compositions include the Book of the Heavenly Cow, Book of the Gates, and other underworld books. Select scenes and passages from these documents occur on tomb walls, sarcophagi, and mummy cases. Personal piety increased during the New Kingdom after the Amarna Period, and amulets representing different aspects of deities were worn on occasions. Household shrines played an important role in the daily lives of ancient Egyptians, and local shrines offered a chance for commoners to participate in religion on a regional scale. Certain aspects of ancient Egyptian religion lasted through the Coptic Period, but most ancient practices died out with the introduction of Islam in AD 662.

Temples and Funerary Monuments

Numerous temples appear throughout Egypt, but none are as well known as the temple of Karnak, on the east bank of the Nile in Luxor. It was the temple of Amun-Re, creator of all things, known as "the place of majestic rising for the first time." Karnak was simultaneously the divine residence of the god and an ever-growing cult; it played important roles in social, economic, and political events. Its construction began in the Middle Kingdom, and it grew continuously until Ptolemaic-Roman Periods. Over 80,000 people worked at Karnak Temple during the time of Ramses II (Dynasty 19). The temple itself has an east-west axis, with a main pillared hall, numerous pylons (twin towers flanking entryways), courts, and jubilee halls. The complex was dedicated to the Amun-Mut-Khonsu triad, with adjacent temples complexes constructed for Mut and Khonsu.

Five kilometers south of Karnak is another major temple, Luxor Temple, which was dedicated to Amun of Luxor, a major fertility figure. Built originally by Amenhotep III, Ramses II added a pylon, an outer court, and two obelisks. The Beautiful Feast of Opet was celebrated at Luxor Temple annually to celebrate

the birth of the king's *ka* (spirit) and to regenerate his divine kingship. Luxor Temple was later used as a Roman military camp, and the mosque of Abu el-Hagg was constructed on its grounds. Today, numerous sphinxes from the reign of Nectanebo line its entrance. There are still major finds within its grounds; an excavation in 1989 discovered many votive statues of divinities and kings buried in its courtyard to make room for new votive statues.

The Valley of the Kings and Valley of the Queens lie in western Thebes. The latter place represents the place for Pharaoh's wives and children. The Valley of the Kings, known as "The Great Place," or Wadi el-Biblaan el-Malik, "The Valley of the Gates of the Kings," contained the burials for the kings of the Dynasties 18 through 20. In the Valley of the Kings are 62 known tombs, alongside 20 pits or unfinished shaft tombs. Despite the high-quality limestone of the hills and the protected and remote valley, the royal tombs still suffered robbery, mostly during the New Kingdom. The large *quern* or hill overlooking the region functioned as a focal symbolic pyramid. Today, over 1 million people visit the Valley of the Kings annually, making it one of the most popular archaeological sites in the world.

Numerous royal mortuary temples from the New Kingdom lie on the west bank in Luxor, built separately from the tombs in the Valley of the Kings. Over 20 were constructed in a 500-year period. Called "the mansion of millions of years" for each king, few remain standing today.

Settlement Archaeology

Egypt's major settlements and provincial and national capital cities existed as political, cultural, and religious centers during key periods of Dynasties 1 through 30. In particular, the cities of Abydos, Memphis, Thebes (Luxor), and Alexandria formed particularly significant settlements for most of the pharaonic era.

Abydos, located 145 km north of Luxor, represented the burial place for the kings of Dynasties 1 and 2, with 10 known associated funerary enclosures. The subsequent Old Kingdom pyramid complexes originated from the royal cemetery at Umm el-Qa'ab, while the north cemetery at Abydos functioned as the burial place for commoners during the Middle Kingdom. The ancient settlement of Abydos is located at Kom es-Sultan, which spanned the Old Kingdom to the First Intermediate Period. Royal cult foundations existed at Abydos in both the Middle and New Kingdoms. For instance, the Osiris Temple of Seti I was constructed during Dynasty 19, with seven sanctuaries called "The House of Millions of Years."

Memphis, which lies 25 km south of central Cairo on the east bank of the Nile, usually represented the capital of Egypt. Founded in about 3100 BC, its placement at the apex of the Delta, between southern and northern Egypt, and its access to desert trade routes made it an ideal administrative center. Memphis was the capital of Egypt in the Old Kingdom, lying near the Dynasty 12 capital at el-Lisht. In Dynasty 18, it was a powerful bureaucratic center, and in the Late Period

and Ptolemaic Period, kings were crowned at Memphis. It existed as a religious center of pilgrimage for many years.

Luxor, or ancient Thebes, has archaeological material beginning in the Middle Kingdom. In the New Kingdom, it became a religious center for all of Egypt, containing major temples, tombs, and funerary monuments. It was known in ancient times as "the city" (much like New York today), with many festivals taking place throughout the year. Today, the modern city covers much of the ancient one, but excavation is starting to reveal the broad extent of Thebes at the height of pharaonic power.

Alexandria was founded in 332 BC at the northwest edge of the Delta opposite the Island of Pharos. It was five km long and 1.5 km wide, with the city divided into three equal parts. The famous lighthouse lay at the end of a bridge across the bay. Over 1 million people lived in Alexandria during its height, and it continued to be a major city throughout the Ptolemaic and into the Roman Periods. The library, housing tens of thousands of important scrolls and documents, appears to have burnt down during the conquest of Alexandria by Julius Caesar. In the late 4th century AD, Alexandria suffered extensive modification and destruction when temples became churches and many earthquakes damaged the city. The modern town covers much of ancient Alexandria, and new building construction continues to bring to light many important aspects of the city.

Future Directions

Modern urban developments, coupled with an increasing population, threaten many of Egypt's archaeological sites. The rising water table is causing damage to innumerable monuments throughout the Nile Valley, and much is lost each year to the agricultural needs of the populace. Fortunately, the Egyptian government is working in partnership with many foreign expeditions in heritage management and conservation efforts. A new part of the Egyptian Supreme Council of Antiquities, the Egyptian Antiquities Information Service, is attempting to document every known archaeological site in Egypt and aims to preserve as much as possible.

Technology is also playing an important role in the location, preservation, and reconstruction of archaeological sites, including remote sensing (both on the ground and in the air), 3-D modeling and mapping of sites, and digital scanning of monument inscriptions and reliefs. With many wonderful discoveries gracing the pages of newspapers and journals each year, Egypt's past continues to offer much to its present.

— *Sarah Parcak*

See also **Egyptology; Pyramids**

Further Readings

Allen, J. (1999). *Middle Egyptian: An introduction to the language and culture of hieroglyphics.* Cambridge: Cambridge University Press.

Bard, K. (Ed.). (1999). *Encyclopedia of the archaeology of Ancient Egypt.* London: Routledge.

Kemp, B. (1994). *Ancient Egypt: Anatomy of a civilization.* London: Routledge.

Redford, D. (2002). *The ancient gods speak: A guide to Egyptian religion.* Oxford: Oxford University Press.

Shaw, I. (Ed.). (2000). *The Oxford history of Ancient Egypt.* Oxford: Oxford University Press.

Shaw, I., & Nicholson, P. (2000). *Ancient Egyptian materials and technology.* Cambridge: Cambridge University Press.

Wilkinson, R. (2000). *The complete temples of Ancient Egypt.* London: Thames & Hudson.

ABU SIMBEL

The extensive temple complex of Abu Simbel near Aswan, Egypt, has attracted the attention of archaeological anthropologists around the world since the 1820s, when noted French archaeologist Jean-François Champollion, the "founding father of Egyptology," first deciphered inscriptions on the temple. Archaeologists have been especially interested in the fact that Abu Simbel was carved out of mountainous, living stone rather than the more traditional freestanding temple. Ostensibly, Ramses II (1290–1224 BCE) built the temples to glorify the Egyptian deities Re-Harakhta and Re Amon. However, the temples have served as lasting monuments to Ramses II (who had the distinction of negotiating the first antiaggression pact in recorded history) and to his favorite wife, Nefartari.

Since the completion of the restoration project that began in the 1960s and saved the Abu Simbel temple complex from being overrun by the proposed Aswan Dam, tourists have flocked to the ancient temples to see depictions of the pharaoh surrounded by his wife and the children. The temples give visitors a glimpse of daily life as well as portrayals of Egyptian military life and ancient Egyptian religions. Visitors to Abu Simbel are fascinated by the temple's special construction, which allows the gods in the inner sanctum to be lit by the rising sun for two days each fall.

In the aftermath of the terrorist attacks and the subsequent war in Iraq in the early 2000s, tourism in the Middle East dropped dramatically. Initially, visitors canceled 50% of the scheduled reservations to Abu Simbel and the surrounding area. However, unlike other tourist meccas in the Middle East, Egyptian tourism rebounded. By the summer of July 2003, Egypt was reporting that 6 million tourists had visited the country, with a jump of 16.4% over 2002.

Survival of the Abu Simbel temple complex is currently being threatened by the environmental

dangers of fire, smog, and corrosive winds that continue to damage this relic of ancient Egyptian life, causing the stone to become brittle and making it more likely to crumble. The fire and smog are caused by nearby rice farmers who burn chaff in the Nile delta. In addition to this enveloping blanket of smog and fire, archaeologists believe that since its relocation, Abu Simbel has become more exposed to corrosive winds, resulting in a gradual wearing down of the inscriptions. The Egyptian Environmental Affairs Agency has launched an effort to protect Abu Simbel and other such relics of ancient Egypt from these new dangers.

— Elizabeth Purdy

TUTANKHAMUN AND ZAHI HAWASS

The figure of the pharaoh Tutankhamun has always been shrouded in mystery. The discovery of his intact tomb in 1922 has increased sinister speculations about this historical character and his supposed curse, which struck all those involved in the expedition and the excavation. The death of the Egyptian king, who ruled from 1333 BCE to 1323 BCE, has also been the subject of much speculation. Because he lived in a turbulent period in Egypt's history, many archaeologists have argued that the pharaoh, who died before he was 20 years old, was murdered. Historians have suggested that Ay, Tutankhamun's prime minister, had murdered him or had him killed because he was seeking greater independence.

A different group of scholars believed that a high priest called Pa-Nahesy killed him after accusing him of blasphemy. The evidence for this theory was the recovery of bone fragments in his skull that were found in 1968, when a team led by Professor Ronald Harrison, of Liverpool University, was allowed to x-ray the mummy. The bone fragments in his skull suggested a blow to the head. Yet in 2005, Tutankhamun's mummy was removed from its tomb and analyzed through the use of more modern computerized technologies by a group of Egyptologists, led by the archaeologist Zahi Hawass, the outspoken secretary general of the Supreme Council of Antiquities in Cairo.

The scan of the mummy revealed that Tutankhamun was not murdered but that he probably died after breaking his leg in an accident and then picking up an infection in the open wound. The scans supervised by Hawass confirmed the presence of two fragments of loose bone in the skull. Yet the team concluded the skull could not have been fractured before the pharaoh's death. Otherwise, the fragments would have become stuck in the embalming fluid that was poured into the head at burial after the removal of the brain. The skull must have been damaged during the embalming process or by Howard Carter, who discovered the tomb. The team led by Hawass also discovered a fractured left thighbone. The fracture had not started to heal, and embalming fluid was located inside the wound. These two pieces of evidence supported the hypothesis that the fracture in the leg may have happened shortly before death. The idea of the accident is also confirmed by the possibility that the right kneecap and right lower leg may also have been fractured.

— Luca Prono

EGYPTOLOGY

Egyptology is defined as the study of Ancient Egypt from the *Badarian*, circa 4500 BCE, to the Muslim invasion of Egypt in AD 641. (Identified in Upper Egypt by Brunton and Caton Thompson in 1928, the *Badarian* is contemporary with *Fayum A* in Lower Egypt.) This brought the "Great Tradition" cultural practices that had coalesced during Egyptian civilization's 5,000-year existence to an end (pyramid building and other related monumental architecture, worship of the pantheon of Egyptian deities, dynastic succession, hieroglyphic writing, and mummification).

Egyptology should not be confused with "Egyptomania," which refers to the fascination with "all things Egyptian" that took place after Howard Carter

discovered the tomb of Tutakhenaten (who ceremonially changed his name to Tutankhamun shortly before his death), in the early 1920s. In this case, "Egyptomania" disrupted the systematic study of the artifacts by trained Egyptologists; bizarre interpretations of ancient Egyptian civilization remain with us today as a result (for example, the popular book *Chariots of the Gods* claimed that the pyramids were probably built by extraterrestrial beings, not by the indigenous people of Africa). However, the general public's interest is certainly beneficial to Egyptology; few patrons can forget the impact of an Egyptian exhibit after visiting a museum like the Metropolitan Museum of Art or the Cairo Museum. Remarkably, Ancient Egyptian civilization continues to be compelling, and relevant, in the postmodern world.

A History of Egyptology

Although Athanasius Kircher made a valiant attempt to decipher Egyptian hieroglyphs in the mid-1600s, the modern phase of the study of Ancient Egypt is believed to have commenced after Napoleon Bonaparte's invasion of Egypt in 1798. Napoleon employed a number of artists and scholars, an estimated 167 in total, who formed the Commission des Arts et des Sciences, which included Claude Louis Berthollet, Gaspard Monge, Jean Michel Venture de Paradis, Prosper Jollois, Edmé François Jomard, René Edouard Villers de Terrage, and Michel-Ange Lancret; more than 30 from the commission died in combat or from disease. A new organization to focus on the study of Egypt, the Institut d'Egypte, was formed by Napoleon in August of 1798, with Gaspard Monge serving as its president. Baron Dominique Vivant Denon (1742–1825) was urged to join Napoleon's expedition by his protectress Joséphine de Beauharnais, who would later marry Napoleon. Denon was a diplomat, playwright, painter, and renowned society conversationalist; his drawings of Medinet Habu are considered to be some of the most important in the history of Egyptology. Baron Joseph Fourier (1768–1830), who was an outstanding mathematician, facilitated the publication of *Description de l'Égypte* upon his return to France, and he held a number of prestigious posts, including prefect of the Isère Départment, in Grenoble, and Director of the Statistical Bureau of the Siene; Fourier's publication represents an early attempt at compiling the tremendous amount of Egyptian material that was being discovered apace, making it widely available for other scholars to examine.

The British invaded Egypt shortly afterward and took possession of the priceless "Rosetta stone," which had been discovered in 1799 near a city known as *Rashîd* (meaning "Rosetta"), in 1801 when the French capitulated. The Rosetta stone was inscribed with three scripts—Egyptian hieroglyphic, Egyptian demotic, and Greek—thus Greek served as a conduit between the ancient Egyptians and the modern world. Thomas Young, a British physicist who had mastered 12 languages by the time that he was 14 years old, is responsible for some of the first creditable decipherments of ancient Egyptian writing, and he shared his findings with Jean F. Champollion, who later became famous as the preeminent figure of the decipherment effort.

A multitalented circus performer, strongman, and artist-turned-explorer named Giovanni Battista Belzoni (1778–1823) conducted archaeological excavations at Karnak between 1815 and 1817, and he entered Khafre's pyramid at Giza in 1818, making him the first known person to enter the temple in modern times. In 1820, Belzoni published *Narrative of the Operations and Recent Discoveries Within the Pyramids, Temples, Tombs, and Excavations, in Egypt and Nubia.* Belzoni's association with Henry Salt, the British Consul General who had retained him to procure Egyptian antiquities for the British Museum, often causes scholars to regard him as a treasure hunter. Belzoni's lack of "scholarly" credentials and his questionable archaeological agenda generate a measure of concern and derision among Egyptologists. Girolamo Segato (1792–1936) went to Egypt in 1818 as well, and he crossed Belzoni's path, uncovering elusive artifacts that had been overlooked. Segato was a chemist, naturalist, and draftsman, and he was the first person to enter the Step Pyramid of Djoser in modern times (the pyramid had been plundered, presumably in antiquity, like most of the pyramids). Segato was a prolific mapmaker, in the service of Ismail Pasha, with his work leading him well into the Sudan, where he encountered the Kingdom of Chiollo and Wadi Halfa during a 40-day walk. Although most of Segato's drawings were lost to fire and his Egyptian treasures lost to shipwreck, he published *Pictoral, Geographical, Statistical, and Cadastral Essays on Egypt* in 1823, and *Atlas of Upper and Lower Egypt* with Domenico Valeriano in 1837.

The most noteworthy contributors to the establishment of Egyptology as an academic discipline are Ippolito Rosellini, diplomat, explorer, and collector Bernardino Drovetti (1776–1852), Emmanuel vicomte de Rougé, Jean Jacques Rifaud (1786–1845, Drovetti's artist), James Bruce (1730–1794), Owen Jones, Samuel Birch, Ludwig Borschardt, Heinrich Brugsch, Emile Brugsch (1842–1930), Adolf Erman, Hermann Grapow, Carl Richard Lepsius, Somers Clarke (1841–1926), Emile Armélineau (1850–1915), Jean Capart (1877–1947), Gaston Maspero (1846–1916), Edouard Naville (1844–1926), Victor Loret (1859–1946), Sir John Gardner Wilkinson, Sir Alan H. Gardiner, Sir William Matthew Flinders Petrie (Seriation at Abydos), James Henry Breasted, Auguste Mariette, Amelia Edwards (1831–1892), Ernest Alfred Thompson Wallis Budge (1857–1934), George Andrew Reisner (1867–1942), Howard Carter (1874–1939), Jaroslav Cerný (1898–1970), Dorothy Louise Eady (1904–1981), and Walter B. Emery (1903–1971).

Source: © FreeStockPhotos.com.

Sir John Gardner Wilkinson (1797–1875) went to Egypt in 1821 to study tombs in the Valley of the Kings, the site of Karnak, and the sacred Gebel Barkal in Nubia, a mountain that appears to be shaped like a *uraeus* (the cobra that fronts the Egyptian king's crown). Wilkinson made contributions to Egyptian epigraphy by copying inscriptions and being the first to identify the names of the kings with whom they were associated.

Rosellini (1800–1843) and his brother Gaetano accompanied Champollion on an expedition to Egypt in 1828 and directed the Italian committee as head archaeologist, while Champollion directed the French committee; supported by Leopoldo II, grand duke of Tuscany, and Charles X, King of France, their field study was called the Franco-Tuscan Expedition. Naturalist Guiseppe Raddi, artists Alessandro Ricci, Alexandre Duchesne, Albert Bertin, draftsman Nestor L'Hôte, and Pierre Lehoux were major contributors to the project. Champollion and Rosellini published the results of their expedition in *Monuments de l'Égypte et Nubie*. This visionary title clearly suggests that these scholars surmised that there was a significant relationship between Nubia and Egypt; however, its significance has been overshadowed until recent times. Today, we know that Nubia's influence on Egypt was far greater than many Egyptologists had suspected. For example, Nubian pottery has been unearthed and dated at 8000 BCE, which provides evidence that sedentary life in Nubia predates the *Badarian,* when Egyptian civilization began to coalesce; a great deal of effort has been directed at creating a rigid separation between the two areas, or populations. Importantly, metals like gold were virtually nonexistent above the Second Cataract (*cataracts* are the whitewater regions of the Nile); therefore, it was mined at Buhen or other Nubian sites and carted off to Egypt by the ton. Thus, Egypt's reliance on Nubian products was perpetual, from the emergence of dynastic Egypt around 3250 BCE until the invasion of the Persian Archaemenid Dynasty in 525 BCE.

Owen Jones (1809–1874), a British engineer and draftsman, traveled to Egypt in 1832, made substantial drawings of Karnak, and published *Views on the Nile from Cairo to the Second Cataract* in 1843. Samuel Birch (1813–1855) wrote the introduction to Jones's elaborate volume, which contained engraver George Moore's lithographs of his original drawings, accurately documenting the architectural details of the various structures that Jones had encountered during his expedition. After collaborating with Joseph Bonomi and Samuel Sharpe, Jones published *A Description of the Egyptian Court* in 1854. Scottish artist David Roberts (1796–1864) went to Egypt shortly after Jones's expedition, in 1838. Roberts believed that Abu Simbel was the most impressive of all Egyptian temples, and his various paintings became the most popular of his time.

Lepsius (1810–1884) led an expedition to Egypt from Germany, commissioned by Friedrich Wilhelm IV of Prussia, in 1842. Lepsius was accompanied by artist Joseph Bonomi and architect James Wild, and he published *Denkmäler aus Ägypten und Äthiopien, 12 vol.* in 1859 (Egyptian and Ethiopian Monuments), which rivaled the work published by Fourier in scale. Emmanuel vicomte de Rougé (1811–1872) worked with Lepsius to formulate a method for interpreting new Egyptian discoveries in a consistent manner. De Rougé was also curator of the Egyptian section at the Louvre in Paris.

Brugsch (1827–1894) collaborated with Mariette (a cousin of Nestor L'Hôte) in the 1850s, and his major contribution to Egyptology is his work on the decipherment of the demotic script; Brugsch worked at the Berlin Museum as well, and he held a number of posts related to Egyptology, including Founder and Director of the Cairo School of Egyptology. Mariette (1821–1881), an archaeologist known for virtually destroying archaeological sites, went to Egypt in 1850 to look for ancient manuscripts; however, he excavated Saqqara and Memphis instead, working in Egypt and sending antiquities to the Louvre until 1854. After returning to Egypt in 1858, he remained in Egypt and established the Egyptian Museum, after convincing the Ottoman Viceroy of Egypt of its merit. Mariette unearthed the temple of Seti I, as well as other temples at Edfu and Dendera. His work exposed material that dated back to the Old Kingdom, extending the range of Egyptian history that scholars could analyze.

Amelia Edwards (1831–1892) was a successful journalist who went to Egypt in 1873 and became enthralled with what she saw. Edwards published *A Thousand Miles Up the Nile* in 1877 and in 1882, founded the Egypt Exploration Fund (now known as the Egypt Exploration Society) to rescue ancient Egyptian monuments from decay, neglect, and vandalism. A wealthy British surgeon, Sir Erasmus Wilson, supported Edwards's efforts until her death, shortly after she completed an American speaking tour that consisted of 115 lectures, in 1889. Edwards strongly endorsed Sir Flinders Petrie in her bequest for the establishment of a chair of Egyptology at University College in London; it contained a proviso that "Flinders Petrie should be the first professor." Petrie (1853–1942) is considered to be "the father of modern Egyptology" by some Egyptologists. In conjunction, the archaeological methods that he developed extended beyond the Egyptian sites and are used by many of today's archaeologists. Petrie excavated Naqada, Tanis, Naucritis, Tell-al-Amarna, the pyramids of Senusret II and Amenemhat II, and the cemetery at Abydos, from 1895 to 1899 (see the Methods in Egyptology section that follows).

Erman (1854–1937) elucidated and emphasized what he believed to be significant connections between ancient Egyptian language, the Coptic language, and Semitic languages. Three of Erman's publications are considered to be among the most important that have ever been written on Egyptology: *Ägyptische Grammatik* (Egyptian Grammar), *Wörterbuch der ägyptischen Sprache* (Dictionary of the Egyptian Language), and *Neuägyptische Grammatik* (New Egyptian Grammar). Grapow (1885–1967) was a protégé of Erman, and his publications focused on ancient Egyptian medicine. Gardiner (1879–1963), a student of Erman, is well-known for his interpretation of the *Narmer Palate* and his seminal 1927 publication, *Egyptian Grammar,* which is considered required reading for Egyptologists today.

Breasted (1865–1935) published the five-volume *Ancient Records of Egypt* in 1906, *A History of Egypt* (1905), *Development of Religion and Thought in Ancient Egypt* (1912), and *A History of the Early World* (1916) before his 1919 expedition to Egypt, while he was a professor of Egyptology and Oriental History at the University of Chicago. With the financial support of John D. Rockefeller, Jr., Breasted established the Oriental Institute at the University of Chicago, in 1919.

A number of other archaeologists, artists, authors, and architects could certainly be included among

these important figures in the history of Egyptology, and their contributions to the discipline's development must be acknowledged. Many of the Egyptologists who are working today will undoubtedly become part of this illustrious historic record.

Methods in Egyptology

The systematic study of Ancient Egypt has provided a wealth of information; however, it is of a relatively recent vintage. The Edict of Milan, which was issued in AD 313 by the Roman Empire, established Christianity as the empire's official religion. As a result of this decree, representations of Egyptians gods and deities were attacked as symbols of "devil worship," and Egyptian artifacts were zealously destroyed by Christians.

By the time Napoleon's scholars arrived in Egypt to conduct systematic studies, significant damage to Egypt's artifacts had already taken place. Egyptologists were forced to assess what remained with the understanding that looters, vandals, zealots, and adventurers had gotten to the sites ahead of them. When Sir William Matthew Flinders Petrie arrived in Egypt to excavate Abydos near the end of the 19th century, he was horrified by the methods and practices that he observed used by Mariette at Khafre's temple, which is documented in Lorna Oakes and Lucia Gahlin's *Ancient Egypt.*

Mariette excavated the Serapaeum at Memphis as well, where the sacred Apis bulls had been buried. Mariette's methods included the use of dynamite, which inherently destroys aspects of an archaeological site that may have been of importance. By intentional contrast, Petrie invented *seriation,* a method used by archaeologists to determine the sequences of artifact development, change, and frequency (or lack of frequency) in the layers of a site's strata. For example, artifacts found in the lower levels of the strata are considered to represent an earlier techno-complex or habitation period in relation to the upper levels of the strata; seriation is a *relative-dating* technique. Petrie first used seriation at Naqada, Hu, and Abadlya, and his method is now widely used by modern archaeologists; at the very least, in this way, Egyptology certainly contributed to the study of humans as a whole. B. G. Trigger, B. J. Kemp, D. O'Connor, and A. B. Lloyd described Petrie's method in their groundbreaking *Ancient Egypt: A Social History,* which was first published in 1983.

Petrie cut 900 strips of cardboard, each measuring 7 inches long, with each representing a grave that he had excavated; on each strip, Petrie recorded the pottery types and amounts, as well as the other grave goods, which allowed him to compare the grave's contents and develop a relative chronology. Petrie's meticulous method represented a watershed event in both Egyptology and archaeology, and seriation has undoubtedly enhanced the effort to analyze, preserve, and curate countless antiquities. In conjunction with seriation, a variety of methods are now used by Egyptologists to locate archaeological sites, including aerial photography, electromagnetic acoustic sounding radar, resistivity measurement, and thermal infrared imagery to indentify geological anomalies that merit further investigation. Polymerase chain reaction (PCR, a method of DNA molecule duplication that yields more material for analysis) and CAT-scans are now used to study the genetic relationships, or the lack thereof, between the human remains that have been unearthed and the pathology of their diseases. Computer programs that allow users to create 3-D reconstructions of sites and that allow users to type hieroglyphs are widely used by researchers, epigraphers, and students of Egyptology today. Relative dating methods, like stratigraphic palynology, and absolute dating methods, including thermoluminescence (TL), Radiocarbon (C-14), and electron spin resonance (ESR), are among the methods that can now be used to date artifacts, faunal, or floral material that is associated with Egyptian archaeological sites. These investigative tools have definitely enhanced Egyptologists' ability to study the world of the ancient Egyptians.

A new method that is available to Egyptologists yielded some compelling results in August 2004. Gilles Dormion and Jean Yves Verd'hurt reported that they had found an unknown corridor that leads to a burial chamber in the tomb of Khufu, by using ground-penetrating radar; if they are correct, they may have solved an age-old mystery as to where Khufu was actually buried. However, as of now, Dormion and Verd'hurt have not been given permission to excavate.

Major Sites of Study

Mariette's discovery of the Serapaeum at Memphis, and Khafre's temple at Giza were major sites of study in the 19th century. Abydos, the center of the Osiris cult, was found to be equally significant. The Abydos

site continues to be one of the most important in Egyptology. Based on the archaeological excavations of Dr. Gunter Dreyer from the 1990s, it appears that during the Gerzean, pharonic Egypt and hieroglyphic writing began at Abydos, about 3200 BCE. With the discovery of the tomb of King Scorpion (Sekhen), Dreyer found many of the markedly Egyptian cultural practices that would become definitive, including the mastaba, the ivory sceptre, the symbol of Horus, and the bulbous crown that symbolized a ruler's dominion over Upper Egypt.

In conjunction, Dr. John Coleman Darnell and Deborah Darnell discovered the Scorpion Tableau nearby at the Jebel Tjauti site, which appears to be the earliest known example of the "smiting of the king's enemies" mural that later Egyptian kings would commission. Karnak and Thebes (Luxor) are among the most studied sites of Upper Egypt, in conjunction with the Valley of the Kings, Deir el Medina, Hierakonpolis (where many ancient kings claimed to have been born), and Naqada. Dr. Kent Weeks is now conducting the Theban Mapping Project that is focusing on KV5 where Ramses II built interconnected tombs for his sons, which probably numbered over 50. KV5 represents an architectural project from antiquity that is completely unique. Egyptian kings were buried in the Valley of the Kings from about 1500 BCE to 1000 BCE, and the number of tombs located there is somewhat staggering, to say the least. At least six kings from the Ramesside Period were also buried in the Valley of the Kings, along with Merenptah, Tawosert and Sethnakhte, Seti I and II, Tuthmosis I, III, and IV, Siptah, Horemheb, Yuya and Tuya, and of course, Tutankhamun. Deir el Bahri in Western Thebes, the site of both Mentuhotep II and Hatshepsut's tombs, continues to be a major site of interest to Egyptologists as well; the location of Hatshepsut's tomb, which was built nearly 500 years after Mentuhotep II's, exemplifies the later pharaoh's desire to identify with and surpass her predecessor.

Some of the major archaeological sites of Lower Egypt are the illustrious Giza Plateau, Bubastis, Sais, Heliopolis, and Tanis. In the delta region, natural preservation is more problematic; however, astonishing finds associated with the 21st Dynasty have been unearthed. The silver coffins that were made during the Tanite Dynasty and its successors are exceptionally impressive, although this period in Egypt (29th–23rd Dynasties) may have been relatively chaotic, in view of the archaeological and historical records.

The major archaeological site of Middle Egypt is Tell al-Amarna (Akhetaten in antiquity), a city that was purposely built in the desert, in iconoclastic fashion, by king Akhenaten for his worship of the Aten. This site may represent the first example of a monotheistic king and state; however, Akhenaten's motive may have been twofold. By abandoning the pantheon of Egyptian gods and deities that were in place, Akhenaten may have wanted all power to reside in him.

Many discoveries have been made as a result of restudies of sites that were already known. In this way, Upper, Middle, and Lower Egyptian sites provide perpetual enrichment for Egyptologists. For example, the Abusir site was excavated by Ludwig Borschardt (1863–1938) from 1902 to 1908; however, it is now being worked again, and its remarkable complexes are providing today's Egyptologists with more knowledge about the lives of Raneferef, Sahure, and other kings from the 5th Dynasty.

In conjunction, the modern-day boundaries of Egypt do not correspond with the boundaries of the Old Kingdom, Middle Kingdom, or New Kingdom. Therefore, Egyptian influence was prevalent below the First Cataract to areas south of the Third Cataract, and the number of pyramids in Nubia (modern-day Sudan) actually exceeds the number of pyramids that were built within the boundaries of modern Egypt. After Tuthmosis I (ca. 1504–1492 BCE) invaded Nubia, Amenhophis III built a well-known temple at Soleb. Akhenaten built a temple at Sesibi, which marks the southernmost point of the New Kingdom's conquest of the Kushites.

Major Discoveries and Areas for Research in Egyptology

The discovery of the Rosetta stone in 1799 was one of the most critical of all discoveries, because it allowed Egyptologists to communicate with the ancient Egyptians. Without the Rosetta stone, much of what Egyptologists believe would probably be dependent upon conjecture. Therefore, the decipherment of hieroglyphic writing has clarified a great deal about antiquity, and it represents a major benefit for all researchers.

Djoser's pyramid, Egypt's first stone building, which consists of a series of stacked mastabas; the pyramid of Khufu (Cheops) at Giza; the Red Pyramid at Dashur; and the Kushite pyramids discovered at el-Kurru represent merely a few of the major

architectural achievements of this culture area. Karnak Temple, Abu Simbel, and other examples of monumental architecture demonstrate the undeniable brilliance of ancient Egyptian mathematicians, engineers, architects, and workmen.

Recent discoveries in the Valley of the Kings are no less than remarkable, because Egyptologists are learning so much more about a site that some archaeologists considered to be exhausted about a 100 years ago. In conjunction, the inadvertent discovery of the blue lotus's similarity to Viagra, in 2001, has transformed Egyptologist's interpretation of Egyptian paintings. The virtually ubiquitous use of the plant has medical, sensual, and cultural implications that are now being studied.

Interpretations of the Evidence and Recent Theories

New theories about the mysterious Egyptian have now emerged that merit further scrutiny. Dr. Bob Brier has been examining the circumstances of King Tutankhamun's early demise and his physical remains. For Brier, foul play is evident, based on a cranial anomaly and the political climate of the time. Some forensic scientists are not convinced; however, the evidence continues to be examined critically, and this research may broaden our understanding of the 18th Dynasty's machinations in significant ways.

In 2000, Robert Bauval hypothesized that the configuration of the pyramids at Giza was aimed at replicating the heavens on earth; each pyramid represented a star, and it was to be placed in alignment with the constellation now known as Orion. By superimposing a scale model of the Giza Plateau upon a photograph of the constellation Orion, a correspondence between the alignment structures and the stars can be observed. If Bauval is correct, this would explain why the Egyptians invested so much effort in building projects that would propel them into the afterlife, at least in part.

Egyptologists cannot say exactly how the pyramids were built, and theories abound as to how such a feat could have been accomplished without the use of modern equipment. Dr. Maureen Clemmons, a Professor of Aeronautics at the California Institute of Technology, surmised that the ancient Egyptians may have built their pyramids by using kites and wind power. Overcoming a number of technical obstacles and setbacks in her field tests in the Mojave Desert, and with the assistance of Morteza Gharib and Emilio Graff, the team was able to raise a concrete obelisk that weighed about 3.5 tons in less than 5 minutes, using sails, wood, rope, and pulleys that would have been available to the ancient Egyptians. If Clemmons is correct, this would appear to be one of the most cogent explanations for how so many tons of stone could have been moved in antiquity.

Are these theories mere conjecture, or will they eventually enhance our understanding of the ancient Egyptian, who scholars have been struggling for centuries to understand? There are Egyptologists who take differing positions on these, and other, theories; however, divergent theoretical orientations serve as the foundation for scientific inquiry, and they often lead to breakthroughs, as Thomas Kuhn suggested in *The Structure of Scientific Revolutions.*

Preserving the Evidence/Sites

The rescue of the temples at Abu Simbel represents one of the most remarkable efforts known to Egyptologists. Ramses II built the two temples in Nubia; however, the rising level of the Aswan Dam, which was built in the 1950s, was about to flood their location and submerge the monuments forever. Through the efforts of UNESCO (United Nations Educational, Scientific and Cultural Organization), about $36 million was raised from international sources in order to move the temples to higher ground, and the temples were salvaged between 1963 and 1970. Clearly, this was a visionary undertaking, since the massive stone temples had to be dismantled in sections for future reassembly.

Tourism is a major sector of modern Egypt's economy; however, numerous measures have been enacted to limit the deleterious effects upon the visitation sites. Humidity within the structures is now monitored, and the number of people who are allowed in per day is regulated. The natural decay of structures, like the Amenhotep III temple at Thebes, has been a recurrent problem since ancient times. Traffic and pollution have both served to hasten the deterioration of the Sphinx and other ancient monuments. Thus, human activities continue to be a threat to the cherished artifacts of this unique civilization, and this has been recognized by Dr. Zahi Hawass, Chief Inspector of Antiquities for the Egyptian government. Hawass engaged in numerous restoration and preservation projects at Edfu, Kom Obo, and

Luxor, in conjunction with building tourist installations that are located a safe distance away from the sites, the use of safe zoning that separates a site from a town, and open-air museums. Taken together, these measures will complement the preservation efforts of the archaeologists who have permits to work alongside Egypt's vital tourist industry.

The Value of Egyptology to Anthropology

Egyptology offers exceptionally fertile areas of study for all four of anthropology's subfields. Physical anthropologists have gleaned a wealth of information about human adaptation, disease pathology, mating, and medicinal practices from ancient Egyptian remains; as for archaeologists, Egypt has exerted a substantial influence on their field considering the impact of seriation, which is widely used, developed by Egyptologist Sir Flinders Petrie.

The vibrant cultural array of Ancient Egypt and Nubia, including their pantheons of gods, philosophies, mating systems, and geopolitical interaction spheres, continues to be of interest to cultural anthropologists, with no evidence of abatement. And for linguists, the discovery of a unique, unpointed (written without vowels) language with a full compliment of written symbols has proven to be irresistible, at least since medieval times.

An incalculable number of anthropologists have drawn inspiration from Ancient Egyptian civilization, and they will probably continue to do so, while preserving its legacy for future generations of scholars and enthusiasts alike.

— *Larry Ross*

See also **Egypt, Ancient; Pyramids**

Further Readings

Bongioanni, A., & Croce, M. S. (Eds.). (2001). *The treasures of Ancient Egypt from the Cairo Museum.* New York: Universe.

Hawass, Z. (2004). *Hidden treasures of Ancient Egypt.* Washington, DC: National Geographic Society.

Johnson, P. (1999). *The civilization of Ancient Egypt.* New York: HarperCollins.

Oakes, L., & Gahlin, L. (Eds.). (2003). *Ancient Egypt.* New York: Barnes & Noble Books.

Shaw, I. (2002). *The Oxford history of Ancient Egypt.* Oxford: Oxford University Press.

Siliotti, A. (1998). *The discovery of Ancient Egypt.* Edison, NJ: Chartwell Books.

Trigger, B. G., Kemp, B. J., O'Connor, D., & Lloyd, A. B. (1983). *Ancient Egypt: A social history.* Cambridge: Cambridge University Press.

Watterson, B. (1998). *Women in Ancient Egypt.* Gloucestershire, UK: Sutton.

JEAN-FRANÇOIS CHAMPOLLION

French linguist and scholar Jean-François Champollion greatly advanced the field of archaeology by founding the field of Egyptology, allowing researchers to discover the secrets of ancient Egyptian life, language, and culture. Determined that he would be the one to encipher Egyptian hieroglyphics, in 1821, Champollion used the writing on the Rosetta stone to break the code that had eluded scholars for centuries.

In early 2003, new information about how Champollion was able to accomplish his task came to light when a portfolio of watercolors and drawings were discovered in Kingston Lacy, the Dorset County home in England that had belonged to William Bankes, a disgraced English politician. Between 1815 and 1819, Bankes had meticulously documented Egyptian monuments, including the temples of Dabod and Abu Simbel. In an effort to remind posterity of who had been involved in uncovering the mysteries of ancient Egypt, Bankes scratched his name on the leg of one of the colossi at the entrance to Abu Simbel.

Kingston Lacy was also home to an Egyptian obelisk that Bankes had transported from Philae Island near Aswan. The inscriptions on this obelisk were integral in Champollion's deciphering of the hieroglyphics. To the end of his life, Bankes believed that Champollion had taken all the credit for deciphering ancient Egyptian writings without acknowledging publicly that he had built on the

work of British scholars who had given him free access to their work. After fleeing England to escape arrest on charges of sodomy, Bankes died in exile in 1855. His contributions to Egyptology were relatively unknown until archivists at the British Museum decided to organize and publish his notes and drawings after the discovery at Kingston Lacy.

Unlike Bankes, the contributions of Champollion to Egyptology have been documented for two centuries, and his contributions are clearly evident in resources on the subject today, including the Internet. More than 1 million sites are available, ranging from those aimed at the general public to those designed for serious scholars.

On the site of the Egyptian Supreme Council of Antiquities (http://www.sca.gov.eg/index.html), for example, it is possible to virtually examine artifacts at Egypt's Alexandria Library Museum or learn about the expanding field of underwater archaeology. For those who prefer to visit ancient Egypt more directly, the Internet offers a sampling of displays at museums that may be closer to home. Such displays include those at the Museum of Fine Arts in Boston (http://www.mfa.org/egypt/explore_ancient_egypt/index.html), the Poznan Archaeological Museum in Poland (http://www.muzarp.poznan.pl/muzeum/eindex.html), and the Louvre in Paris (http://www.louvre.fr/francais/collec/ae/ae_f.htm).

With a few clicks, it is possible for archaeologists and would-be archaeologists to gather information on possible digs taking place in Egypt (http://www.newton.cam.ac.uk/egypt/dig.html) or take a virtual tour of particular sites such as the Odyssey in Egypt site (http://www.website1.com/TheDigSite/), offering information on the excavation of the Monastery of St. John the Little at Wadi Natrun.

Although Champollion died at the age of 42, long before he had accomplished all that he meant to do, the field of Egyptology has served as a monument that continues to expand its reach to new generations who understand the importance of learning about the past and the part that such knowledge plays in understanding the present.

— Elizabeth Purdy

El Cerén

Located in the highlands of central El Salvador, El Cerén, or Joya de Cerén, has been described as the "Pompeii of the Americas." Discovered by accident in 1976, the Classic Maya site was covered with more than 5 meters of ash from an eruption of the Loma Caldera volcano circa AD 600, leaving this hamlet in an outstanding condition of preservation. It is registered with United Nations Educational, Scientific and Cultural Organization (UNESCO) as a World Heritage Site.

At the time of the Loma Caldera eruption, Cerén was a hamlet on the banks of the Rio Sucio. Data from several years of excavation suggest that people were just finishing their evening meal when the first signs of danger appeared. People fled the site, leaving buildings and belongings as they were. No human remains have been encountered at the site as a result of the disaster, though it is uncertain whether or not the people of Cerén actually escaped the many waves of intense explosions or not.

Outside of the eruption that preserved it, village life at Cerén was not unique. It was one of many villages and towns under the influence of the Classic Maya center at San Andres. San Andres served as the major religious and political center as well as providing a market where people from Cerén could have bartered for needed and desired items such as obsidian, shell, and salt. Life at Cerén however, focused on agricultural production of corn, with some specialized production of ceramics and other crafts.

Excavations at Cerén are notable for three major reasons. First, the sudden abandonment of the site left it in an unparalleled state of preservation. This led to an ongoing series of field projects directed at understanding the details of daily life in a Classic Maya village. Investigations have provided evidence for domestic and public architecture; where and how food was stored, prepared, and consumed; specialized tasks conducted by residents; agricultural practices; as well spatial arrangements within and between dwellings. It was because of the research potential of this unprecedented preservation that Cerén was nominated to UNESCO's list of World Heritage sites.

Second, Cerén has been both a testing ground and a model for interdisciplinary research and applications of technology in archaeological research. The challenges of conducting excavations of a substantial and

deeply buried site promoted the use of remote-sensing technologies, such as resistivity and ground-penetrating radar, and opened up opportunities for collaboration with a variety of natural scientists. Excavation techniques for recovering and analyzing fragile remains of house posts, roof thatching, and growing corn developed over many seasons of fieldwork.

Third, Cerén stands as a model of diplomacy and international cooperation. Initial excavations at Cerén took place during intense conflict and political instability in El Salvador, during which project leaders successfully negotiated for the safety of excavators and the site itself. In addition, the Cerén project became one of the best-documented and most accessible archaeological projects in the world, with a well-maintained site museum and many field reports, photographs, and field specimen lists available through an official Cerén Web site.

— Jo Ellen Burkholder

See also **Mayas**

Further Readings

Lewin, J. S. (2002). *An interactive guide to Cerén before the volcano erupted.* Austin: University of Texas Press. http://ceren.colorado.edu

Sheets, P. D. (1992). *The Cerén site: A prehistoric village buried by volcanic ash in Central America.* Fort Worth, TX: Harcourt, Brace, Jovanovich.

Sheets, P. D. (2002). *Before the volcano erupted: The ancient Cerén village in Central America.* Austin: University of Texas Press.

Elders

Humans are the primate species with not only the longest life span (120 years) but also the greatest proportion of those years spent in social and biological maturity. The evolutionary legacy of aging also includes a powerful biological dimension of programmed senescence. Despite this, cross-cultural psychiatrist David Gutmann suggests elders exist not because of our species' technical ability to keep the weak alive; instead, we attained our humanity through the very existence of elders and the significance of their postparental roles.

The simplest way of conceptualizing elders and elderhood is as the age cohort relatively older than yourself or the generation with more years than anyone else in the community. Cultural construction of this older-adult category typically combines the path of biological maturity, the developmental kinship and family cycle, and broader notions of social generation. Elderhood more often than not focuses on the latter two factors, although for women, menopause can function as an important status-turning point, signaling eligibility for elder status. However, as Rasmussen notes for the Tuareg, the ending of reproductive capacity complexly impacts the unfolding of female personhood through realignment of kin hierarchies and other social strata affecting both males and females.

In essence, cultures are more apt to see elderhood as a marker of a social rather than a biological or time-based maturity. This is clear when we see persons, especially males, enter the beginning ranks of elder in their late 20s and early 30s among Africa's age set societies as well as in Australian Aboriginal tribes. From another perspective, an abundance of years without the culturally prescribed markers may allow individuals never to be socially considered an elder. For example, in Peterson's study of African American working-class women in Seattle, she found that female elders were designated by the word "wise," a term given to women who have not only borne children, but have raised kids who, in turn, have their own offspring. In this community, the label "wise" could be attained while a woman was in her late 30s. However, females who might be in their eighth decade of life but had not accomplished the required social tasks of maturity would be considered in the same generation as teenagers.

Age along with gender and kin relations stand as the three universal bedrocks of how all human societies construct a framework of social order and biocultural succession. Passage of human populations through the life span is translated into notions of social time, created by transit through successive age-based statuses marking the cultural mapping of the life cycle. Linguistic variants of child, adult, and elder become social boundaries in virtually all societies, marked by such things as variations in dress, comportment, modes of speech, and deferential gestures. Sometimes, actual physical boundaries can be involved, such as in the traditional Irish peasant pattern of moving elders into the sacred west room of the house, where younger kin could not enter without permission. An even more dramatic and negative case is that

of the Fulani, West African pastoralists. Here, after a couple's last child has wed, the elders are regarded as socially dead. They live as dependents of their oldest son, moving separately to different outer edges of his house compound, symbolically residing over their future grave sites.

The societal definition of elder status is often differentiated from "oldness" or the cultural constructions of old age. The latter terms are more keyed to biological maturity of an individual in combination with some social aspect of one's relative position in society. In an indigenous, Nahuatl-speaking Mexican peasant community, Sokolovsky found that elderhood was attained by having shouldered important community rituals and becoming a grandparent, or *culkn.* To be considered old, or *culi,* required at least several grandchildren plus signs of physically slowing down, such as using a cane to walk around. A more debilitated stage of oldness, where one seldom ventures far from the home, is called *Yotla Moac,* literally "all used up."

One of the earliest efforts to mine anthropological data on the contribution of elders to their societies came from Leo Simmons's classic work, *The Role of the Aged in Primitive Society* (1945). He showed the wide variety of ways elderly function in society, including knowledge bearing; child care; economic support; and ritual, judicial, and political decision making. Numerous ethnographies have validated how a combination of deep knowledge held in older adults' heads and their nurturing actions toward younger generations sustains human societies. Among the Akan of Ghana, there is no adjective that exists to describe a human as old, but those who have grandchildren and are older adults are referred to by the verb *nyin,* to grow. Such individuals who acquire wisdom based on experience and use this for the benefit of others receive the honorific of *payin*, or honorable, composed, and wise. As van der Geest relates in a 2004 journal article, an Akan saying is that a "*payin* has elbow so that 'when you are in the chief's palace and you are saying something which you should not say, a *payin* will . . . touch you with his elbow to stop you from saying that which might lead you into trouble.' The proverb means if the *payin* has nothing at all, he has wisdom, he can give advice to people."

Globally, elderhood is less celebrated in ritual than the beginning phases of social maturity, adolescence, and adulthood. Yet in some societies, age is a predominant means of ordering social life, such as in Africa's age set societies, where passing into elderhood and even exiting active elderhood are marked by powerful rituals. Here, persons progress through the life cycle collectively and form tightly bound groups, performing specific tasks. Societies where age groupings play such a powerful role in ordering social life have been found in Africa, among certain Native American groups, Australian Aborigines, and Papua New Guinea, but their global occurrence is relatively rare. The most elaborated forms of such cultural systems are found among East African nomadic herders, such as the Samburu of Kenya or the Tiriki.

Age set organizations for women in non-Western societies are reported much less frequently than for males. Well-documented examples include the Afikpo, Ebrie, and Mbato peoples of West Africa. It is likely, as Thomas suggests, that the paucity of age sets for females is related to the difficulty of male ethnographers learning about a realm of culture purposely kept secret from men.

— Jay Sokolovsky

See also **Family, Extended**

Further Readings

Aguilar, M. (Ed.). (1998). *The politics of age and gerontocracy in Africa: Ethnographies of the past and memories of the present.* Lawrenceville, NJ: Africa World Press.

Albert, S., & Cattell, M. (1994). *Old Age in global perspective.* New York: G. K. Hall.

Ikels, C., & Beall, C. (2000). Age, aging and anthropology, In R. Binstock & L. George (Eds.), *The handbook of aging and the social sciences* (5th ed., pp. 125–139) San Diego, CA: Academic Press.

Sokolovsky, J. (Ed.). (1997). *The cultural context of aging* (2nd ed.). New York: Bergin & Garvey.

Van Der Geest, S. (2004). "They don't come to listen": The experience of loneliness among older people in Kwahu, Ghana. *Journal of Cross-Cultural Gerontology, 19,* 77–96.

Eliade, Mircea (1907–1986)

As novelist, philosopher, and humanist, Mircea Eliade advocated a unique perspective in his primary work as historian of religions, a field in which he was

universally recognized as a brilliant and enthusiastic scholar. By means of his creative and controversial approach to the religious expression of humankind, he attempted to bridge the gap between the contemporary, secularized world and archaic or more traditional cultures, where the sacred dimension has held a higher profile. By any standard, Eliade had a significant impact on his field and related academic disciplines, but the debate about Eliade as "problem" or "prospect" is still quite lively. As a leading historian of religions, he mastered a vast array of data, but became, and still remains, the subject of considerable inquiry himself.

Eliade was born in Romania and was educated as a philosopher at the University of Bucharest. He was an avid reader (in several languages) and learned English to gain better access to James George Frazer's *The Golden Bough,* a classic in the anthropological study of religion. While in Italy doing research on Renaissance philosophers, he became interested in Indian philosophy and took an opportunity to study for 4 years at the University of Calcutta. This time in India, which included an extended period in an Himalayan ashram, changed Eliade's life in several ways. He returned to Bucharest and received the doctorate in 1932 for a dissertation on yoga (later published as *Yoga, Immortality, and Freedom*), but he also returned to the West with a profoundly different understanding of the East, including Eastern religious traditions.

Like Frazer's work, Eliade's writing was marked by illustrations drawn from the wide range of religious traditions, from the broad sweep of history. Though he produced several specialized studies on religion (such as yoga, shamanism, Australian religions), Eliade called for "learned generalists" that could identify and interpret parallel thoughts as expressed throughout the history of humankind. Of course, he was aware of the historical contexts of religious events, objects, and words but had a special interest in the recurring forms or patterns of religion. Such wide-ranging research led to the compilation of a major theoretical work, *Patterns in Comparative Religion* (1958), and toward the end of his life, the completion of his three-volume *A History of Religious Ideas* (1978–1986).

Through his cross-cultural and historical approach, Eliade documented what he claimed were universal patterns, and his search for common ground in the world's religious traditions led him to advocate a new humanism. He was aware of the more rationalistic perspective on religion, but some students of Eliade's hermeneutic detect a postmodern slant in his approach.

He left Romania in 1940 because of political turmoil and more promising circumstances and spent the rest of his life teaching and writing in Europe and America. This exile included time in Paris, where he lectured at the Sorbonne and formulated some of his central concepts. Eliade became a professor at the University of Chicago in 1956, where he succeeded Joachim Wach and served with many illustrious colleagues for 30 years, until his death in 1986. In Eliade's earlier days, he published numerous novels (including *The Forbidden Forest*), which focused on great philosophical themes and fantasy and included slightly veiled references to his Indian experience. Taken as a whole, the literary legacy of Mircea Eliade is remarkable; he wrote over 1,300 items (beginning with an article at age 14), including many books that are still held in great esteem and some that are regarded as classics in the field. Other important titles in the Eliade oeuvre include *The Myth of the Eternal Return* (an analysis of the human experience of history and time); *The Forge and the Crucible* (a byproduct of Eliade's lifetime interest in alchemy); and *The Sacred and the Profane* (a study of how the holy has manifested itself in some cultures). In 1961, he was instrumental in launching the prestigious journal *History of Religions;* he also served as editor in chief of the 16-volume *Encyclopedia of Religion* (1987), an important reference set that reflects Eliade's own encyclopedic range of interests.

The intellectual forces that shaped Eliade (through the written word or through his many friendships) were numerous and varied (for example, Rudolf Otto, Surendranath Dasgupta, Gerardus van der Leeuw, George Dumézil, Raffaele Pettazoni, C. J. Jung, Paul Tillich). His background in philosophy and lifelong interest in Eastern religions and mythology (among other subjects) are evident at every turn. Eliade's analyses of religious phenomena (as historian, phenomenologist, and interpreter) always reflect his academic background, but the reader of an Eliade book can easily detect the author's energy, creativity, and curiosity. Much of that creativity was channeled into an intriguing technical vocabulary, without which it is impossible to understand what Eliade means. Sometimes he adopted (and adapted) these technical terms from ancient or medieval writers or

his own scholarly predecessors, but some words were defined in specific ways for a book and serve as keys to its main points (for example, axis mundi, coincidentia oppositorum, ganz andere, hierophany, homo religiosus, homo symbolicus, illud tempus, imago mundi, sacralize, theophany). Eliade promoted his humanist agenda by asking readers to recover meaning and truth in a "desacralized" world—by discovering the sacred, the "wholly other," in its various hierophanies—and to accept religious phenomena within their own frame of reference.

— *Gerald L. Mattingly*

See also **Religion and Anthropology**

Further Readings

Eliade, M. (1963). *Patterns in comparative religion.* New York: World Publishing.

Rennie, B. S. (1996). *Reconstructing Eliade: Making sense of religion.* Albany: State University of New York Press.

Saliba, J. A. (1976). *"Homo religiosus" in Mircea Eliade: An anthropological evaluation.* Leiden, The Netherlands: Brill.

Emics

Emics is a term used by some cultural anthropologists to denote descriptions and explanations of human beliefs and behaviors in terms relevant to the native practitioners of the culture in question. The linguist Kenneth Pike coined the term emics from the linguistic term *phonemics,* the study of the system of sound contrasts used by speakers of a language to construct meaningful units: words and so forth. Pike used emics to denote a level of description of human behavior based on categories meaningfully relevant to the people performing the behavior.

Marvin Harris and other cultural materialists popularized the term within anthropology by using it to refer to native or folk explanations for cultural beliefs and behaviors. One of Harris's best-known examples is his analysis of the Hindu Indian cattle complex. Hindus revere cattle as sacred and claim that their religion prevents them from killing or eating the cattle. This is, in Harris's terms, an emic explanation for Hindus' treatment of cattle. The emic level of explanation can be further divided into two categories corresponding to (conscious) belief and behavior: *emic-mental* (cattle are not killed or eaten because the Hindu religion has declared them to be sacred) and *emic-behavioral* (cattle are not killed or allowed to starve to death).

It is important to emphasize that in Pike's original formulation, emics (along with etics) represented a level of description. Pike saw behavior, like speech, as composed of waves; humans, however perceive, categorize, and react to behavior in terms of particles, or contrastive units, which in the case of language correspond to phonemes. In more contemporary terms, we might say that behavior is analog, while human mental processing of behavior is digital. Pike's goal of emic description of any human behavior is to present that behavior in terms and categories relevant to the native participants in the behavior. Harris and some other anthropologists use the term to represent a level of explanation. Emic explanations correspond very approximately to what some other anthropologists refer to as "folk models" or folk "explanations."

— *Ronald Kephart*

See also **Etics; Language; Models, Anthropological**

Further Readings

Harris, M. (1987). *Cultural materialism: The search for a science of culture.* New York: Random House.

Headland, T. N., Pike, K. L., & Harris, M. (Eds.). (1990). *Emics and etics: The insider/outsider debate.* Newbury Park: Sage.

Pike, K. L. (1971). *Language in relation to a unified theory of the structure of human behavior.* The Hague: Mouton.

Empedocles (495–435 BC)

Empedocles was a Greek pre-Socratic philosopher and a poet. He was born circa 495 BC in the Sicilian city of Acragas (recently Agrigento) and died, according

to a famous but unproven story, by throwing himself into the active volcano Mount Etna in Sicily circa 435 BC, thus intending to demonstrate his personal immortality.

Empedocles is said to have been personally extravagant, practicing magic, medicine, rhetoric, and politics. His philosophy was fundamentally inspired by, and is a reaction to, the teachings of another two major pre-Socratics, Pythagoras and Parmenides. Empedocles provided the first comprehensive vision of the pluralistic and dynamic unity of the universe in Western philosophy. He sought to put all diversity of being into one system, to unite nature with human soul, physics with psychology, lifeless things with living bodies, even competing and contradictory powers and processes into one cosmic cycle of endless flux of formation and dissolution.

His two major works, philosophical poems *On Nature* and *Purifications,* survive in one of the largest corpus of fragments of all pre-Socratics. Empedocles's basic philosophical doctrine presupposes that there are four irreducible physical elements or roots (earth, air, fire, and water), from which the whole cosmos is created. To explain this creation as well as any kind of movement, change, and evolution, Empedocles postulates, in addition to four elements, two basic cosmic forces or principles, one of which is constructive (love, *philia*), another destructive (strife, *neikos*), as a means by which the elements are combined and separated. The elements themselves, being the earliest version of particle theory, though eternal and unchanging, are by no means mechanistic and involve their own creative potential within, since they are also divine and sentient. This potential comes into actual being by their intermingling in endless mixtures, which are constantly reconfigured without losing their elementary building blocks. The active powers, remaining rather magical and mythical in Empedocles's conception, that secure this reconfiguration of stable and rather passive elements are of two kinds: Love brings all together, harmonizes and unites, while strife separates, dissolutes, and divides. The results of both attraction and distraction processes are bodies, plants, organisms, and living creatures and their decomposition back into parts and elements. This shows the powerful analogy between the evolution of the universe and the evolution of life and makes a link to Empedocles's biological explanations of zoogeny (the origin of species), which is also anthropologically relevant and later influenced Plato and Aristotle. According to Empedocles, life is the consequence of an evolutionary process.

— *Emil Visnovsky*

Further Readings

Guthrie, W. K. C. (1962–1978). *A history of Greek philosophy.* Cambridge: Cambridge University Press.

Kirk, G. S., Raven, J. E., & Schofield, M. (1983). *The pre-Socratic philosophers.* Cambridge: Cambridge University Press.

Wright, M. R. (1981). *Empedocles: The extant fragments.* New Haven, CT, and London: Yale University Press.

Enculturation

Enculturation is the process by which children are socialized to the standard modes of thinking, feeling, and behaving considered appropriate for an adult in a given society. Because language is the primary means of communication, it is one of most important components of the enculturation process, and because cultural information is encoded in language, children acquire knowledge about their society through verbal interaction with adults. Even before birth, a fetus can differentiate its mother's voice from other sounds. Though an infant is born with the ability to produce any sound and learn any language, they are shown to prefer their mother's native tongue, which they hear prenatally. Later on in their development, an infant begins to discriminate between sounds, producing those that are heard most often. In addition, they learn speech patterns and syntax as adults use intonation and rhythmic sounds. Once toddlers have the ability to communicate ideas and a cognitive awareness of their surroundings, adults begin to define their world and its important aspects. For example, children in Western societies learn the many dangers of modern conveniences, including light sockets, hot irons and stoves, and traffic.

Furthermore, children begin to learn the social rules of behavior as they interact with other members of their society. American children learn the value of directness and independence, while Japanese children learn that indirectness and circumscribed behavior

are more appropriate. Children also learn about the concepts of status and roles with which they must be familiar. For example, in patrilineal societies, the father is the main source of discipline and authority, while in matrilineal societies, this role falls to the mother's brother, and the child responds to each accordingly. Children also learn gender roles, including the expectations of each sex as they mature. In Australia, fathers give boys tasks that bring them outside, while mothers solidify the concept of the women's domain in the home. Other aspects taught are the attitudes, feelings, and emotions of the culture. Displays of affection are regarded differently depending on social background. In Ecuador, men and boys hug and kiss as a sign of friendship and goodwill. However, in other parts of the world, this behavior would make men the objects of ridicule.

Anthropologists began studying this phenomenon in the late 1800s. Unlike psychologists, they did not automatically assume that the enculturation process was identical cross-culturally. Influenced by Freud, the early work focused on set stages encountered in the first 3 years. Freud believed that each individual experience in early childhood formed adult personality and any deviation from a set pattern produced psychosis. However, in Margaret Mead's classic study, *Coming of Age in Samoa* (1928), child-rearing studies showed that Freud's stages were not universal; even the concept of adolescent angst was foreign to the Samoan teenagers. Mead argued that no stage was common to all cultures nor inevitably faced by a growing child. Children growing up in Samoa developed different personality traits because their characters were formed by different enculturation processes.

— *Luci Fernandes*

See also **Childhood Studies; Family, Nuclear; Socialization**

Further Readings

Bailey, G., & Peoples, J. (2002). *Essentials of cultural anthropology.* Belmont, CA: Wadsworth Thomson Learning.

Lenkeit, R. E. (2004). *Introducing cultural anthropology.* New York: McGraw-Hill.

Rosman, A., & Rubel, P. G. (2004). *The tapestry of culture: An introduction to cultural anthropology.* New York: McGraw-Hill.

NATURE AND NURTURE

For centuries, scientists have debated whether nature or nurture has more influence on human behavior. The basic argument was whether human differences are historic and the result of genetics or whether they are environmental and therefore changeable.

In the 19th century, nature was widely believed to be dominant over nurture. Those who held with this belief thought that inherited traits accounted for most human behavior.

Much of the fuel for nature advocates has come from studies of twins who were separated at birth and raised in different environments. When they meet as adults, they are found to have many of the same mannerisms and habits. It seems plausible that something in the genetic makeup of the individual determines such mannerisms, considering that the twins were reared in entirely different environments.

Much of the literature in recent years that calls itself evolutionary psychology or behavioral genetics has held that most human behavior has been programmed into the human genes by natural selection. This point of view has been popularized in recent years by MIT psychologist Stephen Pinker and others. In January 2003, this view was challenged by a pair of prominent Stanford University scientists, Paul R. Ehrlich and Marcus W. Feldman. Both are members of Stanford's department of biological sciences' faculty and both are considered pioneers in genetics and evolutionary biology and have recently written separate books on those topics. Their article "Genes and Cultures: What Creates Our Behavioral Phenome?" challenges Pinker and others, whom they say "overestimate how much of human behavior is primarily traceable to biological universals that are reflected in our genes."

Ehrlich and Feldman argue that evolutionary psychologists such as Pinker fail to acknowledge the importance of cultural evolution and of interactions. They accuse these psychologists of promoting the idea that human nature is genetically fixed, while they themselves suggest that circumstances and experiences contribute a great deal to each person's individual nature.

Their publication was met by many rebuttals from leading anthropologists who accused the two men of name-calling and wrongfully criticizing the methods used by geneticists and evolutionary psychologists. Many believe it is not necessary to take an extreme position on either side of the nature-nurture controversy. Most scientists agree that, to some degree, heredity and environment work hand-in-hand to develop the personalities or natures of human beings.

— Pat McCarthy

Endogamy

From the Greek εντὸζ + γαμώ ("in" + "to marry"), endogamy is the marital rule according to which the spouses are selected from within the same social group (kindred, religious, ethnic, etc.). It is the opposite of *exogamy.*

Through endogamy, social groups aim to preserve their constitutive elements (for example, power, wealth, religion, language) and transmit them to the following generations, in order to perpetuate their existence.

Each society may be endogamic in one or more aspects and exogamic in others. For instance, the Aborigines in Australia are exogamic as to the *clan* (a social group the members of which acknowledge a common ancestry and whose relationships are ruled by solidarity) but endogamic as to the *tribe* (wider than a clan group that owns a territory and is homogeneous and autonomous from a political and social viewpoint).

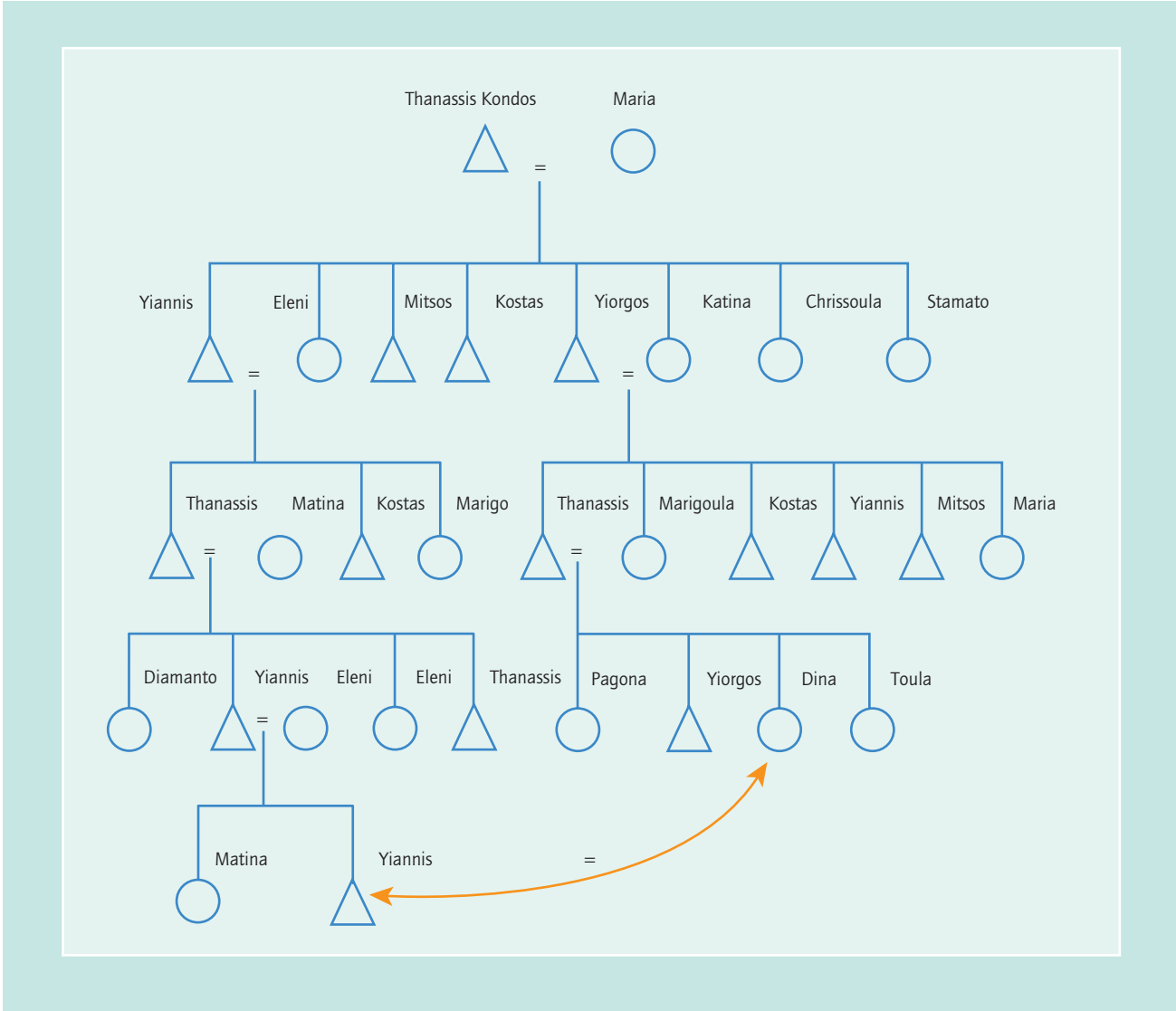
Kindred Endogamy

One form of endogamy is the one taking place within the kindred group (but beyond the boundaries of incest, which may be different for each society). Such a case is *preferential marriage,* that is, marriage with a close relative, such as between the children of a brother and sister (*cross cousins*). In practice, this translates to a man marrying his mother's brother's or father's sister's daughter. Such marriages are encountered in Southeast Asia, New Guinea, the Aborigines in Australia, and native South Americans.

Another case of kindred endogamy is the so-called lineage endogamy, that is, the marriage between "relatives" who are beyond the boundaries of kinship (and therefore of incest) set by their society but still maintain a memory of kinship. This is a marriage that, although desirable, is by no means mandatory. Such a marriage is usually performed on a *lineage* level (hence the term *lineage endogamy*), that is, within the wider group of individuals beyond the family who are interconnected through consanguineal kinship either patrilinealy or matrilinealy and who acknowledge a common ancestor. It may often result in the women having the same family name before and after marriage (*patronymic endogamy*), since it usually occurs in *patrilineal* lineages, where their prime constituents (such as the family name) are transmitted via the father. Such marriages are often arranged at the birth of the future spouses and serve to reinforce "family" ties. They are a very common strategy in Mediterranean societies, for example, in rural France, the Mediterranean Arab societies, and certain societies in Greece, such as the Maniates in west Mani and the Arvanites in Ermionida, both in the Peloponnese. The Arvanites are groups spread across Greece and characterized mainly by their language, Arvanitika, an archaic Albanian dialect they speak in parallel with Greek. The figure records a particular case of *lineage endogamy* from the village of Didima in Ermionida. The predominant explanation for such a marriage is that it allows for the patrimony to remain in the lineage. If the girls married outside of it, a part of the patrimony would leave the lineage in the form of the dowry.

In other societies, the endogamic rule, according to which, following the death of a spouse, the second husband must be a brother of the first (*levirate*) or the second wife a sister of the first (*sororate*), is in place. For example, the mosaic law dictates that should the husband die, the wife must marry his brother. The children born from this marriage are considered to be the dead man's children. This ensures the continuation of the dead husband's family.

The rule of *kindred endogamy* is also applied in the case of *fraternal polyandry* (the most common form of polyandry, where a woman can simultaneously have more than one husband, provided they are all brothers). In this case, endogamy shows which lineage the children originate from, which would be impossible if the husbands were not brothers.



Lineage endogamy (Didima, Greece). The marriage of Dina and Yiannis was not only desirable but also allowed, as the forbidding rule of incest extends only to second cousins

Religious Endogamy

Religious endogamy is a universally enforced form of endogamy, according to which the spouses must belong to the same religion. Religious endogamy is especially strong because religion and marriage are intimately intertwined. Marriage is usually validated by a religious ritual, which must be accepted by the spouses; this can only happen when they both embrace the same religion. If this requirement is not fulfilled, the marriage cannot take place.

A particularly strict form of endogamy takes place within the castes in India (i.e., hierarchical groups in which individuals are hereditarily placed for life), as dictated by the Hindu religion.

Local and Ethnic Endogamy

The preservation of the cohesion (and consequently the perpetuation) of the *local community* (social group the members of which share goods and interests and live together in general), the *ethnic group* (the group of individuals belonging to the same culture and acknowledging themselves as such), and even of the *nation* are the main reasons behind the choice of the spouse from within the same local community,

ethnic group, or nation. These forms of endogamy are particularly widespread and powerful.

The following saying, used throughout Greece with respect to spouse selection, aptly summarizes the preference toward local endogamy: "[Get] a shoe from your place even if it's patched," that is, it is better to choose a local spouse despite his or her shortcomings (implying that selecting a nonlocal spouse may have unpredictable consequences). Thereby, in Didima (Peloponnese), on a local community level and according to marriage records, between 1928 and 1939, 93.7% of grooms and 90.0% of brides were locals. From 1940 to 1988, these percentages continuously fall, reaching 56.7% and 83.6% respectively between 1980 and 1988. This trend shows the gradual decline of the rule of local endogamy.

— *Maria Velioti-Georgopoulos*

See also **Exogamy**

Further Readings

Goody, J. (1983). *The development of family and marriage in Europe.* Cambridge, UK: Cambridge University Press.

Lévi-Strauss, C. (1949). Endogamy et exogamy. In *Les structures élémentaires de la parenté* (pp. 49–60). Paris: PUF.

Segalen, M. (1972). *Nuptialité et alliance. Le choix du conjoint dans une commune de l'Eure.* Paris: Maisonneuve et Larose.

Engelbrecht, William Ernst

Dr. William Ernst Engelbrecht, the son of Waldo Ernst Engelbrecht and Margaret Patricia Schall, is an archaeologist whose primary focus continues to be on Northern Iroquoian peoples. After completing his bachelor of arts in anthropology at Northwestern University (1965), where he studied under Sally Binford, Paul Bohanen, Ronald Cohen, Creighton Gable, Bruce Trigger, and Oswald Werner, Engelbrecht entered the University of Michigan in pursuit of his doctorate. At the University of Michigan, he continued his studies while taking classes taught by James B. Griffin, Arthur Jelinek, Frank Livingston, Jefferey Parsons, Roy Rappaport, Marshall Sahlins, Robert Whallon (Engelbrecht's dissertation adviser), and Leslie White.

In 1965, Engelbrecht received funding from the National Science Foundation, which allowed him to attend a field school in Hay Hollow Valley (Arizona) that was under the direction of Paul Martin. Building on this experience in Arizona, he completed a variety of fieldwork, including his participation (1966) in the Teotihuacán Mapping Project, which was initiated by William Sanders from Penn State and continued by Jeff Parsons. In 1967, Engelbrecht completed fieldwork in Saginaw, Michigan, and in southeastern Missouri.

Engelbrecht was hired by Marian White to run the Highway Salvage Archaeology program at the State University of New York at Buffalo in 1969 while finishing his degree at the University of Michigan. White, an archaeologist who was responsible for the identification, examination, and preservation of prehistoric and historic sites throughout the western New York region, provided Engelbrecht with additional direction and an enduring friendship that still motivates and guides Engelbrecht. While overseeing the Salvage Archaeology program, Engelbrecht gained a strong familiarity with the Niagara Frontier and the peoples whose activities in the region preceded any European excursions. The job also provided him with an opportunity to familiarize himself with archaeological collections in the western New York region.

After finishing his graduate studies and obtaining a PhD in anthropology (1971), Engelbrecht received a teaching position at Edinboro University in Pennsylvania, where he remained until 1973. In 1973, he was hired as an assistant professor in the anthropology department at Buffalo State College. He served as department chair for 6 years and retired in 2003. During his tenure, he taught an assortment of courses, which allowed him to incorporate his research and field experience into courses focused on human origins, the indigenous populations of North America, ancient civilizations, and archaeological examinations of North America. He also directed 17 archaeological field schools that focused on the excavation of the Eaton Site. Eaton is a multicomponent site located in western New York, which includes a Late Woodland Iroquoian village site occupied circa AD 1550. In conjunction with these field schools, Engelbrecht taught multiple seminars in archaeology that prepared and assisted students in the research and analysis of material from the Eaton Site.

Engelbrecht continues to analyze material collected from the Eaton Site and assist graduate and

undergraduate students examining the material. Throughout his career as an educator, he advised countless students in their educational and career pursuits, assisted and encouraged students in their efforts to conduct and publish research, and served as an outside dissertation reader for 19 graduate students. His dedication to his students was recognized in 1990 when he received the Chancellor's Award for Excellence in Teaching.

Engelbrecht's research and publication interests varied, but his primary focus remains on Northern Iroquoian peoples, particularly the nations of the Haudenosaunee Confederacy (the Iroquois). His PhD dissertation itself, *A Stylistic Analysis of New York Iroquois Pottery* (1971), was a study of Iroquois ceramic trends that served as a continuation of Robert Whallon's study of Owasco and Iroquois ceramics. The examination and analysis of Iroquoian ceramics was a continual focus for Engelbrecht, resulting in additional publications between 1971 and 2003. During this time, he also analyzed and published a large volume of data from the Eaton Site and other sites in the northeastern North American region. Of this work, he placed a considerable amount of attention on the effects of contact between Native Americans and Europeans and the "disappearance" of Iroquoian nations, particularly peoples from the St. Lawrence region. Engelbrecht's work also included studies of Paleo-Indian "watercraft" (work and publication coauthored with Carl Seyfert) and population changes and social organization among Native American nations. Through it all, however, the Haudenosaunee Confederacy remained a primary interest, leading to Engelbrecht's comprehensive 2003 publication, *Iroquoia: The Development of a Native World*.

— Neil P. O'Donnell

Further Readings

Engelbrecht, William E. (1971). A stylistic analysis of New York Iroquois pottery. (Doctoral dissertation, University of Michigan, 1971). *University Microfilms International.*

Engelbrecht, William E. (2003). *Iroquoia: The development of a native world.* Syracuse, New York: Syracuse University Press.

Engelbrecht, William E., & Grayson, Donald K. (Eds.). (1978). *Essays in Northeastern anthropology in memory of Marian E. White. Occasional Publications in Northeastern Anthropology, 5.*

Engels, Friedrich (1820–1895)

Friedrich Engels was born November 28, 1820. Engels's father was a wealthy German entrepreneur. In his early 20s, he moved to Manchester, England, to supervise the family cotton factory. While managing the plant, Engels was shaken by the poverty of his workers. This became the data for his book *Condition of the Working Classes in England* (1844). He also became associated with the Chartist, an English working-class movement for political and economic reforms. In 1844, in Paris, Engels became part of a radical journal *Franco-German Annals,* which was edited by Karl Marx; the two men became close friends. Together they wrote *The Holy Family* and *German Ideology.* On January 25, 1845, Marx was deported from France for radical activities. Engels and Marx from then on would always be seen as part of a larger European community of revolutionaries. Marx, together with Engels, moved to Belgium. With Engels's financial support, Marx had the opportunity to put together his economic and political theories in written form.

In July 1845, Engels and Marx traveled to England. There, they met with Chartist leader George Julian Harney. In Brussels, in 1846, Engels and Marx established the Communist Correspondence Committee for all socialists in Europe. Later, this became the Communist League. While in England in December 1847, they attended a meeting of the Communist League Central Committee. It was decided that in order to remove the bourgeoisie from power, the proletariat must control the economy; eliminate the current society, which was established on class antagonisms; and create a new society without classes or private property. Engels and Marx wrote a pamphlet explaining their philosophy; the first draft was called *The Principles of Communism.* Later, Marx finished the pamphlet, calling it *The Communist Manifesto,* which summarized the forthcoming revolution and the nature of the communist society.

Together, these two men claimed that class societies were specific to a restricted historical situation. The history of any class society is one of class struggle. Each class has its own unique interests; this conflicts with the interests of other classes in society. This conflict sooner or later leads to revolution. One of Engels's and Marx's main premises was that the big changes in history were the triumph of one class over another.

Source: Courtesy, Wikipedia.

As Engels and Marx explained it, the *bourgeoisie* (capitalists) were the owners of all the raw materials and means of production. The *proletariat* (workers) owned only their labor power and were required to sell their labor power to the capitalists in order to live. With the vanishing of the bourgeoisie as a class, *class society* would cease to exist. The class-based state is then no longer needed to control the producers, and it withers away."

With the publication of the *Manifesto,* Engels and Marx were forced to flee from Belgium to London. Engels continued to support Marx both financially and philosophically. To do this, Engels returned to work for his father in Germany until 1869, when he was able sell off his share of the family business. The two kept in constant contact over the next 20 years.

Karl Marx died in London in March 1883. Engels devoted the rest of his life to editing and translating Marx's writings. This included the second volume of *Capital* (1885). Engels then used Marx's notes to write the third volume of *Capital* (1894). Friedrich Engels died in London on August 5, 1895.

Engels was a major Marxist theorist in his own right, contributing much to Marxism. Several of his major works are seen as classics in Marxist anthropology, sociology, and economic history. The partial list that follows has made a major contribution to anthropology.

Peasant War in Germany, written in 1850, was inspired by the failure of the revolution of 1848, which strongly resembled the peasant revolutions of 1525. To have a deeper understanding of these histories, the researcher must examine the class grouping in both histories. Both revolutions proved that class alliances are required if there is to be any hope of success in any political revolution.

Engels wrote *Anti-During* in 1878 and *Dialectics of Nature* in 1873 to 1884 to explain materialism and dialectics. Matter in motion is self-creating, with everything in the universe, including life, developing out of already-existing natural forces. Life originates from a complex natural interaction of physical, chemical, and biological materials and evolves from one form into another. Materialism, being dialectical, becomes science without a need for philosophy. Anthropology, being interdisciplinary, can use Engels's work as a bridge between the physical, biological, and social sciences.

Socialism, Utopian and Scientific, 1882 to 1892, was written as a summary of *Anti-During* in pamphlet form. One of Engels's major points was that the three origins of Marxism were French socialism, German philosophy, and English economics. In this pamphlet, Engels clarified that most socialism of the past had been utopian. In the past, in most political history, class analysis was absent. There was a very slow maturity of the dialectical philosophy over thousands of years; this philosophy was what allowed Marx to see and explain the materialist conception of history. This means that the first principle of historical sociology is the mode of producing the necessities of life. This, in turn, is controlled by the distribution of the needed resources and the products created through labor among the members of society. After capitalism took off in Europe in the late 18th century, it rapidly replaced existing class societies around the world. Ranking by birth was replaced by free trade, legal equality, individualism, and competition. Capitalism controlled the economic resources, and the workers had no choice but to sell their labor power to any employer they could find. The state represented the interest of the ruling

class. The republic became a dictatorship of the bourgeoisie. With mass production of goods, the means of production became socialized. The working class was then in a position, through revolution, to replace capitalism with socialism.

According to *Origin of the Family, Private Property, and the State*, 1884, state society and class society are two sides of the same category. The first form of exploitation was within the family. The exploitation of women was the first form of inequality. With each further evolution of inequality, class structure is further developed, and the changes in the family reflect these evolving inequalities. With capitalism, the capitalist controls the opportunities for working-class survival. With the family, the husband has authority over the wife in the contemporary capitalist families. To have any real social equality, there must be total equal rights by law. This requires not only legal and political rights, but the woman would have to also be economically independent of her husband. As such, this solution for social equality could lead to the abolition of the monogamous family as the economic unit of society.

Friedrich Engels was known mostly for his close association with Karl Marx. However, Engels made many valuable contributions to Marxist theory in his own right. While Marx had a strong background in philosophy and later political economy, Engels kept Marx abreast of the latest changes in the natural sciences and anthropology.

— *Michael Joseph Francisconi*

See also **Marxism; Political Economy**

Further Readings

Cameron, K. N. (1995). *Dialectical materialism and modern science.* New York: International Publishers.

Engels, F. (1975). *Origin of the family, private property, and the state.* New York: International Publishers.

Engels, F. (1977). *Dialectics of nature.* New York: International Publishers

Engels, F. (1978). *Anti-during.* New York: International Publishers.

Marx, K., & Engels, F. (1970). *The German ideology.* New York: International Publishers.

McLellan, D. (1977). *Friedrich Engels.* New York: Penguin Books.

Enlightenment, Age of

As a historical epoch, "The Age of Enlightenment" comprises the crucial developments of Western civilization in the 18th century. In France, which is considered the cradle of the Enlightenment, this period included the time from the death of Louis XIV (1715) until the coup d'état of Napoleon Bonaparte (1799). But Enlightenment was spread also over Europe, involving a range of developments in Germany, Britain, Scotland, and Russia, and crossed even further over the Atlantic to influence the substantial events in the history of North America. The founding fathers of the United States were devoted followers of either British or French Enlightenment thought.

The Enlightenment is generally known as a broad social, political, cultural, and intellectual movement, which had been the culmination of a longer period, initiated by the Renaissance and Humanism of the 14th and 15th centuries and followed by Reformation and the natural philosophy and science revolutions of the 16th and 17th centuries. This latter era as a whole, including the Enlightenment as its pinnacle, is described as "The Age of Reason." At the same time, the Enlightenment marked a new beginning. New ideas and approaches to old institutions set the stage for great revolutions to come. Politically, this period included the revolutions both in France (1789–1799) and America (1763–1793). In terms of social development of humanity, the Enlightenment marked the decisive turn to modernity, with its ideals of *liberté, egalité, fraternité,* all destined to have been split up into the opposite ideologies of capitalism and socialism; these too are the emanations of the Enlightenment, with their shared goal to transform the human world, even though pursued by radically different means of liberal democracy versus social revolution. In terms of cultural and intellectual paradigms, the Enlightenment marked the advent of the reign of rationality, science, education, and progress. The movement's intention was to lead humanity out of a long period of irrationality, superstition, and tyranny of the Dark Ages (the Middle Ages). Individualism, freedom, and change replaced community, authority, and tradition as core European values. In fact, the Enlightenment intellectuals themselves were those who coined the name for their era and project. They believed that human reason could be employed in order to build a better world. However, the Enlightenment was the age

of reason, which could not eliminate faith as such, despite all its efforts; rather, it replaced the religious faith with the secular faith in reason itself. The essence of the Enlightenment in such a sense was best formulated by Immanuel Kant (1724–1804) in his famous short essay titled "*Was ist Aufklärung?*" (1784), who gave the motto of enlightenment as "*Sapere aude!* Have courage to use your own intelligence!" However, Kant made a distinction between the "Age of Enlightenment" and the "enlightened age," while associating the former with the public and the latter with the private spheres of human life. The full triumph of the Enlightenment principles he could see only in the public.

Intellectually, philosophy can be said to represent the heart of the Enlightenment. The philosophy of the Enlightenment had continued in the belief in a rational, orderly, and comprehensible universe and put forward the claim for a rational and orderly organization of the state and knowledge in a way expressed in the doctrine of Deism. The idea of universal rational order, either found in nature or made in human society, can be seen as the core of this philosophy. Thus, rationalization, standardization, and the search for universal unities are the hallmarks of the Enlightenment. This idea, as applied to social and political order, found its many ways of expression in the "rationalization" of governments in England, Austria, Prussia, and, in particular, in the ideals of the American Declaration of Independence, the Jacobin program of the French Revolution, as well as the American Constitution of 1787. The figure who had become the icon of the age owing to his best representation of such a line of thought was the elitist French philosopher François-Marie Arouet Voltaire (1694–1778). Voltaire had personally served as a counselor to several European rulers in order to achieve the enlightened state of governance. According to him, freedom and tolerance are the companions of human reason. His slogan "*Écrasez l'infâme!*" directed at the traditional Catholic Church and its followers, may serve also as a battle cry against all kinds of human stupidities and for the ideal of a rational society. Voltaire believed in the republic of scholars and in the primacy of ideas in historical evolution. Ideas were for him the motive force. Thus, he became the prophet of progress, which also is the gradual assertion of reason. Voltaire and his rationalistic followers have put much hope in the powers of reason to solve all human problems. One of the most optimistic of them was the Marquis de Condorcet (1743–1794), who in his posthumously published work *Esquisse d'un tableau historique des progrès de l'esprit humain* (1795) provided what can be regarded as the most radical advocacy of human progress based on the power of reason and science in the history of thought. Nonetheless, it was Jean-Jacques Rousseau (1712–1778), the second important Enlightenment philosopher next to Voltaire and his chief adversary, who started to oppose in many respects such overly constructionist prospects, while inclining more to naturalism, which would, eventually, lead to the Romantic movement. Whereas Voltaire insisted on the supremacy of the intellect, Rousseau emphasized the emotions; whereas Voltaire emphasized social, Rousseau emphasized natural forces. The Romantics represented a sort of internal declination within the Age of Enlightenment, which from Rousseau to German thinker J. W. von Goethe (1749–1832) adopted the naturalistic intuition of self-organization and evolutionary forces. The Romantics intuited the unhappy opposition between the naturalness of self-ordering of nature and the artificiality of rational ordering imposed on an organic world. Rousseau even went so far as to advocate a return to primitive simplicity. The modern dualism of culture versus nature has been born with Rousseau, who also applied it to the sphere of education in his famous novel *Émile* (1762).

The idea of universal rational ordering was also implemented in the domain of human knowledge and science. The group of intellectuals calling themselves "*Encyclopédistes*" came up with the idea to bring together all scientific knowledge of all fields in one comprehensive multivolume edition. From this publication, they expected the regeneration of humanity. Denis Diderot (1713–1784) and Jean le Rond d'Alembert (1717–1783) sought the liberation of the mind and education of humanity via the spread of knowledge. Under the editorship of these two, *The Encyclopédie ou Dictionnaire Raisonné des Sciences, des Arts et des Métiers* was published in 17 volumes between 1751 and 1765. The aim of this Enlightenment project was to provide information on every sphere of knowledge and to promote the application of science in industry, trade, and the arts. *Encyclopédie* can be seen as a true manifesto and epitomizing of the spirit of the Enlightenment. In this spirit Baron D'Holbach (1723–1789) wrote his *Systèm de la Nature* (1770), in which he firmly asserted that explanations of nature should not be sought in traditional beliefs or the

"revelations" of the Bible, but through the application of scientific method. The Enlightenment thinkers replaced the universalism of theology with the universalism of scientific conceptions.

Such an approach supported the empirical understanding of human nature in the Enlightenment. Etienne Bonnot de Condillac (1715–1780), the most important French Enlightenment empiricist, believed that moral reasoning was susceptible to the same exactitude as geometry and also identified the association of ideas as the key to the study of human nature. Even though Rousseau and the *Encyclopédistes* succumbed to the idea of a "noble savage," according to himself as well as to Voltaire and many others, there is no such thing as godly created nor naturally given unchanging human nature. Rather, it is substantially and almost completely the product of culture and education, as if humans could mold themselves in an arbitrary way. However, there is a problem with human beings here, since the science suggests the doctrine of determinism, effective also in the social realm. Human beings are not exempt from determination even by their biological makeup, and if we accept the naturalist empirical view that human beings are organized systems of matter, as J. O. de La Mettrie (1709–1751) did claim in his work *L'Homme Machine* (1747), and that our minds are formed as a result of experiences, then we may try to explain human behavior in terms of cause and effect. If we knew enough about the biological makeup of an individual, his early childhood experiences, and the social and historical circumstances he was born into, then perhaps we could predict all of his actions. From this point of view, the idea of free will or the ability to choose is simply the result of or ignorance of all of the causal factors. Thus, the idea of determinism, both natural and social, sometimes understood in a very mechanistic way, gave rise to social engineering and started the reign in the realm of anthropology for centuries to come. This has been regarded as the epitome of a scientific approach to human nature, knowledge of which has had to serve as the guidance for rational human action and the building of the rational social order.

The legacy of the Enlightenment can be seen in the set of ideas centralized around rationality and freedom: To be rational is to be free to pursue the scientific truth wherever it may lead us, and to be free is to be rational in the practical pursuing of individual ends and rights. Liberal democracy has been proposed as the best political framework for such a combined application of reason and freedom. However, the history since the 18th century, and in particular the history of the 20th century, has shown that reason is not always the sufficient guarantee of freedom, and vice versa. Without any charge of antihuman intentions placed against the Enlightenment thinkers, it is historical evidence that the atrocities committed in the post-Enlightenment era have also been backed by both the ideologies of rationality and emancipation. It seems as if the Enlightenment has missed some important point in the nature of human nature. The unbound reason can be dangerously intolerant itself, so the problem unresolved has remained, whether reason can be directed from within or not. Furthermore, another problem has remained open, namely how reason can avoid its inclinations to uniformity and preserve diversity. It seems that liberation from tyrannies of blind dogmas and traditions could not save humanity completely from new rationalistic trappings. Thus, there have been many controversies over the interpretations of the "Enlightenment project." Already in the 18th century and later in the 19th century, the movement of counter-Enlightenment had appeared (particularly in Germany), but only more recently, later in the 20th century, did it become evident that the main currents of Western civilization have their roots in the Enlightenment. Undoubtedly, the Enlightenment occupies a central role in the justification of the movement known as "modernism" as well as the era known as "modernity." However, the substantial critique of such trends, based on the failed Enlightenment concept of instrumental rationality, was initiated by philosophers, such as the Germans T. Adorno and M. Horkheimer, in their book *Dialectics of Enlightenment* (1944). Furthermore, at the turn of the 20th century, a cultural and intellectual movement of "postmodernism," drawing on such philosophers as Nietzsche and represented by the radical critic of the Enlightenment Foucault (1926–1984) and many others, started to invoke the terms "postmodernity" and "post-Enlightenment." This has brought up the controversy of whether the legacy of the Enlightenment is to be preserved and continued or rather reassessed and abandoned. It is by no means clear whether humanity is to turn to the search for completely new ideals, or to return to the pre-Enlightenment era, or perhaps attempt a New Enlightenment, in the style of the "New Age" movement. There are some, such as German philosopher J. Habermas (b. 1929), who

consider the Enlightenment project unfinished and suggest its completion under some revisions. Thus, judging the Enlightenment shows that it can be both praised and blamed for many things to which it has given an impetus for arising in the modern world.

— *Emil Visnovsky*

See also **Kant, Immanuel; Postmodernism**

Further Readings

Dupre, L. (2004). *The Enlightenment & the intellectual foundations of modern culture.* New Haven, CT: Yale University Press.

Gray, J. (1995). *Enlightenment's wake: Politics and culture as the close of modern age.* London: Routledge.

Himmelfarb, G. (2004). *The roads to modernity: The British, French, and American Enlightenments.* New York: Knopf.

Kramnick, I. (Ed.). (1995). *Enlightenment reader.* Harmondsworth, UK: Penguin Books.

Munck, T. (2000). *Enlightenment: A comparative social history, 1721–1794.* London: Oxford University Press.

Osborne, T. (1998). *Aspects of Enlightenment.* London: UCL Press.

Outram, D. (1995). *The Enlightenment.* Cambridge: Cambridge University Press.

Schmidt, J. (Ed.). (1996). *What is Enlightenment? Eighteenth-century answers and twentieth-century questions.* Berkeley: University of California Press.

ENLIGHTENMENT VERSUS POSTMODERNISM

Among the most dynamic and most alarming developments of postmodern culture has been the growth, especially in the United States and the United Kingdom, of what could be called the "skinhead" culture. Beginning in the early 1980s in both countries, this cultural phenomenon was a direct refutation of the cultural and enlightened norms of the day. Its causes were deeply rooted by fears of unemployment among unskilled, White youths and of large-scale, largely non-White immigration, which White youths feared would submerge them and their way of life. It was caused too by a fear that rising technology would marginalize them, since they did not have the skills needed to compete in an increasingly technological world.

The fact that many immigrants, especially from Pakistan and India, were skilled in modern technology, especially computer science (information technology at its highest level) only served to exacerbate the racism that was a blatant part of the youth ideology). Anti-Semitism was also an important part of their beliefs.

According to the Anti-Defamation League (ADL), the skinhead culture was a British import to the United States. The uniform spread as well: usually T-shirts, very close haircuts (hence the term "skinheads"), jeans or overalls, and heavy workboots, which were used as weapons in fights. Their music, called "oi" music, was loud and reflected their racial prejudices. Once such song "The Voice of Britain," as noted by Bill Buford in *Among the Thugs,* described Jews: "They're the leeches of the nation/but we're going to stand and fight." In America, skinhead music as well was overtly racist and nationalistic. In England, the skinheads adopted the Manchester United Soccer Club as their favorite team (although Manchester played absolutely no role in encouraging this development). On both sides of the Atlantic, the skinheads also brought their hatred to bear on sexual minorities, including lesbians, bisexuals, transgendered, and the intersexed.

The tendency of the skinheads to resort to violence was a fact that was not lost on the organizers of the extreme right wing, such as Tom Metzger of the American White Aryan Resistance (WAR), who attempted to use their free-floating hatred to groom skinheads as the new storm troopers of the White Supremacy movement. Metzger founded WAR in 1983. The ADL noted that, "On November 12, 1988, skinheads from the Portland, Oregon, group East Side White Pride, attacked three Ethiopian immigrants with a baseball bat and steel-toed boots. One of the immigrants—Mulugeta Seraw—was killed. Investigation into the murder resulted in three convictions and revealed close connections between the skinhead gang and White Aryan Resistance. The

jury ultimately awarded $12.5 million in damages to the Seraw family ($5 million from WAR; $3 million from Tom Metzger; $4 million from John Metzger; $500,000 from two of the murderers). Upheld on appeal in April 1993, the judgment was one of the largest civil verdicts of its kind in United States history."

Although the lawsuit effectively brought an end to any large-scale organizing that Metzger was able to do, he continued in his role as a leader of the extreme right in the United States. In an update in March 2002, the ADL noted that there were lessons Metzger felt that could be learned from the Palestinian terrorists.

— John F. Murphy Jr.

ENTELECHY

Coined by Aristotle in the 4th century BCE, *entelechy,* or *entelecheia* in classical Greek, originally meant "being complete," or having the end or purpose internally. Two thousand years later, Leibniz found it necessary to reintroduce the term to describe the principle and source of activity, the primitive force, in his "monads," or real, substantial unities. In the beginning of the 20th century, entelechy was again revitalized through the writings of Hans Driesch, who used it to point to an immaterial "thing" that distinguishes the organic from the inorganic. Today, entelechy has come to be associated with the largely discredited or defunct theory of vitalism in the philosophy of biology.

To understand Aristotle's use of this term, it is necessary to see it in relation to two other terms: *dunamis,* often translated as "potentiality," and *energeia,* which is sometimes translated as "activity," sometimes as "actuality." Puzzled by how one can correctly say something like "That is a human," when pointing at an infant or newborn, Aristotle distinguished between a thing's potentiality (dunamis), and a thing's realized potentiality (energeia), that is, what it is or what it is doing relative to a particular potentiality. For example, there is a sense of "human" that is rightly predicated of an infant, since that infant has the potentiality to be a mature human being (i.e., a *rational* animal); likewise, to point to a human adult and say "That is a human being" is correct, since the thing one is pointing at—a human—has the energeia of being a human (again, it *is* a rational animal). Now, what exactly energeia is, and how it is to be distinguished from entelecheia has puzzled not a few. While Aristotle may have come to use the two terms interchangeably, at times at least, he seems to have used energeia to mean the internal *activity* that a thing has (in its primary sense, the internal activity of a *living* thing) when its potentiality has been realized, and entelecheia to mean the *state* of having that potentiality realized. As the Aristotelian scholar George Blair has put it, in a way they mean the same thing, insofar as the referent (say, a mature human) is the same; but entelecheia points to the fact that the human has "humanity" within it internally (as opposed to having it outside it as it would if it were an infant or a small child), and energeia points to the fact that the human has the internal activity of a mature human. For Aristotle, this means having the soul functions of a mature human (for example, self-nutritive, growth, reproductive activities, sensation and rationality).

In his attempt to understand what must be so, Leibniz postulated his theory of monads. We see around us composite substances. Insofar as these are compound, they are made up of simpler substances. What, then, are the simplest substances? What are the most simple things that exist on their own? They cannot be physical or corporeal things, for all physical things, insofar as they have extension are divisible and so are not, by definition, the most simple. Thus, Leibniz argued, the simplest substances must be incorporeal (without parts or extension), metaphysical points analogous to soul. But while they have no quantity, these most simple substances, or "monads" as he called them, must each have their own inner constitutions. If not, there is no possibility of an explanation for the plurality of perceptible phenomena in the world. Thus, each monad has a principle or source of its own distinctive activities within it, its own primitive force, energy, or activity. This principle or source is what Leibniz called a monad's "entelechy." Monads, then, are the ultimate constituents of compound substances. What we perceive are aggregates of these monads. Each monad has, with its entelechy, a corresponding passivity that limits its activities. Taken together, these active and passive principles result in what Leibniz calls "secondary matter," "mass," or "body" and as such is perceptible and resists penetration. What we call "substances" in the

physical world, then, are these aggregates of secondary matter or body, which, in turn, comprise active force (entelechy) and passivity (what Leibniz calls "prime matter"). Each perceptible organic substance is a unity (as opposed to a heap or mere collection of monads), however, insofar as it possesses a dominant monad, the entelechy of which acts as the entelechy of the whole.

Both Aristotle and Leibniz come to speak of entelechy so as to make sense of the world. As such, for both, entelechy is a nonempirical concept. It is not something that can be discovered by experimentation or other scientific means, nor is it meant to explain causal events. For Aristotle, paying careful attention to how we use certain words can show us something about the world we live in and make sense of (i.e., there *are* natures or essences); for Leibniz, in order to make sense of compound substances and the orderliness of the universe, again, something like entelechies must exist. The starting point or question of Hans Driesch, however, was slightly different, as he wondered whether there are events that "cannot be reduced to otherwise known natural phenomena" but are "a law unto themselves and autonomous." His answer, supported by both the results from his experiments on developing organisms as well as by argumentation regarding the compatibility of his ideas with chemistry and physics, was in the affirmative, and this led him to speak (descriptively, he believes) of entelechy as the natural constant and that which differentiates organic phenomena from the inorganic. In essence, his theory of vitalism is based upon two things: first, his observations of certain living creatures able to reproduce their heads and other limbs when cut off and, second, his arguments that the organic being as a whole has certain qualities that are not only not shared by its parts but also are not derivable or reducible to the qualities of any of the parts. What he means by entelechy is just that which the organic whole has that none of its physicochemical constitutents does. Today, Driesch's entelechy and theory of vitalism are held in low repute, but the significance of the differences between the properties of parts and wholes continues to be debated under the title of "emergent properties," "reductionism," and "physicalism."

— *Heidi M. Northwood*

See also **Aristotle; Teleology**

Further Readings

Blair, G. A. (1992). *Energeia and entelecheia: "Act" in Aristotle.* Ottawa, Canada: University of Ottawa Press.

Schröder, J. (1998). Emergence: Non-deductibility or downward causation? *The Philosophical Quarterly, 48*, 433–452.

Environments

The relationship between culture and nature is on assault on many fronts. Researchers argue that environmental degradation is the single most important problem affecting the quality of life across the globe. Author Manjara Mehta quotes from her research on environmental change and gender in the Himalayan Valley: "Our lives are no different from that of our buffaloes." The meaning of this becomes clear when we address the reliance on the physical environment for all of our needs. In a slightly different context, the following passage illustrates this intricate connection and daily struggle for survival. "She walked her daily path to the river. When she arrived, she noticed the water looked different today. A bit cloudier than the day before. The sun was shining and it was incredibly hot. The dry season was approaching and the need to store water was more important than ever. With each day, the presence of clean water became more and more vital to the survival of her family. She took what she needed from the river and headed back to her village. The water would suit her needs for today. She would be able to cook, clean, bathe, and drink from the water she collected every day. However, with the uncertain condition of the water, she had no idea of knowing what effects may result from its consumption. Her family's survival depends on their ability to use and consume clean water. The reliance on this resource directly connects her to the physical environment." This brief vignette only scratches the surface of the human-environment relationship. The mysticism and complexity of the natural environment has often been associated with women. In many cultures, women are responsible for the everyday maintenance of the family and community. Much of this responsibility relies on their daily interaction with the physical environment. The connection

between gender and the environment is but one area where culture plays a role in understanding environmental issues.

Assessing the state of the physical environment is an important factor toward a clear understanding of the cultural and social problems of a society. The environment is not simply a space for cultures to grow and emerge but also serves to provide necessities and natural resources vital for a culture to survive. When environments are out of balance with the life they are supporting, problems emerge. Ecologically, habitats achieve and try to maintain equilibrium in order to continue to function. When systems are stressed, levels of natural resources and vital support for animals and humans become impacted. The idea of maintaining equilibrium can be better understood through the concept of carrying capacity and population. Carrying capacity relates the maximum population an environment can support while being able to support that population. When an environment exceeds its carrying capacity, the population can no longer be adequately supported. This results in a decline in available resources and other problems for the population. This ecological description can be translated to human culture as well.

As important as it is to recognize culture as primary in anthropologic studies, it is also important to reference the physical environments that support various cultures. The natural environment shapes and influences global cultural development. Each aspect of culture is impacted by its natural surroundings. From dress to diet, the environment determines what resources will be available for cultural development.

Both environmental anthropology and environmental sociology have emerged as subfields within their respective disciplines to address the role of the environment from both social and cultural aspects. A key point addressed in each field is the relationship that humankind establishes and maintains with the physical environment. Research questions range from discussion of pollution, resource extraction, and desertification, to social concerns of human rights through environmental justice struggles, occupational health and safety, and the environmental movement. The role of the physical environment must be considered in each of these research areas. Problems affect different environments in various ways. Environmental problems span the range of natural environments, including but not limited to tropical rain forest, savanna, desert, temperate, and arctic regions. The following serves as a brief introduction to different ecological areas.

Ecological Types

Ecology is the science that encompasses the study of how organisms interact in and with the natural world. Darwin emphasized the conditions of the struggle for existence and identified the complex relationships through ecology. Throughout his work, the physical environment's influence on the biological condition points to the importance of understanding both dimensions.

Understanding how physical environments are classified helps to make sense of environmental interactions. A biome is a major ecological region within which plant and animal communities are broadly similar in terms of general characteristics and relationship to the physical environment.

Tropical Rain Forest

The biome closest to the equator is distinguished by exuberant plant growth in response to year-round rainfall. The tropical rain forest is marked by little variation in day length or seasonal change. Tropical species may only be found in specific areas of the rain forest; however, it is the greatest space for species diversity. Two of the primary ecological problems facing this region are loss of rain forest due to clear-cutting and loss of species diversity.

The need for open grazing land has led to the disappearance of thousands of acres of rain forest. Worldwide consumption of dairy and meat has led farmers and industry to expand the areas needed for grazing cattle. In addition, demand for resources harvested from the rain forests has also increased. Besides the obvious effects, including loss of habitat for native species, elimination of the rain forest canopy may contribute to global climate change. Researchers note that loss of tree coverage reduces the planet's ability to absorb carbon dioxide burned from fossil fuels. This in turn adds to the increase of greenhouse gases that have been documented to cause an increase in global temperature.

Savanna

The savanna is characterized by extreme rainy and dry seasonal change. This bioregion experiences very heavy summer rain and very dry winters. The terrain

shifts from woodland areas with grass to open grassland spaces and deciduous trees.

Some argue that the savanna did not derive from natural processes but from human fire. Following this explanation, the savanna is the oldest human-shaped landscape. The history of environmental problems can begin with this transformation of the natural landscape. Even seemingly natural terrain change can be traced back to human intervention.

Desert

Desert landscapes are found in two primary global locations. Desert landscapes mark both the subtropics, through high-pressure atmospheric conditions, and the mid-latitudes. Found in continental interiors, deserts vary from no recordable rainfall per year to an annual rainfall of 4 to 12 inches. Vegetation in the desert varies from shrublike plant life to cacti and succulents. These plants are able to store moisture for long periods, allowing a high survival rate despite dry conditions. Because of their extreme conditions, desert environments are not able to sustain much in the way of animal or plant life. The desertification of the Earth's other bioregions through erosion, clear-cutting, and resources extraction is of global concern. With once fertile regions becoming desertlike, the opportunity for cultures to sustain themselves agriculturally substantially decreases.

Temperate

Temperate zones, once found 30 to 50 degrees North and South latitude, are marked by warm summers and cold winters. Environmental issues that affect this area include but are not limited to deforestation. Deforestation remains the primary issue altering the landscape in this region. Much of the woodland forest cover that once characterized this region has been removed. Our demand for natural resources found in this region continues to grow. Cultural reliance on lumber as a construction material is but one example of resource extraction.

Arctic/Tundra

Known as the tundra biome, this region is characterized by a seasonal temperature that does not exceed 50 degrees Fahrenheit. In addition, most of the area is underlain by permafrost, or permanently frozen ground. Often referred to as the frozen desert, the tundra environment does not offer a variety of animal or plant life. Environmental problems that face this area are similar to those of the desert landscape. The ground is such that it is unavailable for agricultural use. Lack of available water and food create a challenge for any sort of sustainable use of this region.

Because there is not much human activity in this region, resource extraction in vast open spaces is another problem facing this area. For example, the controversial push to explore oil-drilling options in Alaska without a full understanding of the range of use or consequences of drilling characterizes the issues facing the region.

Problems and Solutions

Marked by the first Earth Day, 35 years ago, the environmental movement has developed from a mere acknowledgment of environmental issues in the United States to a global phenomenon. The environmental movement is charged with spreading awareness and working toward solutions for issues facing the environment. Those working within the environmental movement work both sociologically and culturally to promote environmentally friendly policy worldwide. Some key issues facing the global environmental challenge are the development of risk assessment to measure global environmental and societal impact, defining sustainability and developing global environmental policy, and understanding environmental impact in terms of population and technology.

Understanding Risk Assessment

Risk assessment is often used in environmental science to determine risk and calculate possible exposure costs. It is considered somewhat problematic in that many times true risk cannot ever be known. This is the equivalent to trying to calculate the future or probability of certain events happening. For one, individuals have different biological responses to environmental exposure. It would be difficult to say that the same affect would occur each time an exposure response was measured. Political and medical responses to risk will not be the same across populations or cultures. How do we ensure that societies will take measures to ensure the safety of their citizens if risk is left to interpretation? Some may consider a certain event a public health risk, while others may not—leaving populations with different levels of vulnerability.

Uncertainty of the risk outcome is a natural part of this process, and it is something even the most diligent scientific methods can get around. Risk assessment is still our best guess many times. Risk assessment is defined as identifying hazards and calculating adverse consequences, while risk evaluation is the process of determining acceptability of defined risks in order to guide policy decisions. Some questions that must guide our thinking in risk perception include the following: What are some ways of locating risk? How do we identify hazards to humans? How do we calculate acceptable risk in terms of human and nonhuman life? How is scientific knowledge contested? How do members of a community know they are safe or at risk? How do they identify risk and feel safe?

The sociological perspective of risk includes the modernization of a risk society, organizational behavior, and institutional response to risk. The human context in which perceptions are formed involves how constructions are filtered through lenses by social and cultural meanings. For example, research in institutional and technology addresses "normal accidents," or the routine failure of organizations, as well as institutional failures. In essence, this argument claims that accidents are normal and that the relative probability of their occurrence should simply be accepted in society. We should not be surprised at their happening. Other theorists claim that accidents are preventable depending on the quality of leadership and the priority that prevention takes over capital accumulation and profit making.

Sustainability and Global Environmental Policy

In an effort to stall the current rate of environmental degradation, current policy development is guided more and more by the idea of sustainability. In some sense, this is problematic because the definition of sustainability is rarely agreed upon. Generally, sustainable development entails development practices that consider the availability of current resources levels and consider future use of these resources for generations to follow. Resource use and extraction becomes a primary focus in policy design. Many feel that as a society we have exceeded our ability to correct or even attempt to stall the problems that we already face, while others feel that the state of the environment has been overreported as negative and our real conditions are not as bad as once thought. Either way, knowing that much of our resource use is based on the extraction or processing of nonrenewable resources is cause for concern. There have been small strides to address this through the development of alternative fuels, renewable energy, and hybrid vehicles; however, consumption patterns have not changed enough to see that these efforts make an impact yet.

Population, Technology, and Environmental Justice

Issues of population, technology, and environmental justice connect to form an important aspect of the human cultural/environment relationship. Global population is ever increasing, causing more and more strain on the physical environment's ability to sustain human, nonhuman, and plant life. The carrying capacity of the Earth is a formulaic determination that considers population density and available resources for an absolute level of survival. If the population exceeds this level, problems such as disease and starvation, among other things, may occur. One such formula to determine environmental impact is known as IPAT or environmental impact = population × affluence × technology. This takes into account the relative level of consumption, population density, and technological promise of a designated area. Determining environmental impact in this way can assist decision makers when they need to consider potential affects of development projects or environmental legislation.

The environmental justice movement emerged in an effort to protect the rights of citizens to live in a healthy, safe setting, free from environmental toxics. Since the 1980s, global strides for environmental justice have focused on the presence of chemical contaminants in communities. Contaminants range from airborne pollution output from nearby factories to the presence of chemical toxins found in soil. Much of the work in the environmental justice movement has been centered on marginalized populations such as minority groups, women and children, and working-class and impoverished members of society.

Work in the environmental justice movement began in the southern region of the United States, where African American communities were carrying the burden of chemical pollution as compared to Caucasian communities. Research in this area has drawn controversial conclusions, but does show a statistically significant correlation between location of chemical waste and race. A similar relationship exists between chemical pollution and class.

Classic works in this area stem from Rachel Carson's alert in the 1962 publication of *Silent Spring*. Following that call to action, environmentalists began

to recognize the potential problems of chemical contaminants. Love Canal, in Niagara Falls, New York, served as another wake-up call to communities. Citizens were made aware that chemical contaminants resided in the soil, silently existing among them. Lois Gibbs describes her struggle for recognition of the problem and relocation in her 1982 book *Love Canal, My Story.* Other works in environmental justice include Bullard's account of environmental racism in *Dumping in Dixie.*

Today, environmental justice research spans the globe. Development issues in peripheral nations have emerged as primary in the fight for global environmental equities. As basic as they may be, the fight for the right to clean water, available fertile land, and disease control encompasses much of the global environmental struggle.

The degree to which we concentrate on the preservation of our natural environment will inevitably determine how cultures progress into the future. Culture and environment are inextricably connected. We need to preserve the balance between our human footprint and the natural world. This relationship must be recognized in order to curtail the current path to environmental degradation that is seemingly inevitable.

— *Erin Elizabeth Robinson-Caskie*

Further Readings

Bullard, R. (2000). *Dumping in Dixie: Race, class and environmental quality.* Boulder, CO: Westview Press.

Carson, R. (1962). *Silent Spring.* Boston: Houghton Mifflin.

Cutter, S., Renwick, H. L., & Renwick, W. (1991). *Exploitation, conservation, preservation* (2nd ed.). New York: John Wiley.

Gibbs, L. (1982). *Love Canal: My story.* Albany: State University of New York Press.

Hannigan, J. A. (1995). *Environmental sociology: A social constructionist perspective.* New York: Routledge.

Humphrey, C. R., Lewis, T. L., & Buttel, F. H. (2003). *Environment, energy, and society: Exemplary works.* Belmont, CA: Wadsworth.

Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (Eds.). (1996). *Feminist political ecology.* New York: Routledge.

Townsend, P. (2000). *Environmental anthropology: From pigs to policies.* Long Grove, IL: Waveland Press.

Wilson, E. O. (1988). *On human nature.* Cambridge, MA: Harvard University Press.

GLOBAL WARMING

Global warming is the term used by scientists to describe changes in the climate of the Earth involving increasing temperature. The Earth's climate has become 1 degree Fahrenheit warmer in the past 100 years. The exact reasons are not known by scientists, but their working hypothesis is that it is due to human activity.

Changes in the Earth's climate occur naturally. Not longer than 14,000 years ago, the Earth was experiencing the latest of the planet's Ice Ages. Millions of years before that, it had experienced a much warmer climate. The changes in Earth's climate today are an important research area, as scientists seek to understand whether global warming is mainly a natural or human-caused phenomenon.

Earth's atmosphere is composed of a number of gases: nitrogen, oxygen, carbon dioxide, water vapor, argon (an inert gas), methane, varying amounts of ozone, and other gases such as nitrous oxide. These gases retain energy from the sun and cause the "greenhouse effect," which is a natural phenomenon of the Earth's atmosphere. Without this effect, the biosphere of earth would not exist because the Earth's climate would be too cold.

Global warming is believed to be caused by variations in the quantity of these gases and the amount of energy from the sun that is trapped in Earth's biosphere and atmosphere. For example, the more plants there are, the more carbon dioxide will be locked out of the atmosphere. Potentially, with enough plant growth, the climate could become cooler.

Human energy consumption since the beginning of the Industrial Revolution has caused vast quantities of wood and fossil fuels—coal, oil, and natural gases—to be burned. This activity has increased the amount of carbon dioxide in the atmosphere. As a consequence, the increased carbon dioxide levels are believed to have caused the increase in the temperature of Earth's climate.

An increase in global warming means changes in the climate are occurring that can have significant effects upon both nature and humans. Global warming is melting glaciers. It is raising sea levels

in coastal areas and threatening sea life in estuaries and coastal dwellings. It heats the oceans, increases the size of storms such as hurricanes, and shortens winters and prolongs summers.

Global warming threatens humans by increasing drought in some areas, endangering human health with heat stress, and threatening food supplies. The effects upon nature can be catastrophic, even involving the disappearance of whole species.

— Andrew J. Waskey

Environmental Philosophy

Environmental philosophy is a branch of systematic philosophy that started addressing the global environmental situation in the second half of the 20th century. Environmental philosophy appears as a philosophical reaction to the worldwide deterioration in the environment and to its partial analysis by biologic and system sciences. This is, for example, a reaction to the general system theory (L. von Bertalanffy); new ethic and axiologic challenges of the so-called Earth ethics (A. Leopold); the first studies of the Roman Club authors (*The Limits to Growth*, 1972); and, indirectly, older concepts of life philosophy (H. Bergson) and process philosophy (A. N. Whitehead). The most influential forms of environmental philosophy comprise ecosophy, that is, the deep ecology (A. Naess); various forms of environmental ethics (J. B. Callicott, J. Passmore, C. E. Haergrove); and social ecology (M. Bookchin). Development of this philosophy is supported by the annually published studies (State of the World) of the WorldWatch Institute in Washington, D.C.

Even though the deep ecology and ecologic ethics achieved decent popularity due to their emphases upon the nonanthropocentric values and upon changes in the orientation of life from nature control and property amassing toward inclusion of man into the biotic community, they are weak in their insufficient ontologic anchoring. The systematic ontical conflict between culture and nature hasn't been clearly philosophically formulated yet, and therefore it hasn't also been accepted as the currently most serious philosophical problem. Except for evolution ontology, the relationship between culture and nature hasn't become a part of a wider philosophic ontology. The general public still lacks a generally understandable philosophical concept of the global environmental crisis, but there hasn't yet been processed the necessary ontological minimum for its understanding.

Philosophical analysis of the global environmental crisis requires interpreting man, nature, and culture from the viewpoint of the evolution ontology. This viewpoint implies that the current people, who appeared on the Earth at the very end of the Tertiary period, cannot be the climax and meaning of the natural evolution of the biosphere. The unfinished evolution of the life on the Earth still faces a few billion years of future development: It is hardly directed toward any climax, and therefore it cannot culminate in any biologic species. All of the currently living species, including the oldest ones (e.g. bacteria), are mutually interconnected, functionally cooperate, and complement one another, but they also fight each other, because many survive at the expense of the others. Therefore, the currently living individuals, populations, and species, as temporary elements of a higher system of life on Earth, establish the conditions for a slow evolution of the biosphere and, consequently, also for a comparatively stable frame of the human culture's existence and development. Because man, as the first biologic species, has succeeded in starting a cultural revolution, it is apparent that this species' peculiarity isn't based only in speaking ethnic languages, thinking, acting morally, learning, and believing. This peculiarity is best expressed in the thesis that man has established himself on the Earth as the second ontically creative force, *as a small god, as an originator and creator of the nonbiological system of the culture.*

If the natural biotic evolution cannot culminate in man, then even the culture, which is a human product, cannot be a continuation of the natural evolution of life. The system of the culture, which originates within highly organized live nature and draws its nourishment from this nature, must be established in conflict with the natural biotic order. It is an artificial nonbiologic system with dispersed internal information. This internal information cannot really be the biotic genetic information, integrating the biosphere, but the ethnic-language-encoded epigenetic information, the neuronal–spiritual culture. Similarly to the biosphere, the human culture is an open, nonlinear system integrated by internal information. Only

when we are able to understand that the spiritual and material cultures belong to each other and that they establish a functional system of the particular culture will we be able to correctly understand not only the role and character of the spiritual culture but also the conflict between the culture and nature. Nevertheless, until the appearance of the global culture of the current technical and consumer type, we couldn't have known anything specific about the character of science, philosophy, and other ideas and values of the spiritual culture. Only now are we starting to realize that our spiritual culture isn't as grand and magnificent as we had believed: It is significantly antinatural and anthropocentric.

Thinking about evolutionary ontology, you can quite easily see that there are just two basic means of origination and maintenance for all current systems and structures: The first means is represented by the natural evolution of nature, and the other is the man-generated evolution of the culture. Disagreement and conflicts between these two creative processes are the roots of the current global environmental crisis. Culture can rearrange and newly shape the highly organized surface of the Earth only by breaking the original natural order, destroying a part of the creative work of the natural evolution, of the capitalized God. Putting it less poetically, the more culture—cities, motorways, fields, cars, and computers—the less nature—rain forests, biological species, and human physical and psychical health.

Only in this context is it possible to understand the impact of the knowledge that man is not just a thinking observer of the surrounding world, but a highly active animal species who is the only one to temporarily manage to deceive the biosphere and, within this biosphere, to start one more still life-dependent but structurally different and ontically constitutive process: the antinatural cultural evolution. We are discovering that this evolution started not only a remarkable human epoch but also a sad period in the Earth's history. Expansion of the systems and structures of the cultural existence results in the suppression and disappearance of the natural existence and causes the sixth stage of the mass extinction of species. Since the cultural evolution rather quickly spoiled the Earth, we are currently facing not only the problem of an adequate theoretical understanding of the substance of this process but also the serious ethical problem of human responsibility and guilt for the lost natural order.

Formally, a simple thesis of the evolutionary ontology, stating that the global environmental crisis is a physical conflict between human culture and the Earth and that culture is the endangered species, shows quite explicitly what is endangered and partially even what should be done about it. For example, there is no point in trying to change human nature. Human nature is as old as man himself, as the culture. It is biologically (genetically) fixed, and we cannot and must not change it in the course of a short time. Also, the Earth's nature (biosphere) as a system that is a part of the universe and that has been established in the course of billions of years cannot be really adapted to human culture, that is, to a comparatively young, dependent and temporary structure (existentially dependent on man). At this civilization crossroads, there is therefore probably only one direction for the future positive development of the culture: an effort to build a biofile culture that would carefully guard the Earth's fitness for habitation.

The secret of the human cultural rise was once connected with the fact that man as a species was able to change the type of his adaptation in a comparatively short time. Possibly under the pressure of extreme external influences, man switched from the prevalence of adjusting his own biological structure, which is slow and genetically limited, to an aggressive adaptive strategy, to an intentional transformation of external environmental conditions. These days, though, this highly efficient strategy, which has included human claim of the whole Earth, has met its own finality.

Yet strategy is just the means, not the ends. Even very different strategies can be equifinal (i.e., they can reach the same goal). Therefore, if we don't want to become prematurely extinct, along with other endangered species, we will have to change the adaptive strategy type, once again. It's an advantage that this time the circumstances make us change something that we can really change: the type of the adaptive strategy of the culture. All of the current culture, as a human-made system that has mostly aggressively adapted nature, pushed her back, reduced, and transformed her so that she would comply with the expansionist claims of his little-adaptable antinatural structure, must turn to an opposite adaptive strategy: to its own adaptation to nature by means of internal organizational transformations without any further growth. This culture can save its indispensable host environment only by making way for nature,

only by a biofile transformation of its spiritual and material elements.

Spatial expansion of the material culture elements, which are as objective and spatial as the animate and inanimate nature elements, proceeds only by the culture's limiting or destroying the original natural order. Even though slow-developing culture was advantageous for man (for example, the first cities were rather suitable for easier meeting of cooperating people), the fast-expanding technical civilization is becoming dangerous: It expands too radically the biologically adverse, artificial environment and a differently structured sociocultural space.

The culture-nature conflict doesn't, therefore, culminate either by the "failure" of man or by the "failure" of culture. Quite the contrary, it culminates due to the successful growth of the current antinatural culture, the planetary interconnection of the originally local human cultures. Dispersed, regionally specific cultures, which still prevail in this world, push nature back slowly and invisibly, and therefore the crisis, whose substance we cannot directly see, originates as a result of the decline in naturally organized structures, locations, and regions of the finite surface of the Earth. This crisis originates as a result of a dangerous extinction of the original, man-homogeneous, natural existence. And because the devastation of the Earth's natural order is not just a limited and accidental but a global and dominant result of the cultural spatial expansion, it follows that it is necessary to philosophically consider not only what culture brings to man in the current, narrowly intellectual meaning but also what it brings in a perspective, biological outlook: by radically changing the Earth, natural ecosystems, and the way of humans living within the culture.

The biosphere, as the only earth-based system capable of an independent, long-term existence and evolution, is currently in the state of a critical dynamical imbalance. The biological species extinction rate is about 1,000 times faster than the natural extinction rate. And since an open, nonlinear Earth system is not subject to mechanic causality, even a small impetus could turn it into a new, unbalanced state. We are almost certain that this planetary system, which is capable of self-regulation, will "sacrifice" most of the current higher life forms to maintain its own integrity in new conditions because these life forms will not be currently needed.

Even though this "allergic reaction" of the biotic system of our planet is generally caused only by the human species, we can see a certain, higher, and abstract justice in the fact that even this species is subordinated to the unforgiving logic of maintaining the stability and integrity of life. Man becomes an endangered species. For the first time in history, man and his culture are endangered by their maternal planet environment, which had nourished their rise a long time ago. The central topic of philosophic thinking, which was astonishment in the Antique period, humility in the Middle Ages, and doubt in the Modern Times, is slowly turning toward the feeling of responsibility and guilt.

The conflict between culture and nature has also its gnoseologic roots, connected with human knowledge. All of our conceptual interpretations are influenced by our interests, not only by the individual and group ones, as generally accepted, but also by the generally human ones and species-selfish that aren't usually much talked about. Nature has always been for us just what our conservative biologic equipment has mediated to us in the particular historical era and what part of the external reality we have understood due to our forefathers, training, and education. Not even man as a species learns primarily for the purpose of enjoying the truth, but mostly for the purpose of his own active (aggressive) adaptation to nature by means of culture.

Each particular piece of knowledge about a live or a cultural system (every information revealed within the environment) is not just information about external reality but also an attempt at reconstructing its structure. Learning is possibly ontically creative; it occurs in order that an ontically active system could use it for its own survival, reproduction, and evolution. Therefore, within live or cultural systems, the information acquired from the environment can not only be inscribed and compressed into their internal memories, it can also be retrieved and embodied in ontical structures (in biotic or cultural structures). Considering the similar ontical functions of learning, both the live systems and culture grow in an analogous way: Elements of the external environment are included in their own systems, their learning is materialized, and their own internal information is ontologized. And we could even extend this analogy: The natural biotic knowledge, which is inscribed in the genetic memory, divides the terrestrial nature into animate and inanimate sections; it integrates the

biosphere and provides for its evolution. Social-cultural knowledge, which is actually inscribed in the human neuronal memory (in the social-spiritual culture), even without drawing any attention, ontically divides the Earth: into the culture and nature. It integrates the culture, and for the time of the human existence, it participates in its evolution.

Yet despite this similarity, the most important fact still remains hidden. Knowledge of a particular system arises for the purpose of allowing this system's existence, adaptation, and evolution. Contents of the biotic learning is objective to such an extent that it was able to participate in the biosphere creation, the ontical layer of reality interconnected with the abiotic universe by means of substance and energy. By animating some inanimate terrestrial structures, the natural biotic evolution establishes emerging live systems compatible with the evolutionally older processes and structures of the Earth. Even though the social-cultural knowledge whose growing objectivity and exactness were the bases for the Modern Age culture provided for the origination of an emerging ontical layer of the terrestrial reality (culture), the abiotic structures of the culture (for example, the micro-electronic technics) were only pseudoanimated. And worse, so far, they cannot be channeled in the direction of life, but only against it.

Therefore, we have to try to establish the biofile planetary culture that we couldn't have built directly due to our biologic settings, on the basis of our negative experience with the antinatural culture, on the basis of a theoretically sound reconstruction of the current, spontaneously originated culture. The character of this historically unprecedented task implies that its solution can be started only with the help of an adequate ontological increase in wisdom of the philosophy proper, only with the use of a theoretically competent and publicly comprehensible understanding of the crisis. And such a transparent view of the terrestrial existence, an ontological and axiological minimum adjusted to the current world, is needed because the environmental transformation of the culture must proceed both from above and from below, by means of coordinated professional and civil efforts.

— *Josef Šmajs*

See also **Culture Change; Ecology and Anthropology; Gaia Hypothesis; Globalization**

Further Readings

Bookchin, M. (1981). *The ecology of freedom.* Palo Alto, CA: Cheshire Books.

Capra, F. (1982). *The turning point.* New York: Simon & Schuster.

Devall, B., & Sessions, G. (1985). *Deep ecology.* Salt Lake City, Utah. Peregrine Smith.

Gore, A. (1992). *Earth in the balance.* New York: Houghton Mifflin.

Neass, A. (1989). *Ecology, community, and lifestyle. Outline of an ecosophy.* Cambridge: Cambridge University Press.

Skolimowski, H. (1992). *Living philosophy: Eco-philosophy as a tree of life.* London: Arkana.

Smajs, J. (1997). *The threatened culture.* Presov, Slovakia: Dobromysl & Slovacontact.

ENVIRONMENTAL ETHICS

Environmental ethics has been a strong part of the movement to save our environment since its debut in the culture wars of the 1970s. The debate has pitted two equally committed and partisan groups. On one hand are those who view the environment as a field for greater development for the benefit of mankind, as well as a source of increased economic profit. On the other are those groups, like Greenpeace, that feel the environment is a treasure, which must be handed down to later generations pristine and untouched. Most times, such debates have been carried on in reasonably restrained conditions and in acceptance of the other side's point of view. Yet, as the riots in Chile at the meeting of the World Trade Organization (WTO) in 2004 attest, the dispute can become violent. In February 2005 (not for the first time), the debate became deadly.

On February 12, 2005, Sister Dorothy Stang, 73, a nun in the Roman Catholic order of the Sisters of Notre Dame de Namur, was murdered, shot six times at close range as she read from her Bible. She was killed in Anapu, Para State, in Brazil. Serving in Para since 1972, she had carried on a campaign

against the logging magnates who had sought to reap a windfall profit from the vast reserves of timber in the Amazon region of Brazil. In doing so, they had intimidated—and even killed—both environmental activists and those who sought to defend them. It was 16 years earlier that the native Brazilian activist Chico Mendez had also been slain by the loggers.

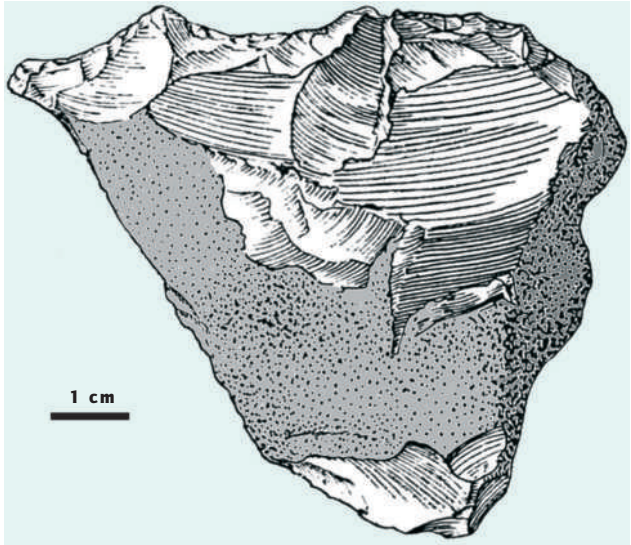
According to Greenpeace, "Para is the Amazon state with the highest murder rate related to land disputes. Some 1,237 rural workers died in Brazil from 1985 to 2001 and 40% of these occurred in Para." Sister Stang's murder had taken place only days after her meeting with Brazil's human rights secretary. While believed to have been on "death lists" for years, Sister Stang had courageously continued her work defending the Amazonian environment and those people who were being terrorized by companies determined to exploit the Amazon at all costs.

As an answer to the outcry following Sister Stang's assassination, the president of Brazil, Luiz Inacio Lula de Silva, sent 2,000 troops of specially trained jungle infantry to restore order in the region. Also, in order to preserve the natural resources for which the nun had been killed, he ordered the creation of two large protected areas, hopefully to be secure from the uncontrolled logging of the past.

— John F. Murphy Jr.

Eoliths

Eoliths are chipped flint nodules formerly believed to be the earliest stone tools dating back to the Pliocene (in modern terms, a period dating from 2 million to 5 million years ago). These were regarded as crudely made implements that represented the most primitive stage in the development of stone tool technology prior to the appearance of Paleolithic tools, which show definitive evidence of standardized design and manufacture by humans. Given their crudeness, eoliths were considered barely distinguishable from naturally fractured and eroded flints. This led to heated debates between prehistorians and geologists at the end of the 19th and beginning of the 20th centuries about whether or not eoliths did indeed represent human artifacts.



Flint eolith discovered by Benjamin Harrison from the Plateau gravel at Ash in Kent, England

Source: Adapted from K. P. Oakley (1972) *Man the Tool-Maker*. London: Trustees of the British Museum (Natural History).

Benjamin Harrison, an amateur archaeologist and naturalist, collected the first eoliths in 1885 while exploring the Chalk Plateau of Kent in southern England (see figure). With the publication in 1891 of Harrison's discoveries by the eminent scientist Sir Joseph Prestwich, eoliths were widely accepted as the earliest known stone tools. A previous report of primitive stone tools from the Miocene of France by Abbé L. Bourgeois in 1867 had already been discounted. The term *eolith* (from the Greek *eos* + *lithos*, "dawn stone") was first coined by J. Allen Brown in 1892. Further discoveries of eoliths were made during the early years of the 20th century by J. Reid Moir below the Red Crag of East Anglia, England, and by A. Rutot and H. Klaatsch in continental Europe. The occurrence of eoliths in Western Europe provided confirmation that humans had occupied the region prior to the oldest known fossil finds. This was important evidence that helped contribute to the acceptance of the fossil remains from Piltdown in southern England as early human ancestors. These latter finds were described in 1912 as a new species of extinct human, *Eoanthropus dawsoni*, but were later found to be a hoax.

In 1905, the French archaeologist M. Boule published one of the earliest critiques of the authenticity of eoliths, claiming that it was impossible to distinguish between intentional chipping of flints by humans and damage caused by natural phenomena. This view was substantiated by S. Hazzledine Warren, based on his experiments and observations, which demonstrated that eoliths can be matched exactly by stones chipped as a result of geological processes, such as glacial movements. The debate continued into the 1930s, but support for the artifactual nature of eoliths in Europe waned with the accumulation of a wealth of evidence from geology and archaeology to show that eoliths are consistent with rocks that are naturally fractured, as well as the discovery of undoubted simple stone tools of late Pliocene age in Africa (i.e., Oldowan tools) associated with the earliest members of the genus *Homo.*

— *Terry Harrison*

Further Readings

Klein, R. G. (1999). *The human career: Human biological and cultural origins* (2nd ed.). Chicago: University of Chicago Press.

Oakley, K. P. (1972). *Man the tool-maker.* London: Trustees of the British Museum (Natural History).

Eskimo Acculturation

The indigenous Arctic peoples are the *Yuit/Yup'ik* of Siberia and Alaska, the Inupiat of Alaska, and Inuit of Canada, Greenland, and Iceland; they have also been generically called *Inuit.* The term *Eskimo* is a name derived from an Algonquin word meaning "to eat it raw" and has been considered by many Arctic people to be an uncomplimentary name, much like the term "Indian" for the indigenous peoples south of the Arctic Circle. From ancient times, these people of the north lived a nomadic to seminomadic lifestyle, which was close to nature, in harmony with their unique environment, and aware of the seasons and the subsistence that was available throughout the year. Survival-appropriate technology was the way of life, and whatever was hunted or gathered was completely utilized, and there was little if anything wasted; for example, walrus intestines were dried and made into waterproof clothing. Their religion was animistic; their belief is that all creation, whether animate or inanimate, has souls, and thus all creation is to be treated with respect and to share a good life.

When the Europeans arrived and exercised their more dominant technology, a disruptive acculturation was attempted to bring about the evisceration and absorption of the Inuit culture. Due to the remoteness and harsh winters, many of the Arctic people did not experience European "conversions" of their homeland until the 20th century. Whether the colonization of the "White men" came in the 1720s, as experienced of the Inuit in Greenland by the Danish, or in 1950s, by the Inuit of Alert Bay, the result has been similar to their culture and environment. The changes that occurred became forms of cultural genocide as the acculturation oppression of the gamut of cultural expression ensued as follows: Drum songs and festivities were outlawed and replaced by Christian music and holidays; the separate accommodations of men's houses and the women and children's houses ceased; the sharing of wives to create a kinship between families stopped; the nomadic lifestyle was replaced by permanent housing; the semi-submerged houses were replaced by drafty houses, requiring oil to heat and money to pay for the oil; "good Christians" didn't have tattoos and labrets, and so they were prohibited; the hierarchies ceased as a result of the declining numbers due to infectious diseases, with which shamans were ill-prepared to deal. The respect of animals' spirits was replaced with Christianity and the medical system, since the missionaries threatened eternal sanctions against all those who professed or practiced a faith in anything outside the religious confines of the church; the ravages of alcohol created ripples of pain and sorrow throughout the indigenous people's lives and communities, as they struggled to adapt to these foreign ways while their world was constantly changing, on multiple levels at an incredible speed. The contacts and settlements of Euro-Americans and the enforcement of "civilization" tactics on the northern aboriginal people have come full circle as these indigenous people have learned to defend their aboriginal homeland and rights in the political arena, bringing about beneficial changes like the Alaska Native Land Claims and the Land Claims Agreement in Canada.

Their traditionally remote homeland has been exposed to the modern luxuries and conveniences of

life that is much different than what is within reach in the Arctic regions, training them in the mercantile tradition of commerce, first by trade and trading posts, and then within the newly formed cities; as well as myriad catalogs and magazines, the radio and television brought the world to their living room; and finally the Internet is bringing the Inuit's culture and products to the world. What will be the culmination of cultural ancestry and the impending conglomeration of a working-class identity for the Arctic peoples?

Religion Enforcement and Consequences

The missionaries, shocked by the lifestyle of the "Eskimos," brought the greatest changes to the lives of these Arctic people, which attacked the very core of their lives: their spousal exchange, the practice of polyandry and polygyny, and the practice of families only living together when they were at camp and not at their villages. To remedy these situations, missionaries were known to arrive at a camp or village and quickly marry the couples who were together in bed, whether or not the couples were already traditionally married or intended to marry, and announce that these "Christian" marriages were binding. The next step was to abolish the gender-separate living quarters; their semi-submerged houses were abandoned as planks and shipped in to make houses the missionaries felt the "Eskimos" should live in. These turned out to be little one-room homes, occupied by usually more than one family. This sudden rearrangement brought much confusion and unhappiness to those who felt that their traditional way of life was better.

In the gender-separate living quarters, the young women shouldered many of the daily activities as they were being instructed by their female elders. Like many aboriginal communities, the children were tended to by all of the women, but especially instructed by the elder women. This system gave time for the younger women to learn the responsibilities and knowledge of all the survival skills prerequisite to living in the Arctic environment. The relocation of young Inuit families in Canada to work on the railroads and mines disrupted the traditionally honored training system. This degeneration of the societal fabric was observed and reported by David S. Stevenson in his study of the *Problems of Eskimo Relocation for Industrial Employment,* wherein he found heavy alcoholism occurred, as children were "left to themselves." Compared to the various relocations Stevenson observed, there was one mining area that did experience some success, due to the presence of elder Inuit women who trained the younger women in a trade, which made the relocation bearable.

With the pressing onslaught of modern development, there were also simple pleasures and benefits that came to the Arctic people's lives due to Christianity; for example, a young woman was allowed to marry a young man of her own age and her own choosing, instead of being bound to a prearranged marriage with someone who was usually older than she; also, both twins were now able to live, instead of one being

Campfire on the beach of Nuchek Island of the Chugach People. The Chugach are a mix of Aleuts, Alutiiq, Eyak, and Tlingit. Their language, Alutiiq, is more closely related to the Yup'ik.

Source: Photograph courtesy of John F. C. Johnson, Chugach Alaska Corporation.

A traditional Chugach 3-holed Bidarka kayak

Source: Photograph courtesy of John F. C. Johnson, Chugach Alaska Corporation.

chosen to ride in the mother's hood; the infanticide of summer babies also ceased, who before would have slowed down the band during the busiest time. Another valuable contribution has been education, although it came at a heavy price in the beginning stages, empowering the indigenous people in their right to have their own culture and become innovators and leaders in this ever-changing world.

Schooling Among the People

Throughout Alaska and Canada, children were taxied out of their villages and camps by planes, to attend school from fall to spring. During this time, the spread of various diseases, such as measles, whooping cough, and the like, nearly decimated the Arctic people, wiping out nearly half of some villages. This prompted some families to move near the schools to be with their children and medical care; missionary boarding schools also turned into orphanages when the children's families died and there was no one to go home to.

In the villages of Alaska, it had been a practice to send high school children to schools, such as the Presbyterian Affiliated Sheldon Jackson; but in the 1970s, a law passed to have high schools in the individual villages, because it was a hardship to have young people return to school during the hunting seasons, when they were most needed at home. Difficulties had also developed with the new environment, for example, coming from the wide-open spaces of the Arctic to the "suffocating" confines of being surrounded by the forests of southeast Alaska. Another contributing factor to some of the students' failure was that the provincial curriculum taught in the village schools failed to adequately prepare them for the broader scope of the larger school's curriculum. There was also a tendency for the students to leave school and return home due to loneliness.

Cognitive studies of Inuit children reported by Judith Kleinfeld found they have innately strong skills in the following: the ability to remember complex images, which facilitates a person's mapmaking and drawing ability, as well as being a natural at mechanical skills. Through the years, as these young people have found their academic strengths and gone on to college, they have seldom returned to the villages, due to a shortage of jobs in their career fields and the modern advantages that they had become adapted to.

The Land and Its Subsistence

Family lifestyles shifted as the fur traders altered the hunters' goals from subsistence to profit motive. Traditional subsistence foods such as seals, whales, and fish were also desired for commercial purposes. At first, these provided the Arctic peoples avenues to acquire the much-needed money that was becoming part of their lives. Transitions were made in the hunting and fishing gear from the poles and boats in fishing, to guns and snowmobiles for hunting. The transition from the dogsleds to snowmobile transportation was

a difficult experience for some of the Inuit, when laws were imposed requiring their dogs be tied down and resulted in depriving them of essential exercise they needed to pull the sleds. For a time, there were no hunters in some villages, as the elders lamented over the lack of meat in their diet. When the snowmobiles arrived, they were a mixed blessing, because they were unreliable, broke down, required money for gas to and from the hunting grounds, and, unlike their faithful dogs, could not detect seal breathing holes.

Smoking salmon in a traditional Chugach smokehouse

Source: Photograph courtesy of Darin Yates, Chugach Alaska Corporation.

Although modern food is increasingly consumed, subsistence has been a prevalent mainstay in the Inuit diet. The act of distribution to the families after a catch has seen these people through survival since ancient times. Today, there is a new element to hunting preparation, the pooling of resources acquired through the workforce, to afford the hunting trips. Another important factor negatively affecting their livelihood is the regulation of their fish and game. Prior to the Euro-American government creating these regulations, the Arctic people gathered what they needed, when they needed it, and this system worked, with no overharvesting. Respect was shown for the animals, which meant they only took what was needed. However, in today's regulated society, should a person be apprehended for taking an animal or the herring spawn out of season, for example, there is not only a fine, but the much needed food is confiscated.

From after World War II to the 1960s, the Inuit people began assertively expressing themselves within the political system, due to their appearance in the political spotlight as they defended their aboriginal homeland against the encroachment of the powerful developers and tried to keep their right to subsistence, for example, to preserve their land from the devastation of oil-drilling exploration and exploitation, to control external wild life abuse and taking, to exercise the franchise to vote, and to continue to participate in whale and seal harvests. With the realization that all of the Inuit people were experiencing the same problems, various indigenous organizations began forming, like COPE (Committee for Original People's Entitlement), Inuit Tapirisat (Inuit Brotherhood) in Canada, and the Inuit Circumpolar Conferences, to name a few.

Pollution is a growing concern for the hunters of today, as it falls upon the land and water in which the animals live and are nourished, to be consumed by the Inuit hunter's families. When the Russians did nuclear testing during the cold war, it contaminated the land and reindeer populations from Russia to Scandinavia. There is also an "Arctic haze," a smoke from the industrial plants of the southern regions, that accumulates in the Arctic, as well as the airborne radioactive waste from the 1986 Chernobyl nuclear meltdown. This has resulted in a drastic decline in the birthrate and a rise in cancer-related problems, as well as the increased mortality among the people. The Greenland Inuit breastmilk and muscle tissue, for example, has been analyzed, and the results were determined to be contaminated and equivalent to toxic waste. Considering the plight of our ecosystem and how it is adversely effecting a people who are not contributing to its demise, what would be the next step in healing this world that we all share, for all of the people concerned?

Sunset at Nuchek Island in Prince William Sound, Alaska

Source: Photograph courtesy of Darin Yates, Chugach Alaska Corportation.

European Work Schedule

These traditional Arctic peoples were, and still are, in tune with the rhythm of the seasons and the hunting, fishing, and gathering subsistence lifestyle. Their seminomadic lifestyle slowly faded as they made way for whaling ships, fur trapping, and then the workforce. Some found it difficult to adapt and to acclimate to a way of life that required unreasonable rigid work schedules, which appeared to have little relevance to survival in their traditional milieu and were in conflict with the time and availability to prepare for the year-round subsistence that had once been their way of life. Those who have sought a career in carving, for example, have found a way to keep their own lifestyles and schedules and still acquire an inflow of cash funds.

Substance Abuse

An altered state of consciousness was an acceptable practice with many indigenous peoples. Many shamans throughout the world were able to connect with the spirit world via plants, such as peyote for the southern indigenous tribes. Tobacco was used by the Alaskan Inupiats prior to contact with Europeans, through trade with the Siberian Yup'iks. One explorer went into detail describing the various methods of uses for tobacco, for example, holding the smoke in the lungs for long periods of time, which was practiced by the adults and the children. It is surmised that tobacco was the first substance abused by the Inuits. When tobacco was first introduced, was it substance abuse, or was it a means of acquiring an altered state, which facilitated a feeling of connectedness with the spirit world? The tribes in North America cultivated this plant for ceremonies, as far north as the western coast of Canada and southeast Alaska by the Haida and Tlingit.

Alcoholism has been noted since the introduction of liquor among the indigenous people of North America and the Arctic regions. There were records by early sea captains of those who became incapacitated due to their inebriation. This resulted in their failure to make the traditional subsistence gathering, preparation, and preservation of supplies to meet the winter demands. There were disastrous results of starvation in not having enough food to last through the winter. Some villages could become dangerous, as fights, murders, suicide, and domestic violence escalated. Still later, many villages in Alaska became "dry," yet cases of liquor were shipped in; some entrepreneurs would sell bottles at high prices to fund their own uses.

In Joe McGinniss's documentation of his statewide trip to Alaska, he found alcoholism of both "White people" and "Natives," as this land of the "last frontier" was dealing with the new "oil rush" of the 1970s. The various drinking populations who entered the northern regions—sailors, whalers, fur traders, gold prospectors, imported prostitutes, miners, fishermen, construction workers, oil drillers, and the like—have for the most part been models of heavy drinking to the indigenous people. This begs the question of the double standard: "Why was it okay for the 'White man' to drink unto excess, but not for them?" The continued heavy stereotyping of alcoholism among

indigenous people fails to recognize the growing numbers of those who are not only abstaining, but are returning to their culture and reidentifying with their ancestral past, on their own power.

A Chugach man carving a kayak paddle

Source: Photograph courtesy of Darin Yates, Chugach Alaska Corporation.

The Language

The Inuit language has three main dialects: *Inupiaq* for the western Yup'ik and Inupiat people of Siberia and Alaska, *Inuktitut* for the Canadian Inuits, and *Kalaallisut* for those in Greenland and Iceland. The missionaries tried to prohibit the Inuit language, yet unlike some of the tribes to the south, who had lost their language altogether, the Inuit retained their language. Although in Alaska, the younger generations speak more English than Inupiaq, with their elders, it is the opposite. For the Canadian Inuits, the language is evolving, and for the most part, only the elders speak and understand the old dialect. Books are written in all three dialects, and many are used in the schools for the new generations of Inuit people. In Canada, there are Inuktitut radio and television programs, as well as an Inuktitut production company from which came the movie *Atanarjuat: The Fast Runner* (2003), which became the unprecedented accomplishment as the first Inuit-written, -directed, and -acted movie in the spoken Inuit language of Inuktitut.

The Artists

Ivory carvers were the first to start creating a new trade from their aboriginal lifestyle. During the gold rush in Nome, Angokwaghuk (aka "Happy Jack") studied the sailors' scrimshaw art as a member of a whaling crew and created the first commercial Eskimo art to meet the demands of the changing market. Although he died in the Nome epidemic in 1918, today, his legacy is continuing through the talented Arctic aboriginal carvers, sculptures, printmakers, painters, writers, musicians, and actors who are following in his footsteps and creating art for a new time, a new people, and yet one that still speaks of the northern aboriginal Arctic people.

The Music

Most of the drumming and singing occurred in the winter, during seal-hunting time. After a long day of hunting, the men returned to celebrate their accomplishments with their drumming, dancing, and singing. They sang hunting songs, reverting back to an ancient past and their connection with the spirit world. At times when the festivities were over, the intricately carved masks worn by the dancers were cast into a sacrificial fire. Explorer Roald E. G. Amundsen made reports in his travels of the Arctic (1908) of the "Eskimo" people singing whenever they worked and how their rhythm and tone were "strange" to him.

Not understanding the "savages," the missionaries forbade these Arctic peoples to practice their winter festivals, and their traditional music underwent tremendous upheaval due to the "civilizing" of the

Source: Photograph courtesy of Darin Yates, Chugach Alaska Corporation.

population. The traditional music of drum songs and throat games (singing) within the celebrations that had been practiced since time immemorial were forbidden, and for a time ceased. The Monrovian missionaries had thought they had abolished the "masquerades" in the late 1800s, though they continued until the 1920s incognito in remote areas.

In time, new instruments were introduced, and songs were translated into the various Arctic dialects. Today's drum songs have evolved and reflect the modern Inuit lifestyle: hunting songs have elements of a motor that gave out; a victory song may be about a sport game won; story songs reflect the modern-day parent's pride and patriotism when their child returns safely home from military service. Mainstream music began to appear in the repertoire of the musicians as well, and there is an Inuit record label, Inukshuk Productions, Inc., which features many genres of music by Inuit musicians. Bjork, the internationally celebrated Inuit singer from Iceland, has become one of the most innovative musicians of her time, and her album *Medulla* (2004) features throat singing from Inuit Tanya Tagaq Gillis, of Nunavut.

Future of the Arctic Peoples

The elders have experienced dramatic changes in their lifetime, extending from the traditional survival lifestyle they were born into, mandated by their unique environment, to the culture eradicating actions of Euro-American newcomers into their lands. They have struggled to adapt to changing economic conditions as their subsistence gathering has changed from a full-time occupation to only certain foods and portions, enough to supplement store-bought foods. The hunting-and-gathering areas have diminished, and recently the summers have been longer and the winters shorter, resulting in not only less ice but also thinner ice, which is negatively impacting the wildlife. The elders have also witnessed the tragic breakdown of their family structure, as their children were removed from the camps and villages to attend the government and religiously affiliated schools, only to return and struggle with their identities. They have seen the destruction of their communities from the ravages of drug and alcohol abuse. Recently, they have watched their grandchildren and great-grandchildren; some are discovering the many facets of their culture; some are caught up in the new technology and living far away from home; and others are like a "lost people," not listening to their elders, not knowing how they "fit in."

Through all of the changes that have faced these aboriginal people of the Arctic, they have grown stronger by fighting for their rights as a people. Their cultural identity is growing stronger, and they are bringing their story to the world, in their own words, through the various media. Regardless of the modern homes and conveniences that surround today's Yup'ik, Inupiat, and Inuit, there is a developing bond with the past, as well as a great intent to preserve and perpetuate their culture for posterity. They are courageously meeting the future, not as a people from a faraway place, but as a people known and respected by the world.

— *Pamela Rae Huteson*

See also **Eskimos; Inuit**

Further Readings

Barker, J. H. (1993). *Always getting ready: Upterrrlainarlut: Yup'ik Eskimo subsistence in southwest Alaska.* Seattle: University of Washington Press.

Cavanagh, B. (1982). *Music of the Netsilik Eskimo: A study of stability and change.* Ottawa, Canada: National Museums of Canada.

Cowan, S. (Ed.). (1976). *We don't live in snow houses now: Reflections of Arctic Bay.* Ottawa, Canada: Canadian Arctic Producers.

Hall, E. S. (1975). *The Eskimo storyteller: Folktales from Noatak, Alaska.* Knoxville: University of Tennessee Press.

Hensel, C. (1996). *Telling our selves: Ethnicity and discourse in southwestern Alaska.* New York: Oxford University Press.

Klausner, S. Z., & Foulks, E. F. (1982). *Eskimo capitalist: Oil, politics, and alcohol.* Totowa, NJ: Allanheld, Osmun.

Oswalt, W. H. (1990). *Bashful no longer: An Alaskan Eskimo ethnohistory, 1778–1988.* Norman: University of Oklahoma Press.

Ray, D. J. (1980). *Artists of the tundra and the sea.* Seattle: University of Washington Press.

Eskimos

Eskimo, more commonly called *Inuit,* is a term used to describe people who primarily live in the far north, usually the Arctic. The Arctic is located north of the Arctic Circle, and although it has extreme cold temperatures, Eskimos have adapted to the harsh environment both physically and culturally. Most Eskimos are compactly built, having a barrel-shaped torso and short arms and legs, which minimize heat loss. In addition, it is only in the last 50 to 100 years that the Eskimo way of life, which remained virtually unchanged for tens of thousands of years, has become more "modern." Before the 1900s, the Eskimo lifestyle mainly varied depending on the environment and season. The most important aspects of Eskimo life at that time included shelter, food, clothing, and transportation.

In the winter months, some Eskimos built igloos or snowhouses, while others lived in sod houses. The igloos were built for temporary shelter while the Eskimos moved to find food. During the summer, they lived in tents made of seal or caribou skin, depending on which animal was readily available.

Eskimos also hunted seal and caribou and fished for food. Seals were hunted year-round, while caribou were hunted only during the summer and fall. Eskimos hunted seals using different techniques depending on the season. In the fall and winter, seals were taken from the sea ice close to shore. During the spring, hunters killed seals as they slept on the ice, and during the summer, Eskimos hunted seals with harpoons from kayaks. When hunting caribou, women and children helped by chasing the animals toward the waiting men, who then used spears or bows and arrows to make the kills.

Fishing was also common in Eskimo culture. Eskimos fished with forked spears that had hooks made of bone or antler. Salmon, cod, and seal provided the majority of the nutrients from the sea. Many Eskimos preferred to eat meat raw, because otherwise it took a long time to cook over small flames. In addition, raw meat provided Eskimos with essential nutrients that cooking destroyed. This is one of the theories of how Eskimos got their name, which in Abenaki means "eaters of raw meat." Others believe that Eskimo is a Montagnais word that refers to the way Eskimo snowshoes were laced.

Hunting and fishing provided Eskimos not only with food but also clothing. Clothes were made from animal skins, usually caribou because it was lightweight and warm. The style of dress varied between regions, but all Eskimo clothing was similar. The general attire consisted of a hooded jacket, trousers, socks, boots, and mittens. Many women decorated their clothing with beads and furs. Sealskin was used for soles because it allowed moisture to escape, but it kept in heat. During the winter months, it was common for Eskimos to wear two suits of clothing. An inner suit with fur was worn next to the skin, while an outer suit with fur facing outside was worn on top. The air between the suits kept body heat in and allowed perspiration to evaporate. When the weather was warmer, only the inner suit was worn.

To make hunting easier, various types of transportation were used. The Eskimos used dog sleds, which were especially helpful when traveling long distances on snow and ice. Also, boats were used to sail across water, and walking was common during the summer months.

Dog sledding is the method of transportation most commonly attributed to Eskimos. There were two

Source: © Galen Rowell/CORBIS.

types of wooden sleds: plank sleds and frame sleds. The plank sled was used mainly in Canada and Greenland, and it resembled a long ladder. The Eskimos of Alaska and Siberia used frame sleds that had a basketlike frame built on runners and slanted from the front to the back of the sled. The sleds were propelled using a team of dogs tied to the front. However, the Eskimos were able to keep only as many dogs as food would allow, and in some regions this meant only one or two.

Eskimos also used kayaks and umiaks for transportation across the sea. The kayak was similar to a canoe, with a deck and a wooden frame covered with sealskin, usually made for one person. A long paddle with a blade at both ends was used for propulsion. The umiak was an open boat with a wooden frame, also covered with sealskin, which could hold up to 12 people. These boats were used to hunt large sea animals and for long trips.

Group life was an important aspect of Eskimo culture. Eskimo group size varied and was usually related to type of hunting. Large Eskimo groups usually split into smaller groups when it was time to move in search of food. The subgroups usually consisted of a husband and wife, their children, and the married children's families. In addition, some Eskimos practiced infanticide to keep the population from outgrowing the available resources. Also, Eskimos did not have a formal system of government, but instead followed very strict rules rather than laws. Generally, the elder men were in charge of making sure that the rules were followed and that people who committed serious crimes were executed.

Religion played an important role in Eskimo culture. Eskimos believed that spirits controlled nature and the forces of life, such as the wind, weather, sun, and moon. Eskimos felt that the souls of the dead lived in another world. After a death, the body was wrapped in animal skins, laid on the tundra, and surrounded by a circle of stones. Tools and other items were placed next to the body for the soul to use in the next world.

For the majority of Eskimos, many of the traditional ways of life ended in the 1900s. Today, most Eskimos live in towns or small settlements and eat food purchased from stores. They live in wooden homes and wear modern clothing. In addition, technological advances allowed Eskimos to replace dog sleds with snowmobiles, and kayaks with motorboats. For many, traditional beliefs have melded with or been substituted by Christianity. Also, most Eskimos now compete with the economy instead of nature. Some work in labor-intensive jobs, while others do not. There is, however, a high unemployment rate among Eskimos, and many use financial assistance from the government.

The majority of Eskimo peoples currently inhabit four countries: the United States, Greenland, Canada, and the Soviet Union. The United States has about 57,000 Eskimos, or Inupiaq and Yupik, who began U.S. citizenship in Alaska in 1924. During World War II, many of them worked at U.S. military bases. Although education is available for all in the United States, most Eskimos do not finish high school.

The total population of Greenland is 56,309, of which 87% (48,989) are Eskimo or Inuit and Kalaadlit. In Greenland, although most Eskimos work in the manufacturing and service industries, unemployment is still high. Greenland has programs to assist Eskimos with education, housing, and health care.

Canada has a population of 33,000 Eskimos or Inuit. The Canadian government offers assistance in

developing commercial fishing cooperatives and handicrafts to help lower the high Eskimo unemployment rate. Last, the Soviet Union has a population of 1,500 Eskimos on the northeastern tip of Siberia.

No matter where they're found, Eskimos embody a unique coalescence of cultures. Whether they live in igloos or wood houses, hunt or buy commercially manufactured foods, use dog sleds or snowmobiles, Eskimos have remained a people of mystery until recently. Because of their isolation in the far north, Eskimos arrived late in their adoption of modern goods and customs. In the last 50 to 100 years, this modern adoption has demystified Eskimo culture and permitted a better understanding of the Eskimo people, both past and present.

—Lisa M. Paciulli and Justine B. Movchan

See also **Eskimo Acculturation; Inuit**

Further Readings

Barker, J. H., & Barker, R. (1993). *Always getting ready, Upterrlainarluta: Yup'Ik Eskimo subsistence in southwest Alaska.* Seattle: University of Washington Press.

Burch, E. S. (1998). *The Inupiaq Eskimo nations of northwest Alaska.* Fairbanks: University of Alaska Press.

Fienup-Riordan, A., Kaplan, L. D., & Silook, S. (2001). *Inupiaq and Yupik people of Alaska.* Anchorage, Alaska Geographic Society.

Molnar, S. (2002). *Human variation.* Upper Saddle River, NJ: Prentice Hall.

Moran, E. (2000). *Human adaptability.* Boulder, CO: Westview Press.

Steltzer, U. (1985). *Inuit: The north in transition.* Chicago: University of Chicago Press.

Essentialism

Essentialism is a philosophical doctrine that each object has an essence that makes that object what it is. Essence can be seen as a set of properties of a thing, which that thing must possess to be that particular thing.

The word *essence* is the English translation of a Latin term *essentia,* by which Roman translators tried to render the obscure original Aristotelian phrase *ti ên einai,* which literally means "the what it was to be" for a thing. For Aristotle, the essence of a thing is both the cause of existence of that thing and a set of properties that defines the identity of the thing. A thing cannot change its essential properties as long as it exists or as far as it belongs to a particular *kind,* in contrast to nonessential, accidental properties, the loss of which affects neither existence nor kind-membership of a thing.

For Aristotle, essence is as important for ontology as for epistemology, because true knowledge (*epistémé,* science) of something means to know the essence of a thing by grasping it with words in a specific way called *definition.* A definition is an account *(logos)* that signifies an essence, but we have to keep in mind that for Aristotle, definition is not about the meaning of something, but about what it is to be a something. It is important to point out that according to Aristotle, science is about kinds and the essences that define them, not about individuals, for science cannot be about accidental, random properties. Essence is thought to be common to all members of a kind, and as immutable and everlasting as kinds themselves. That is why true knowledge is possible: There is no reason for later revisions once true essences are discovered. This doctrine of essences and kinds is often called "Aristotelian essentialism."

In many aspects, Aristotelian essences are similar to Platonic forms, with the one important difference, that essences dwell inside the things of this material world, not in a separate immaterial world of forms. This fusion of Platonic forms with Aristotelian essences started with neo-Platonism and was much more elaborated through the Middle Ages period by scholastics in a way to fit within Christian theology. Essences are seen by scholastic philosophy as eternal forms dwelling in God's mind as paradigms according to which things are created (essence precedes existence), and are, of course, immutable and everlasting.

Critics of essentialism have attacked the immutability of essences, refuting the reality of essences as such. Locke rejected Aristotelian essentialism, but at the same time, he suggested two new types of essences: real and nominal. Real essences of material things are, according to Locke, their deep atomic structures, hidden to the naked eye. They are different from Aristotelian essences, for they are not eternal and immutable; they can be changed, as, for example, an internal frame of watch. But there are also nominal essences. Nominal essences are general names that

relate to complex ideas, which we develop from experience by sorting things based on various perceivable qualities. Locke holds that there is no single, true sorting of things; there is no single, natural classification that reflects the relationship between natural kinds. In fact, according to Locke, there are many possible ways to classify the world.

The antiessentialist mood of today's social and human scientists is mostly based on empirical studies of race, ethnicity, nationalism, and gender, and it refutes essentialism in general. Support for this general antiessentialism can be found in the philosophy of the 20th century. For example, logical positivists believed that the very idea of essential property is incoherent and that essentialism itself is outmoded intellectual past. Recently, essentialism in philosophy received a new impetus, with interest in modal logic (S. Kripke), but this did not have any impact on antiessentialism of contemporary social and human sciences.

A completely different approach to essentialism came from empirical studies in cognitive and developmental psychology during the last quarter of the 20th century. It was discovered that, from early childhood, the human mind develops essentialist biases. Developmental psychologist Susan Gelman contends that the bias of essentialism influences the way humans categorize things. Based on empirical studies with children, she believes that this "essentializing bias" is not directly taught, but rather occurs early in children as a way of making sense of their natural surroundings. These predispositions are shaped by language and intuitive folk theories about the world. It seems that people unconsciously believe in hidden essences responsible for observable similarities in members within a kind. They also believe in the real existence of natural kinds and a direct correspondence between language and basic categories of natural and social kinds.

Experiments demonstrate that we apply cognitive bias mostly to animal and plant species; to natural substances such as water and gold; and to social kinds such as race and gender. But we do not apply it to artificial kinds, such as tables or socks. These findings are in contrast with the opinion that essentialism itself is culturally constructed by historical coincidence like Western philosophy.

— *Peter Sykora*

See also **Aristotle**

Further Readings

Atran, S. (1998). Folk biology and the anthropology of science: Cognitive universals and cultural particulars. *Behavioral and Brain Sciences, 21,* 547–609.

Gelman, S. A. (2003). *The essential child: Origin of essentialism in everyday thought.* Oxford: Oxford University Press.

Gil-White, F. J. (2001). Are ethnic groups biological "species" to the human brain? *Current Anthropology, 42,* 515–554.

Ethics and Anthropology

Concepts

The term *ethics* was first coined by the philosopher and physician Aristotle (384–322 BC), in his book *Ethika Nikomacheia* (ethics for his son Nikomachos). Ethics has its roots in the noun *ethos,* which means "custom." Aristotle understood it as the rational study of custom which, methodically, as a practical science has not the exactness of the theoretical sciences. Today "ethics" is used in a manifold way. The public often uses the term synonymously with moral behavior: Someone is called ethical if they behave morally. In philosophy, ethics is synonymous with "moral philosophy" and deals with questions of how we can justify norms, distinguish "good" and "evil," or develop consistent ethical theories. In Christian theology, ethics is synonymous with "moral theology," reflecting the moral precepts of the Bible and the Church. The term *anthropology* is ambiguous in a similar way. It covers a range from biological anthropology as well as cultural and social anthropology, to philosophical and theological anthropology, each with their different methodologies and scopes.

Let us focus on the fundamental anthropological-ethical question of whether or not there is free will, then turn to the important question of ethical relativism and some topics of professional ethics concerning social and cultural anthropologists.

The Question of Free Will

Neurobiological discoveries in combination with modern genetics have led some to the conviction that

human beings are biological machines determined by the biological hardware, especially their brains and genes, combined with influences from outside. So there is no room for free will: The basket of motivations that move us may be fixed. We just do what we are determined to do. If ethics develops moral norms of what we ought to do, this seems to be contradicting the assumption that we are determined. We need the ability to act in accordance or disaccordance with the "ought," not by determination, but by free will. Otherwise, the concept "ought" becomes meaningless.

There are different solutions to this problem. Philosophical anthropology often suggests a version of free will in terms of modular brain functions that is compatible with determinism. We are seen as a complex, determined, neurophysiological system. Data are taken in and alternatives generated and ranked. Eventually, an output initiates an action. This action is considered free, if the following is valid:

> The subject acted freely if she could have done otherwise in the right sense. This means that she would have done otherwise if she had chosen differently *and,* under the impact of other *true and available* thoughts or considerations, she *would* have chosen differently. True and available thoughts and considerations are those that represent her situation accurately, and are ones that she could reasonably be expected to have taken into account. (Blackburn, 1999, p. 102)

Theological anthropology often offers an incompatibilist version; that is, free will is not compatible with determinism. For strict Calvinists, for example, there is no freedom of (the) will. God predetermines what we do. The Roman Catholic Church explains freedom of the will by introducing an inner self, the soul. It is the soul that decides what to do. The question of how different thoughts are evaluated by the soul and why some act in accordance and some in disaccordance with the "ought" is answered by introducing the concepts of grace and sin and the mystery of evil.

Ethical Universalism Versus Cultural Relativism

Social and cultural anthropology has discovered a huge variety of customs among different populations and tribes. The Greek historian Herodotus reports one of the most famous examples. Darius, king of Persia, once asked Greeks who burned the dead bodies of their relatives how much he would have to pay them to eat their fathers' dead bodies. They refused to do it at any price. Then, Darius offered a huge amount of money to some Indians, who by custom ate the bodies of their parents, in order to make them willing to burn their fathers' bodies. The Indians, according to their convictions, refused to accomplish so horrid an act. Herodotus drew the obvious moral conclusion: Each nation considers its own customs as morally right and the opposite customs as morally wrong. Social and cultural anthropology, up to the present day, has discovered huge differences among societies in their moral evaluation of such matters as euthanasia, infanticide, permission of sexual relationship, the question of duties to support children, the poor, the status of women, slave labor, and so on. Philosophical and theological anthropologies differ so much in their theories about men and women that they are one more example of the diversities of different cultures. A very important question arises from these discoveries: Does a cultural relativism entail an ethical relativism? Is morality only a matter of what is customary, relative to a particular society? If this is so, then words such as "good" and "bad" just mean "approved in a certain society" or "disapproved in a certain society." Even if there are common moral convictions across cultures, this does not mean that ethical relativism is proved wrong. There was a time in which slavery was not questioned by any known society. Today, we do not accept slavery as morally right. Although the populations of the great powers were excited about going to war in 1914, we do not claim today that World War I was morally "good."

From a logical point of view, ethical relativism cannot be proved wrong, but the examples of slavery and of World War I show that this ethical position is highly problematic: We do not accept slavery today because *our* society disapproves of slavery. We (do) reject slavery because we are convinced that slavery was wrong and is wrong and will be wrong. And we have good reasons to do so in order to defend human dignity and human rights, which through the experience of the atrocities of the 20th century became the fundament of a common universal ethical bond among human beings. Alan Gewirth developed a rational argument for an ethical universalism concerning human dignity and human rights. This argument rationalizes the experience: I do (or intend to do) "X" voluntarily for a purpose that I have chosen.

There are generic features of agency in a deep sense of the word *agency.* My having the generic features is good for my achieving the purpose I have chosen. I ought to pursue my having the generic features of agency. Other agents categorically ought not to interfere with my having the generic features *against my will* and ought to aid me to secure the generic features when I cannot do so by my own unaided efforts *if I so wish.* I have both negative and positive claim rights to have the generic features. If I have these rights, all agents have these generic rights, and I have to respect their rights. Who does not accept this reasoning contradicts himself or herself, because then it is possible to interfere with his or her generic features against his or her will. But even if this argument gives good reason for an ethical universalism, it does not entail what generic features exactly are. Therefore, on one hand the different results of social, cultural, philosophical, and theological anthropologies do not necessarily lead to an ethical relativism. On the other hand, they help to become careful not to claim a norm as universal too early. For example, the final report of the commission to review the American Association of Anthropologist's statements on ethics states

> Acceptance of "cultural relativism" as a research and/or teaching stance does not mean that a researcher or a teacher automatically agrees with any or all of the practices of the people being studied or taught about, any more than any person is required to accept each practice of his or her own culture as morally acceptable.

It seems to endorse ethical relativism, but at the same time relativizes the relativism that clearly is the case when the same committee states as a *universal* principle: "Anthropologists must respect, protect, and promote the rights and the welfare of all those affected by their work."

Professional Ethics of the Different Anthropologies

The professional ethics of the different anthropologies have common features with all sciences and humanities. They are bound to good scientific practice. This means that they have to develop an ability to distinguish important from unimportant results. The publications should be scientifically important. This excludes, for example, plagiarism, manipulating research material, and similar kinds of frauds. They have to struggle not to be compromised by research funds they get from "parties with a vested interest," for example, if the ministry of defense of a country pays for anthropological studies in a certain area. Theological anthropologists have to be careful not to present personal opinions as statements of their religious communities. Instead, their research has to be a service to God. Philosophical anthropologists have to reflect the implications of their "image" of human beings for society (cf. the discussion of free will). Theologians and philosophers also have to take into account what the sciences develop. If their results are incompatible with the results of science (to distinguish from transcending the results of science), for example, in stating that the earth is flat or that the species are created distinctly, excluding a creation by means of evolution, they become close to superstition. Biological anthropologists have to be careful not to confuse science with philosophy. If someone speaks of a "selfish gene," he is not speaking as a scientist, but as a philosopher or poet. Social and cultural anthropologists often face ethical dilemmas. If the "universal" principle to promote the welfare of all those affected by their work, mentioned above, is the guideline, there are situations that do not allow a simple solution. This always is the case when the welfare of some is promoted but at the same time the welfare of others is endangered. Therefore, in many cases, ethical codes, for example, for anthropologists in the field, can offer only a framework for decision making. Nevertheless, they are helpful tools in the development of a professional ethics.

— *Nikolaus Knoepffler*

See also **Anthropology, Philosophical**

Further Readings

Blackburn, S. (1999). *Think: A compelling introduction to philosophy.* Oxford: Oxford University Press.

Cantwell, A. E., Friedlander, E., & Tramm, M. L. (Eds.). (2002). *Ethics and anthropology: Facing future issues in human biology, globalism, and cultural property.* New York: New York Academy of Sciences.

Caplan, P., & Caplan, P. (Eds.). (2003). *Ethics of anthropology. Debates and dilemmas.* Oxford: Routledge.

Ethnocentrism

Ethnocentrism is the term used to describe the phenomenon of people from a certain group seeing all other groups in comparison to their own as the ideal. *Ethnos* is the Greek word for "nation," so ethnocentrism literally means nation-centered. *Ethnicity* itself is a word that is broad enough to include any number of features that differentiate a group, such as ancestry, language, religion, culture, or geographic proximity. Ethnocentrism should not be confused with nationalism or patriotism (loyalty and pride in one's nation). Instead, ethnocentrism usually is used negatively in the social sciences.

Because anthropology is the study of human development, those undertaking the study are vulnerable to unfairly comparing other groups to their own. It is impossible, however, to step completely outside of one's own perspective, and the ethnocentric view is not always a distinction of superiority. National holidays in the United States, for example, were based upon Christian ideologies for many years, perhaps not intentionally to neglect other religions such as Judaism, Islam, or Hinduism, but rather based on the assumption that the majority of citizens were Christian. Sometimes certain assumptions are imposed concerning the behavior of other groups. Americans may question the Spanish or Italian siesta when businesses close mid-afternoon for a break after lunch, thinking this a prime time to be working and keeping shops open. Europeans likewise may question the average 2-week American vacation (compared to nearly a month for many European countries), wondering if Americans prefer to be earning money rather than spending quality time at home with their families. Language and concepts that incorporate knowledge are also influenced by culture-specific ideas. What one group identifies as "blue" or "love" might mean different things to members of different groups. Through recognizing that one's observations about the world begin from within a particular cultural position, the anthropologist can gain a better understanding of both one's own and other cultures.

The attitude characterized by ethnocentrism is probably as old as human civilization; traditionally, other cultures were seen as people to be conquered or demonized, often for differences of religion. It was not until the 20th century that anthropology began to integrate the concept into theory and methodological practice, however. In his 1906 book *Folkways,* William Graham Sumner first used the word "ethnocentrism" to explain the way of seeing the world as surrounding one's own group, which is in the center. As humans observe others humans, groups of people are seen as either "us" or "them." Studies of one's own people, also called the "in-group," are informed by the researcher's personal experiences and understanding of cultural values. Studies of other people, or the "out-group," automatically place the observer outside of the culture being observed. Despite intentions to collect fact-based data, the "affectivity in cognition" theory suggests it is difficult, if not impossible, to completely step aside from one's vantage point. When data are analyzed with the assumption that one's home culture is *superior,* the study is tainted with a sort of collective egoism, and that attitude is what we call ethnocentrism.

Ethnocentrism is one of several subclasses of sociocentrism, which, as the name implies, is a central focus around one's own society. Other subclasses include nationalism, class sociocentrism, and specific heritage-focused attitudes like Eurocentrism or Afrocentrism. All of these positions feature two major elements. There is positive valorization, or the presumption of an especially high value on the accomplishments of the in-group. There is also the perspective of evaluating the out-group by comparing those values to one's own. Whatever is praised, or positive, within the in-group is considered to be the normal way of behaving. Whatever is criticized, or negative, is seen as an exception to the norm. An ethnocentric observer will compare the out-group to the norms and exceptions already determined for the in-group. If the observer sees no difference, then the out-group is considered to be identical to the in-group. If differences are noted, they are weighed according to positive and negative assumptions. When the out-group positively values something determined to be negative in the in-group, or the out-group negatively values something determined to be positive in the in-group, the ethnocentric member of the in-group considers the out-group to be developmentally inferior.

Such condemnation can be behind negative cultural attitudes like racism, discrimination, and ethnic cleansing. Ethnocentric behaviors are easily observed in the way the German Nazi regime sought to exterminate the Jewish people, and even through eugenics, the goal of perfecting a breed of human through

sterilization and genetic manipulation. In eugenics the intention is less to distinguish people according to ancestry than rather by mental, physical, or health characteristics, such as preventing diseases spread through natural reproduction. Taken to an extreme, however, the ethnocentric group increasingly identifies as "negative" the characteristics that perhaps occur in healthy people. The Western nations of Sweden and the United States forced sterilization on mentally ill citizens well into the 20th century—many of whom were institutionalized for the equivalent of what is called "depression" today. This practice forfeited individual reproductive rights for the betterment of the larger cultural group. When value judgments are placed on what makes someone human or healthy or worthy of propagating the species, those passing judgment are centering their opinions of worth around themselves. By suppressing the outside or inferior group, the status of the in-group is further elevated.

It is natural for people to associate with a group and to find value in the self through pride in one's culture. Furthermore, the awareness of others is fostered by the groups people live within, so an individual's concept of right, wrong, appropriate, and offensive will usually reflect the values of the group as a whole. The anthropologist is interested in recognizing this tendency in the people studied as well as limiting its negative effects within the field. In an effort to overcome ethnocentrism in academic practice, contemporary anthropology has advanced a position of cultural relativism. By recognizing that the individual is influenced by the in-group's cultural values, the anthropologist is able to step back to appreciate the unique characteristics of every culture without judgment. Such a position also encourages the observer to understand behaviors and values for the roles that they serve for that culture. By acknowledging and accounting for ethnocentrism, the study of anthropology allows a deeper understanding of the adaptations made within diverse cultural groups and within one's own.

— Elisa Ruhl

Further Readings

LeVine, R. A., & Campbell, D. T. (1972). *Ethnocentrism: Theories of conflict, ethnic attitudes and group behavior.* New York: John Wiley.

McGrane, B. (1989). *Beyond anthropology: Society and the other.* New York: Columbia University Press.

Preiswerk, R., & Perrot, D. (1978). *Ethnocentrism and history: Africa, Asia and Indian America in Western textbooks.* New York: Nok.

Ethnoecology

Ethnoecology is the study of human knowledge, perception, classification, and management of natural environments. Work in ethnoecology synthesizes the ecologist's understanding of the relationships between biological and physical components in ecosystems with the cognitive anthropologist's focus on the acquisition and expression of cultural information. For ethnoecologists, culture is seen as the knowledge necessary for ecologically adaptive behavior. Accordingly, culture is understood as an evolutionary process transmitted and replicated through language. Ethnoecologists emphasize the symbolic and functional roles of language, the analysis of which allows access to ecological knowledge. Research in ethnoecology integrates the empiricism of ethnoscience with the functionalist perspective of ecological anthropology to understand fully the adaptive significance of cultural knowledge and the ecological relevance of human behaviors.

The term "ethnoecology" was first coined in 1954 by Harold Conklin, who conducted a systematic study of plant-naming strategies among the Hanunóo, a small-scale horticulture society in the Philippines. By examining the content and structure of Hanunóo plant nomenclature, Conklin demonstrated the hierarchical nature of ethnobotanical classification. Conklin's dissertation, though never published, was the first of its kind to adopt an empirical approach to understanding traditional ecological knowledge. While previous ethnobiological studies were concerned primarily with documenting human uses for living things, Conklin's research provided the first real insight into human conceptualization of a natural resource.

Throughout the 1950s and early 1960s, efforts to examine human ecological interactions proceeded within the rubric of ethnobotany, the study of relationships between people and plants, and to a lesser

extent, ethnozoology, the study of human-animal relationships. Much of this early work was descriptive in nature and utilitarian in scope, devoted largely to building lists of plant and animal names and their corresponding cultural uses. Although these studies lacked a theoretical framework, they yielded essential discoveries about the common features used in traditional systems of plant and animal nomenclature.

By the mid-1960s and 1970s, ethnoecological research came under the influence of the cognitive theory of culture as a shared system of knowledge. Anthropologists interested in traditional environmental knowledge turned to the ethnoscientific approach, which regards the individual as the culture bearer and language as the medium in which information is encoded. Ecological resources were envisioned as semantic domains, constructed and categorized with reference to the shared similarity between constituent items. This approach, also called the *particle model* of cultural knowledge, focused on the construction of semantic domains according to imagistic associations. This process of "mapping" knowledge and classification of cultural categories ultimately resulted in folk taxonomies of numerous ecological domains, such as firewood in rural Mexico, birds of the Indonesian forests, soils in the Peruvian Andes, and ice in the Canadian Arctic. Subsequent cross-cultural research into folk classification has largely confirmed the existence of a finite set of principles governing human categorization of the living world.

More recently, the analysis of ecological domains has demonstrated how environmental knowledge is distributed among members of a cultural group. Studies of traditional ecological knowledge have found that some individuals know more than others about various plants, animals, and other natural resources, which is the result of *intracultural* factors such as age, gender, occupation, interest, education, and experience. For example, in societies where women control the cultivation and management of food crops, women are more likely to hold more detailed knowledge of cultivars. Conversely, where men participate as hunters in local subsistence, men generally control and communicate information about wild animals. Ethnoecologists have benefited from these discoveries by learning to identify those respondents who are most knowledgeable about specific resources. Variation in ecological knowledge may also stem from *intercultural* differences, such as religion, subsistence, acculturation, and species diversity in local habitats. Understanding cultural variation is crucial for ethnographers interested in devising strategies for protecting endangered biota from disappearing altogether from local ecosystems and from the cognitive inventory of a society's natural resources.

A complementary approach to ethnoecology is the ethnographic perspective, also referred to as the *wave model* of cultural knowledge. Using participant observation and other qualitative data collection techniques, ethnoecologists have successfully generated behavioral models (also called scripts and schemas) by assessing the perceived consequences of various decisions in the context of relevant ecological variables. This approach has been invaluable for determining and predicting the impact of human behaviors, particularly in unstable ecosystems such as those affected by deforestation. It has been determined, for example, that indigenous communities can and do practice subsistence strategies that maximize the productivity of all available landscapes and resources. Such practices may include the adoption of multiple survival mechanisms, including foraging, fishing, animal husbandry, and the cultivation of home gardens. By defining the parallels between the behavioral and spatial dimensions of the human landscape, ethnoecologists have advanced anthropological understanding of the adaptive significance of cultural knowledge.

Ethnoecology has witnessed significant advancements during the last two decades. Motivated by the urgent need to safeguard biological and cultural diversity in developing regions of the world, ethnoecologists are presently constructing new protocols for protecting indigenous knowledge of agricultural crops. This form of "memory banking" has recently been used in tandem with germplasm conservation to ensure that local crops and heirloom varieties are sustained for posterity, in addition to the cultural knowledge necessary to cultivate and sustain these species. Ethnoecologists have also used their findings to strengthen the productivity of agricultural systems and to engender awareness on a community level of the various medical and economic applications of local species.

Because of its holistic vision of the changing character of indigenous environmental knowledge, ethnoecology is presently informed and guided by a variety of frameworks and methodologies. A number of professional academic organizations, such as the

Society for Ethnobiology and the International Congress for Ethnobiology, have helped to promote the visibility of ethnoecology by providing collaborative venues and publications for anthropologists, ecologists, environmental scientists, and other scholars engaged in ethnoecological research. Multidisciplinary efforts in the field have made considerable progress in documenting and sustaining traditional ecological behaviors and praxis. Presently, the challenges facing ethnoecologists include the development of policies to protect the intellectual property rights of native peoples, the appropriation of funding to support natural resource conservation, and the implementation of local, national, and international strategies to engender cultural support and responsibility for ecological knowledge for the benefit of present generations and those yet to follow.

— *Justin M. Nolan*

See also **Ecology and Anthropology**

Further Readings

Gragson, T. L., & Blount, B. G. (Eds.). (1999). *Ethnoecology: Knowledge, resources, and rights.* Athens: University of Georgia Press.

Nazarea, V. (Ed.). (1999). *Ethnoecology: Situated knowledge/located lives.* Tucson: University of Arizona Press.

Toledo, V. (2002). Ethnoecology: A conceptual framework for the study of indigenous knowledge of nature. In J. R. Stepp, R. S. Wyndham, & R. K. Zarger (Eds.), *Ethnobiology and biocultural diversity* (pp. 511–522). Athens: University of Georgia Press.

Ethnogenesis

The term *ethnogenesis* is derived from the Greek *ethnos,* signifying a people sharing a same language and culture. The term ethnos is synonymous with the Latin *gens* (*gentes* in the plural) and the less common *natio.* The Greek and the Latin words worked their way into the English language as *nation* in Middle English and *ethnic group* in modern English. Both are used to signify a group of people sharing a common language, common ancestry, common culture, and common territory (though the territory may be an ancestral homeland). The term ethnogenesis is used to describe the process by which an ethnic group or nation (in the older sense of "people" and not "state") is formed. There are many cases of ethnogenesis recorded in history. A case in point is the emergence of the Métis, in the valley of the Red River in what is now Manitoba. The descendants of 18th-century French-speaking fur traders working for the trading companies plying the Canadian and American interior for furs and indigenous wives, the Métis emerged as a distinct cultural entity in the 18th century, with a distinct culture that was a hybrid of French-Canadian and indigenous culture and a distinct language that was a Creole admixture of the French and Cree language. By the mid-18th century, the Métis were referring to themselves as a "new nation," and the ethnogenesis of a new ethnic group or nation was complete.

The Métis are an exceptional group in that their emergence is clearly documented and happened within the last few centuries. In certain cases, the origins of a group are known only in their myths. This is the case with Judaism, and the biblical account of the origin of the Jewish population is traced back to Adam and Eve in the book of Genesis. However, other cultures have accounts of their ethnogeneses. One of the oldest creation accounts is the *Rig Veda,* which was written down 3,500 to 4,000 years ago and recounts the creation of the world. Along with the other Vedas, it recounts the history of the Aryan invaders who came to settle in northern India.

Having a name is often central to determining whether ethnogenesis has occurred. Quite often, a population defines itself as being "human." The term *Inuit* is used by the Inuit (Eskimo) as an ethnonym meaning "people" and is the plural of *Inuk,* or "person," and this term would not have been applied to neighboring indigenous populations. In a similar vein, the original meaning of the word *barbarian* in the Greek language simply signified an individual from another ethnos who did not speak Greek. Likewise, by the 14th century, the inhabitants of the principalities of Eastern Rus (what is now central Russia) were calling their land "the Russian land" and saw themselves as having a distinct language and identity. This was the result of a centuries-long process of ethnogenesis in which they saw their

nation or people emerging out of an older Slavic people. In each case, you have the emergence of nations or ethnic groups with their own origin myth.

— *Michel Bouchard*

See also **Ethnohistory**

Further Readings

Hastings, A. (1997). *The construction of nationhood: Ethnicity, religion, and nationalism.* Cambridge: Cambridge University Press.

Smith, A. D. (2004). *The antiquity of nations.* Malden, MA: Polity Press.

Ethnographer

An ethnographer, most typically a cultural anthropologist, sometimes a sociologist, or another type of social scientist, educator, or humanist, is a person who writes a description of a cultural group or situation using participant observation and informant interviews. The product of the research is the ethnography, or written account of that particular culture. Using all senses, but especially observational skills, the ethnographer spends weeks to months to years in the field collecting data, eventually compiling descriptions of events, people, and activities through what can be a lengthy writing process into publications for student, general, or scholarly audiences. Although they may use laptop computers, tape recorders, and cameras, ethnographers themselves are the primary research instruments in their work.

As part of the fieldwork process, ethnographers establish important relationships with the people they interview. The ethnographer/informant bond is crucial for successful collaborative work. Known as "building rapport," the ethnographer seeks to establish trust and cooperation with individuals from the culture who are interested and knowledgeable about the research topic.

While qualitative and quantitative research methods are taught in many university courses today, ethnographers frequently still develop their own ways of taking and organizing the notes, which contain their field data. There are at least four kinds of notes maintained in the field. Brief or preliminary jottings are quick reminders of what is currently happening, which then can be used as the basis for a fuller account written up later. This full or complete daily account depends on the trained memory of the researcher as well as the preliminary notes. In addition, ethnographers keep a field diary or journal in which they reflect on personal and emotional experiences that may impact their research. Finally, many ethnographers develop interpretive notes, in which they attempt to synthesize and integrate patterns in behavior or ideas that have emerged from their data collection.

As ethnographic fieldwork developed in the first quarter of the 20th century, European ethnographers frequently conducted research in African or Asian colonies of their home countries, while Euro-American researchers visited American Indian reservations. However, social science research including ethnographic fieldwork increasingly attracted native participants in the latter half of the 20th century. Countries such as India have produced many eminent ethnographers. European and American ethnographers also frequently study their own societies today—whether these are unique subcultural studies, such as "tramp" culture or studies of "mainstream" culture, like waitress-customer interaction in bars. The feminist movement of the last quarter of the 20th century not only increased the number of women ethnographers but also produced a variety of ethnographies on women's experiences cross-culturally, ranging from the lives of Bedouin women to Japanese geishas.

Ethnographers influenced by postmodernism and postcolonial criticism often include personal, political, and reflexive writing in their publications. Neutrality and objectivity are no longer the only positions considered legitimate by ethnographers. Balancing the goals of cultural description with political concern and self-awareness is the goal of many. Ethnographers today experiment with many forms of writing and struggle to represent the cultures they study sensitively as well as accurately.

— *Audrey C. Shalinsky*

See also **Ethnographic Writing; Fieldwork, Ethnographic; Participant-Observation**

Further Readings

Golde, P. (1970). *Women in the field.* Chicago: Aldine.

Rose, D. (1990). *Living the ethnographic life* (Qualitative Research Methods Series, 23). Newbury Park, CA: Sage.

Van Maanen, J. (1995). *Representation in ethnography.* Thousand Oaks, CA.: Sage.

OBJECTIVITY IN ETHNOGRAPHY

Objectivity is held as an ideal in ethnography, but most people now agree that complete objectivity is impossible. Ethnography, by its nature, is a subjective study, because it is a study carried out by people who record their observations. Accuracy is a goal of ethnography. It can be furthered by use of photography and tape recordings, as well as personal observations.

Cultural biases, gender biases, and racial biases can influence ethnography. People don't usually realize they have these biases until they are confronted with them. The final product of ethnography is a result of complex interaction between the informants and the field researcher. Methods have been constructed to help the researcher be as objective as possible. That way one who reads the ethnography may better understand the "native" point of view.

There are several reasons why ethnography cannot be wholly objective. The fact that it is an interpretive endeavor attempted by human beings, each bringing his or her own background and experiences to the endeavor, will affect the questions asked and the observations made.

Sometimes, we assume that it is difficult for the ethnographer to be objective because he or she is in a foreign culture. That is not always the case. Ethnographers sometimes work within their own cultures. Also, ethnography is not based on a large number of cases from which generalities may be drawn. It is a descriptive study of one culture in one small area.

It is important for the ethnographer not to assume that his or her culture is the best and the way things are done in it are the way they should be done everywhere. This can lead to a condescending attitude toward the culture being studied. While it is impossible to be completely objective in every way, it is the duty of the ethnographer to try to achieve as impartial a perspective of the culture as possible. This can be aided by using scientific standards and proven procedures.

Ethnography is a qualitative research method, as opposed to quantitative research, which yields statistics based on a large number of cases. Ethnographic research takes place over a long period of time, often months or years.

— Pat McCarthy

VERIFICATION IN ETHNOGRAPHY

Ethnography produces studies of a particular human society. Contemporary ethnographic work is based almost entirely on fieldwork, thus requiring the complete immersion of the anthropologist in the culture and everyday life of the people who are the subject of his or her study. Ethnography is also comparative in nature, because of the cultural and ideological biases that the researcher maintains when doing fieldwork. This central technique in anthropology requires the observer to make a large number of inferences about the meaning of the phenomena under scrutiny. Ethnography is thus a selective process of interpretation that depends on the role and the position that the researcher takes while observing.

The position adopted by observers can result in their becoming more full members than an objective observer of the group under examination. Yet, postpositivist anthropologists have stressed the importance of producing accounts that the observed would recognize as accurate stories of their lives. This has led many ethnographers to check with the group under observation for their interpretations. In his *Social Research Methods* (1992), R. M. Hessler describes this technique as

"touching base." This involved going over the more general recordings of his fieldwork on the Mexican American community he was observing with his informant: "I would ask him if I had observed the particular event or confrontation between a neighbourhood resident and the medical director correctly. I even checked my interpretations." In *Interpretation of Cultures,* Clifford Geertz has stressed the importance of describing a given culture in terms we imagine that culture to construct itself. Taking as an example Berber, Jewish, and French cultures, Geertz states that we should cast their descriptions in terms of "the formulae they use to define what happens to them." Yet this is not to say that our accounts are authentically Berber, Jewish, or French, as they are not part of the culture under observation. They are anthropological, "part of developing system of scientific analysis." All anthropological writing is thus fictitious, in the sense that it is constructed, not in the sense that it is based on unreal events.

According to Geertz, the line dividing the mode of representation and substantive content is "as undrawable in cultural analysis as it is in painting," as the source of anthropology can both be in social reality as much as in scholarly artifice. "Although culture exists in the trading post, the hill fort, or the sheep run, anthropology exists in the book, the article, the lecture, the museum display, or sometimes, nowadays, the film." If this seems to threaten the objective status of ethnography, "The threat is hollow." Verification must not be carried out "against a body of uninterpreted data, radically thinned descriptions." The cogency of ethnographic accounts must be measured "against the power of the scientific imagination to bring us into touch with the lives of strangers."

— Luca Prono

Ethnographic Writing

Ethnography is an in-depth description of a culture or group of people sharing a culture. It is a fairly straightforward idea until one begins to ask troubling questions, such as: What is a culture? What are the boundaries of the group of people we are describing? Who describes them and upon what terms? What is the point of view of the description? The questions can become more difficult and even esoteric: "Who is privileged? Is it the narrator or the people?" "How objective or subjective can the narrator be?" "Should the narrator attempt to be objective?"

The entire issue of reflexivity has come to the fore in ethnographic writing over the past 20 years or so. The need for the ethnographers to put themselves into perspective regarding social position (gender, social class, age, ethnicity, and so on) has became an imperative for ethnographic presentation, as has the need to produce "texts," often verbatim, undigested interviews and descriptions from the field. The influence of literary criticism on this movement is apparent. The philosophical positions and techniques of postmodernism, deconstruction, psychoanalysis, and other relativistic ideas and methods are obvious.

What many people ignore is the fact that many of these questions have troubled ethnographers for many years. Certainly, Franz Boas and his disciples in the United States and Bronislaw Malinowski and his followers in the United Kingdom produced "texts" and described real life people conducting their everyday business. Their papers are filled with such examples, and their letters attest to their interests in producing accurate pictures of societies.

Moreover, major disputes within anthropology between competing pictures of cultures further attracted attention of people to reasons for discrepancies in description. The disputes between Robert Redfield and Oscar Lewis and Ruth Benedict and a young Chinese scholar, Li An-Che, are but two of many disagreements over "ethnographic reality." For example, long before the Margaret Mead-Derek Freeman controversy over Samoa, in which Freeman waited until Mead was dead, there was the dispute between Mead and Jesse Bernard over New Guinean material, a gentler difference of opinion and one of interpretation, not the gathering of information. However, the Lewis-Redfield differences led to a productive exchange of views in which the importance of the position of the observer was taken into account. The consensus was that it would be good to have a team of ethnographers work in an area. This team could compare its divergent views from various perspectives to present a truer picture of the whole.

Certainly, disputes continue to the present day regarding not only sensitivity and "voice" but also accuracy and consequences of description. The most recent of these disputes has been that over the Yanomami as described by Napoleon Chagnon. The ethical implications of the dispute are serious, as are questions regarding the methods and techniques for gathering information. However, many of the questions regard the description of the Yanomami of Venezuela and Brazil as "fierce people," as well as the personality of the ethnographer itself. The issue came to a head with the publication of Patrick Tierney's book *Darkness in El Dorado,* which made serious accusations against Chagnon's field methods and portrayal of the Yanomami.

Recent Developments

Clifford and Marcus (1986) in *Writing Culture: The Poetics and Politics of Ethnography* focused many movements that had been addressing the issues of ethnography over the years. It presented a coherent postmodern, reflexive, politically correct, and literary critical approach to the texts of ethnography wrapped in a neo-Marxist package. It drew careful attention to issues of power in fieldwork and the privileging of Western ideas, tying in carefully not only with French grand theory but also with the works of third-world critics of anthropology, such as Edward Said.

The book also drew needed attention to the obligation for presenting the viewpoint of those who live the culture, what had come by then to be termed the *emic perspective,* and allowing the people to speak for themselves. The Boasian tradition, often without crediting Boas, of collecting texts in the indigenous language regained popularity. The subjective nature of fieldwork, something Joseph Casagrande (1960) in his edited collection *In the Company of Man* had noted, was also given great attention.

In stressing the relativity of fieldwork and the role of the reader in drawing meaning from the "texts," the new relativizing, deconstructionist movement, in the judgment of many, runs the danger of reducing anthropology to a branch of literature in which one opinion is as good as another and in which there are "truths" but no search for "truth." This flirtation with solipsism in which nothing is privileged but only sensitivity matters is also nothing new. It is not the skepticism that demands proof of, say, Raymond Firth or Franz Boas, but rather the reflection of old Greek and Roman strands of philosophy stemming from the Sophists, in which the individual becomes the measure of all things.

The various techniques of ethnography taught in departments of anthropology attempt to incorporate the best of the old and new. For example, here is a sample of guidelines from Michael Stone's course on ethnography at Hartwick College.

> In research, you need to identify your personal assumptions, preconceptions, experiences, and feelings that affect your perceptions as a researcher. Hence, you will need to reflect upon them and incorporate them into your thinking and writing throughout the project. You are the essential instrument of the research process. In short, you will learn to be more conscious of your positioning as a researcher. Why have you chosen your site or subject? Which of your fixed positions (personal facts such as your age, gender, race, class and nationality) may affect your continuing perceptions, and how? What subjective positions (life history and personal experiences) may inform your ability to carry out research? What textual positions (the language choices you make in conveying what you perceive) may affect *the way you know* what you know about your research?

In common with other such courses, Stone blends the ethics of the American Anthropological Association with old and new techniques and approaches in a thoroughly professional and useful course. These are highlighted with practical exercises, giving future anthropologists a taste of the field and sharpening their ability to provide what is the building block of anthropological science and humanism: ethnography.

— *Frank A. Salamone*

See also **Boas, Franz; Darkness in El Dorado Controversy; Emics; Ethnographer; Mead, Margaret; Participant-Observation**

Further Readings

Behar, R., & Gordon, M. (Eds.). (1995). *Women writing culture.* Berkeley: University of California Press

Chiseri-Strater, E., & Sunstein, B. S. (1997). *Fieldworking: Reading and writing research.* Upper Saddle River, NJ: Blair Press.

Clifford, J., & Marcus, G. (Eds.). (1986). *Writing culture: The poetics and politics of ethnography.* Berkeley: University of California Press.
Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). *Writing ethnographic fieldnotes.* Chicago: University of Chicago Press.
Kirsch, G. (1999). *Ethical dilemmas in feminist research: The politics of location, interpretation, and publication.* Albany: SUNY Press.
Sanjek, R. (Ed.). (1990). *Fieldnotes: The makings of anthropology.* Ithaca, NY: Cornell University Press.
Stoller, P. (1989). *The taste of ethnographic things.* Philadelphia: University of Pennsylvania Press.
van den Hoonaard, W. (Ed.). (2002). *Walking the tightrope: Ethical issues for qualitative researchers.* Toronto, Canada: University of Toronto Press.

Ethnography

Ethnography, the study of people in a natural setting, provides an opportunity for researchers to conduct a detailed study of a group of people while being immersed in the culture of that group. Ethnography (*ethno,* "people" or "folk," and *graphy*, "to describe something"), sometimes referred to as participant observation or field research, involves the study of people or an organization though face-to-face interactions in a real-life social setting. There is no deductive hypothesis to follow or any statistical formula. Over time, this interaction yields a rich and detailed account of the culture, history, and characteristics of a social phenomenon.

Ethnography has a rich history. We can see it in the travel logs of early explorers and in the diaries of settlers. In sociology, ethnography is connected to the developments of the early Chicago School, with three primary ideas that emerged from it. First, researchers need to gain access to populations in their natural settings so that they capture the essence of human behavior without it being tainted in a false setting, such as a laboratory experiment. Second, ethnography allows researchers to become intimately familiar with their subjects by talking directly with them. And third, ethnographers gain an understanding of the social world and make theoretical statements about the subjects' perspective, which is the goal of ethnography as a research method.

Ethnography is ideally suited for research topics that are very broad, ambiguous, or have poorly defined boundaries. Topics such as these allow researchers to define the limits of the study, which is sometimes difficult after spending time in the field and continuing to collect data. Topics that are best suited to field research are attitudes and behaviors that we can understood more readily when they unfold over time in their natural settings.

The Practice of Ethnography

We can consider ethnography a collection of techniques rather than a single technique. In-depth interviews, life histories, unobtrusive measures, secondary analysis of text, and historical comparative methods are a few of the techniques enthographers use.

Grounded in an approach called *naturalism*, ethnographies involve observing ordinary events in natural settings rather than in contrived, invented, or researcher-created settings. This approach emphasizes that, to be successful, researchers must consider numerous forms of data collection. Ethnographers try to establish themselves in a community and become a natural part of the setting at the same time they take on the role of researcher. How, then, do ethnographers remain loyal to their research agenda and to living their everyday lives among those they are studying?

Dualistic Nature of Ethnography

The nature of qualitative research is nonlinear and flexible. Rather than focusing on the end results, field researchers may let the situation dictate the direction of their research and thus may follow a loose set of steps.

First, ethnographers select a topic. As with most research, personal interests provide the seed for research topics, as being close to the subject and having a strong interest in the topic are advantages for field researchers.

Second, researchers must distance themselves from the subject of their research, including the results that other researchers have reported in literature on the subject. As researchers defocus, they let go of preconceived stereotypes about their subjects and tell themselves to observe everything, not just what they may consider important at the onset.

Third, successful ethnography involves research strategies. Field researchers must consider how to enter the group, organization, or society they intend to study, including finding gatekeepers and various informants. Ethnographers must decide how much to tell the subjects about their own personal lives, experiences, interests, and belief systems. The very role of researchers might cause the group members to behave differently than if they believed they were simply welcoming a new member. This presents an ethical dilemma. Do researchers disclose nothing at all, deceive the subjects, and get better data? Or do researchers risk affecting the subjects and tell them about the research agenda? As field researchers gain more trust, are exposed to more sensitive information, and become parts of the groups, this issue must be resolved.

Throughout the ethnography, researchers act as both members and scientists. The dualistic nature of this work forces ethnographers to be constantly aware of their roles as participants and as observers. This can affect reliability and validity in terms of overall generalizability. Are the researcher's observations about an event or member consistent and accurate to the meaning put forth by the group's members? Does it make a coherent picture of the situation and setting? Do the data and conclusions fit with the overall context of the study?

Qualitative researchers are more interested in depth of knowledge than breadth of knowledge. Ethnography often involves not simply what is said or done but the underlying context of what is expected or assumed. This highly depends on researchers' insights, awareness, suspicions, and questions.

Classic Ethnographies

A number of ethnographies emerge as classics in the field of anthropology. Among these are the works of Malinowski (*The Trobriand Islands,* 1915; *The Argonauts of the Western Pacific,* 1922), Radcliffe-Brown (*The Andaman Islanders,* 1922), Mead (*The Coming of Age in Samoa,* 1928), Turnbull (*The Forest People,* 1962), and Evans-Pritchard (*The Nuer: A Description of the Modes of Livelihood and Political Institutions of a Nilotic People,* 1968). These researchers develop stories of the cultures and situations in which they studied, and thus have provided insights into specific cultures that may have otherwise gone unnoticed.

Ethnographies expand awareness of global culture, reduce ethnocentric views, and establish significance for ritual, practice, and cultural idiosyncrasies.

— Erin Elizabeth Robinson-Caskie

See also **Participant-Observer**

Further Readings

Agar, M. H. (1985). *Speaking of ethnography.* Beverly Hills, CA: Sage.

Clifford, J., & Marcus, G. E. (1986). *Writing culture: The poetics and politics of ethnography.* Berkeley: University of California Press.

Fetterman, D. M. (1989). *Ethnography: Step by step.* Newbury Park, CA: Sage.

Glaser, B. G., & Strauss, A. E. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago: Aldine.

Goodall, H. L. (2000). *Writing the new ethnography.* Walnut Creek, CA: AltaMira.

Goodall, J. (1988). *In the shadow of man.* Boston: Houghton Mifflin.

Kutsche, P. (1997). *Field ethnography: A manual for doing cultural anthropology.* Englewood Cliffs, NJ: Prentice Hall.

Van Maanen, J. (1988). *Tales of the field: On writing ethnography.* Chicago: University of Chicago Press.

Vincent, J. (2002). *The anthropology of politics: A reader in ethnography, theory, and critique.* Malden, MA: Blackwell.

Ethnohistory

Ethnohistory refers in general terms to the study of the history of a social group from an anthropological perspective. Frequently, this involves using a variety of sources, such as oral history, missionary documents, and travel accounts, to reconstruct the social history of the marginalized peoples who tend to form the subject matter of most anthropological accounts. Historians and anthropologists generally undertake ethnohistorical analysis, and the results are published not just in the journal *Ethnohistory* but also in a wide variety of other scholarly publications. Ethnohistorical research is often used in the legal system, particularly in cases regarding Native American property claims.

Ethnohistory's Beginnings

From its origins, ethnohistory has been an interdisciplinary endeavor. Anthropology and history are the primary contributors, both methodologically and theoretically, to the development of the field. From the perspective of history as a discipline, the interest of the Annales School in reconstructing social institutions, broadly speaking, prefigured the interest and development of ethnohistory within history departments. Within anthropology departments, a concern with historical analysis was evident, to a greater or lesser extent, in different kinds of anthropological research from early on (see below, particularly with respect to the Boasians).

Ethnohistory became a clearly demarcated field of inquiry in the 1940s. Initially, ethnohistory was conceived as a way to supplement archaeological research through the use of documentary evidence. As a concern with acculturation processes became more prevalent in the sociocultural anthropology of the 1940s and 1950s, ethnohistory increasingly fell under the rubric of cultural anthropology. Ethnohistory became a truly recognized field of study after it was institutionalized in the form of the 1954 Ohio Valley Historic Indian Conference, which became the American Society for Ethnohistory in 1966, and through publication of the journal *Ethnohistory.*

The Historical Axis in Sociocultural Anthropology

It is, in general, a mistake to argue that "time" or "history" never existed as operational concepts in sociocultural anthropology. The earliest anthropologists in the United States, the Boasians, were quite concerned to trace the diffusion of cultural, linguistic, or other traits over time among native populations. In this respect, they share the legacy of the German diffusionists, who performed the same type of reconstruction in the Pacific, India, and Africa. In general, the Boasians were interested in the study of human pasts to the extent they were interested in the holistic reconstruction of human societies.

However, it is also clear that the Boasians were not engaged in the study of history for its own sake. They never fully reconstructed the past of a culture, and they did not use extensive documentary evidence to aid in their research on the recent past. Indeed, many Boasians, as well as structural functionalists, felt that the documentary evidence would not support research into the cultural phenomena they hoped to study. This thinking ignores the incipient ethnohistorical research present since the "discovery" of the New World, in the work of Landa, Sahagún, and Las Casas. This theoretically subservient use of history characterizes most of the ethnography before the 1950s and not an insignificant amount of it since.

Nor was history of great relevance to the neoevolutionists. Edward Tylor, like the American Lewis Henry Morgan before him, viewed culture in a unilinear evolutionary paradigm. A straightforwardly developmental model that placed Western civilization at the end point of an inexorable cultural movement, Tylor's anthropology and that of contemporary social anthropologists maintained little to no interest in the documentary evidence as a way into understanding the past of cultural groups. In contrast to Émile Durkheim's mechanical/organic typology, which in principle allowed for variation and erratic movement between its end points, the unilinear view held that development proceeded through a series of already well-defined stages.

Those following in the Durkheimian paradigm also generated ahistorical analyses. Interested in the structure of primitive society, they were perhaps not as explicitly evolutionist as Tylor, but neither were they diffusionist Boasians. The *Année Sociologique* tradition referenced the Durkheimian typology of mechanical/organic, which was also a typology of primitive/modern and thus implicitly evolutionist. The French tradition marks the beginning of the study of culture internally—largely free from contextualizing features such as time and place. The social body is understood to structure everything from totemic classifications to religious experience.

With the advent of functionalism and structural functionalism, the general disinterest in time and history continued. For example, Bronislaw Malinowski ignored the study of history in his attempt to elucidate the structure of Trobriand social life. Alfred R. Radcliffe-Brown's biological metaphor of culture as organism naturally developed from Durkheim's interest in social structure. And indeed, Radcliffe-Brown argued explicitly against historical research in anthropology.

Claude Lévi-Strauss's structuralism is the most clearly ahistorical of the models of culture discussed so far. Taking inspiration from de Saussure's structuralist view of language, Lévi-Strauss's binarism

effectively ignores the passage of time. Still, this is not to say that history does not play any role whatsoever in his thinking. Indeed, his massive *Mythologiques* series is devoted to tracing out myths of the Americas in a fashion that is not historical, though certainly implies the passage of time in the comparison of versions of myths. That is, Lévi-Strauss is primarily concerned with the binary mental processes revealed by the study of myth and so partially ignores the question of temporality at the same time that it is suggested in his analysis.

Lévi-Strauss's dominance in the discipline of anthropology in the 1950s and 1960s is usefully seen as the general theoretical background to which many of the first ethnohistorians were responding. It should not be surprising that just as a particular conception of anthropology (as the synchronic study of cultural structure) takes hold, there would be some reaction. This is particularly true of anthropology in the Boasian tradition, which was interested in history and the temporal perspective (if only nominally) from its inception. Hence, ethnohistory, if viewed against the intellectual history of anthropology, is a logical development.

The Practice of Ethnohistory

Ethnohistory, as a subfield of sociocultural anthropology, developed out of, and in reaction to, strands of anthropological encounters with historical method. This is why it could be claimed, in the first issue of *Ethnohistory,* that anthropologists needed to incorporate history into their descriptions, whether through the use of archival work or archaeological analysis. Soon, ethnohistorians began to grapple with the use of other types of information as well, such as oral histories. Jan Vansina and others working in Africa had made persuasive arguments that oral history is a genuine type of history and should be accorded a great deal of importance in reconstructing a group's past, although one did need to question the details of the storytelling event—who was telling the story, for what purpose. This example highlights a major difference with the (U.S.-conceived) ethnohistorical approach outlined above, because initially, members of the newly founded subdiscipline were interested more in documentary evidence than in oral history. It is worth noting the similarity between Vansina's and Boas's approach. Ultimately, Vansina's goal was a more complete picture of the past than Boas, the latter using discrete myths in order to trace diffusion, but both accepted that there is truth in an oral narrative.

In addition to documentary evidence, archaeological reconstruction played an important role in ethnohistorical analysis. Perhaps due to the greater presence of archaeological research efforts in North America (and the Americas generally) than in sub-Saharan Africa, the written and material records were combined to yield rich, diachronic pictures of ethnic groups. Another striking characteristic of ethnohistory is that it was conceived in a consciously political environment: the fight for Native American rights. The drafting of the Indian Claims Commission Act (ICCA) of 1946 allowed groups of Native Americans to sue the U.S. government for compensation for land that was taken illegally (see Indian Claims Commission Act, 25 U.S.C.A. sec. 70 *et seq.*). The journal *Ethnohistory* was a forum in which scholars, who were occasionally called as expert witnesses in these ICCA cases, could present their material, although the practice does not seem to have been frequent (but see *Otoe and Missouria Tribe of Indians v. The United States,* 1955; *Sioux Tribe of Indians v. The United States,* 1985).

The legal background to ethnohistory likely explains the ethnohistorian's initial predilection for documentary evidence, where written evidence is held up to closer scrutiny in a court of law. Even before the ICCA, individuals, often trained by Boas or in the Boasian tradition, completed extensive reports on the Northwest Coast, Siouan and Muskohegean (Southeast), and Cherokee (Southeast) Indians on behalf of the Bureau of American Ethnology. These reports, some of which remain classic statements even today, were used not just to support theoretical arguments but also to demonstrate migration routes and to document Native American ownership of land.

Studies on acculturation have been influenced by the development of ethnohistory. As discussed above, there was always a conscious temporality in anthropological theory, but it was of time as a series of self-contained stages of cultural development. Only in the research on acculturation did diachrony as an active process begin to appear in anthropological analyses. World system theorists and others, such as Immanuel Wallerstein and Eric Wolf, elaborated further methods of acculturation insofar as they analyzed processes by which European politico-economic forces have influenced societies typically seen as isolated—an inherently temporal approach. Still other anthropologists (for example, Marshall Sahlins) have argued for

the mutual dependence of (cultural) structure and history by insisting that only through the historical reproduction of cultural structure is structure understood by the observer and altered by those living within it. Put more generally, culture makes sense of history just as history causes the reproduction and reorganization of culture. Thus, ethnohistory has helped to refashion our understanding of the relationship between history and anthropology.

Modern Ethnohistorical Approaches

Ethnohistory demonstrates the fruitful engagement of anthropology and history. Historical scholarship contained a critique of anthropology, at least the kind of anthropological work that theorizes culture as a synchronic whole, such as structural functionalism, structuralism, and even some semiotic approaches. Historically nuanced studies of anthropological topics have shown that things as they are (in the ethnographic present) fit the logic of history just as well as, if not better than, any cultural constraint. At the same time, anthropology has broadened the scope of many historical analyses to include not just descriptions of kings and wars but also investigations of social history and cultural patterning as well. Today, ethnohistorical approaches are used almost instinctively by many historians and anthropologists, as well as scholars in related fields, such as cultural studies.

— Michael W. Hesson

See also **Anthropology, Cultural**

Further Readings

Fogelson, R. D. (1989). The ethnohistory of events and nonevents. *Ethnohistory, 36*(2), 133–147.

Shepard, K. III. (1991). The state of ethnohistory. *Annual Review of Anthropology 20,* 345–375.

Trigger, B. (1982). Ethnohistory: Problems and prospects. *Ethnohistory, 29,* 1–19.

Ethnology

The word *ethnology* comes from the Greek words *ethnos,* meaning "people" and *logia,* meaning "study of." Franz Boas said the goal of ethnology was first to describe and explain culture, and then formulate laws about it. While some anthropologists use this term as synonymous with sociocultural anthropology, more often, it means one of the two branches of sociocultural anthropology, the other being ethnography. While ethnography deals with a society in depth, ethnology uses a comparative approach to analyze culture (because of this, in much of the 20th century, social anthropologists concentrated most on ethnography, while cultural anthropologists concentrated most on ethnology). Two current popular ways anthropologists have classified societies is in terms of different modes of production and political organization. In terms of mode of production, one such classification would be in terms of foraging societies, agricultural societies, pastoral societies, traditional states, and industrial societies. In terms of political organization, one such classification would be in terms of band, tribe, chiefdom, and state. Ethnology looks at how people relate to their environment and to other people around them. Ethnologies also do not only describe but also attempt to explain something about culture. While in the past, ethnologists, under the direction of Franz Boas, tried to look at all aspects of culture, many ethnologists today focus on issues of their own specific concern to explain similarities and differences between cultures. Ethnologists often concentrate on specific subfields of anthropology, like psychological anthropology, anthropology of religion, economic anthropology, political anthropology, gender studies, folklore, and the study of kinship.

Three types of ethnology are evolutionary ethnology, comparative ethnology, and historical ethnology. The first anthropologists of the 19th century thought cultures evolved from simpler, more primitive forms to more complex advanced forms. They drew diagrams to show the evolutionary development of societies in terms of things like how people evolved from prerational to scientific, and from magic to religion to science. They also classified societies from least developed to most developed. A chart might then be made of least developed to most developed in this way: Aboriginals, Africans, American Indians, Chinese, Japanese, and English. Two of the most important of the evolutionary ethnologists were Edward Tylor (1832–1917) and Lewis Henry Morgan (1818–1881). Tylor talked about the evolution of religion from animism to polytheism to monotheism, but he said that more advanced civilizations retained primitive features in the form of

survivals. He wrote that all societies could evolve in the same way because of a psychic unity of mankind. This meant that all people would find the same answers to problems independently. Morgan talked about the evolution of the family from promiscuity to monogamy. While evolutionary ethnology remains popular in anthropology, particularly archaeology, which looks at typologies of cultural development such as the band, tribe, chiefdom, and state example, most anthropologists reject the idea of progressive evolution where societies evolve from inferior societies to superior ones. They say people who live in bands may have some advantage over people who live in states.

One of the most important early ethnologies was Ruth Benedict's *Patterns of Cultures,* written in 1934. She wrote about cultures as having a particular psychological character in terms of the United States, Zuni, Dobu, and Kwakiutl. Similarly, Margaret Mead looked at Samoa and New Guinea in part to deal with issues in the United States. Malinowski had also done ethnology by showing how Freud's oedipal complex could vary across cultures. In the 1950s, many anthropologists used the Human Relations Area Files to do ethnology, in what is called "holocultural comparison." Other types of ethnology included the structuralism made popular by Claude Lévi-Strauss and regional and local-level comparison among cultural ecologists, ethnoscientists, and some functionalists. In recent years, anthropologists have used ethnology to deal with issues of how to understand "big men" in Melanesia.

Comparative ethnology tends to be more theoretical compared to ethnography, which tends to be more descriptive. Theory influences how anthropologists understand particular cultures. We can see this in terms of two accounts of the village of Tepotzlan in Mexico and two accounts of Samoa. Robert Redfield, who did research in the Mexican village of Tepotzlan in 1926, wrote that folk communities had more harmony than cities. He described Tepotzlan as a harmonious place. Oscar Lewis visited Tepotzlan in 1943 and found discord. Lewis saw the discord in a relatively peaceful village because he was looking for things that Redfield was not. In 1925, Margaret Mead did research in Samoa and said Samoan adolescents had much more sexual freedom than Western ones. Derek Freeman, who had done research in Western Samoa in 1940 and 1943 and did research where Mead had done from 1963 to 1965, said that the Samoans Mead had seen had lied to her. Other anthropologists who have conducted research in the area, Lowell and Ellen Holmes, say that Mead was basically correct, though she had exaggerated some things. While this matter is not settled, Mead and Freeman both had different theories, and their theories definitely influenced what they said about this part of Samoa. One of the most important theoretical debates today in anthropology is whether anthropology is more a science or a humanity. Various theories, including cultural materialism and hermeneutics, have entirely different answers to these questions. Comparative ethnology is also sometimes used to oppose theory, so that ethnology has been used to show limits of the theories of Wallerstein's world systems theory and Said's concept of orientalism.

Historical ethnology deals with ethnohistories. Ethnohistories look at how a particular culture has changed over time. To do this type of ethnology, an anthropologist has to look at written records and try to reconstruct what a particular culture looked like during different points of time. Generally, anthropologists have to use records not written by anthropologists and deal with the biases of those recording the accounts. Ethnologists act like historians except that they generally deal with the records written about the people rather than records written by the people themselves. Some historical ethnologists looked at transformations of a specific movement, such as the Ghost Dance Movement of Native Americans. Recently, anthropologists like Eric Wolf, Clifford Geertz, and Marshall Sahlins have focused on the changes that take place as cultures have come in contact with Western culture and capitalism.

— *Bruce R. Josephson*

See also **Anthropology, Cultural; Benedict, Ruth; Ethnographer; Ethnohistory; Ghost Dance; Mead, Margaret**

Further Readings

Barnouw, V. (1977). *An introduction to anthropology: Ethnology.* Homewood, IL: Dorsey Press.

Geertz, C. (1973). *The interpretation of cultures.* New York: Basic Books.

Gingrich, A., & Fox, R. (2002). *Anthropology, by comparison.* New York: Routledge.

Holy, L. (Ed.). (1987). *Comparative anthropology.* Oxford: Blackwell.

Vogt, F. (1975). *A history of ethnology.* New York: Holt, Rinehart, & Winston.

ETHOLOGY AND ETHNOLOGY

Among students of early humans in the Americas, the theory that the first hominids had come across a land bridge over the Bering Strait from Siberia was a reliable way of answering the question of how human groups first reached North, Central, and South America. Although the time span varied, this theory had stood the passage of time. However, in July 1996, the discovery of skeletal remains in Washington State posed an interesting—and controversial—challenge to the accepted theory.

As Andrew Slayman wrote in *Archaeology* magazine, "The skeleton came to light in Kennewick, Washington, during a hydroplane race on the Columbia River. Will Thomas and Dave Deacy, residents of nearby West Richland, stumbled across the skull while wading at the edge of the river." While the discovery, in and of itself, seemed not to be the stuff of heated controversy, what followed became just that. As Slayman noted, CT-scans of the skeleton, which was some 8,400 years old, showed that the point of origin had been Europe—not Siberia or Asia. The scientists who came to this conclusion were Catherine J. MacMillan, a professor emeritus at Central Washington University, and the anthropologist James Chatters.

The discovery, and the conclusion of the scientists, raised a telling challenge to the accepted theory. Even more, it offered a challenge of even deeper immediacy to the Native Americans, who, if this discovery were accepted, would suffer severe loss of self-esteem by being displaced as the true, original inhabitants of the Americas. Even more alarming news came when Grover S. Krantz of Washington State University observed that the skeleton, dubbed "Kennewick Man," "cannot be anatomically assigned to any existing tribe in the area, nor even to the Western Native American type in general . . . It shows some traits that are more commonly encountered in material from the eastern United States or even of European origin, while certain other diagnostic traits cannot presently be determined."

The Native American tribes, especially those living in the Pacific Northwest, became outraged at the thought that the central part of their heritage might be denied them. Supporting the tribes, the U.S. secretary of the interior, Bruce Babbitt, offered his opinion. According to Jeff Benedict in *No Bone Unturned,* Babbitt determined that Kennewick Man "was Native American and belonged with the five tribes in the Northwest." The U.S. Army Corps of Engineers, with Babbitt's approval, planned to turn the remains over to the tribes for burial. While this would have satisfied a deep need among Native Americans, it also would have deprived science of a rare opportunity to study the earliest days of human habitation in North America. For 6 years, attorneys Paula Barran and Alan Schneider carried on a legal battle to prevent the federal government from giving Kennewick Man to the tribes. Finally, on August 30, 2002, federal Judge John Jelderks ruled against the government in the case. Although the case ended on a sad note for Native Americans, it did give scientists a chance to perhaps rewrite the early history of mankind in the Americas.

— John F. Murphy Jr.

ETHNOMEDICINE

The nature and experience of affliction and the causes and consequences thereof vary from culture to culture and, over time, within a culture. Cultures have developed more or less organized approaches to understand and treat afflictions, and identify the agents, forces, or conditions believed responsible for them. Ethnomedicine is that branch of medical anthropology concerned with the cross-cultural study of these systems. While medical systems or elements thereof were foci of research early in the 20th century in the work of W. H. Rivers, the study of popular systems of health and illness did not coalesce into a field of study in anthropology until the 1980s. Foundational formulations of the field of medical anthropology appeared in the 1950s and 1960s, in the works of such writers as William Caudill and Steven Polgar.

Indigenous medical beliefs and practices appeared earlier in works focused thereon, as well in ethnographies of religion and culture and personality. Ethnomedicines were conceptualized in terms of an idealized Western medicine, *biomedicine.* Anthropologists considered it to be of an entirely different

order than medicines of other cultures, and the term *ethnomedicine* reflected this radical dichotomy.

Ethnomedicine–Old

Ethnomedical beliefs and practices were the products of indigenous cultural developments outside of "modern medicine." Writers unabashedly referred to such systems as "primitive," and "irrational." Because these systems were assumed to be based upon custom, they were, by definition, inefficacious "beliefs" in contrast to the putatively certain "knowledge" of biomedicine. Whether they were the ultimately biological theories of misfortune (witchcraft, as among the Azande) or the diagnosis of skin maladies among the Subanun, any reported ethnomedical efficacy derived "coincidentally" when their beliefs paralleled those of "scientific" medicine.

Early researchers, from Rivers forward, recognized the intimate interconnections of medical with other cultural ideas; no separation existed between medicine and other cultural domains such as religion, gender, or social structure. Researchers assumed this separation held for biomedicine.

Ethnomedical studies' central foci of concern were systems of classification of illness and etiological theories. Researchers developed broad generalizations that often served to bolster the dichotomy between "primitive" or folk medical systems and "scientific medicine." These etiological theories were dichotomized and classified as concepts as "naturalistic" (caused by outside forces and events such as ecological changes) or "personalistic" (caused by specific agents such as witches or sorcerers) or "externalizing and internalizing" medical systems. Such notions dichotomized ethnomedical systems in terms of their logic.

Diagnosis and therapeutic approaches to illness, including rituals, pharmacopoeias, and body manipulation, attracted attention as did the healers themselves. Shamans as well as sorcerers and diviners received considerable interest, including research on recruitment. A research staple was the plethora of folk, or culturebound, disorders (for example, susto, amok, latah, koro). Ethnomedical nosologies are not universal, as biomedicine asserts with respect to its own classifications. Rather, such systems are local, as are many of the illness entities they classify. An example is the well-studied system of humoral pathology in the Americas. As well, what is regarded as a symptom of illness or health varies from culture to culture. Signs of sickness in one culture are signs of health in another. This is the case with depressive ideation, which is seen as troubling in the United States but suggests growing enlightenment in Buddhist cultures.

Ethnomedicines have a wide variety of healing strategies. They include magical/religious means as well as mechanical (body manipulation) and biochemical agents and compounds (for example, purgatives, poultices, drugs). Biomedical compounds also may be employed within a folk medical system, where criteria of usage diverge from that of biomedicine. Therapies may integrate biomedical ideas into traditional practices or reconceptualize such ideas in light of local realities, as with folk systems in the U.S. South. Of concern, too, are indigenous preventive measures. These measures take specific, local forms, depending on indigenous etiological theories. Encounters and transactions in the context of healing were central and have renewed interest due to the increasingly sophisticated semantic, narrative, and linguistic analyses in all medical contexts.

Ethnomedicine–New

The anthropology of biomedicine in the late 1970s and early 1980s permanently altered the perception of biomedicine. The view of it as acultural, rational, and scientific rapidly became unsustainable. The theory and practice of biomedicine is thoroughly cultural and local, with distinct local biologies underlying biomedical research and practice in the West and beyond, as with the notions of "race," that shape scientific/medical research and practice. Biomedical theory and practice is also gendered and generally ignores differential social status and its attendant differences in mortality and morbidity and the geography of affliction.

The term *ethnomedicine* originally included the professional medicines of other cultures, suggesting that these were merely more formalized folk medicines, with rare exception. These professional medicines include Ayurvedic (India), Unani (Middle East), traditional Chinese medicine (TCM), and Kanpo in Japan.

Such medicines evidence all of the features that earlier writers suggested distinguished biomedicine from them: dedicated educational institutions, formal curricula, licensing, pharmacopoeia, divisions of labor and specialization, experimentation, change over time, and written texts.

Biomedicine now is seen as one of a number of professional ethnomedicines. Instead of asserting that "we" have (bio)medicine and "they" have ethnomedicine, we now recognize that all medical systems are medicines. Now, issues of difference and power are foci of research in studies of practice as well as the new biomedical technologies and procedures (for example, definitions of death, organ transplantation).

The new ethnomedicine allows us to examine health and illness experientially, phenomenologically, and in terms of social causes of illness and distress and to dispense with the biased implicit suppositions that framed the early medical anthropological gaze on non-Western medicines.

— *Atwood D. Gaines*

See also **Ethnopharmacology; Ethnopsychiatry; Health Care, Alternative; Medicine Man; Shaman**

Further Readings

Bird, C., Conrad, P., & Fremont, A. (Eds.). (1999). *Handbook of medical sociology* (5th ed.). Englewood Cliffs, NJ: Prentice Hall.

Casey C., & Edgerton, R. (Eds.). (2005). *Companion to psychological anthropology.* Oxford: Blackwell.

Ember, M., & Ember, C. (Eds.). (2004). *Encyclopedia of medical anthropology.* Dordrecht, The Netherlands: Kluwer Academic/Plenum.

Gaines, A. D. (1992). *Ethnopsychiatry: The cultural construction of professional and folk psychiatries.* Albany: State University of New York Press.

Kleinman, A., Das, V., & Lock, M. (Eds.). (1997). *Social suffering.* Berkeley: University of California Press.

Lock, M., Young, A., & Cambrosio, A. (Eds.). (2000). *Living and working with the new medical technologies: Intersections of inquiries.* Cambridge: Cambridge University Press.

Post, S. G. (Ed.). (2004). *Encyclopedia of bioethics* (3rd ed.). New York: Macmillan.

Ethnopharmacology

Ethnopharmacology is the cross-cultural study of how people use plants, animals, fungi, or other naturally occurring resources for medicinal purposes. Such knowledge provides the basis for the herbal remedy industry and has led to the development of at least 121 pharmaceuticals. Often, this involves observation of how a traditional remedy is used; then, the effective chemical compound is isolated in a laboratory for commercial production. In an early example, the French naturalist Jean B. C. T. Leschenault de la Tour brought a plant of the genus *Strychnos* to France in 1805, based on its indigenous use in poison arrows in the South Pacific. French chemists isolated strychnine, an alkaloid still widely used in medicine. Pharmacologists have investigated thousands of different plants to derive drugs used for birth control, surgery, malaria, asthma, heart disease, and many other medical applications.

Ethnopharmacology is used as an argument for conserving cultural and biological diversity. "Bioprospecting" refers to collaboration among drug companies, anthropologists, or biologists searching for new drugs. Some human rights organizations call this "biopiracy," because indigenous knowledge is exploited for profit, and they have succeeded in stopping research projects. The search for new drugs using indigenous knowledge may become obsolete due to new technologies that allow pharmacologists to rapidly isolate chemical compounds from natural sources and screen them for medicinal potential regardless of their use as folk remedies. Also, traditional medicinal knowledge may be disappearing as indigenous populations integrate with the global economy.

Not all anthropologists or pharmacologists believe that indigenous knowledge is useful for finding medical cures. Some argue that there are too many symbolic treatments targeted at satisfying emotional needs that have no biochemical basis—known as the "placebo effect." Alternatively, Makoto Taniguchi and Isao Kubo showed that knowledge of traditional African healers was at least four times more likely to produce useful compounds than a random selection of plants from the same environment. Anthropologist Nina L. Etkin argued that a fundamental cross-cultural problem is that indigenous peoples often have different symbolic interpretations of an illness that may be biologically identical to a medically defined illness. She suggested that ethnopharmacologists analyze the complete cultural process of curing, rather than focusing only on which plants are used.

Ethnopharmacology has important implications for evolutionary theory. Plants evolve toxic chemicals as defenses against herbivores. Kenneth E. Glander,

Barry A. Bogin, and Timothy A. Johns have argued that higher primates evolved in biologically diverse environments and used taste to optimize nutritional intake, while minimizing toxins. Knowledge of beneficial toxins that reduce parasites is transmitted through primate troops. Higher cognitive abilities of humans allow for symbolic interpretation of taste and illness symptoms and more complex cultural transmission. Johns argues that agriculture reduced dietary diversity, increasing the need to culturally identify beneficial toxins. Contrary to the popular notion that rain forests harbor the greatest medicinal potential, John R. Stepp and Daniel E. Moerman have shown that indigenous people rely heavily on weeds growing in agricultural areas or near houses for medicines.

— David G. Casagrande

See also **Ethnomedicine; Ethnopsychiatry; Tropical Rain Forests**

Further Readings

Berlin, B., & Berlin, E. A. (2004). Community autonomy and the Maya ICBG project in Chiapas, Mexico: How a bioprospecting project that should have succeeded failed. *Human Organization 63,* 472–486.

Etkin, N. L. (1993). Anthropological methods in ethnopharmacology. *Journal of Ethnopharmacology 38,* 93–104.

Johns, T. A. (1990). *With bitter herbs they shall eat it: Chemical ecology and the origins of human diet and medicine.* Tucson: University of Arizona Press.

Ethnopsychiatry

Ethnopsychiatry is that branch of medical anthropology focally concerned with mental health and illness. Historically, ethnopsychiatry studied the theories and practices of "primitive" or folk psychiatries. Such work generally involved the application of then current western "psychiatric" (unmarked) "knowledge" and practice to the ethnopsychiatries of other cultures. The field of ethnopsychiatry was first delineated by Hungarian-born, French-educated and U.S.-trained psychoanalytic anthropologist and classicist George Devereux (né György Dobó) (1908–1985). His colleague, Dr. Louis Mars, a Haitian psychiatrist, coined the term.

In Devereux's original conception, ethnopsychiatry is double sided. First, it is " the systematic study of the psychiatric theories and practices of a primitive [sic] tribe. Its primary focus is, thus, the exploration of (a) culture that pertains to mental derangements, as (locally) understood" (Devereux, 1961, p. 1). Second, the field is the study of "culture and the abnormal."

The ethnopsychiatric rubric now subsumes a wide variety of studies. They include works from the history and philosophy of medicine and psychiatry as well as from anthropology and allied social sciences. The merging of once distinct disciplines has been occasioned by the interpretive turn in the social sciences. The semantic or hermeneutic and cultural constructivist positions have served to deconstruct dominant discourses of Western medicines and open them to far-ranging analyses that expose the reality of the variety of professional psychiatries and their respective cultural cores. Early on, colonialist psychological projections could be seen as the bases of ethnopsychiatric investigations serving to (re)create notions of otherness of the externally and internally colonized.

Psychiatrists have assumed that Western nosologies and disease entities are universal. Whereas traditionally, ethnopsychiatry focused on folk systems almost exclusively, the "New Ethnopsychiatry" took as its subject all forms of ethnopsychiatric theory and practice, whether folk or professional, in the East or West. It further redefined the clinical encounter as an engagement between healer and sociocultural, historical representative rather than patient-as-biological-unit. This perspective represented an updating and a localizing of Devereux's original conception and sees professional systems of medicine as equally culturally constructed and situated in local cultural historical and moral contexts.

Ethnopsychiatric research now includes the application, as well as study of Western psychological, psychiatric, and psychoanalytic theories themselves in the investigation of psychic lives. Ethnopsychiatry today recognizes that a cultural, rather than a universal, psychology underlies specific folk or professional psychiatries. In anthropology and in professional ethnopsychiatries, the terms *cross-cultural* or *cultural psychiatry* are often used to refer to work at the interface of culture and mental illness and health.

In the New Ethnopsychiatry, the application of German, U.S., or French psychiatric knowledge to another culture provides insight and data both on the psychiatric system from whose perspective the study is conducted as well as that system or systems serving as the object of study. The distinction between folk and professional ethnopsychiatries is now seen as one of degree, not of kind. The former term applies to an informal system that concerns an abnormal ethnopsychology and its treatment, while the latter refers to a formal such system that evidences licensing, educational institutions, written texts, and so on.

The New Ethnopsychiatry, unlike the old, has direct relevance to the theory and practice of professional ethnopsychiatry as well as to anthropology. Increasingly, from within psychiatry, there is recognition of the central role of culture and cultural identity. One here notes the ethno- (or cultural) psychiatry clinics established in Montréal, Paris, Cambridge, Massachusetts, and San Francisco.

In the fourth edition of the *Diagnostic and Statistical Manual of the American Psychiatric Association* (1994) and its text revision (2000), there appears an "Outline for Cultural Formulation and Glossary of Culture-Bound Syndromes." The American Psychiatry Association has published a manual on culture assessment that covers individual cultural identity, etiological theories, culture-specific stressors and supports, cultural features of the patient/physician relationship, and a section on overall cultural assessment for therapy and planning.

However, there is yet the tendency in professional U.S. ethnopsychiatry, in line with its "biological essentialism," one of its two main orientations, among others, to biologize and, therefrom, to create notions of fundamental differences among social categories. With respect to ethnic populations, the biological essentialism reproduces cultural notions of "race" to the detriment of these populations. Gender also plays a role, often negative, in biomedical and psychiatric practice, as does age and social standing. These cultural features demonstrate the validity of the conception of psychiatry as ethnopsychiatry.

A key focus, past and present, has been on local cultural understandings of mental disorder and signs thereof. Such considerations focus on all ethnopsychiatries.

The personal meanings embodied in and the experience of such disorders, illness narratives, more recently have become foci of research. Also of interest are diagnostic and therapeutic practices, including psychopharmacology. Pharmacology studies now include constructions of ethnicities that are allegedly biologically distinct (i.e., like "races"), which "may benefit" from different dosages or different agents.

The study of illness course and outcomes has been important for demonstrating the cultural and social bases of even the major psychiatric illnesses. Work also demonstrates that institutions reflect cultural values and in turn influence the experience and behavior of those living in them, whether hospitals or today's prisons.

The New Ethnopsychiatry incorporates into the clinical setting and psychiatric thinking previously excluded domains of experience. These include the suffering of those subjected to illness and violence and marginal social status (for example, refugees, immigrants).

The New Ethnopsychiatry engages ethnopsychology because of the intimate relationship of the medical/psychiatric with nonmedical notions of self and person, identity, gender, emotion, and cultural history from which notions of affliction derive. Central conceptions of person continue to attract attention in folk psychiatries, as they have in professional psychiatries since its introduction into that literature.

A new area of interest is that of psychiatric bioethics and geropsychiatric bioethics incorporating studies of bioethics.

Chronic ethnopsychiatric conditions, some new to the gaze (and how these are endured and managed by self and others) differ from our usual focus on acute problems. Increasingly, we see interest in geropsychiatry, especially the dementias, such as Alzheimer's disease (AD). This research brings aging into ethnopsychiatry's gaze. The interest in dementia entails the study of the sciences involved in the construction of AD as a disease (and not brain aging).

A stock-in-trade of ethnopsychiatry has been the study of culturebound syndromes. Now, however, researchers often consider Western disorders as culturebound. This perspective actually began in the work of this field's founder, George Devereux, and his analysis of schizophrenia as a culturebound syndrome, in 1963.

— *Atwood D. Gaines*

See also **Dementia; Ethnomedicine**

Further Readings

Desjarlais, R., Eisenberg, L., Good, B., & Kleinman, A. (Eds.). (1995). *World mental health: Problems and priorities in low income countries.* Oxford: Oxford University Press.

Devereux, G. (1961). *Mohave ethnopsychiatry.* Washington, DC: Smithsonian Institution, Government Printing Office.

Fernando, S. (2003). *Cultural diversity, mental health, and psychiatry: The struggle against racism.* London: Brunner/Routledge.

Gaines, A. D. (Ed.). (1992). *Ethnopsychiatry: The cultural construction of professional and folk psychiatries.* Albany: State University of New York Press.

Gaw, A. (2001). *Cross-cultural psychiatry.* Washington, DC: American Psychiatric Association.

Good, M. D., Brodwin, P. E., Good, B. J., & Kleinman, A. (Eds.). (2002). *Cultural assessment in clinical psychiatry.* Washington, DC: American Psychiatry Association.

Jenkins, J. H., & Barrett, R. (Eds.). (2003). *Schizophrenia, culture, and subjectivity: The edge of experience.* Cambridge: Cambridge University Press.

Lebra, W. (Ed.). (2000). *Cultural psychiatry and medical anthropology.* London: Athlone.

Tseng, W.-S., & Streltzer, J. (2004). *Cultural competence in clinical psychiatry.* Washington, DC: American Psychiatric Association.

Whitehouse, P. J., Maurer, K., & Ballenger, J. F. (Eds.). (2000). *Concepts of Alzheimer disease: Biological, clinical, and cultural perspectives.* Baltimore: Johns Hopkins University Press.

Ethnoscience

Ethnoscience is the study of what native people know about the world around them, including biology, zoology, and astronomy. This discipline is concerned with the cultural knowledge and classification systems in a given society. An ethnography, from this methodology, would include all the rules and ideas that a member of a society would need in order to function within its own culture. Ethnoscience began in the mid-1950s as a reaction to traditional ethnographic work, which was thought to be biased toward Western conceptual classifications. The goal of ethnoscientists was to "reproduce a cultural reality as it was perceived and lived by members of a society." In 1956, Floyd Lounsbury and Ward Goodenough published information regarding the semantic analysis of kinship terms. It compared the American Indian Pawnee system with the Truk of the Pacific. These papers presented a method for identifying ideal units and analyzing the organization in structure of classificatory terms. While developed specifically for the purpose of analyzing kinship terms, the general principles can be extended to other domains. During the 1970s, Berlin, Breedlove, and Raven applied this methodology to the way in which people organize knowledge about plants and animals. Their theory emphasized the need to reduce the number of characteristic features used to differentiate species. One technique thought to be used by informants was *attribute reduction,* which simply limits the number of criterial attributes. More simply, "If it quacks, it's a duck." The greater focus for the researchers was *configurational recoding,* where features are chunked together to form a single attribute recognized as a definitive characteristic. In other words, this technique relates "kinds of things"; for example, a husky is a kind of dog because it holds the essence of dogginess. In this system of organization, there are a limited number of levels, and each has a rank determined by what it classifies. The *unique beginner* is a general term encompassing all things included in the taxonomy, for example, the term *plant.* This category can be broken down into life forms, such as "trees," "flower plants," and "vines." Furthermore, there is the level of generic terms, which distinguishes type, such as "palm." The next level determines the specific attributes of the generic term, for instance a "peach palm." The last level is *varietal,* which is rare and used to delineate items of cultural importance. Robert Randall faults this form of analysis by arguing that the anthropologist may be creating the structure by leading the informant's response by the way in which the questions are formed. Despite its criticisms, today, this methodology is used to compare languages through color classifications, as well as influence the development of the discipline of ethnobotany.

One aspect of the emerging field was the adaptation of the methods used in ethnoscience, first employed by Harold Conklin in 1954, with his history work among the Hanunóo. He found that the people had an incredibly rich vocabulary to distinguish their

plants containing more than 1,800 specific plant terms. His study involved how the people organized this information.

— *Luci Fernandes*

See also **Ethnosemantics**

Further Readings

Dandridge, R. (1995). *The development of cognitive anthropology.* Cambridge: Cambridge University Press.

McGee, J. R., & Warms, R. L. (2004). *Anthropological theory: An introductory history.* Boston: McGraw-Hill.

Randall, R. (1976). How tall is a taxonomic tree? Some evidence of dwarfism. *American Ethnologist, 3,* 545–546.

Ethnosemantics

Ethnosemantics, sometimes called "ethnoscience," is the scientific study of the ways in which people label and classify the social, cultural, and environmental phenomena of their world. Beginning in the 1960s, ethnosemantics continued the Boasian tradition of focusing on linguistic relativity and the importance of native language terms, with a focus on developing theories of particular cultures, rather than an overarching theory of culture in general. Nevertheless, ethnosemantic studies have contributed to the latter by making it possible to find universal constraints on the ways in which humans deal linguistically with their environments.

One of the best examples of this is the terminology people use for naming colors. Studies have shown that while color-naming systems vary, the different systems can be organized into an implicational scale. All languages appear to have terms for black/dark, white/light, and red. If a language has four terms, it adds either green or yellow; the fifth term added is the missing yellow or green; the sixth is blue; and so on. Because color varies continuously along a spectrum, the boundaries between colors tend to be arbitrary: For example, the boundary between English green and blue is not the same as the boundary between Spanish *verde* and *aula.* The scope of red, however, is relatively uniform, a result of the biology of color perception that makes the wavelengths in the red area of the spectrum the most neurologically salient part of the spectrum.

Many ethnosemantic studies have focused on folk taxonomies, especially folk biology and botany. In taxonomy, the dominant relationship between categories is hyponymy. For example, *animal* is a hypernym or superordinate category; *mammal, fish,* and *bird* are hyponyms, or *kinds of* animal. One interesting find is that folk biological taxonomies tend to correspond fairly well to the Linnaean system at the level of genus and species. A related problem in ethnosemantics involves the ways in which people classify other people and themselves into putative biologically based "racial" categories; these categories may be relatively crisp (the U.S. hypodescent rule) or fuzzy (as in most of Latin America).

Another important domain of ethnosemantic study is kinship, the way in which people who are considered relations are classified and labeled. At their extremes of complexity, kinship terminologies may be minimally descriptive, as in Hawaiian, in which aunts and uncles are lumped with "mothers" and "fathers," and cousins are "sisters" and "brothers." Or they may be maximally descriptive, as in the Sudanese system, where each position has a unique label.

A technique sometimes used in ethnosemantics is componential analysis, which analyzes the meaning of a term into its components. For example, a componential analysis of the Aymara (Bolivia) pronoun system would take the speaker and the hearer as separate components, with each being either present or absent:

	speaker	*hearer*	
jiwasa	+	+	(you and I)
naya	+	–	(I/we, not you)
juma	–	+	(you, not me)
jupa	–	–	(neither you nor me; they)

Ethnosemantic studies continue to be relevant as anthropologists and linguists investigate the relationships between language, thought, and behavior.

— *Ronald Kephart*

See also **Ethnoscience; Language**

Further Readings

Berlin, B., & Kay, P. (1969). *Basic color terms: Their universality and evolution.* Berkeley: University of California Press.

Lucy, J. A. (1992). *Language diversity and thought: A reformulation of the linguistic relativity hypothesis.* Cambridge: Cambridge University Press.

Medin, D. L., & Atran, S. (Eds.). (1999). *Folkbiology.* Cambridge: MIT Press.

Ethology

Ethology is a subdivision of biology that focuses on animal behavior that is innate—a study of animal behavior that holds the belief that most of what animals know is instinctive, not learned. Instincts are genetically programmed behaviors; they generally serve to galvanize the mechanisms that evoke the animal to act or react. Ethology, as a discipline, developed in Europe and became popular in the early 1900s. As a study of animal behavior, ethology also deals with the question of nurture versus nature, focusing on the natural environment and the physiological aspects in that environment. Unlike animal behaviorists, who are generally interested in learned behaviors, ethologists focus on innate behaviors—that is, the behavior developed during ontogenetic development. According to one theory, for example, ducks learn to "quack" like ducks and don't "honk" like geese because the chicks hear their parents while in the egg; thus, they learn to "quack." Early ethologists noted for their work were Herbert Spencer, Charles Darwin, G. J. Romanes, and William James. Major modern ethologists include Konrad Lorenz, Nikolaas Tinbergen, and Karl von Frisch. These modern ethologists unveiled four basic strategies by which genetic programming directs the lives of animals: sign stimuli, motor programs, drive, and imprinting.

Sign Stimuli: A sign stimulus is an external sensory stimulus that triggers a typical, innate behavior (fixed-action pattern). It allows animals to recognize and react appropriately to important objects or individuals they interact with for the first time. For example, baby herring gulls know from birth to whom they direct their begging calls in order to be fed. They also know how to trigger the regurgitation action in their parents in order to receive the food. However, the chick does not recognize the parent itself. It solely relies on the sign stimulus of the vertical line of the herring gull bill and the red spot on the tip of the bill (pecked at to induce regurgitation). Almost any model presenting this visual image would evoke the same reactions from the chicks. Another example involves the graylag goose and its unaltered egg-retrieval pattern. If it sees an egg outside of the nest, the goose rolls the egg with its beak back to the nest using side-to-side head motions. However, the fixed-action pattern is such that any object resembling an egg is rolled to the nest even though it may not be incubated. Fixed-action patterns are innate behavioral patterns that are triggered by sign stimuli. They are carried out to completion even if other stimuli are present or if the behavior is inappropriate (the graylag goose and nonegg objects).

Sign stimuli aren't solely visual. They may be tactile or olfactory, such as in the case of pheromones. The most customary uses of sign stimuli in wildlife are in communication, food gathering, and in warning signals. The various types of communication include visual, chemical, and mechanical communications. Mechanical communication is primarily performed through vibrations through the ground or air. Chemical communication largely includes pheromones that one animal emits to influence the behavior of another species or that of the other gender. Sign stimuli are also used in courting and mating. They are especially prevalent among animals that are usually solitary except during the sexual part of their lives. Sticklebacks, for example, use a system of interlocking releasers to organize their mating. When the sticklebacks' breeding season arrives, the male's underside turns bright red. While the color attracts females, it also provokes other males to attack. As a female approaches the "red" male, she reveals her belly, which is swollen with eggs. This rouses the male to perform the mating dance and then lead the female to his nest. Through a series of movements, the male induces the female to release her eggs so he can fertilize them. If the female is induced in any other way other than the specific movements of the fertilizing male, the male stickleback will not fertilize the resulting eggs, but will eat them instead.

Motor Programs: Motor programs are chained sequences of specific muscles coordinated to perform a single task. Mating dances, stinging actions, and

nest making are all examples of motor programs. There are two classes of motor programs. One is entirely innate (fixed-action patterns), and the other is learned. The first class of motor programs is largely applicable to animals, while the second is largely applicable to humans. The egg-rolling mechanism in geese has been a source of great curiosity to ethologists. The sign stimulus is the egg (or any other round, egglike object); however, the actual act of rolling the egg to the nest is a motor program. It has been recorded that the goose will continue rolling the egg cautiously into the nest even after the egg has been removed. The goose itself does not "think" about performing this act, rather it is inclined to it by the sign stimulus of a round object.

The second class of motor programs includes those that are learned. For example, in humans, bike riding, shoe tying, speaking, swimming, and walking are all learned. However, after a certain amount of time and practice, they become so much part of the norm that they can be performed without full conscious attention. They become so almost innate that they can be performed without normal feedback. An example of this class of motor programs in animals is that of the songbird. Though the songbird needs its audio abilities to sing, once it has learned the "songs," it no longer needs to hear what it is singing. This also applies to humans. Once a person learns to speak, no matter if he goes deaf, he can still speak. These motor programs need to be wired early on in development, so that later in life, they become nearly instinctive.

Drive: The third general strategy of ethology is drive. Drives are generally defined as desires or subconscious instincts that are switched on and off depending on inborn timers and chemical releasers. The stickleback, for example, normally is a solitary creature that neither lives with other individuals of its species, nor wishes to. However, at the stage of sexual reproduction, a sign stimulus is formed (the red belly), a drive to reproduce is created, and a motor program is carried out (the series of movements the male performs to induce the releasing of eggs). Drives are the inborn senses that are awakened when animals need to migrate or hibernate. In some frogs and reptiles, for example, as the weather becomes colder, the blood cells perform reverse osmosis in which the cells become extraconcentrated with salt as the diluted water outside of the cells freezes. In essence, these animals freeze during the winter and thaw out once the weather turns favorable. Other stimuli that trigger drives are lengthening or shortening of days. Spring migration and courtship behavior are triggered by the lengthening of daylight, while the shortening of daylight triggers winter migrations and certain cryogenic methods in animals.

While drives are put to sufficient use in the wild, in domestic animals, they are usually pent-up. The effect of this unused motivation is evident in cats. Even though these animals are well fed, they chase and stalk small animals, insects, or toys. In severe cases, they might even attempt to kill, devour, or disembowel imaginary targets. This behavior can occur without a proper stimulus or, in some cases, without even an apparent stimulus. However, as the desires and motivations of wild animals are exercised, they "learn" to ignore normal, repetitious stimuli if no threat or reward exists. Then, as soon as an abnormal stimulus occurs, normal reactions take place.

Imprinting: Imprinting is an example of programmed learning. It is described as the capacity to learn specific types of information at certain critical periods in development. This method of learning is displayed in the young of certain species. Ducks and other bird chicks must be able to recognize their own parents from other adults of the same species. This is also apparent in humans. Babies seem to know their mothers within a few months of birth. They cry and bring attention to themselves when they know they are being held or coddled by unknown persons. While in humans, this process can actually be described as learning and can afford to take a few months' time, in animals, this process of recognition must occur from birth. This immediate identification is accomplished through evolutionary wiring. Ducklings, for example, are wired to follow the first object they see moving that produces the species-specific call. The call triggers a drive in the duckling to follow the object. As long as the object makes the right calls and moves, the ducklings will follow a varied list of objects, such as rubber balls, cans, and humans.

The parental-imprinting phrase is brief, about 36 hours after birth. Another phase of imprinting occurs when the newborn matures and is about to begin mating. While some of the imprinting is helped along by genetics, most is learned, thus making imprinting the only ethological strategy that relies heavily on learning.

Other Areas of Research in Ethology

There are many strategy specific branches in modern ethology. The new areas of research include comparative ethology, analysis of behavioral patterns, and human ethology.

Comparative ethology is a field that tries to find relations in common behavior between animals with a common ancestor that performed this behavior. The primary mission is to investigate biological and behavioral similarities and differences between two different species and make a connection as to why either occurs.

Analyses of behavioral patterns are prevalent not only among animals, but among humans as well. Analysis has been taking place on the observational, neural, and molecular levels. Sensatory learning abilities have been proposed and tested. Mating behaviors and aggressive behaviors have also been thoroughly researched and explained.

Human ethology is a field that compares our own behavior to that of our closest evolutionary relatives, and through a roundabout way, comes to understand our own behavior. Human ethology is also closely related to comparative psychology, a field that discusses the psychological patterns and relations among our genus. Origins of such phenomenon, including origins of nonverbal communication, social behavior, and grooming are explored by human ethologists. New aspects of human ethology include human behavior, genetic psychology, psychobiology, and behavior evolution. The evolutionary basis of human behavior and methods of how to observe and record human behavior are also addressed by this subject. Thus, human ethology goes hand in hand with psychology but has a biological twist. It focuses on evolutionary and genetic traits that are species specific, and on other behaviors that humans have in common with other animals.

— Komanduri S. Murty and Ashwin G. Vyas

See also **Ethology, Cognitive; Lorenz, Konrad**

Further Readings

Eibl-Eibesfeldt, I. (1975). *Ethology: The biology of behavior* (2nd ed.). New York: Holt, Rinehart & Winston.

Hailman, J. P. (1967). *An introduction to animal behavior: Ethology's first century.* Englewood Cliffs, NJ: Prentice Hall.

Lorenz, K. Z. (1981). *The foundations of ethology.* New York: Springer-Verlag.

Lorenz, K. Z. (1996). *The natural science of the human species: An introduction to comparative behavioral research.* Cambridge: MIT Press.

Ethology, Cognitive

Cognitive ethology is the study of higher mental functions in animals. Until about 1980, the possibility of cognitive powers in animals was largely denied. This aversion to thinking about the animal mind was rooted in the deeply embarrassing "Clever Hans" incident.

In the early 1900s, a horse known as "Clever Hans" was apparently taught language, mathematics, and music by a retired German schoolmaster. Hans answered questions by pointing or by tapping his hoof. Thorough tests showed that no trickery was involved. Only after months of experimentation did Oskar Pfungst find the actual source of Hans's cleverness: The horse had discovered that as the tapping or pointing neared the correct answers, members of the audience would tense in anticipation. After the correct number of taps or when the nose had swept to the appropriate object, the observers relaxed.

In an unsurprising wave of overreaction, researchers concluded that animals in general, and horses in particular, had no cognitive powers. Behaviorists, who came to dominate American psychology from 1915 until about 1970, went so far as to deny thinking even in humans; instead, all behavior grew out of conditioning. The other major school studying animal behavior, ethology, accounted for essentially all of behavior on the basis of instinct and innately directed learning; they had little interest in humans. Neither group, then, worried much about thinking.

Telling exceptions to this dominant dismissal of higher mental processes in animals continued to turn up. In 1917, Wolfgang Köhler found evidence of planning in chimpanzees, as did Paul Schiller when he repeated this work 25 years later. In the 1930s and 1940s, Edward Tolman documented several cases of apparent planning in rats, coining the term "cognitive map" to describe the mental manipulations necessary to formulate a novel course of action. Around 1960,

D. S. Olton demonstrated that rats have a maplike maze memory. In the wild, ethologists were finding more and more behavior that seemed to require at least a partial understanding of the problems animals were facing.

Cognitive ethology got its start in 1976, when ethologist Donald Griffin wrote *The Question of Animal Awareness.* His argument was that because evolution predicts continuity between species, and humans have cognitive abilities like planning, thinking, and awareness, then if these mental operations are adaptive, why should we assume that no nonhuman animals can think? The major possible objection to this line of thinking is that some unique human adaptation—most likely language—makes cognition possible. Griffin attempted to show that human mental experience does not inevitably require language and that numerous examples from animals seem to involve analogous—presumably qualitatively similar—cognitive operations. At the same time, work on human language uncovered a widespread set of innate, species-specific circuits that help make it possible.

The ensuing debate sparked research that leaves no doubt that much of the behavior we take as cognitive is routine among animals. Planning novel routes, for instance, is seen in nearly any species with a need, including honeybees and hunting spiders. Mirror-image recognition is evident in chimpanzees, gorillas, and dolphins. Problem solving by thinking rather than trial and error is found in at least chimpanzees and ravens. Honeybees, parrots, and pigeons are among the species that can form concepts. The list goes on and on. Most researchers now agree that the human mind and animal minds have more in common that had been formerly assumed.

— *James L. Gould*

See also **Chimpanzees; Ethology; Instincts; Intelligence**

Further Readings

Gould, J. L., & Gould, C. G. (1999). *The animal mind* (2nd ed.). New York: Freeman.

Griffin, D. R. (1976). *The question of animal awareness.* New York: Rockefeller University Press.

Pfungst, O. (1911). *Clever Hans.* New York: Holt, Rinehart & Winston.

Etics

Etics is a term used by some cultural anthropologists to denote descriptions and explanations of human beliefs and behaviors that are presented in terms relevant to an outside analyst or observer but not necessarily meaningful or relevant to the native practitioners of the culture in question. The linguist Kenneth Pike coined the term etics from the linguistic term *phonetics,* the articulatory, acoustic, or auditory study of the sounds used by speakers of human languages. Pike used etics to represent a level of description of human behavior based on categories meaningfully relevant to scientists but not necessarily to the people performing the behavior.

Marvin Harris and other cultural materialists popularized the term within anthropology by using it to refer to explanations for cultural beliefs and behaviors constructed by objective, scientifically oriented analysts and separate from native explanations. One of Harris's best-known examples is his analysis of the Hindu Indian cattle complex. Hindus revere cattle as sacred and claim that their religion prevents them from killing cattle. However, Harris identified what he saw as objective reasons for not killing cattle, related to their usefulness for pulling plows in the fields and also as producers of dung, which was used as fuel and fertilizer. Furthermore, despite their emic beliefs and behaviors regarding cattle, cattle do in fact end up being killed, particularly male cattle. Thus, the etic level of explanation can be further divided into two categories: *etic-mental* ("Let the male calves starve to death when food is scarce") and *etic-behavioral* ("Male calves are starved to death").

It is important to emphasize that in Pike's original formulation, etics represented a level of description. Pike saw physical behavior, like speech, as composed of waves; humans, however, perceive, categorize, and react to behavior in terms of particles, or contrastive units, which in the case of language correspond to phonemes. Pike's goal of an etic description of any human behavior was to present that behavior in terms of categories relevant to the scientific analysts. Harris and other anthropologists have used the term to represent a level of explanation. Etic explanations correspond very approximately to what some anthropologists refer to as analytic models.

— *Ronald Kephart*

See also **Emics; Models, Anthropological; Phonetics**

Further Readings

Harris, M. (1987). *Cultural materialism: The search for a science of culture.* New York: Random House.

Headland, T. N., Pike K. L., & Harris, M. (Eds.). (1990). *Emics and etics: The insider/outsider debate.* Newbury Park, CA: Sage.

Pike, K. L. (1971). *Language in relation to a unified theory of the structure of human behavior.* The Hague: Mouton.

EUDYSPHORIA

Eudysphoria is a neologism coined by A. Gaines to represent and characterize *dysphoric* (the Greek meaning "hard to bear") affect that is ego-syntonic and positively experienced in particular cultural contexts. The term critiques U.S. ethnopsychiatry's uniformly negative conception of dysphoric affect and highlights the existence of distinct, positive cultural evaluations thereof.

Psychiatry interprets dysphoric affect in the form of depression as the most common major mental disorder and asserts it is largely biological in etiology. However, sophisticated psychiatric epidemiological studies regularly yield incomparable incidence, prevalence, and/or lifetime incidence rates for depression and dysthymia. Some of the varying results derive from "the rhetoric of complaint," a Mediterranean self-presentation style stressing misfortune and suffering that enhances self- and social esteem.

Patterned configurations and modes of expression of eudysphoria are found in several culture areas. In the Latin world, they are labeled *peña, dano, tristitia, débilidad, saladera,* and *nervios.* We find *stenohorias* and *nevra* in Greece and *fatigué/triste touts le temps* in France and among immigrant groups from these areas.

The history of Mediterranean religions exhibits an association of dysphoric affect/suffering and religious piety that has led to its positive evaluation and social utility. In this context, those who suffer or who are blessed equally exhibit the grace of divine attention.

As well, the ability to deeply experience suffering and sadness is a mark of a mature personality. Discursive practices and rituals foster this capacity, which can lead to the popular conferral of the title of "saint."

A second cultural system exhibiting eudysphoria is the Buddhist. Here, what Westerners regard as noxious, dispiriting thoughts of worthlessness, meaninglessness, and futility indicate instead deep insight demonstrative of burgeoning enlightenment and transcendence.

While some authors argue for the importance of culture in shaping depression, they yet commonly assume an acultural, biological substrate. Gaines demonstrated the logical problem with this view. Allowing B = biology and C = culture, and D = depression/dysphoria, as "it" is experienced in a specific culture, we find that Western (ethno)psychiatry presumes that universally, B + C = D.

However, the equation's factors are not single entities. Rather, they are heterogeneous *categories,* comprising various cultures' notions of biology and of distinct cultures, respectively. Biology is a category constituted by a number of the world's distinct *biologies.* Gaines groups these under the general rubric of *local biology.* The second term of the equation, C, is also problematic because the great heterogeneity of cultures is well established. Thus, the equation cannot hold. For a given culture, C1, the formula yields: B1 + C1 = Dl, while for a second, the equation is B2 + C2 = D2. For n cultures, the formula is: Bn + Cn= Dn. However, since D1 D2 Dn, it is illogical to assert that dysphoria or depression (as emotion, mood, or disorder) has either biological or experiential universality.

— Atwood D. Gaines

See also **Buddhism; Ethnopsychiatry**

Further Readings

Casey, C., & Edgerton, R. (Eds.). (2005). *Companion to psychological anthropology.* Oxford: Blackwell.

Gaines, A. D. (Ed.). (1992). *Ethnopsychiatry.* Albany: State University of New York Press.

Horwitz, A. V., & Scheid, T. L. (1999). *A handbook for the study of mental health.* Cambridge: Cambridge University Press.

Kleinman, A., & Good, B. J. (Eds.). (1985). *Culture and depression.* Berkeley: University of California Press.

Leslie C., & Young, A. (Eds.). (1992). In *Paths to Asian medical knowledge.* Berkeley: University of California Press.
Pfleidere, B., & Bibeau, G. (Eds.). (1991). *Anthropologies of medicine.* Wiesbaden, Germany: Vieweg & Sohn Verlag.

Eugenics

Concept

The term *eugenics* was coined by Sir Francis Galton in his book *Inquiries into Human Faculty* (1883). The term is taken from two Greek words: *eu,* which is the Greek word for the adverb "well," and *gen,* which has its roots in the verb *gignesthai,* meaning "to become." Galton described with this word the program of improving the human stock by giving the "more suitable races or strains of blood a better chance of prevailing speedily over the less suitable."

It was the Greek philosopher Plato (427–347 BC) who first developed the idea, which Galton later labeled eugenics. Plato wrote about improving the human stock. He took this idea directly from the successes of animal breeders, especially breeders of hounds and noble poultry. Already in his times, they increased desirable features in livestock by selectively mating only those specimens with the desired trait. In his classical work *Republic* (Book V), Plato proposed measures enforced by the state to foster the procreation of the "best" and to prevent the "worst" becoming parents. Thereby, he did not hesitate to recommend that the philosophical kings, as the leaders of the state, should use lies and deception to convince the people in following their proposals.

Eugenicists at the beginning of the 20th century, following Galton's terminology, used the term "positive eugenics" for the idea of fostering the procreation of the "best" by measures of the state and "negative eugenics" for the idea of preventing the "worst" becoming parents.

Toward Realization and the Discreditation of the Idea

In 1900, three scientists, Correns, Tschermak, and de Vries, independently rediscovered Mendel's "laws of inheritance," written in 1866. They recognized its implications for the study of heredity and the theory of evolution. With this rediscovery, the idea of eugenics became so powerful that a number of leading scientists all over the world started advocating eugenics. New steps were to be taken.

To identify "good" and "bad" genes, research programs were first pursued in both state-supported and private laboratories. Concerning "positive eugenics," the United States enacted the Immigration Act of 1924, reducing the immigration of eastern and southern Europeans to the United States. Britain and Germany changed their family allowance policies in the 1930s. The true topic of the political agenda was "negative eugenics." People with certain forms of diseases, handicaps, or criminal attitudes were sterilized by force. Laws of this kind were declared constitutional in the 1927 U.S. Supreme Court decision of *Buck v. Bell.* By the late 1920s, some two-dozen American states had enacted sterilization laws.

The political agenda of the German National Socialist government included a mixture of racist, ideological, and eugenic ideas. Laws discriminating against handicapped people were introduced as early as 1933. Laws discriminating against Jews were introduced in 1935, and millions of Jews were killed in the gas chambers during World War II. A similar attempt was made against Sinti and Roma. The T4 program (1939–1941 officially, afterwards unofficially) led to the killing of hundreds of thousands of people labeled "unworthy to live," especially those who were mentally handicapped. To foster "positive eugenics" in the Nazi sense, programs like Lebensborn ("spring of life"), in which SS officers mated with selected Aryan women, were undertaken. With the end of the Nazi regime in 1945, eugenics as a term and idea was discredited.

The Reappearance and Reformulation of the Idea of Eugenics

In 1962, with the Ciba-Symposion "Man and His Future," 27 prominent scientists reassessed the original idea of eugenics and spoke openly about improving mankind by genetic diagnosis (negative eugenics) and genetic engineering (positive eugenics). The conference was heavily criticized for its purposes. As a result, instead of fostering the idea of programs to improve mankind, the idea of eugenics was reformulated: The focus is now on the question of whether parents have the right to use genetic diagnosis and

genetic engineering to avoid having children with certain genetic traits and to increase the probability of having children with preferred traits. Especially, technologies like preimplantation genetic diagnosis have the potential to fulfill some of these expectations. This is often called the question of whether liberal eugenics is allowed, and if so, to what extent. On the other hand, genetic screening of whole populations (Iceland, Estonia), together with the Human Genome Project led to a new discussion of the idea of eugenics in the classical sense.

Ethical Considerations

Eugenics initiatives can be divided in two categories: *classical eugenics,* as a program of states or supranational institutions to improve the human gene pool, and *liberal eugenics,* as decisions of individuals or couples to control or improve the genetic makeup of their children. Classical and liberal eugenic initiatives can have a twofold aim: "positive eugenics," in which the frequency of genes presumed "good" is increased, and "negative eugenics," in which the frequency of genes presumed "bad" is diminished. Different methods are available or imaginable to reach these aims: On a macroeugenic level, "positive eugenics" could be put into practice through financial incentives for couples with "good genes," whereas "negative eugenics" could include sterilization laws for couples with "bad genes." Programs could also give incentives for preimplantation genetic diagnosis and prenatal diagnosis in order to prevent the presence of certain genes in the next generation. Even the method of germ line treatment is imaginable to introduce "better genes" and extirpate "bad genes." Couples could use the same technologies for their purposes. An ethical evaluation has to take into consideration the difference between decisions of states and decisions of individuals, between different aims and different methods.

Arguments against classical eugenics revolve around the primacy of privacy: Considering the difficulty, if not to say impossibility, of a precise definition of "disease" and "good and bad genes," every couple should have the right to decide on their own over such issues. This affirmation is correct, but at the same time misleading. We may discuss whether a certain genetically altered genotype should be considered a disease, but we have to acknowledge that there are genetic alterations that are life threatening, such as trisomy 18. However, even if we acknowledge that an alteration of genes causes a life-threatening condition like Chorea Huntington, we have to answer the question of whether a state is allowed to implement a program of "negative eugenics." The question arises because there is an overlapping consensus not to kill a baby with this genetic trait. The reason for this consensus consists in the fact that the newborn can expect about 40 "good" years before the disease will manifest itself. Therefore, we have good reasons to be very careful with political agendas fostering eugenics both negative and positive.

On the other hand, there is a question of how far the freedom to reproduce may go. For example, if human beings who are severely mentally handicapped are not able to take responsibility for their offspring, who are very likely to have a similar mental handicap, then sterilization laws have to be considered. Also for discussion is the question of whether the state is responsible for reducing environmental mutagens to avoid harmful genetic alterations or to give incentives to procreate earlier in life to reduce the risk of children with trisomies. It is a very important point for further ethical discussion whether states have a right to enact laws obliging women to undergo certain forms of prenatal diagnosis or, in the future, preimplantation genetic diagnosis if in vitro fertilization treatment is the case. There will also be forms of gamete selection possible. Some are convinced that these possibilities raise the specter of a political eugenic agenda in which women will be passive recipients of artificially selected embryos. On the other hand, the practically worldwide prohibition of incest shows to a certain extent a common human awareness of genetic risks of relationships between close kin. This prohibition is accepted and rarely questioned.

Concerning liberal eugenics, some forms seem to be accepted in most countries. Abortion after prenatal diagnosis discovering genetic alterations is very common. Even if in some countries, like Germany, these abortions are allowed only because of the risk for the life or health of the mother, in practice, the reason for the abortion is mostly a genetic trait of the child. The huge gap between different aims of liberal eugenics from alterations of chromosomes as trisomy 18 to alterations of genetic traits causing harelip is just as ethically noteworthy as the difference between prenatal and preimplantation genetic diagnosis. This raises the question concerning the

moral status of human preembryos, embryos, or fetuses. It is noteworthy: On one hand, prenatal diagnosis concerns a human being with a beating heart. Preimplantation genetic diagnosis concerns a human morula. In addition, the latter is outside the mother. On the other hand, the possibility of choosing between different human morulas (preembryos) presents an option for prospective parents to choose the morula with certain qualities. This opens a wide field for ethical reflections.

Some methods in eugenics result in the destruction of human preembryos, embryos, or fetuses. Whoever considers the moral status of human preembryos, embryos, and fetuses as in principle (right to live) equal to the moral status of born human beings is obliged to reject any destruction of human preembryos after preimplantation genetic diagnosis or any form of abortion undertaken for genetic purposes. The only exception would be made when the preimplantation genetic diagnosis shows that the preembryo has an alteration of chromosomes that would cause its death during pregnancy or immediately after birth (for example, trisomy 15). An obligation would also exist to reject germ line treatment insofar as the establishment of this technology needs experiments, in which preembryos and embryos would be destroyed. Whoever, instead, considers the moral status of human preembryos, embryos, or fetuses as not equal to the moral status of born human beings has a wide range of moral options depending on his or her ethical framework. In this case, the ethical consideration has to take into account that on the one hand, there is a kind of vertical escalation from "negative eugenics" by individual couples—to "positive eugenics" as a political agenda. On the other hand, there is a horizontal escalation from destroying preembryos, embryos, and fetuses for the reasons that they will not survive their first months after birth—to destructions for reasons that these human beings have certain genetic traits that are not accepted by their parents or the society (highest form of escalation). Answers to the different questions arising from these many forms of eugenics possibilities depend on an ethical framework. A utilitarian will answer them differently from someone in the tradition of Immanuel Kant, and even religions answer them differently.

— *Nikolaus Knoepffler*

See also **Euthenics; Galton, Francis; Genetic Engineering**

Further Readings

Buchanan, A., Brock, D. W., Daniels, N., & Wikler, D. (2000). *From chance to choice: Genetics & justice.* Cambridge: Cambridge University Press.

Kevles, D. J., & Lappé, M. (1995). Eugenics. In W. T. Reich (Ed.), *Encyclopedia of bioethics* (Rev. ed., Vol. 2, pp. 765–777). New York: Simon & Schuster Macmillan.

Winnacker E. L., Rendtorff, T., Hepp H., Hofschneider, P. H., & Korff, W. (2002). *Gene technology: Interventions in humans. An escalation model for the ethical evaluation* (English and German 4th ed.). Munich: Utz.

Euthenics

Euthenics is a branch of art and science that deals with the improvement of human functioning, efficiency, and well-being by modifying controllable environmental factors such as living conditions and education. The word *euthenics* is derived from the Greek word *euthenein,* which means, "to thrive or flourish."

One of the first known authors to make use of the word *euthenics* was Ellen Swallow Richards (1842–1911) in her book *The Cost of Shelter* (1905). She used the word euthenics to mean "the science of better living." In 1926, the *Daily Colonist* summarized euthenics as "efficient living." In 1967, *Technology Week* went on to define euthenics as "man's environmental opportunity," "his education." In all of these nascent definitions, the idea of improving humankind and human functioning by the concept of modifying controllable conditions, such as better shelter, efficient living, and education, is present.

In 1869, an English scientist, Sir Francis Galton (also cousin of Charles Darwin) coined the phrase *eugenics,* which is now defined as the study of human genetics and of particular methods to improve mental and physical characteristics that are inherited. In his book *Hereditary Genius* (1869), he upheld his hypothesis that human mental abilities and personality traits were essentially inherited, in the same manner that hair color, height, and so forth are inherited. This hypothesis was supported by his collection of data and also by analyzing the obituaries in the newspaper, where he traced the lineage of eminent men in Europe and ascribed their success to superior genetics

that were inherited. These findings provided the formative years of the eugenics movement.

A modern adaptation of Galton's view of eugenics is directed toward the discouragement (usually forceful) of the propagation among the "unfit," for example, individuals with traits such as dwarfism or Down syndrome. This is defined as "negative eugenics." Conversely, the encouragement of the procreation of those individuals who are healthy and intelligent would be defined as "positive eugenics."

The encouragement of positive eugenics was seen in societies as early as ancient Sparta. In this culture, the strongest and best warriors were arranged to breed with women who were also strong and skillful warriors, or with the daughter of another powerful warrior. In this way, Sparta's people gave birth to some of the toughest and fiercest armies in the ancient world. It was also no coincidence that Sparta was the only city that did not have a wall around it, because they did not need one.

More modern examples of positive eugenics were applications of such principles that included enforced sterilization of the insane in the United States. Even more recently, in 1994, the Republic of China enacted restrictions on marriages involving persons with disabilities and diseases.

Darwin's theory of "natural selection" is also implicitly a form of natural positive eugenics, in that the dominant males will have more opportunity to breed with the females and thus propagate their more favorable genetics. In addition to this, the females of a species are naturally more attracted to the more dominant male or the "alpha male." Both of these natural methods work to ensure the survival and improvement of the species.

The idea of eugenics differs from euthenics in that eugenics makes a direct attempt to ensure a favorable inheritance of good or desirable genetics. This is demonstrated by the act of selective breeding that is seen in dog or horse breeding, and in plant breeding as well. In selective breeding, the breeder will take top-quality stock that contains the favorable genetics desired in that particular species and breed those animals or plants together. This will directly increase the chances of offspring inheriting favorable genetics.

More recently, with the completion of the Human Genome Project and new advances in biogenetic engineering, attempts can be made to manipulate and potentially improve a species' genetics on a molecular level. Technology can be developed to delete or modify (or turn on/off) genes that are associated with undesirable genetic diseases. The major ethical concern is that the technology can be taken too far in an attempt to create a "super human." Additional concerns deal with the uncertainty of the consequences involved in "playing God."

Euthenics differs from eugenics in that euthenics strives to make improvements in human functioning by altering the controllable environment around the individual. There is no attempt to improve or influence the genetic makeup; rather, the improvement is made after birth. However, both euthenics and eugenics share one theme in common: the amelioration of the species by altering controllable factors, whether genetic or environmental.

It is also worth pointing out another difference in approach between euthenics and eugenics. Euthenics uses education to allow an individual to make a choice about whether to reproduce or not. Eugenics on the other hand, makes the decision and eliminates any choice, for example, through legislation or selective breeding.

The attempt to improve humankind, either via euthenics or eugenics, gives rise to serious philosophical questions, such as: "What do societies value in an individual, or what physical inheritable traits are deemed as an advantage or disadvantage in the human species?" In addition, other perplexing questions will need to be evaluated, such as: "What are the moral guidelines (if any) for improving the species, or how much is too much improvement?" and "Who will make these types of decisions, the government, scientific/ medical specialists, ethicists, or religious leaders?" Answers to these questions will only give rise to further questions.

All of these ethical questions will also (and already have) meet with religious conflicts of interest. For example, some people believe that what you are born with is sacred, and therefore alterations of any type are an offense to God. Of course, with the many diverse types of religions worldwide, euthenics and eugenics will be approached differently.

Legal questions will also arise. For example: "What is the legality of inducing sterilization in individuals with undesirable genetics?" and "What are the legal rights of an individual in regard to prenatal and postnatal alterations?" In addition, the cost to society as a whole has to be considered, such as "Who will be able to afford this type of improvement, and who will ultimately benefit from this?"

The future of euthenics will have a direct impact on modern health care. Improvement of human

functioning can be attainable by providing education about genetic diseases. Therefore, if the population is made aware of inheritable traits that are undesirable and detrimental to health and quality of life, then perhaps those people may be convinced not to reproduce if they possess those traits, thereby preventing them from being passed on. For example, if two individuals both have a moderate or severe form of epilepsy, those two individuals may decide to not reproduce, to prevent passing on this medical condition to their offspring. This would in effect reduce the prevalence of inherited genetic diseases in the population. In addition, society can be given greater scientific education as to what technologic interventions exist and how they can be beneficial, for example, the existence of reliable prenatal screening and other forms of genetic testing.

Besides improving the environment and increasing education, medical interventions after birth will also play a significant part in euthenics. For example, pharmacological advances in new medications, antibiotic therapy, and nutrition can better improve a person's well-being by directly improving physical health in general and without intentional modification of the genetic makeup.

— John K. Grandy

See also **Eugenics; Galton, Francis; Genetic Engineering**

Further Readings

Bennett, J. H. (1983). *Natural selection, heredity, and eugenics.* New York: Clarendon Press.

Carlson, E. (2001). *The unfit: A history of a bad idea.* New York: Cold Spring Harbor Laboratory Press.

Galton, F. (1990). *Hereditary genius: An inquiry into its laws and consequences.* New York: Peter Smith.

Richards, E. (2004). *The cost of shelter.* New York: IndyPublish.com.

Evans-Pritchard, Edward (1902–1973)

Edward Evan Evans-Pritchard was a British social anthropologist known for his ethnographic work among the various tribes of Africa. Evans-Pritchard was born in England in 1902. He studied at the Exeter School, Oxford, and the London School of Economics, under Charles Seligman. In 1945, Evans-Pritchard was appointed reader in anthropology at Cambridge University. In 1946, he was appointed professor of anthropology at Oxford, following the departure of A. R. Radcliffe-Brown. He continued as professor and fellow of All Souls College until his retirement in 1970. The following year, he was knighted.

Evans-Pritchard was a significant figure in the development of British social anthropology. First, and foremost, Evans-Pritchard was a brilliant ethnographer, who carried out fieldwork among the Azande and Nuer of the southern Sudan. His field notes contained detailed descriptions of every aspect of life, ranging from religion to political organization to kinship relations. Evans-Pritchard argued that to fully understand another culture, anthropologists must accurately translate and understand the concepts of another unfamiliar culture. This, he argued, was often accomplished by learning another culture's language and using concepts relevant to that group instead of the anthropologist's own culture. Many of his ethnographies, including *The Nuer: A Description of the Modes of Livelihood and Political Institutions of a Nilotic People* (1940), *Kinship and Marriage Among the Nuer* (1951), and *Nuer Religion* (1952), were written with these ideas in mind.

In contrast to other anthropologists, Evans-Pritchard argued that anthropology was not a natural science, but was most closely aligned with humanities. In an article titled "Social Anthropology: Past and Present" (1950), he argued that anthropology is closely related to history due to similarities in theory and method.

During the 1950s and 1960s, much of his research was focused on the study of religion. In *Theories of Primitive Religion* (1965), he argued against prior notions that religion was constructed for sociological and psychological reasons. Instead, he argued that this idea was biased toward the views of the anthropologist, since quite often they were unable to accurately understand the concepts behind another culture's motivations. This was most readily demonstrated by his juxtaposing of the religious views of believers and nonbelievers. For a nonbeliever, the cultural beliefs of others are often explained as a result of sociological, psychological, or existential phenomena. These phenomena are often seen as unreal and have limited behavioral consequences.

Believers view religion in terms of their reality and the ways in which they should relate or organize their daily activities around these ideas. They generally develop concepts and social institutions that help them to relate these phenomena to reality and deal with the consequences that result from undesirable situations.

Evans-Pritchard continued to work on his ethnographic notes until his death on September 11, 1973. Decades later, his ethnographies remain classic texts that inform us about the non-Western populations of the world.

— *Christina B. Rieth*

See also **Anthropology, Cultural; Anthropology, History of**

Further Readings

Bohannan, P., & Glazer, M. (1988). *High points in anthropology.* New York: Knopf.

Evans-Pritchard, E. E. (1937). *Witchcraft, oracles, and magic among the Azande.* Oxford: Oxford University Press.

Evans-Pritchard, E. E. (1940). *The Nuer: A description of the modes of livelihood and political institutions of a Nilotic People.* Oxford: Oxford University Press.

Evans-Pritchard, E. E. (1951). *Kinship and marriage among the Nuer.* Oxford: Oxford University Press.

Evans-Pritchard, E. E. (1956). *Nuer religion.* Oxford: Oxford University Press.

Eve, Mitochondrial

Mitochondrial Eve is the name given to the idea that the mitochondrial DNA in all modern humans can be traced back to a single genetic lineage, carried by a woman who lived in Africa approximately 250,000 to 150,000 years ago. This idea has been misunderstood by people who incorrectly think that it means that all modern humans can be traced exclusively to one single human ancestor, like the biblical "Eve." This is incorrect because "mitochondrial Eve" is not the ancestral person from whom we can trace our entire nuclear DNA, the DNA that carries the codes to make humans.

Mitochondrial DNA

Mitochondria are small, energy-producing organelles found in eukaryotic cells. They have their own DNA (called *mitochondrial DNA* or *mtDNA*), separate from nuclear DNA, and replicate by themselves. They are thought to have entered into a symbiotic relationship with protoeukaryotic cells earlier than 1.5 billion years ago.

MtDNA is much easier to study than nuclear DNA. There are hundreds of mitochondria in the cytoplasm of each cell, making it easy to extract DNA for study. Human nuclear DNA contains the instructions to make a human being and is 3 billion base pairs long; mtDNA, which primarily contains the information to make the mitochondria, is much shorter, only 16,000 base pairs long (about 0.05% as long). However, there are two major features of mtDNA that make it particularly useful for evolutionary analysis. First, mtDNA accumulates mutations at a faster (but fairly constant) rate than nuclear DNA; these mutations may more often be neutral, instead of advantageous or disadvantageous, so mutations persist instead of being deleted. Second, mtDNA is inherited solely

from the mother, so it does not recombine like nuclear DNA.

This latter point requires some explanation. A person inherits nuclear DNA equally through the egg and sperm of the parents. When sperm fertilizes an egg, it contributes almost exclusively nuclear material; any mitochondria-containing cytoplasm from the sperm does not survive entry into the mother's egg. The two nuclei combine to create a person equally related to each parent. However, the parental mitochondria do not combine; the person inherits mtDNA exclusively from the mother.

Matrilines and "Mitochondrial Eve"

So, while males and females inherit nuclear DNA equally from each parent and pass it on equally, both males and females get their mtDNA only from their mother. Going back one generation, a person is equally related to all four grandparents through nuclear DNA, but only one grandparent through mtDNA (the maternal grandmother). This direct inheritance of the mtDNA lineage makes it possible to reconstruct phylogenetic (or evolutionary) trees using these lineages. This means that the mtDNA of all living people are copies (with some mutations) of the mtDNA from one woman who lived thousands of generations ago.

Sometimes, lineages can be lost. In each generation, some women will not leave mtDNA descendants, as they will have either no children or exclusively sons. This lineage loss is analogous to the family name loss experienced in some cultures where women take their husband's family name; if she has no children or exclusively daughters, the name does not continue. As mtDNA lineages slowly die out over time, there are fewer lineages; eventually, there will be only one lineage remaining: the originator of this lineage has been dubbed "mitochondrial Eve." This name is misleading: "Mitochondrial Eve" may be the most recent common ancestor of our mtDNA, but in the grandparents example above, she is only one of our countless other nuclear DNA ancestors who lived alongside her.

Of course, the picture is muddied because new mtDNA lineages can be added over time. When mutations occur in the mtDNA, these mutations are transmitted down the generations as new lineages. Because of these mutations, modern mtDNA has diverged from the original mtDNA from "mitochondrial Eve." Since these mutations occur at a fairly constant rate, the amount of divergence is roughly proportional to the amount of time that has passed. This helps to calibrate the molecular clock used to determine when "mitochondrial Eve," and her population, lived.

The Molecular Clock

The hypothesis behind the molecular clock is that genetic change occurs at a relatively constant rate and therefore can be used to measure the time elapsed since two species (or two populations) diverged from a common ancestor. Because mtDNA accumulates mutations at a higher rate than nuclear DNA, it is used to calibrate a molecular clock to track recent evolutionary changes occurring from several hundred thousand to a few million years ago.

Comparisons of the mtDNA variation in many species indicate that humans are less variable than many other species, most notably chimpanzees. This suggests that humans have undergone a population bottleneck sometime in the past, followed by a rapid population explosion. For mtDNA, this would mean a large number of lineages were lost quickly, followed by a slow buildup of new lineages. Since modern African populations are more variable than other populations, containing more mtDNA lineages, it is thought that the population explosion began in Africa. Using the molecular clock concept, the evidence suggests that "mitochondrial Eve" lived between 250,000 and 150,000 years ago in Africa.

There are several issues involved in assessing the meaning and significance of the genetic data. To explore modern human origins, the mtDNA is used to track past population movements and to determine when and where the earliest modern human ancestor lived. To do this, one must model gene flow between past populations in different geographic regions, which has proven difficult. Another issue is that of stochastic lineage loss; it is possible to remove old mtDNA lineages from a population while retaining the nuclear DNA material. A third problem is that the assumption that the mtDNA mutations are selectively neutral might not be correct. If natural selection favors one or more of the mtDNA lineages, that can create inaccuracies in the molecular clock. Finally, it has been challenged that mitochondria carried by sperm sometimes make it into the fertilized egg, making it possible for some male mtDNA to

occasionally be passed on; if this is found to happen more than just rarely, it would throw into question the idea that mtDNA is a pure matrilineal marker and invalidate the concept of a "mitochondrial Eve."

"Mitochondrial Eve" and Modern Human Origins

Was "mitochondrial Eve" a modern human? Some of the oldest fossils that are considered to be anatomically modern humans do date from around this time, in Africa. Most phylogenetic trees constructed using mtDNA show that the earliest branches occur in modern Africans and all other modern human groups branch from them. It is possible, then, that "mitochondrial Eve" lived in the population that later left Africa to colonize the rest of the world. Many researchers cite this evidence as support for a recent African origin model of modern human origins. However, critics of this model cite problems with the calibration of the molecular clock and suggest that "mitochondrial Eve" lived much earlier, during a period that predates anatomically modern humans in Africa. This, they argue, is evidence that modern humans share a common mtDNA ancestor as old as *Homo erectus,* which refutes a recent African origin of our species.

"Mitochondrial Eve" and "Y-Chromosomal Adam"

Recent research has suggested that there is a male analog to "mitochondrial Eve," known as "Y-chromosomal Adam." Humans have 23 pairs of chromosomes; one of these is known as the "sex chromosome," which has two forms, X and Y. Females have two copies of the X chromosome, while males have one X and one Y. So, sons inherit the Y chromosome exclusively from their fathers.

Studies indicate that the common ancestor of Y-chromosome lineages lived in Africa between 90,000 and 60,000 years ago, much later than "mitochondrial Eve." If both sets of dates are correct, this may be evidence that the human species experienced another, more recent bottleneck. It also suggests that the creation and loss of some genetic lineages depends on chance. Alternatively, human behavior may play a role; the practice of polygamy may restrict offspring to a smaller set of all males in the group, which might speed up the loss of some Y-chromosome lineages.

The concept of "mitochondrial Eve," that all modern humans share mtDNA descent with one African woman, is compelling. Rather than imagining our ancestors as fossils, it encourages us to imagine the lives of our great-great-grandmothers, thousands of generations ago.

— *Cathy Willermet*

See also **DNA, Recombinant; Evolution, Molecular; Gene Flow; Genetics, Human**

Further Readings

Dawkins, R., & Ward, L. (1996). *River out of Eden: A Darwinian view of life.* New York: HarperCollins.

Sykes, B. (2001). *The seven daughters of Eve: The science that reveals our genetic ancestry.* New York: Norton.

Wells, S. (2003). *The journey of man: A genetic odyssey.* Princeton, NJ: Princeton University Press.

EVIL

The Nature of Evil

The notion of evil is complex but usually involves some combination of or interplay between four basic categories, consisting of two sorts of effect and two sorts of cause or origin. The two sorts of effect are *suffering* and *metaphysical evil*, and the two sorts of cause are *moral* and *natural evil.*

Suffering includes both physical and psychological pain and distress, while *metaphysical evil* involves facts such as the impermanence of the world and the things in it, and especially human death (for simplicity's sake, in what follows, the term *suffering* will generally be used to include *metaphysical evil*). *Moral evil* is roughly what the Christian, for example, would call "sin," the Hindu "p~pa" or "adharma": deliberate actions, typically of human beings, but sometimes of other creatures or of supernatural beings. *Natural evil* is the result of the workings of the natural world as left to itself, without outside or supernatural intervention; it involves natural disasters such as earthquakes, floods, and famines but also individual events such as lightning strikes and sickness. While much if not most discussion in Western traditions of thought has concentrated on the issue of moral evil, other traditions have often been more concerned with the occurrence and degree of suffering and of metaphysical

evil. For example, in the Buddhist tradition, Siddhartha was led to give up his life of princely luxury in order to seek enlightenment (the Great Renunciation) when, for the first time in his life, he encountered old age, sickness, and death and realized that suffering (*dukkha,* which is founded in *anicca,* "impermanence") is universal among human beings. In fact, whatever philosophers, theologians, and other thinkers have taken as central, ordinary people in most cultures generally see as problems arising out of the effects rather than out of the causes; in religious terms, especially, it's the occurrence and quantity of pain and suffering, the cutting short of lives, and so on, that causes people to question their faith.

A further important distinction should be drawn between the view that evil is a positive property or entity in itself and the view that evil is a mere privation or absence of goodness. In different cultures this takes very different forms, ranging from a conceptual distinction between kinds of property to a concrete distinction between the presence of a malevolent, evil supernatural being and the absence of a benevolent one. In whatever form, the distinction is especially relevant to the categories of moral evil and suffering, of course, though it can also be applied to the other two categories. The distinction is important, for those who view evil as something positive are usually thought to be under particular pressure to explain its origin.

Different cultures have developed various accounts of the nature and origin of evil, accounts that perform a variety of functions. These include the provision of psychological comfort in the face of suffering or perceived unfairness and the reconciling of evil with other aspects of the culture's belief system, especially with religious beliefs; the latter, of course, will generally also encompass the former.

The Problems

The chief questions asked by cultures throughout the world and over the millennia have centered on two main concerns: first, what are the origin and justification of evil, and second, why is suffering distributed so unfairly? In the Abrahamic religious traditions of Judaism, Christianity, and Islam, the first of these concerns generally takes the form of what is known as the Problem of Evil—the apparent inconsistency between the fact that the world contains (a great deal of) evil and the existence of a god who created the world and who has the attributes of omnipotence, omniscience, and benevolence (in fact, there is a problem concerning the existence and quantity of evil in the world even for those who believe in the existence of benevolent but less than omnipotent, omniscient deities); attempts to resolve this inconsistency are known as "theodicies." In both cases, the concern is sometimes with the mere existence of evil, sometimes with its quantity, and sometimes with the existence of certain kinds of evil (for example, it might be held that moral evil but not natural evil can be accounted for). With specific regard to moral evil, one can also ask why people are sometimes evil, or why normally good people sometimes do evil things; those who believe that people are inherently evil can ask why that should be. Whereas the Problem of Evil and its polytheistic counterparts are bound up with religious beliefs, the question of individual moral evil needn't be; it arises for naturalistic psychology too.

The second general concern is with the fact that suffering is so unfairly distributed. Why, that is, do the good or the innocent so often suffer and the bad or guilty so often prosper? Like the various versions of the Problem of Evil, this sort of question is most natural—perhaps only really makes sense—if asked in the context of a view of the world that involves more than just a naturalistic network of causes and effects. One needs to have some reason to suppose that the world *shouldn't* contain evil or that suffering *should* be distributed according to our deserts. Without such suppositions, there is no ground for surprise when we discover that the world isn't like that.

The Origins of Moral Evil

Here there are two main questions: What is the source of evil in general, and what is the source and nature of evil in the individual person?

With regard to the source of moral evil in general, there are three main views: that human beings are naturally evil, that human beings are naturally good, and that human beings are morally neutral or mixed. The first of these fits naturally with the view that evil is something positive, involving selfish aggression; the second fits with the view that evil is merely negative, an absence of good, so that human evil is the result of our falling away from our original nature; the third is more or less neutral between the two views, though it is most often associated with the former. If the second or third view is accepted,

we're faced with questions such as, Why are some people evil? and Why do people sometimes do evil things? Some cultures respond in terms of outside influences, such as demons and witches, or aspects of the natural world; others appeal to the workings of human psychology.

With regard to the three categories of natural evil, suffering, and metaphysical evil, there are three main views: first, the world came about naturally the way it is, so that the occurrence of natural evil is a brute fact, needing no further explanation; second, the world was created by a malevolent being—a god or other powerful supernatural entity (in other words, natural evil is interpreted as a special kind of moral evil, the result of supernatural intentional acts); third, the world was created by a benevolent being, but the occurrence of natural evil can be reconciled with this.

There are two main ways in which people have attempted to reconcile the occurrence of natural evil with a good creator. The first depends upon the notion that a malevolent being or beings, such as fallen angels or demons, interferes in the world; this is of course similar to the notion that the world was created by such a being. The second involves the claim that it's impossible to create a world without the possibility of natural evil (that is, necessarily any set of natural laws will sometimes lead to natural disasters; in our world these include floods, disease, and lightning strikes, but in any possible world without these phenomena, there will always be other evils arising out of the particular structure of that world).

Cultural Relativism

With relevance especially to moral evils, there is a reasonably common view, associated in anthropology especially with the name of Franz Boas, that every culture is structured according to its own logic and so has to be understood in terms of that logic. As a methodological tool, this is unexceptionable; in order to understand any culture in itself rather than as viewed from another culture, one must do one's best to be objective, to get to grips with the culture on its own terms. This approach, central to any scientific endeavor, can, however, slide into the philosophical position that there is no objective truth about cultures and particularly about moral values. In its crudest form, this is of course self-contradictory, for it presents as objectively and universally true the claim that nothing is objectively or universally true. It's not clear, though, that a consistent form of relativism can be developed, as it can be argued that any relativized notion of truth or morality depends for its meaning on a nonrelativized notion.

The Origins of Natural Evil, Suffering, and Metaphysical Evil

There are three main kinds of explanation of such evils as illness, injury, and natural disasters and for the occurrence of suffering and metaphysical evil such as death. First, one can attribute them to the causal workings of the world; second, one can attribute them to malicious natural beings such as sorcerers, witches (including possessor of the evil eye), or little green men in flying saucers; third, one can attribute them to a supernatural being or beings. All of these approaches divide into many, often very different variations.

Appeals to the causal nature of the world include, aside from scientific accounts, various notions of *karma* (operating within and across a person's lifetime), more or less fatalist systems such as astrology, and metaphysical claims that any physical world with the regular laws needed for life must by its very nature be impermanent and prone to undesirable but inevitable inconveniences. Appeals to the actions of either human or supernatural agents can also vary enormously. For example, misfortune can come from a divinity as a way of reminding the victim of some religious or moral duty or as punishment for some trespass or as a way of building character; on the other hand, the misfortune can be undeserved, caused by a malicious being such as the Tibetan *klu,* the Burmese *nats,* the Scandinavian *black elves,* or (as in the case of HIV–AIDS) government scientists doing secret weapons research.

—*Peter J. King*

See also **Aggression; Boas, Franz; Conflict; Crime; Mores; Taboos; Witchcraft**

Further Readings

Babuta, S., & Bragard, J.-P. (1985). *Evil.* London: Weidenfeld & Nicolson.

Garrard, E. (2002). Evil as an explanatory concept. *The Monist 85*, 320–336.

Herman, A. L. (1976). *The problem of evil and Indian thought.* Delhi, India: Motilal Banarsidass.

King, P. J. (1998). The problem of evil. *Philosophical Writings, 9.*
Midgley, M. (1979). *Beast and man.* Ithaca, NY: Cornell University Press.
Morton, A. (2004). *On evil.* New York: Routledge.
Obeyesekere, G. (1968). Theodicy, sin, and salvation in a sociology of Buddhism. In E. R. Leach (Ed.), *Practical religion.* Cambridge, UK: Cambridge University Press.
Parkin, D. J. (1985). *The anthropology of evil.* Oxford, UK: Blackwell.
Rorty, A. O. (2001). *The many faces of evil.* New York: Routledge.
Sharma, R. P. (1977). The problem of evil in Buddhism. *Journal of Dharma, 2.*
Sharma, U. M. (1973). Theodicy and the doctrine of karma. *Man, 8*, 347–364.

Evolution, Arc of

One must distinguish between the fact of organic evolution and those different interpretations of this process that are offered in the world literature. The arc of interpretations ranges from materialism, through vitalism and spiritualism, to mysticism. Furthermore, perspectives vary from population dynamics to cosmic history. The interpretation may give preference to science, philosophy, or theology. Emphasis may be placed on facts, concepts, or beliefs, respectively. Essentially, an interpretation of evolution will favor materialism or spiritualism.

Each interpretation of evolution includes a view of humankind within this universe. Our species may be seen as a recent product of primate evolution that is totally within nature and therefore a complex animal that is only distinct from the great apes; that is, our species differs merely in degree (rather than in kind) from the pongids. Or our species may be seen as a special animal that is somehow separated from the natural world in terms of both its rational intellect and immortal soul.

A systematic interpretation of organic evolution is grounded in metaphysical assumptions about ontology and cosmology, whether they are implicit or explicit in the presentation. Likewise, an epistemological stance and an ethical framework are taken (or at least value judgments are made). Obviously, not all evolutionists will take the same perspective, have the same values, or agree on the same interpretation of our species and its place within organic history and this universe.

Charles Darwin (1809–1882) had been greatly influenced by the writings of Lyell and Malthus, and his global voyage as a naturalist aboard HMS *Beagle.* Particularly significant was his 5-week visit to the Galapagos Islands in 1835. Darwin became acutely aware of both the awesome multiplicity of life forms on the earth and the incredible variability existing in individuals both within and among populations. Acknowledging the mutability of species throughout organic history as clearly documented in the fossil record of the geological column, he explained biological evolution in terms of natural selection and sexual selection favoring some individuals over others in the struggle for existence. Over vast periods of time and change, in order to adapt and survive and reproduce under challenging situations or in new environments, most species evolve into new life forms, or they become extinct.

Darwin presented his facts and concepts in two pivotal books, *On the Origin of Species* (1859) and *The Descent of Man* (1871). His scientific interpretation of biological evolution is strictly naturalistic, grounded in mechanism and materialism. Consequently, our human species is seen as an evolved ape with no claim to a special position in dynamic nature that separates it from the rest of the animal world. This scientific interpretation is now defended by Richard Dawkins, whose writings are a rigorous representation of neo-Darwinism.

Henri Bergson (1859–1941) accepted evolution, but he rejected Darwin's materialism, claiming that it does not sufficiently account for the diverging novelty that emerges throughout organic history. Bergson's philosophical orientation gives preference to time, consciousness, and intuition. It maintains that a life force causes biological evolution. Bergson presented his vitalistic interpretation of the living world in his major work, *Creative Evolution* (1907).

Ultimately, Bergson's vitalism supports a dualistic view of dynamic nature that is not in step with the ongoing advances in evolutionary science and rational philosophy. Another vitalistic interpretation of organic evolution had been offered by the philosopher Friedrich Nietzsche, who argued that a will to power pervades the history of life and will eventually bring about the emergence of the future overman

(a being that will be as superior to the human animal of today as our species is now superior to the lowly worm).

Pierre Teilhard de Chardin (1881–1955) accepted the fact of evolution while attempting to reconcile science and theology within a process view of this universe. The renowned geopaleontologist and controversial Jesuit priest focused his attention on the earth, maintaining that planetary history represents three major but distinct stages of evolution: geogenesis, biogenesis, and noogenesis. Teilhard believed that evolution is a directional, converging, and spiritual process that will result in the formation of a unified humankind in terms of global thought. Eventually, as he saw it, this developing layer of mind (the noosphere) will detach itself from the earth, transcend space-time, and become united with a personal God at the "omega point"; this future event is the final end goal of human evolution on earth.

Teilhard presented this mystical vision of involuting evolution in his major work, *The Phenomenon of Man* (1938–1940, 1948). Although this fascinating and provocative interpretation of cosmic evolution is essentially both geocentric and anthropocentric, it does deal with those philosophical questions and theological issues surrounding evolution that are usually ignored by traditional thinkers.

Presently, both religious creationism and biblical fundamentalism challenge science and reason. Yet for the arc of evolution, which spans from materialism to mysticism, ongoing discoveries in the special sciences favor an interpretation of evolving life (including our own species) that is grounded in naturalism rather than spiritualism.

— *H. James Birx*

See also **Bergson, Henri; Creationism, Beliefs in; Darwin, Charles; Teilhard de Chardin, Pierre**

Further Readings

Bergson, H. (1998). *Creative evolution.* Mineola, NY: Dover. (Original work published 1907)

Birx, H. J. (1991). *Interpreting evolution: Darwin & Teilhard de Chardin.* Amherst, NY: Prometheus Books.

Darwin, C. (2000). *The voyage of the Beagle.* Amherst, NY: Prometheus Books. (Original work published 1839)

Teilhard de Chardin, P. (1975). *The phenomenon of man* (2nd ed.). New York: Harper & Row/Harper Colophon/Perennial Library. (Original work written 1938–1940, 1948)

INTERPRETING EVIDENCE

Anthropology is a social science that studies the origin and nature of human beings. It gathers data and organizes it into knowledge using the scientific method. Consequently, anthropology's method is naturalistic because it does not use methods taken from sources other than human reason.

As a science, anthropology uses the empirical method to gather evidence. The empirical method may be quantitative or qualitative (objective or subjective). In quantitative studies, the number of behaviors or other features of the object of study are counted. With the advent of computers, quantitative studies of family or group relations, marriage, divorce, and interrelations have been made.

Anthropological data, to be useful, must be converted into scientific knowledge. Interpretation of evidence occurs as field studies are checked for accuracy. For example, did a linguistic study capture the sound or the meaning of a word in the object language?

Interpretation of evidence also requires careful avoidance of prejudice or bias so that unusual human behaviors are not misinterpreted for some reason. The goal is to interpret the evidence so that it explains the seemingly irrational and therefore explains how a people under study developed. As more evidence is gathered, it is placed into increasingly more general categories. Interpretation at this stage allows masses of evidence to be put into a unified model that explains the origin and nature of humans.

Anthropology, until the middle of the 19th century, was a part of natural history, which put an emphasis upon biology. Many aspects of anthropology still use this approach, interpreting data about intelligence, race, and biological features and fossil records of human origins.

After Charles Darwin, cultural anthropology used an evolutionary model. In the 20th century, the focus shifted to studying the function of cultural practices. It also interpreted human nature as infinitely malleable rather than fixed. The functionalist school focused on the function of customs, beliefs, material culture, and other features of a group of people. Structuralists, in contrast, interpreted field studies as part of a hidden-meaning system that could be interpreted by understanding myths and symbols.

An anthropologist, like all scientists, makes a number of decisions before beginning a study. These all require interpretations of evidence. Choosing the object of study, making assumptions about the object of study, choosing the best method for study, and coming to decisions about the meaning of the data all involve interpreting the evidence.

— Andrew J. Waskey

Evolution, Disbelief In

The Abrahamic religions (that is, Christianity, Judaism, and Islam) all have fundamentalist schools and denominations that believe in the inerrancy of the Bible. Because of the belief in the infallibility of the Bible, the fundamentalists reject evolution and believe in the literal truth of the origin accounts as told in Genesis. The fundamentalist Christians, mainly Protestants and some charismatic Catholics, are more numerous and better known, and the consequences of their rejection of evolution are more important for public education in the United States than the fundamentalist schools and denominations of the other Abrahamic religions. Fundamentalist Christians have attempted to pass laws to prohibit the teaching of evolution in the public schools. Having failed to prohibit the teaching of evolution, the fundamentalists have either tried to have the Genesis story told alongside the teaching of the principles of evolution or downplay the centrality of evolutionary theory to the modern life sciences in K–12 textbooks.

There is, however, variation in the explanations of the origin of species offered by the antievolutionists. The Institute for Creation Research and Answers in Genesis maintain, for example, that the universe, earth, and all species were created less than 10,000 years ago, as described in Genesis. The less literal Christians have proposed the gap theory and the day-age theory. The gap theory sees God as modifying species in the gaps in the fossil record and the day-age theory posits that one day in the Genesis might be longer than a 24-hour day as we know it. More recently, the old idea of the English theologian William Paley (ca. 1802) has been revived in the form of Intelligent Design, or ID. The proponents of ID accept that species undergo small changes and the earth is older than 10,000 years. They argue, however, that living creatures are too complex to have evolved without the planning and intervention of an intelligent designer.

The leaders of antievolutionary organizations are educated. Many have doctorate degrees. While they have thus far presented no research that confirms creationism, many do believe that the widespread acceptance of evolution has led to social ills. In the absence of published research in recognized and accepted scientific and academic journals, it is difficult for creationists to participate in a serious debate on the importance of evolutionary theory to the life sciences.

— Linda D. Wolfe

See also **Creationism, Beliefs in; Darwin, Charles**

Further Readings

Alters, B. J., & Alters S. M. (2001). *Defending evolution: A guide to the creation/evolution controversy.* Boston: Jones & Bartlett.

Number, R. L. (1993). *The creationists: The evolution of scientific creationism.* Berkeley: University of California Press.

Scott, E. C., & Branch, G. (2003). Antievolutionism: Changes and continuities. *BioScience, 53,* 282–285.

Evolution, Human

Inspired by the scientific framework of organic evolution, paleoanthropologists continue to be very successful in discovering the diversified remains of fossil hominids at sites in eastern and southern Africa. This growing evidence represents the very long, branching,

and complex process of human emergence from Pliocene apelike forms, through protohominids and then hominids, to the present human species.

The evolution of efficient bipedalism separated humankind's earliest terrestrial ancestors from arboreal quadrupedal pongids; the adaptive and survival advantages of sustained bipedal locomotion for the emerging hominids are still very debatable. Plio-Pleistocene hominids (early australopithecines) were followed by *Homo habilis* with a Paleolithic culture of cores and flakes, then the migrations of *Homo erectus* with bifacial hand axes, and eventually the appearance of *Homo sapiens* with a modern cranial capacity, an advanced material culture, and increasing cognitive abilities in a social group (especially the use of symbolic language as articulate speech).

Darwin's Influence

After waiting 20 years, the great naturalist Charles Darwin finally published *On the Origin of Species* (1859). This book argued for the mutability of species over time by means of variation and selection, that is, organic evolution as a result of the survival of the fittest in the struggle for existence. Knowing how controversial his scientific theory of biological evolution would be for science, philosophy, and theology, Darwin deliberately left out of this pivotal work a discussion on the origin and history of the human species. However, any critical reader could easily see that the Darwinian theory can be extended to also include the evolution of the human animal from an apelike form in the remote past to *Homo sapiens sapiens* of today. In fact, after 1859, both Thomas Huxley in England and Ernst Haeckel in Germany were quick to lecture on and write about human evolution (although early fossil hominid evidence outside of Europe was lacking at that time).

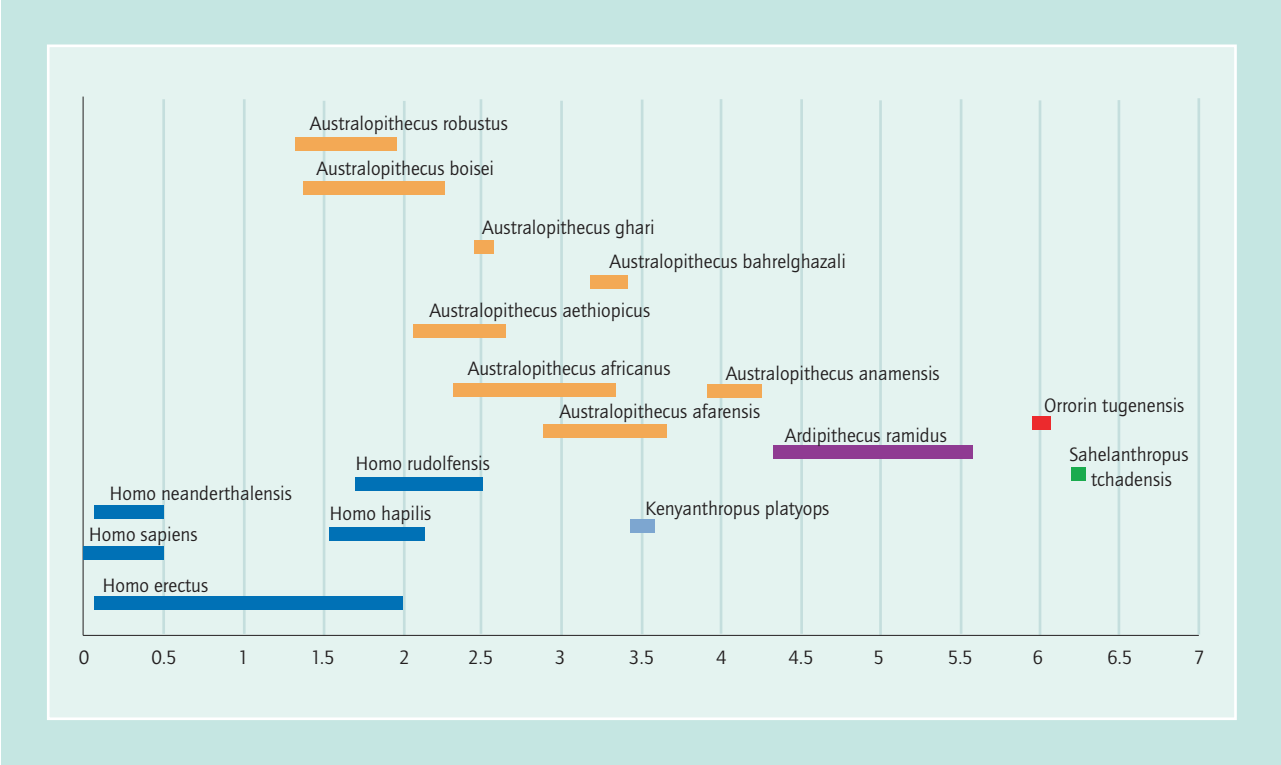
Darwin's writings represent one long argument for organic evolution in terms of both science and reason. Grounded in a mechanistic and materialistic interpretation of nature, his books maintain that natural selection is the basic principle to explain the evolution of all species throughout geological time. The fact that species are mutable challenged traditional science, philosophy and theology; it had been held since antiquity that plant and animal types are eternally fixed within a single hierarchy of static forms from minerals, through plants and animals, to the human being at the apex of this so-called great chain of being or ladder of nature. The Darwinian conceptual revolution of biological evolution in science gave priority to change over permanence; it also supported mechanism and materialism over Aristotelian teleology and essentialism, while discrediting vitalism and challenging spiritualism.

Twelve years after the appearance of his *Origin* volume, Darwin published *The Descent of Man* (1871). In this work, he focused on human evolution. Darwin claimed that the human species is closest to two African great apes (chimpanzee and gorilla), with which it shares a common fossil ancestor that would be found in Africa; although at that time, it was generally held by naturalists that Asia was the birthplace of humankind. Unfortunately, during Darwin's own life, no fossil hominid specimens older than the Neandertals of Europe had been found, and the bonobo, the third great ape (or pongid) of Africa, was still unknown to science.

As had Huxley and Haeckel, Darwin also maintained that the difference between the human animal and the living pongids is merely one of degree rather than one of kind, there being no structure or function in the human species that does not already exist to some extent in the great apes. Furthermore, Darwin held that the human species is closer to the pongids than they are to the hylobates (gibbon and siamang); evidence from comparative studies in biochemistry, genetics, embryology, immunology, anatomy, physiology, psychology, and behavior now support this scientific generalization.

Today, the discovery and examination of the bonobo, or pygmy chimpanzee, in Central Africa adds a fourth great ape species to the pongids (which include the African gorilla and the common chimpanzee, as well as the Asian orangutan). In fact, in terms of biology and behavior, *Homo sapiens* is very close indeed to both chimpanzees. As a result, it becomes futile to draw a sharp line between the earliest hominid implement-making behavior and the making of tools or weapons by living bonobos and chimpanzees.

The idea that the human species evolved from an apelike ancestor did not settle well with the Victorian worldview. Nevertheless, naturalists could not ignore the growing facts in geology, paleontology, biogeography, botany, and zoology that gave empirical support to the fact of biological evolution. Essentially, the bitter controversy surrounding Darwinism was clearly due to the far-reaching implications and disquieting consequences that scientific evolution held for interpreting the place that the human animal occupies within the primate order and organic history. Evolution claims that the human species is a product



Hominid Evolution: Since the writings of Charles Darwin, Thomas Huxley, and Ernst Haeckel, paleoanthropologists have searched for fossil hominid remains in Africa and Asia to substantiate the scientific theory of human evolution. Although interpretations of particular specimens may vary among physical anthropologists, a century of discoveries now offers an overview of the evidence thus far. The evolution from quasi-bipedal protohominids to our big-brained and culture-bound species with sustained bipedality and articulate speech was a long and complex process. We have uncovered many fossil hominid species that existed during the past four million years, and no doubt many more will be. But all of these species became extinct except our own. Furthermore, the emergence of *Homo sapiens* was not an inevitable outcome of directional evolution, but the result of chance genetic variations and natural/social selection within changing environments over millions of years

Source: Courtesy of Minka Kudrass, Phyletic Museum, Jena.

of, dependent upon, and totally within dynamic nature. The writings of Huxley, Haeckel, and Darwin himself inspired several naturalists to speculate seriously on human evolution and to begin searching for fossil hominids (first in Asia and then in Africa).

Major Discoveries

The framework of evolution provided a new paradigm for understanding and appreciating the human species in terms of science and reason. If primate evolution is true, then fossil hominid specimens should be found to substantiate the emergence of the human animal from a prehistoric apelike form that once existed outside of Europe millions of years ago.

Oddly enough, in his book *Arboreal Man* (1916), the comparative anatomist F. Wood Jones presented a "tarsoid hypothesis" to account for the origin of the human animal. He argued that the human species had descended from an early tarsier-like form independent of the lines leading to the Old World monkeys and six apes. Modern physical anthropology now recognizes that the human animal is closest to the chimpanzees and bonobos. Of course, earlier evolutionists had recognized the glaring similarities between the pongids and the human species in terms of general morphology and social behavior.

Near the end of the 19th century, naturalists began to search for fossil jaws, teeth, crania, and other skeletal bones at hominid sites, first in Asia and then in Africa. Their impressive successes during the past 120 years clearly demonstrate the awesome power of scientific inquiry, particularly when it incorporates a team effort and a multidisciplinary approach in

modern paleoanthropology. Furthermore, the shift from merely relative to more exacting (radiometric) dating techniques during this time has resulted in far more accurate models for and better interpretations of hominid evolution.

Inspired by the "missing link" hypothesis of Ernst Haeckel, the naturalist Eugene Dubois left Europe and went to Indonesia in order to search for a fossil apelike form ancestral to the human species and the pongids. Erroneously, Haeckel had maintained that an ape-man without speech (*Pithecanthropus alalus*) had existed between fossil pongids and the present human animal. He further claimed that Asia was the cradle of human evolution, speculating that a landmass he referred to as "Lemuria" (assumed to have once existed) was the geographical location where the human species had its origin from such an ape-man species.

During the early 1890s, at the Trinil site on the island of Java, Dubois was fortunate enough to discover the fossil hominid bones of *Pithecanthropus erectus* ("Java man"). These remains are over 500,000 years old. This evidence suggested that Asia may have been the birthplace of hominids.

During the first two decades of the 20th century, additional Neandertal and Cro-Magnon specimens were being found in Europe. However, none of this hominid evidence dated back earlier than about 200,000 years. Nevertheless, discoveries made of much earlier fossil hominid forms at sites in the Transvaal area of South Africa did substantiate Darwin's claim that this continent (not Asia) was the cradle of humankind.

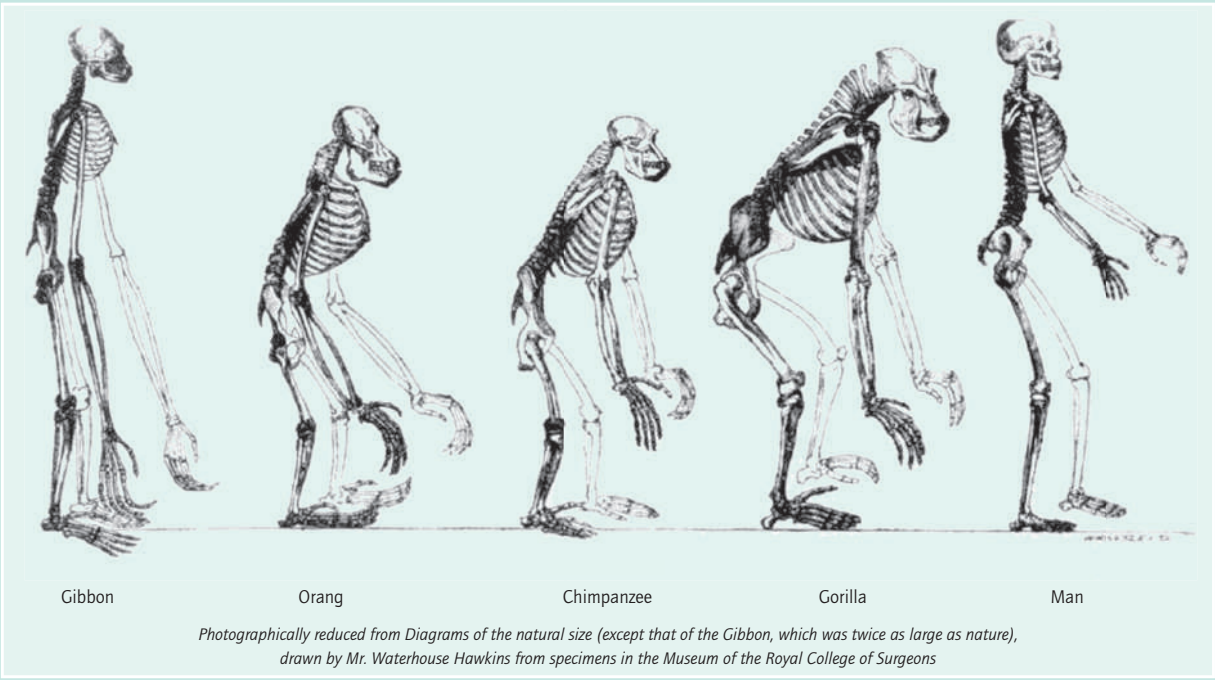
Of special significance are the fossil hominids found at five sites in the Transvaal area of South Africa. In 1924, anatomist Raymond A. Dart analyzed a fossil juvenile skull from the Taung site; amazingly, it was over 1 million years old. Dart correctly interpreted this specimen as representing a hominid form that was clearly separated from the fossil apes of that time. Subsequently, important discoveries were made of several adult individuals found at other sites in this area (Kromdraai, Swartkrans, Sterkfontein, and Makapansgat). These adult specimens clearly justified giving a hominid status to all this fossil evidence from the Transvaal sites.

Collectively referred to as the "southern apes" or australopithecines of South Africa (although they are hominids, not pongids), these specimens are from 1 to 3 million years old. They represent at least two different species: the large *Australopithecus robustus* and the small *Australopithecus africanus.* There is no conclusive evidence that either form made stone implements. Still, they were the earliest fossil hominids known to paleoanthropology before the middle of the 20th century. However, it is now held that these two species represent side branches in hominid evolution that became extinct about 1 million years ago, long before the most recent Ice Age.

Beginning in 1928, geopaleontological research in the Western Hills near Zhoukoudian, China, was directed first by Davidson Black and then by Franz Weidenreich; both were anatomists from the Cenozoic Laboratory of the Peking Union Medical College. Over several years, scientific excavations unearthed fossil hominid evidence referred to as *Sinanthropus pekinensis* ("Peking man"). These specimens are at least 350,000 years old. The geopaleontologist Pierre Teilhard de Chardin became famous for his research at and popularization of this important site that helped to establish the scientific fact of human evolution. Today, both Java man and Peking man, as well as the hominid skeleton of a boy (specimen KNM-WT 15000) 1.6 million years old from Nariokotome on the western shore of Lake Turkana in central East Africa, are now relegated to the *Homo erectus* phase of human evolution. This stage of hominid development lasted over 1.5 million years, spanning between the earlier *Homo habilis* form and the later *Homo sapiens* species.

Darwin's idea that the earliest humans would be found in Africa greatly inspired the anthropologist Louis S. B. Leakey, who dedicated his entire career to searching for the first fossil hominid specimen to be discovered in central East Africa. Undaunted by his lack of success for three decades, Louis concentrated his research at Olduvai Gorge in the Gregory Rift Valley of Tanzania. Although he found fossil ape specimens, no hominid evidence was discovered during his 30-year search in this part of the world. Even so, Louis continued his quest along with his second wife Mary, an anthropologist specializing in the prehistoric archaeology of central East Africa.

In 1959, ironically, it was Mary Leakey who found the first fossil hominid specimen in central East Africa: the cranium of *Zinjanthropus boisei* (as it was classified at that time), belonging to a 1.75 million-year-old robust hominid form found in the lowest rock strata at Olduvai Gorge. The "Zinj" skull was a major turning point in paleoanthropology because it inspired other physical anthropologists to concentrate their search for other similar hominids (if not even earlier forms) in central East Africa. Today, the famous "Zinj" specimen



Source: T. H. Huxley (1863), *Evidence as to Man's Place in Nature.*

is classified as *Australopithecus boisei,* a brutish hominid form, with both large premolars and molars, that became extinct before the most recent Ice Age.

Just 2 years later, Louis himself found the skull of *Homo habilis* in the same rock strata at Olduvai Gorge; it is a far more hominid form than "Zinj" and is directly associated with the pebble culture of the Oldowan tradition, consisting of the earliest human-made stone implements of cores and flakes known at that time (although it is arbitrary when the designation "human" may be first applied to the very long, branching, and complex process of hominid evolution).

In 1972, at Koobi Fora on the eastern shore of Lake Turkana in northwestern Kenya, Richard Leakey discovered the famous *Homo habilis* skull 1470, dating back about 1.9 million years. Therefore, both at the Olduvai Gorge and Koobi Fora sites, the larger-brained *Homo habilis* is associated with the dawn of human-manufactured Paleolithic culture.

In 1974, at the Hadar site in the Afar Triangle of northern Ethiopia, Donald C. Johanson found the fossil hominid "Lucy" skeleton. This specimen was dated at over 3 million years old. Although the skull and teeth of *afarensis* have apelike characteristics, the postcranial skeleton is truly hominid. An analysis of the postcranial bones revealed that "Lucy" stood erect and walked upright with a bipedal gait. Classified as *Australopithecus afarensis,* this remarkable discovery clearly demonstrated that bipedalism had been established in hominids before the end of the Pliocene epoch.

In 1978, at the Laetoli site, south of Olduvai Gorge, Mary Leakey had the incredible good fortune to find three tracks of hominid footprints about 3.6 million years old. According to Johanson, these Laetoli tracks were made by *Australopithecus afarensis* (for him, the common ancestor of all later hominids). In 1995, these Pliocene footprints were reexcavated and reexamined. Then, the three Laetoli tracks were carefully reburied in order to preserve this unique discovery for centuries to come.

In science, nothing succeeds like success. The more paleoanthropologists search for fossil hominids in central East Africa, the more evidence they find. Recent discoveries by Tim White and Meave Leakey have pushed back the beginning of hominid evolution to over 4.4 million years ago. These earliest bipedal hominid forms are represented by *Ardipithecus ramidus* (a side branch in hominid evolution found in Ethiopia) and the later *Australopithecus anamensis* from Kenya, a species ancestral to *Australopithecus afarensis.*

In 1999, fossil hominid evidence from the Bouri site, south of Aramis, in Ethiopia, was dated to about 2.5 million years old. This latest discovery is designated *Australopithecus garhi* and is another illustration of Plio-Pleistocene hominid species diversity in Africa.

Also, in 1999, at a site in Northern Kenya near the western shore of Lake Turkana, a research team headed by paleontologist Meave Leakey discovered an unusual million-year-old skull. The near-complete cranium shows both hominid-like and pongidlike characteristics: small brain, small teeth, and human-looking but flat face. It is classified *Kenyanthropus platyops,* denoting both a new genus and new species among the early fossil hominids of central East Africa (thereby separating this form from the *Australopithecus afarensis* specimens found at Hadar and Laetoli). If more fossil hominid species from this time period are found, then those complex questions that still concern the direct ancestor to *Homo habilis* may be answered in the future.

One generalization is clear: The very earliest hominid forms emerged in central East Africa long before later hominids, representing *Homo erectus,* migrated north into Europe and east into Asia. Consequently, both Charles Darwin and Louis Leakey are vindicated in light of the growing empirical evidence for the birth of humankind's most remote bipedal ancestors in central East Africa. Of course, models and interpretations of hominid evolution vary among physical anthropologists. And there is no common consensus concerning the classification and interpretation of the growing fossil evidence for hominid evolution. Remaining questions about the origin and emergence of humankind will be answered by the discovery of more fossil hominid specimens and prehistoric stone artifacts in Africa and elsewhere.

Near the famous Hadar site, in Ethiopia, a recent fossil hominid discovery that is 4 million years old could shed more light on the emergence of bipedality (particularly in terms of what the evolving ankle joint contributed to walking upright). Furthermore, at Liang Bua cave, on the Indonesian island of Flores, scientists discovered individual skeletal remains representing a diminutive human species, named *Homo floresiensis,* that lived for thousands of years in isolation from *Homo sapiens;* the age of the bones spans a period from 95,000 to 13,000 years ago. This provocative find illustrates the surprising diversity of early hominids, as well as the enormous influence that geographical isolation has on both the genetic makeup of a remote population and its probable extinction.

The Pongid-Hominid Split

The simplistic three-stage sequence of fossil apes/hominid ancestors/*Homo sapiens,* which was offered at the beginning of the 20th century, has now been necessarily expanded. Present taxonomic schemes account for the ever-growing hominoid and hominid evidence as a result of ongoing research by paleoanthropologists, particularly since the discovery of the "Zinj" skull in 1959. In fact, both the diversity of hominids and the complexity of their evolution is far greater than was imagined in the middle of the 20th century.

The Miocene hominoids represented a large, diversified group of apelike forms that survived and thrived for millions of years throughout the eastern hemisphere. Just several decades ago, fossil hominoid evidence suggested that the split between fossil apes and the earliest hominids had occurred before the end of the Miocene epoch at least 12 million years ago. However, upon careful reexamination of the fossil specimens, all these hominoids were found to be pongidlike rather than hominid-like (suggesting that the pongid-hominid split had occurred much later than was first thought to be the case). A reevaluation of the later Pliocene fossil hominoid evidence places the emergence of protohominids about 5 to 7 million years ago in Africa.

Early hominoid forms ranged from *Proconsul* of Rusinga Island, in Africa, and *Sivapithecus* of the Siwalik Hills, in India and Pakistan (both from the Miocene epoch), to the later *Oreopithecus* of Europe and the huge Pleistocene fossil ape *Gigantopithecus,* of India and China.

About 10 million years ago in central Turkey, the fruit-eating fossil ape *Ankarapithecus meteai* roamed the woodlands long before the pongid-hominid split. Although such forms were once numerous during the Miocene adaptive radiation of hominoid genera and species in Africa and Asia, these fossil apes were becoming extinct during the Plio-Pleistocene time. Insufficient evidence prevents determining which hominoid form is a definite common ancestor of the later African fossil apes and the first protohominids.

The earliest-known hominid, *Ardipithecus ramidus* of Ethiopia, lived about 4.4 million years ago. This form was followed by *Australopithecus anamensis* of Kenya, about 4.2 million years ago, which was later replaced by the emergence of *Australopithecus afarensis* of central East Africa.

The incredible similarities between the human species and the great apes, particularly both the

common chimpanzee (*Pan troglodytes*) and the pygmy chimpanzee or bonobo (*Pan paniscus*), argue for a far more recent pongid-hominid split than was once maintained. With the serious consideration of comparative biochemistry and genetics, as well as molecular dating to determine the evolutionary relationships among different primate species, it became clear that protohominid evolution probably diverged from fossil apelike forms only about 5 to 7 million years ago. If this is true, then the common ancestor shared by apes and the human animal should be found somewhere in central East Africa, the fossil remains being only about 6 million years old.

The various fossil hominoid forms during the Plio-Pleistocene age reflect the diversified habitats of the central East African environment during that time. Through the mechanisms of genetic variation and natural selection (including sexual selection), hominoid populations in a variegated environment gave rise to the pongid-hominid split, which resulted in the apes remaining primarily quadrupeds, on one hand, and the emergence of quasi-bipedal protohominids, on the other; with the latter forms leaving quadrupedal locomotion behind as they ventured out of the forests and jungles for a more and more terrestrial social life in the open woodlands and on the grassy savannahs. (A recent theory maintains that bipedality emerged among the protohominids while they evolved in the forests and jungles.)

There were probably numerous attempts at bipedalism. For whatever reason or reasons, there was an adaptive, survival and, therefore, a reproductive advantage to becoming more and more bipedal as the protohominids evolved into terrestrial hominids. Although a long, branching, and complex process, the evolution of protohominids paved the way for the appearance of the earliest true hominid forms as bipeds over 4 million years ago, for example, the species *ramidus* and *anamensis.*

Even though they stood erect and walked upright with a bipedal gait, the early hominid forms of central East Africa (including *afarensis* and *habilis*) probably returned to the security of the trees during the night in order to escape ground predators.

Human Evolution

In modern physical anthropology, the *habilis-erectus-sapiens* sequence is now well documented in the fossil hominid record, although this history is far more complex than was once maintained. Furthermore, there is no common consensus concerning the taxonomy of the early hominids, and no doubt additional species will be found. Nevertheless, for over 2 million years, human evolution shows an increase in the size and complexity of the brain, a reduction in the size of the face and teeth, and an ever-increasing reliance on cultural adaptations (especially symbolic language, manufactured stone technology, and social patterns of cooperative behavior). Although speech, consciousness, and behavior are not preserved in the fossil record, they may be inferred from osteological and archaeological remains.

Like other emerging groups of animals, the early hominids underwent adaptive radiation. To date, over 500 fossil hominid specimens have been found from sites in Africa. This diversity among the early and then later australopithecines resulted in many genera and species. No doubt, many other forms of early and later australopithecines will be found as future paleoanthropologists continue searching for fossil evidence at sites ranging from 1 to 5 million years ago in Africa.

About 2.8 million years ago, a population of *Australopithecus africanus* inhabited subtropical woodlands in South Africa. These bipedal hominid individuals had a small brain, long arms, and short legs; they may have coexisted with *Australopithecus afarensis,* with the probability that both species once shared a common ancestor. This hominid evidence suggests that perhaps the transition from *africanus* to *habilis* may have taken place in South Africa (rather than in central East Africa), followed by the *habilis* species migrating northward.

Within this diversity of australopithecines, it is the bigger-brained, implement-making, and wider-ranging *Homo habilis* that was successful in terms of adapting, surviving, and reproducing over 2 million years ago. Other hominid forms became extinct (for example, *Australopithecus aethiopicus, Australopithecus africanus, Australopithecus boisei,* and *Australopithecus robustus*). Because of its superior brain and Paleolithic culture, *Homo habilis* not only survived, but, more important, it gave rise to the next stage of hominid evolution, *Homo erectus,* about 2 million years ago. This transition was not sudden, for the *habilis* and *erectus* phases overlapped in central East Africa.

The emergence of *Homo erectus* from *Homo habilis* represented a major change both in the biological

and sociocultural advances in hominid evolution. Compared to *habilis, erectus* was taller and had a larger brain. It even migrated both north into Europe and east into Asia, although populations of *erectus* remained in Africa. For almost 2 million years, *erectus* survived and thrived throughout the eastern hemisphere. Its culture consisted primarily of stone Acheulean bifacial hand axes, along with cleavers and scrapers in Africa and stone chopper/chopping implements in Asia. From an evolutionary viewpoint, *Homo erectus* represented a long and successful stasis in hominid biocultural evolution. Even so, recent fossil hominid evidence suggests that the *erectus* stage of human evolution may actually represent a diversity of forms (perhaps even different species).

With the extinction of all other hominid genera, *Homo erectus* is directly ancestral to *Homo sapiens.* Before the emergence of the human species, the average hominid brain evolved slowly for about 2 million years, from about 630 cc in *habilis* to about 900 cc in *erectus.* Then, both the size and complexity of the hominid brain evolved faster, reaching an average of 1,400 cc in *sapiens* today. With the appearance of *Homo sapiens,* the human species manifested far greater self-consciousness, along with the emergence of symbolic language as articulate speech (although a crude form of symbolic speech as protolanguage may be over 1 million years old).

About 400,000 years ago, with the extinction of *Homo erectus,* the archaic *Homo sapiens* form first appeared (this stage of hominid evolution probably emerged in Africa before spreading north into Europe and east into Asia). In South Africa, about 120,000 years ago, an early member of the human species left fossil footprints at Langebaan Lagoon and cultural remains (ashes, mussel shells, and animal bones) in caves at Klasies River Mouth. This evidence suggests that South Africa may have been the birthplace of modern *Homo sapiens,* or at least a species anatomically like humans.

The later *Homo sapiens neandertalensis* populations represent a complex and elusive phase of human evolution, showing great regional variation until about 35,000 years ago. They were hunters, gatherers, and scavengers who occupied caves and used fire. More advanced both biologically and culturally, the classic Neandertal people had a modern cranial capacity and the far more sophisticated culture of the Mousterian tradition, including the deliberate burial of their dead with ritual (suggesting the emergence of magico-religious beliefs and practices). In some areas of the eastern hemisphere, the Neandertals were contemporary with the even more advanced Cro-Magnon people, with the two forms intermittently occupying the same sites. Apparently, the two subspecies seldom, if ever, mixed their gene pools. Any *neandertalensis-sapiens* overlap was relatively brief. For whatever reason or reasons, the Neandertals would eventually disappear, thereby setting the stage for the success of the Cro-Magnon people as *Homo sapiens sapiens* (early phase).

The Cro-Magnons had even greater self-consciousness, and it was expressed in the creative explosion of tools (for example, blades and burins) and works of art (for example, stone sculptures and, in particular, the painted cave murals at Altamira in Spain and Lascaux in France). Surely, the Cro-Magnon people were far more sophisticated than the Neandertals in terms of thought and behavior. The Cro-Magnons built shelters and had articulate speech; perhaps their greater social intelligence and advanced symbolic language (rather than genetic makeup) separated them from the rapidly vanishing Neandertals. Moreover, the Cro-Magnon people are directly related to *Homo sapiens sapiens* (present phase); that is, they were the immediate ancestors to modern humans.

Following the most recent Ice Age, *Homo sapiens sapiens* has been enormously successful in adapting to different environments around the world as a result of the evolution of culture, especially accelerating advances in science and technology. Yet despite sociocultural diversity, the human species has remained a biological unit on this planet. At this present stage of hominid evolution, through genetic engineering, the human animal is becoming more and more capable of directing the further development of itself as well as the ongoing evolution of other plant and animal species. One may argue that the human species, as the bipedal ape or third chimpanzee, is becoming the cosmic primate. In fact, humankind's self-imposed destiny may require adapting to habitats on other worlds.

At present, several different interpretations of human evolution are possible. For example, conflicting phylogenetic models depicting the relationship between humankind's common hominid ancestor and later hominid forms are presented by Donald C. Johanson and Richard Leakey. One may even argue that each of the major phases of hominization first

appeared in Africa. Yet the earliest making of fire and the origin of symbolic language as articulate speech may always elude the paleoanthropologists. For the rigorous evolutionist, explaining the long and complex emergence of the human species (strictly in terms of a naturalistic worldview) requires no appeal to a divine plan or predetermined direction or necessary end goal.

The human species is not nailed to this planet, but it is tied to life on earth through genetic evolution. Likewise, the human animal is always subject to the threat of extinction, which remains a possibility in light of the fact that most of the billions of species that have inhabited this planet are now extinct. Ironically, the evolutionary success of the human species in terms of sheer numbers may well be the cause of its future demise (in sharp contrast to humankind's population explosion, the small wandering bands of our earliest bipedal ancestors had been successful for millions of years). Furthermore, there is the ever-increasing possibility that the human species' modern technology (which represents extraordinary progress from the manuports and eoliths of remote hominid ancestors to the stealth jet and space shuttle of today) will in the future either destroy or supersede humankind as now known. Or, in time, the human species may give rise to a new form of life.

In short, hominid evolution has been about a 5-million-year journey from our earliest ancestral form in central East Africa to the self-reflective global species that it represents today. As a result of ongoing research in paleoanthropology, a much clearer and more complete picture of human evolution will emerge in light of the discovery and interpretation of additional fossils and artifacts. With the use of sophisticated computer simulations, future paleoanthropologists will provide science with a better understanding of and deeper appreciation for the emergence of the human species.

Hominid evolution has been a far more complex process than was thought just a few decades ago. The growing fossil evidence clearly documents the past existence of many hominid forms. Yet only one species has been successful, and this form represents the present biological unity of humankind.

About 3.6 million years separate the fossil hominid tracks at Laetoli from Neil Armstrong's footprints on the moon. Overcoming incredible odds and the threats of extinction, hominid evolution has been a remarkable success story. No doubt, in the distant future, humankind's descendants will leave both their bipedal impressions and cultural achievements on the surfaces of remote planets.

— H. James Birx

See also **Hominids; Homo Erectus; Homo Habilis; Human Paleontology; Leakey, Louis S. B.; Leakey, Mary; Leakey, Meave Epps; Leakey, Richard E. F.; Oldowan Culture**

Further Readings

Birx, H. J. (1988). *Human evolution.* Springfield, IL: Charles C Thomas.

Campbell, B. G., & Loy, J. D. (2000). *Humankind emerging* (8th ed.). Boston: Allyn & Bacon.

Darwin, C. (1998). *The descent of man* (2nd ed.). Amherst, NY: Prometheus Books. (Original work published 1871)

Johanson, D. C., Johanson, L., & Edgar, B. (1994). *Ancestors: In search of human origins.* New York: Villard Books.

Leakey, R. E. F. (1994). *The origin of humankind.* New York: BasicBooks/HarperCollins.

Tattersall, I., & Schwartz, J. H. (2000). *Extinct humans.* New York: Westview Press/Nevraumont Books.

de Waal, F. B. M. (2002). *Tree of origin: What primate behavior can tell us about human social evolution.* Cambridge, MA: Harvard University Press.

Walker, A., & Shipman, P. (1996). *The wisdom of the bones: In search of human origins.* New York: Vintage Books/Random House.

Whitehead, P. F., Sacco, W. K., & Hochgraf, S. B. (2005). *A photographic atlas for physical anthropology.* Englewood, CO: Morton.

Wolpoff, M. H. (1999). *Paleoanthropology* (2nd ed.). New York: McGraw-Hill.

EVOLUTION EDUCATION CONTROVERSY

Eighty years after the famous Scopes "Monkey Trial" in 1925, in 2005, American education received a surprise as the controversy over evolution in textbooks was revived. This time it was not in the "Bible Belt" state of Tennessee, but in progressive Pennsylvania. Among religious conservatives, the

"theory of intelligent design" has grown up, asserting that the universe was simply too complex to emerge from a single, atypical cosmic big bang. (In fact, intelligent design is itself only a modern fugue on the far older theory of a first cause for the universe, as taught by generations of priests of the Roman Catholic Jesuits, or Society of Jesus.) Intelligent design, while gaining many adherents, has never actually been considered as part of any school biology curriculum.

However, things changed dramatically in November 2004. In that month, the school board in rural Dover, Pennsylvania, voted that biology teachers had to inform their classes that "evolution may not, after all, explain how we all got here," explained ABC News. The decision of the school board made national news, rapidly thrusting the controversy over evolution versus intelligent design into the headlines as it has not been since John Thomas Scopes was brought to trial in Tennessee for teaching evolution.

Immediately, the issue became a cause with both the religious right, whose contribution was important to President George W. Bush's 2004 presidential campaign, and liberal activist groups like the American Civil Liberties Union (ACLU). The ACLU paid prime attention to the developing case in Dover, providing massive legal support to fight the school board's decision. Indeed, into early 2005, the controversy was unresolved; similar scenarios were also being played out in the states of Georgia and Ohio.

— John F. Murphy Jr.

FUTUROLOGY

There have been few "students" of the future with the impact of Alvin and Heidi Toffler, whose previous works *Future Shock, The Third Wave,* and *Powershift* focused the attention of Americans on serious consideration of the future. Their most recent book, *War and Anti-War,* brought attention to a new aspect of the future: the shape and conduct of warfare. In their book, published in 1993, they foresaw the development of electronic warfare, as we see today in the use of Predator drone aircraft.

The Tofflers also wrote of the rise of religious extremism, which in February 1993 saw the first terrorist bombing of New York's World Trade Center. "A minority of Islamic extremists," they warned, "conjure up fantasies of a New Crusade, with the entire Muslim world united in a jihad, or Holy War, against Judeo-Christianity." Even more, they foresaw the dangers of nuclear proliferation. They wrote, "prior to the Gulf War [of 1991], the IAEA (International Atomic Energy Agency) used the equivalent of only 42 full-time inspectors to check on 1,000 declared nuclear energy plants around the world." That figure did not take into account clandestine, or hidden, ones.

Even more, *War and Anti-War* focused on what is known today as electronic warfare or information warfare. Information warfare involves the use of computers to not only plan a country's military campaigns—but also to frustrate an enemy's "cyber-warriors," with such things as "Trojan Horses" and other computer weapons. Indeed, both the United States and the People's Republic of China today emphasize information warfare as a weapon that may indeed one day decide the outcome of a battle. In 1993, the Tofflers wrote how "with only a limited grasp of its implications, nations everywhere are preparing, as best they can, to exploit knowledge-intensivity."

Yet with some of the new technologies have come new risks. The Tofflers wrote of lasers being used to guide bombs and missiles, a significant part of the deadly accuracy of the bombardments that preceded the invasions of Afghanistan in 2001 and Iraq in 2003. However, in the new field of nonlethal weaponry that has developed since the Tofflers' book, lasers are now seen as battlefield weapons that can be used against enemy troops to not only disorient them but blind them as well. As with all else in modern weaponry, including biological weapons, there is a fear that such weapons may reach the hands of terrorists. In the waning months of 2004, there were several reported incidents of laser beams being directed into the eyes of civilian airline pilots. There is

evidence that terrorists have explored using lasers as weapons, though there is no specific intelligence indicating al Qaeda or other groups might use lasers in the United States.

— John F. Murphy Jr.

MONOGENESIS VERSUS POLYGENESIS

The theories of monogenesis and polygenesis set forth opposite theories of how the human race evolved. Those who believe in monogenesis say that all humans share the same origin. Polygenesis asserts that at least some of the races had a separate origin. It maintains that different races have different origins, different characteristics, and different histories.

Monogenesis was widely adhered to in Christian Europe through most of its history. This was mainly because the Bible was believed to say that all humans descended from Adam and Eve, giving them all a common origin. Belief in polygenesis became widespread in the United States during the middle of the 19th century. This was in part because it was becoming difficult to reconcile the biblical account with new scientific evidence.

The early polygenists relied mainly on scientific evidence and ignored biblical arguments that the monogenists used. For a while, the pendulum swung toward belief in polygenesis. Some believe that polygenesis was used to further racism in the United States. Charles Darwin was a believer in monogenesis and believed that polygenesis was just an excuse for racism. When interest in polygenesis was at its height in the United States, some of the leading American polygenists shifted the focus of their beliefs. Rather than concentrating on proving that different races had different origins, they began to focus their efforts on proving that the then current differences in the races would continue unchanged.

The theories of monogenesis and polygenesis are also debated by linguists trying to determine the origin of languages. Approximately 5,000 languages are spoken in the world today. Did all of those languages spring from one original language? Or did many languages develop in many different locations? Linguists analyze languages to find systematic differences and similarities. They believe that those with similar structures may have evolved from a common ancestor. There is even debate among linguists about whether or not certain languages should be grouped together in families. Linguists divide into the lumpers and the splitters. Lumpers believe that there are only approximately two dozen languages. Splitters believe that there are many times that number of basic groupings.

Joseph Greenberg of Stanford University is convinced that the original language developed in Africa among early *Homo sapiens.* He believes that the original language, which he calls the Mother Tongue, diverged eventually over time into the several thousand languages spoken today.

So the debate goes on. No one has proven conclusively that either monogenesis or polygenesis is correct.

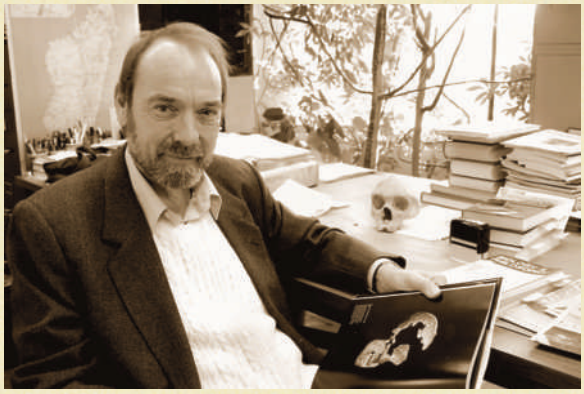
— Pat McCarthy

IAN TATTERSALL

Paleontologist, evolutionary biologist, and primate behaviorist Ian Tattersall is curator of anthropology at the American Museum of Natural History in New York and adjunct professor of anthropology at the City University of New York. Tattersall's biography is as diverse and varied as his academic interests. He was born in England but grew up in East Africa and received his professional training at Cambridge (archaeology and anthropology) and at Yale (geology and vertebrate paleontology). His fieldwork has taken him to countries such as Madagascar, Vietnam, Surinam, Yemen, and Mauritius.

Tattersall has focused on two main areas of research, in which he has achieved international

fame: the analysis of the human fossil record, and the study of the ecology and systematics of the lemurs of Madagascar. His many books, including *Becoming Human: Evolution and Human Uniqueness* (1999) and *Extinct Humans* (2001), have popularized scientific findings on evolution and primates for a general readership. His studies have proved extremely readable, yet other scholars in the field have criticized them for their lack of academic references and sustained evidence.



Source: Denis Finnin/AMNH.

Tattersall argues that in the evolutionary process, there is "continual evolutionary experimentation, with constant origins of new species, triage among those species by competition, and the extinction of the unfortunate." He also asserts that humans owe much to chance and opposes the theory of modern evolutionary synthesis, which brings together Darwinian evolution and the laws of Gregor Mendel. Tattersall has revised the straight-line progression of the human "family tree," which would take the human race from the apelike *australopithecines* to the mysterious *Homo habilis* to the legendary Neandertals and culminate in the superior *Homo sapiens.* According to his theory, many different types of extinct species have coexisted during the evolutionary process.

Tattersall has identified the Cro-Magnons as the ancestors of humans, claiming that the Neandertals were replaced by them. The defining feature, which differentiates the two hominids and which makes humans unique, was the development of symbolic thought that is clearly shown in the elegant artworks found in the Cro-Magnon caves. "Art, symbols, music, notation, language, feelings of mystery, mastery of diverse materials and sheer cleverness: all these attributes, and more, were foreign to the Neandertals and are native to us," Tattersall concluded in *Becoming Human.* Yet, in spite of his celebration of human abilities, Tattersall seems to have doubts about the potential of contemporary humankind for further evolution: "Everything we know about evolution suggests that to get true innovation, you need small, isolated populations, which is now unthinkable."

— Luca Prono

Evolution, Models of

Several major models have been used to represent organic evolution on earth. These models include the arc, line, spiral, circle, pyramid, and tree or bush or coral of life forms throughout biological history.

Aristotle (384–322 BCE), the father of biology, including morphology and taxonomy, taught that plants and animals represent a hierarchical line of eternally fixed forms. These kinds of life range from the simplest plant to the most complex animal, with our own species, as the only rational being, at the apex of this planetary ladder of the living world. Aristotle's great chain of being, from global minerals to celestial stars, was not an evolutionary interpretation of this universe.

Aristotle's worldview is grounded in the assumption that each type of life has a fixed essence. Consequently, this natural philosophy contributed to an antievolutionary view of organic history for nearly 2,000 years.

Carolus Linnaeus (1707–1778), the father of modern taxonomy, classified the living world into groups of similar life forms (for example, the primate order includes our species, apes, monkeys, and prosimians). Linnaeus was not an evolutionist, although he did admit that a species may produce varieties of itself.

As the first serious evolutionist, Lamarck (1744–1829) interpreted organic history as an escalator of evolving species. He wrote that the human being has evolved from the chimpanzee in Africa and the orangutan in Asia. With little empirical evidence and no explanatory mechanism that could be tested, Lamarck was unable to convince other naturalists that species are mutable and evolve throughout vast periods of time.

Charles Darwin (1809–1882) wrote about the evolving tree of life in order to represent the branching out of successive species over eons of organic time. To also include the fact that plant and animal forms have become extinct throughout biological history, he preferred to interpret organic evolution as the coral of life. Darwin's empirical evidence, from paleontology to morphology, and explanatory mechanism of natural selection convinced several important naturalists that species either evolve or become extinct over time. His own sketch of evolving species illustrates the principle of divergence, thereby challenging all straight-line interpretations of organic history.

Ernst Haeckel (1834–1919) was the first evolutionist to draw a detailed picture of the tree of life. In fact, he drew several illustrations to demonstrate the historical relationships among groups of species as a branching tree of organic evolution. These illustrations may be seen in his home Villa Medusa, now a museum in Jena, Germany.

Several thinkers have interpreted evolving nature as a circle. Herbert Spencer (1820–1903) saw the universe in general and earth history in particular as a returning circle, each cycle representing the three basic stages of evolution, equilibrium, and devolution; yet each cycle would be different in its content.

However, Friedrich Nietzsche (1844–1900) held that given enough time, the identical cosmic cycle would return. In fact, for him, this same cycle would repeat itself forever. Nietzsche's awesome idea of the eternal recurrence of this same universe is the quintessential assumption of his metaphysical position.

Critical of Darwinian mechanistic materialism, Henri Bergson (1859–1941) argued that a vital force is necessary to account for the pervasive creativity throughout organic evolution. For him, this vital force has caused the creative divergence of plants, insects, and animals within biological history. In his interpretation of reality, our species now represents the apex of organic evolution in terms of consciousness. Yet, in the final analysis, Bergsonian philosophy gives preference to metaphysics and intuition rather than science and reason.

Although influenced by Henri Bergson, the geopaleontologist and Jesuit priest Pierre Teilhard de Chardin (1881–1955) emphasized global convergence rather than planetary divergence. Teilhard saw earth history in terms of three successive circles: the inorganic geosphere, the organic biosphere, and the human noosphere. Seeing things within the framework of a spiraling and involuting pyramid, he believed that the further evolution of our species on planet earth will result in a mystical unity of humankind with God. Teilhard referred to this final end goal for our species as the "omega point."

Today, most neo-Darwinians reject both teleology and essentialism. They interpret organic evolution and our species within a strictly naturalistic framework. Earlier models of evolution have been modified in light of the growing fossil and genetic evidence, as well as the use of computers to understand and appreciate the patterns in biological history. Ongoing inquiry will generate new models of organic evolution.

One may speak of emerging teleology as scientists genetically engineer new life forms and, through human intervention, more and more direct the continuous evolution of our own species and others. Furthermore, empirical evidence documenting exobiology and exoevolution would result in a conceptual revolution concerning interpreting the place of life and humankind within this dynamic universe.

— H. James Birx

See also **Evolution, Human; Evolution, Organic; Evolutionary Epistemology**

Further Readings

Bergson, H. (1998). *Creative evolution.* Mineola, NY: Dover. (Original work published 1907)

Birx, H. J. (1991). *Interpreting evolution: Darwin & Teilhard de Chardin.* Amherst, NY: Prometheus Books.

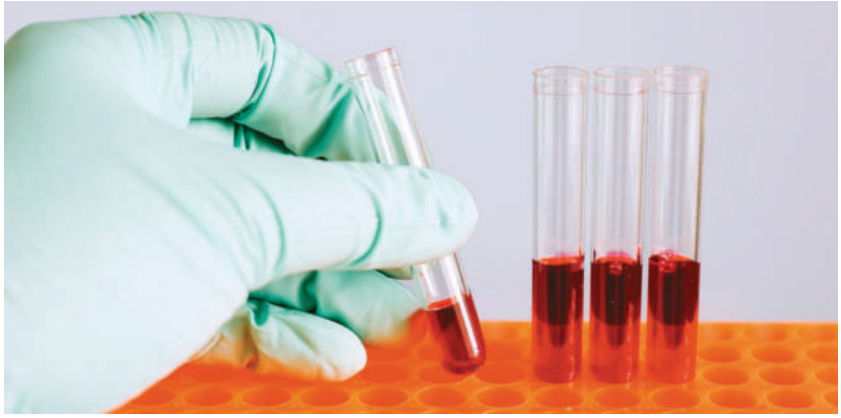
Darwin, C. (2000). *The autobiography* (F. Darwin, Ed.). Amherst, NY: Prometheus Books. (Written in 1876, first published in 1887)

Teilhard de Chardin, P. (1975). *The phenomenon of man* (2nd ed.). New York: Harper & Row/Harper Colophon/Perennial Library.

Evolution, Molecular

Theories of molecular evolution try to explain the natural history of deoxyribonucleic acid (DNA), which is the material carrier of genetic information.

Evolutionarily relevant variations between organisms must be implemented in the biochemical structure of DNA sequences. Otherwise, those variations



Source: © iStockphoto/Andrei Tchernov.

would not be genetically transmitted from an organism to its offspring, so they would disappear from nature after one generation. Molecular evolution is thus the foundation of evolution on all higher levels of biological organization, like the organism, the population, or the species.

After the famous discovery of the double-helical structure of DNA by James D. Watson and Francis H. Crick in 1953, it was known that genetic information is stored in sequences of four DNA building blocks, the nucleotides. That parts of the linear structure of DNA store genetic information means that those parts can instruct the biosynthesis of proteins, which are the most important macromolecules for cellular metabolism. More concretely, the specific succession of nucleotides can encode the primary structure of a protein, that is, the linear sequence of amino acids linked by peptide bonds. In the information bearing parts of DNA, three nucleotides (a codon) encode one amino acid. A gene is the informational unity the function of which is to encode the complete primary structure of a protein. The set of rules that relate each of the 64 possible codons (one has to take the number of nucleotides, which is four, to the power of the number of nucleotides in a codon, which is three) to an amino acid residue constitutes the genetic code. Those rules cannot be deduced from the laws of biochemistry alone. The molecular evolutionist must also reconstruct the historical and contingent physicochemical context in which the genetic code originated.

The biological disciplines that are involved in discovering the laws of molecular evolution and in reconstructing its course are, above all, biochemistry, molecular and population genetics, systematics, and general evolutionary theory.

Biochemistry and molecular genetics analyze the material structures and the physico-chemical mechanisms that realize the storage, replication, variation, transmission, and reading of genetic information. The success of this project is evident from the enormous technical progress that was made during the last 30 years in the development of genetic engineering.

Population genetics studies the evolutionary dynamics by which the relative frequency of genes changes with time in populations of organisms. Mathematical models were developed that describe different types of evolutionary dynamics in a more and more realistic way. These models can be tested against empirical data gathered by systematic analyses of wild-living populations.

Systematics classifies the rich variety of species, which lived and live on Earth, in order to reconstruct their evolutionary relationships in so-called "phylogenetic trees." Such a tree shows graphically how some species, with which we are concerned, are related to each other by placing their common ancestor at its root and by illustrating the separation of a new species with a branching point. Finally, the species in question are to be found at the top of the resulting branches. Before the advent of automated DNA-sequencing techniques, morphological descriptions were the most important data on which phylogenetic trees were based. Nowadays, molecular data of DNA sequences are of equal importance for the reconstruction of natural history.

General evolutionary theory tries to synthesize the insights of the before-mentioned biological disciplines in an all-embracing picture of molecular evolution. This integration is to be accomplished by discovering the causal mechanisms that can explain the facts of natural history.

What mechanisms are responsible for molecular evolution? Of course, the answer that first comes to mind is natural selection, the evolutionary mechanism that stands in the center of Charles Darwin's research on the origin of species. His theory can be applied to the molecular level, if we remember that the differences between individual organisms and therefore also between species are caused by differences in their genetic material, which are, in turn, caused by mutations in the nucleotide sequences of their DNA.

Since those mutations are inherited by offspring, fitness as the measure for the evolutionary success of an organism can be redefined on the molecular level as the replication rate of its genes in the gene pool of its population. The struggle for life described by Darwin is thus the struggle of genes to raise the number of their copies in the next generation. The more copies of a DNA sequence that are successfully transmitted to offspring, the fitter it is.

But there is another theory that claims also to contribute important insights to the explanation of the course of molecular evolution. This claim is laid by the neutral theory of molecular evolution, which the Japanese population geneticist Motoo Kimura has developed since the 1960s. He postulates that most genetically transmitted mutations are selectively neutral; they do not have any positive or negative consequence on the fitness of the organism in which they occur. The spread of neutral mutations in the gene pool of a population, called "genetic drift," has then nothing to do with natural selection. It is a process that follows, from the perspective of natural selection, a completely random course.

Today, even staunch Darwinians accept that genetic drift constitutes an important mechanism that is effective in natural history. On the other hand, it seems to be also clear that randomness cannot explain everything in evolution. Kimura's neutral theory does not completely replace Darwin's selection theory, but it describes an explanatory scheme that supplements traditional Darwinian reasoning. In concrete cases of explaining a molecular evolutionary process that happened between kindred species, it is often very difficult—and perhaps impossible—to decide which of the two theories proves to be right.

How difficult it is to develop a general evolutionary theory on the molecular level will be clear after one has realized that it has to address not only the evolution of DNA. Molecular evolution also encompasses the evolution of precursors of DNA and, last but not least, the origin of the first material carrier of genetic information. Since the existence of genetic information presupposes the existence of a genetic code, the origin of the latter belongs to the main problems of research into molecular evolution, too.

— *Stefan Artmann*

See also **DNA Testing; Gene Flow; Genetic Drift; Genetic Engineering**

Further Readings

Graur, D., & Wen-hsiung, L. (2000). *Fundamentals of molecular evolution* (2nd ed.). Sunderland, MA: Sinauer.

Kimura, M. (1983). *The neutral theory of molecular evolution.* Cambridge: Cambridge University Press.

Küppers, B.-O. (1985). *Molecular theory of evolution: Outline of a physico-chemical theory of the origin of life* (2nd ed.). Berlin: Springer.

Evolution, Organic

Evolution, in the modern sense, refers to changes in the genetic composition of populations over time and is the result of natural selection and/or genetic drift acting on population variation. In this Darwinian paradigm, species may change or split into more than one species (speciation). All extant species are descendants of a common ancestor (descent with modification). Definition of the term in this framework encompasses the gene-frequency changes of population microevolution, anagenetic changes within a lineage, cladogenesis, and the appearance of evolutionary novelties. The present diversity of organisms was produced by change within species (anagenesis) and splitting of species (cladogenesis) through geological time, in contrast to the explanations offered by separate creation and Lamarckian transformism. The former denies both the mutability and common ancestry of species, and the latter invokes change within species but denies the splitting and common ancestry of species. Historically, the term *evolution* was also used to describe development of the embryo and in the theory of embryonic recapitulation.

Evolution is a process that occurs in populations rather than in individuals: The genetic composition of a population changes, but that of the individual does not. Evolution occurs in populations by changes in the frequencies of alleles and genotypes. The changes at the genetic level are observed in the phenotypes of individuals (e.g., protein structure, individual morphology, behavior).

Ernst Mayr identifies five major postulates that form the foundation of the Darwinian paradigm: (1) organisms change through time, (2) all organisms have a common ancestor, (3) species multiply by

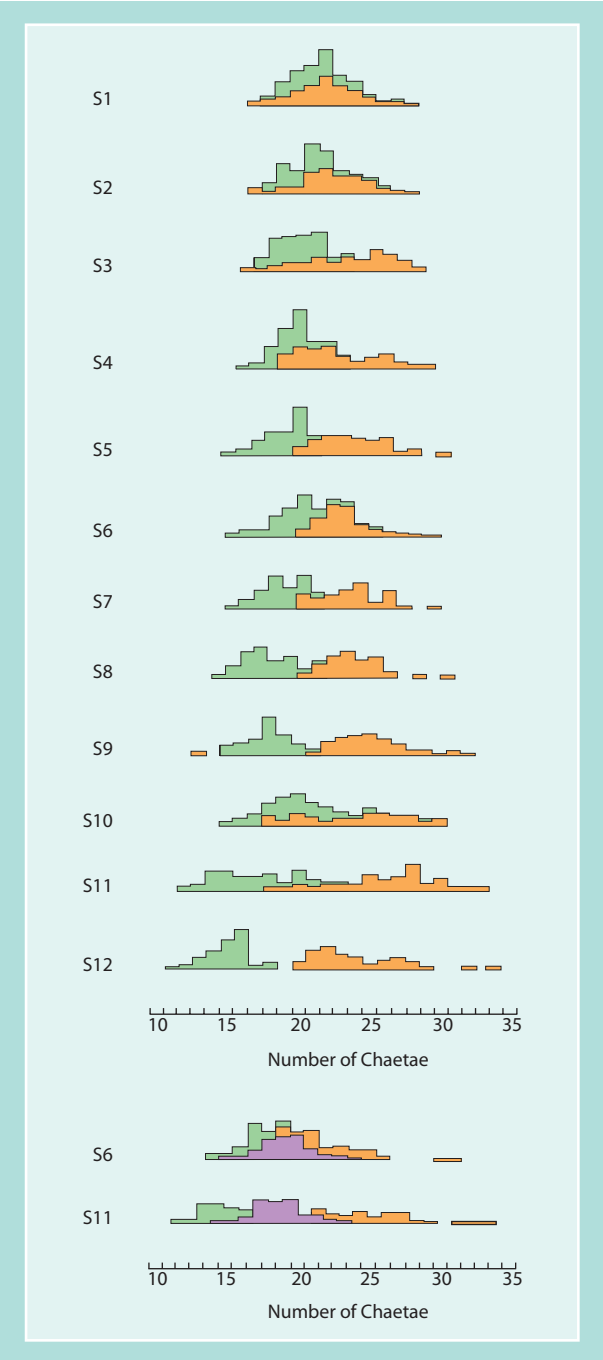


Figure 1 Thoday and Gibson conducted a selection experiment on a number of sternopleural chaetae (stout hairs, bristles) in *D. melanogaster*. The histograms depict distribution curves for each generation S1-S12. Green is progeny of low number females and orange is progeny of high number females. Disruptive selection caused the high chaetae group to diverge from the low chaetae group.

Source: From *Nature, 193*, pp. 1164–1166, "Isolation by Disruptive Selection" by Thoday, J. M., & Gibson, J. B., et al. Copyright © 1962, reprinted by permission of *Nature*.

splitting or budding, (4) gradualism, and (5) natural selection. It should be pointed out that the Darwinian concept of gradualism is not that evolutionary change is necessarily slow and steady. Rather, it is that evolution does not occur by saltations, the results of macromutations that render offspring reproductively isolated from the parental generation, *sensu* the writings of Richard Goldschmidt.

Evidence for Evolution

Matt Ridley points out that two fundamental questions need to be answered to demonstrate evolution. Do populations and species change through time? And do living organisms share a common ancestor? The evidence used to answer these questions in the affirmative comes from a number of sources, including observation of evolution on a small scale, the presence of extensive variation among populations and subspecies, homology, adaptive radiation, and the fossil record.

Evolution "on a small scale," over a number of generations rather than over millions of years, has been achieved under domestic and experimental conditions and observed in the wild. The origin and development of domestic breeds of animals and plants has been a topic of interest to anthropologists and clearly demonstrates that species change. In *On the Origin of Species* (1859), Charles Darwin discusses the production of domestic breeds as the result of "accumulative selection" by humans and points out that breeders and horticulturalists intentionally modify breeds within a human lifetime. He particularly concentrates on the origin of pigeon breeds. Darwin also addresses "unconscious selection," in which a breed is altered simply by breeding the "best" individuals (for example, the English pointer dog). In both techniques, the breeder is allowing only those individuals with extreme values of a particular character to produce offspring during each consecutive generation (the "traditional breeder's approach"). This shifts the mean value for the selected characteristic during successive generations in the descendants: The breeder is applying directional selection to the particular trait of interest (the somewhat unfortunate term "artificial selection" is often applied to this methodology, which could be misconstrued). Darwin expands upon this discussion in *The Variation of Animals and Plants Under Domestication* (1883) and states that domestication is a gigantic experiment in selection. Modern

discussions of the principles and results of plant and animal breeding are couched in terms of genetics.

In an experimental context, both the traditional breeders' approach and natural selection in a controlled environment have been employed to demonstrate change in populations. Well-known examples of the former have focused on disruptive selection on the number of sternopleural chaetae (stout hairs) in the fly, *Drosophila melanogaster.* These experiments not only sought to demonstrate that change in mean population chaetal number would result from differential reproduction but also tested whether disruptive selection could overwhelm the results of gene flow—a central issue in sympatric and parapatric speciation models. The general approach was to allow flies with low chaetal number and flies with high chaetal number to breed, but not allow breeding by those with intermediate numbers. The results consistently showed shifts in mean population numbers over time. The same approach was employed in a behavioral context by J. C. Tryon, a pioneer of behavioral genetics, in his famous experiment on maze-running ability in rats. Later applications include the work of Rodriquez-Ramilo and associates on the effects of inbreeding and selection on *D. melanogaster.*

In experiments that employ natural selection in a controlled environment, subjects are exposed to a predetermined environmental regimen for one or more generations, but the experimenter does not directly determine which individuals breed. D. N. Reznick and associates used this approach in field experiments in which guppies were moved from areas where they were subject to predation by cichlid fishes to sites where they were not; the descendants of guppies from sites with less predation matured later and at a larger size than descendants of those from high predation sites. The approach is particularly valuable for the study of niche dimensions, range limits, and character displacement.

Demonstration of the occurrence of evolution in the wild often falls within the discipline termed *ecological genetics,* a combination of naturalistic observation, experimentation in the field, and the use of laboratory genetics. Ecological genetics seeks to establish that change occurs within populations and species, to demonstrate that there is a hereditary basis to phenotypic variation, and to identify the agent of change. The work of J. H. Gerould on color polymorphism in caterpillars is cited as an early example.

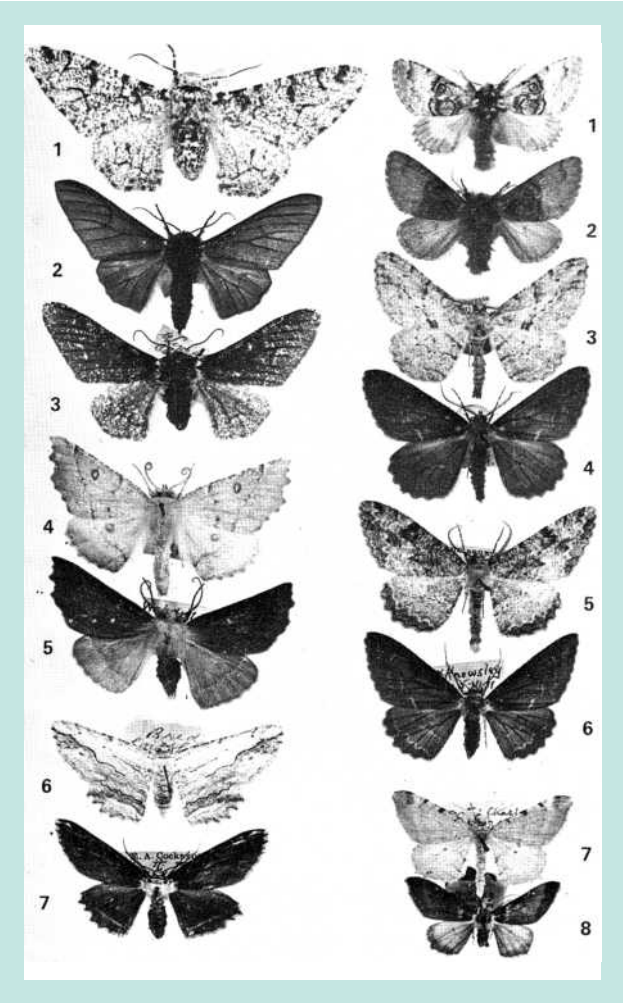


Figure 2 Industrial melanics from a variety of moth genera. The *typica* variety of the peppered moth is in the upper left (1) and the *carbonaria* form (2) is below it.

Source: Plate 5.6 (p. 62) from *The Evolution of Melanism* by Kettlewell, B. (1973). By permission of Oxford University Press.

A common methodology employs the following components: (1) observations and collections made to establish that distinct phenotypes (generally of a trait that manifests clear polymorphism) are found in the wild, (2) establishing that there is a change in the proportions of the phenotypes over time or geographic distance, (3) determination that there is a genetic basis to the various phenotypes, and (4) identification of the agent that is responsible for altering the frequencies of phenotypes and genotypes. The latter step is often the most difficult, because the occurrence of a feature may be influenced by more than one process. In *Ecological Genetics,* Edmund B.

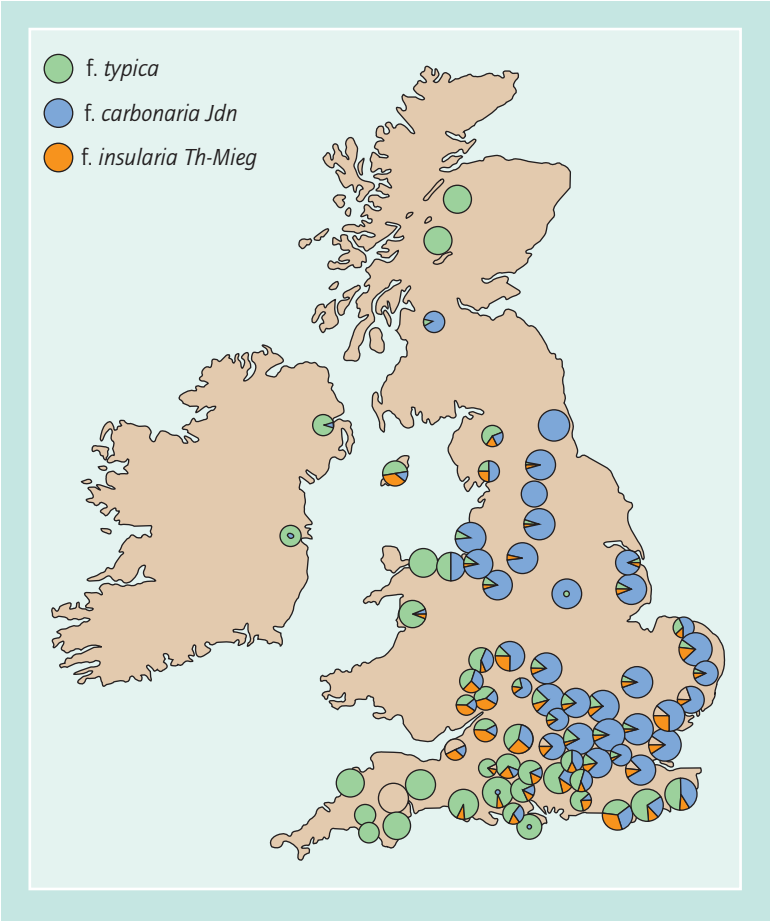


Figure 3 The frequencies of *carbonaria* (blue areas) and *typica* (green areas) in Britain. Shaded segments represent the *insularia* variety, which is not discussed in this entry. There is a strong correlation between pollution levels and frequency of *carbonaria*: High frequencies were close to, or east of, polluted industrial districts; in contrast, Scotland and southwest England show virtually no *carbonaria*.

Source: Plate 5.4 (p. 113) from *Melanism: Evolution in Action* by Majerus, M. E. N. (1998). By permission of Oxford University Press.

Ford synthesizes the extensive literature on shell polymorphism in *Cepaea nemoralis,* chromosome polymorphisms in *Drosophila,* mimetic polymorphism in butterflies such as *Papilio dardanus,* and industrial melanism.

Industrial melanism is generally cited in discussions of evolution demonstrated on a small scale. A classic example has been that of wing and body color polymorphism in the English peppered moth, *Biston betularia.* Michael Majerus states that melanism occurs whenever there is a pervasive darkening of the ground color or patterning of an organism. The term *industrial melanism* applies to darkening as a result of industrial pollution of the environment. The first-known melanic specimen of the peppered moth was captured in 1848, in Manchester, and melanics rapidly increased to 98% to 99% of the population by 1895 to 1898. The books of Ford, Bernard Kettlewell, and Majerus summarize literature on the phenomenon dating back to 1864. It is often held that the origin of the melanic *carbonaria* was a single point mutation in the region around Manchester, with subsequent migration to other areas, but Majerus indicates that there may have been more than one mutational event. Early explanation of the occurrence of melanism invoked Lamarckian transformism. A mutation pressure explanation was advanced by J. W. H. Harrison in 1928. He argued that melanism was induced in adults as a consequence of larvae feeding on leaves contaminated with mutagens that increased the mutation rate of genes associated with melanin production. However, it has never been confirmed that the influence of environmental stimuli during development can induce melanism in adult Lepidoptera.

The Darwinian natural selection explanation replaced those of the inheritance of acquired characteristics and mutation pressure. The primary explanation of the geographic spread, and numerical increase of *carbonaria* became that of selective advantage of the melanic form over that of the lighter *typica* in areas of industrial air pollution, because of camouflage from insectivorous birds. The occurrence of industrial melanism in Lepidoptera gave rise to a series of elegant studies of *Biston betularia,* summarized by Ford, Kettlewell, and Majerus, and Kettlewell's work had a significant impact on the acceptance of natural selection as an agent responsible for evolution. His investigations included a controlled experiment on bird predation on moths in an aviary to construct quantitative degrees of camouflage effectiveness, field experiments in polluted (Christopher Cadbury Bird Reserve, Birmingham) and unpolluted (Deanend Wood, Dorset) localities, and surveys of peppered-moth frequencies throughout Britain. The fieldwork included mark-recapture, studies to determine whether moths released in

early morning were still at the release point later in the day, and (with Niko Tinbergen) filming of actual bird predation on moths. Kettlewell concluded that differential selective predation by birds was responsible for differences in the relative frequencies of *typica* and *carbonaria* in areas that had become polluted.

It has been realized that the classic exposition of natural selection on *Biston betularia* is too simple, in part because camouflage and predation do not seem to be important in maintaining melanism in some other taxa. A variety of workers have studied industrial melanism in the ensuing decades since Kettlewell's landmark work. The term industrial melanism is now applied to taxa such as the two-spot ladybird and the pale brindled beauty moth, without the implication that predation is responsible for maintaining the polymorphism. Kettlewell himself pointed out that melanism affects many aspects of an organism's life, including behavior, sexual selection, temperature tolerance, and physiology of pigment production; natural selection could potentially affect the moth population through any of these features, among others. Publications by Bruce R. Grant and Majerus review many of the major criticisms, including that large numbers of released moths produced artificially high prey densities and may have attracted birds; moths settled on tree trunks, but it is unclear whether this is a natural hiding place for *B. betularia;* moths released during daylight hours do not behave normally; a combination of lab-raised and wild-caught moths were used; there are differences between human and bird vision; and there was no evidence that typicals and melanics prefer to rest on different backgrounds—contra Kettlewell's barrel experiments. However, these authors conclude that such shortcomings do not jeopardize the principal conclusions that the intensity of bird predation varies according to habitat and that industrial melanism in the peppered moth is a valid example of natural selection and evolution in the wild. There was a solid correlation between pollution levels and the frequency of the melanic form. Kettlewell compared the relative success of the morphs on the same parts of trees in different areas (not different parts of trees in the same area), and he showed that moths that were most conspicuous to humans were also eaten first by birds. Kettlewell's conclusions are bolstered by recent studies of predation on male mosquitofish by Lisa Horth.

Geographic variation in intraspecific phenotypes and proportions of genotypes provides evidence for evolution. If a species is studied in the wild, it will generally be found that there are phenotypic variants in different geographic areas. Often, these variants are designated as subspecies of the species; variation is often so extensive that small differences in samples of populations have been used to assign subspecific rank, and some have argued that the subspecies category has been overutilized. Examples of variation within the primates include the geographic variants found within sub-Saharan vervet monkeys (*Cercopithecus aethiops*), South American white-fronted capuchins (*Cebus albifrons*), tufted capuchins (*Cebus apella*) and common squirrel monkeys (*Saimiri sciureus*), and the northern greater galago (*Otolemur garnetti*). Interpopulation variability is often readily interpreted in terms of environmental factors to which each population has adapted, as in the cases of *Peromyscus* mouse populations to substrate color and cyanogenic clover (*Trifolium repens*) to probability of frost. The latter also illustrates that interpopulation variation can be distributed in the form of a cline, a gradual change in a phenotypic character or genotypic along a geographic transect. In humans, there is a cline in the frequency of B type blood across Eurasia. A cline may be formed by interbreeding between formerly isolated populations or by geographic variation in selection pressures on a character. Descent from a common ancestor and subsequent local evolution are the most logical and parsimonious explanations for geographical variants. Special creation and transformism would have to explain each local variant as having a separate origin. Explanation by Lamarckian transformism would be particularly hard to envision, as it would necessitate separate origin by spontaneous generation for each population, followed by the inheritance of acquired characteristics that would make populations separated by hundreds of miles sufficiently different to be distinguished only at the subspecies level.

Powerful evidence from geographic variation comes from ring species, in which there is an almost continuous set of intermediates (cline) between two sympatric species, and the intermediates are arranged in a ring. The set of intermediates between the lesser black-backed gull (*Larus fuscus*) and herring gull (*L. argentatus*) is distributed around the North Pole. As one moves along the ring, there is only one species present in any local area. However, there are

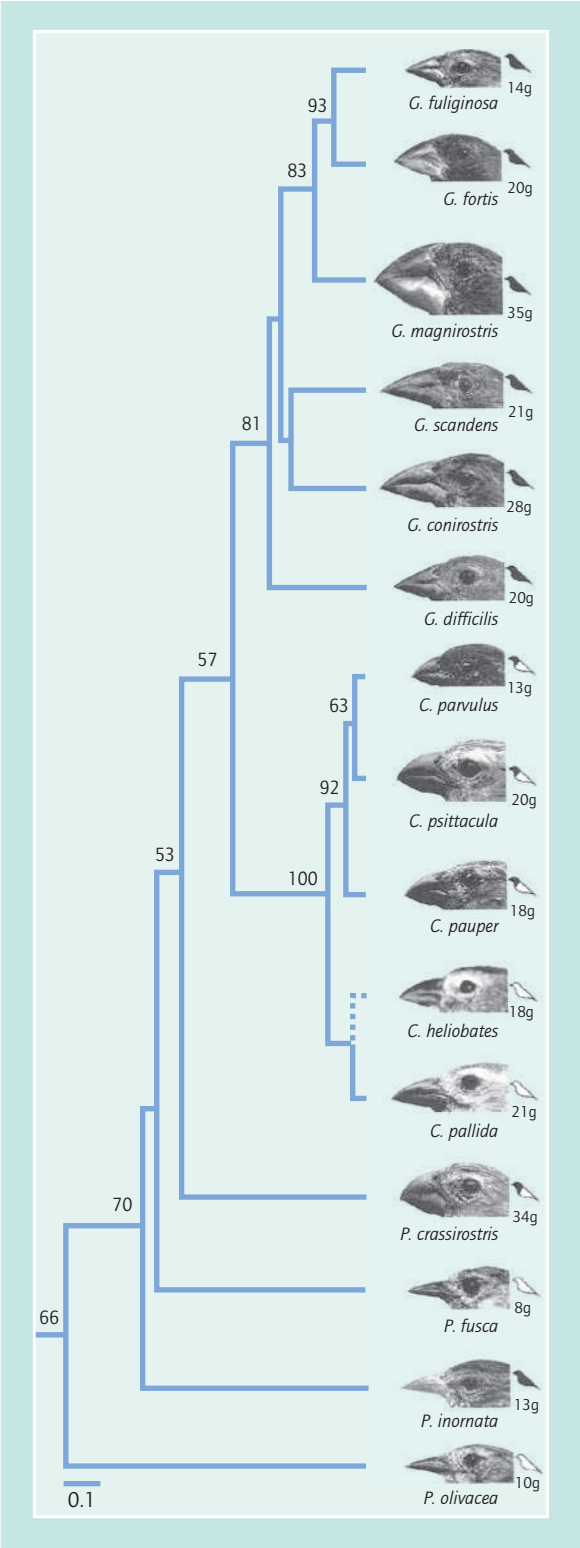


Figure 4a Phylogeny of Darwin's finches based on microsatellite length variation

Source: Adapted from Grant, Peter R., *Ecology and Evolution of Darwin's Finches.* © 1986 Princeton University Press. Reprinted by permission of Princeton University Press.

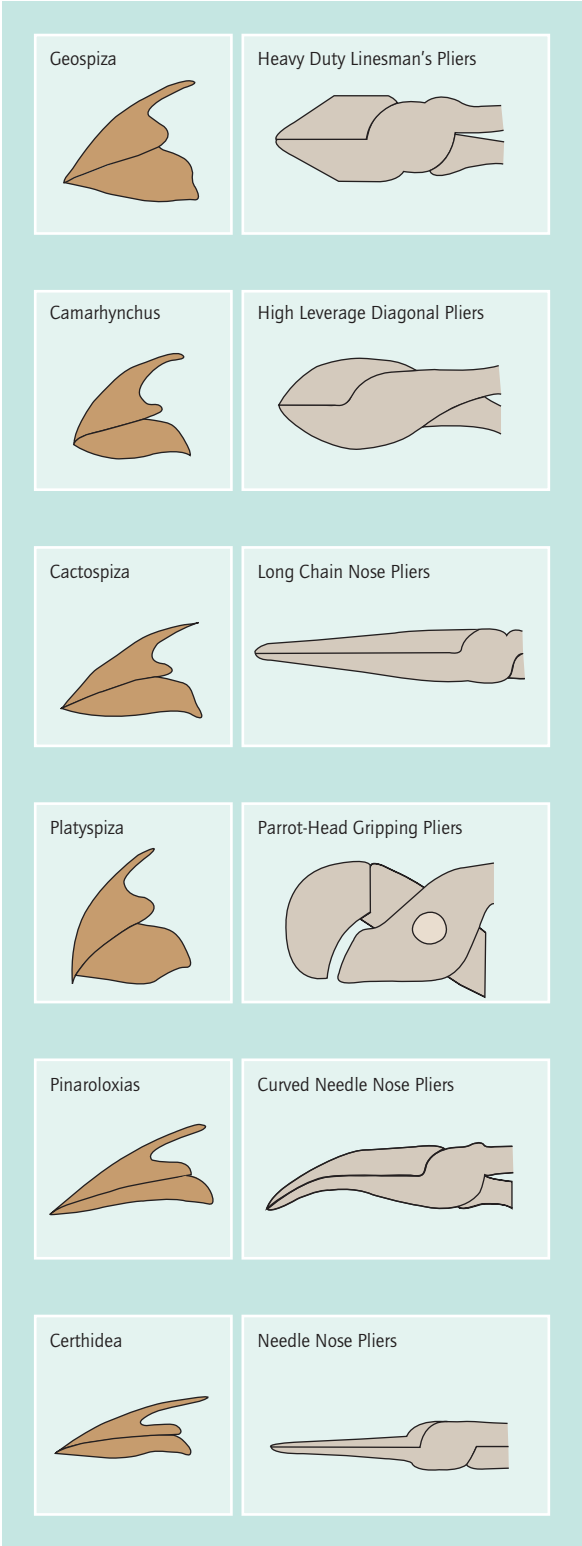


Figure 4b Analogy between beak shapes and pliers

Source: Adapted from Grant, Peter R., *Ecology and Evolution of Darwin's Finches.* © 1986 Princeton University Press. Reprinted by permission of Princeton University Press.

reproductively and ecologically separate species where the two end points of the ring meet in Europe. Mayr terms this "speciation by distance." Ring species demonstrate that intraspecific variation can be great enough to make two species and that there is a continuum from interindividual to interspecific variation. Recent research on greenish warblers (*Phylloscopus trochiloides*) by Darren E. Irwin and colleagues, using amplified fragment length polymorphism markers, provides evidence that speciation by distance can produce distinct species despite gene flow along the ring.

Homology is the possession by two or more species of a trait derived, with or without modification, from a common ancestor. Gunter P. Wagner terms it the central concept of comparative morphology. It is also robust evidence for evolution, for structures are homologous because of common descent, not because of close similarity in function. Wagner explains that homologous structures (homologs) are those that have been acquired only once in the history of a group of organisms possessing the character; those features of a development system that cause restriction in phenotypic consequences of genetic variation are important in determining that features are homologs. Well-known examples are the pentadactyl hand of a primate and the pentadactyl wing of a bat: They both possess five digits because of descent from a common ancestor, not because of close similarity in function.

Wagner also points out that the study of homologs is the basis for the reconstruction of phylogenetic history by morphological methods. This has historically been true in the study of adaptive radiations before the advent of molecular phylogenetic approaches. An adaptive radiation occurs when a single ancestral species diversifies into a large number of descendant species that occupy a variety of ecological niches and differ in traits used to exploit those differing niches. Articles in *Molecular Evolution and Adaptive Radiation* (1997), edited by Thomas J. Givinish and Kenneth J. Sytsma, give alternate definitions. Well-known examples include the radiations of placental and marsupial mammals, Hawaiian silversword plants, African cichlid fishes, and Caribbean *Anolis* lizards. All 14 species of Galapagos finches share finch homologies and are members of the single subfamily Emberizinae of the finch family Fringillidae. In the even more diverse radiation of Hawaiian honeycreepers, all species share finch homologies. Although beak size is a continuously varying character governed by both genetic and environmental factors, Galapagos finch and Hawaiian honeycreeper species manifest beaks adapted to particular foraging strategies and diverse niches.

The evidence for evolution that is most often cited is from the fossil record. Four aspects of the fossil record are particularly important: Many species are extinct; fossil and extant forms in the same geographic region are related to each other (law of succession); the history of the Earth has been one of environmental change; and species have changed through time and there are transitional forms in the fossil record. The latter aspect of the fossil record is one that receives particular attention, in terms of both describing forms that are transitional between major taxa and in documenting evolution within lineages and clades.

One of the presumed problems with using the fossil record as evidence for evolution is that there are gaps between fossil forms and a smooth transition is not always documented. Darwin listed this as the first difficulty of the theory of descent with modification in *On the Origin of Species* (1859) and sought to answer the objection by pointing out the imperfect and intermittent nature of preservation of "parent-forms" and intermediate links. This explanation has been used subsequently on many occasions, and workers have sought to chronicle the resolution of the fossil and archeological records.

A particularly well-known fossil history is that of horses. Since the early work of Kovalevsky, many eminent paleontologists (including the rivals O. C. Marsh and Edward Drinker Cope) have studied horse evolution. The writings of George Gaylord Simpson have made the evolution of the horses one of the best-known, and debated, examples of long-term evolution. Simpson's work has sometimes been characterized as advocating that the morphological trends in dental morphology, crown size, body size, skull size, preoptic dominance, brain size, and limb ratios were the result of phyletic evolution within a direct phylogenetic lineage, that is, a single line of gradual transformation from Eocene *Hyracotherium* to modern *Equus*. However, in *The Major Features of Evolution* (1953), Simpson points out that horse evolution is characterized by repeated and complex splitting (he specifically states that it is "bush-like"). He notes that there were no trends that continued throughout the history of the family in any line.

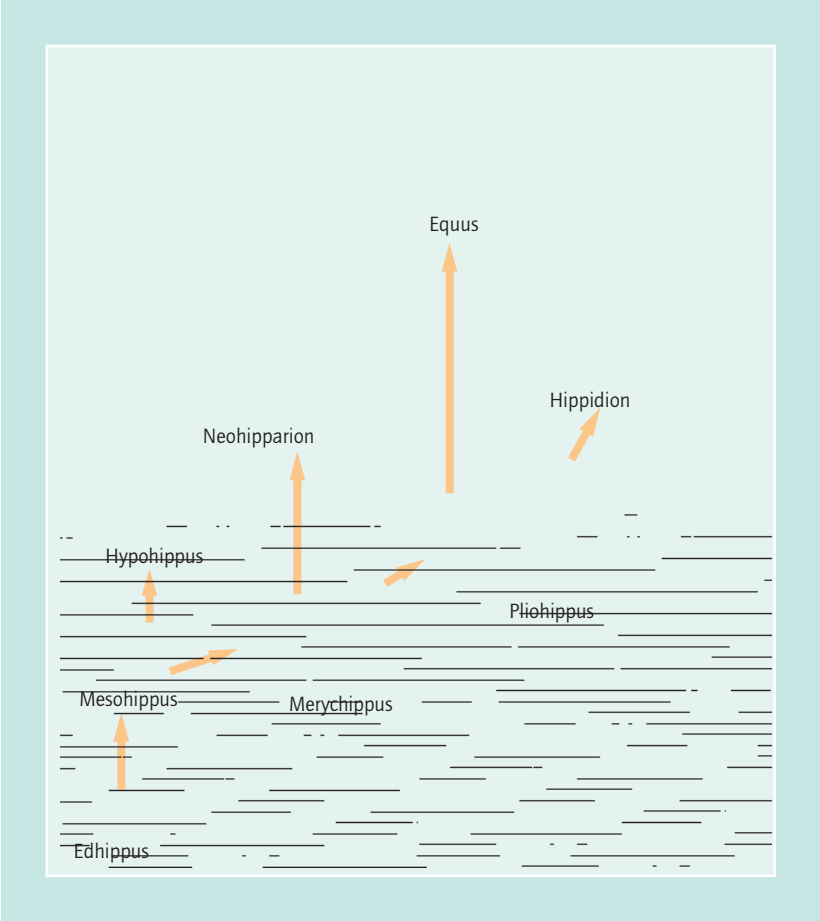


Figure 5a Trends in the evolution of horses. Simpson termed the early Miocene "the great transformation" of horse anatomy correlated with the spread of grassland. 5A presents the evolution of the skull, showing the increase in size and changes in cranial proportions including lengthening of the preorbital region; 5B depicts the trend toward increased brain size and complexity; 5C shows the trend toward increased crown height in upper molar teeth; 5D illustrates the molarization of premolars in the Eocene; 5E further depicts evolution of horse cheekteeth from brachydont, browsing teeth to hypsodont, grazing teeth for transverse shearing of abrasive grasses; 5F provides selected stages in the evolution of the forefoot, with a reduction of metapodials from 4 in *Hyracotherium* (eohippus) to 3 in *Mesohippus* and eventually to 1 in "Pliohippus" and *Equus*. Simpson viewed each column as a distinct mechanical type.

Source: From *Horses* by George Gaylord Simpson, copyright © 1951 by Oxford University Press, Inc. Used by permission of Oxford University Press, Inc.

Contrary to creationist views, horse fossils chronicle large-scale evolutionary change even if the various genera were separated from one another by tens of millions of years. This is true regardless of whether horse evolution is interpreted in the context of anagenesis or as an example of "bushy," cladogenetic evolution. Controversies regarding whether evolution has occurred within a lineage or clade by phyletic evolution or punctuated equilibrium are debates regarding the tempo and pattern of morphological change, not whether change has occurred—both patterns document evolution. The same is true of contrasting interpretations of hominin evolution. However, creationist tracts sometimes cite sources emphasizing rectangular patterns of evolution to argue that evolution does not occur because of a purported lack of transitional forms; they demand evidence of phyletic evolution to support evolution as a fact.

Robert L. Carroll summarizes several well-documented cases of phyletic, directional evolution in late Cenozoic mammals in *Patterns and Processes of Vertebrate Evolution* (1997), including increase in length of limb bones and in the number of osteoderms in the giant armadillo (*Homesina*) lineage from Florida, morphology of the upper and lower molars in the sagebrush vole (*Laqurus curtatus*) over 287,000 years, and change in size and thickness of enamel in the molars of the water vole (*Arvicola cantiana*) over 300,000 years.

Examples of phyletic evolution have been chronicled for the primate fossil record, including within the Eocene *Cantius* lineage by W. C. Clyde and P. D. Gingerich and the Eocene *Tetonius-Pseudotetonius* lineage by Kenneth Rose and Thomas Bown. Meave Leakey discusses phyletic evolution in the *Theropithecus oswaldi* baboon lineage, from the upper Burgi Member Koobi Fora Formation to upper Bed II of Olduvai Gorge, in characters such as increase in complexity of molars and their size compared with those of anterior teeth, decrease in size of canines and in the sectorial cusp of P_3, development of a "reversed cusp of Spee" on cheekteeth, increase in size of the glenoid process, and increase in estimated body weight. She interprets the evidence as representing an unbranched, evolving lineage that can be divided into the three subspecies: *T. oswaldi darti* (earliest in time and

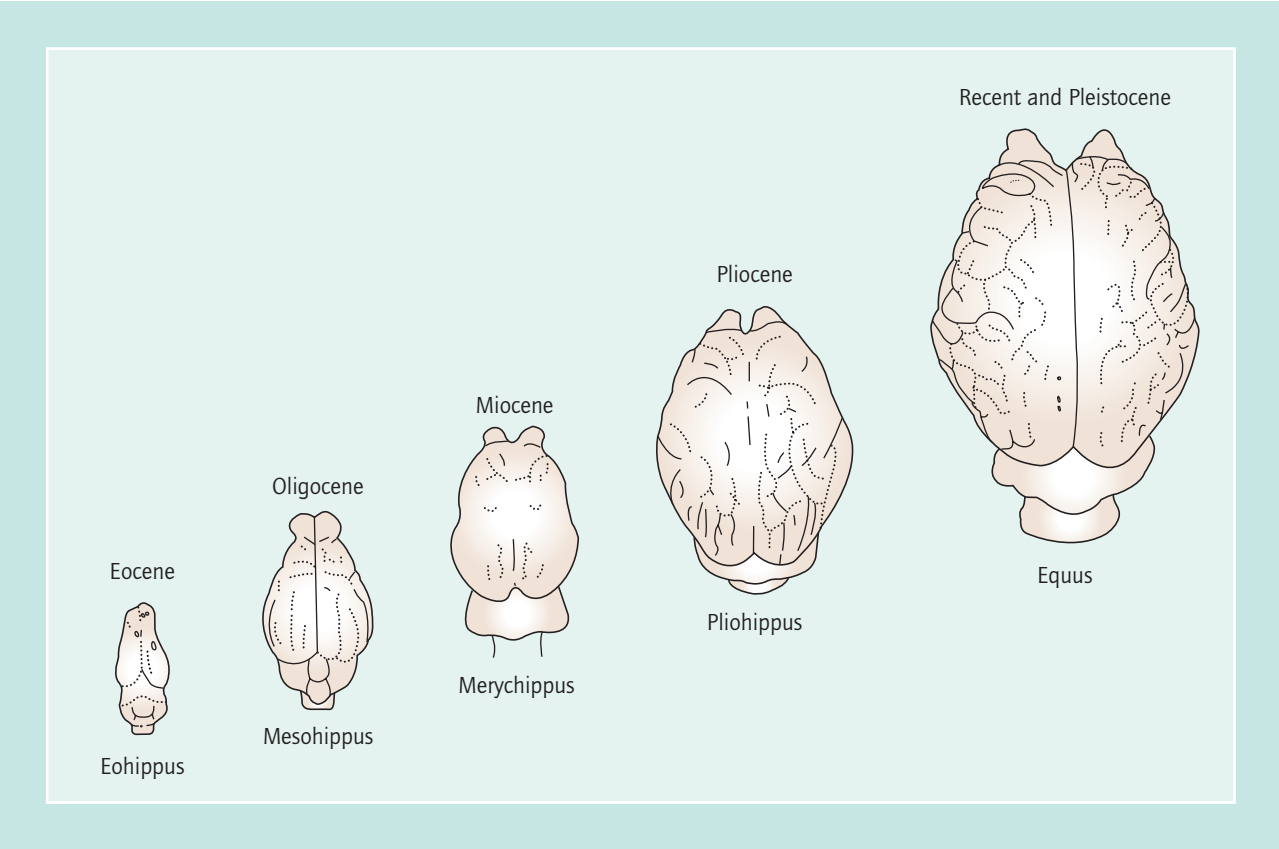


Figure 5b

Source: From *Horses* by George Gaylord Simpson, copyright © 1951 by Oxford University Press, Inc. Used by permission of Oxford University Press, Inc.

smallest in size), *T. o. oswaldi* (intermediate) and *T. o. leakeyi* (latest and largest). Gerald G. Eck also interprets it as a phyletically evolving lineage but prefers to assign the earliest material, from Hadar and Makapansgat, to the species *T. darti* rather than using subspecific designation.

The recording of the tempo and pattern of change in individual characters is the methodology used in the studies cited above. It is preferable to plotting the range of species to document the pattern of evolution. The results produced by the latter often depend on the degree of variability in morphological parameters of each named species or genus, as well as on whether species are recognized on the basis of meristic characters or on those that vary continuously. Carroll states that the character-based approach often shows that evolution occurs in a mosaic manner: that different characters, or the same character at different stratigraphic levels, will show different tempos and patterns of evolution—an observation also discussed by Simpson in reference to horse evolution.

Variation and the Processes That Affect It

Genetic variation in characters is the raw material for evolution. As pointed out by Ronald Fisher in the fundamental theorem of natural selection and supported by subsequent experimentation by Francisco Ayala, evolution can occur only in populations that manifest genetic variation. Population geneticists have therefore spent considerable amounts of effort to measure variation. Since the pioneering work of Richard Lewontin and J. L. Hubby, gel electrophoresis has often been the technique employed, and estimates of genetic variation have been made by electrophoresis of proteins and both mitochondrial and nuclear DNA. Mean heterozygosity and the percentage of polymorphic loci are then calculated. Although John H. Gillespie argues that electrophoretic studies of enzymes may overestimate the amount of protein variation (because these proteins may be more polymorphic than are "typical" protein loci), the basic conclusion has been that natural populations are very

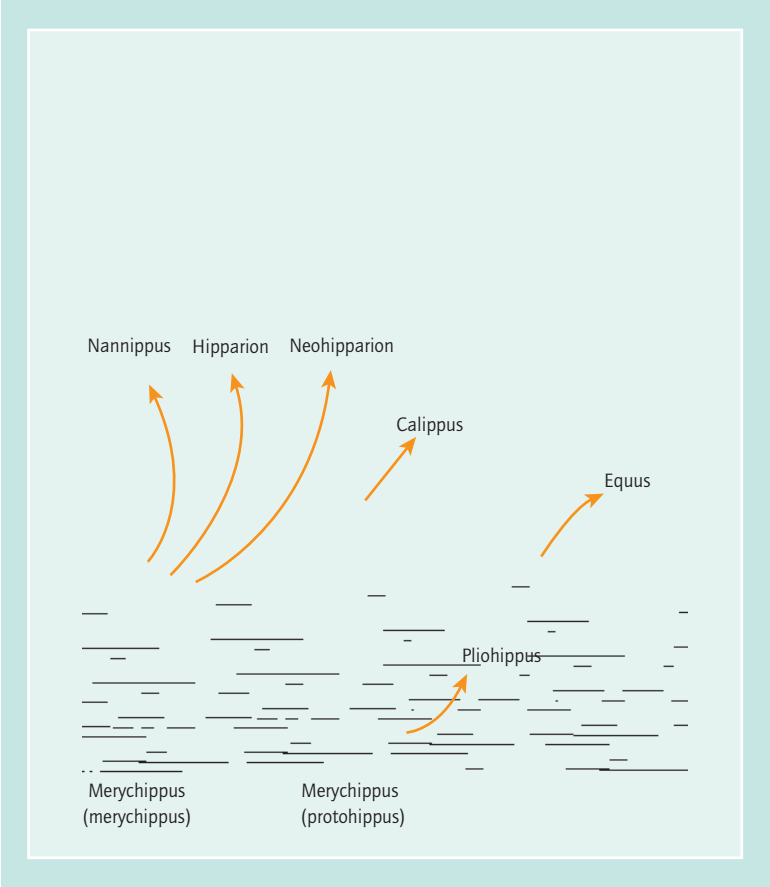


Figure 5c

Source: From *Horses* by George Gaylord Simpson, copyright © 1951 by Oxford University Press, Inc. Used by permission of Oxford University Press, Inc.

variable. Jeffrey B. Mitton, in *Selection in Natural Populations* (1997), states that 33% to 50% of enzyme loci are polymorphic and the average individual is polymorphic for 4% to 15% of its genes, but there is considerable variety in the percentage of genes that are polymorphic, from 0% in the modern cheetah and northern elephant seal to 100% in the mussel *Modiolus auriculatus*. Studies of plants and of *Peromyscus* mice suggest that the amount of genetic variation increases with the size of the geographic range.

High levels of variation counter the "classical model," associated with Herman J. Muller, which held that populations in the wild would manifest little genetic variation: The model postulated that one allele of each gene would function best in each deme and would therefore be favored by natural selection. Almost all members of the population would be homozygous for this "wild-type" allele. If a superior new mutation arises, it eventually becomes the new wild type. A population would evolve, but there would not be much genetic variation at any one time in the population. Mutations would be deleterious or have adaptive value, but would not be neutral in their effects.

With the discovery of large amounts of genetic variation in populations, two major competing models (balance and neutral mutation) sought to explain the maintenance of variation. The balance model, associated with Theodosius Dobzhansky, observes that many individuals are heterozygous at many loci: No single allele is best, and balancing selection would prevent a single allele from reaching very high frequency. Evolution would occur by gradual shifts in the frequency of alleles. Examples of heterozygote advantage, in which the heterozygote is fitter than is either homozygote (as in sickle-cell trait), bolster this argument. The neutral-mutation hypothesis (termed by Mark Ridley, the "purely neutral" theory) states that much, if not most, variation is selectively neutral because different genotypes are physiologically equivalent. Evolution is not driven so much by natural selection acting on alternate phenotypes/genotypes, but by genetic drift. The purely neutral hypothesis predicts that larger populations will contain more genetic diversity than smaller ones, a prediction that appears to be contradicted by evidence.

Five processes influence the amount of variation in a population: mutation, recombination, gene flow, genetic drift, and natural selection. Mutation is any heritable change in the DNA, including both point mutations (for example, alleles that produce the varieties of hemoglobin) and chromosomal mutations (for example, polyploidy, polysomy). Recombination (crossing over), a process by which segments of homologous chromosomes are exchanged during Prophase I of meiosis, produces new combinations of alleles on chromosomes. Gene flow is the incorporation of alleles into the gene pool of a population from one or more other populations. The archetypal view is that it homogenizes genetic composition if it is the only operating factor; that is, the amount of gene flow between local populations influences the

degree to which each deme is an independent evolutionary unit, for if there is little gene flow, then each deme evolves independently from others. Gene flow would not only deter genetic drift but also potentially constrain the adaptive divergence of populations living in different environments. This issue is important because models of sympatric and parapatric speciation assume that if selection is strong enough, it can overwhelm the effects of gene flow and adaptive divergence and speciation can occur. Recent work by Andrew P. Hendry and Eric B. Taylor on lake and stream populations of the threespine stickleback fishes (*Gasterosteus aculeatus*) suggests that gene flow may constrain adaptive divergence, but to varying degrees, and that different traits do not respond in the same way to the same amount of gene flow.

Genetic drift (the "Sewall Wright effect") is the random fluctuation of allele frequencies in effectively small populations: populations in which the number of individuals that actually breed is small. The basic premise is that small samples are often not representative of the range of genetic variation within a population and that the frequency of an allele in a small sample is unlikely to be equal to its frequency in the entire gene pool of a large population. Genetic drift is sometimes subdivided into continuous drift, intermittent drift, and the founder principle. The founder principle refers to situations in which populations are begun by a small number of colonists, which carry a fraction of the variability of the parental population, and allele frequencies differ from those of the parental population. When a population is subject to drift, the frequency of an allele will randomly change from one generation to the next until the allele is either fixed or lost (see Figure 7). It, therefore, reduces the amount of genetic variation within a population. Genetic drift has been produced in experimental populations of *Drosophila,* extensively treated mathematically, and modeled by computer simulation. It has been discussed in the microevolution of aboriginal Australians, the high incidence of hereditary eye disease and clinodactyly in the human island population of Tristan da Cunha, Ellis-van Creveld dwarfism in eastern Pennsylvanian Amish, and oculocutaneous albinism Type 2 in the Navajo.

Natural selection was defined by Darwin as the preservation of favorable individual differences and variations and the destruction of those that are disadvantageous. Selection acts directly on the phenotypes of organisms and indirectly on their genotypes. In a genetic sense, alleles that promote greater ability to survive and reproduce in a particular environment (higher fitness) will leave more offspring than do less fit genotypes. The difference in frequency between various genotypes and phenotypes is a result of differences in ecology and not because of chance. Selection can occur at any stage of the life span, but it has maximal evolutionary impact when it acts on those age classes with the highest reproductive values. There are several basic premises: Phenotypic variation exists between individuals in a species; species have more offspring than can survive and reproduce; individuals with different phenotypes vary in their ability to survive and reproduce in a particular environment; and a portion of the ability to survive and reproduce is hereditary. While selection can cause evolution to occur in a population, a population may be at equilibrium as a result of natural selection and other processes.

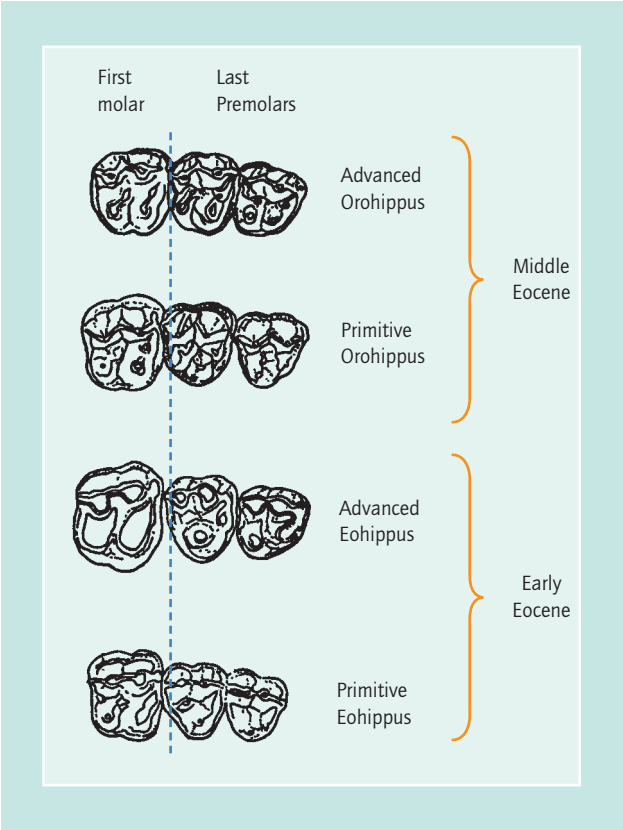


Figure 5d

Source: From *Horses* by George Gaylord Simpson, copyright © 1951 by Oxford University Press, Inc. Used by permission of Oxford University Press, Inc.

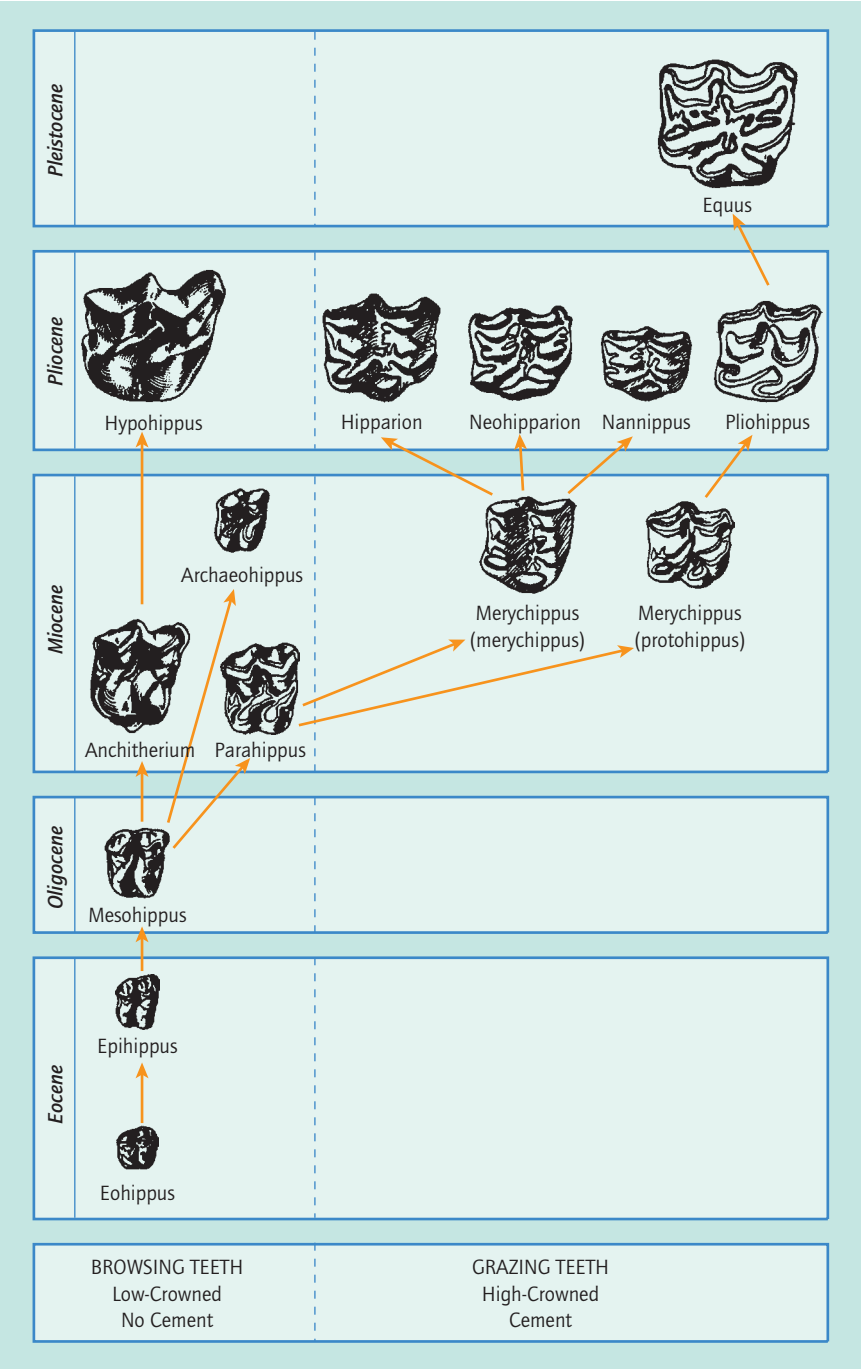


Figure 5e

Source: From *Horses* by George Gaylord Simpson, copyright © 1951 by Oxford University Press, Inc. Used by permission of Oxford University Press, Inc.

It has been posited that selection can occur at any level of organization that fulfills the above premises: individual genes or larger parts of the genome (for example, meiotic drive in *Drosophila* and other taxa), individual organisms that have different genotypes and phenotypes, groups of organisms (discussion generally focused on kin selection), and entire species (species selection, a tenant of punctuated equilibrium and a proposed mechanism to explain evolutionary trends without invoking phyletic evolution). Most of the naturalistic, experimental, and theoretical work centers on selection at the level of the individual. A number of well-known naturalistic cases are cited: melanism in peppered moths, survival of English sparrows during the winter of 1898, shell color polymorphism in British populations of European landsnails, water snakes on islands in western Lake Erie, heavy metal tolerance in the grass *Agrostis tenuis* on mine tailings, stolon length in populations of *Agrostis stolonifera* that grow in different environments, Batesian mimicry in Lepidoptera, and immunity to malaria in human populations with sickle-cell trait.

Neutral Theory and the Molecular Clock

While it is clear that the above five processes affect the amount of variation in populations, there is considerable debate over which mechanisms are most important in maintaining and changing the amount of genetic diversity. Natural selection and adaptation have received considerable attention, as has the purely neutral theory of molecular evolution (termed the "neoclassical theory" by Lewontin). In this hypothesis, most evolutionary changes in the DNA do not result from the action of natural selection on variation. Rather, the mechanism of change is the random fixation of neutral or almost neutral mutants by the action of genetic drift. The probability of fixation of a neutral allele in a finite population is equal to the initial gene frequency (p); the rate of gene substitution is equal to the mutation

rate per locus. Most intraspecific protein and DNA polymorphisms are selectively neutral, and polymorphic alleles are maintained by a balance between origination by mutation or introduction into a population by gene flow and elimination by random extinction. Therefore, most molecular polymorphisms are not maintained by selection. It is predicted that genes that evolve rapidly will manifest high degrees of intraspecific variability.

Masatoshi Nei, in *Molecular Evolutionary Genetics* (1987), summarizes major points in the neutralist theory: many mutations at the nucleotide level are apparently neutral or nearly neutral; only a small proportion of mutations are advantageous; natural selection is a process that preserves advantageous mutations and eliminates disadvantageous ones; new mutations spread by genetic drift or by natural selection, but a large proportion of new mutations are eliminated by chance; and populations do not always have the genetic variation for new adaptation. In the neutralist paradigm, natural selection is invoked to explain the *loss* of disadvantageous mutations, but genetic drift to account for *fixation* of mutations. This differs from the selectionist approach, which invokes the effects of natural selection to explain both fixation and loss.

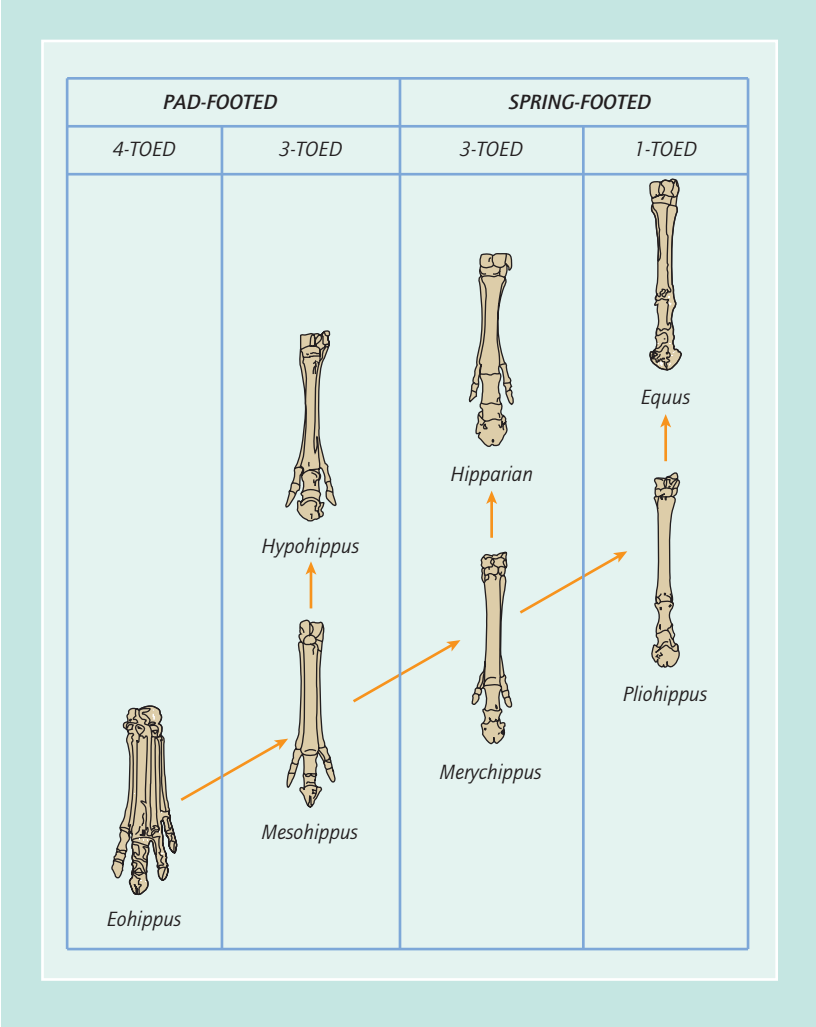


Figure 5f

Source: From *Horses* by George Gaylord Simpson, copyright © 1951 by Oxford University Press, Inc. Used by permission of Oxford University Press, Inc.

Related to the idea of selective neutrality is the molecular clock hypothesis, in which the rate of nucleotide or amino acid substitution is constant per site per year. The clock predicts a stochastically, not absolutely, constant rate of change. In his writings, Moto Kimura assumes that the rate of neutral mutation per year is almost constant among different organisms with very different generation spans, a conjecture that appears to depend on whether mutations are synonymous (silent) or nonsynonymous (replacement). The application of the molecular clock achieved notoriety by the work of Vincent Sarich, in which he concluded that the earliest possible date of divergence of the African apes and hominins was slightly more than 4 million years ago. This suggestion strongly contradicted the dominant paradigm of the period, which placed the divergence in the Miocene with the identification of *Ramapithecus* as a hominin, and Sarich made the extreme statement that morphology was an unreliable indicator upon which to base estimates of dates of divergence. "Universal" rate calibrations have been suggested for mitochondrial DNA, albumin immunological distances, codon substitutions for cytochrome, myoglobin, alpha and beta hemoglobin, fibrinopeptides A and B and insulin, and the 16S rRNA gene.

The purely neutral and molecular clock hypotheses have received both support and criticism. In *The Genetic Basis of Evolutionary Change* (1974), Richard Lewontin extensively reviews the evidence for the maintenance of genetic variation available

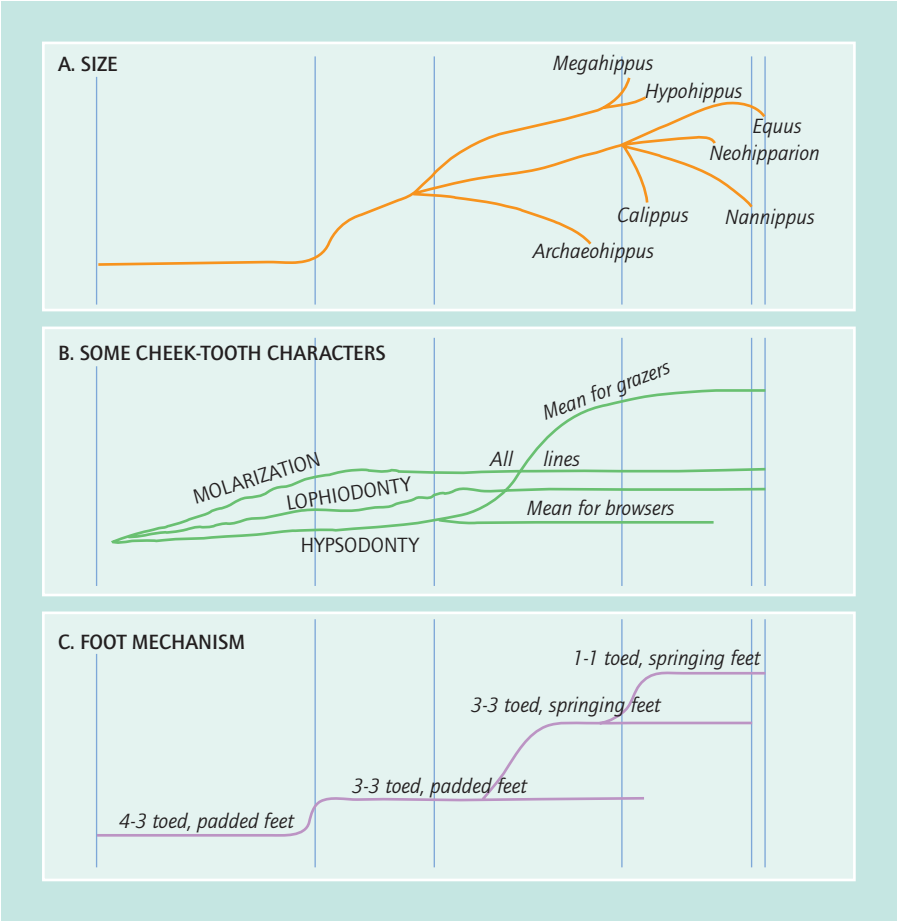


Figure 6 Diagram of the evolution of characters in horses. Vertical lines are not proportional to the size of the changes, and the curves show rates, times, and directions of change in a relative way. Simpson's commentary states that trends were often different in rate and direction in different lines and in the same lines at different times, different trends occurred at different times and rates within a single functional system, a character may not show any trend for a long period even though it may have manifested a trend earlier or later in the fossil record, and a character may change from one "stable adaptive level" to another by a unique sequence of step-like shifts.

Source: Adapted from *The Major Features of Evolution* by George Gaylord Simpson. Copyright © 1953.

to that date, including the neutralist explanation and the suggestion that variation is maintained by frequency-dependent selection. More recent reviews include those by John C. Avise (*Molecular Markers, Natural History, and Evolution,* 1994), Gillespie (*The Causes of Molecular Evolution,* 1991), Roger Lewin (*Patterns in Evolution: The New Molecular View,* 1997), Nei (*Molecular Evolutionary Genetics,* 1987), and Ridley (*Evolution,* 2004), as well as many professional papers. Discussion can be divided into that which deals with the relative importance of selective neutrality in evolution and that which is aimed at the assumptions and application of the molecular clock.

Because of the large amount of electrophoretic work that has been done on allozymes, examples of protein variation that can be shown to have important physiological effects and impact on fitness are used to counter the neutralist hypothesis. Different allozymes should work better in different environments: It should be possible to discover the kinetic and thermostability properties that make one variant work better than others in a particular environment and to find higher percentages in areas where it works better than other variants. There should also be increases and decreases in the relative percentages of allozymes as environments change. Studies that have sought to understand enzyme variation in an adaptive context include those of J. E. Graves and G. N. Somero on lactate dehydrogenase in four barracuda species, Ward Watt and colleagues on phosphoglucose isomerase in *Colias* butterflies, and D. A. Powers and P. M. Schulte on lactate dehydrogenase-B in the fish *Fundulus heteroclitus.*

Of particular interest are studies that have examined species on either side of the Isthmus of Panama, as the date of the origin of the isthmus is considered to be well established at about 3 to 3.1 million years ago. Results have been used to counter both the interpretation of allozyme variants as selectively neutral and the application of the molecular clock. Gillespie, citing the work of Graves and colleagues on pairs of fish species that are separated by the isthmus, argues that adaptive changes in the enzyme lactate dehydrogenase occur with only a 2-to-3-degree difference in average environmental temperature between the Atlantic and Pacific. Application of

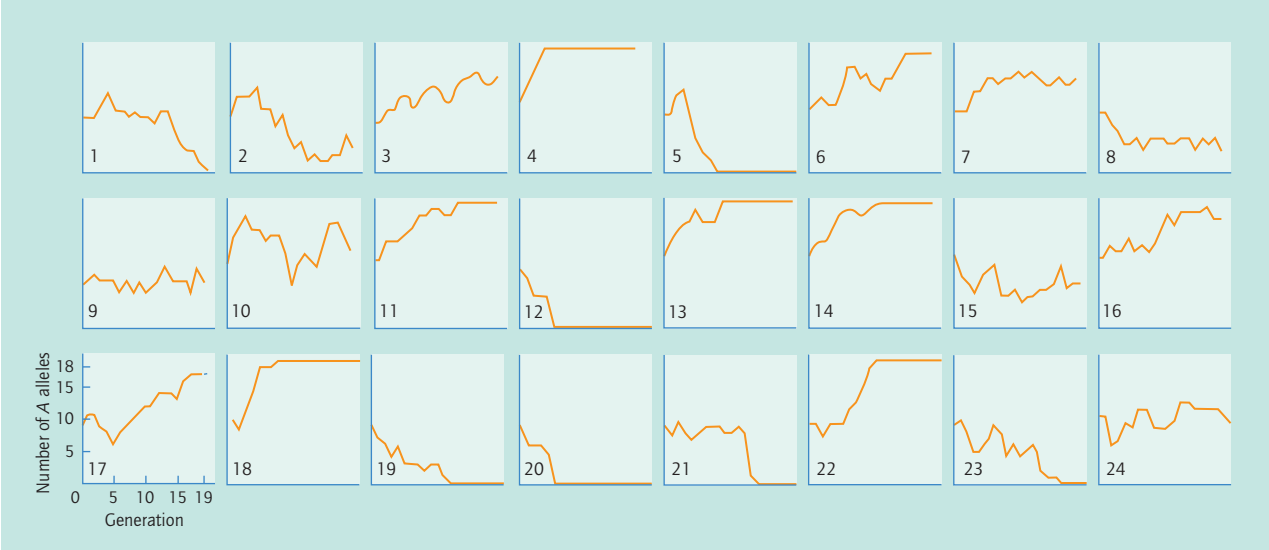


Figure 7 Computer simulation of genetic drift over 19 generations in 24 hypothetical populations, each of 9 individuals. Note that the allele frequency changes at random from one generation to the next. If the simulation was continued, allele frequency would change erratically until the allele was either fixed ($p = 1$) or lost ($p = 0$) in each population.

Source: Adapted from D. L Hartl, *A Primer of Population Genetics, 2/e* (1988, Fig. 1, p. 72). Reprinted by permission from Sinauer Associates.

Atlantic and Pacific comparisons to the molecular clock has yielded contradictory results, at least in the study of mtDNA. Avise and associates find that there is a definite separation in the mtDNA phylogeny of the Atlantic and Pacific populations of the green turtle (*Chelonia mydas*) but that the extent of the sequence divergence is 10 times lower than expected if the mammal-derived evolutionary rate of 2% divergence per million years is applied (Allan Wilson argues that this rate should be applicable to all animals). Avise concludes that mtDNA evolution is slower in turtles than in mammals. In contrast, a study by E. Bermingham and H. A. Lessios finds that the rate of divergence per million years for sea urchins is close to that calculated for mammals. Further complicating the molecular clock debate, Nancy Knowlton examined mtDNA and allozymes for snapping shrimp and concluded that the age of the biogeographic vicariance event probably does not accurately document the point at which gene flow stopped between the Atlantic and Pacific sides of the isthmus.

A revision of the original selective neutrality hypothesis is the "nearly neutral theory," associated with T. Ohta, in which there are small positive or negative selection coefficients associated with mutations. In this paradigm, nearly neutral mutations are affected more by drift when populations are small, but more by natural selection when populations are large. It may be argued that these effects of population size are true regardless of whether the mutation is nearly neutral or has a substantial positive or negative selection coefficient. Ridley extensively discusses this paradigm and perceives several advantages in comparison with the "purely neutral" hypothesis, including the prediction of a more erratic, less constant rate of evolution based on the influence of population size on whether slightly disadvantageous mutations will be affected by drift or selection.

Recent attention has also focused on microsatellite analysis rather than on the more traditional allozymes, mtDNA and RFLPs. Microsatellites are short, repeated sequences that are usually found in noncoding regions of nuclear DNA. They manifest a Mendelian pattern of inheritance, unlike mtDNA. Because of the large amount of variability in microsatellite arrays, researchers have used them in identification of parents/offspring and in forensic applications. It has also been suggested that they may show selective neutrality because their function is currently unknown. John Hawks and colleagues incorporate microsatellites in their discussion of population bottlenecks and Pleistocene hominin evolution: Variation in microsatellite base pairs should reflect population size expansions if the loci are selectively

neutral. However, as the authors point out, if it can be demonstrated that selection affects microsatellites, then variability in these regions need not indicate population expansions.

Evolution and Physical Anthropology

The Darwinian paradigm of evolution provides a conceptual framework in which the fossil record, primate behavior/ecology, and human and nonhuman primate population biology can be interpreted. While it was possible for Linnaeus to assign formal taxonomic names to primates (for example, *Cercopithecus aethiops*) and Baron Cuvier to describe *Adapis parisiensis* from the Montmartre gypsum quarries prior to Darwinism, the evolutionary paradigm provides a unifying, explanatory framework for physical anthropology. In their recent edition of *Principles of Human Evolution* (2004), Roger Lewin and Robert A. Foley discuss the four types of biological explanation; two varieties that are relevant to our discussion are explanations about adaptive value and evolutionary history. The former inquiries about the function of a trait or behavior and the latter about evolutionary history; both are central to the investigations conducted by physical anthropologists. It is not adequate to simply describe a morphological feature or behavior. Rather, it is crucial to (1) understand how that feature or behavior allows the individual to successfully interact with its environment and (2) to understand the diversity of extinct and extant primates in the context of common descent.

Physical anthropology has borrowed from other disciplines of evolutionary biology and ecology in these endeavors and, increasingly, contributed to the formulation of evolutionary concepts with application beyond the primates. Examples of concepts and techniques adapted from other areas of evolutionary biology and ecology are too numerous to completely enumerate here. The study of variation was a major contribution of the New Synthesis of evolutionary biology and was emphasized by papers in the seminal *Classification and Human Evolution* (1963), edited by Sherwood L. Washburn; it has formed a major aspect of primate taxonomy in both neontological and paleontological settings. Paradigms of phyletic evolution and punctuated equilibrium have been used in the interpretation of the primate fossil record. Various species concepts, such as the biological species concept, the phylogenetic species concept, and the recognition species concept, have been applied to primates. Cladistic taxonomic philosophy and methodology, initially invented by the entomologist Willi Hennig, has been widely adopted and applied by physical anthropologists. The idea of the ring species (speciation by distance) was discussed by Yoel Rak to analyze hominin evolution in the Levant. It has been suggested that the phenomenon of nanism (dwarf forms), observed in island forms of ducks, hippopotami, elephants, and deer, may have occurred in hominin evolution, as documented by the recent discovery of *Homo floresiensis*. The ideas of sociobiology, employed outside of physical anthropology to explain social systems as diverse as eusocial insects and naked mole rats, are widely employed in modern primatology. And formulations associated with population genetics (such as the Hardy-Weinberg equilibrium and effective population size) are routinely used in the study of human and nonhuman primate population biology.

Physical anthropologists have been somewhat slower to apply their findings to larger evolutionary issues and concepts. This is unfortunate, because primate morphology, ecology, population biology, and behavior have been studied with an intensity that is unequalled in mammalogy. Long-term field studies, such as those of the Awash and Amboseli baboons, provide a wealth of detailed data that are of great benefit to the specialties of speciation research and behavioral ecology.

— Paul F. Whitehead

See also **DNA, Recombinant; Evolution, Molecular; Gene Flow; Genetic Drift; Mutations; Selection, Natural**

Further Readings

Avise, J. C. (1994). *Molecular markers, natural history, and evolution.* New York: Chapman & Hall.

Carroll, R. L. (1997). *Patterns and processes of vertebrate evolution.* Cambridge: Cambridge University Press.

Conner, J. K. (2003). Artificial selection: A powerful tool for ecologists. *Ecology, 84,* 1650–1660.

Freeman, S., & Herron, J. C. (2001). *Evolutionary analysis.* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Gillespie, J. H. (1991). *The causes of molecular evolution.* New York: Oxford University Press.

Givnish, T. J., & Sytsma K. J. (1997). *Molecular evolution and adaptive radiation.* Cambridge: Cambridge University Press.
Kimura, M. (1983). *The neutral theory of molecular evolution.* Cambridge: Cambridge University Press.
Majerus, M. E. N. (1998). *Melanism: Evolution in action.* Oxford: Oxford University Press.
Mayr, E. (1991). *One long argument: Charles Darwin and the genesis of modern evolutionary thought.* Cambridge, MA: Harvard University Press.
Ridley, M. (2004). *Evolution* (3rd ed.). Malden, MA: Blackwell.

Evolutionary Anthropology

In a famous manifesto, the geneticist Theodosius Dobzhansky (1900–1975) claimed in 1973 that "nothing in biology makes sense except in the light of evolution." One could also wonder if anything in anthropology makes sense except in the light of evolution. Indeed, there is a part of anthropology that does not deal with evolutionary issues. This is true for most of cultural anthropology, especially on the fringe of the sociology domain. It is even true for some aspects of physical anthropology. Medical anthropology deals with the health status of different populations in relation to different geographical and sociocultural environments. Forensic anthropology focuses mostly on identification of body remains, as well as of living subjects. It should be also underlined that anthropology was born and developed as a science in a preevolutionist period. Although the word *anthropologos* was used in antiquity, it is not before the Renaissance that it was used in a context involving goals of knowledge. Until the Classical Age, it was mostly centered on the "knowledge of one's self." However, dissertations on the moral nature of humans developed in parallel to studies of character and anatomical descriptions. From the middle of the 16th century, surgeons such as André Vesale (1514–1564) put emphasis on the anatomical determination of the human body. The word *anthropologia* appears for the first time in its anatomical meaning in a German book by Magnus Hundt (1449–1519), published in 1501, *Anthropologium, de hominis dignitate, natura et proporietatibus.* In the 17th century, anthropology, the science of the study of humans, was divided between anatomy, addressing the body structure, and psychology, which speaks about the soul. In the 18th century, the first anthropological syntheses were developed, including the *Treaty of Man* by Georges-Louis de Buffon (1707–1788) and *The Anthropology or General Science of Man* published in 1788 by Alexandre Cesar Chavannes (1731–1800). Under the influence of the 18th-century naturalists such as Carl Linnaeus (1707–1778) and Buffon, anthropology became the natural history of humans. It was defined as such in 1795 by Johann Friedrich Blumenbach (1752–1840). The middle of the 19th century is marked by the creation of anthropological institutions, faculty chairs, and scientific societies in France, England. Germany, and the United States.

Revolutionary Perspectives on Anthropology

Anthropology was already established as an official science when three major events revolutionized perspectives on the place of humans in nature. In 1856, fossil remains of an extinct form of humans were discovered in the site of Feldhofer (Neandertal, Germany). Discoveries of fossil humans had already occurred in 1830 in Belgium (Engis) and in 1848 in Gibraltar (Forbe's Quarry). However, although these specimens were later identified as genuine fossil hominids, the finding of Neandertal was the first recognized as such. It is not before the latter part of the 19th century that the concept of Neandertals as a distinct and extinct form of humans was universally accepted. Second, in 1859, Charles Darwin (1809–1882) published his master work, *On the Origin of Species by Means of Natural Selection.* The notion of evolutionary change in living species predated Darwin, and the French scientist Jean-Baptiste Lamarck (1744–1829) can be considered the father of the evolution concept in its biological meaning. However, Lamarck failed to propose a valid mechanism to explain the mechanism of evolutionary processes. The primary contribution of Darwin was the identification of natural selection as a major force driving evolutionary changes. The third event of major importance also occurred in 1859. English archaeologists and geologists including Hugh Falconer (1808–1865), Joseph Prestwich (1812–1896), and Sir John Evans (1823–1908) accepted the association of

human-made Paleolithic flint implements with extinct fauna in geological ancient deposits that had been described by Jacques Boucher de Perthes (1788–1868) in northern France. Although a large portion of anthropological studies still remained out of the evolutionary perspective, beginning with this period, prehistoric archaeology and human paleontology became important topics of research for cultural and physical anthropologists. Because of the complexity of the roots of anthropology, this science is the crossing point of several distinct fields of knowledge and is multidisciplinary in nature. Evolutionary anthropology can be defined more as a perspective than as a science. It is the synthesis of the various fields of anthropological studies addressing the behavioral and biological nature of humans and their mechanisms of emergence through time.

Human Evolutionary Processes

Looking at the anatomical changes of humans in a remote past, and at the changes in technical skills, is the most obvious way to approach human evolutionary processes. Indeed, paleoanthropology represents the core of evolutionary anthropology and is essentially the field that unites all the others. The term *paleoanthropology* is sometimes understood as a synonym of *human paleontology*; however, more often it encompasses paleontological and archaeological studies. In the course of their evolution, humans have combined biological and cultural adaptations while they geographically expanded. Even if technical responses to the challenges offered by the conquest of new geographic and ecological niches became preponderant, it is most important to consider the two aspects of human adaptation and their complex interactions. One defining aspect of human paleontology lies in the fact that the study of rare and precious specimens remains the core of the discipline. The fossil hominids give a very fragmentary and discontinuous picture of the past evolution of humans. Traditionally, they have been described and compared in order to provide a picture of the phylogenetic tree of our ancestors and direct relatives. One major problem in this process is related to the difficulty in accessing specimens. After discovery, they can remain unpublished for long periods, and later, they can be possibly under the care of curators more preoccupied by conservation than by scientific studies. Since the 1990s, new techniques, primarily from medical imaging (for example, CT scanning) have allowed development of new approaches for the study of these fossils. "Virtual paleoanthropology" is based on the utilization of 3-D images that allow virtual extraction and reconstruction, precise quantitative analyses of internal structures, and also mathematical analyses of the shape through 3-D morphometrics and the modelling of ontogenetic processes, biomechanical properties, and evolutionary changes themselves. Although the resolution of these 3-D images is still far from perfect, one can expect that in the future their use will reduce the need to access the specimens. Work on the original specimens will be restricted to specific issues such as the analysis of fine anatomical details, cut marks, microstructure, and chemical composition.

A new series of approaches have developed, inherited primarily from histology, geochemistry, and biochemistry. With the rise of non- (or less) destructive methods, this field is rapidly expanding. In parallel, it should be noted, there have been growing interests in biological issues, for example, diet or growth processes, that are not directly related to phylogentic issues. Microstructural studies have developed mostly in the field of dental anthropology. Several types of incremental mineralized structures, to date, represent the primary way to assess life history in extinct species. This emergence of microstructural analyses has been made possible by large technological advances in microscopy.

Chemical analyses of fossil specimens aimed to reconstruct paleobiological features are mostly concerned with extraction of organic molecules. The sequencing of small fragments of mitochondrial DNA extracted from fossil remains of humans and animals has opened a new area of paleobiological study. The analysis of stable isotopes, mostly carbon, oxygen, and nitrogen, represents another major field of research in paleoanthropology. Stable isotope rate is an essential source of information about the environment and the diet of individuals during their lifetimes. In the future, issues such as migration and seasonality will become accessible through these kinds of studies. These methods may also provide a better knowledge of the environmental conditions of humans in the continental environment.

Paleoanthropologists place a great deal of emphasis on the understanding of evolutionary processes. Important methodological progress was made in the 1970s with the rise of cladistic methods. However,

specialists still investigate the significance of the features used in phylogenetic analysis. To what extent are they genetically determined, or depend on environmental conditions and behaviors? Are they homologous from one species to another? These are the questions that need resolution in order to gain better insight into phylogenetic relationships. Among the paleobiological issues, changes in growth and development processes along life history are increasingly seen as a powerful mechanism to explain evolutionary changes. A consistent effort is applied to the establishment of developmental trajectories in extant hominoids and extinct hominins. Other aspects of the biology of extinct species are also accessible through the progress of archaeological sciences. Proteins and lipids are extracted with increasing frequency from fossil bones and may give us access to physiological features that have been inaccessible to date. Paleodemographic questions related not only to life history and longevity but also to population size and their fluctuations through environmental changes are also of high interest.

Photo by H. Moll, Max-Planck-Institute, Leipzig, Germany

Importance of Fieldwork

A very important aspect of paleoanthropological studies is related to fieldwork. The spectacular increase of fossil material in the last two or three decades, resulting in a much better understanding of human evolutionary history, is mainly the consequence of the development of field surveys and excavations. This is also where, often, human paleontologists and prehistoric archaeologists meet. Contrasting with the rarity of ancient human remains, artifacts are found in large numbers in areas where humans have lived in the past. The occurrence of stone artifacts is the most reliable parameter to assess the occupation of given geographical areas through geological time. However, the abundance of stone artifacts provides a biased picture of ancient behaviors and technologies. The evidence for the "Stone Age" comes mostly from the fact that tools manufactured by flaking of hard stones are virtually indestructible and can accumulate in very large numbers over long periods of time. Most of the Pleistocene was actually, rather, a "Wood Age," at least in some parts of the world. The study of archaeological sites with mixed artifacts, faunal remains, and sometimes structures such as fireplaces left by humans aim to separate human activities from natural processes. Most of the time, it is a somewhat naïve view to assume that these accumulations represent "habitats." In many cases, human occupation was discontinuous and other mammals such as carnivores may have played a major role in the accumulation and alteration of the faunal remains. The artifacts themselves could be displaced in a secondary accumulation. Finally, the whole site may have undergone significant geological modifications. Site formation and taphonomical studies are important issues in the interpretation of archaeological sites. The density and distribution of the human occupations in the landscape are related to environmental factors that one tries to discriminate. These data help us to understand the history of the peopling, past demographic fluctuations and the way ancient humans could exploit the environment. Zooarchaeology research aims to analyze the faunal remains in order to reconstruct hunting (or scavenging) strategies, carcass processing, and transportation and, in a broader context,

Photo courtesy of Max-Planck-Institute, Leipzig, Germany

how ancient hunter-gatherers interacted with the animal world. The stone and bone artifacts themselves are the objects of many studies. They were, in the past, considered as chronological markers, but today the technology leading to their production has become of greater interest and gives us some clues about the skills and cognitive abilities of ancient humans. The raw materials that have been used by ancient humans also inform us about the patterns of land occupation and possible long-distance exchanges between human groups. For the most recent periods of prehistory, the occurrence of symbolic manifestations such as body ornaments, geometric signs, paintings, engravings, and sculptures reveals the development of modern thinking. It can give some clues on the major changes in the social organization in humans and, likely also, in the development of modern language. For these late periods, it is possible to use the archaeological evidence to identify ancient ethnocultural entities.

Study of Nonhuman Primates

Because evolutionary anthropology is mainly concerned with the question, "What makes humans different?," the study of nonhuman primates represents an important part of its scope. In this perspective, primate studies focus on biological and behavioral aspects. A large proportion of evolutionary studies have been dedicated to comparative anatomy and physiology. Attention has also been paid to differences in the process of growth and development among different species of monkeys and apes. Primate paleontology is an important field of research, as it brings light on the phylogenetic relationships of living and extinct species and also on the adaptive strategies of the different groups. However, with respect to phylogeny, molecular studies and genetics have as well made a very significant contribution in the last decade. Finally, social organization and behavior of living apes and monkeys is also an important field of research that aids in understanding the emergence of hominin societies.

Among the primates, the species that are the closest to our own are classified together with humans and their ancestors into the superfamily of hominoids. This is the reason that many studies put emphasis on the gibbons, the orangutans, and our even closer relatives, the African apes: gorillas, common chimpanzees, and bonobos. One major problem faced by evolutionary anthropology lies in the fact that, in the wild, these species are greatly endangered. Although they may survive only in zoos in the near future, there is still a lot to learn from them. This is especially true in the areas of development, genetics, and ethology (the science of animal behavior). Unfortunately, life in captivity will make many questions regarding these issues inaccessible. In the past, hominoids have been a much more successful group than they are today. The human species, which covers an entire planet, represents an exception. In fact, the number of species of hominoids has been reduced since the Miocene period. Other groups of primates (cercopithecoids), on the contrary, have undergone an expansion during the same period. Hominoids represent a group of middle- to large-bodied primates, primarily adapted to forested or semiforested environments. Analyzing the anatomy of the living and fossil species is of crucial interest to understand human

origins. Indeed, hominins achieved a very unique adaptive model. They adapted to a new evological niche for hominoids, in particular the open environments of the middle and high latitudes. They adapted to an entirely new locomotor repertoire with the development of bipedalism. They accessed new diets with the developments of carnivory and hunting. Finally, they developed cultural and technical adaptations to a level unequalled in the primate world. In an evolutionary perspective, primatology is interested in analyzing these differences between humans and apes but also in the separate emergence of some features once considered unique to humans in the other hominoids. In terms of behavior, it is important to understand how the variety of social systems developed by apes responds to different adaptative strategies. This includes social organization and reproductive patterns that can be quite different from one species to another. The types of cognitive abilities that have been developed by these different species are under the scrutiny of primatologists. Sociocognitive processes, including communication, cooperation, social interactions, and learning, are also very important to analyze.

It is fascinating to consider the behavioral diversity that can exist between different populations of the same species of apes. One of the most important discoveries of the last decades has been the revelation of "ape cultures." Different groups within the same species can develop "traditions." This issue has been studied especially in common chimpanzees in which technical skills involving the use of tools such as hammers and anvils, but also "fishing sticks" to acquire insects, have been described. These technologies, as well as specific behaviors such as hunting strategies for a spectrum of prey, are transmitted between generations and vary from one group to another. Wherever possible, wild apes are studied by direct observation in the field, which implies long-term projects dedicated to the follow groups and individuals over long periods of time. In the course of these field projects, some biological aspects are also analyzed, and molecular geneticists analyze samples of feces and hair collected noninvasively to address questions concerning paternity, reproductive strategies, relatedness between and within social units and phylogeny.

Evolutionary anthropological genetics investigates the genetic history of primates in general and humans in particular. This field of evolutionary anthropology focuses on the processes directly affecting the evolution of the genome, such as mutation, recombination, natural selection, and genetic drift. Rebuilding the detailed history of different lineages in terms of demographic evolution and phylogenetic relationships is also of great interest in this discipline. With increasing frequency, studies are dedicated to living great apes, which provide a very important comparative model for the evolution of early hominids even if, in general, their demographic and genetic evolution differed in important ways from our own over the course of the last 2 million years. Molecular phylogeny has provided invaluable information on the origin, relationships, and times of divergence for the different species of hominoids, including humans. Another important aspect of genetic studies is dedicated to examining the ways in which the genome determines development and function of organisms. The comparison of the gene expression patterns in various tissues in primates has given us a greater understanding of many biological aspects of the human nature. The history of ancient populations, or even extinct species, can be approached by using genetic analyses. It is possible to extract, amplify, and sequence mitochondrial DNA fragments from fossils, such as Neandertals 40,000 years old. This genetic information helps us to establish the phylogenetic status and times of divergence of such an extinct species. It provides insights into the variation of the size of these ancient populations throughout their evolution. Fossil DNA is as well extracted from non-human mammals, which were the hunted game or the competitors of our ancestors and relatives. Such genetic material is extracted from bone remains but also from coprolites (fossil feces). It provides data for interesting comparisons, as animal material is much more abundant that are human fossils. A major challenge faced by paleogenetics results from the problem of contamination of ancient samples by modern human DNA, which is abundant in our present environment. Paradoxically, it is easier to identify genuine fossil DNA in extinct humans such as Neandertals than in more recent modern populations.

Population Genetics

Since the 1980s, population genetics has emerged as a major methodological framework in which to understand the origin, migration, and evolutionary history of the modern humans and their direct ancestors.

The analysis of genetic variation in living populations has been intensively explored in evolutionary anthropological research. This is particularly true for research examining variation in the mitochondrial DNA, transmitted from mother to offspring, and in the Y chromosome, exclusively transmitted from fathers to sons. Most of these studies establish a recent origin of modern humans (between 200,000 and 100, 000 BP), most likely in Africa. They suggest past bottlenecking of ancient populations and indicate a late dispersal of modern populations throughout Eurasia and Australia, and even more recently, throughout the Americas and the Pacific Islands. Genetic analysis provides not only a general tree for human populations but also some indications of the timing of colonization by modern humans. In the details, it can bring some light on interactions between groups, mating strategies, differences in mobility between genders, or the geographical origin of pioneer groups like those that colonized the Pacific. Population genetics often interacts with linguistics in order to elucidate the detailed history of human groups. Like genes, languages are transmitted from parents to their children. Words and grammatical structures also undergo "mutations," which result in a diversification and divergence of numerous linguistic groups.

Language is indeed a unique feature of humans, and a great deal of effort is dedicated to the study of its structure and evolution. Although "communication" is common among other animal species, human language distinguishes itself by the complexity of sounds that the human vocal tract is capable of producing, as well as the control of sound production at a rapid time scale. It is also characterized by the complexity of its syntax, which facilitates the organization of concepts in a way that goes much further than the simple combination of vocal signals. The question of the origin of language is difficult and much debated. Anatomical features allowing the physical production of human languages, as well as the cerebral abilities necessary for its manifestation, may well have been selected independently and for other needs in the course of hominin evolution. Linguists are very much interested in establishing the common features of all human languages ("language universals"). Some have even tried to delineate some traits of an original language ancestral to all the others. Language universals may result primarily from the way the human mind is able to conceptualize ideas and articulate them into speech. Other aspects of linguistic studies are dedicated to the way languages can differ from each other and how they vary over the course of time. Understanding these processes allows the construction of language trees at different scales. Families of languages descending from a single ancestor have been established. Sometimes they present distribution that can be related to the spread, development, or movement of large human groups. Establishing the relationships between these families into larger units has proven to be a more difficult task. The fact that linguistic traits can be imposed or adopted from one group to another through complex historical processes greatly complicates comparisons of archaeological, genetic, and linguistic features in order to rebuild the history of different populations.

Developmental and Comparative Psychology

Developmental and comparative psychology is also crucial to the understanding of what makes humans different. This field of research investigates cognitive and social features of humans and compares them to those of other primates. These studies aim to establish the abilities that have been uniquely developed by humans. Studies on large apes are generally conducted through experiments exploring the abilities of the different species. The field also explores individual variation within groups. Several types of cognition are explored and are generally grouped into two areas referred to as social cognition and physical cognition. The first is relevant to how individuals are able to understand the actions and intentions of other individuals. Analyzing the learning and imitation processes is a main issue in the analysis of social cognition. Physical cognition is implemented by individuals in their interactions with their environment. Experimental psychology is also much interested in the development of human children. Humans contrast with other primates with an extended period of brain maturation occurring after birth while the individual is already interacting with his or her physical and social environment. The learning period is longer in humans than in any other species of primates. The acquisition of language is one of the most spectacular changes during this period. Psychologists are interested in how humans read and understand the minds of other people and develop social skills during the

first year of life. Techniques of medical imaging have opened the possibility to connect the brain development with the acquisition of specific abilities. In older children, the development of social and physical cognition is also explored. The acquisition of language is, of course, a main focus of interest. Its learning processes are investigated in a clinical way, as well as cross-culturally.

Evolutionary psychology also analyzes human behavior in adults. The reproductive strategies, mating patterns, and parental investment in children have played a particularly important role in the past and present evolution of human groups. However, the field extends to many other behaviors, such as reciprocity and cooperation between individuals, or even violence and homicide. The determinism of these behaviors and/or of their transmission is often difficult to clarify, as they are also depending on cultural and economical conditions. Ultimately, cultural features in past and present societies can also be assessed in an evolutionary perspective.

The animal nature of humans has always been a matter of fascination, if not of anxiety, for us. For centuries, philosophers, writers, and scientists have tried to define the unique nature of humans and to separate them from the animal world. Evolutionary anthropology deals with the oldest origins of humans, among the primates, and utilizes our closest relatives as comparative models. It interprets the complex features of human behavior in the light of adaptation and faces the challenge of unweaving the complex interactions between biology and culture at work in the course of human evolution.

— Jean-Jacques Hublin

Photo courtesy of Max-Planck-Institute, Leipzig, Germany

Further Readings

Barrett, L., Dunbar, R., & Lycett, J. (2002). *Human evolutionary psychology.* New York: Palgrave.

Boesch, C. (2000). *Behavioral diversity in chimpanzees and bonobos.* Cambridge, UK: Cambridge University Press.

Cavalli-Sforza, L. L. (2000). *Genes, peoples and languages.* Berkeley: University of California Press.

Delson, E., Tattersall, I., van Couvering, J. A., & Brooks, A. S. (Eds.). (2000). *Encyclopedia of human evolution and prehistory.* New York: Garland.

Klein, R. (1999). *The human career: Human biological and cultural origins* (2nd ed.). Chicago: University of Chicago Press.

Spencer, F. (Ed.). (1997). *History of physical anthropology* (Vols. 1–2). New York: Garland.

Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition.* Cambridge, MA: Harvard University Press.

Evolutionary Epistemology

Evolutionary epistemology considers the scientific processes and bounds of *knowledge,* with an emphasis on natural selection as the crucial source of sensate cognition by which organisms adapt to their environments. This mode of naturalistic epistemology contrasts significantly with the traditional *transcendant*

formulation, which presupposes no particular format of knowledge. The traditional approach traces to Plato, who sought to differentiate knowledge from true belief insofar as the true belief does not require *justification.* Later rational empiricists, notably Descartes, sought to identify and further systematize the bounds and processes of human knowledge, particularly as it is organized in neuromental assemblages. Ultimately, the two approaches converge in the aim of traditional epistemology to reconstruct human knowledge via justification that separates knowledge from merely true beliefs.

However, Darwinian insights of the 19th century cast humans as natural beings arising in the course of evolution. As means of human knowledge and belief are likewise expressions of natural selection, they are perhaps best analyzed and systematized by the scientific method in general and the principles of evolution more specifically. Hence, there is a pragmatic, not transcendant, basis for epistemics rooted in a priori facts of evolutionary biology and psychology.

Evolutionary epistemology has two main component interests: adaptation as it occurs both through phylogeny or within individual development and understanding the legacy of ideas, concepts, and cultural tropes in which knowledge exists. With respect to adaptation, the phylogenetic analysis of evolutionary epistemology takes up how the mechanisms of sentience *fit* the world. This is a direct extension of Darwinian concepts to philosophy insofar as the heuristic function of knowledge is to enhance reproductive fitness. Thus, evolutionary epistemology of adaptation posits, in the first instance, that the processes and bounds of knowledge accumulate and evolve as the result of variation and selection. Otherwise, the ontogenic aspect of adaptation takes up how individual ontogeny of knowledge is also an expression of processes in which variation and selection play a central role. Trial-and-error learning or the development of scientific theories are obvious examples of this second element in the evolutionary epistemology of adaptation.

These direct correspondences between mechanisms of evolution with those of ideation were noted by Darwin, Spencer, Romanes, Poincaré, Dewey, William James, and others. However, it was only more recently that evolutionary epistemology was systematized as a cogent philosophical approach to knowledge, first by Karl Popper and then by Donald T. Campbell and others.

Popper emphasized *conjecture* and *refutation* as key elements of valid science and also noted that every scientific theory must be *falsifiable;* that is, it must be subject to deselection. Such an iterative trial-and-error process accumulates knowledge about the world. In his later work, Popper emphasized analogies between this iterative conjecture/refutation process and the very similar operations of natural selection, in what he deemed evolutionary epistemology.

Campbell greatly elaborates this approach to take in the whole of evolutionary neuromental processes subserving knowledge in sentient beings. Campbell's project directly applies Darwinian principles to educe three main provisos:

1. *Blind variation and selective retention:* Primitive processes for new knowledge are *blind.* However, even without foresight as to what may be learned, ineffective elements are deselected whereas adaptive elements are retained.
2. *Vicarious selector:* Trial-and-error processes recede as "fit" knowledge accumulates and functions as a selector predictive of environmental selective pressures.
3. *Nested hierarchy*: Retained selectors may also be subject to variation and selection at a higher level. This fosters cognitive-emotive-rational assemblages at higher levels of ever-more-intelligent adaptive systems.

But there is another strand of evolutionary epistemology beyond this cognitive neurobiological perspective, as there is a need to explain the evolution of epistemic norms of ideation itself. To this end, models of scientific theory and human culture are constructed in a manner compatible with evolutionary neurobiology. Ultimately, this other main component relates to semiotics and meaning making as it analyzes the scientific method itself in evolutionary terms as varying hypotheses are selected on the accumulation of useful information.

These two interrelated but quite different aspects of the field have become known, respectively, as the *evolution of epistemological mechanisms* (EEM) and *evolutionary epistemology of theories* (EET). Valid EEM selectionist explanations (for example, how the brain works) do not in themselves explicate how systems of human knowledge are assembled.

Conversely, valid EET explanations of how human knowledge systems are selected do not in themselves explicate the neurobiological mechanisms of perception or cognition.

Indeed, one major criticism of evolutionary epistemology is that it traverses and perhaps conflates several levels and domains of evolution—biological, sensory, perceptual, cognitive, emotional, social, and linguistic—even as it also addresses the rather different realm of the evolution of scientific concepts. A more complete epistemology of human knowledge must explain how these processes interact within both phylogeny and individual development as well as with respect to the evolution of scientific culture. Thus, some argue that neither EEM nor EET analyses are proper works of epistemology, at least as epistemology is traditionally a normative discipline. However, the rigorous consideration of evolutionary possibilities and constraints with respect to processes and bounds of knowledge has greatly enriched traditonal epistemology. It has also brought attention to important issues of practical importance in an era marked by major progress in neuromental sciences.

Evolutionary epistemology may best offer descriptive accounts of knowledge mechanisms, whereas traditional epistemology attends to the resolution of prescriptive issues of continuing philosophical interest. At the very least, evolutionary epistemology enhances traditional methods as it helps identify implausible normative prescriptive notions that are inconsistent with evolutionary perspectives concerning human understanding.

— Daniel R. Wilson

See also **Popper, Karl**

Further Readings

Bradie, M. (1986). Assessing evolutionary epistemology. *Biology & Philosophy, 1,* 401–459.

Campbell, D. (1960). Blind variation and selective retention. Creative thought as in other knowledge processes. *Psychological Review, 67,* 380–400.

MacLean, P. (1990). *The triune brain in evolution.* New York: Plenum.

Popper, K. (1972). *Objective knowledge: An evolutionary approach.* Oxford: Clarendon Press.

Evolutionary Ethics

The obvious as well as the ideal place from which to begin a consideration both of social Darwinism and of evolutionary ethics is the work of Charles Darwin and the ideas he developed and presented in *On the Origin of Species* (1859), which advocates both of social Darwinism and of evolutionary ethics have tried to apply more widely. This is not, of course, to say that Darwin had no intellectual ancestors, any more than it is to say that biological theory has stood still since his death. To say or to suggest either of these things would be wrong.

It would not even be true to say that nothing was published with any claim to the label "evolutionary ethics" until after the first appearance of *On the Origin of Species.* Herbert Spencer was strictly correct when, in the general preface to *The Principles of Ethics,* he claimed that the "doctrine of organic evolution" as it applied to humans had come earlier than that. Spencer was on this occasion referring to his *Social Statics,* first issued at the end of 1850 and containing an outline of the ethical ideas he was about to develop. He could also have claimed, and elsewhere did claim, to have been the first to use the notion of the "survival of the fittest" in an evolutionary context, in an article in the *Westminster Review* for 1852.

The very phrase a "struggle for existence," which epitomizes the gladiatorial view of human life so often taken to be the true moral to be drawn from *On the Origin of Species,* is to be found already, in a similar context, in 1798, in what should be called "the first essay of Malthus on *The Principle of Population,*" in order to distinguish it from the substantially different work Malthus issued in 1803 as if it were merely a second edition. Darwin himself acknowledges his debt to this first essay of Malthus in *On the Origin of Species.* Nevertheless, after all due cautions have been given, it is *On the Origin of Species* that is, and must be, the reference point here. It was the ideas of that work which the forerunners foreran. It was the triumph in biology of the theory that it presented which lends vicarious prestige to whatever can be put forward as Darwinism.

Since many sharp things need to be said about some particular sorts of attempts to develop an evolutionary ethic, it becomes important to emphasize from the beginning that the desires to connect, to see microcosms in relation to the macrocosm, are in

themselves excellent; and certainly, they should be shared and not despised by anyone who aspires to the title of "philosopher." It is therefore neither surprising nor discreditable that in every generation since Darwin, some of the liveliest and least blinkered of students of biology have wanted to explore the possibility of connections between Darwinian evolution and ethics.

The main reason why professional philosophers are apt very brusquely to dismiss all such efforts is that we mistake it that they must involve the committing of what philosophers call the "naturalistic fallacy." The nerve of this fallacy is the attempt to deduce a conclusion about what either *ought* to be or *ought to have been* the case from premises stating only, in morally neutral terms, what either *actually is* or *actually was* the case. Once this fallacy has been recognized for what it is, it may seem that with evolutionary ethics, this is both the heart of the matter and the end of the affair.

This is not good enough. Certainly, the first necessity when a logical fallacy has been committed is to show what was going wrong in that particular case and then perhaps to reinforce the lesson by citing a few further cases of committing the same fallacy in various other areas of discourse. But to stop there would be to fail to appreciate that the source of the very idea of an evolutionary ethic, which Darwin himself did not accept, lies in *On the Origin of Species.* The danger of Darwin's pointedly paradoxical expression "natural selection," and this danger has often been realized, is that it can mislead people to overlook that this sort of selection is blind and nonrational, which is precisely the point. Once this point is missed, it is easy, especially if you are already apt to see nature as a mentor, to go on to take natural selection as a sort of supreme court of normative appeal—and this despite, or in many cases doubtless because of, the time-serving character of the criterion of fitness by which this sort of selection operates. Such ideas may then be, and often have been, regarded as the biological application of the Hegelian slogan, "World history is the world's court of judgment."

These apotheoses of natural selection take many forms. Perhaps the most interesting and important of such misconceptions, and one from which Darwin himself was not altogether free, is that the deductive argument that was the core of his theory proves some sort of law of progressive development. Thus, Darwin concludes his chapter on instincts with the sentence: "Finally, it may not be a logical deduction, but to my imagination it is far more satisfactory to look at such instincts as the young cuckoo ejecting its foster brothers, ants making slaves . . . not as specially endowed or created instincts, but as small consequences of one general law leading to the advancement of all organic beings—namely multiply, vary, let the strongest live and the weakest die."

Again in the penultimate paragraph of the whole book, Darwin writes: "As all the living forms of life are the lineal descendents of those which lived long before the Cambrian epoch we may feel certain that . . . no cataclysm has desolated the whole world. Hence we may look with some confidence to a secure future of great length. And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection."

The first of these two passages is not, perhaps, as clear and explicit as one could wish. But in the light of the unhesitating concluding sentence of the second, we may perhaps take it that "what may not be a logical deduction" is not the "one general law leading to the advancement of all organic beings," but rather its implications as regards the more unattractive instincts. Certainly Darwin here was offering natural selection as a guarantee of progress and as both a descriptive and a prescriptive law. Equally certain is that this guarantee was not in fact warranted by his theory. Indeed, neither of the conclusions of this second passage can be justified as deductions from the theory alone.

The first was, on the evidence available to Darwin, an entirely reasonable inductive extrapolation. It is only since the beginning of the atomic era that we humans have acquired any grounds for anxiety about the survival prospects of our own species. The second conclusion never was justified. To choose is necessarily to exclude, and there would seem to be no reason at all, and certainly none within the theory, for saying of every individual who loses out in the struggle for existence that that must be for its own good. Applied not to individuals but to species, the statement might seem to find some justification in the now notorious fact that most actual variations are unfavorable. But because survival is, in theory, the criterion of fitness, and hence of what counts as favorable, the only good that is guaranteed is the survival of whatever makes for survival; and this good is not necessarily good by any independent standard.

Although we would be mistaken if we believed that Darwin's theory implies a general law of progressive development, the idea that it does has been perennially tempting. Since it surely is the case that in every epoch of the fossil record, fresh possibilities of life have been realized, and since it also seems that the most complex of these in each epoch have been more elaborate than the most sophisticated achievements of the previous period, and since we ourselves are among the latest products of such development, it is easy to pick out a trend that we can scarcely regard as anything but progressive.

To pick out a progressive trend is, of course, made still easier if we allow ourselves to misconstrue in a normative sense the paleontologists' purely spatio-temporal use of the terms "higher" and "lower" to characterize first the strata and then the creatures that first appear in those strata. It was not for nothing that Darwin pinned into his copy of *Vestiges of the Natural History of Creation* the memorandum slip, "Never use the words *higher* and *lower.*"

Once a trend has been thus identified it may seem a short step from a trend to *the* trend, another equally short step from *the* trend to a *law of tendency,* and so again finally, from a law of tendency to a universal overriding *law of development.* This slippery slope is greased by the fact, first, that the crucial mechanism is called natural selection or the survival of the fittest and, second, that the core of Darwin's theory is a deductive argument that certainly does prove that natural selection is operating and is therefore ensuring the survival of the fittest.

But a trend is a very different thing from a law of tendency. There is a trend if there has been a direction in the development so far, whether or not there is any reason to think that things will continue to develop along this line. But to assert a law of tendency is to say that something always has occurred and always will occur, except in so far as this tendency was or will be inhibited by some overriding force. Furthermore, a law of tendency is a very different thing from an absolute law of development. The former may obtain even though the tendency in question is never in fact fully realized; the first law of motion and Malthus's principle of population are not disproved by the observations that in fact there always are impressed forces and countervailing checks. But an absolute law of development would state that some particular line of evolution is absolutely inevitable, that it neither will or would be prevented by any counteracting causes.

Darwin himself seems never to have gone further than to suggest (as in the two passages already quoted) that his theory might warrant a conclusion of the first and weaker kind: that there is in the evolution of all living things an inherent tendency to progress. It was left to others reviewing evolutionary biology in the light of their own various preconceptions about the (supposedly) predestined lines of nonhuman development to discern in Darwinism the deeper foundation for, or the wider background of, their own supposedly discovering absolute laws of human progress.

By far the most interesting and most important case is that of the two most famous young Hegelians, Karl Marx and Friedrich Engels. In his preface to the first German edition of *Das Kapital*, Marx wrote, "When a society has got upon the right track for the discovery of the natural laws of its movement—and it is the ultimate aim of this work to lay bare the economic law of motion of modern society—it can neither clear by bold leaps, nor remove by legal enactments, the obstacles offered by the successive phases of its normal development. But it can shorten and lessen the birth pangs." And in his speech at Marx's graveside, Engels claimed, "Just as Darwin discovered the law of development of organic nature, so Marx discovered the law of development of human history."

The crucial distinctions between actual trends, laws of tendency, and absolute laws of development can be instructively applied to the writings of two 20th-century British social Darwinists: Julian Huxley, who, after first acquiring his Fellowship of the Royal Society as a result of his biological research, eventually went on to become the first director of UNESCO (United Nations Educational, Scientific, and Cultural Organization), and Joseph Needham, who, after first acquiring his Fellowship of the Royal Society in the same way, went on, with considerable assistance from Chinese colleagues, to produce his massive study, *Science and Civilization in Ancient China.*

Huxley in a famous essay on "Progress, Biological and Other" quoted one of the sentences from Darwin we have just quoted: "As natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection." It is, I think, clear that Huxley, if pressed, would never claim to be revealing more than a law of tendency, and usually only an actual trend.

Huxley starts by urging that the most fundamental need of man as man is "to discover something, some

being or power, some force or tendency . . . moulding the destinies of the world—something not himself, greater than himself, with which [he can] harmonize his nature . . . repose his doubts . . . achieve confidence and hope." He then offers "to show how the facts of evolutionary biology provide us, in the shape of a verifiable doctrine of progress, with one of the elements most essential to any such externally-grounded conception of God." He later concludes that "the fact of progress emerging from pain and imperfection . . . is an intellectual prop which can support the distressed and questioning mind, and be incorporated into the common theology of the future."

Although Julian Huxley is certainly not adequately insistent upon the first crucial distinction between an actual trend and a force, he does in the following essay on "Biology and Sociology" fairly clearly repudiate the suggestion that the actual progressive direction of development to be discerned in evolutionary biology and elsewhere necessarily reveals an absolute law of progressive development: "When we look into the trend of biological evolution, we find as a matter of fact that it has operated to produce on the whole what we find good . . . This is not to say that progress is an inevitable "law of nature," but that it has actually occurred. . . ." This strongest idea of a law of inevitable development, rejected by Huxley, is in fact urged, eloquently and unequivocally, by Joseph Needham in two books of essays, *Time: The Refreshing River* and *History Is on Our Side*. Much of their interest for us lies in the attempted synthesis of biological science, Marxist historical pseudoscience, and ritualistic Christian religion. For the author was at the time of writing a leading biochemist, an active member of the Communist Party, and a practicing Christian.

Thus, Needham was able to write that the historical process was the organizer of the City of God. "The new world-order of social justice and comradeship, the rational and classless world state, is not a wild idealistic dream, but a logical extrapolation from the whole course of evolution, having no less authority than that behind it, and therefore of all faiths the most rational."

— *Antony Flew*

See also **Darwin, Charles; Malthus, Thomas; Spencer, Herbert**

Further Readings

Farber, P. L. (1998). *The temptations of evolutionary ethics.* Berkeley: University of California Press.

Katz, L. D. (Ed.). (2000). *Evolutionary origin of morality: Cross-disciplinary perspectives.* Exeter, UK: Imprint Academic.

Nitecki, M. H., & Nitecki, D. V. (1993). *Evolutionary ethics.* Albany: State University of New York Press.

Thompson, P. (Ed.). (1995). *Issues in evolutionary ethics.* Albany: State University of New York Press.

EVOLUTIONARY ETHICS

An *Encyclopedia of Philosophy* writes of evolutionary ethics: "Morality is universal, whereas biologically useful altruism is particular favoring the family or the group over others. Evolutionary ethics is, on a philosopher's time-scale, a very new approach to ethics. Though interdisciplinary approaches between scientists and philosophers have the potential to generate important new ideas, evolutionary ethics still has a long way to go."

One area in which evolutionary ethics has been set on its head is in Africa, where AIDs has devastated the population of the continent. In South Africa, for example, which has tended to be reticent about divulging its losses due to AIDs, the loss of life has been staggering. The *Washington Post* noted, "South Africa reported a 57 percent jump in deaths between 1997 and 2002, providing a startling—if indirect—picture of the rocketing toll of the country's AIDS epidemic. Releasing figures from a widely awaited national mortality study, Statistics South Africa reported deaths had leapt to 499,268 in 2002 from 318,287 in 1997. Among those older than 15, deaths increased by 62 percent."

The disease, which has completely changed the face of health in Africa, spread largely in the 1980s over the Trans-Africa highway, which had opened up vast areas of the continent to commerce. AIDs was carried over wide distances by truck drivers who passed it to roadside prostitutes, who were driven by rural poverty to the African cities that served the trucking trade, like Kinshasa in the Congo. Ironically,

in a situation where the ravages of AIDs are aggravated by the spread of modern commerce, the disease's toll is only made higher by traditional African tribal practices. In much of West Africa, tribal custom has held that abstinence from sexual intercourse marked the period after a wife gave birth to a child, a custom rooted in helping the new mother recover her health from the ordeal of child bearing. Of course, implicit too was that if she recovered in a healthy state, she would be able to bear more children to ensure the survival of the tribe. However, recent studies have shown that while husbands abstain from sex with their wives, they have sexual relations with other women, among whom there could be carriers of HIV, the virus which causes AIDs. In various studies, this situation was essentially unchanged after controlling for marriage type, age, education, urban-rural residence, income, and household wealth.

The report concluded with the observation that the potentially protective effect of prolonged abstinence after childbirth in Benin (and probably in much of West Africa) is offset by an increased probability that husbands will seek extramarital partners without using condoms. The implication is clear that to curtail new cases of AIDs, the old tribal customs will have to change and the population educated: What once helped the evolution of the species now hurts it. But such customs rooted in the past are difficult to alter. Thus, an ancient taboo, designed to promote the health of the mother and the ultimate survival of the tribe, has come to threaten tribal extinction from a modern nemesis: AIDs.

— John F. Murphy Jr.

EVOLUTIONARY PSYCHOLOGY

In *Evolutionary Psychology: A Primer,* Leda Cosmides and John Tooby write that "The brain is a physical system. It functions as a computer. Its circuits are designed to generate behavior that is appropriate to your environmental circumstances." During recent years, this theory has led to a new trend in psychology and psychiatry: the use of new psychiatric medications. Increasingly during the 1990s and the early 2000s, Ritalin, or its generic form, methylphenedate, has been prescribed for the conditions known as attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) among children, including elementary school age children. It was hoped that such medication would help to control or modify students whose behavior was considered disruptive to their teachers and classmates.

However, concern over the use, and possible misuse, of such a drug among young patients caused almost immediate concern from parents and medical personnel. The concern was underscored by the U.S. Congress Subcommittee on Early Childhood, Youth, and Families holding hearings on the subject in May 2000. Congressman Michael Castle, who chaired the hearings, noted in his opening remarks that "A news report on the increasing use of Ritalin caught my attention. I was particularly alarmed by the finding that for the years 1991 to 1995, the number of children ages two to four, who were prescribed psychotropic drugs, including Ritalin, increased by 50 percent. The researchers commented that these findings were 'remarkable' given the lack of research on the drug's effect on children." Such prescription of psychotropic medication also opened up another serious problem—those for whom the drug was prescribed were also selling it or giving it to their peers, either to increase performance in school or for recreational abuse.

The mounting concern over Ritalin and its possible abuses spurred further legislative attention, as legislators on all levels of government responded to the rising level of concern. The *State Health Lawmaker's Digest* for March 10, 2005, noted, "The results show that psychotropic medication prevalence varied across the three sites. Stimulant treatment in preschoolers increased approximately threefold during the early 1990s. During the late 1980s and 1990s, there was a dramatic increase in the use of psychotropic medications by children in the United States. This increase cuts across age, racial/ethnic, geographic, gender and insurance groups. Stimulants are often used as part of treatment for attention deficit-hyperactivity disorder (ADHD). Example: Ritalin."

One of the conclusions of the report was alarming: "Thus, there are still many unresolved questions involving the long-term safety of psychotropic medications in young children and the possible effects on a developing brain." While the debate over the use of stimulant drugs for the young continues, as does that for the prescribing of antidepressants, ongoing public interest ensures that the most important part of the dialogue will remain at center stage: the psychological health of young people.

— John F. Murphy Jr.

Evolutionary Ontology

Ontology is that branch of philosophy that asks what exists. Traditionally, this has been understood to mean what kinds of things exist in general, but in recent times, it has also been applied to mean what objects a scientific theory requires to actually exist if it is to explain the phenomena. We must therefore ask what things evolutionary theory requires to exist. This is, of course, distinct from the question of what things we can *observe* or *measure,* which is a matter of epistemology, not ontology.

In metaphysics, a distinction is sometimes made between *types* of things, and *tokens* of the types. A similar and related issue is whether things are *classes* that can be defined or *individuals* that can only be described or ostensively defined (i.e., pointed at). Most evolutionary objects have been interpreted to be either types and classes or tokens and individuals. Part of the problem is that since evolution by definition involves a lack of stability in the objects it explains and covers, it is hard to clearly define the types of objects.

Universal Darwinism

Evolution is usually understood as a biological process, but following Richard Dawkins, and with antecedents well before him, attempts have been made to formulate what is called by Dawkins "universal Darwinism." This is a generalized model of evolution that is independent of the physical substrate—a kind of general theory of any possible evolutionary process that might be called "Darwinian." Philosopher David Hull has applied it most extensively to the evolution of science, for example. We will consider biological evolution, but with an eye to the generalized ontological implications.

When we ask what "evolutionary theory" requires, of course we must take some representation of it, as that theory is itself evolving over time. The most widely discussed form is, of course, the conception of Richard Dawkins, sometimes called the "selfish-gene perspective," after his seminal book, or the "received view." Out of this and later works, a distinction was refined by David Hull, which has become known as the "Hull-Dawkins distinction," between *replicators* (genes and anything that is copied accurately like genes, including cultural items, called *memes*) and the economic systems they are part of and are reproduced when they are copied, which Hull calls *interactors* (organisms and anything like them that are differentially successful at getting the resources needed to replicate), although Dawkins prefers a less voluntaristic term, *vehicles.* Replicators are defined in Dawkins's *The Selfish Gene* as being those entities that are *fecund* (make more of themselves), *faithful* (have a high fidelity of replication), and are *long-lived* (persist over evolutionary time frames). Organisms do not persist over intergenerational time frames and so are not significant in evolutionary terms. Replicators are divided into "dead-end" replicators (for example, somatic genes), and germ line replicators (gamete genes).

The received view has been opposed or modified by critics, particularly Ernst Mayr (1988), who asserts that the objects subject to selection are organisms, not genes, which are "hidden" from evolution. Another critical stream is called "developmental systems theory," and its adherents hold that the evolutionary objects subjected to selection are *developmental systems* and life cycles. It is worth noting that Dawkins's view is a reworking and development of George C. Williams's notion of an *evolutionary gene,* which is, as he called it, a "cybernetic abstraction," defined as "any inherited information for which there is a favorable or unfavorable selection bias equal to several or many times its rate of endogenous change." A primary feature of evolutionary theory is that what is hereditable, whether they are replicators or not, must have variant forms (in genetics, *alleles*) that can be in competition for resources in order for selection to occur.

Sewall Wright suggested a metaphor of an *adaptive landscape,* which is the fitness value of each possible allele of each locus in the genome. This is sometimes taken literally, as a description of the values of genes in an environment. The adaptive landscape is itself constituted by the states of other organisms and their genes, as well as by the physical environment in which all these organisms exist. The sum total of these features is called the *ecosystem,* which is arranged into classes called *ecotypes.* A particular role in an ecotype is referred to as a *niche.* These properties of evolving things are primarily economic; they refer to the physical resources required by interactors to persist until reproduction. William Wimsatt has influentially defined *reproducers* as the key object in evolution viewed from an economic aspect, instead of replicators. This has given rise to the distinction made by Stanley Salthe and Niles Eldredge between the *genealogical hierarchy* and the *economic hierarchy.* Genes apply only to the genealogical hierarchy.

Phylogenetic Objects

A major set of disputes has arisen over the *phyletic* (that is, the evolutionary-tree level) entities in evolution. These include questions about the ontological standing of *species* and other *taxa,* whether lower than species or higher. Mayr asserts the ontological primacy in evolution of the *population,* which is a group of interbreeding organisms, or a Mendelian gene pool. Populations are understood to be primarily statistical in nature, with properties distributed over modal curves. It is expected that most populations will be polymodal (in biology, *polytypic*). On this view, a species is the set of all populations (the *metapopulation*) that exchange genes. Asexual (nonreplicator exchanging) species have to be defined in another way, usually based on their genome clustering about a "wild-type" mode that is at an adaptive peak.

A somewhat different approach derives from the taxonomic discipline of *cladistics.* This approach of classification is by genealogy (*clades,* meaning branches) rather than by grades or overall similarities. The fundamental object of cladistics is the *lineage,* which is variously understood as a sequence of populations or as the parent-child relationship of any organic entity. Lineages that split (*cladogenesis*) form clades, which are the ancestor and all descendent lineages of a particular branch. Such groups of taxa are called *monophyletic* and are the only natural group allowed in cladistic methodology. However, while clades are taxonomic groups based around species, cladistic methods also apply to genetic lineages, and the resulting trees of genes are considered to support phylogenetic trees if they agree. If they do not, a consensus of gene trees is held to give the taxonomic, or phylogenetic, tree.

Part of the problem with an evolutionary perspective for taxonomy is that the entities are not stable, and they are not all commensurate. While in the older Linnaean system, there were absolute ranks such as genus, family, order, class, kingdom, and so on, in the cladistic view, these are arbitrary and relative, and the only "natural rank" is the species, in part because the assignment of groups of species to these ranks is a subjective one. Cladistics is therefore a rankless system.

Beneath the level of species, there are smaller entities. In biology, there are subspecific groups known as geographical races, although the term *race* is now often avoided in favor of some other term, such as *variety*. Geographical groups are specified by a correlation of traits with distinct ranges. However, varieties can also be found across ranges, and in this case these are referred to as *subtypes, varieties,* or *trait* groups.

Group Selection

While the level of the individual organism (the interactor) is considered to be the primary focus of selection, another level is the *kin group,* in which the genetic fitness of a gene is the average fitness of all copies of the gene in all interactors (*inclusive fitness*). This allows selection to make individuals altruistic toward their kin, without making their genes less fit. However, it does not allow for altruism (in which a replicator makes its vehicle behave in ways that benefit other vehicles and not itself) to evolve toward nonkin, that is, those who do not share that gene.

Some have proposed *group selection,* in which the larger scale groups behave as the "fitness bearers." Many think this is inconsistent with the replicator-interactor distinction or its precursors, while others seek to find analogues at higher levels to the canonical replicators and interactors. Group selection has been proposed for trait groups, temporary populations competing against each other, for species, and even for larger-scale clades. Even the classical argument of Williams against group selection allowed it could occur.

Some have also argued for the reality of *body plans,* or generalized structural arrangements of organisms, in evolution acting as constraints on the possible evolutionary trajectories in a "space" of morphologies *(morphospace),* although others consider this to be an artifact of the modeling methodology.

Ontologies and the Metaphysics of Evolution

Overall, evolutionary ontologies have been divided into those that are historical (process based) and those that are ahistorical (pattern based). Things that are defined ahistorically, such as some definitions of species, tend to rely on the characters or propositions used to define them. These things form *classes,* and they do not change, although a lineage might change into a class from another class or grade. A more recent approach is to see evolutionary objects as *individuals,* meaning not individual organisms or cohesive systems, but historical objects with a boundary in space and time. Michael Ghiselin and David Hull defined species as individuals in this way (although they have also defined species as cohesive individuals as well). Similar considerations apply to other evolutionary objects, such as genes; they can be classes on one account or individuals on another, but not both in the same account.

— *John S. Wilkins*

See also **Cladistics; Dawkins, Richard; Evolutionary Epistemology; Memes**

Further Readings

Dawkins, R. (1989). *The selfish gene.* Oxford and New York: Oxford University Press.

Gee, H. (2001). *Deep time: The revolution in evolution.* London: Fourth Estate.

Gould, S. J. (2002). *The structure of evolutionary theory.* Cambridge, MA: Belknap/Harvard University Press.

Hull, D. L. (1988). *Science as a process: An evolutionary account of the social and conceptual development of science.* Chicago: University of Chicago Press.

Oyama, S. (2000). *The ontogeny of information: Developmental systems and evolution.* Durham, NC: Duke University Press.

Sober, E., & Wilson, D. S. (1998). *Unto others: The evolution and psychology of unselfish behavior.* Cambridge, MA: Harvard University Press.

Sterelny, K., & Griffiths, P. E. (1999). *Sex and death: An introduction to philosophy of biology.* Chicago: University of Chicago Press.

Williams, G. C. (1966). *Adaptation and natural selection: A critique of some current evolutionary thought.* Princeton, NJ: Princeton University Press.

Wilson, R. A. (Ed.). (1999). *Species: New interdisciplinary essays.* Cambridge: Bradford/MIT Press.

EXCAVATION

Excavation is one of the most commonly known and used techniques of archaeological investigation. It involves the systematic removal of data from the ground. Excavation provides the most complete evidence for human activity during a particular period and how these activities changed over time. There are many approaches to excavation, but at its most basic, the method involves looking at activities horizontally in space and vertically through time.

By its very nature, excavation is a destructive and costly process. It is an unrepeatable experiment that requires precise methods of data extraction and recording. Before excavating a site, it is essential to understand how sites are formed. Sites are what remains from settlements and other structures. The residues of a past social system will change over time due to decay, erosion, robbing, and the effects of plant and animal action. It is thus important to recognize these processes and distinguish them from the past actions that led to the creation of the site.

To understand this, it is essential to understand the principle of stratigraphy. This is a geological principle that states that layers of strata are laid down according to processes: The layer at the bottom is the oldest layer, while the topmost layer is the most recent. This is called the *law of superposition.* Understanding this process is crucial for interpretation and dating purposes.

The archaeologist, then, must carefully remove and record each layer and understand the stratigraphic sequence. He or she must be able to recognize how the process works. For example, a pit dug from a higher into a lower layer may lead to later materials being found in lower levels. Strata can also become inverted; for example, a series of strata can be eroded

to the bottom of a valley. To this, one must add what Michael Schiffer calls "N-transforms," natural processes which affect the archaeological record, for example, burrowing by animals and seismic activity. Changes brought about by humans are called "C-transforms" (cultural transforms).

Source: © iStockphoto/Tina Rencelj.

Sampling Strategies

The first requirement, however, is identifying the survey area in which to operate. Once that is accomplished, the archaeologist must then break down the region into smaller units in order to test the viability of any sampling strategy, particularly in little-explored areas. The major problem with this is in extrapolating whether the validity of results are representative of the survey region as a whole.

Such sampling techniques include systematic, random, and stratified random sampling. Systematic sampling can be thought of like alternating black-and-white pieces on a chessboard, which assumes that the sites themselves were laid out in a gridlike format approaching a modern city square layout. The pitfall is that the excavators may hit or miss everything if the layout of the site in question does not correspond to the idealized, superimposed excavation grid.

An alternative, random sampling uses a method whereby the sample squares in the survey region are fixed by randomly chosen coordinates. This method ignores known material culture distributions and environmental boundaries. While it might appear that such randomly chosen squares will be distributed widely, in practice, it is more common for tight clusters of squares to appear, leaving large sections of the surveyed region unsampled. Thus, this method does not take into account any knowledge of the landscape and the impact this may have had on the distribution of settlement and material culture remains.

As a result, the most commonly used sampling method is *stratified random sampling*. The survey area is first divided up according to its environmental or topographic layout, and sampling is then undertaken within each of the zones as deemed appropriate. This method has the advantage of combining ecological knowledge with the power of random test excavations.

However, even stratified random sampling has its problems. Although it attempts to balance statistical variability with representativeness, the region chosen for sampling is determined both by financial considerations and a degree of expectation on the part of the archaeologist about the nature and size of the site or sites expected. Therefore, the interplay between practical and theoretical considerations is a reflection of the research designs undertaken.

An example of good surveys is to be found in rock art studies. Many rock paintings are present in rocky terrain, which makes targeted surveying a necessity. Not all geological formations are suitable either for painting or for long-term survival of art, and field teams will normally focus on those geological zones that maximize the potential for mapping new occurrences of rock art sites.

Excavation Techniques

The focus on the methodology of excavations is far later in the history of archaeology. Early approaches simply involved the extraction of material deemed interesting by the excavator. While many such endeavors are accompanied by accounts, these are very different from the site reports familiar to students and archaeologists. The birth of modern techniques dates

to the 19th century. The British Lieutenant-General Pitt Rivers developed a precise methodology during excavations on his estate, Cranborne Chase. His meticulous attention to detail was simply groundbreaking.

Archaeological excavation methodology and its procedures are typical of sampling. Factors of preservation, together with the economics involved in setting up the research project, result in excavators adopting sampling procedures that are best targeted toward achieving the objectives of the mission.

Attention also is paid to other pragmatic considerations, like natural formation processes, as archaeological sites can have complex physical and organic environments. These include water and wind actions, animal depositions and interference, as well as plant growth. The impact of these actions could disturb the site in such a way that detailed reconstruction is required in order to interpret the original material traces in a meaningful fashion.

The reasons behind why a particular site was chosen to be excavated, and the manner in which it was, must be recorded. A test of good record keeping is replicability, which permits another archaeological mission to accurately track the steps taken by its predecessor and enables participants to access the excavation strategies employed and to reconstruct the contexts of the material culture unearthed. Although this attention to detail is important, as with all archaeological work, there is a continual interplay occurring between research aims, technical developments, and theoretical perspectives.

Vertical Dimensions

The interplay between cultural and natural formation processes, operating between when the site was first used and the time of excavation, potentially renders the stratigraphy of sites complicated. Repeated uses of a site by hunter-gatherers, for example, are difficult to separate out into their discrete visits. However, archaeological traces of fireplaces and food refuse are manifested through localized, subtle alterations in soil color. These are called *lenses,* which are present within the stratigraphic layer.

At sites that have been visited repeatedly for a lengthy period of time, it is often difficult to distinguish between the complex series of lenses and layers that develop. The archaeologist records such stratigraphies through the use of sections: the stratigraphy of a straight side in a designated trench.

In situations where there are no discernable differences in soil color or texture, the archaeologist still needs to maintain vertical control and therefore may elect not to try and excavate according to faint stratigraphic layers, but instead in arbitrary vertical units called "spits."

Underwater Excavation

Horizontal and vertical control of deposits becomes even more paramount when dealing with sites under bodies of water; indeed, this is what distinguishes archaeological research from treasure scavenging.

Excavation underwater is rendered problematic by the presence of multiple hazards not encountered on the surface: seabeds of various textures exposed to currents, depth of sediments accumulated on top of the archaeological deposit, and the quality of visibility. Grid squares, made of rope, need to be placed over the designated area of the site and secured in place by concrete sinkers. Additional sinker markers are required for assisting in laying out the quadrants, which are buoyed and mapped using theodolites from the surface.

Thus, excavation techniques vary widely and are adapted according to the research requirements and the physical nature of the site in question. Despite the differing views held by archaeologists on the nature of the interaction between theory and data, the central tenet is to accurately establish the context in which the assemblages excavated occurred.

Stratigraphy as Dating

When deciding on what form of stratigraphic units to follow in an excavation, the archaeologist is also effectively deciding on the type of chronology to employ. Different, and sometimes discrete, human actions get compacted together by soil color and texture into layers. At Stone Age sites, many hundreds of individual actions and occupations may be compacted into a layer. Thus, archaeologists are confronted with the tangle of dealing with compacted human actions through artificially dividing the actions into discrete slices.

In this way, stratigraphy is at the heart of the archaeological concept of time, enabling reconstructions of chronologies to be undertaken through relative and absolute dating techniques. Examples of relative dating include analyzing and comparing the faunal compositions of neighboring or faraway sites,

constructing pottery seriation sequences, and more specialized techniques, such as contrasting the chemical composition of fossil bone material. Absolute dating techniques, providing age estimates that refer to a calendrical time scale, are based either upon radioactive decay or other natural processes.

Beyond Excavation

Excavation is the most visible part of archaeology. In the public mind, it is what archaeologists do. However, as any dig participant can attest, postexcavation is a far more time-consuming and equally important activity. Excavation is not meant to stand alone; the processing and publication of material is equally important.

Moreover, it is not always possible to fund excavation projects and/or obtain legal permits. For this reason, surveys have become increasingly important, for example, in the Mediterranean. While surveys potentially offer a broad range of information in a relatively shorter space of time, excavation remains the best way to uncover and document the past.

On another level, excavation provides an excellent opportunity to create dialogue with the nonarchaeological community. Ian Hodder's excavations at Catal Hoyuk are an example of reflexive archaeology and dialogue with various communities. Finally, the material culture recovered must be handled and conserved appropriately. Excavation also raises many contentious issues, including repatriation and claims to land rights.

— *Isabelle Vella Gregory*

See also **Archaeology; Stratigraphy**

Further Readings

Barker, P. (1993). *Techniques of archaeological excavation* (3rd ed.). London and New York: Routledge.

Hall, M. (1996). *Archaeology Africa.* Cape Town, South Africa: David Philip.

Renrew, C., & Bahn, P. (2004). *Archaeology: Theory, methods, and practice.* London: Thames & Hudson.

Roskams, S. (2001). *Excavation* (Cambridge Manuals in Archaeology). Cambridge: Cambridge University Press.

Schiffer, M. B. (1996). *Formation processes of the archaeological record.* Salt Lake City: University of Utah Press.

Exobiology and Exoevolution

Exobiology is the scientific search for life-forms existing elsewhere in this universe, whereas exoevolution involves speculating on the adaptive histories of organisms on other worlds.

It is not generally known that, at least once in his life, Charles Darwin envisioned the existence of plants and animals on another world. In 1836, having returned to a Brazilian rain forest and being impressed with its luxurious life-forms, he thought how great it would be if it were possible to admire the scenery of another planet. Darwin recorded this speculation in Chapter 21 of his first book, *The Voyage of the Beagle* (1839).

Do life-forms exist on other worlds? Are there intelligent beings living among the galaxies? Have advanced civilizations emerged elsewhere in this universe? These questions were asked by a few major thinkers in antiquity, but now these same questions are being taken seriously by many distinguished scientists and philosophers. The answers will have a direct bearing on the place life itself and the human species occupy within dynamic nature.

In particular, is the human animal unique and alone in this material cosmos? Or is the human species just one of many similar sentient beings inhabiting unknown worlds throughout sidereal reality? The science of exobiology intensifies human curiosity and challenges the imagination, while the quest to find forms of life and intelligence beyond the Earth requires a multidisciplinary approach that involves scientific specialists in various fields, from astronomy and biochemistry to biology and engineering, as well as the latest advances in space technology.

Exobiology

If life emerged from matter on the Earth, then is it not possible that organisms have appeared elsewhere in this universe? From ancient speculations to modern hypotheses, some of the greatest minds in the history of philosophy and science have grappled with the idea of exobiology (the existence of life-forms beyond this planet), for example, Cusa, Leibniz, and Kant.

In antiquity, Anaxagoras and Lucretius maintained that life does exist beyond the Earth. During the Italian Renaissance, the daring philosopher Giordano Bruno (1548–1600) argued for an eternal, infinite, endlessly changing, and inhabited universe. He even held that

intelligent beings, superior to the human species, exist on planets elsewhere in dynamic reality. Of course, his iconoclastic framework challenged the earthbound and human-centered worldview entrenched in Western philosophy and theology. In fact, Bruno was burned alive at the stake in Rome (near the Vatican) because of his unorthodox worldview.

In the 20th century, although a silenced evolutionist, the geopaleontologist and Jesuit priest Pierre Teilhard de Chardin (1881–1955) failed to take seriously the probability of life-forms and intelligent beings existing on planets elsewhere. Instead, he focused on this Earth and the human species. Actually, his cosmology is merely a planetology. In his major work, *The Phenomenon of Man* (1955), Teilhard believed that the final goal of human evolution is a spiritual Omega Point at which time the united human species will merge with a personal God at the end of Earth history in terms of a converging and involuting collective consciousness. It is not surprising that his mystical vision satisfied neither religious creationists nor scientific evolutionists, although the courageous Teilhard is to be greatly admired for his serious introduction of the fact of evolution into modern theology

Going beyond the ideas of Galileo and Darwin, one may anticipate an exobiology revolution in scientific cosmology. The impact would be awesome for the human species. No longer would the Earth or the organisms on this planet, including humankind, be unique in this universe.

In the United States, astronomers Frank Drake and Carl Sagan took the emerging science of exobiology seriously. In 1961, Drake proposed a mathematical equation to determine the number of detectable civilizations in this universe. His calculations suggest that there may be thousands of civilizations similar to those of humankind in the Milky Way galaxy. And in his popular writings and television series, Sagan brought the exciting probabilities of exobiology to the general public. Modern technology now makes the search for life and intelligence elsewhere possible, particularly in terms of space probes and radio telescopes, for example, the Arecibo Observatory in Puerto Rico.

Concerning civilizations with advanced technologies, physicist Freeman Dyson speculates that superior beings could use planetary matter to build an energy-capturing sphere ("Dyson Sphere") around their star.

In Russia, the scientists Nikolai S. Kardashev and Iosif Shklovskii have proposed the construction of several huge radio telescopes in the Earth's solar system, in order to detect extrasolar planets. Actually, modern astronomers have already discovered over 60 planets existing in other solar systems. Kardashev has classified civilizations into three energy output types: Type 1 is planetary, Type 2 is solar, and Type 3 is galactic. Going beyond this scheme, one could even imagine a supercivilization utilizing the power output of a cluster of galaxies.

Considering the age and size of this expanding universe, with its billions of years and billions of nebulas, there has probably been all the time and space necessary for life (as now known) to have emerged more than once in nature. The general uniformity of both physical laws and chemical elements throughout reality increases the probability that life, that is, the RNA or DNA molecule, has appeared on other worlds. In fact, carbon and water are plentiful in this universe. Furthermore, organic molecules (amino acids) exist in comets, meteors, cosmic gas/dust clouds, and planetary atmospheres. Therefore, the conditions for the origin of life do exist elsewhere in reality. Surely, the discovery of the RNA or DNA molecule in the sidereal depths of outer space would give exobiology an empirical foundation it now lacks, and it would intensify further scientific investigation for conscious observers and intelligent machines elsewhere in this cosmos.

All living forms need not be restricted to only this planet. Because there are billions of galaxies, each with billions of stars, it seems reasonable to assume that there are millions of solar systems with planets similar to the Earth. No doubt, at least some of these planets would resemble the Earth in size, chemistry, temperature, and atmosphere. Thus, it is highly probable that zones with the necessary conditions for the origin of life exist elsewhere. Of course, extraterrestrial organisms need not be similar to those plants and animals that have inhabited and now exist on the Earth. As a result, alien forms of galactic life could be so different from known organisms that they may not be recognized by the human species or detected by its technology.

Is life a unique miracle or random accident or statistically inevitable, given enough time and the right situation? Actually, the origin of life on this planet was remarkably swift from the geological perspective. It appeared about 4 billion years ago, only 600 million years after the formation of the Earth. Surely, if the origin of life happened once, then it can happen again elsewhere under similar conditions; recall that the prebiotic chemistry for life pervades this universe.

Logic does not dictate that this planet or life on Earth or the human species must be unique in all reality (although religionists and theologians may still believe each of these claims to be true).

At this time, there is no direct empirical evidence to support exobiology. Because of the awesome cosmic distances among the stars and nebulas, one may never discover the existence of life on other worlds in this universe (even if it does exist). Life-forms may have emerged and vanished before the existence of this solar system, or organisms will appear on other planets in the remote future. Another possibility is that superior beings elsewhere may not be interested in the human species; if they are intelligent enough to discover humankind, then they are wise enough to stay away. The human animal has nothing to offer such superior visitors from deep space.

Furthermore, it is possible that other universes with life-forms have existed before this one, are coexisting with this world, or will exist after this particular cosmic epoch has ended. Consequently, the questions raised by exobiologists may never be answered in the affirmative, even if life does exist elsewhere. The same is true for questions concerning exoevolution.

Perhaps numerous inhabited planets do orbit stars in this galaxy and in others. Concerning the organic evolution of life-forms on other worlds, what is possible? If planetary systems are common, then do Earthlike worlds elsewhere harbor biological activity needing carbon and liquid water (or is life elsewhere based on another element, for example, silicon or boron)? The human quest for cosmic life and intelligence may even find fossils and artifacts on other worlds.

Exoevolution

Four billion years of biological evolution on this planet have produced a staggering spectra of organisms, ranging from bacteria and plants to invertebrates and vertebrates. This creative unity of global life includes such diverse life-forms as worms, sponges, sharks, turtles, snakes, and elephants. Among the very social creatures are species of insects, birds, and primates (especially the pongids and hominids). Yet, most of the species that have inhabited this world are now extinct, for example, all the trilobites, ammonites, and dinosaurs have vanished from the biosphere.

As if organic evolution on Earth is not difficult enough for many to accept, especially biblical fundamentalists, then the discovery of exoevolution will challenge all thinkers to seriously reassess the place that humankind occupies in dynamic reality.

The only process of organic evolution that is now known to science is the one taking place on Earth. However, exobiology infers exoevolution. Environments are never fixed anywhere in nature. No doubt, the struggle for existence pervades this universe. As on this planet, life-forms elsewhere would have evolved to meet the challenges of their changing habitats. One can only speculate on what directions organic evolution and adaptive radiation have taken on other worlds. Perhaps human explorers will find species similar to ants, whales, and the apes; and maybe even the technological remains of past civilizations, or the existence of cognitive biorobots of superior intelligence, will be discovered in this cosmos.

If life-forms are found elsewhere, then future scientists and philosophers would participate in the critical study of comparative exoevolution. Or if human beings send themselves and other life-forms into outer space, then these plants and animals will evolve in strange new habitats (thereby making the study of exoevolution a certainty). In fact, the human species itself may evolve into a new form of life as it adapts to living among the distant stars.

Are we completely alone in this material universe? If not, then contact with extraterrestrials will be the most momentous event in human history. In fact, the Nietzschean Overman may have already emerged somewhere in this universe. Cosmic aliens with superior intelligence could be wise, benign, creative, and compassionate, or they could be indifferent and evil. Certainly, their achievements in science and technology will be far beyond our comprehension.

Moreover, cosmic microbes may cause diseases that could bring the human species (if not all terrestrial life-forms) to extinction. The cosmic quest for life elsewhere is not to be taken lightly.

Exobiology and exoevolution directly challenge geocentrism, zoocentrism, and anthropocentrism. The discovery of organic evolution beyond the Earth will make this planet and the human species even less significant than they now are. If intelligent beings are discovered elsewhere, then the human animal will no longer be something special in this universe. Such an incredible event would have an awesome and lasting impact on humankind's science, philosophy, and theology (not to mention the inevitable psychological and sociocultural changes to the self-centered human

species). Giving priority to science and reason, and with courage and humility, future naturalists will need to accept the true place of our human species in material reality from a cosmic perspective and within the evolutionary framework.

For most scientists, the origin of life on Earth was a strictly materialistic event. The subsequent history of living forms on this planet has been a long, complex, contingent, unpredictable, opportunistic, and inefficient process of biological evolution. Organic evolution is also nonrepeatable, irreversible, and subject to material constraints.

Homo sapiens sapiens is a product of, dependent upon, and totally within evolving nature. Because of the staggering necessary sequence of improbable events that had to occur in order to bring human beings into existence, it is unlikely that the human species will meet its exact duplicate on a remote world. Nevertheless, at least once, with the recent emergence of the human being, this dynamic universe became aware of itself.

Rational speculations are very important, but there is no substitute for evidence, observation, and communication. It is conceivable that processes of evolution elsewhere in this universe have produced forms of life similar to, or remarkably different from, those species that have emerged on the Earth over billions of years. In fact, the possibilities for life-forms inherent in exoevolutions on other planets seem endless.

Of course, extinction and evolution are two sides of the coin of life. A comet strike or global plague or nuclear war could wipe out the human animal and most, if not all, of the other species on Earth. In fact, this vulnerable planet has already experienced at least five mass extinctions. Similar horrific events may have already eliminated all life-forms on some other worlds.

There is no evidence of a preestablished direction or preconceived purpose or preordained goal for this cosmos that gives the human species a central position in material nature. This universe is clearly independent of and utterly indifferent to humankind; until now, the human species has played no special role in the existence of reality. There was cosmic time before the appearance of the human animal, and material nature will endure after the extinction of life and consciousness on this planet.

At some time in this millennium, reminiscent of the young Charles Darwin in a Brazilian rain forest, a naturalist may stand on another world and marvel at forms of life beyond humankind's present imagination. Another intriguing possibility remains: the survival and fulfillment of the human species may depend on its working in consort with sentient life-forms still to be encountered elsewhere in this universe.

— *H. James Birx*

Further Readings

Davies, P. (1995). *Are we alone? Philosophical implications of the discovery of extraterrestrial life.* New York: HarperCollins.

Dick, S. J. (1996). *The biological universe: The Twentieth-century extraterrestrial life debate and the limits of science.* Cambridge, UK: Cambridge University Press.

Drake, F., & Sobel, D. (1992). *Is anyone out there: The scientific search for extraterrestrial intelligence.* New York: Delacorte.

Ferris, T. (2000). *Life beyond earth.* New York: Simon & Schuster.

Koerner, D., & LeVay, S. (2000). *Here be dragons: The scientific quest for extraterrestrial life.* Oxford, UK: Oxford University Press.

Lamb, D. (2001). *The search for extraterrestrial intelligence: A philosophical inquiry.* New York: Routledge.

Lemonick, M. D. (1998). *Other worlds: The search for life in the universe.* New York: Simon & Schuster.

Sagan, C., & Shklovskii, I. S. (1966). *Intelligent life in the universe.* San Francisco: Holden-Day.

Webb, S. (2002). *Where is everybody? Fifty solutions to the Fermi Paradox and the problem of extraterrestrial life.* New York: Copernicus/Springer-Verlag.

Zubbay, G. (2000). *Origins of life on earth and in the cosmos.* San Diego, CA: Academic Press.

Exogamy

From the Greek εντὸζ + γαμώ ("out" + "to marry"), exogamy is the marital rule according to which the spouse must be sought outside the social group (e.g. kindred, totem, royal) one belongs to. It is the opposite of endogamy.

The explanation of exogamy has been a major concern for anthropologists. In addition, as it has been mainly linked to the interdiction of incest, which constitutes the most important form of exogamy, exogamy as a social phenomenon was considered to

be of natural origin. However, Lévi-Strauss theorized that the interdiction of incest, and therefore exogamy, is not of natural but of cultural origin. Based on a quote from Tylor, he proceeded to give the succinct interpretation that man very soon realized that he needed to choose "between marrying-out and being killed-out." Under these conditions, no society can exist without exogamy.

Just as social groups aim to preserve and transmit their constitutive elements (for example, power, wealth, religion, language) to the following generations through endogamy in order to perpetuate their existence, exogamy aims at forming alliances between the groups connected through marriage for the same purpose. This perpetuation is achieved as well through biological replenishment as well as any sort of strengthening (financial, military, etc.) and the resolution of enmities, and so on, as has been and is the case with royal families, for which exogamy is the norm. An example of this is the marriage of Eric Tudor, heir of the house of Lancaster from his mother's side, with Elisabeth from the house of York. Eric was crowned king by setting an end to the War of the Two Roses (1455–1458), fought between the houses of Lancaster and York over the throne of England. The war took its name from the crests of the houses, Lancaster's being a red rose and York's a white one. With his marriage, Eric united the two roses on his crest and became the head of a new dynasty.

Consanguinity Kindred Exogamy

The most common form of exogamy occurs with the selection of the spouse outside the kindred group within which marriage would constitute incest. The stringency of the universal rule forbidding incest (and thereby enforcing exogamy) varies for different societies, ranging from the interdiction of marriage between parents and children as well as between brothers and sisters to the interdiction of marriage if even a single common ancestor is discovered.

For instance, the Greek Orthodox Church allows marriage between relatives beyond the fourth degree (i.e., the first cousins) for consanguinity kindred. However, custom appears to be stricter than religion, as it only allows marriage between relatives past the second cousins most of the time, or even past the third cousins on more rare occasions. Elsewhere, as in for example, the Aborigines in Australia, marriage is forbidden between parallel cousins, that is, children of two siblings of same sex, which are considered to be siblings (a case of exogamy). Conversely, it is allowed and even largely enforced between cross cousins, that is, children of two siblings of different sex (brother and sister), this being a case of endogamy.

Lineage and Clan Exogamy

Exogamy is also a very frequent phenomenon on a *clan* (a social group the members of which acknowledge a common ancestry and whose relationships are ruled by solidarity) or *lineage* (the group of individuals who are interconnected through consanguineal kinship either patrilinealy or matrilinealy and who acknowledge a common ancestor) level. In northern Albania and parts of southern Albania, the fis, a large group of men of patrilineal descent with a common ancestor (lineage), follows a strict exogamy. The obstacles to marriage derive from the state of consanguinity the members of the same fis share because of their "blood link," originating from their patrilineal affiliation. If a marriage within the fis was discovered, the "culprits" were subjected to persecution and could even be assassinated. The *clans* in southern Mani (Greece) were also exogamic for the same reason.

A strict exogamy is obeyed by most totem *clans,* that is, clans bearing the names of plants, animals, or natural processes that they usually treat as their ancestors and protectors (totems). The members of the clan with this common ancestry consider each other relatives. This results in exogamy, as in the Ojibwa Native North Americans, where the term *totem* originates (*ototeman* means "is my friend or relative" in their language).

Fictitious (or Ritual) Kindred Exogamy

Apart from consanguineal (or by affinity) relatives, individuals related by *fictitious* (or *ritual) kinship* are also usually subject to exogamy. This term covers social bonds equivalent to consanguineal or affinity kinship, often using the terminology of kinship (or cognate terms, for example, father-godfather) and usually necessitating a ritual for their creation (such as godparenthood, adoption, or fraternization).

The rule of exogamy is thus particularly stringent for godparenthood in the Greek Orthodox Church, where marriage is forbidden between the godparent and the godchild as well as the godparent and the godchild's parent. This is because the godparents are considered to be spiritual parents and the godchild

their spiritual child. In order to remove the risk of such a marriage, custom dictates that men only baptize boys and women only baptize girls. This practice has yet another purpose: it eliminates the possibility of a marriage between godchildren baptized by the same godparent. The godchildren are considered siblings by custom and for whom marriage is forbidden. The danger of a marriage of this kind is particularly evident in endogamic societies. Still according to custom, marriage is also forbidden between the natural children of the godparent and their godchildren, who are considered siblings as well.

Exogamy usually applies between an adopting parent and an adopted child in most societies, as the adopted child takes the place of a natural child. In some cases, for example, in Albania, a powerful *lineage* could adopt a weaker one by adopting one of its children. The members of both lineages would then be subject to exogamy.

Interdiction of marriage also stands between individuals who have become siblings following a ritual (fraternization), although these individuals are most often of the same gender (usually men). Fraternization is encountered in many African and Balkan societies, where exogamy can apply to the families of the individuals linked by fraternization and often to the members of both their lineages.

— *Maria Velioti-Georgopoulos*

See also **Endogamy**

Further Readings

Goody J. (1983). The spiritual and the natural. In *The development of family and marriage in Europe* (pp. 194–221). Cambridge, UK: Cambridge University Press.

Lévi-Strauss, C. (1949). Endogamy et xogamy. In *Les structures élémentaires de la parenté* (pp. 49–60). Paris: PUF.

Lévi-Strauss, C. (1962). *Le totémisme aujourd'hui,* Paris: PUF.

Extinction

Extinction is a word commonly associated with undesirable, catastrophic loss of entire populations or species. However, extinction is as much a part of the cycle of life on Earth as is evolution. Indeed, extinction and evolution together form the cycle responsible for the ever-increasing complexity of life on Earth. From the earliest evidence in the fossil record, we see populations and species disappear, to be replaced by other populations and species. In most cases, this occurs as the more complex organism replaces the simpler one. However, there have been several times in the Earth's history when mass extinctions occurred that wiped out the complex forms but allowed simpler forms to survive.

It is human nature to seek ways to forestall or avoid the inevitable concerning human extinction, and thus the study of extinction has earned high priority in scientific circles. This heightened interest has led to significant research on the topic. A true understanding of the processes of extinction requires a detailed understanding of most facets of the Earth's history, including climate shifts, tectonic movements, atmospheric conditions and content, sea level changes, and the flora and fauna itself. The geologic and fossil records are notoriously incomplete, making this research difficult. Even the tidbits that have been discovered, however, provide tantalizing glimpses into the intricate and complex patterns and processes of extinction.

Extinction can best be defined as the condition that exists when the last remaining individual of a population or species dies. Since this death can be caused by any number of factors and since extinction is inevitable for every species on Earth, understanding the causes, patterns, and processes involved can be daunting.

Types of Extinction

Extinction events can generally be divided into two types: background extinction and catastrophic, or mass, extinction. Background extinction follows the concept of Darwin's "survival of the fittest," perhaps better expressed as "survival of the luckiest." For one reason or another, groups of living organisms regularly pass into oblivion. These reasons include lack of nutrients, disease, genetic anomalies, unusual weather conditions, and being out-competed for existing resources. Changes in climate seem to play the largest role in this type of extinction. Very minor changes, as small as having a drought in a region for a few years, can cause an extinction event.

Background extinction seems to be part of a cycle most species of organisms follow. Initially, a species comes into existence from organisms occupying a new environment or following a new life style compared with their ancestors'. These organisms typically exhibit few specializations, and they are generally not very well suited to the new environment or lifestyle. Through successive generations, the organisms become more specialized and better able to exist in the new environment, but this comes at the cost of being less able to cope with changes to the new environment. Finally, the organism faces the problem of a change in its new environment, and because it no longer has the ability to adapt and change rapidly, it dies out. If the species is not an evolutionary dead end, somewhere in this process, some of the offspring were either born defective, forcing them to move into a different environment to survive, or perhaps a small group was merely trapped in an area where the environment was somewhat different. In any case, the demise of the parent species leaves behind one or more daughter species, and the cycle continues. Throughout the history of the Earth, this pattern has produced a gradual increase in both the number of different species and the complexity of organisms on Earth.

Catastrophic extinction often has the opposite effect on the number and complexity of Earth's species. Catastrophic extinctions, as far as is currently known, are always related to a massive, rapid change in the Earth's global environment. Such extinctions tend to affect the most complex and specialized organisms more rapidly and seriously. Simpler, generalized forms are usually better able to survive catastrophic events. There have been numerous catastrophic extinction events throughout Earth's history. Although there are many references to the "Big 5" and the current extinction as the sixth, there have actually been more than 20 times when mass extinction has occurred. Catastrophic extinction is defined as the extinction of a large number of species in a short time interval. It is easy to see that extinction events may be included or excluded from this category based simply on what one decides is a "large number of species" and a "short time interval."

There have been at least 5 major catastrophic extinction events and at least 14 more events that saw losses of more than 20% of species of organisms on the Earth. In addition, there may be as many as a dozen more extinction periods in the fossil record that are potentially this severe. However, due to the incomplete nature of the rock and fossil records, these events may or may not have occurred, and the actual number of Earth's catastrophic extinction events may never be known. Also, the classification of extinction events is arbitrary; there are no sharp separations in severity of extinction events. Extinctions of virtually every resolvable magnitude have occurred, from one species to virtually all species wiped out in a single event or time period.

Benefits of Extinction

Most of the research concerning extinction is concerned with the harmful effects to living species and the best means of preventing their extinction. A major force in human politics today is maintaining the current "status quo." Humans do not like to see change, especially when it concerns the loss of species that humans value. However, the history of hominids would be quite different were it not for the driving forces of extinction and adaptation. The last few million years of Earth's climate history have been unusually variable. The Earth has gone from very warm to very cool several times during this period. We are currently experiencing a moderate global temperature that is unusual from a geologic perspective. In fact, scientists are divided over whether we are on the brink of another ice age or a severe greenhouse event.

Such fluctuations of global climate have undoubtedly been responsible for the "weeding out" of hominid species such as *Australopithecus* in favor of the more intelligent *Homo habilis.* Had the climate not changed and the forests of the Pliocene given way to savannah grasslands, the australopithecines would likely still abound. The global cooling of the climate during the early Pleistocene caused the loss of the forest habitat of *Australopithecus,* and the species most likely died out as a result of this loss of habitat. However, the ability to use tools and the addition of meat to the diet allowed at least some members of *Homo* to survive and thrive long after the extinction of *Australopithecus.*

Similar climatic variation throughout Earth's history is likely the single most important mechanism behind the evolution of increasingly more complex species. An event that spells disaster for one population or species is likely to provide an opportunity for another group to change, adapt, and grow. From the current data, it seems that only the most cataclysmic events in Earth's history reverse this trend and cause the loss of the more complex species.

Major Extinction Events

The earliest-known, well-documented catastrophic extinction occurred near the end of the Precambrian, approximately 670 million years ago. This event wiped out approximately 70% of Earth's species; stromatolites and acritarchs were especially hard-hit. This extinction likely produced the conditions needed for the Vendian fauna, a series of soft-bodied animals, to appear and evolve. In turn, the Vendian fauna were largely wiped out approximately 520 million years ago, and the Cambrian hard-shelled fauna appeared. Other events documented by major faunal turnovers include the end-Cambrian (488 mya), end-Ordovician (438 mya), late Devonian (360 mya), end-Permian (251 mya), end-Triassic (200 mya), end-Cretaceous (65 mya), and end-Pleistocene (the last 10,000 years).

Five of these extinction events have been recognized as the "Big 5": the late Ordovician event, when 84% of animal species went extinct; the late Devonian extinction, when 79% of existing species were lost; the end Permian extinction, when over 95% of all species died out; the late Triassic extinction, when 79% of species vanished (this actually turned out to be two closely timed but separate events; however, it is still considered one of the "Big 5"); and the Cretaceous Tertiary (K/T) extinction, which ended the reign of the dinosaurs and over 70% of animal species disappeared. It is likely that more taxa were lost from the Vendian and Cambrian extinctions than from some of the "Big 5" events, but the paucity of the fossil record prevents truly accurate determinations. Also, please note that the numbers of missing species supplied here are calculations and estimates from studies mostly concerned with hard-shelled invertebrates. Other organisms either preserve poorly (small vertebrates, soft-bodied invertebrates, unicellular and colonial organisms) or are primarily nonmarine (plants, higher vertebrates) and thus are preserved only under fortuitous circumstances. These factors severely limit the accuracy of the numbers listed above but should not significantly affect the relative severity comparisons.

The most severe extinction event was the Permo/Triassic (P/T) extinction. It is estimated that the Earth was virtually sterilized at that time, with over 99% of all life being wiped out. Because it takes only a small surviving population of any taxon to preserve that taxon, the extinction percentages are largest at the lowest taxonomic levels. For instance, over 99% of individuals were lost during the Permo/Triassic event, but only 95% of species, 70% of genera, and 50% of family-level taxa were lost. It should also be noted that such a massive disruption to global ecology is also seen in the rocks themselves. The Paleozoic rocks of the world are noted for their abundance of marine, coral reef structures, and even amateur geologists easily recognize the red sandstones of the early Triassic in outcrops around the world. Only one family of coral survived. There has not been one fossil reef structure found in rocks dating to the first 10 million years after the Permo/ Triassic extinction event, and it took 100 million years for corals to again create significant reefs worldwide.

Causes of Extinction

Causes of catastrophic extinction, except in the current instance, are speculative at best. One observation that has troubled researchers for a long while now is the periodicity of extinctions and how this periodicity may correlate with astronomical events. There seems to be statistically significant regularity in the timing of extinctions, and this observation has spawned several hypotheses concerning causes for increased large meteor, asteroid, or comet impacts during those periods. As of this time, there is no conclusive evidence of this being the case, but the hypothesis does coincide with the K/T extinction being caused by asteroid impact. Unfortunately, the cycle is 26 or 27 million years in duration, and most evidence of impacts vanishes in only a few thousand years due to erosion and redeposition. Most recently, this line of investigation has led to the suggestion of a hypothetical binary sun (Shiva or Nemesis) or 10th planet (Planet X) that has an orbit that passes through the Oort Cloud, disturbing orbits and sending an increased amount of comets and other objects hurtling toward the Earth. It is well documented that a magnetic anomaly affects Uranus, Neptune, and Pluto, and this is the primary evidence that some large celestial body exists in the distant reaches of our solar system. Without precise measurements of this object and its orbit (its very existence is conjectural at this point), its effect on other objects in our solar system is impossible to accurately predict.

There are, however, several well-documented causes of worldwide catastrophe that don't involve a hypothetical planetary body. Every major extinction event and most of the minor ones have been associated with one or more known climate-altering events. In fact, of the "Big 5," all but the late Ordovician

extinction are time equivalent, with massive extrusive volcanics and large meteor craters. Also, all of the "Big 5" are associated with large-scale glaciation except the K/T event. Trying to sort out the relative importance of these factors contributing to Earth's extinctions has been the focus of much research, speculation, argument, and frustration. It is likely that every major extinction event involved a variety of factors that combined to create inhospitable, often uninhabitable, environments over large portions of the Earth's surface.

It is now known that many of the recorded extinction events are correlated with changes in sea level. When glaciers cover significant portions of the Earth, virtually all continental shelf environments are brought to the surface, severely reducing the amount of available primary marine habitat. Likewise, when sea levels rise, major portions of the most habitable continental lowlands are inundated. This rise and fall of sea level is largely responsible for most documented extinctions, because the preserved sediments are primarily marine and show the loss of these types of life. Sessile organisms abound in continental shelf environments, but they are very susceptible to extinction through loss of habitat. It is possible that current research is skewed in overreporting (or underreporting) the seriousness of an event because most of the data gathered to date are from these marine environments.

The Current and Future Extinction

Compared with past extinction events, the current rate of species loss is very high. Should this rate continue for more than a few thousand years, the current event will easily rival the "Big 5" when it comes to number of species lost. However, it is beyond human experience to be able to recognize if this loss is comparable to other minor events or if it is truly a major catastrophe for life on Earth. The fossil and geologic records provide us with glimpses in time, but the records are of instants that are usually hundreds or thousands of years apart. If we were looking at the fossil record of this time from the vantage point of several million years in the future, we would not be able to separate those species lost during the last ice age from those lost last year.

The one comparison that can be made is how, in general terms, the current conditions on Earth match up with conditions during, or just prior to, any other extinction event. The Earth is recovering from an ice age, which matches the conditions found at the onset of at least four major extinctions. This is significant in that every documented ice age event is observed to coincide with an extinction event, and ours is no exception. When combined with a dramatic rise in temperature, as in a virtually instantaneous global-warming event, the matching situations found in the geologic record indicate a severe extinction. This, in fact, was the situation that was thought to have existed at the time of the P/T extinction event.

Unlike the P/T event, however, the Earth is not currently experiencing massive volcanic eruptions, nor is the Earth experiencing sizable asteroid impacts. Should both of these events happen, the Earth would undoubtedly see a repeat of the P/T extinction and most life would cease to exist. On the other hand, the P/T event was mitigated somewhat by the amount of carbon removed from the system through the reef-building processes of the Paleozoic. The Earth is currently experiencing a reintroduction of massive amounts of carbon previously removed from the system, and this is creating a carbon overload and atmospheric carbon dioxide spike.

On the whole, many scientists see many similarities between the Earth's final minutes before the P/T extinction and the present. The two questions, "Do we need to stop this pattern?" and "Can we stop this pattern?" are likely to plague scientists for the foreseeable future. Unfortunately, the answers to these questions may determine the cause and severity of the next extinction event on Earth.

— *David Trexler*

See also **Fossil Record**

Further Readings

Benton, M. J. (2003). *When life nearly died: The greatest mass extinction of all time.* New York: Thames & Hudson.

Cockell, C. (2003). *Impossible extinction: Natural catastrophes and the supremacy of the microbial world.* Cambridge: Cambridge University Press.

Hallam, T. (2004). *Catastrophes and lesser calamities: The causes of mass extinctions.* Oxford: Oxford University Press.

Leakey, R., & Lewin, R. (1995). *The sixth extinction: Patterns of life and the future of humankind.* New York: Anchor Books.

Macdougall, D. (2004). *Frozen earth: The once and future story of ice ages.* Berkeley: University of California Press.
McGhee, G. R. Jr. (1996). *The Late Devonian mass extinction: The Frasnian/Famennian crisis.* New York: Columbia University Press.

MASS EXTINCTIONS

The earth has an enormous biodiversity. However, many scientists, biologists, oceanographers, zoologists, and numerous others who work in scientific disciplines are very concerned that the earth may soon experience a catastrophic loss of a great number of species.

There are an estimated 2 million plants and animals known today. Some scientists estimate that as many as 50 times that number may exist. However, the danger is that a great number of species may disappear before they are even discovered.

There is geological evidence from fossils that during previous geological eras many species vanished within a short period of time. There may have been as many as five major extinctions that occurred during the earth's history. Fossil evidence strongly suggests that massive dying of species occurred during the Ordovician, Devonian, and Permian geological eras. The most obvious example is the disappearance of the dinosaurs. However, the concern today is that another "great dying" of species is being caused not by nature but rather by humans.

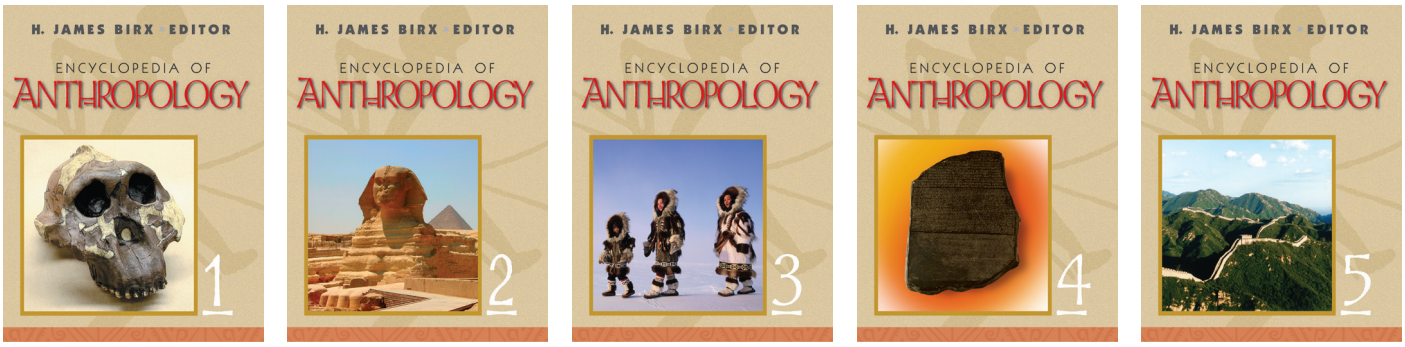
Polls taken of biologists, environmentalists, naturalists, and other scientists report concern not only that numerous species are now threatened with extinction but also that a massive extinction is under way. Some have estimated that 20% of all species could disappear by 2040. The estimate of extinction by some scientists is as high as 50,000 species each year.

The single major cause of massive species extinction is widely believed to be human activities. These activities include the thinning of the ozone layer, global warming, hunting, farming, mining, pollution from industry, deforestation and logging, the introduction of invasive species, habitat loss, and degradation. Evidence for species extinction that scientists offer includes the great declines in populations of plants, fish, and frogs as well as the decline in living corals in coral reefs.

The International Union for Conservation of Nature and Natural Resources is a global organization networking thousands of scientists. It has issued a "Red List" of species that are extinct, threatened, or endangered as well as those that are in satisfactory condition.

Critics charge that the claims of massive extinction are exaggerated and alarmist and that these overestimations are falsely derived from extrapolations based on the destruction of rain forests or other rich habitats. When asked in opinion polls, many laypeople do not believe that mass extinctions are likely to occur.

— Andrew J. Waskey



ENCYCLOPEDIA OF ANTHROPOLOGY

H. JAMES BIRX ▪ EDITOR
Canisius College, SUNY Geneseo

3

A SAGE Reference Publication

SAGE Publications
Thousand Oaks ▪ London ▪ New Delhi

Copyright © 2006 by Sage Publications, Inc.

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

For information:

Sage Publications, Inc.
2455 Teller Road
Thousand Oaks, California 91320
E-mail: order@sagepub.com

Sage Publications Ltd.
1 Oliver's Yard
55 City Road
London EC1Y 1SP
United Kingdom

Sage Publications India Pvt. Ltd.
B-42, Panchsheel Enclave
Post Box 4109
New Delhi 110 017 India

Printed in China.

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Encyclopedia of anthropology / H. James Birx, editor.
p. cm.
Includes bibliographical references and index.
ISBN 0-7619-3029-9 (cloth)
1. Anthropology—Encyclopedias. I. Birx, H. James.

GN11.E63 2005
301′.030—dc22
2005013953

05 06 07 08 09 10 9 8 7 6 5 4 3 2 1

Sage Reference:	Rolf Janke, Sara Tauber
Production:	Claudia A. Hoffman
Permissions and Image Research:	Karen Wiley
Typesetting:	C&M Digitals (P) Ltd.
Indexing:	Will Ragsdale
Cover Designers:	Ravi Balasuriya and Michelle Lee Kenny

CONTENTS

3

List of Entries
ix

Reader's Guide
xvii

Editorial Board
xxix

Entries F–K
941–1394

Index
I-1–I-96

F

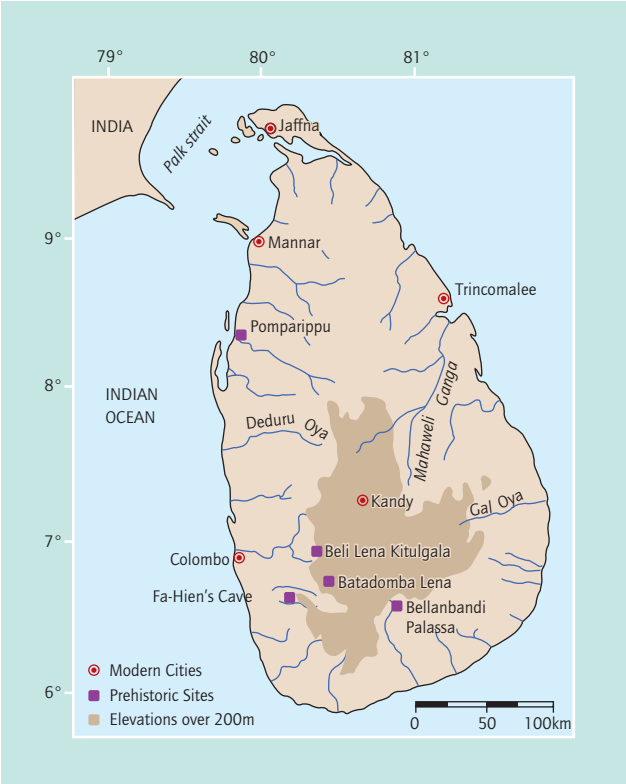
Fa Hien Cave

Human skeletal remains of Late Pleistocene antiquity were recovered from several caves and open-air sites in Sri Lanka during the last half of the 20th century. Fa Hien Cave is one of the largest on this island nation and is situated in the southwestern lowland wet zone of Katutara District, Sabaragamuva Province. In 1968, human burials were excavated by Dr. Siran U. Deraniyagala, of the government's archaeology department, and 20 years later, with his assistant, W. H. Wijepala. These archaeologists dug in two areas at the center and rear of the cave, which yielded at the lowest level above the bedrock numerous stone non-geometric microlithic tools, charcoal from ancient hearths, and faunal and human skeletal remains. Radiocarbon dates obtained from charcoal at this first level and at deposits above it indicate that Fa Hien Cave was occupied over a long period of time: from about 33,000 to 4,750 years ago. This time frame embraces the Late Pleistocene and Early to Middle Holocene epochs. The human bones from all levels were removed from their burial deposits and transported to the Human Biology Laboratory at Cornell University, Ithaca, New York, where they were examined by Dr. Kenneth A. R. Kennedy and a graduate student, Joanne L. Zahorsky.

The most ancient skeletal series consists of fragments from several individuals, including a child of 5.5 to 6.5 years of age, two infants, a juvenile, and two adults. Their bones are coated with red and yellow ochre. Cranial and postcranial bones indicate they are secondary burials; that is, following the death of these individuals, their survivors exposed their bodies to the elements. During postmortem decomposition, scavenging animals and climatic temperature changes reduced the bodies to bones. These were later collected and deposited in the graves from which the archaeologists exhumed them. Deposits nearer the present ground surface of the cave floor include skeletal remains of a child and a young adult female dated circa 6,850 and 5,400 years ago, respectively. These, too, are secondary burials, with the bones coated with red and yellow ochre.

Given the fragmentary condition of the cranial and postcranial bones from all of these human remains at Fa Hien Cave, laboratory examination focused upon the teeth, many of which are well preserved. Deciduous and permanent teeth were measured, and their mean crown diameters and robusticity values were compared with a large number of other prehistoric and modern human populations for which dental data have been published. Results of this study show that the dentition reveals relatively large molar tooth size for all specimens, the deciduous molars of infants and children being larger than deciduous molars of later prehistoric populations and modern humans. Since all of the teeth exhibited extreme wear on their occlusal surfaces, it appears that large tooth size was adapted to a coarse diet impregnated with grit and sand from grinding nuts, seeds, and grains in stone querns and other food preparation techniques. A trend toward tooth size reduction in hominids was a consequence of plant and animal domestication that began at the beginning of the Holocene epoch, but Sri Lankan populations continued a hunting-gathering socioeconomic lifeway until the beginning of its Historic period, around the 8th century BC.

Fa Hien Cave is important to archaeologists and human paleontologists because its earliest people were contemporaries with Cro-Magnon populations in Europe and other Late Pleistocene hominids of Europe, Africa, Asia, and Australia. But Fa Hien Cave is not the only prehistoric site on the island that has been excavated and yielded human skeletal remains.



Geometric microliths with human bones and teeth occur in the same southwestern sector of the island at the cave sites of Batadomba Lena (ca. 28,500 years ago) and Beli Lena Kitulgala (ca. 12,000 years ago), and at the open-air site of Bellanbandi Palassa (ca. 6,000 years ago). Sri Lanka has the earliest-dated microlithic stone tools in the prehistoric record, and on the adjacent Indian mainland, this technology does not appear in archaeological sites until the Early Holocene epoch. These stone tools are first present at about this same time in Europe, although geometric microliths have been recovered from Late Pleistocene sites in sub-Saharan Africa. Later cultural traditions of the Sri Lankan Iron Age flourished by the 7th century BC, with its hallmarks of iron weapons and implements, the construction of megalithic monuments, and unique ceramic vessels. It has been proposed that the aboriginal people of Sri Lanka, the Veddahs, show some cranial and postcranial anatomical similarities to the later microlithic-using inhabitants of the island.

— Kenneth A. R. Kennedy

See also **Prehistory**

Further Readings

Deraniyagala, S. U. (1992). *The prehistory of Sri Lanka: An ecological perspective* (2 vols.). Colombo, Sri Lanka: Department of the Archaeological Survey, Government of Sri Lanka.

Kennedy, K. A. R. (2000). *God-apes and fossil men: Paleoanthropology of South Asia.* Ann Arbor: University of Michigan Press.

Kennedy, K. A. R., & Deraniyagala, S. U. (1989). Fossil remains of 28,500 year-old hominids from Sri Lanka. *Current Anthropology, 30,* 394–399.

Kennedy, K. A. R., & Zahorsky, J. L. (1995). Trends in prehistoric technology and biological adaptations: New evidence from Pleistocene deposits at Fa Hien Cave, Sri Lanka. *South Asian Archaeology, 2,* 839–853.

Fagan, Brian M. (1936–)

Brian Fagan (b. 1936) is arguably one of the world's most influential archaeologists, in that he has reached thousands of archaeology students through his college-level archaeology textbooks and millions of nonarchaeologists through dozens of popular archaeology books and articles. The son of a publisher, Brian Murray Fagan was born in Birmingham, England. After 2 years in the Royal Navy (1954–1956), he was admitted to Pembroke College, Cambridge, where he studied Stone Age archaeology and earned a bachelor of arts with honors in 1959, a master of arts in 1962, and the PhD in 1963.

Fagan's professional career began in Africa as Keeper of Prehistory at Zambia's, then Rhodesia's, Livingstone Museum. While there, Fagan excavated the Acheulian components at Kalambo Falls and reorganized the museum's archaeological collections; the former was the basis of his 1963 PhD dissertation. Fagan held this position until 1965, when he left to become the director of the Bantu Studies Project for the British Institute in Eastern Africa. Shortly thereafter, after tiring of fieldwork, Fagan accepted a visiting scholar position at the University of Illinois in Urbana-Champaign. In his 2004 retrospective, he described his experience at the University of Illinois as "severe intellectual shock," as he came face-to-face with what would come to be known as the "New Archaeology" and with the realization that he had missed nearly a decade of archaeological

literature. The following year, Fagan joined the Department of Anthropology at the University of California in Santa Barbara, where he served in a variety of faculty and administrative roles. Fagan retired from the University of California in 2003 as professor emeritus, after 36 years of teaching, research, and service.

Although much of Fagan's early career was committed to research, mainly in Iron Age Africa, he is best known for his commitment to bring archaeology to the public through the publication of numerous books, magazine articles and columns, television and radio documentaries, and, recently, interactive multimedia formats. Fagan's interest in popular nonfiction was inspired by his archaeological research in Zambia, where he was writing history literally from the ground up, since no written history existed. Fagan also credits Sir Mortimer Wheeler, a renowned Old World archaeologist, for encouraging him to write for popular audiences. Fagan recalled Wheeler's advice in his 2004 retrospective: "Write about the past for the public. . . . We need a new voice who's worked outside Britain." Fagan's first textbook, *In the Beginning,* was published in 1972 and is still in press—in fact, it is now in its 11th edition. Since that time, he has edited the massive Oxford Companion to Archaeology and published over 30 books on topics including general world prehistory, the origins of modern humans, native North America, Mesoamerica, historical archeology, archaeological methods, history of archaeology, and paleoclimatology, not to mention sailing.

A biography of Fagan would be remiss to neglect to mention his love of sailing. He is an accomplished sailor who has charted courses in Europe, the Mediterranean, the Caribbean, and California. Like archaeology, his devotion to sailing is reflected in the publication of no less than eight books on the subject and an editorship at *Sailing* magazine.

Along with popular archaeology and sailing, Fagan is equally committed to undergraduate teaching, which he sees as the key to the long-term viability of the discipline in an archaeological world marked by academic overspecialization and cultural resource management. To this end, he has pioneered new and alternative methods to teaching large undergraduate archaeology courses. His work in this area culminated in the cocreation of a multimedia approach to teaching Anthropology 101 called "Anthropology 3," which has since become one of Apple Computer's demonstration projects.

Whether in research, teaching, or popular nonfiction, it is safe to say that the world of archaeology would not be the same without the prolific contributions of Brian Fagan.

— *Phillip R. Hodge*

See also **Archaeology**

Further Readings

Fagan, B. M. (2004). Retrospect (But certainly not a necrology!). *Antiquity, 78,* 173–183.

PalArch Foundation. (2005). *Brian Murray Fagan, curriculum vitae.* Rotterdam: Netherlands Scientific Journal. http://www.palarch.nl/CV/CV_Fagan.pdf

Family, Extended

Extended families, more so than nuclear families, are characterized by great variation in type and form. The term *extended family* is usually applied to family systems where the ideal is for multiple generations to live together, so that a man and his wife live with the families of their married sons (or daughters in a matrilocal society) and all other unmarried children. This may be accomplished by adding rooms or ells to houses or by clustering huts or tents into a compound or in close proximity. When the married sons stay with their parents, it is known as a *patrilocal* residence pattern and when married daughters remain and the sons move to their wives' families' home, that is referred to as *matrilocal* residence.

Sometimes included as a type of extended family are *stem families,* which require one family member, usually the oldest son, to inherit all the family property while remaining responsible for unmarried sisters and underage brothers, and *joint families,* where property is held in common by all direct male descendants, who jointly benefit from the family property.

While the extended-family form is the ideal in many societies, it is rarely fully expressed. Wealthier and higher-status families are more likely to be able to attain the ideal because of greater resources, especially larger land holdings, which can use the labor of the family members. Another factor influencing the prevalence of extended-family households is the mortality rate;

Source: www.downtheroad.org, The Ongoing Global Bicycle Adventure.

sons frequently want to break away from the family compound and start their own household upon the death of the father. Last, the life cycle of the family combined with the ideal of the extended family suggests that many individuals in a society probably spent at least a small portion of their lives in an extended family, but that at any one time most families were not extended.

A major difference between nuclear and extended-family households is in the strength and direction of the emotional bonds formed within the family. In extended families, the emotional bond between the child and parent remains strong, and the bond between spouses may be comparatively weak or characterized by jealousy of the mother-in-law by the daughter-in-law. Daughters-in-law may spend much of their time with their mothers-in-law, more time than they spend with their husbands. Marriages are more likely to be arranged, with bride and groom not knowing each other before the wedding.

Another feature of interpersonal relations in extended-family households has to do with decision making and the handling of conflict. Decisions about many aspects of the family and household are made by an older individual, the head of the extended family. Men who are the fathers of their own nuclear family within the extended family but are not the head themselves are unlikely to exercise much decision-making power, even in areas such as child rearing and the education of their own children. Members of extended families typically rely on cultural norms of behavior that allow them to avoid conflict, including an emphasis on the welfare of the group over the individual and techniques for neutralizing conflict in close quarters.

Extended families are more commonly found in medium-sized societies that are primarily agricultural. Extended-family households are able to marshal a large labor force to perform seasonal agricultural work, which makes them advantageous in agricultural societies. In large-scale societies with more social and spatial mobility, extended families can be a hindrance to mobility and they tend to decline in frequency in more complex societies.

— *Patricia B. Christian*

See also **Family, Forms of; Family, Nuclear; Matriarchy; Patriarchy**

Further Readings

Goode, W. J. (1963). *World revolution and family patterns.* New York: Free Press of Glencoe.

Goode, W. J. (1964). *The family.* Englewood Cliffs, NJ: Prentice Hall, Inc.

Laslett, P. (Ed.). (1972). *Household and family in past time.* New York: Cambridge University Press.

Netting, R. McC., Wilk, R. R., & Arnould, E. J. (Eds.). (1984). *Households: Comparative and historical studies of the domestic group.* Berkeley: University of California Press.

Family, Forms of

Although efforts toward a cross-cultural definition of family are beset by difficulty and disagreement, in anthropological writings, different congregations of kin and affines (i.e., people related through marriage) have been labeled as specific forms of family, changing as new theories of kinship, marriage, or gender

have been developed. It has been shown that great social and cultural diversity and social change in family composition and structure can be found; much social and cultural anthropological research is dedicated to understanding this variation and changes over time. Multiple forms of family are, above all, differentiated regarding characteristics of family structure, composition, and residence pattern.

Forms Regarding Structure and Composition

In his influential work *Social Structure* (1949), George Peter Murdock defined the family as "a social group characterized by common residence, economic cooperation, and reproduction. It includes adults of both sexes, at least two of whom maintain a socially approved sexual relationship, and one or more children, own or adopted, of the sexually cohabiting adults." The two-generation family composed of mother, mother's husband, and their offspring was defined by Murdock as the *nuclear family.* This form is mostly found in hunting-and-gathering and industrial societies. On one hand, in times of hardship and catastrophes, little help is shown from outside, which means that in the case of the mother's or the father's death, the children's lives become insecure. On the other hand, this form of family is well-adapted to a high-mobility life, be it the society of the Inuits or contemporary industrialized societies. This form of family is also common where there is a sexual division of labor. Murdock took this form of family as a universal human social grouping, but he also recognized that among the majority of world's societies, "nuclear families are combined, like atoms in a molecule, into larger aggregates." This composite family form is called the *extended family.*

The extended family, in the broad sense of the term, is a family, usually coresiding, consisting of more members than children and parents. An extended family may include grandparents, brothers, sisters, aunts, uncles, and so on. One important form of an extended family consists of two or more nuclear families affiliated through an extension of parent-child relationships, the nuclear family of a married adult joined to that of his and/or her parents (an extended family in the narrow sense of the term). An extended family need not to live in the same household. Kin provides the core relationship here. In times of crisis or hardship, families pooled resources among households, and kin moved between households, extending the nuclear family to more complex forms. This is not restricted to non-Euro-American cultures or to the past. Research in Scotland and northern England in the 1980s, for example, suggested that the extended family was as important as the nuclear family in patterns of residence, household composition, and access to resources during periods of unemployment. Some researchers use the term *joint family* to refer to an extended family composed of nuclear families linked together by sibling ties. Much debate, moreover, has centered on the supposed breakdown of extended families with industrialization. But much of this debate rests on an oversimplified dichotomization of nuclear and extended forms of the family without defining what is meant by "extended-family ties" and which kinds of extended families are talked about. Murdock based his typology of extended families on the prevailing rule of residence. He distinguished the *patrilocal,* the *matrilocal,* the *bilocal,* and the *avunculocal extended family* (see the following variations in residence pattern). Extended families are often transitory and dissolving at the death of the parents, when inheritance makes it possible to divide family property.

Further forms of family regarding structural characteristics are found in cultures with multiple marriage partners, resulting in *polygamous families. Polyandrous families,* as one form of the polygamous family, consist of one wife/mother, her children, and two or more husbands/fathers. The polyandrous family is a one-woman/several-men family. The family generally starts with a monogamous mating pair. Later, a second adult male may join the family and assist in child rearing, although the men sometimes live in a separate house. The polyandrous family is found, for example, with ethnic Tibetans of Humla District in Tibet and in Nepal and with the Toda in India. The connections between polyandry and reproduction have long interested anthropologists, who have puzzled over the conditions in which a system of men sharing their wives with other men (thus sacrificing some of their own reproductive potential) might have developed. *Polygynous families,* the second form of the polygamous family, consist of a husband/father, two or more co-wives/mothers, and their children. The polygynous family is a one-man/several-women family. This form of family has puzzled male anthropologists to a lesser extent. Two thirds of the 849 societies examined by Murdock practiced polygyny. Today, polygyny and polygynous families are concentrated in Africa, the Middle East, India, Thailand, and Indonesia.

Source: Photodisc.

As traditionally defined, the nuclear family is based on the conjugal bond (i.e., the husband/wife bond), although some anthropologists distinguish between the nuclear and the *conjugal family.* But many societies place the primary emphasis on consanguine (blood) ties in structuring the family unit. A *consanguine family* consists of a mother and her children and her blood relatives (mothers, aunts, sisters, brothers). The central unit is not the conjugal bond, but blood. This kind of family is common where mothers do not have the resources to rear their children on their own and is found, for example, with the Nayars in South India. In this culture, the mother-children unit has no significant bonds to the father or mother's husband. This form of family is also called *matrifocal,* or mother-centered. The mother-centered family form is usually defined by the absence or relatively limited role of the father. Other frequently cited examples of matrifocal families are Black Caribbean families or families in Guyana.

For those stressing blood ties, the minimal definition of family is already satisfied by the mother-children unit. And some define the universal nuclear family group as that composed of a woman and her dependent children. In Euro-American society, the nuclear family (in the traditional sense) has been seen as the ideal. With this ideal in mind, for anthropologist Bronislaw Malinowski, a group consisting of a woman and her offspring was sociologically incomplete and illegitimate. And as mentioned above, Murdock also took it as a defining feature of a family that adults of both sexes are included. But this defining feature was not only challenged by single-parent families but by same-sex-parent families as well. Even some quite early ethnographic accounts attested to the fact that the nuclear family in the sense of the heterosexual conjugal family was not as ubiquitous as the dominant theories maintained. There are situations in some societies (the West African Nuer and native North American among them) where women may take wives ("woman-to-woman" marriage), or men husbands. What is interesting in these situations is that the people who are allowed to do this are often special, privileged members of society, such as female chieftains or businesswomen in West Africa, and shamans and priests in North America. Nevertheless, *same-sex conjugal* families, either gay or lesbian coparenting, are still regarded by most members of Western societies as "alternative" or "deviant" family forms. As far as lesbian coparenting families are concerned, new possibilities emerge. Until recently, only one of the women could be the biological mother. But reproductive technologies made it possible to think of biological motherhood in a dual way: The genetic mother and the birth mother could be different. One woman could contribute the genetic material, and her partner could become the gestational/birth mother. Advocates of the "traditional" heterosexual conjugal family fear the breakdown of the family due to these new possibilities, contemporary Western lifestyle, and women's increasing social autonomy in Euro-American societies.

Forms Regarding Residence Patterns

The issue of residence pattern is one of the most basic questions in ethnography. Because the location of the family unit has important logistical consequences, residence patterns have a long history of study. Traditionally, anthropologists have analyzed residence in relation to marriage. A *virilocal* (Latin, *vir*: man, husband) or *patrilocal* (Latin, *pater:* father) family is a family whose residence upon marriage is in the locality associated with the male partner's relatives or,

more specifically, with the male partner's father. For example, in the society of the Maya of Guatemala, a newly married woman goes to live with her husband in the household in which he grew up. An *uxorilocal* (Latin, *uxor:* wife) or *matrilocal* (Latin, *mater:* mother) family is a family whose residence upon marriage is the locality associated with the female partner's relatives or, more specifically, with the female partner's mother. This form is found mostly in horticultural societies and has been linked to the solidarity of the female working group. The Iroquois are an example, as women farm and own the harvest. In *ambilocal* or *bilocal* families, the family may choose either matrilocal/uxorilocal or patrilocal/virilocal residence. The family could live where the resources are best or where the labor is most needed. In *avunculocal* families, the family lives with the husband's mother's brother. This form of family is found only in societies where descent through women is deemed crucial for the transmission of important rights and property, as it is for the Trobriand Islanders, for example. A *neolocal* residence pattern means that a family establishes a new household in a location apart from either the husband's or the wife's relatives. This is the prevailing residence pattern of families in Euro-American societies.

Although these differentiations are very common, several alternative approaches to the analysis of family and residence have been proposed.

Additional forms of family are the *family of procreation*, also called the *family of marriage* and the *family of orientation:* the nuclear family a person establishes, consisting of his or her partner, sons, and daughters. Someone's family of orientation is the nuclear family into which that person was born and raised, consisting of his or her father, mother, brothers, and sisters.

In Euro-American societies, established ideas about the "natural" family in the public eye are being challenged because of the increasing number of single-parent families, same-sex unions, households based on friendship, and cross-cultural data, which stress different types of family and household structure. Anthropological research has shown the complexity of the family viewed in comparative perspective. The family will continue to be a major focus of anthropological research, although the understanding of family and forms of the family are currently being redefined.

— *Anne Siegetsleitner*

See also **Family, Extended; Family, Nuclear; Matriarchy; Patriarchy; Polyandry; Polygamy; Polygyny**

Further Readings

Gittins, D. (1993). *The family in question. Changing households and familiar ideologies* (2nd ed.). London: Macmillan.

Parkin, R., & Stone, L. (Ed.). (2003). *Kinship and family: An anthropological reader.* Oxford: Blackwell.

Winthrop, R. H. (1991). *Dictionary of concepts in cultural anthropology.* New York/Westport/London: Greenwood Press.

Family, Nuclear

The nuclear family is one type of conjugal, or marriage-based, family, consisting of a husband, wife, and their children who reside together. Characteristics of the nuclear family that set it apart from some other family types is that it contains only two generations and that it contains a married couple. A single-parent family is considered a nonconjugal family.

In large-scale, Western, industrial societies, nuclear and single-parent families are the predominant type of family form, but in other, smaller-scale, less Westernized cultures, the nuclear family may be relatively rare and unimportant, or even nonexistent. In larger-scale societies, individuals can function more independently of their families, and the functions that larger, extended families used to supply to their members have been increasingly taken over by other social institutions, such as schools, churches, hospitals, police, and paid leisure and entertainment industries.

Some historians and demographers have suggested that the rise of the nuclear family in northwest Europe, traced back to 1300 in some regions, developed in response to a unique set of ecological conditions, laying the foundations for industrialization hundreds of years before the first factories were built. Northwestern European families followed a neolocal residence pattern, whereby a couple did not marry until they were able to establish their own household.

In general, nuclear families are characterized by normatively stronger marital bonds between husbands and wives than are expected in extended-family or other societies. Societies where nuclear

Source: Ministry of Foreign Affairs–Photographic Service.

families are common are more likely to allow young people to select their own spouse, with less involvement on the part of their parents. Relations with in-laws are likewise attenuated, although kin-based work groups and socializing may still be extensive. Divorce is also more likely to be tolerated, with one spouse perhaps simply putting the other spouse's belongings outside their home to indicate the end of the marriage.

Nuclear families are less likely to be found in agricultural societies where most families work the land cooperatively. A nuclear-family structure facilitates mobility, whether it is migratory labor or movement to urban areas or across borders. The smallest societies, hunter-gatherers, are frequently organized into small groups of nuclear families who work cooperatively and are characterized by significant gender egalitarianism. Members of society are "produced" by families by the process of providing food, shelter, clothing, health care, and emotional intimacy. Individuals are also provided with social status through membership in their families of origin, although in societies with many nuclear families, social mobility is typically possible, which allows individuals to have more of an influence over their own social class.

Nuclear families share with all families the function of producing new adult members of society through conception, birth, nurturing, and socialization. Families regulate the sexual activities of their members, allowing regular sexual relations between spouses and prohibiting sexual relations among all other members. When children in nuclear families reach adulthood, their legal responsibilities to their families of origin and their parents' obligations to them are generally reduced, replaced with voluntary companionship. This creates the possibility of extreme isolation for nuclear families, which have fewer resources for child care, elder care, and assistance throughout the life course.

— *Patricia B. Christian*

See also **Family, Extended; Family, Forms of; Matriarchy; Patriarchy**

Further Readings

Goode, W. J. (1963). *World revolution and family patterns.* New York: Free Press of Glencoe.

Goode, W. J. (1964). *The family.* Englewood Cliffs, NJ: Prentice Hall.

Laslett, P. (Ed.). (1972). *Household and family in past time.* New York: Cambridge University Press.

Shorter, E. (1975). *The making of the modern family.* New York: Basic Books.

Farber, Marvin (1901–1980)

The scholarly writings of 20th-century American philosopher Marvin Farber owed a great deal to the field of anthropology and the theory of evolution in both their scientific and conceptual ramifications. For him, humankind is a recent and fragile species on

planet Earth. From the cosmic perspective, he argued that our species has no meaning or purpose other than those value judgments that human beings themselves make in order to adapt, survive, and thrive in a material universe that is, for him, totally indifferent to the ephemeral existence of our zoological group.

Having been influenced by the thought of Ludwig Feuerbach, Karl Marx, and Ernst Haeckel, Farber's ideas are a contribution to philosophical anthropology. Thus, despite his early interest in phenomenology, Farber came to see it only as a method that had to be used within the perspective of a naturalist framework free from all dualistic, idealistic, and spiritualistic suppositions.

Farber was very aware of the predictive, explanatory, and exploratory powers of the theory of evolution. For him, humankind as societies of knowers and doers is a product of both organic history and sociocultural development. He held that all religious beliefs are grounded in those psychological wants, needs, and desires of our very vulnerable species. Furthermore, all human values must recognize the advances in the special sciences, the need for rigorous reflection, and a naturalist framework that embraces both a cosmic perspective and the implications of the empirical theory of organic evolution.

While stressing those perennial themes of inquiry in the history of serious thought, Farber spoke of the philosophical quest and saw as one of its major functions the critical evaluation and holistic synthesis of the natural and social sciences within a plurality of logical, cooperative, and complementary methodological procedures. He especially respected anthropology as an academic discipline, acknowledging that its facts, concepts, and approach are indispensable for any sound and valid view of humankind within nature.

There is a qualified optimism in his healthy-minded interpretation of the tenuous place of human existence within this material universe. Farber stressed that the natural world is independent of and prior to the human knower and the knower's sociocultural environment. Consequently, for Farber, the process of reflective thought occupies only an infinitesimal part of this dynamic cosmos, and it occurs only when there are sentient beings in action.

As an evolutionist, Farber warned about illicit transference: the unwarranted extension and application of an explanatory principle valid in a particular field of inquiry to other areas of investigation or realms of reality to which it cannot validly be transferred and used. A glaring example of this fallacy would be the overextension of the descriptive mechanism of the *survival of the fittest* from biology to sociology, with devastating ethical results. For Farber, it must be remembered that in human inquiry each field of science has its own peculiar problems, research methods, explanatory mechanisms, and open-ended interpretations.

There is always a need to clarify the place of our own species within this material universe and to assess the status of mental activity in the context of organic history and sociocultural development. Farber followed the advancements in the special sciences and acknowledged that the ongoing findings in comparative primate behavior studies offer a striking confirmation of the scientific theory of organic evolution. For this naturalist and humanist as philosophical anthropologist, the goal of scientific philosophy is to increase human freedom, happiness, and longevity.

— *H. James Birx*

See also **Feuerbach, Ludwig; Haeckel, Ernst; Marx, Karl; Spencer, Herbert**

Further Readings

Farber, M. (1967). *Phenomenology and existence: Toward a philosophy within nature.* New York: Harper Torchbooks.

Farber, M. (1968). *Basic issues of philosophy: Experience, reality, and human values.* New York: Harper Torchbooks.

Farber, M. (1968). *Naturalism and subjectivism.* Albany: State University of New York Press.

Mathur, D. C. (1971). *Naturalistic philosophies of experience: Studies in James, Dewey and Farber against the background of Husserl's phenomenology.* St. Louis: Warren H. Green.

Fayoum Culture

The Fayoum is a region located 60 km southwest of Cairo and contains archaeological remains from the past 12,000 years. Its most prominent feature is the Birket el-Qarun (Lake Moeris), the only freshwater lake in Egypt, covering an area of 215 km, whose

numerous crocodiles during Pharaonic times gave rise to the local crocodile cults for the crocodile god Sobek. The fortunes of the Fayoum settlements have always been closely linked with the lake water levels. Archaeological remains are focused on three primary periods of time: the Epipaleolithic and Neolithic time periods and the Greco-Roman period.

A number of archaeologists have worked in the Fayoum. Initially identified by the Napoleonic survey in the early 1800s, work was subsequently carried out by B. P. Grenfel, B. G. Hogarth, and A. S. Hunt in the late 1800s to locate papyri. G. Caton-Thompson identified the Fayoum "A" and "B" cultures in the 1920s, while F. Wendforf and his team explored the early occupants of the Fayoum and their connections to the Nile Valley in the 1980s and 1990s.

Early Periods of Occupation

Located in a large depression filled through glacial processes, the Fayoum was originally fed by a branch of the Nile, thus linking its rise and fall to the annual inundation levels. The earliest remains from occupations of the Fayoum date to 10,000 BC. Early inhabitants of the Fayoum (ca. 6500–5500 BC) combined fishing, hunting, and foraging, all made possible by the swamps and forests supported by the lake. This formed the basis for the Quarunian industry, known for flakes, blades, fishing, and large-mammal hunting, including gazelles, hartebeest, fish, and hippos. Grain grinding was practiced but not an integral part of the local diet. Nile fish caught in receding floodwaters facilitated fishing during the late spring each year.

Around 5500 BC, the people of the Fayoum were either replaced, displaced, or converted to the Neolithic culture, when they started farming wheat, grains, and barley, as well as domesticating sheep and cattle. The earliest evidence for an agricultural economy in Egypt can be found at the site of Mirimde Bene Salame, with cereals likely introduced to Egypt from southwest Asia, as well as domesticated sheep, goats, and some species of cattle.

Other possible origins include the northeast Jordan valley or Sudan or Saharan cultures such as those found in Bir Kiseiba or Nabta Playa. Even though the Fayoum people are culturally related to the Bir Kiseiba and Nabta people, resources locally available allowed them to hunt, fish, and gather for a much longer people of time. Numerous hearths (ca. 5500–4500 BC) appeared along the lake edges, yet excavations have not uncovered permanent occupations, due to potential seasonal inhabitation in reed huts.

The Fayoum B and Fayoum A cultures occurred during this time, also known as the "Fayoum Neolithic" (ca. 5200–4000 BC). Numerous grain silos were observed at Kom K, with Kom W as the largest settlement from this period. Material culture observed includes pottery and concave-base arrowheads. Around 4000 BC, the Fayoum became a marginal area, due to human dependence on resources affected by seasonal changes in lakeshore levels. The Nile Valley became more reliable, with increased land to farm, and sites located along the Nile becoming trade and exchange routes.

Pharaonic Occupation

During Pharaonic times, Lake Moeris was known as *she-resy* and *mer-wer*, the southern lake and great lake, respectively. There is limited occupation in the Fayoum during the pre-Dynastic period (ca. 3700–3000 BC), with an intrusion of the Gerzean culture at the pre-Dynastic cemetery of Gerza and pottery similar to the pre-Dynastic settlement at Ma'adi. In the Old Kingdom, there is evidence for an Old Kingdom dolerite quarry road at Umm es-Sawan. The Middle Kingdom saw agricultural improvements in the area, with a major land reclamation project around 1970 BC. Temples appear at Medinet el-Fayoum and Kimim Fares as well as limited lakeshore settlements. The region became a resort area for the elite of Egypt in the New Kingdom, with colossi of Amenhotep III found at the site of Biahima. The lake levels are reflected in the times of high and low settlements: The lake levels are high in the Epipaleolithic, Neolithic, Middle Kingdom, and late New Kingdom, but are low in the Old Kingdom. There is an increase in settlements starting from the Late period, with Ptolemaic irrigation channels observed by Caton-Thompson in her work.

Greco-Roman Occupation

During the Greco-Roman era, hundreds of sites could be found in the Fayoum. These are known from both texts and archaeological remains. Most towns were founded during the reign of Ptolemy II, in a major land reclamation project surrounding the

Birket el-Qurun (Lake Moeris). Retired Roman military men and their families were settled in the Fayoum, which increased during the 1st and 2nd centuries AD. Many cults existed that were dedicated to the local crocodile god, with numerous temples. Most sites were abandoned by the 4th century AD, with some lasting through to the 7th century. Large sites founded by Ptolemy II include Dimai, or Soknopaiou Nesos (Island of Soknopaiou), along the northern edge of the Fayoum, with a temple complex, public buildings, houses, and four occupation layers, and Kom Darb Gerza (Philadelphia), along the eastern edge of the Fayoum, some 24 hectares in size. It existed as a major travel route between the Nile and Fayoum and a major administrative center. The most well-preserved town in the Fayoum is Kom Aushim (Karanis), located in the northeast, with many thousands of buildings found and inhabited to the 6th and 7th centuries AD. The Fayoum is most well-known for its Roman period mummy portraits (noted for their lifelike resemblances of the deceased), most recovered from the necropolis near present-day Rubayyat, north of the Hawara pyramid.

Current research being carried out by W. Wendrich and her international team of specialists in the Fayoum will help to answer questions surrounding human interactions with the environment and the location of new sites. The Fayoum has only grown more fragile with increasing urban development and, with numerous archaeological sites at risk, needs this work before the sites are lost forever.

— *Sarah Parcak*

See also **Agriculture, Origins of; Egypt, Ancient**

Further Readings

Bernard P., Hunt, A. S., & Hogarth, D. G. (1900). *Fayûm towns and their papyri.* London: Egypt Exploration Fund.

Caton-Thompson, G. (1934). *The desert Fayum* (2 vols.). London: Grenfell.

Krzyzaniak, L., & Kobusiewicz, M. (Eds.). (1989). *Late prehistory of the Nile Basin and the Sahara.* Poznan, Poland: Poznan Archaeological Museum.

Wendorf, F., & Schild, R. (1976). *The prehistory of the Nile Valley.* New York: Academic Press.

Feasts and Festivals

In the beginning of "the people," the commensality and feasting had birthed a social mechanism, a central theme in our evolving society. Within cultures, the hearth symbolizes "welcome." A feast is a celebration with foods, perhaps served only for the occasion, in unique and sacred containers. There may be gift giving either with or without a contractual obligation. Anthropomorphic, carved figures may be displayed either within the feasting area or outside, to welcome the guests. Name giving has been an important part of feasts by some cultures, like the tribes on the northwestern coast of the United States, carrying on the potlatch tradition.

Makah red cedar carving by Youngdoctor, circa 1890s, containing original polychrome pigments. This type of carving would be displayed during a feasting occasion.

Source: Photography courtesy of Flury & Company, www.fluryco.com.

Left to right: Back row—wooden Tlingit spoon with inlaid with abalone; wooden Pacific Eskimo spoon. Front row—wooden Tlingit spoon; small dark spoon of a northwest origin; Tlingit horn spoon.

Source: Photograph courtesy of Flury & Company, www.fluryco.com.

Tlingit dancer Tootsie-a-'Kea-Tiny Barril performing an "entrance dance" at Tom Dalton's 2005 Tlingit Potlatch, Tulalip, Washington.

Source: Photograph by Pamela Rae Huteson.

As feasts evolved, rituals became attached, which signified the type of feast being held. Soon, these feasts became more complex, expanding into festivals involving specific etiquette, which molded community behavior. Feasts and festivals proliferated and assimilated cultures by blending rituals, as occurred with the early Christian and Roman observances, such as the creation of Christmas from the solstice celebrations. Could our very political system stem from the act of feasts and festivals? This is the question Michael Dietler and Brian Hayden pose in their analysis *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power* (2001). How was surplus food used to start creating feasts and thus preserve the etiquette revolving around the display of finely crafted property appropriate to ensure survival of these mores?

What new feasts and festivals will be created in the future? As modern indigenous peoples are rediscovering their ancient pasts, will there once again be a revival of ancient rituals, perhaps returning to a moral universe, where Raven rules within his potlatch?

Feasts can be put into three categories:

- *Long-Term-Goal Feast:* There is a definite plan in this type of feast, such as to solidify alliances, to bring about peace, to settle disputes, or to raise the status of a chief's child.
- *Symbolic Feast:* There may be underlying goals in this feast, such as occur at a funeral feast to demonstrate future leadership. These feasts are usually sacred in character, such as memorial or marriage feasts, the first harvest, honoring the ancestors, births, adoptions, and rites of passage.

Tlingit Orator Chief Roy Williams III speaking before the first of three totems to be raised in Klawock 2003.

Source: Photograph by Pamela Rae Huteson.

- *Immediate-Goal Feast:* This is more of an impromptu feast and may not have any ritual foods connected with it. This may be a crisis or work feast, or perhaps when a judgment needs to be made or during the planning of potlatch.

Evolution of Feasting

Feasts are speculated to have originated prior to Paleolithic man. Hunting-and-gathering tribes were usually nomadic in nature and would call a feast with the advent of any sudden abundance of food. A case in point is the system of distribution among the Inupiat and Nootka Peoples. When a whale is taken, after a feast is held, the entire clan receives shares. The Inupiat call this the *nalukataq,* and in ancient times, this would last nearly a week and would signify the cessation of whaling. Nomadic peoples lacked the ability to store surplus food required for a large feast; consequently, these may have been started by semino-madic, transegalitarian tribes.

Gender reinforcement is visible in ancient feasts, as most often the females prepared and served the feasts, although historically, handicapped males would also take part in what was thought to be "women's work." The males did the hunting and developed their prowess and status as a result of their success and leadership positions. Some tribes observed a strict etiquette regarding certain foods; for example, the Koyukon distinguished between feasting on black and brown bear meat. The first feast was held by the hunters within the forest, to honor the bear's spirit. The "best parts" of the meat were saved for the potlatch, and then cooked only by men. Adults have encouraged children to partake in feasting rituals in the past as Franz Boas (1858–1942), discovered among the Kwakiutl.

Various Rituals Observed

Beginning rituals would involve thanking the animal or Creator for bringing food to the clan. While doing

Brown Bear totem raising at Klawock Totem Park, 2003. Master Carver John Rowen in the center wearing a white shirt.

Source: Photograph by Pamela Rae Huteson.

his study on Huna seagull egg gathering in 2003, Eugene S. Hunn was told to "have respect for everything" concerning the ritual of food gathering. Fasting may be observed in the beginning phases of a religious purification feast. A sacramental communal feast may be a totem feast, where the clan joins in eating the totem object (salmon or bear, for example) as the totem's "power" is consumed, renewing the person's individual connection with that power. Rituals have taken the form of dancing and singing, such as the Feast of the Dead, witnessed by Ernest Hawkes, in 1914, where the "Feast Giver" honored a departed loved one by dancing and wearing the clothes representing the gender of the departed relative.

Traditional oratory was important to the Tlingit People, as is set forth in the oral tradition recorded among the Tlingit by Nora and Richard Dauenhauer, in their traditional research entitled *Haa Tuwunáagu Yis: for Healing our Spirit* (1990). Because there was no written record, public speeches were given to reaffirm the owner's rights to inherited privileges and property. The Bella Coola, as other Northwest cultures, have utilized this time to bring honor to their given traditional family names and also to bestow revered names upon their children and those they adopt. Attendees witnessing these privileges are paid rich and elaborate gifts to remember the name, meaning, and history. Smoking has been part of some feasting rituals, as was observed by the Tlingits; they put tobacco in the fire while respectfully uttering the names of the deceased being honored, before smoking their native tobacco in their world-renowned and elaborately carved pipes.

Status reserved seating was observed in nonegalitarian societies, as was the displaying of valuables. The northwestern coast Natives observed a ritual of honoring the fish by returning the bones of the first catch to the water, to ensure future fish runs. With the Koyukon, honoring ceremonial animals took the form of a ritual, to return the bones of water creatures to the water and bones of land creatures to the land. These rituals were based on the belief; it was the choice of the

animals, fish, and fowl as to whether they wanted to be human food, depending on how they were honored.

There may be specialized structures built or made for feasting, such as the Inuit circular-stone seating arrangements, which stand out in their Arctic homeland and served not only as an area for feasts, but also for courts of judgments, as photographed by Norman Hallendy in 2000. In a dramatic ritual among the Inupiat at the Bering Strait, ceremonial items may be destroyed at the end of the festival, and at this time, masks may be thrown into the sacrificial flames. The Tlingits, Haidas, and Kwakiutl have been known to burn canoes, throw copper shields in the water (also known as "drowning the copper"), kill slaves, and tear blankets during their feasts.

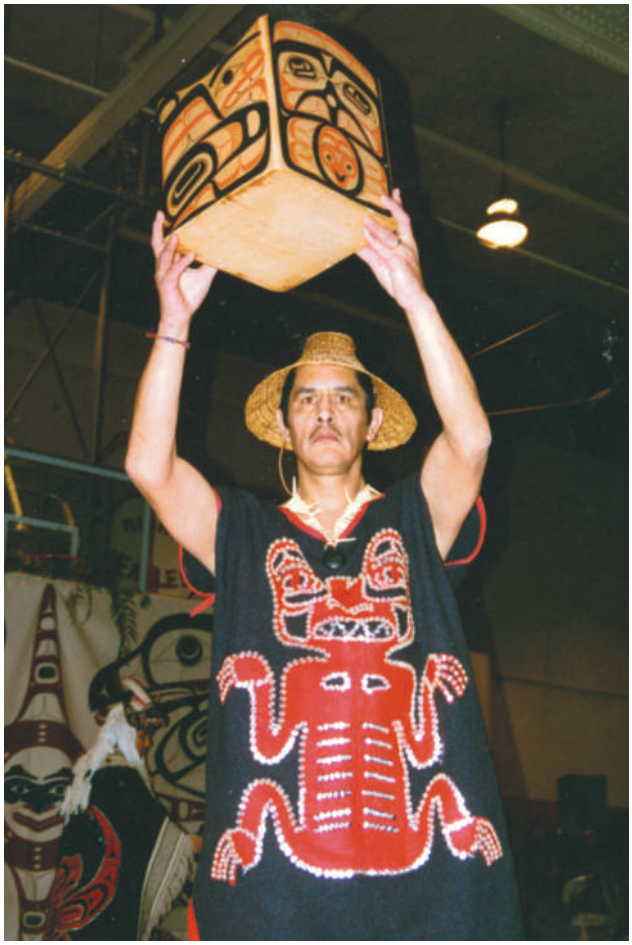
Festivals

As rituals and customs evolved within feasts, festivals began to emerge. A festival usually accommodated more than one feast that observed set rituals. Alliances were often required from all of the kinsmen to prepare for a festival, with the lower caste doing most of the production and food gathering, including the exploitation of slaves. Seminomadic tribes or bands started developing festivals, such as the Inupiat with their "traditional trading fair," held in the summer, where bands of Inupiat gathered to trade, visit, and feast.

The host, in observing said rituals (e.g., to honor the ancestors), may also serve to benefit that person or clan by raising their status to ensure a greater return, as in a competitive potlatch or the Inupiat's "Great Feast of the Dead." It would take years for both parties to gather wealth for distributing the gifts, at which the receivers assumed a contractual obligation to give as many, if not more, gifts in return at their feasting occasion. When the potlatch was banned in Canada in 1885, many hosts who gave away much wealth (e.g., rifles, pool tables, sewing machines, and so on) were never repaid, thus experiencing a great loss; but since the host takes on the "superior" status in outdoing his peers if he is not repaid, then at least that status remains.

Continuing Traditions

The act of feasting and of festivals is a long-standing tradition with humankind. The development of these occasions has brought about elaborate religious ceremonies, which are serious and formalized, as well as numerous light-hearted functions encompassing agricultural or seasonal events, to name a few. As researchers and students alike reevaluate the feasts and festivals within cultures and how they have had an importance on the bonds created within the people of the study, this may bring a new depth in understanding ancient peoples. Modern cultures may continue to create new reasons for feasts and festivals, as well as resurrect and evolve ancient ones, as the northwestern indigenous First People continue to do with the potlatch.



Haida Carver Sáádúúts: Robert Peele, showing of a gift received at a potlatch, in a traditional manner.

Source: Photograph by Pamela Rae Huteson.

Bon Appetit!
The Feast is here to stay.

— *Pamela Rae Huteson*

See also **Agricultural Revolution; Aleuts; Athabascan; Totemism**

Further Readings

Dietler, M., & Hayden, B. (Ed.). (2001). *Feasts: Archaeological and ethnographic perspectives on food, politics, and power.* Washington, DC: Smithsonian Institution Press.

Emmons, G. T. (1991). *The Tlingit Indians* (Edited with additions by F. de Laguna and a biography by J. Low). Seattle: University of Washington Press.

Huteson, P. R. (2002). *Legends in wood, stories of the totems.* Tigard, OR: Greatland Classic Sales.

Jonaitis, A. (1991). *Chiefly feasts: The enduring Kwakiutl potlatch.* Seattle: University of Washington Press.

Roche, J., & McHutchison, M. (Ed.). (1998). *First fish first people: Salmon tales of the North Pacific Rim.* Seattle: University of Washington Press.

Feminism

Feminism has been defined as a belief that women have been treated unfairly in society and that the situation should be rectified. This definition encompasses the two major aspects of feminism: It is a body of social theory that seeks to explain the universality of women's subordinate status, and it is a social movement acting in the interests of women through political action and other attempts to improve the lot of women. Feminism has profoundly affected virtually all academic disciplines as they have had to respond to criticism of their theoretical paradigms that ignored the effects of gender. Feminist thought has affected the humanities, the natural sciences, and the social sciences. In addition, feminism has affected all societal institutions, including the economy, the family, education, religion, and politics. It would be fair to say that feminism and the women's movement have altered the landscape of American life as deeply as any paradigm shift of the 20th century.

History

Feminism traces its roots to the Enlightenment, when thinkers such as Lady Mary Wortley Montagu and the Marquis de Condorcet championed women's education. Mary Wollstonecraft's *A Vindication of the Rights of Women,* published in 1792, may be the earliest feminist writing of the modern age.

The first wave of feminism and the women's movement began in the early 19th century among abolitionists, especially women abolitionists, who began to draw comparisons between the oppression of the slaves and the position of women in society; neither could own property in their own name, vote, sit on a jury, or testify in a court of law. In 1848 the first women's rights convention was held at Seneca Falls, New York, organized by Elizabeth Cady Stanton and Lucretia Mott. The suffrage movement won victory finally with the passage of the 19th Amendment, which in 1920 granted women the right to vote. After this achievement, the first wave of feminist activism died down for about 50 years, as many women and men assumed that with the vote, equality was assured.

The second wave of the feminist movement had its first stirrings during World War II, when women took on factory and other war-related work for the men who had gone overseas. Women also played a significant role in the military for the first time. Day care was provided for the children of working mothers, who were told they could accomplish anything. After the end of the war, the propaganda reversed; women were sent home to their children, who they were told now needed them at home, and consequently some women felt let down and deceived. Betty Friedan's book *The Feminine Mystique*, published in 1963, described what many women were feeling, a sense of malaise and purposelessness that led to feelings of despair and deep unhappiness.

Two prongs of feminism were important from the start: During the 1970s, organizations such as the National Organization for Women worked for legislation guaranteeing women equal opportunity in the workforce and equal rights under the law. Discrimination on the basis of gender became illegal, and the Equal Employment Opportunity Commission and other enforcement agencies backed up the laws. At the same time, women were making enormous strides in academia and altering the way gender was treated in research and scholarly endeavor. Out of this intellectual ferment, with cross-pollination from the world of social activism, various strains of feminist theory emerged.

Theoretical Perspectives

Radical feminists take patriarchy as the starting point of women's unequal treatment. They argue that patriarchy is separate from and predates capitalism. Men

as a group dominate women as a group, with men being the primary beneficiaries of women's subordination. Patriarchy is related to male violence against women. Many radical feminists consider rape the ultimate expression of male power and believe that male appropriation of female bodies through violence includes marriage and childbearing as well as domestic labor.

Unlike radical feminists, *Marxist feminists* consider gender inequality to derive from capitalism, not patriarchy. Men's domination of women is a by-product of capital's domination over labor. Capital depends on women's domestic labor in the home to provide for the day-to-day care of workers and the care and socialization of the next generation of workers.

Liberal feminists interpret women's subordination as a summation of numerous small-scale deprivations. Their view is grounded in the classical liberal position that individuals should be free to develop and pursue their own interests. Liberal feminists accept the basic organization of society, including capitalism and democracy, but seek to expand rights and opportunities for women.

Difference feminism refers to the ideas of feminists who believe there are significant inborn differences between men and women and who argue that society should adopt more feminine values of pacifism and nurturance.

Eco-feminism draws parallels between male domination of women and human domination of the earth and promotes close connections between feminists and environmentalists.

Contribution of Feminism

Feminists have brought many issues to the attention of scholars and researchers. The first of these is simply the importance of taking gender into account in research. No longer is it acceptable to conduct research only on male subjects or to talk only to the men in a household or village. Secondly, a gendered perspective encourages researchers to see the world from the viewpoint of the oppressed and the other. Social life is understood to consist of multiple power relations in which different groups stand in different relations to one another based on group membership and identity. Gender studies show that the world is seen in terms of contrasting pairs of attributes, one pair being male and female. Patriarchy is a model for the way the colonial powers exploited subject peoples or the way humans exploit the earth.

Within anthropology, feminism has had fundamental effects. For example, physical anthropologists challenged the dominant *man-the-hunter* model, which posited analogies between male-dominant African savanna baboons and the evolution of male-dominant human societies. Noting that primates more closely related to humans, such as chimpanzees and bonobos, are less male dominant and can be described as egalitarian or even female centered, feminists have proposed the *woman-the-gatherer* model, which has had far-reaching influence. Research now focuses on the importance of food sharing in the evolution of humans and human culture.

Current issues in feminist anthropology include questions about the extent to which anthropologists can reinterpret older ethnographic works to look for hidden or unacknowledged sources of female power, by, for example, retheorizing kinship relations. The issue of politically motivated research and the role of the anthropologist in advocating for dispossessed and marginalized people continues to be controversial both within the field and between anthropologists and the wider community.

— *Patricia B. Christian*

See also **Condorcet, Marquis de**

Further Readings

Chodorow, N. (1978). *The reproduction of mothering.* Berkeley: University of California Press.

Di Leonardo, M. (1991). *Gender at the crossroads of knowledge: Feminist anthropology in the postmodern era.* Berkeley: University of California Press.

Fox Keller, E. (1992). *Secrets of life: Essays on language, gender and science.* London: Routledge.

Friedan, B. (1963). *The feminine mystique.* Harmondsworth: Penguin.

Gilligan, C. (1982). *In a different voice: Psychological theory and women's development.* Cambridge, MA: Harvard University Press.

Lorber, J. (1994). *Paradoxes of gender.* New Haven: Yale University Press.

Reiter, R. R. (Ed.). (1975). *Toward an anthropology of women.* New York: Monthly Review Press.

Rosaldo, M., & Lamphere, L. (Eds.). (1974). *Women, culture and society.* Stanford: Stanford University Press.

Walby, S. (1990). *Theorizing patriarchy.* Cambridge, MA: Basil Blackwell Inc.

Fertility

Biologically, fertility is the ability to reproduce and bear children. The term also refers to the fertility of land, animals, and plants. Culturally, the concept of fertility is conceptualized and articulated in various ways. Fertility has been the subject of both anthropological and historical studies.

Anthropologists, archaeologists, and ethnologists have long been interested in the fertility of preindustrial societies. Methodologically, such studies have often been conducted as distinct from demographical and reproductive biology studies.

Anthropologically, studies have produced conflicting results on the relationship between agriculture and fertility. A study by Sellen and Mace used various statistical methods to establish whether there is a relationship between the level of fertility in human populations and the form of economic subsistence within a society. Such a study goes beyond the nature-culture dichotomy, and results point to an increase in fertility in agricultural societies. However, they admit that the mechanisms for this remain unknown.

One problem with studying fertility anthropologically is that of ethnographic time. An anthropologist will need to spend a long time with a given population if he or she wants to obtain a picture of biological fertility, its nature, and implications.

How fertility is conceptualized is tied to the nature/culture debate. If nature and culture are considered dichotomous, fertility will be interpreted in terms of ecological determinism. On the other hand, the postmodern critique of the nature-culture dichotomy has made it clear that such a dichotomy is fallacious. Combined with the recognition that even sex is a cultural construction, fertility cannot be considered simply in terms of nature.

Archaeologists have traditionally placed a strong emphasis on fertility, usually vis-à-vis Neolithic culture. While Paleolithic people possessed many of the cultural capabilities of modern humans, they have been explained mostly through an ecological framework. At most, fertility is applied to "fat" figurines.

However, the Neolithic is often interpreted within a social rather than an ecological framework. One of the assumptions that has characterized Neolithic studies is that people were dependent on agriculture and thus needed a belief system to protect, strengthen, and promulgate fertility.

The concept has been widely applied to the interpretation of various female and seemingly female Neolithic figurines. This, in turn, is tied to a wider set of assumptions encompassing birth, sexual union, nurturing, and the cycle of growth. These attributes are mostly associated with motherhood, which, being one of the universal human realities, has often been conceptualized in terms of growth and nurturing.

While the universality of motherhood is undeniable, it is fairly simplistic to think in circular terms involving women, fertility, agriculture, and procreation. While the Neolithic reached various parts of the world, this phenomenon was by no means homogenous. There is no reason to assume, therefore, that the gradual spread of agriculture led to a universal, homogenized belief system with fertility at its core.

The evidence touted for celebrations of fertility, goddesses, and female-led rituals is open to various interpretations. The Neolithic body of statuary is immensely varied, and, while there are representations of pregnancy and birth, there are also many representations that are not. This does not mean that as a concept, fertility was not important in past societies. The consciousness that women carried unborn children and gave birth was an essential part of humanity's development. The fertility of animals would have been known to hunters, and when agriculture gained prominence, observation would have yielded information on the fertility of both land and domesticated animals.

— Isabelle Vella Gregory

See also **Cultural Tree of Life**

Further Readings

Bentley, G. R., Jasienska, G., & Goldberg, T. (1993). Is the fertility of agriculturalists higher than that of nonagriculturalists? *Current Anthropology, 34,* 778–785.

Laqueur, T. (1990). *Making sex: Body and gender from the Greeks to Freud.* Cambridge, MA: Harvard University Press.

Sellen, D. W., & Mace, R. (1997). Fertility and mode of subsistence: A phylogenetic analysis. *Current Anthropology, 38,* 878–889.

Feuding

Feuding is a series of revenge-based killings that not only result in the loss of human life but also contribute to the disruption of the social order. There are five essential elements to feuding: (1) Kinship groups are involved; (2) homicides take place; (3) the killings occur as revenge for a perceived injustice or affront to honor; (4) three or more alternating killings or acts of violence occur; and (5) the violent encounters take place within a political community. Nearly half the societies studied by anthropologists have had feuds occur within them. Feuds can be divided into two types: feuding without compensation, in which there is no institutionalized means by which compensation can be paid, and feuding with compensation, in which payment of compensation can prevent a counterkilling, thereby stopping a feud. Cross-cultural studies suggest that the second type of feud outnumbers the first type about 2 to 1. Theories of feuding tend to focus on only one of these two types.

Dividing the world's societies into those with and those without feuding permits the identification of two types: (1) societies with fraternal interest groups, which have much conflict, including feuding, internal war, rape, and intrakinship group executions, and (2) societies without fraternal interest groups, which have little conflict, no feuding, no internal war, no rape, and polity-wide executions. Fraternal interest groups are localized groups of related males who defend the interests of their members. These groups come into existence through the practice of patrilocal or virilocal residence. Polygyny can also produce fraternal interest groups. Otterbein and Otterbein showed that when patrilocal residence and polygyny were combined, the likelihood of feuding greatly increased. Divale and Harris later showed that such societies had a "male-supremacist complex." Mistreatment of women and female infanticide accompanied the complex.

Type 1 societies can be divided further, based upon whether councils of elders are present. While all political communities have a leader, some have councils, and some do not. If a polity with a council is at war, the leader may be able to prevent feuding. A leader with the backing of a council may also be able to insist that a kinship group carry out the execution of a wrongdoer in its rank. All the theories listed below except for world systems theory are predicated upon the assumption that fraternal interest groups are present and generating feuds.

Theories of feuding that appear to pertain to societies without compensation include those theories that refer to feuding as self-help, folk justice, or quasi-law. A revenge killing is viewed as a "counteraction" which leads to a "correction." Another approach known as "world systems theory" argues that commercial expansion leads to disruptive social change, which leads to out-of-control violence. World systems theory has also claimed that such expansion has created warfare in regions where it had not previously existed, "war in the tribal zone." A third theory views blood revenge as not only defining groups, but preserving them. Retaliation, based on deterrence theory, is believed to prevent counteraggression. Empirically, this does not occur, but if it leads to the elimination of one group, the survivor group has achieved the desired results.

Other theories of feuding appear to pertain only to societies with compensation. In societies with patrilineages organized into segmentary lineage systems, Max Gluckman has identified "peace in the feud." Lineages make peace through the payment of compensation, thus uniting to form larger kinship groups that feud with each other. Another theory, argued by Christopher Boehm, views the payment of compensation as a means of controlling conflict: Feudists realize that uncontrolled armed combat within the polity would lead to huge casualties.

— *Keith F. Otterbein*

See also **Conflict; Dispute Resolution; Polygyny; War, Anthropology of**

Further Readings

Boehm, C. (1984). *Blood revenge: The anthropology of feuding in Montenegro and other tribal societies.* Lawrence: University of Kansas Press.

Daly, M., & Wilson, M. (1988). *Homicide.* New York: Aldine de Gruyter.

Ferguson, R. B., & Whitehead, N. L. (Eds.). (1992). *War in the tribal zone: Expanding states and indigenous warfare.* Seattle: University of Washington Press.

Gluckman, M. (1982). *Custom and conflict in Africa.* Oxford: Oxford University Press.

Otterbein, K. F. (Ed.). (1994). *Feuding and warfare: Selected works of Keith F. Otterbein.* Langhorne, PA: Gordon & Breach.
Waller, A. L. (1988). *Feud: Hatfields, McCoys, and social change in Appalachia, 1860–1900.* Chapel Hill: University of North Carolina Press.

Feuerbach, Ludwig (1804–1872)

German philosopher Ludwig Andreas Feuerbach is noted for his materialistic philosophy of human existence. Born in Bavaria, Feuerbach was raised as a Lutheran in a traditional Catholic state. Influenced by devout and resolved parents, Feuerbach's scholastic terms at the gymnasium in Ansbach provided the basis for exploring his interests in scripture and pious attitude, which directed him toward the area of theology. However, his theological orientation became severely compromised prior to his entrance into the University of Heidelberg. Although the reasons for his shift in attitude concerning theology are a point of speculation, his study in theology was subverted by his growing interests in philosophy. Considered a "left Hegelian," it was the philosophy of G. W. F. Hegel (1770–1831) that was particularly damaging, ultimately causing fissures in his view of the relationship between theology and philosophy. Unable to complete his education due to financial reasons, Feuerbach attended the University of Erlangen, whereby he received his doctorate in philosophy.

Feuerbach's academic career was less than illustrious. He was a teacher of philosophy at the University of Erlangen for a period of 6 years (1829–1835). Due to his highly critical positions on both philosophy and theology, his controversial views had left him unemployed. This fact had kept his academic and professional contributions to a minimum; yet his influence was great. Views in *Thoughts on Death and Immortality* (1830), *The Essence of Christianity* (1841), and *Principles of the Philosophy of the Future* (1843) had influenced great thinkers such as Nietzsche, Freud, and, most notably, Marx. Though his intellectual circle was a source of sociopolitical problems, his marriage to Berta Low in 1837 could be considered a joyous juncture. However, the move to Bruckberg with his new bride would end up being futile. The family business gained through marriage became bankrupt and forced the couple to move near Nuremberg. With failing health and near destitute conditions, Feuerbach continued to be an advocate for philosophical and social change (for example, Marxism and the women's movement). Though his activism is not well-known, his noteworthy contributions were in his ability to articulate the eventual implications of evolution within a materialistic and naturalistic framework. Essentially, Feuerbach stated what Charles Darwin (1809–1882) did not articulate: the beginning of the end for theology.

Concepts of materialism and the process view of change are not new in the history of thought. The philosophies set forth by the pre-Socratics evaluated our species completely within both a materialistic and naturalistic framework. Explanations concerning the origin of our species and the processes of change were explored by philosophies of Anaximander, Heraclitus, and Paramendies. Though these ancient Greek philosophers did not have the evidence or the benefit of modern science, their acute observations and rational speculation removed the shroud of myth and superstition, ultimately serving as a beacon to which future materialistic philosophies could relate. In this same manner, Feuerbach had seen the apparent contradictions within theology and philosophy. Without the beneficial evidence of evolutionary theory provided by Charles Darwin, Feuerbach evaluated our species in a completely materialistic framework. As Feuerbach stated, the implications for theology were evident: the total dissolution of theology into anthropology. Such a task would require introspection in the deepest parts of the human psyche. The resulting answer would require an understanding of the human condition and strength in viewing human mortality.

Unlike the articles of faith and traditional theology of Christianity, concepts of the soul, God, and immortality have skewed our species's own ontological and teleological reality. According to Feuerbach, human beings, necessitated by physiology, possess the capabilities to distinguish themselves from the rest of nature. This act of distinguishing serves as a means to understand the relationship among our conscious being, nature, and the perceived essence or soul. Yet the essence or soul is indistinguishable from nature. When rationality seeks to distinguish the parts of this relationship, the outcome is an expressed desire for immortality and an explanation for a natural

phenomenon. This act becomes ritualistic, essentially creating a creative spiritual being. However, as Feuerbach points out, this desire for causal explanation results in the projection of our own humanity that is beyond the spaciotemporal plane of existence.

In Feuerbach's evaluation, the relationships depicted in the theological concept of the Trinity encompass the psychological unity of the individual in relation to himself and the community. As Feuerbach stated, God the Father is equated with understanding (intelligence); God the Son is love (warmth). This combination of love and understanding is the mind of the total individual. The Holy Spirit is the expression of love between God the Father and God the Son, the bases of religious emotive desires and an objectified religion. The God the Father and God the Son, through the Holy Spirit, becomes a unity that creates a community. The Virgin Mary, however, allows for the actualization of this love and community, for love is a divine feminine principle that already exists in God the Son. The Holy Virgin becomes a necessitated and integral part for the actualization of this Trinity. Through the Immaculate Conception, God the Son becomes a paradoxical being; a negation of God the Father and affirmation of humanity. This concept of the duality of Christ (Christology) allows for the visibility of God the Father within the spaciotemporal plane of existence. The existence of God the Son, through his death and resurrection, gave the faith and hope for the very immortality that our species continuously sought. It has become consciousness trying to circumvent the inevitable, that being a complete and absolute death.

Being aware of our own mortality is a direct consequence of possessing a greater degree of consciousness. The quest for immortality begins with this conscious yearning for both contemplation (an object) and love. Together, these needs become an identity by which an individual can interact within a community. However, as Feuerbach stated, the implications stemming from a projected God become evident; death is final and complete. Death is the total dissolution of your existence within space and time, a negation of the spirit, reason, and consciousness. In this manner, reason, spirit, and consciousness cannot transcend death or exist beyond this spatiotemporal existence. Personhood, derived from our humanity, is the essence of being human in this life and only in this life. Only in this contingent human life can an individual be considered immortal. At death, being a fulfillment of the precondition of existence, the unity of matter, consciousness, spirit, and reason cease to exist. The ultimate surrender to death becomes an act of love derived from freedom.

Feuerbach's philosophy may be seen as nihilistic; yet his perspective has more liberating and probative value. Without the evidence provided by modern science, Feuerbach exposed the contradictions within theology and modern philosophy. Dismissing biblical narratives, theological and philosophical rhetoric, Feuerbach placed our species back within a materialistic and naturalistic framework. Viewing the history of our species, the reconstruction of theistic explanations could be reduced to human psychological projections of our own humanity. This projection is necessitated by the natural processes stemming from our materialistically based consciousness. Relating to these anthropomorphic entities allows our species a sense of control over the uncontrollable or the inevitable end of existence. These facts do not deter from the quality of human existence; rather, they should be a source of strength and liberation. No longer should our species be a slave to its own projected multiplicity found in God. Our species should reclaim what it has freely given, our total humanity. Essentially, God is humankind's own ideal ontological and teleological perspective in the process of actualization. This process should be reflected in a new philosophy.

Feuerbach's claim that the task of the modern era was the realization and humanization of God would essentially negate over 2,000 years of philosophy and theology. Although empiricism began this transformation, modern philosophy had taken theological concepts into philosophy (for example, Descartes). Feuerbach had seen the need for another transformation, essentially a new philosophy as an outgrowth of the old. In the new philosophy, Feuerbach sees existence as love, and it is this love that will be the basis of the new philosophy. It will be the essence of feeling within consciousness that transforms the heart into mind. Love is the criteria of all being and reality, all of which should be turned into action. Necessitated by previous philosophical thought, Feuerbach states that the new philosophy had taken theology and dissolved theistic reason and heart into the very subject of anthropology. Thus, anthropology, combined with physiology, is seen as the universal science, beyond the revealing essences of humanity expressed in art, religion, and philosophy. It will be the understanding

of the human predicament that will change love into human action. Conscious of our precarious material existence, Feuerbach's hope is that in the process of reclaiming our humanity, the basis of existence, love, will express itself among all members within our community. This new philosophy was probably the basis of Feuerbach's view on social change and equality. Ultimately, this new philosophy would act to continuously redefine our own ontological and teleological existence within a dynamic and evolving universe.

— David Alexander Lukaszek

Further Readings

Feuerbach, L. (1980). *Thoughts on death and immortality.* Berkeley: University of California Press.

Feuerbach, L. (1986). *Principles of the philosophy of the future.* Indianapolis: Hackett.

Feuerbach, L. (1989). *The essence of Christianity.* Amherst, NY: Prometheus Books.

Field Methods

The various ways anthropologists conduct research in naturalistic settings, or in the field, are called field methods. They include participation in social life and various forms of observation. Anthropology relies on field methods as its ultimate source of information. Research in the field, known as fieldwork, involves collecting primary data on humans, other primates, and the objects and processes relevant to their lives. Through further examination, analysis, and comparison in library, laboratory, or office settings, researchers produce the discipline's general principles and theoretical advances.

Various field methods are used, depending on the data available, to illuminate a chosen problem. The diverse range of interests in anthropology is usually represented in the North American tradition by reference to its four subfields, namely, physical or biological anthropology; archaeology; sociocultural anthropology, also known as cultural or social anthropology or ethnology; and linguistic anthropology. There is, however, significant overlap in the kinds of data, and therefore the field methods, used in each of the subfields.

Methods of the Four Subfields

Biological Anthropology

Physical or biological anthropology makes use of field methods combined with laboratory work to understand aspects of humankind as a biological species. The place of humans in nature, their anatomy, physiology, evolution, similarities and differences with related species, physical adaptations to various environments, and biological diversity are all topics of interest to biological anthropology and are studied in the field.

Biological studies of deceased individuals and past groups make use of archaeological techniques to acquire fossil, bone, and other tissue samples and record the context in which they are found. Genetic and medical studies use blood, other physical samples, and anthropometric data, such as weight and height, collected from living or deceased individuals. Ethological or animal behavior studies of nonhuman primates make use of social observation and limited participation in animal groups.

Archaeology

Archaeological anthropology uses field methods to understand all aspects of the human past, with particular emphasis on what can be learned from remaining material culture, including artifacts and stratigraphic contexts. Field archaeologists conduct landscape surveys and sampling to locate sites of past human activity and identify patterns of occupation of the landscape. They conduct controlled excavations to collect artifacts and human remains, from which they assemble detailed data about particular sites.

In ethnoarchaeology, living people are observed and joined by means of participant-observation and conversation in order to learn how artifacts are made and disposed. Discarded objects and the processes involved in the formation of archaeological sites, or *taphonomy*, are also observed to learn how to interpret the archaeological record.

Sociocultural Anthropology

Sociocultural anthropology studies contemporary human groups in the field in order to understand the range of social relationships and organizations that human groups exhibit, as well as the learned beliefs and values that guide behavior. Most fieldwork in this subfield is directed toward producing ethnographies,

or written descriptions of ethnic groups. Thus, ethnological field techniques are often termed *ethnographic methods*.

Living among the people under study, ethnographers use observation and description of the settings in which people live, participant-observation in social activities, various forms of interviewing, and focus groups. Participant-observation is cultural anthropology's central contribution to the methodology of social science.

Linguistic Anthropology

Linguistic anthropology is concerned with language and its relationship to human culture and biology. The field methods of linguistic anthropology include interviewing speakers of a language; engaging in participant-observation to discover locally important social contexts and corresponding language use; recording naturalistic utterances and discourse; and describing nonspoken forms of language, such as writing systems in physical media and visual signing.

Linguistic anthropologists in the field need to learn local languages in a naturalistic setting, without the aid of written texts or trained teachers. Language structure, including phonology (sound systems), morphology (word structure), and syntax (sentence structure), can be worked out in the field by collecting numerous texts for comparison and analysis. The ways in which language use intersects with social and cultural conventions, including the linguistic forms used in particular situations and the cultural meanings attributed to them, are best studied in the field.

Categories of Anthropological Field Methods

All anthropological field methods can be grouped into five basic categories: (1) material observation, (2) biological observation, (3) behavioral observation, (4) direct communication, and (5) participant-observation. All five types of field methods involve observation, including the use of any of the five human senses to acquire information about the environment.

There are two basic means by which the field researcher engages with a topic of study: *subject-object* and *subject-subject relationships*. A subject-object relationship is pure observation, involving a subject (the observing anthropologist) and an object (the observed thing, setting, or person). Subject-object relations are one-way, in that an active observer collects information about a passive, independent, or nonresponding object. This is an appropriate method to learn about inanimate objects, including artifacts, which reflect human and nonhuman primate activity. It is also ideal when collecting data on what people actually do as opposed to what they say they do or when biology and behavior are being observed without purposeful input from the people under study.

Subject-subject relations, on the other hand, involve a mutual, dialogical relationship between two thinking beings. This relationship is ideal for research situations in which the people studied are capable of and willing to communicate information about their inner states or beliefs. The subject-subject mode of engagement allows the meanings, abstractions, and mental models of informants to be directly communicated. These data are among the most interesting and rich forms of anthropological knowledge. While all field methods involve observation, they vary in the degree to which subject-object or subject-subject engagement is used.

Material Observation

The observation of physical settings provides the best information on the material foundations of social life, including ecological and economic relations. Observation of physical settings is also the most reliable method for producing evidence of actual, as opposed to ideal, behaviors, which may be repressed or denied by the populations engaging in them. Family, social organization, and even ideologies respond to environmental conditions and leave physical traces.

Observing objects and settings allows the description and analysis of a range of physical characteristics. Anthropologists in the field document landscapes, natural objects, built environments, architectural features, and artifacts.

Contemporarily occupied settings are visible and in use and are often easily accessed, although gaining access may require negotiation with local people. Material remains of past behaviors, though, are often buried and deteriorated, making their discovery, recovery, and analysis challenging in other ways. Because material remains are often the only available evidence of past behaviors, archaeologists are most consistently developed and specialized in the study of material culture in the field.

Archaeological methods for recovering objects and settings are designed to allow the maximum amount of information to be obtained, preserved, and communicated. Survey methods vary depending

on the size and characteristics of the terrain to be mapped for sites of interest, and these methods often make use of statistical techniques to ensure representative coverage. While survey techniques need have no impact on the material record, excavation systematically destroys contextual information about where objects were found in relation to one another. Therefore, excavation is done using an exactly surveyed, three-dimensional grid system, and each layer of soil is slowly and painstakingly removed and a careful record made of each stratum and how any objects found were situated.

Observing materials provides a window through time because of the relative stability of some material traces of behaviors. These methods produce data from objects rather than people, but in combination with the other methods of anthropology, they provide insight into how people make, use, and understand materials.

Biological Observation

Humans and related primates are biological species that can be studied in the field either as individual organisms or as populations. Such study can use methods that train observation on the form, function, and evolution of life. This group of methods includes gathering data on the anatomy and physiology of humans, hominid ancestors, and other primates.

Some of these data are recorded in the field from living subjects, using calipers, tape measures, scales, and other devices. *Anthropometry*, as this biological measurement is called, can be done either in the field or in the laboratory and provides data on such variables as stature, growth rate, and nutritional status of populations. In addition, samples of bodily fluids can be taken in the field and tested in the laboratory for blood group, diseases, and genetic characteristics and affinities. Biological observations can also be made of nonprimate species in order to determine which animals and plants are present in the environment and the ecological relations between these and the population being studied.

Refined physical observations are made in the laboratory, but contextual information, such as the disposition of the remains in relation to one another and surrounding objects, are discovered in the field and form the basis for sophisticated interpretations. Thus, field methods for collection and documentation of physical remains specify the same careful and detailed care that artifacts in archaeological sites require. Tiny biological samples, such as bone fragments and burned grains, can be retrieved by shaking soil through screens and by flotation, in which soil is placed in water, which allows light carbonized materials to float to the surface, where they can be removed for identification and study.

Biological observations are also made of fossilized remains of human ancestors and other species, and in these cases the field methods of paleontology come into play. Fossils are often embedded in sedimentary rock and are discovered through systematic survey of landscapes where sediments of appropriate age are eroding on the surface. Once an appropriate area is identified, excavation can reveal more materials and can provide geological samples of plant and animal remains, which can be tested in laboratories to determine the approximate age of the fossils as well as climatic, floral, and faunal information about the time when the fossilized animals lived.

Biological and material observation overlap when artifacts and human remains are found in association. For this reason the two groups of methods are often combined. For example, skeletal material associated with grave goods reveals information about mortuary practices and social status.

Physical anthropology traditionally emphasizes the observation of anatomy rather than physiology, which is left more to medical study. However, one extension of physiology, behavior, is of central interest to anthropology and is, for the most part, best observed in the field.

Behavioral Observation

All primates exhibit behaviors, defined as volitional movements, that can be observed directly in the field. These behaviors include kinesics, dance, and speech, as well as specific intentional movements such as ritual performances and food procurement. Behavior, in other words, refers to actions that derive at least in part from intentional direction. These actions include gross movements such as walking or speaking, but not physiological measures like heart rate, although some physiological measures are influenced by volitional behaviors.

By observing behaviors without engaging with the observed individuals, anthropologists can document interactions without influencing them. The primatologist, for example, can watch a monkey troop from a distance using binoculars. Such methods are also

useful in situations in which linguistic communication is not possible, such as the earliest phase of some cultural anthropology fieldwork.

Many nuances of daily life reveal themselves to the quiet and patient observer of behavior. Through these observations one can develop a typology of the kinds of behaviors that are repeated and keep a record of how often and in what circumstances individuals undertake them. For example, one can describe grooming, greeting, and ritualized actions in a relatively objective manner by employing pure observation. Initial language learning also benefits from simple observation of utterances. Certain sounds and words are often repeated, allowing an initial entry into an unfamiliar linguistic world.

When linguistic communication is possible, one can listen to others' utterances without engaging in conversations. Here, the behaviors observed are linguistic and thus include information on meanings and inner states, but such communications are not truly dialogic, as direct communication is.

Direct Communication

This group of field methods includes all means of linguistic, paralinguistic, and other conscious interaction between anthropologist and research subjects. Rather than merely observing a living person or animal or taking notes on an inert object, these methods include two-way communication and allow the deepest possible exchange of information on mental states between two minds. In other words, direct communication is a subject-subject rather than a subject-object means of encounter.

The weakest form of direct communication is the survey, comprised of a series of standard questions, often requiring numerical or precisely formatted answers, distributed to a large number of people. Surveys are particularly useful for providing information, summarizable in charts and graphs, about whole populations. To ensure that survey results are representative of very large groups, for which complete coverage is impractical, the surveys must be distributed to a representative sample of the population.

Surveys are favored in sociological research but are used only lightly in anthropology because of their tendency to distance the researcher from the subjects and because they can be awkward to use among illiterate populations. Surveys can be conducted in some situations by mail, that is, without the anthropologist's having to enter the field. However, anthropologists can also administer them in person in either written or oral form or distribute them directly while in the field.

Among the most valued field methods in anthropology are interviews, which are conversations between the anthropologist and informants and are designed to elicit a specified kind of information. In formal or structured interviews, the anthropologist provides a standardized list of questions. These are carefully planned to provide data capable of addressing theoretical and empirical concerns. Formal interviewing is a particularly useful method for producing comparable, quantifiable data on a particular topic. Its disadvantage is that it can force informants' knowledge into predetermined categories, ratifying rather than enriching and correcting theoretical models. Furthermore, as an artificial form of communication, it has the potential to stifle the more natural and genuine exchange of ideas that is found in informal conversation.

In informal or unstructured interviews, anthropologist and informant chat about a set topic. While the anthropologist has particular questions and a range of issues in mind, he or she allows the conversation partner to indulge in digressions and tangents and to take a great deal of control over the content of the discussion. The data produced by informal interviews are relatively idiosyncratic and thus often not amenable to statistical analysis. However, they may represent the best compromise between obtaining data to test a particular hypothesis and gaining insight into local views.

In focus groups, the researcher brings together several people selected for their particular knowledge or social roles and moderates a discussion among them about a topic of interest. The advantage of focus groups is that the participants jog one another's memories, encourage one another, and together can provide a more complete, nuanced, and publicly acceptable account of the topic of interest than an individual interviewee could.

The simplest yet also the most intimate and rich form of direct communication is a spontaneous conversation between the anthropologist and an informant. Interlocutors are most likely to speak in an unselfconscious manner, revealing those things that are most important to them.

Finally, there are forms of direct communication that are nonlinguistic but nevertheless often deeply revealing. First of all, during conversations and interviews, a great deal of valuable information is conveyed

paralinguistically, by such means as tone of voice, facial expression, and gesture; although these paralinguistic modes could also be categorized as observed behaviors, in a conversational context they are often used to enrich direct communication.

When the interaction is between a human researcher and a nonhuman primate, nonlinguistic behaviors are a valuable medium for direct communication. Calls, gestures, and glances can communicate feelings and desires between species. In ethological field research, however, anthropologists must avoid assuming that expressions resembling ones from their species and culture have a similar meaning for another species. Nevertheless, anthropological researchers of nonhuman primates can attain a remarkable degree of direct communication with their research subjects without the benefit of language or mental apparatus identical to the other species.

Direct communication allows intentional transmission between researchers and subjects of information about internal states. However, except insofar as the local language and its idioms are used, researchers using direct communication need not enter the world of their informants behaviorally. Crossing that threshold characterizes the final group of anthropological field methods.

Participant-Observation

Participant-observation involves the immersion of the researcher in another social world. The researcher seeks to emulate the subjects' behaviors and thought patterns in order to achieve an empathetic understanding of their points of view.

The attempt to emulate local ways of life gives the researcher a firsthand experience of what they are like, and it demonstrates the researcher's respect for local customs, which may improve rapport. However, it must be stressed that even though an anthropologist lives in a local style of dwelling, eats traditional foods, attends native rituals, and so on, the anthropologist does not have exactly the same quality of experience as these activities evoke in local people. This is so first of all because the anthropologist does not merely participate in routines but is highly conscious and observant, taking nothing for granted and noting the experience in great detail. Second, if the anthropologist hails from another cultural background, these new experiences will be registered in the context of earlier experiences that are different from those of local people and that may on a personal level seem strange or even immoral.

Participant-observation is suited almost exclusively to the study of living human societies. To an even greater degree than interviewing, it allows the anthropologist to attain a sense of local points of view, cultural assumptions, and social conventions because one must live in accordance with them. Social errors are frequent at first but are often easily forgiven by one's hosts, who recognize the foreign anthropologist as being in a childlike condition of ignorance but growing in poise under their instruction. Each social blunder in participant-observation is a learning experience pointing to a cultural difference between the anthropologist's and the hosts' cultures. As time goes on, errors become fewer and competence grows.

The lengthy period scheduled for participant-observation fieldwork, typically at least a year, allows initial impressions to be tempered, enriched, and corrected as familiarity with the local way of life deepens. It also allows a growing rapport that, under the right conditions, matures into a state in which the anthropologist's presence becomes so familiar to people that they behave more naturally. For this reason, in spite of its relatively high reliance on subjective feelings of empathy, participant-observation is arguably the most accurate way of understanding another culture.

Technologies of Fieldwork

Anthropologists use a wide variety of technologies to enhance what can be taken in by the senses and recorded in memory. Survey and excavation of artifacts and biological remains make use of many tools, ranging from rulers to remote sensing and geographic information systems equipment to precisely locate and map finds. Simple trowels in dry settings, and hoses in wet ones, aid the recovery of objects from the earth.

All anthropological fieldwork makes intensive use of writing, either on paper or via computer, to produce permanent records of findings, or field notes. Taking good field notes depends on purposeful observation, as true in ethnographic as in other anthropological research. Quite often, rough notes are taken during the day's labor, as much to avoid being obtrusive as to allow the field-worker to take in what is happening with full attention. In the evening, before sleep intervenes and memories are lost, rough notes are carefully transformed into full, detailed ones.

Descriptive field notes are supplemented by technologies that allow the direct capture of information. Sound recording allows exact words, songs, and linguistic samples to be collected. Photography allows the capture of settings, sites, objects, and activities. Cinematic recording captures visual action and sound together and is particularly useful for the study of dance and craft techniques. Of course, portable computers allow storage of all of these media and can run helpful applications, such as databases that store data for further analysis. Genealogical information, for example, is managed much more easily with the help of computer databases. Where there are no power grids, portable solar electric systems can be used to power this equipment.

Ethical Issues

A variety of ethical concerns surround fieldwork. For example, anthropologists must take care to collect information in the field without producing harm or discomfort for their hosts. Field-workers avoid putting informants into dangerous or awkward positions. For instance, field-workers may allow informants to remain anonymous if they desire.

Field-workers may also encounter conflicts over the ownership and study of the artifacts, biological specimens, and even ethnographic data they collect. The populations under study, as well as people acting as their descendants or representatives, may challenge researchers. To ensure that local groups' approval is secured and respected, it is vital that proper permits be obtained and that those groups be consulted and involved in the research.

Objectivity, Subjectivity, and Intersubjectivity

All anthropological research requires acute attention to perspectives as an integral part of its system of knowledge, or epistemology. In the field, this attention takes the form of an awareness of multiple points of view, guiding assumptions, and purposes.

From the perspective of the researcher, there are three possible epistemological stances, each with its own strengths and weaknesses, and each appropriate to different kinds of fieldwork: objectivity, subjectivity, and intersubjectivity. *Objectivity* refers to perceiving and describing something from as neutral and unbiased a perspective as possible in order to produce observations that can be verified by a trained community of observers. Although objectivity can never be absolute or perfect, it is an important baseline from which to accurately and comparably measure objects, organisms, and behaviors. Objectivity is also needed to provide a factual description of what things physically exist, as opposed to imagined, abstract, or metaphysical entities. It also provides a guide for accuracy. Without a commitment to objectivity, anthropological fieldwork loses its grounding perspective as well as its trustworthiness.

Objectivity is insufficient for successful fieldwork, however, because it enforces a distance between researchers and researched, serving as a barrier to empathy. Self-consciously engaging their own subjectivity, researchers can draw on their own background and interests to allow a more emotional and value-based engagement. Using *subjectivity* in the field, one interprets observations with the help of personal feelings or opinions, which provide one with a more meaningful and artistically expressive connection to the objects and subjects of research. While unbridled subjectivity can allow observers to lose touch with the reality before them, measured and self-conscious subjectivity can deeply enrich the humanistic engagement of researchers with the topic or people under study. Indeed, since even the most objective observation is tinged with subjectivity, field-workers strive to know their own biases.

While elements of both objectivity and subjectivity are involved in all the field methods, a third mode of engagement characterizes direct communication and participant-observation. This mode is *intersubjectivity*, or the mutual engagement of two or more subjective perspectives in conversation or activity. Intersubjectivity is self-consciously used as a field method to remind researchers that their individual informants are, like the researchers, perceiving their world from unique perspectives meaningful to them. Intersubjectivity is a valuable method to communicate the meaning systems of conversation partners in a way that helps to preserve their emotional tenor.

The theoretical perspective of a researcher profoundly influences what questions are asked and what field methods are employed. A theoretical interest in how environmental factors influence behavior would direct the field-worker to observe and measure these factors in quality and quantity. On the other hand, a theoretical interest in how local value systems influence

choices would necessitate interactions with people to access, relate to, and describe their inner states.

Through anthropology we study ourselves by learning how we compare to others: our ancestors, other peoples and cultures, and our cousins in the animal kingdom. The range of field methods reflects anthropology's effort to understand humanity from within and without, in both its broadest outlines and its most particular manifestations.

— *Roger Ivar Lohmann*

Further Readings

Banning, E. B. (2002). *Archaeological survey*. New York: Kluwer Academic/Plenum.

Bernard, H. R. (2001). *Research methods in anthropology: Qualitative and quantitative approaches* (3rd ed.). Walnut Creek, CA: AltaMira.

David, N., & Kramer, C. (2001). *Ethnoarchaeology in action*. Cambridge, UK: Cambridge University Press.

DeWalt, K. M., & DeWalt, B. R. (2001). *Participant observation: A guide for fieldworkers*. Walnut Creek, CA: AltaMira.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). Writing ethnographic fieldnotes. Chicago: University of Chicago Press.

Hester, T. R., Shafer, H. J., & Feder, K. L. (1997). *Field methods in archaeology*. Mountain View, CA: Mayfield.

Newman, P., & Ratliff, M. (Eds.). (2001). *Linguistic fieldwork*. Cambridge, UK: Cambridge University Press.

Setchell, J. M. (2003). *Field and laboratory methods in primatology: A practical guide*. Cambridge, UK: Cambridge University Press.

Spradley, J. P. (1980). *Participant observation*. New York: Holt, Rinehart & Winston.

Fieldwork, Ethnographic

Ethnographic fieldwork is an in-depth localized research process aimed at the description and analysis of cultural systems. Both scientific and artistic in perspective and approach, ethnographic fieldwork is characteristic of the work of cultural anthropologists who seek explanation and/or interpretation of human behavior, practices, ideas, and values. Conducted in the naturalistic setting of everyday life, ethnographic fieldwork lasts from months to years as ethnographers immerse themselves in the social interaction and cultural scenes of a social group.

Ethnographic fieldwork involves either applied or basic research goals. For the latter, a researcher investigates a group, a previously unexplored topic, or one that has changed significantly, writing publications that describe, for example, the Nuer of the Sudan and their love for cattle, or the San of southern Africa and their traditional foraging subsistence pattern. In applied ethnographic fieldwork, researchers address problems and offer possible solutions to a limited set of issues. For example, if a team is hired to investigate the consequences of a flood, they may use available statistical data on land and households and survey research in addition to ethnographic fieldwork, and then make recommendations for policy decisions to a government agency.

Ethnographic fieldwork includes quantitative and qualitative data collection techniques based on participant observation and ethnographic interviews with key informants. Together, these form methodological checks and balances so that data gained through observation are checked as the researcher participates in the culture and conversations with informants proceed to greater intimacy. Similarly, interview data are evaluated and compared with those gained in participant observation and also are compared from informant to informant. Ethnographic fieldwork has been described as a series of stages, from the excitement and culture shock of the initial period through the development of rapport and reciprocity with informants to the final sadness of departure. Some cultural anthropologists continue ethnographic fieldwork on repeated visits over lengthy periods and establish long-term relationships with those they study.

In the 19th century, social (or cultural) anthropologists usually did not directly collect data in the field. They relied on the accounts of explorers, travelers, and missionaries, compiling them into comparative frameworks for "scientific" purposes. An exception to this pattern was Lewis Henry Morgan, who visited the Iroquois and collected information about kinship. The change to firsthand direct data collection by anthropologists in the field is generally attributed to Franz Boas for the Americanist tradition and

Bronislaw Malinowski for the British. Even before emigrating to the United States, Boas fulfilled his dream of living among the Inuit and studying their understanding of landscape and geography. From his position at Columbia University, Boas trained many anthropologists to do ethnographic fieldwork as he did among the Kwakiutl. His initial emphasis was on "salvage" ethnography in order to preserve cultural traditions before they disappeared. On the other hand, Malinowski's interest was in observing the society as it then worked, using the Trobrianders' language in order to understand their point of view. By the second quarter of the 20th century, ethnographic fieldwork was the defining standard and practice for sociocultural anthropology.

— *Audrey C. Shalinsky*

See also **Anthropology, Cultural; Ethnography; Participant-observation**

Further Readings

Fetterman, D. M. (1989). *Ethnography step by step.* Newbury Park, CA: Sage.

Lawless, R., Sutlive, V., & Zamora, M. (Eds.). (1983). *Fieldwork: The human experience.* New York: Gordon & Breach.

Wolcott, H. (1995). *The art of fieldwork.* Walnut Creek, CA: Alta Mira.

Fiji

The nation of Fiji contains a large group of islands known as an *archipelago.* Officially titled the Sovereign Democratic Republic of Fiji, the archipelago contains 330 islands that sprawl over 501,800 square miles in the world's largest ocean, the Pacific. The people of Fiji inhabit about one third of the islands within the archipelago. The two largest islands, Viti Levu and Vanua Levu, and the remaining small islands surround the Koro Sea.

Fiji divides Melanesian and Polynesian islands, with low coral atolls to the east in Polynesia and mountainous volcanic islands to the west in Melanesia. Although the islands of the archipelago form a bridge between the eastern and western South Pacific cultures, Fiji is considered part of the Melanesian Islands. The islands are further divided, in fact, by the International Date Line, which runs across the 180-degree meridian, dividing yesterday from today.

While most people of Fiji are Indian or Fijian, some are Polynesian, European, or Chinese. Migrant communities have maintained their ancestral heritage, religion, customs, and culture. Once feared for their cannibalistic practices, these islanders have been welcomed back into the world community and look forward to a future of economic and social prosperity.

Archeological evidence has shown that peoples first settled in Fiji in the late 2nd millennium BC. A legendary Melanesian chief called Lutunasobasoba led the first settlers, perhaps from Southeast Asia through Indonesia, to Fiji. Melanesian settlers to Fiji were initially fisherman who lived in coastal areas. When they migrated inland, in approximately 500 BC, they developed into agricultural settlements. Population rates and feudalism then increased. In around AD 1000, Polynesians invaded Fiji from Tonga and Samoa, and both cultures would establish a long-term presence in Fiji. The various tribes established a hereditary chief, who was responsible for finding solutions to everyday problems. They enjoyed absolute rule and were considered sacred, not to be touched by ordinary people.

In 1643, a Dutch navigator, Abel Tasman, explored the islands of Vanua Levu and Taveuni. His description of the treacherous Fiji waters kept curious explorers away for almost 150 years. In the 18th century, British explorers would venture close enough to find additional islands that still maintained their mixed Melanesian-Polynesian populations. The Melanesians dominated the windward sides of the islands. The Polynesians controlled the interiors. A complex society with chiefs still existed.

In the early 19th century, trade attracted Europeans. By the 1830s, Fiji was overwhelmed with sailors from Australia, New Zealand, China, and the United States. They sought and most often depleted the island's supplies of sandalwood and sea cucumbers. This trade gave Fijians access to tobacco, metal tools, clothes, and guns. Early Europeans would teach Fijians enough about firearms to soon enable intertribal warfare that would divide the islands.

By the end of the 18th century, Fiji was divided into several small kingdoms, and the Fijian chiefs

Women and Children from the village of Silana. Courtesy of photographer, Gwendolyn A. Ross, United States Peace Corps.

were noticing more constant tribal warfare. Ratu Ebenexer Ser Cakobau was a notable native Fijian chief, who held a shaky and sometimes disputed title of "King of Fiji." He supported the messages being spread by the arriving missionaries, and in 1854, he converted to Christianity. Cakobau and the chiefs under his command were becoming increasingly alarmed with tribal division and constant war. He tendered offers ceding the rule of Fiji to Great Britain. In 1874, knowing that only a strong government could restore order and save Fiji, they tendered a second offer to cede the nation, and Great Britain accepted. Since Britain never fought for or conquered the islands, the relationship between Britain and Fiji was always respectful and productive. The British government encouraged a continuance of most Fiji customs and laws.

Although most customs were preserved, missionaries and the British government worked hard to suppress some Fiji practices. Cannibalism was noted from the time Europeans and missionaries first arrived on the shores of Fiji. To the early Europeans, it was a repulsive custom and one of the reasons so many explorers and missionaries stayed clear of the archipelago. The Fijians had practiced it from around AD 500 until the late 19th century. They believed that eating a person destroyed the person's spirit. Prisoners of war and shipwrecked sailors were brought to the village, sacrificed to the local gods, cooked, and then eaten on behalf of the gods. The custom fell out of practice after years of pressure by the missionaries and British government.

In modern-day Fiji, village land is owned through kinship. When a man dies, his possessions are passed on to his brothers. The brothers then leave this wealth to their eldest sons when they pass. All villagers are expected to contribute to the community or village.

— Debra M. Lucas

See also **Cannibalism; Polynesians**

Further Readings

Lasaqa, I. (1984). *The Fijian people: Before and after independence.* Canberra: Australian National University Press.

NgCheong-Lum, R. (2000). *Fiji.* New York: Times Publishing Group.

Scarr, D. (1984). *Fiji: A short history.* Laie, Hawaii: Institute for Polynesian Studies, Brigham Young University, Hawaii Campus.

Firth, Raymond (1901–2002)

From his position as a professor of anthropology at London School of Economics (LSE), Sir Raymond William Firth was in a position to influence studies of Pacific anthropology while contributing to anthropological theory in many areas, but he did so most prominently in economic anthropology. Firth studied at LSE, primarily with Malinowski, though he initially wavered between becoming an economist or an anthropologist. Born in Auckland, New Zealand (March 25, 1901), Firth received his PhD from LSE in 1927, based on a dissertation on Māori economics, and then began work among the Tikopia (1928–1929), which produced multiple monographs (from 1936–1970). Firth spent 1939 to 1940 in Malaya doing fieldwork, with his wife Rosemary studying fish marketing while she studied household economics.

Firth taught in Sydney from 1930 to 1932 and in 1933 took up a lectureship at LSE, where he stayed except for many brief stints elsewhere, particularly in Sydney, until his retirement in 1968. After retirement, Firth held brief visiting professorships in a number of North American universities: University of British Columbia (1969), Cornell (1970), Chicago (1970–1971), Graduate School of the City University of New York (1971), and University of California–Davis (1974). He was knighted in 1973 and died February 22, 2002, in London.

Firth claimed to be a Marxist of sorts. His analysis in Tikopia stressed the mutual imbrication of kinship and economic relations, with economic relations as a guide and controller of religious process. In his analysis of Malay fishermen, he used careful analysis of fish market bargaining to illustrate the relationship between social structure and economic rationality, again with the emphasis on the economic motivations for social action. Firth proposed that any adequate social theory had to have both a concept of structure and a more dynamic one of social organization emphasizing social choice and innovation. Having begun with training in Marshallian economics, Firth kept a key place in his anthropological work for economic maximizing but did recognize, in discussion and teaching, that over time, anthropology had moved from a concern with stability to an interest in conflict-based change, areas to which even dynamic maximizing activity was less relevant, and Marxism perhaps more.

Firth's work on symbolism and religion was always premised on religion being significant because it constituted important work done in society for either functionalist reasons or materialist ends. Though raised a Methodist, Firth soon abandoned any religious beliefs in favor of an almost Durkheimian perspective on religion: Thus, he initially claimed that religious trance could be said to vary along a continuum ranging from minor to major control by society, allowing no place for individual trance without attempts by others to control the spirits involved.

In an area of recent interest, the relationship between informants and anthropologists, Firth contributed an early and insightful article on his key informant in Tikopea, Pa Rangifuri. The article discusses Firth's relationship and friendship with his informant, the latter's biographical development over the course of 20 years, and, more generally, Tikopian attitudes toward Firth and the informant.

As a teacher, Firth had quite possibly even more influence than as a researcher. He emphasized detailed ethnography, a preference for process over structure, and the study of social organization firmly anchored in the material economy, with concomitant divergences from ideal rules. Despite or because of structure, people had much work to do on multiple levels.

— *Thomas K. Park*

See also **Anthropology, Economic; Anthropology, Social**

Further Readings

Firth, R. (1956). *Human types: An introduction to social anthropology.* New York: Barnes & Noble. (Original work published 1938)

Firth, R. (1966). *Malay fishermen: Their peasant economy.* Hamdon, CT: Archon Books. (Original work published 1946)

Firth, R. (1970). *Rank and religion in Tikopia.* London: Allen & Unwin.
Firth, R. (1973). *Symbols: Public and private.* Ithaca, NY: Cornell University Press.
Freedman, M. (Ed.). (1967). *Social organization: Essays presented to Raymond Firth.* Chicago: Aldine.
Watson-Gegeo, K. A., & Seaton, S. L. (Eds.). (1978). *Adaptation and symbolism: Essays on social organization.* Honolulu: University Press of Hawaii.

Folk Culture

To fully understand the concept of folk culture, we must first separate the two words and define them individually, then rejoin them to completely comprehend the term's overall concept.

Folk, or *folkways,* are routine conventions of everyday life. They are the customary ways that people act: eating, personal hygiene, dressing, and so on. Folkways are actions and customs that are of little moral significance; they are often matters of personal taste.

Culture is a characteristic of societies, not of individuals. Culture is all that is learned in the course of social life and is transmitted across generations, determining social hierarchy. It is the learned, socially transmitted heritage of artifacts, knowledge, beliefs, values, and normative expectations that provide the members of a society with the tools for coping with problems. It also provides an individual in a society the correct and appropriate ways to eat, dress, and the language to use. Culture is also the beliefs to guide behaviors and the practices to follow, and thus it shapes and structures social life.

Folk culture exists within a society, and it is whatever a member must know or believe in order to operate in a way that is acceptable to its members; thus, they must do so in any particular role that they have accepted for themselves. Folk culture is what individuals must learn and is separate from their biological heritage. It is the forms and means of ideas that people have in their minds, their way of perceiving, relating, and otherwise interpreting these forms. It is the things people say and do, their social arrangements, and events, which are products or by-products of their society as they apply it to the task of insightfulness and dealing with circumstances.

Source: © iStockphoto/Calvin Ng.

Folk culture and folk customs are the beliefs and traditions, within a group that preserves its language, and the social order and ways of interpreting the world. They are the accumulated mores and way of life (tales) and learning of particular peoples.

One of the major aspects of folk culture is the spoken word or language, as a means to communicate the core concepts within a society, the important religious and philosophical reflections on the human condition. Societal cognition and individuals' understanding of their uniqueness are a shared attribute often related through a form of symbolic language, and that symbolic language is the central feature of folk culture. Symbolic language affixes a group's culture and is the shared time and place of a people, which is endowed by nature with a desire to pursue their

personal self-interests within the society, which composes their knowledge of themselves. The ideas and concepts of societal cognition can be seen and understood by focusing on the corollary a folk culture has in its relationship to perception, reason, logic, and the way people classify objects and experiences in the world.

Folk culture is often a way a people make sense of their experience in ways that link them meaningfully to the wider world, a picture of reality based on a set of shared assumptions about how the world works. Folk culture is, in essence, the society's established symbolic frameworks, which highlight certain significant domains of social experience while rejecting others. Many folk cultures are a combination of worldviews that coexist in a single society; or a single worldview may dominate the way a society sees itself in the bigger picture. In addition, folk culture acts as a cultural device for understanding geographical features, societal landscapes, and historical backgrounds of folklore within a framework of socioeconomic and political domains.

Folk culture also explains the past-present continuum of folk traditions as seen in literature, inscriptions, artwork, and other items of material culture. Often, our analysis of pastoral and peasant societies gives us an understanding of environmental orientations and a physical reference within a given society or ethnic group.

One of the most important aspects of folk culture is folklore, and its place in the understanding of folk culture is essential to the overall concepts therein.

Folklore is the traditional art, literature, knowledge, and practice that are circulated largely through oral communication and behavioral archetypes. Most societies with a sense of themselves have possession of a shared identity, and a central part of that identity has to do with folk traditions, the things that people traditionally believe (planting practices, family traditions), do (dance, make music, sew clothing), know (how to build an irrigation dam, how to nurse an ailment, how to prepare barbecue), make (architecture, art, craft), and say (personal experience stories, riddles, song lyrics).

Folk culture flows through the realm of behavior, or more precisely, social action in which cultural forms find articulation. Thus, folk culture forms find voice in artifacts and in various states of consciousness, but these forms draw their meaning from the role they play, "its use" in an on going pattern of life, not from any intrinsic relationship they bear to one another. Folk cultural language in this sense is more than mere communications; the nature of the language as a tool or product of folk culture structures the perception of the outside world, emphasizing certain aspects over others. Thus, folk cultural language establishes a form of communications that helps a society articulate the deeper folk and cultural meanings that define that society's development, and describes a way for members in such a society to deal with their environment. Folk cultural language is made up of the myths and legends, folktales, and folklores that define and structure societal language. Often, these elements of folk culture are interchangeable, and their features frequently overlap, but a society's folk cultural language and its elements describe actions of divine beings to explain the origins of the natural world in its past.

— Frederick Meli

Further Readings

Linton, R. (1947). *The cultural background of personality.* London: Routledge.

Mair, L. (1969). *Witchcraft.* New York: McGraw-Hill.

Marcus, G., & Fischer, M. (1986). *Anthropology as cultural critique: An experimental movement in the human sciences.* Chicago: University of Chicago Press.

Wittgenstein, L. (1977). *Culture and value.* Chicago: University of Chicago Press.

FOLK SPEECH

Folk speech has come to mean the continued flourishing of earlier regional dialects in an age when all people in the United States begin to speak "Americanese."

At the beginning of the 20th century, people looked down on folk speech as a remnant of a rural past that Progressive Age Americans were anxious to forget. In 1913, *Webster's Dictionary* noted that folk speech was "the speech of the common people, as distinguished from that of the educated class." It was not until the 1930s that American folklorists such as Zora Neale Hurston and Alan Lomax began a comprehensive effort to salvage what was then recognized as a rapidly disappearing American cultural resource. Folk speech is really the history of the American people enacted in a very personal

way. All regions of the country and their ethnic groups have made their contribution to folk speech, including the Hispanic influence in the southwestern United States, Arizona, New Mexico, California, and Texas. From the time American fur trappers and frontiersmen and women began to venture into the area in the 1820s, this region has affected the speech of Americans in general. This was especially so after the region was annexed by the United States after the American victory in the Mexican War of 1846 to 1948.

Anyone who has ever seen an American cowboy movie would be surprised to learn that terms like *hombre, lasso, cigar,* and *chaps* all came from the language of the first immigrants to the region, colonists who began the trek north from Mexico in 1598. The current interest in the language of the region was highlighted by the success of the 1987 movie *La Bamba,* which chronicled the story of Mexican-American pop music star Richie Valens. Even Linda Ronstadt, whose father was Mexican, contributed to the folk craze with her *Canciones de Mi Padre* (*Songs of My Father*) tour in 1988 to 1989. In 2004, the Tex-Mex music called "Norteno" established Hispanic or Latino folk speech as a permanent mark on the American cultural psyche when a hit song by Texas's Flaco Jimenez earned the ultimate cultural acceptance—it became part of the regular repertory of the satellite radio station at Denny's restaurants.

— John Murphy Jr.

Folkways

Folkways are informal patterns of social interaction that reveal commonly shared attitudes and beliefs by members of intimate social groups. They are found in all societies and characterize subcultures such as age groups, peer groups, and professional groups, family units, or special interest groups. Folkways are typically unconscious ways of thinking and doing that are not codified as formal rules or regulations. When members of social groups deviate from folk norms, they can experience repercussions, but they are usually insignificant. Folkways are fluid. They appear spontaneously, without collaboration, and they can quickly disappear as group membership or circumstances change. Folkways are highly contextual, but they can survive persecution and be passed down through multiple generations in traditional societies. Anthropologists study folkways as creative adaptations to change as well as persistent ways of maintaining cultural values and behaviors.

Anthropologists study folkways as both material and ideological artifacts. They can be ad hoc explanations for curious circumstances that "make sense" in particular contexts. They can be shared wisdom that doesn't quite "make sense" at all, but is convenient for the moment. Folkways are most often clever interpretations of formal religious beliefs or scientific explanations when these codified ideas fail the test of "common sense." They are the names we have for substances we smoke, the procedures we use to dry fruits and preserve vegetables, the things we collect, and the analogies employed by preachers in their sermons. Folkways are innovations and inventions to counter the effects of pests and viruses, the techniques we use to hunt and fish, and the healing arts of folk medicine.

Folkways encompass folklore in the telling of tales, legends, jokes, and even gossip. They are the emotional tone and setting in the transmitting of moral values. They are as much about the way we tell as joke as the joke itself. They are the way we learn about sex, for example, as much as what we learn about it. It is the subtlety or aggression in the way we play lawn games at church picnics, as much as the kinds of games we play. It is the generosity or the intrigue associated with sharing favorite recipes, as much as the details of the ingredients. Folkways are the manner in which we bury our dead and mourn for them.

Folkways are the kinds of items we save for rags, the balls of string we wind, and the drawers full of plastic yogurt containers we never reuse. They are the names we give our children or nicknames we give our friends. Folkways are the practice of cleaning your shovel after you use it, washing your car in the winter, and the habit of kicking your boots against the side of the cement steps to knock of the barn manure before you take them off at night. Folkways are the habits we have that make us unique to others but are not really odd to us. They "make sense." They were the way your grandmother and her friends wore their hair that wasn't quite in style. They were the way your grandfather and his friends wore their dress shirts with their new bib overalls went they went to town on Saturday

night. Folkways are the quilt designs, quilting bees, and quilt auctions held in country churches in Iowa.

A classic example of an academic analysis of a folkway is the study of the transformation of the British version of cricket by the Trobriand Islanders off the coast of Papua, New Guinea. The game was introduced by missionaries as a substitute for local warfare between villages a century ago. The new game has expanded the teams to include all the men in each village clan. Challenging teams enter host villages in colorful parades. Players on both teams frequently interrupt the game with highly stylized dances and inventive mimicries of the colonial past. The parades and dances serve as ritualistic forms of aggression. This is an example of how a sport varies across cultures according to local folkways.

— *Barbara J. Dilly*

See also **Cultural Conservation; Ethnosemantics**

Further Readings

Denbow, J. (1999). Heart and soul: Glimpses of ideology and cosmology in the iconography of tombstones from the Loango Coast of Central Africa. *Journal of American Folklore, 112,* 404–423.

Kell, K. T. (1966). Folk names for tobacco. *Journal of American Folklore, 79,* 590–599.

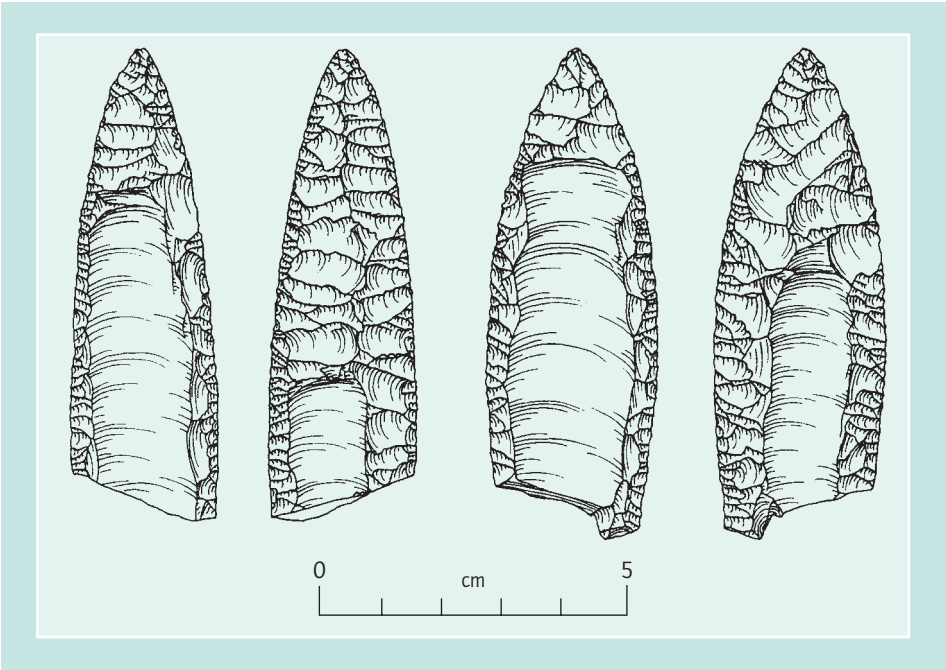
Weiner, A. B. (1977). Review of "Trobriand Cricket." *American Anthropologist, 79,* 506–507.

Folsom Culture

The discovery in 1927 near Folsom, New Mexico, of distinctive stone projectile points in unambiguous association with bones of extinct Late Pleistocene bison provided the first widely accepted evidence for a human presence in North America greater than a few thousand years and initiated the field of Paleo-Indian studies in American archaeology. The discovery also inspired the notion that Paleo-Indians were specialized big game hunters. The points were named "Folsom points," and the Folsom point makers were named the "Folsom culture." Folsom points are one of the most widely recognized point types, possibly in the world, but certainly in North America.

In 1927, in their second season of excavations at the Folsom bison kill site, investigators under the direction of the Colorado Museum of Natural History's Jesse D. Figgins and Harold J. Cook discovered fluted projectile points embedded in the ribs of a *Bison antiquus* skeleton. *B. antiquus* was thought to have gone extinct by the end of the Pleistocene, although the exact age of that event was not known until the 1950s, when radiocarbon dating placed it at about 10,000 years ago. In 1928, Harold Cook used the term "Folsom culture" to refer to the people who made and used the artifacts. By linking technologically distinctive points with extinct fauna in a deeply buried (2–3 m) sedimentary layer, the Folsom site provided a rough base upon which archaeologists could begin building a cultural-historical synthesis of North American prehistory.

The American Museum of Natural History conducted additional excavations at Folsom in 1928 under the direction of vertebrate paleontologist Barnum Brown. After the three seasons of fieldwork, investigators had found remains of about 30 bison, along with at least 14 Folsom points. Discovery of the Folsom site was soon followed by the first excavations of a Folsom bison kill- and camp site near



Folsom points (University Museum catalog numbers 36-19-19 and 37-26-13) from Clovis, NM. From Boldurian and Cotter (1999: Figures 38 and 39). Drawings by Sarah Moore. Reproduced with permission of Anthony T. Boldurian and John L. Cotter.

Lindenmeier, Colorado. Here, the Bureau of American Ethnology's Frank H. H. Roberts excavated remains of 13 *B. antiquus,* along with hundreds of Folsom points and hundreds of other stone tools, such as scrapers.

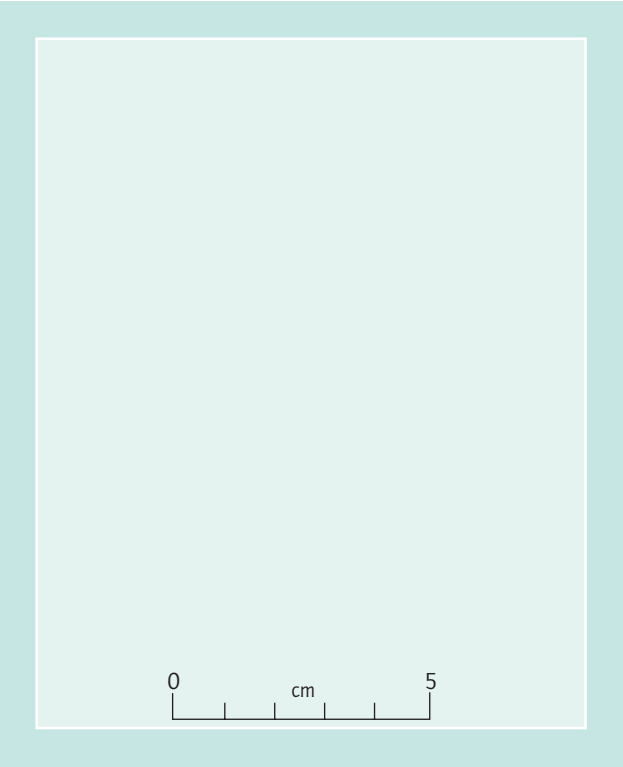
The technology and morphology of Folsom points are very distinctive and are expressed with incredible consistency over a wide geographic area. Folsom points are lanceolate in shape, thin, finished with pressure flaking, very finely made, usually have ground basal and lateral margins, and are distinctive in having a long and proportionally wide channel flake removed from both faces running from the base nearly to the tip, giving them a "fluted" appearance.

Besides the finished points, the fluting process also results in distinctive point preforms and channel flakes; all three are diagnostic artifacts unique to Folsom. Occasionally, a Folsom point is found with only one face fluted. Many Folsom point assemblages, especially near Midland, Texas, also contain unfluted points that are virtually identical to the fluted Folsom points in terms of shape, size, and technology. These points are called "unfluted Folsom points," or "Midland points," after the site where they were first documented. Much less common are points made on flakes that were shaped into a roughly symmetrical lanceolate form by minimal unifacial or bifacial marginal retouch. These points have been termed "flake points" or "pseudo-fluted" points.

Other flaked-stone tools in Folsom point assemblages include end- and side scrapers, finely pointed gravers, and ultrathin bifacial knives. Rare bone artifacts include eyed needles, beads, and decoratively incised items. Other uncommon artifacts include grinding stones, stone abraders, anvil stones, worked hematite, and even jet beads. Folsom stone tools are made almost exclusively from very high quality raw materials, much of it procured at significant distances. For example, the source of one of the end scrapers at the Lindenmeier site in northern Colorado is approximately 1,000 km to the south in central Texas.

Only a small fraction of Folsom sites have been radiocarbon dated. Uncalibrated radiocarbon dates from nine sites span a 700-year period from 10,980 to 10,250 radiocarbon years before present (rcybp). Calibrated radiocarbon dates from these same sites are older and span a slightly greater time range of 12,950 to 12,000 years before present. When Folsom points are associated with faunal remains, bones of *B. antiquus* are invariably present. The radiocarbon dates and consistent faunal associations support a Late Pleistocene age for otherwise undated Folsom sites.

Thousands of Folsom points from more than 1,500 sites have been documented. The geographic distribution of Folsom points is primarily on grasslands of the prairie and plains of west-central North America. This distribution reaches from Alberta and Saskatchewan to Chihuahua and southern Texas, and from eastern Oregon and eastern Arizona on the west to Minnesota, Wisconsin, Illinois, western Indiana, and the eastern parts of Missouri, Nebraska, Oklahoma, and Texas on the east. Physiographic



Folsom points (Texas Memorial Museum catalog numbers, clockwise from upper right, 937-18, 937-27, 937-59, 937-28, 937-12) from Clovis, NM. From Sellards (1952: Figures 25). Drawings by Hal Story. Reproduced courtesy of University of Texas Press.

Source: ©Art Department, CSULA.

provinces included in the Folsom range are the Columbia Plateaus, Northern and Southern Rocky Mountains, Wyoming Basin, Colorado Plateaus, Basin and Range (including eastern Great Basin section), Great Plains, and Central Lowland.

Folsom sites include camps, bison kills and butchery sites, and stone quarry workshops. Sites of all kinds tend to be small in size and in the number of artifacts they contain; Lindenmeier is a notable exception. The numbers of bison represented in kill sites also tend to be small (on the order of 5 to 8), although one site, Lipscomb, in Texas, contained the remains of over 50 bison.

Folsom culture is generally thought to have been characterized by a highly mobile lifestyle necessitated by a reliance on bison for most food, clothing, and shelter needs. Folsom culture is viewed as analogous to highly mobile historic-era Plains Indian cultures that hunted seasonally migratory bison herds. This view is supported by the consistent presence of *B. antiquus* remains in sites that contain any faunal remains and by typically small sites with artifact assemblages characteristic of a mobile settlement strategy. Some researchers have questioned this view based on several grounds, including the frequent presence of species other than bison (for example, pronghorn, deer, and rabbit) at many Folsom bison kill sites and concerns over potential biases in the archaeological record due to better preservation and visibility of bison bones compared with those of smaller animals. But the existing faunal evidence and the correlation of Folsom site locations with bison habitat appear to support a central role for bison in Folsom subsistence and settlement.

As of the end of 2004, older and younger Paleo-Indian skeletal remains are known, yet none are documented for Folsom. It is generally accepted that Folsom point users descended from earlier Clovis point users.

Other important Folsom sites include Clovis (also known as Blackwater Draw) and Rio Rancho in New Mexico, Mountaineer and Stewart's Cattle Guard in Colorado, Bobtail Wolf in North Dakota, Shifting Sands in Texas, and Cooper in Oklahoma.

— *Philippe D. LeTourneau*

See also **Clovis Culture; Native Peoples of the Great Plains**

Further Readings

Amick, D. S. (Ed.). (1999). *Folsom lithic technology: Explorations in structure and variation* (Archaeological Series No. 12). Ann Arbor, MI: International Monographs in Prehistory.

Boldurian, A. T., & Cotter, J. L. (1999). *Clovis revisited: New perspectives on Paleoindian adaptations from Blackwater Draw, New Mexico.* Philadelphia: University of Pennsylvania, University Museum.

Clark, J. E., & Collins, M. B. (Eds.). (2002). *Folsom technology and lifeways* (Lithic Technology Special Publication No. 4). Tulsa, OK: University of Tulsa Department of Anthropology.

Holliday, V. T. (1997). *Paleoindian geoarchaeology of the southern high plains.* Austin: University of Texas Press.

Wilmsen, E. N., & Roberts, F. H. H. Jr. (1978). *Lindenmeier, 1934–1974: Concluding report on investigations* (Smithsonian Contributions to Anthropology No. 24). Washington, DC: Smithsonian Institution Press.

Food

Food is any substance that can be metabolized by an organism to give energy and build tissue. Foods are made up of a combination of calories, proteins, fats, minerals, and carbohydrates. Enzymes in the mouth begin to break down sugars as food is processed for digestion. Upon entering the stomach, the acids therein separate the nutrients and useable compounds in the food in the processes of digestion. These are then absorbed into the body to become the energy source for functioning at the cellular level.

The importance of obtaining and processing food in order to live has been a driving force behind human evolution and culture history. It is hypothesized that the quest for food in the shrinking forests of Africa played a role in bipedal adaptation. Furthermore, the subsistence patterns of different cultural groups influence many of the other institutions in that society. For example, the Masai of Kenya are pastoralists who are organized in extended families that move with their herds to different grazing areas throughout the season. Ownership of cattle is transferred from father to son, and while the women care for the cattle, they can never own them and rely solely on the men in their society for economic stability. Hunter-gatherers are societies that practice food-gathering techniques, while other subsistence strategies include production techniques such as horticulture, pastoralism, and agriculture. Industrial societies also produce food, but the distribution often involves complex economic patterns.

The process of food acquisition for any species is the most important relationship it has to its environment, and for humans, many of the other basic features of their way of life are related to the subsistence pattern practiced. Hunter-gatherers move with the seasonal pattern of abundance in cooperative bands to harness energy and products from the environment. They live in egalitarian societies, which are highly mobile and congregate and disperse depending on availability of resources, and they are characterized by a gender division of labor that works cooperatively on a large land base. Pastoralists are also highly mobile; however, their nomadic lifestyle is divided into territories defined by grazing rights. They are herders who live in a symbiotic relationship with their animals, protecting them to ensure reproduction in return for food and other products. Horticulture is the cultivation of crops using hand tools and is characterized by a variable sedentary lifestyle, in which the group moves to a new area every 10 to 15 years, depending on soil fertility. Agriculture requires intensive and continuous land use for cultivating and raising domesticated plants and animals. Though these are four distinct modes of production, societies often have a mixed economy in which they practice one or more of these food-getting systems.

Because of the importance of food for sustenance, it has become a source of symbolic representation for various other aspects of life. Certain foods are indicative of ethnicity and have become an emblem of a cultural group. For example, pasta, eggplant, and artichokes are considered Italian cuisine, while hamburgers, apple pie, and Coca-Cola are an "all-American" meal; however, more specifically, grits, fried chicken, barbecue, and black-eyed peas represent the southern United States. The foods people eat reflect not only their cultures but also the circumstances in which they eat them. For many cultures, the nuclear family is the primary economic unit of production; therefore, this group eats together to socialize and strengthen the family bonds. However, in many Middle Eastern cultures, such as the Bedouin, only the members of the

same sex may dine together, revealing important facets of the social structure. Almost universally, sharing a table is a show of goodwill. In Pakistan, the Pathans of Swat social rules of hospitality demand that even enemies must be treated like guests until they leave the border of the host's territory, where they can show aggression even to the point of murder. In some societies, such as the Trobriand Islanders, another function of sharing a meal is to publicly acknowledge a marriage. Eating symbolizes the union of a new couple and also becomes a metaphor for the act of sexual intercourse. Euphemisms like "to hunger for" symbolize sexual desire, and the Mehinaku of the Amazon relate the act of sex to "eating to the fullest extent."

Source: © iStockphoto/Branislava Becejski.

Food is also important in its absence when certain prohibitions and taboos are related to rank or religious restrictions. In societies with totems, eating the flesh of the clan representation is akin to cannibalism. The Arapesh of Papua New Guinea consider the pigs they raise to be like children, and so they must exchange these animals, and that process creates an ongoing relationship with other groups. Other societies, like the followers of the Jewish and Islamic religions, have an aversion to pork based on religious edicts. Ostensibly, the reason is the "filthy" habits of pigs; however, there are no bans on chicken, which have many of the same characteristics. Instead, the cause can be seen in the early ecological niche of the domesticated animals of the region. In reality, pigs are more productively efficient energy sources; however, they share the same diet as humans, so the cost to raise them is greater than the "cud-chewing" ruminants that became the staple food source of these societies.

Taboos are limitations on what foods members of a society can eat, but limitations are also placed on how much one could or should consume. Western culture places an emphasis on attaining and maintaining thinness. In America, "fad" diets have become a marketing tool, capitalizing on the consumer's desire to look slender, even though these diets may fail to produce the promised results. Along with this trend is a rise in eating disorders caused by the pressure to conform. Anorexia and bulimia are consequences of a society in which food resources are abundant but people feel the need to starve themselves to look a certain way. By contrast, rural Jamaica is an area of limited resources, where the mark of health and wellness is a plump physique. These people are tied to a kin network, which emphasizes food sharing; therefore, gaining weight is indicative of good social relationships, and it is equated to reproductive fitness as well as personality traits like kindness and sweetness, whereas thin people are considered mean and stingy.

— *Luci Fernandes*

See also **Norms; Taboos**

Further Readings

Counihan, C., & Van Esterik, P. (Eds.). (1997). *Food and culture.* London: Routledge.

Rosman, A., & Rubel, P. G. (2004). *The tapestry of culture: An introduction to cultural anthropology.* New York: McGraw-Hill.

Schlosser, E. (2001). *Fast food nation: The dark side of the All-American meal.* New York: Houghton Mifflin.

Fortes, Meyer (1906–1983)

Meyer Fortes was born in South Africa in 1906. He attended school in South Africa, studying at the University of Cape Town in South Africa. He went to London, where he studied psychology at the London School of Economics and Political Science. In 1930, he received his PhD in psychology from the London School of Economics. However, he moved from psychology to anthropology, and in 1932, he began his studies with Bronislaw Malinowski at the London School. Two years later, he began fieldwork in Ghana, returning to London in 1937. He became a lecturer in social anthropology at the London School of Economics. Soon, he moved to the University of Oxford, and then to Cambridge, where he became a professor and chair of social anthropology at King's College from 1950 to 1973.

Fortes was an influential British social anthropologist. He trained with Charles Seligman, Bronislaw Malinowski, and Raymond Firth, significant figures in the development of British social anthropology. He went on to work with A. R. Radcliffe-Brown and E. E. Evans-Pritchard, as well as Max Gluckman. This extensive contact with the various branches of social anthropology allowed him to bridge the divisions within the school between the more psychologically inclined, such as Malinowski, and the more sociologically prone.

In fact, Fortes began his professional career as a trained psychologist. He combined his psychological interests with the prevailing structural functionalism of the period. His major interest ethnographically was in Africa. His primary fieldwork was with the Tallensi and Ashanti, in Ghana. His work was primarily in the study of family and kinship. Fortes developed these areas to a high level, providing major theoretical contributions in lineage theory, religion, and ancestor worship. Fortes was one of the pioneers in applying field observations to the furtherance of theoretical ideas.

Fortes was also deeply involved in the introduction of the work of Émile Durkheim to British social anthropology. Along with Radcliffe-Brown and Evans-Pritchard, Fortes viewed Durkheim as a spokesperson for a new science of social institutions. Durkheim's insistence on social facts provided a means for scientific rigor in anthropology. This rigorous structural functional approach provided social anthropology with a means and rationale for seeking interpretation for kinship systems, sacrifice, and other social collective institutions. Durkheim provided a means for uniting fieldwork and theory into a coherent theoretical statement. Each part of the system contributed to the stability of the whole.

Fortes had great influence in the overall development of British social anthropology through his position as professor and chair of social anthropology at Cambridge University from 1950 to 1973.

Fortes was a prolific writer. Among his significant works are *African Political Systems* (1940, with Evans-Pritchard); *The Dynamics of Clanship Among the Tallensi* (1945); *The Web of Kinship among the Tallensi* (1959); *Oedipus and Job in West African Religion* (1959); *Kinship and the Social Order* (1969); and *Time and Social Structure* (1970); *Social Structure* (1970, Ed.).

— *Frank A. Salamone*

See also **Anthropology, Social**

Further Readings

Hatch, E. (1973). *Theories of man & culture.* New York: Columbia University Press.

Hunter, D. E., & Whitten, P. (Eds.). (1976). *Encyclopedia of anthropology.* New York: Harper & Row.

Kuper, A. (1983) *Anthropology and anthropologists: The modern British school.* London: Routledge.

Fossey, Dian (1935–1985)

Dian Fossey was to gorillas what Jane Goodall is to chimpanzees. Her long-term studies of Mountain Gorillas *(Gorilla beringei beringei)* in the Virunga Volcanoes of Rwanda, in central Africa, laid the basis for understanding the behavior and social life of gorillas in general, and all subsequent fieldworkers on gorillas have built upon her work.

Like Jane Goodall, Fossey was a protégée of Louis Leakey, the renowned paleoanthropologist. On the grounds that the study of our closest living relatives, the great apes, would teach us a good deal about our own past, Leakey encouraged a number of enthusiastic individuals, almost all of them female, to study these species in the wild. Fossey and most of the others were untrained, but acquired academic training during the course of their fieldwork and in this way were able

to put their own observations into perspective and so could go on to make further insights. Dian Fossey (gorillas), Jane Goodall (chimpanzees), and Biruté Galdikas (orangutans) were the three who achieved long-term observations and so have contributed most to the field.

Fossey was working as an occupational therapist in California when she met Leakey during a trip to Africa in 1963. In 1963, on his urging, she began studying gorillas at Kabara, in the western part of the Virunga Volcanoes, in the Democratic Republic of Congo (at that time called Zaire). Political unrest made this location unsafe, and she crossed into Rwanda, where she set up a new field station at Karisoke, in the central part of the Volcanoes. (The Virungas span the borders of Democratic Republic of Congo, Rwanda, and Uganda). Here she stayed, on and off, for the rest of her life. She was devoted to Robert Hinde, her academic mentor in Cambridge, but was always anxious to be back in Rwanda.

Her contacts with gorillas become very close and intimate, and adults as well as youngsters would approach her, touch her, and sit by her while she wrote her field notes. She devised a system of recognizing individuals by the pattern of wrinkles on their noses, which she called "noseprints," on the analogy of fingerprints. She recorded the relationships of individuals within and between troops, and the means by which new troops are formed and established troops are inherited from father to son.

She was engaged in a continuous war with poachers, who would kill adults to sell their heads and hands as souvenirs to tourists or to capture youngsters for sale to zoos. She also constantly battled government officials who wanted to excise land from the Volcanoes National Park to plant crops, such as pyrethrum, or to graze the cattle herds there. On December 26, 1985, she was found murdered in her cabin. Two men, a camp steward who had been discharged and an American researcher, were initially arrested, but her murder was never satisfactorily solved.

Since her death, tourist visits to see gorillas in the National Park have been instituted. Dian Fossey knew about the plans and had been in two minds about this prospect, but the idea has proved a great success, earning Rwanda far more foreign exchange than pyrethrum or the cattle industry, such that during the massacres and civil war in the 1990s, the gorillas were hardly interfered with. Apart from the understanding of gorillas that she promoted, her enduring legacy is that the Mountain Gorilla still survives and flourishes to this day.

Source: © Bob Campbell.

— Colin Groves

FOSSEY, DIAN

The tragic death of Dian Fossey in Rwanda on December 26, 1985, was not completely unexpected. By the 1980s, poaching, the illicit hunting of African wildlife for profit, had become one of the world's largest clandestine businesses, making poaching not far perhaps from the smuggling of drugs as a major industry in third-world countries. With the beginning of her private war against the poachers, Fossey had made herself vulnerable to those who sought, with AK-47 assault

rifles, to harvest profits from her beloved silverback gorillas. Fossey had been hired by the pioneer African paleontologist Louis Leakey to study the gorillas because he felt they were important to his study of early man in East Africa. He and his wife, Mary, virtually created this field by their own endeavors, with their discoveries of *Zinjanthropus* man in 1959 and *Homo habilis* in 1960.

The work of these scientists was overshadowed by the wars that broke out in Africa after African countries had been given their independence by the European powers beginning in the 1950s. The Congo, where Fossey did her work, had been wracked by war virtually since Patrice Lumumba had become the first president in 1960. Indeed, Moise Tshombe, who led a revolt against Lumumba, forced Fossey from the Congo; it was after that she made Rwanda her base for her primate studies. Nine years after Fossey's death, 800,000 people were killed in 1994 alone in Rwanda in a bloody civil war between the Hutu and Tutsi tribes. Before another decade ended, in 2004, a further 3.2 million would perish in savage fighting in the Congo itself.

The result of the fighting was that the rival armies saw in poaching a way to raise revenue for their coffers, much like the warlords in Afghanistan turned to opium to fund their incessant feuding. Thus, instead of old-time poachers with elephant guns and obsolete Lee-Enfield rifles, the new poachers were armed with AK-47 assault rifles, increasing the speed and efficiency with which they could kill the endangered animals of East Africa. The massive poaching also had its effect on wildlife in Kenya, particularly on the majestic elephant herds, where Mary and Louis Leakey's son Richard carried on the family work.

In Kenya, according to an interview with Richard Leakey in 2001, the British *Guardian* newspaper asserted that "deserters from war-torn Somalia had wiped out 85 percent of the [elephant] herds in a few short years." Leakey had left paleontology to take over the Kenyan wildlife services and had pursued his fight against poaching with all the zeal of Fossey. The *Guardian* wrote, "Leakey was ruthless, and brilliantly successful. He raised £100 million overseas and instructed his rangers to start shooting poachers instead of tracking them. In one of the world's poorest countries, he torched millions of pounds' worth of stockpiled ivory, and lobbied successfully for a world trade ban. For the first time in over a century, African elephant numbers began to rise."

However, Leakey paid a high toll for his zeal, although he survived, unlike Fossey. "He lost both legs in a plane crash (still unexplained), and was horse-whipped on the campaign trail by government thugs," explained the *Guardian.* The crash, as well as the poaching, raised some uncomfortable associations with the corruption-plagued government of Kenyan President Daniel arap Moi. Leakey had been hired by Moi, but later emerged as perhaps his chief antagonist, and could have been in danger for this reason. However, called to task for corruption, Moi was forced out of running again for president in 2002.

— John F. Murphy, Jr.

Fossil Record

The origin and diversity of life on Earth has been one of humankind's most enduring sources of curiosity. The questions of, "who, how, when, where, and why" are still widely debated. These questions cross the boundaries between science, philosophy, and religion. It is not the intent of this entry to settle this controversy. Rather, it will look at these topics from the standpoint of science based on our current level of knowledge and understanding. This entry is arranged chronologically by era. The time spans discussed are compared to their relative positions from the "recent" end of a 100-meter-long rope to illustrate the quantity of time discussed and its distance from the present. Dates presented herein are primarily from the revised stratigraphic chart of the International Commission on Stratigraphy, 2004. The abbreviation *mya* means "million years ago."

One feature of the fossil record is that preserved fossil localities increase in direct proportion to how recently the localities were preserved. In most cases, the preservation is limited to hard body parts, and these parts are often poorly preserved. However, unusually complete and well-preserved assemblages that often include soft-tissue preservation, called

lagerstätten, greatly increase the available information for the time when the assemblage was preserved. When interpreting trends in the fossil record, it is easy to infer a gradual increase in diversity through time when, in reality, the increase is merely an artifact of an increased number of fossil localities. Likewise, lagerstätten have nearly always contributed to interpreted "explosions" of diversity. Unfortunately, these glimpses of possibly true representations of biotic diversity are limited to one environment and one instant in time, and these glimpses usually occur tens of millions of years apart. The fossil record thus does not contain enough information to provide any degree of accuracy concerning any but the most basic trends in biotic evolution. For this reason, this report should be considered a tentative representation of our current understanding rather than a definitive statement concerning Earth's evolutionary events.

Earth's Origin–Hadean Era: 4,550–3,800 mya (100 to 83.5 meters)

The Hadean is the most poorly known part of Earth's history. For much of this time, the Earth was in the process of coalescing, cooling, and continent forming. The 4.55-billion-year date for the beginning of the planet was not obtained from Earth's rocks, but rather from meteorites and moon rocks. These sources seem to place the "solidification" of our solar system, including the Earth, at that date. Then, for a period of time, the Earth likely underwent heating, compression, and eventual landmass solidification. The name "Hadean" was actually given to this period of Earth's history because of the tremendous heating and volcanic events that are speculated to have happened during that time. It is thought that a collision of Earth and another planetoid at approximately 4.5 billion years ago produced our moon and significantly remodeled the Earth in the process. This and other collisions kept the Earth very hot. However, it should be noted that this picture of Earth's distant past is highly conjectural. No rock outcrops are known that date to the first half-billion years of Earth's history. Some scientists have postulated the opposite effect, a "snowball Earth," for Earth's very early history, and still others have postulated an environment rich in oxygen since earliest times. Only the most widely accepted views will be presented here.

The oldest radiometric date obtained from any rock of potentially terrestrial origin is 4.4 billion years. This date was obtained from zircons embedded in younger sedimentary rock in west-central Australia. However, no parent rock has been found, and thus the zircons could theoretically have been of extraterrestrial origin. The oldest rock positively identified as terrestrial in origin is the 4.03-billion-year-old Acasta Gneiss, found near Great Slave Lake, in northwestern Canada. Other ancient sediments include the Porpoise Cove supracrustal sequence of northern Quebec (3.8–3.9 billion years old), the Isua Supracrustal rocks of Greenland (3.7–3.9 billion years old), and Barberton (southern Africa) and Pilbara (Western Australia) greenstone belts (3.3–3.5 billion years old).

The origin of life remains a mystery. Even the search for evidence of ancient life is difficult due to the rarity and metamorphism of preserved rocks of appropriate age and an agreement on what constitutes unequivocal evidence of life. Some researchers are convinced that unusual carbon isotopes found in the Isua rocks are proof of life on Earth nearly 3.9 billion years ago. Widely accepted evidence of life on Earth is fossilized algal mats (stromatolites) dating approximately 3.5 billion years old. However, considering how life must have started, these archaea (formerly known as *archeobacteria*) were exceedingly complex organisms. They could photosynthesize, if only through the primitive Photosystem I series of reactions, and could form colonies. Several lines of research now point to an origin of life (or possibly several origins) in a relatively hot, anoxic environment such as is found today around hydrothermal vents. Such environments were purportedly common in the Hadean, and much less common since. It should also be noted that virtually all information on early life comes from sedimentary rock, and undisputed evidence of life is present in the some of the earliest sedimentary rocks found on Earth so far.

The Planet Cools, and Life Thrives: Archaean Era: 3,800–2,500 mya (83.5 to 54.95 meters)

This era of geologic time occupies over one quarter of all time since the Earth was formed. It is marked by the presence of life and the absence of free atmospheric oxygen. The types of life present during this portion of Earth's history are represented today by similar forms living in hydrothermal pools or near volcanic vents and fumaroles on the ocean floor. These life forms did not need oxygen to survive. In fact, they produced free oxygen as a form of organic

waste. It is probable that these organisms were largely responsible for the atmosphere we have today.

The beginning of the Archaean is marked by the presence of free water in liquid form. The Earth, by this time, had cooled sufficiently that seas were forming, as evidenced by the presence of sedimentary rocks. It is unknown how long prior to the admittedly arbitrary 3.8 billion years Hadean/Archaean boundary water existed on Earth as a liquid, but it is likely that seas, continents, and atmosphere had combined to create a cycle of erosion and deposition by the beginning of the Archaean. Unfortunately, this early Archaean time is also poorly represented in the rock record.

The first undisputable evidence for life on Earth is found in the early Archaean sediments of the Barberton greenstone sequence of the Kaapvaal Craton found in South Africa and the time-equivalent sediments of the Australian Pilbara Craton. These sediments have been dated at 3.5 billion years old and may have been part of the earliest recognized supercontinent, Vaalbara, between 3.45 and 2.87 billion years ago. The African sediments contain carbon-lined tubules in lava rock, and both sediments exhibit fossilized algal mats. It is speculated that the lava tubule discovery is evidence not only for life but also for the trophic behavior of that life. The tubules are purported to show the feeding habit of at least one form of life at that time, burrowing into and eating the rock itself. There is also some evidence that even at this early stage in the history of life, genetic exchange (sexual reproduction) was occurring in some organisms.

Throughout most of the Archaean era, the relatively primitive Archaea consumed carbon dioxide and produced limited quantities of free oxygen. The oxygen was then "trapped" by several oxidation processes. Most researchers agree that the early stromatolites actually represent films of Archaea that exceeded the environment's carrying capacity, then succumbed to a mass die-off. Once most of these cells died, the environment stabilized, allowing the process to repeat, thus producing the stromatolite laminae. It is unknown how many types of Archaea lived during the 1.3 billion years when they were the most common life forms. Today, we have 3 major types of Archaea, and these show remarkably little genetic similarity to each other. In fact, each group is more closely linked genetically with other forms of life than with each other. It has been suggested that these groups became separate life lineages at the "protolife" level, and thus true life may have arisen more than once.

At approximately 2.8 billion years ago, or approximately 1 billion years after life on Earth first appeared, a new form of life made its appearance. Cyanophyta, commonly known as *cyanobacteria,* or blue-green algae, were the earliest life forms known to produce oxygen in large quantities. The Cyanophyta accomplished this by utilization of a series of reactions, known as Photosystem II, that break water into its components. Many believe that it was the early success of the Cyanophyta that produced the relatively large amounts of oxygen in our atmosphere. In a relatively short time from the first appearance of Cyanophyta, approximately 300 million years, the atmosphere of the Earth became saturated with oxygen past the point where oxidation processes could "trap" it. Oxygen then became a significant component of the atmosphere itself, setting the stage for a major environmental readjustment.

The Planet's Oxygen Atmosphere Arrives: Proterozoic Era: 2,500–542 mya (54.95 to 11.91 meters)

Approximately 43% of the history of the Earth is represented by the Proterozoic era. Its beginning is marked by the first appearance of "redbeds" in the stratigraphic record. These redbeds are sedimentary layers colored by oxidized iron. This worldwide oxidation of iron in subaerially exposed sediment required large quantities of oxygen in the atmosphere. The earliest occurrence of these redbeds has been dated at 2.5 billion years ago.

Although Archaea made up a significant portion of the total biomass during the Proterozoic, Cyanophyta were the dominant life forms. It was only during Vendian time, from approximately 600 million years ago until the end of the Proterozoic, that other life forms began to contribute significantly to the biomass. During the Proterozoic, an increase in the oxygen content of the atmosphere, from 1.5% at the beginning to 15% at the end, is attributed to being produced largely by Cyanophyta. It should be noted that heterotrophic eubacteria and eukaryotes are also found in the fossil record of this time period.

The Proterozoic has been broken into three subunits, the Paleoproterozoic (2.5–1.6 billion years ago), Mesoproterozoic (1.6–0.9 billion years ago), and

Neoproterozoic (0.9–0.54 billion years ago). The Paleoproterozoic is marked by the stabilization of several island continents and the significant occurrence of stromatolites. The island continents formed the supercontinent, Kenoraland, and this is the most likely cause of the first recognized major ice age event. The breakup of Kenoraland approximately 2 billion years ago roughly coincides with the end of this ice event. Unfortunately, even though sediments of this age are much more plentiful than those from the earlier eras, there are still large gaps in the preserved record of this time.

Of particular importance is the appearance in the fossil record of eukaryotic organisms (organisms with an encapsulated nucleus) during this time. Current interpretation is that eukaryotic organisms originated as symbiotic multiple prokaryotic cells existing within a common membrane. In the simplest model, an Archaea thermoacidophile and a nonphotosynthesizing, heterotrophic eubacterium formed a symbiosis that included a common cell membrane. Eventually, the Archaea portions evolved into mitochondria, and the eubacterium portions became nuclei. It is widely accepted that chloroplasts are evolved from photosynthesizing Archaea in a similar symbiotic relationship.

The Mesoproterozoic is better represented in the rock record than any previous period of time. Stromatolites are abundant, and fossils of eukaryotic organisms become increasingly prevalent throughout this time period. Island continents from the breakup of Kenoraland were again drifting toward each other, and eventually they came together to form Rodinia, the best-known early supercontinent, approximately 1 billion years ago. During this time, life forms capable of genetic exchange and sexual reproduction became common. Broad diversity of eukaryotic organisms, especially phytoplankton, is observed in the Mesoproterozoic of 1.1 billion years ago. Evidence of the first life on land, in the form of fungus (or possibly lichen), also exists from this time. However, possibly coinciding with the beginning of a major ice age, a decrease in observed diversity exists in sediments from that age to those from the end of the Mesoproterozoic and into the Neoproterozoic. The timing of this decrease in biodiversity begins roughly 100 million years earlier than the observed first advance of the glacial ice, so a more likely explanation is that a yet unknown environmental factor caused the decrease in biodiversity, which may also have led to a later glacial event. A third possibility is that these two events are unrelated and the timing is merely coincidental.

During the Neoproterozoic time, life complexity increased. Spongelike animals appear in the fossil record of this time. A major series of glaciations, the Varanger glaciation event, took place between 950 and 570 million years ago. It seems likely that major ice events occurred at approximately 800, 700, and 600 million years ago. At least three separate glaciation events have been documented between 750 and 600 mya. The first firmly documented extinction and evolutionary bottleneck event occurred during this time. This extinction records the loss of nearly 70% of then-living species approximately 650 million years ago. It is unclear to what extent the extinction event was related to the ice age environmental changes. The glaciations included continued cold (to −40 degrees average global temperature) for tens of millions of years. It is also thought that ice covered over 80% of the Earth's surface at times and that the only reason temperatures were able to moderate was due to an extreme greenhouse effect caused by carbon dioxide buildup. In any case, this extreme event was accompanied by a greatly reduced diversity of life during that time.

This point in geologic time also marks the reassembly of the subcontinents from the breakup of Rodinia into the new supercontinent of Pannotia. Pannotia is difficult to describe in both its extent and duration, since some portions were assembling while other portions were breaking apart. This process continued into the Cambrian. The major assembly of land masses during this process seems to have occurred during the latest Proterozoic.

The later portion of the Neoproterozoic is remarkable for the metazoan life diversity. The last period of the Proterozoic era is the Vendian period. It is rocks of Vendian age that contain the Ediacaran fauna of Australia and similar specimens from elsewhere around the world. The Ediacaran fossils include abundant precursors to corals, worms, sea-pens, and many forms that are difficult to classify. The Ediacaran fauna lived at least 20 million years after the Varanger glaciation, and the diversification of life that occurred during those 20 million years is impressive. Tissue-level organization of life is abundantly represented in the Ediacaran fauna, and organism-level organization of life is also represented. Although many of these animals seem unrelated to known forms, others appear to be primitive arthropods, cnidarians,

molluscans, echinoderms, and possibly chordates. There is little, if any, preservation of hard body parts in these animals, and it is thought that these fossils represent only soft tissue preservation. However, the most common rock in which these specimens are preserved is sandstone, usually a very poor preserver of soft tissue.

Life Becomes Complicated: Paleozoic Era: 542–251 mya (11.91 to 5.52 meters)

The Paleozoic era is marked by the appearance of animals with hard body parts and ever-increasing complexity. The boundary of the Paleozoic era is determined by the lowest occurrence of the complex trace fossil, *Trichophycus pedum*. This trace occurs lower than any other known complex trace fossil, and it is found globally at or below the first occurrence of shelly fossils. This boundary is unusual in that it is not associated with an extinction event. Vendian-type fossils are commonly found above the boundary, together with the remains of animals with hard body parts.

The Paleozoic era, especially the Cambrian period, is noted for its "explosion" of life diversity on Earth. For nearly 90% of Earth's history, life had remained simple and had barely achieved organism-level complexity. Then, all of a sudden, complex organisms abound in the fossil record.

The Paleozoic era is broken into six periods, each containing a different set of dominant life forms. Increasing complexity of organisms correlates with increasing diversity of organisms, and various groups appear, dominate the environment, and then give way to other types of organisms in comparatively short periods of time. Since most of what is known concerning the events leading to the current biodiversity of Earth occurred during this time, it is appropriate to discuss these biotic events by period rather than era. This pattern will be followed through the Mesozoic and Cenozoic eras as well.

Cambrian Period: 542–488 mya (11.91 to 10.73 meters)

The Cambrian period was a time of warm climates worldwide and diverse flora and fauna in marine environments. Climate was, from all indications, moderate, and there is no evidence of polar ice during this period. Several localities of unusually fine fossil preservation, including the Chengjiang Locality of China, dated at 535 mya, and the Burgess Shale Locality of British Columbia, Canada, dated at 525 mya, provide much of the data from which the current understanding of metazoan origins and early evolution is obtained. Terrestrial flora and fauna, as far as is currently known, consisted only of algae and possibly lichen. The dramatic increase in complex life forms found in marine environments was not initially mirrored in terrestrial environments.

Arthropods, in the form of trilobites, dominated the Cambrian seas. These "water bugs" were equipped with many "legs" for mobility and eyes for sensory input. Other animals, such as the 2-meter-long anomalocarids, also seem to be early arthropods or at least their close relatives. By the end of the Cambrian, arthropods had diversified, and early representatives of the chelicerates, crustaceans, and arachnids appear in the fossil record of this time.

Other animals, including representatives of nearly all current phyla and of several extinct phyla, are also represented in the Cambrian fossil record. Chordates such as segmented worms and conodonts appear and diversify, providing the first major step up the ladder of vertebrate evolution. More important, the appearance of two early jawless fish from a recent discovery in China attests to the presence of true vertebrates in the mid-Cambrian. These agnathans, one resembling the lamprey in body design and the other resembling the hagfish, indicate a relatively broad diversity in Agnatha by that time. This diversity suggests that vertebrate origins had to have occurred at least in the early Cambrian and may have occurred in the Neoproterozoic.

The end of the Cambrian period is marked by a major extinction event. The loss of taxa during this event included many brachiopod, trilobite, and conodont species. This extinction event seems related to a cooling of the ocean, possibly due to a relatively localized glaciation event. It is speculated that the faunal losses at that time were of warm-water species unable to tolerate a cooler environment. However, most of the evidence available indicates that mean temperatures could have altered only a few degrees, and the cool period was of short duration. These data suggest a minor, short-lived fluctuation that had a great effect on specialized organisms that were not able to adjust to these relatively minor fluctuations.

Ordovician Period: 488–444 mya (10.73 to 9.76 meters)

The early Ordovician is characterized by an increase in faunal diversity similar to that seen in

the Cambrian. By the end of the Cambrian period, approximately 200 marine invertebrate families are represented in the known fossil record; by the end of the Ordovician, that number had increased to 500. Animals appear abundantly in the Ordovician that were unknown or of minor importance in the Cambrian biosystem. These animals include corals, crinoids, bryozoans, foraminifera, graptolites, agnathans, eurypterids, bivalve molluscans (the alternative spellings of *mollusks* and *molluscs* are commonly used, though probably not correct), and nautiloid cephalopods. Ordovician trilobites were, for the most part, significantly different from their Cambrian counterparts in having developed bizarre spines and other specialized structures.

Significant terrestrial flora and fauna were present for the first time during this period. Very few Ordovician terrestrial fossil remains have been recovered, but those that have been suggest the presence of a developed terrestrial biota. Fungi have been identified from macrofossils of this time, while embryophytes have been identified from spores. Arthropod trackways are also documented from terrestrial sediments from the Ordovician.

Two significant geologic events occurred during this period. Extrusive volcanics of the Appalachians and large volcanic ash deposits suggest that volcanic eruptions of both types occurred that were possibly the largest single event of each type to have happened at any time during the Phanerozoic (Cambrian through present). These events may have been largely responsible for the significant cooling and glaciation of the end of the Ordovician and early Silurian periods.

The end of the Ordovician is marked by paired extinction events, most likely caused by extensive glaciation. The first is a drastic sea level drop, and the second, occurring approximately 500,000 years later, is a significant rise in sea level. Faunal counts across this extinction zone indicate that up to 85% of species on Earth became extinct during that time, making this extinction second only to the Permian/Triassic extinction in terms of numbers of species lost. The most likely explanation for these events is that the ocean levels dropped while ice sheets were building and advancing, then rose when the ice melted. The extinctions are thought to have been caused by marine animals not being able to adapt to the shallower and later, deeper environments to which they were subjected.

Silurian Period: 444–416 mya (9.76 to 9.14 meters)

The beginning of the Silurian period was a time of slowly moderating cold worldwide. However, during the period, the Earth's climate stabilized, and the runaway hot and cold cycles seen earlier in Earth's history have not been seen since. This moderation in temperature produced a subtropical climate over much of the Earth, but glaciers did occur above 65 degrees paleolatitude. Areas of arid landscape were common near the equator, and the equatorial seas were generally warm and shallow.

This environmental stabilization provided near-ideal conditions for another increase in diversity and complexity of life. Coral reefs became common for the first time. Brachiopods made a strong comeback after being decimated in the Ordovician-Silurian extinctions, comprising approximately 80% of the total known hard-shelled species by midperiod. Stromatoporoids and bryozoans contributed significantly to reef building, as do calcareous algae. Graptolites, conodonts, molluscans, and crinoids were also common. Trilobites were not as diverse as they were in the Cambrian and Ordovician, possibly because of the increase and diversity of eurypterid species. Jawless fish became widespread and diverse, and the period also marks the first of both freshwater fish and fish with jaws. Eurypterids, xiphosurans, and scorpions are also found in freshwater sediments of this period.

The first good evidence of life on land is seen in Silurian sediments. Discovered remains include relatives of spiders and centipedes and the earliest fossils of vascular plants. Most vascular plant fossils found have branching stems and no leaves. However, a lycophyte, a plant with leaves and a fully developed vascular system, has been reported from Australia.

The end of the Silurian is unusual in that it is not marked by a significant geologic or extinction event. The marker used to separate the Silurian and Devonian is the first occurrence of the graptolite, *Monograptus uniformis.*

Devonian Period: 416–359 mya (9.14 to 7.89 meters)

The Devonian period saw the continued rapid evolution and diversification of both plants and animals. The Devonian is known as the "age of fishes" because of the virtually simultaneous appearance of precursors

of all living groups of fishes and groups now extinct. However, plants experienced a similar radiation, and the first land vertebrates, insect precursors, and terrestrial spiders appeared. In the seas, ammonites made their first appearance, as did siliceous sponges. Brachiopod and coral diversity reached its peak, but trilobite diversity was declining.

The fossil record of the Devonian includes a broad diversification of jawed fish. Placoderms, acanthodians, sharks, and bony fish are all well represented. An extinction event between the middle and late portions of the period seems to have provided an opportunity for shark and bony fish evolution by removing many of the placoderms. The extinction occurred during a period of relatively uniform, warm climatic conditions, and many animal and plant groups were unaffected. Its severity (70% of known species) primarily represents the decimation of benthic, shallow marine species.

The most significant events of the Devonian occurred as both animals and plants began to occupy terrestrial environments. Terrestrial plants including lycopods, ferns, and horsetails appeared, and by the end of the period, woody, treelike lycopods up to 30 meters tall were common. By the end of the Devonian, seed-bearing plants had developed, although their colonization of drier, more inland habitats would come later. Insects were likely common at this time. However, the only fossil insects known from this period are springtails. Lobe-finned fish evolved that were equipped with both gills and lungs. They also had fins that resembled legs. It is thought that these adaptations were of benefit to survival in shallow marine environments. By the end of the Devonian, this lineage included true amphibious forms capable of walking on land for extended periods. This transition placed these vertebrates into an environment where eurypterids, arachnids, and primitive insects already existed.

Ironically, the terrestrial conquest by plants during the last portion of the Devonian may have been the cause for the extinction event that marks the end of the period. The end of the period is marked by slow cooling, increased atmospheric oxygen, and a decrease in atmospheric carbon dioxide. Terrestrial plants accelerated the formation of soils, thus accelerating the weathering of silicate rocks. The calcium and magnesium released, coupled with a significant increase in terrestrial photosynthesis, provided for significant additional removal of carbon dioxide from the atmosphere. The loss of this greenhouse gas concentration, in turn, allowed the Earth to cool by several degrees. Although the cooler environment did not immediately remove species from the system, apparently it hindered evolutionary adaptation and replacement. Thus, the Devonian extinction event was gradual, with species being removed from the system and not being replaced, rather than following the more catastrophic pattern seen in earlier extinctions.

Carboniferous Period (Mississippian + Pennsylvanian): 359–299 mya (7.89 to 6.57 meters)

The Carboniferous period was first described in England and referred to the lowest occurrence of extensive coal deposits. In North America, the same geologic strata were broken into two periods, the Mississippian and the Pennsylvanian. The Mississippian period featured extensive limestone, as the North American continent was mostly underwater during the entire period. The Pennsylvanian saw a lowering of sea levels and the formation of lowland, deltaic forests that were intermittently inundated by marine transgressions. For the geologic timescale to be applicable worldwide, some arbitrary "tweaking" of the units has made the Mississippian and Pennsylvanian of North America match the Lower and Upper Carboniferous of Europe, respectively. This shift has relegated the Mississippian and Pennsylvanian to an unnamed subperiod status.

The forests of the late Devonian gave way to low-lying shrubs in the early Carboniferous. Sea levels became high worldwide, and much of the Devonian forested land was inundated. The first truly terrestrial tetrapod vertebrates show up in the fossil record. Euramerica is tropical and equatorial, and life flourished in terrestrial, aquatic, and marine environments. It was during this time that the earliest known "reptile," *Hylonomus,* appears. It should be here noted that the term *reptile* is a catchall that contains representatives from several lineages and excludes their descendents, the mammals and birds. The appearance of *Hylonomus* places the origin of the amniotic egg in the Early Carboniferous. As the seed allowed plants to become separated from aquatic environments, so the amniotic egg allowed vertebrate animals to become so separated. It is a still unresolved mystery why animals with this obvious advantage did not become diverse and prevalent until more than 50 million years later.

In the oceans, the placoderms, so diverse in the Devonian, are missing from the Carboniferous record. Chondrichthyan have became diverse and were the top predators in the environment. Echinoderms, in the forms of crinoids and blastoids, became extremely common, and their calcareous skeletal structures add significantly to the limestone sediments of this period. Graptolites became extinct, and trilobites were reduced to one type.

By the late Carboniferous, the ocean levels alternately rose and lowered as Gondwana became covered by glaciers. Euramerica remained subtropical, and coal swamps became commonplace. Forests once again covered large areas of the Euramerican landmass. These forests consisted of diverse plants including 15-meter-tall tree ferns; *Calamites,* a giant version of the modern "horsetail" plant; *Lepidodendron*, a 30-meter–tall lycopod; seed ferns; and primitive conifer-like plants that reached 40 meters in height. These extensive forests eventually produced most of the coal on Earth today. Flying insects arrived, including cockroaches resembling those of today and dragonflies with 70-centimeter (2-feet) wingspans. Bony fish inhabited lakes and streams as well as marine environments. Many types of tetrapods were present, including representatives of virtually all amphibian groups and the precursors for the anapsid, synapsid, and diapsid amniotes. By the end of the Carboniferous, the supercontinent, *Pangaea* (the commonly used spelling, *Pangea,* is incorrect), had formed, and its formation contributed to a warming and drying trend that carried through into much of the Permian. No major extinction event is associated with the Carboniferous/Permian transition, but the coal beds disappear as the climate became warmer and drier.

Amniote origins and evolution has its roots in the Carboniferous period. However, the order of appearance of specimens in the fossil record does not match the current understanding of amniote evolution. It is thought that amniotes diverged into two groups, those in the synapsid lineage leading to mammals and those in all other lineages, very close to the point of amniote evolution itself. This would put the divergence somewhere in the early Carboniferous, no later than 325 million years ago. The second separation that is postulated to have occurred is that of the anapsids, the lineage leading to turtles, branching off nearly as early as that of the synapsids. Finally, the diapsid lineage leading to birds would branch off. However, in the fossil record, diapsids appear first, in the mid-Carboniferous; the synapsids appear next, in the Upper Carboniferous, and the anapsids appear last, in the mid-Permian. While it is certainly possible that these lineages did exist but have not been discovered in the fossil record, it is unsettling that the postulated evolutionary pattern is reversed in the known record.

Permian Period: 299–251 mya (6.57 to 5.52 meters)

The Earth during the Permian period experienced a varied climate, from glaciers in the south to swampy forests at the equator. As time progressed, the glaciers receded, and the equatorial areas became much warmer and drier. The large landmass of Pangaea likely interfered with the normal climate mitigation from the oceans. As a result, deserts and hypersaline inland seas were common. In fact, most of the Earth's salt beds were laid down at this time. During this nearly 50-million-year sequence, climatic fluctuations and increased loss of shallow sea environments precipitated the largest extinction event in Earth's history, the Permo/Triassic extinction. However, throughout the entire 50 million years of the Permian preceding the extinction, marine habitats were dwindling, and species diversity within families of marine animals was lessening. All marine animal groups, with the possible exception of the conodonts and fish, showed a marked decline in diversity throughout the Permian.

During the early portion of the Permian, amphibians such as anthracosaurs and cotylosaurs were competing with early synapsid reptiles for terrestrial dominance. However, amphibian diversity dwindled throughout the Permian. Although the Permo/Triassic extinction event had little effect on the amphibians, only a few forms survived into the Triassic. Pelycosaurs, including the sail-backed *Dimetrodon,* became the largest terrestrial predators. In a parallel evolution, *Edaphosaurus* and caseid pelycosaurs became the first large plant-eating amniotes, some reaching over 4 meters in length. In the mid-Permian, pelycosaurs disappeared, to be replaced by very large-headed but much more mammal-like therapsids. These therapsids are thought to be closely related to the pelycosaurs, but more specialized. In turn, the therapsids were out-competed by one of their daughter lineages, the theriodonts, during the late Permian. This new lineage of mammal-like reptiles, including dicynodonts, gorgonopsids, therocephalians, and cynodonts, most likely included the first warm-blooded, furry animals.

These groups, with the exception of the gorgonopsids, survived the Permo/Triassic extinction and were prominent in the early Triassic terrestrial ecosystem as well. Diapsid reptiles also made their appearance in the Permian, and the late Permian diapsid, *Coelurosauravus,* is the earliest known vertebrate capable of flight.

A series of relatively rapid fluctuations in temperature and moisture seems to have been the driving force behind a significant floral turnover during the Permian. Moist, tropical plants gave way to gymnosperms and seed ferns capable of withstanding a much wider range of climatic conditions. However, at the Permo/Triassic boundary, floral changes occurred rapidly. In some areas, gymnosperm forests were wiped out and lycopods took over, while in others, gymnosperm forests appeared. In most cases, the pattern observed throughout the Permian was disrupted at the Permo/Triassic boundary. Even where gymnosperms remained the dominant floral component, there was a species turnover, and the preboundary forms are not the same as those preserved after the boundary event.

The Permo/Triassic extinction event is identified as the most serious extinction of life ever in Earth's history. Approximately 90% of known marine species and nearly half of terrestrial species were lost. Several factors have been suggested as the cause of this catastrophe, including global trophic collapse, meteor impact, rapid climate change, anoxia, supercontinent formation, glaciation, and both explosive and nonexplosive volcanics. Unfortunately, there is seldom a single cause for any worldwide event. It appears that all the previously listed factors affected the Earth's biosphere at or near the Permo/Triassic boundary. No single factor has yet been identified that positively correlates with every major extinction event in the Phanerozoic, and the Permo/Triassic is no exception. Perhaps the key to this event is in the universality rather than the exceptions concerning this event. The Permo/Triassic extinction event is concurrent with meteor impacts, a supervolcano explosion, huge volcanic flows, climate fluctuations, a supercontinent, and food chain collapse. It may be, indeed, that the reason for this biggest extinction even in Earth's history is the concurrent series of events, rather than any single event.

Dinosaurs Rule: Mesozoic Era: 251–65.5 mya (5.52 to 1.44 meters)

The Mesozoic era was a time when the last major groups of animals and plants evolved. It is broken into three periods: the Triassic, Jurassic, and Cretaceous. The Mesozoic was, generally, a time of uniform warm temperatures and subtropical climates. However, the Permo/Triassic extinction radically altered the roughly steady progression of evolution and diversity of life on Earth. Wonderfully complex and interdependent reef communities were reduced to a few simple forms, and 250 million years later, reef communities were still relatively primitive compared with their previous complexity.

Triassic Period: 251–200 mya (5.52 to 4.40 meters)

Nearly total devastation in the marine environments coupled with hot, dry conditions over most of the terrestrial landscape made the early Triassic period relatively inhospitable. Although Pangaea is still intact, major ecological provinces are observed in the fossil record. These provinces seem to coincide with Laurasia versus Gondwana. However, these two subcontinents were joined by the early Permian and did not separate until the beginning of the Cretaceous period, some 150 million years later. Why such ecologic provincialism existed is unknown.

The two main marine environments were the deep-ocean Panthalassic Sea, which surrounded Pangaea, and the shallow, warm Tethys Sea, which was mostly surrounded by Pangaea (the Mediterranean Sea is a remnant of the Tethys). The seas supported a wide variety of chondrichthyan and osteichthyan fish, cephalopods, molluscans, and brachiopods. Marine reptiles, including ichthyosaurs, also made their appearance for the first time. However, this did not occur immediately after the Permo/Triassic boundary. Both seas exhibited anoxic conditions immediately, and for several million years after, the Permo/Triassic event. In addition, data suggest that the ocean chemistry included high levels of carbon dioxide and hydrogen sulfide during this time as well. Atmospheric oxygen was also depleted to its lowest levels in the Phanerozoic. Life seems to have maintained (and in some cases even flourished) only in isolated habitats during that time.

On land, amphibians made a brief comeback during the early Triassic, but were replaced in most terrestrial habitats by reptiles during the mid-Triassic. Extensive redbeds appear during this time, and these have been interpreted as indicators for hot, dry climate. It has been suggested that the amphibians made a resurgence because they were tied to rivers and

streams and the water ameliorated an otherwise harsh environment. Several lineages of synapsid reptiles survived the Permo/Triassic extinction, including Cynodonts, Dicynodonts, Gorgonopsians, and Therocephalians. However, Gorgonopsians vanish from the fossil record shortly after the Permo/Triassic boundary, and Dicynodonts and Therocephalians slowly dwindle and fade out of the record. It should be noted that *Lystrosaurus,* a Dicynodont, has been found worldwide in Late Permian and Early Triassic sediments. In general, therapsids constitute roughly 90% of early Triassic terrestrial tetrapod fossils.

Diapsid and anapsid reptiles were also present, although early Triassic fossils from these groups are virtually unknown. By mid-Triassic, a diverse fauna again appears in the fossil record. It appears that in the scramble for life during those first few million years after the Permo/Triassic extinction, animals were able to diversify quickly and to survive even if they weren't very specialized. As time went on, however, those lineages whose ancestors were somewhat specialized were able to out-compete those who weren't, and the number of different lineages dwindled. By the mid–to-late Triassic, the diapsid fossil record contains rhamphorynchoid pterosaurs, proto– and true dinosaurs, crocodilians, all major swimming-reptile groups except mosasaurs and lizards. Turtles and true mammals appear in the late Triassic fossil record as well. Dinosaurs diversified very soon after their origin. By the end of the Triassic, theropod, sauropod, and ornithischian dinosaur lineages were present.

The end of the Triassic period is marked by one of the "Big 5" extinction events. A regression of the oceans followed by an early Jurassic transgression are partially responsible for the loss of certain species during that time. Also during that time, one of the largest volcanic events, the mid-Atlantic rifting, began. This rifting and volcanic activity greatly increased the amount of atmospheric carbon dioxide, and it is likely that this event also played a role in the Triassic/Jurassic extinction event. The fossil record is, however, quite incomplete from this particular point in time, and it may be that these events precipitated a protracted faunal turnover that should not properly be considered an extinction event.

Jurassic Period: 200–145 mya (4.40 to 3.19 meters)

The beginning of the Jurassic period is marked by the breakup of Pangaea into Laurasia and Gondwana. The diversity of life seen in the late Triassic is generally seen to continue within the same groups in the Jurassic. A marine transgression covered much of the continental landmass during the early to middle Triassic. This transgression provided greatly expanded shallow marine habitat, and this habitat was soon teeming with marine reptiles, teleost and chondrichthyan fish, plankton, bivalves, arthropods, and other forms. Crocodilians were represented by species similar to the mostly aquatic forms found today.

Terrestrial ecology was dominated by a now diverse dinosaur fauna in both herbivore and carnivore roles. Cynodonts, including primitive mammals, diversified as small, insectivorous forms that did not directly compete with the larger dinosaurs. The tritylodonts survived as herbivorous protomammals well into the Jurassic. Gymnosperms and cycads were common, replacing the last of the seed ferns. Dinosaurs evolved as larger and more specialized forms throughout the Jurassic. The smaller and more generalized prosauropods of the early Jurassic gave way to the larger vulcanosaurids and cetiosaurids, which, in turn gave way to the diplodocids and camarasaurids. By the end of the Jurassic *Seismosaurus* and *Brachiosaurus,* the longest and tallest animals, respectively, to ever roam the Earth, wandered in North America. Likewise, the largest predator of the early Jurassic, *Dilophosaurus,* was replaced by the much larger *Allosaurus* by the end of the period. Smaller dinosaurs, such as *Othnelia* and *Ornitholestes,* were present at the end of the Jurassic. However, they were literally and figuratively overshadowed by the larger forms.

Birds also appeared in the Jurassic. However, these remains consist of only a few specimens of *Archaeopteryx* from the 150-million-year-old limestones of Solnhofen, Germany. The next oldest avian remains are those of *Confusciusornis* and others from 120-million-year-old sediments in China and the approximately 100-million-year-old remains of *Ichthyornis* from the chalk beds of Kansas. Archaeopteryx is so similar to small theropod dinosaurs that for many years, a featherless specimen was incorrectly identified as *Compsognathus.* Most researchers now believe that birds evolved from a *Compsognathus*-like small theropod dinosaur ancestor.

The Jurassic/Cretaceous boundary is the most problematic of any in the Phanerozoic. In many localities, unconformities (areas of missing sediments) are present at this level, and no identifiable marker has

been established where the sediments are present. Sea levels had dropped, but it had happened gradually. Small polar ice caps had formed, and temperatures did reach their coolest of any time in the Mesozoic. However, this "cool" period was still quite warm, even when compared with the Earth today.

It seems that the Earth experienced a faunal turnover around the time of the Jurassic/Cretaceous boundary, but it was apparently a gradual event. Animals would die out and be replaced in one habitat, while thriving for several million years longer before succumbing in other habitats. Perhaps the most visible event is the loss of most sauropod and carnosaurid dinosaurs from Laurasia at that time. Sauropods and carnosaurs continued to thrive in Gondwana but were nearly wiped out on the Laurasian continent.

Cretaceous Period: 145–65.5 mya (3.19 to 1.44 meters)

The Cretaceous period is marked by yet another marine transgression. Indeed, the name, *Cretaceous,* means "chalk," and refers to the chalk formations of the white cliffs of Dover, England. Early Cretaceous terrestrial deposits are rare. There was an approximately 20-million-year gap between the beginning of the Cretaceous period and the lowest occurrence of well-preserved terrestrial fossil remains. The most likely reason for this is that in most localities, these strata are missing.

By the middle of the Cretaceous period, designated as Aptian-Albian, the Earth's oceans had once again receded, and a diverse terrestrial flora and fauna are present in the fossil record. Angiosperms, the flowering plants, have made an appearance, although they did not become diverse and widespread until the very end of the Cretaceous. Both marsupial and placental mammals appear in the fossil record. Saurischian dinosaurs, including Acrocanthosaurus, Deinonychus, and Utahraptor, and ornithischians, such as Tenontosaurus, Psittacosaurus, and Sauropelta, represent the wide dinosaur diversity achieved by the Middle Cretaceous.

Another marine transgression separates the middle of the Cretaceous from the late, although terrestrial sediments are preserved in some locations during this time. Late Cretaceous Earth was dominated by a broadly diverse dinosaur fauna. By the middle of the Campanian age, approximately 75 million years ago, dinosaurs had reached the height of their diversity. Mosasaurs had appeared in the oceans, and flowering plants were common, although not yet the dominant flora. Marsupial mammals were common and diverse. From the mid-Campanian until the end of the Cretaceous, dinosaur diversity dwindled. Even though the numbers of specimens in the fossil record remain roughly equivalent, end-of-Cretaceous dinosaur fossil diversity is not nearly that of the Campanian. A few specialized forms seem to have taken the place of many less specialized types.

Undoubtedly the most famous extinction event is the one that marks the end of the Cretaceous period and the end of the nonavian dinosaurs. However, this extinction event was actually a relatively gradual turnover in flora and fauna that began at least 100,000 years before the iridium-enriched clay layer was produced and lasted for at least 300,000 years afterward. Other estimates place the beginning of the turnover at least 500,000 years before the iridium-producing event. In any case, several events occurred that would have caused at least regional biotic crises. First, mid-latitude climate on Earth changed from subtropical to temperate. Second, grass made its appearance as the dominant ground cover. Third, the Deccan Traps Volcanics were extremely active and were producing huge quantities of ash, methane, and carbon dioxide. And finally, an asteroid approximately 10 kilometers (6 miles) in diameter slammed into carbonate rocks of the Yucatan Peninsula, Mexico.

Although any one of these events may have caused the loss of significant life in Earth's ecosystem, it is likely that it required the combination of these events to actually produce the extensive species turnover seen in both the marine and terrestrial fossil records of the Cretaceous/Tertiary (K/T) boundary. Dinosaurs, and possibly pterosaurs, were likely among the first to disappear. The highest dinosaur or pterosaur remains found to date are still several meters below the iridium layer. However, in certain ocean regions, the turnover observed in fossil plankton is restricted to a dramatic change from one side of the clay layer to the other. This signifies a nearly instantaneous event related to the impact. Taking the evidence in combination, multiple causation of the K/T event is the only viable explanation.

Opportunity Knocks and Mammals Answer: The Cenozoic Era: 65.5–0 mya (1.44 to 0 meters)

The last 65 million years or so of Earth's history is well represented in the fossil record. It is interesting

that this last 1.5% of Earth's history has received more scientific attention than the other 98.5% combined.

Originally, all rocks and fossils of this age were labeled "Tertiary." Later, the most recent sediments were broken off into a Quaternary period. The Cenozoic era is currently divided into two periods: the Paleogene and the Neogene. This is a recent division that has replaced the Tertiary and Quaternary divisions at the level of period, and Tertiary and Quaternary have been raised to sub-eon status. This change has created a more equal period division and has placed the division at a point of major global climate change. It should be noted that the spellings, *Palaeogene,* and *Paleogene,* are both used in print. However, the International Commission on Stratigraphy uses *Paleogene,* and that spelling is thus considered proper.

Paleogene Period: 65.5–23 mya (1.44–0.51 meters)

The K/T extinction event removed most life, and many species, from both terrestrial and marine ecosystems. The loss of the top predators from both ecosystems meant that other animals no longer had to hide to survive. The fossil record indicates a very rapid increase in both number of species and in individual size. The climate itself, except for a short cold spell at the K/T boundary, remained a subtropical greenhouse over most of the Earth. Glaciers were unknown until the latest Paleogene, when the Earth began a gradual cooling that continued into the Pleistocene ice age. The breakup of Pangaea continued, and by the middle of the Paleogene, nearly all current landmasses had formed. These island continents provided reproductive isolation for their respective faunas, and life evolved along different paths in Australia, Eurasia, Africa, North America, and South America.

The Paleogene is divided into Paleocene, Eocene, and Oligocene Epochs. During the Paleocene, condylarths and creodonts dominated most terrestrial environments. Although ungulates descended from condylarth ancestors, the Paleocene terrestrial herbivore ecospace belonged to the nonungulate condylarths. Likewise, ancestors of modern carnivores were present in the Paleocene, but most terrestrial mammalian predators were creodonts. A flightless bird, *Gastornis,* was also one of the top predators of the Paleocene, at least in what is now Europe.

Many of the terrestrial mammals that thrived during the Paleocene became extinct about 10 million years after the K/T event. A major climatic event, the Paleocene/Eocene Thermal Maximum, is thought to have been responsible for this loss and also the loss of many types of benthic foraminifera. A very short-term event, measured at less than 20,000 years, saw a 15-degree rise in ocean temperatures, which affected even the deep ocean. It then took several hundred-thousand years for the temperatures to cool to equilibrium values. It has been postulated that methane "burp" caused the greenhouse conditions that raised the temperatures. Methane was, and is currently, trapped in huge reservoirs of frozen clathrate on the ocean floors. The melting of this material is thought to be a self-perpetuating reaction once started, and the reaction would end only when no more clathrate was left to melt. Some scientists believe that this is a recurring event that was the cause of the Permo/Triassic event and is the most imminent and significant threat to the current ecosystem.

By the Eocene, ungulates and carnivores were vying with the condylarths and creodonts, respectively, for their positions in the ecosystem. Also of note is the appearance in the fossil record of primitive anthropoids by mid-Eocene. Early ancestors of whales were beginning to inhabit aquatic environments, and most modern bird group origins can be traced to Eocene ancestors. A meteor impact formed Chesapeake Bay as a nearly 100 kilometer crater, and another, even larger, struck in Russia near the middle of the Eocene, but these impacts seem to have caused little harm to existing species.

By the Oligocene, the earlier forms had given way entirely to the ungulates and carnivores as the major terrestrial herbivores and carnivores. The first monkeys and apes also appear in the Oligocene. By the end of the Oligocene, Antarctica had taken up its position at the South Pole, and glaciers had formed on its surface. This positioning of Antarctica likely had much to do with the Earth's cooling. A rapid marine regression at the Paleogene/Neogene boundary was likely caused by the formation of Antarctic glaciers. The position of Antarctica is likely a major factor in the cooler-than-normal temperatures of the Earth today.

Neogene Period: 23–0 mya (0.51–0.00 meters)

The fossil record of the Neogene period generally depicts repeated adaptation to gradual, increasing cold. The four epochs of the Neogene—Miocene, Pliocene, Pleistocene, and Recent—are characterized by floral and faunal adaptations to geologically rapid

climatic fluctuations. The sediments of the Oligocene/Miocene boundary provide the first record of significant glaciation occurring above those of the early Mesozoic.

Cool temperatures and Antarctic glaciation of the early Miocene gave way to global temperatures similar to the late Mesozoic greenhouse by the middle of the epoch. Global temperatures reached an average maximum of approximately 6 degrees Celsius more than is experienced today. Although the temperatures rebounded from the early Miocene lows, temperature-sensitive plants gave way to grasses as the predominant ground covering. Toward the end of the Miocene, kelp forests appeared in the oceans for the first time, and global temperatures were gradually decreasing.

Mammals achieved their greatest diversity during the Miocene. Semi-isolation of continental landmasses allowed reproductive isolation and preservation of some less specialized groups in certain areas. Quality grazing and browsing habitats for herbivores also contributed to Miocene mammalian diversity. This diversity includes the first appearance of hominids in the fossil record.

The Pliocene was a time of cooler temperatures and drier climates. No major extinction event is associated with the Miocene/Pliocene boundary, and the flora and fauna in both terrestrial and marine environments remain largely unchanged throughout this time. The same may be said for the Pliocene/Pleistocene boundary. However, the global environment changed drastically approximately one third of the way through the Pleistocene.

The mid-Pleistocene glacial event marks the first glacial incursion into the middle latitudes since the Paleozoic. This unusually cold cycle is thought to be related to the continued location of a continent in the South Polar Region, coupled with global temperature and circulation patterns that largely block heat transport to the Polar Regions. It is thought that glaciation is somewhat self-perpetuating. As more of the Earth's surface is covered by ice, more of the sun's energy is reflected rather than absorbed. And, the less energy that is absorbed, the cooler the Earth gets and the more ice is produced.

Animals began to appear in the Pleistocene fossil record that were well adapted to cold environments. These animals include the wooly mammoth, wooly rhinoceros, elk, moose, and bison. However, the major glaciation events of the Pleistocene were relatively short-lived, lasting only a few tens of thousands of years on average. In between these events, the Earth experienced interglacial periods when the global climate was at least as warm as that of today.

Technically, the fossil record ends with the beginning of the ice age, because more recent remains have commonly not been "fossilized." However, the depositional processes that have provided an interesting and occasionally detailed picture of Earth's history are still at work, and they continue to produce a record of Earth's life and geologic events.

— David Trexler

See also **Big Bang Theory; Extinction; Paleoecology; Paleontology**

Further Readings

Altermann, L. W., & Corcoran, P. (Eds.). (2002). *Precambrian sedimentary environments.* Oxford: Blackwell.

Behrensmeyer, A. K., Damuth, J. D., DiMichele, W. A., Potts, R., Sues, H.-D., & Wing Scott, L. (1992). *Terrestrial ecosystems through time: Evolutionary paleoecology of terrestrial plants and animals.* Chicago: University of Chicago Press.

Farlow, J. O., & Brett-Surman, M. K. (Eds.). (1997). *The complete dinosaur.* Bloomington: Indiana University Press.

Koeberl, C., Martinez-Ruiz, F. C., & Ruiz, F. M. (2003). *Impact markers in the stratigraphic record (impact studies).* New York: Springer-Verlag.

Stiassny, M. L. J., Parenti, L. R., & Johnson, G. D. (Eds.). (1996). *Interrelationships of fishes.* San Diego, CA: Academic Press.

Szalay, F. S., Novacek, M. J., & McKenna, M. C. (Eds.). (1993). *Mammal phylogeny: Mesozoic differentiation, multituberculates, monotremes, early therians, and marsupials.* New York: Springer-Verlag.

Walker, G. (2003). *Snowball earth: The story of a maverick scientist and his theory of the global catastrophe that spawned life as we know it.* New York: Crown.

Fossils

What is a *fossil?* The word is Latin, and it means, "dug up." One of the earliest known research publications to use this term was Agricola's work on systematic

mineralogy, *De natura fossilium*. It wasn't until Lamarck's *Hydrogeologie* was published in 1802 that the term was restricted to "the still recognizable remains of organized bodies." Even as late as the mid-1800s, the concept of fossilization was, except in the minds of a very few, considered the result of a recent worldwide deluge. For over 1,000 years, just the discussion of events beyond the scope of the biblical account of creation could cause one to end up in prison or worse. Sir Walter Raleigh is one of the better-known of these victims. His conviction for treason and subsequent beheading was precipitated in part by his suggestion, in his volume entitled *History of the World*, that civilization was older than the biblical account allowed. The current definition of the term *fossil* has thus only very recently evolved.

Source: © iStockphoto/Fred van Engelen.

Currently, the term "fossil" refers to any remains or traces of once-living organisms. Although this definition is much narrower than the original term's Latin origin, it still covers a broad range of preserved structures. A fossil may be as simple as a single preserved mark in a sediment or as complex as a mummified dinosaur. It may be as old as 3.7 billion years or as recent as a few hundred. Fossils are as varied and diverse as the life forms that produced them and the climatic and structural conditions that preserved them. However, this vast array of preserved evidence of past life has survived to the present through only a very few natural processes. These processes include permineralization, tracks and traces, molds and casts, carbonization, and original preservation. The following is a brief examination of each of these processes and a description of the types of fossils preserved through each process.

It should be noted that one process is common to all fossil preservation: the process of protection. Regardless of the method of preservation, if the specimen had not been suitably protected, it would not have survived. Most often, this protection involves being buried and remaining undisturbed until discovery. Rapid encasement and removal of oxygen from the environment are the key protection criteria for virtually all fossils. These conditions are necessary to keep the organic tissue from either deteriorating or becoming damaged while the other processes take place.

Permineralization and Replacement

The permineralization process is the one most often thought of when one describes fossilization. It is defined as the molecule-by-molecule replacement of the organic remains with inorganic minerals. Through this process, the original structure of the specimen is preserved even at the microscopic level. Although this process has been performed in the lab in a matter of hours, it is a process that usually takes millions of years in nature. In fact, the process is almost never carried to completion; an average of 3% to 8% of the original organic molecules remain in permineralized specimens. The preservation of hominid remains range from virtually no permineralization to almost complete permineralization. The oldest recovered DNA from hominid remains is about 70,000 years. Mineral replacement in the older specimens has progressed too far to allow DNA recovery.

The permineralization process generally occurs in two stages. The first stage happens rapidly, and the second much more slowly. The first stage in this

process consists of filling the pore spaces and cavities, and the second stage is the replacement of the tissue itself. The speed at which these processes take place is determined by heat, pressure, mineral type, and quantity available, and groundwater flow. If an animal carcass is preserved in a hot-springs environment, it will fossilize much more rapidly than if it were in a sand dune in a temperate desert. However, the fossil produced in the desert environment would likely be much stronger and more durable, since the primary mineral available would be silica rather than the carbonate usually found in hot-springs environments.

Molds and Casts

If an object such as a tree trunk or animal carcass falls into mud that subsequently hardens, the mud produces a mold. This mold preserves the exact shape of the object. If the object then deteriorates and is removed, the cavity can be refilled. This infill is a natural casting. Natural molds and casts are some of the most common fossils. Silica infilling of the mold often produces beautiful agate and jasper. Fossilized wood limb casts preserved in this manner are often displayed with a polished cross section, and such specimens are sought by jewelers and rock collectors.

Carbonization

Soft body parts are rarely preserved. When they are, it is usually through the process of carbonization. When preservation conditions are just right, the organic material present in the original specimen is converted to various gases through chemical reactions, leaving only the carbon behind. The result is a thin film of carbon that often perfectly preserves the original body shape. This form of fossilization is responsible for such diverse remains as the Cambrian sea fauna of the Burgess Shale and the Eocene plants of the Green River Formation. This process, on a larger scale, is responsible for coal.

Tracks and Traces

This form of preservation is unlike any other, in that it preserves life events rather than death events. It is also unlike any other listed here in that it is not a single process that preserves, but rather a multitude of processes through which the life event was recorded. These remains include trackways as well as event traces, such as wing brushings, tail drag marks, nest structures, and coprolites (fossilized droppings). It is from these fossils that we gain our best estimates of speed, movement, and diet. This evidence is generally observed as impressions contained within a single sedimentary layer. Once the impression was made, the area remained undisturbed until another layer of sediment was deposited over the top, protecting the impression. Such impressions are among the most numerous of fossils, and they were the first recognized evidence of dinosaurs in the western hemisphere. Fossil hominid tracks have been found in Tanzania, and these tracks preserve some of the earliest life data for *Australopithecus.* The tracks were made over 3.5 million years ago and seem to represent a family unit, of father, mother, and child, walking together, with the child following the adults.

Original Preservation

Organic remains may be preserved unaltered in several ways. The common element for original preservation is extremely unusual circumstances. The cycling of organics from previously living plants and animals as part of their diet, then in turn their organics repeating the process, is responsible for supporting the variety and diversity of life on Earth today. Many mechanisms exist to perform the breakdown, and it is extremely unusual for any remains to escape all these breakdown processes. Encasement and desiccation are two processes through which unaltered remains may survive.

Encasement is a term reserved for preservation in an airtight medium such as tar, ice, amber, or copal. Organic remains preserved in this manner generally exhibit a certain amount of decay often leading to carbonization. However, freeze-dried mummies of Wooly Mammoths and a 5,000 year-old male human, a woman thrown into an asphalt pool at what is now Rancho La Brea, and mosquitoes from Dominican Republic amber (made popular in a major motion picture) are all exceptions. Each of these specimens has provided scientists with valuable clues from these exceptionally well-preserved remains.

Desiccation was one of the earliest observed preservation phenomena. Perhaps due to observations of animal and human carcasses that had perished in the desert, this same process has long been used by humans for the preservation of bodies. Egyptian mummies

were, in earliest times, created by being buried in the hot desert sand. However, as time went by, more and more procedures were added, and so in more recent times, desiccation was a minor factor in the total process.

Regardless of the means by which the fossil is preserved, original preservation retains the greatest amount of usable data for any specimen. However, much information has been gleaned from permineralized specimens, and even from natural molds and castings. Fossils provide a valuable resource for understanding life in the past.

— David Trexler

See also **Paleontology**

Further Readings

MacFall, R. P., & Wollin, J. C. (1983). *Fossils for amateurs.* New York: Van Nostrand Reinhold.

Mayr, H. (1992). *A guide to fossils.* Princeton, NJ: Princeton University Press. (Original work published 1985, as *Fossilien: Uber 500 Verlagsgesellshaft in Farbe.* Munchen: BLV Verlagsgesellshaft mbH)

Parker, S. (1990). *The practical paleontologist.* London: Quarto.

Raup, D. M., & Stanley, S. M. (1978). *Principles of paleontology.* San Francisco: Freeman.

Foucault, Michel (1926–1984)

Foucault's university education was a mixture of philosophy and psychology. He combined this with strong interests in aesthetics, social history, and the history of culture and discourse to produce a rich body of work, which evolved through a number of stages, covering many issues and having an enormous influence across disciplines. His work is present in philosophy, cultural studies, art history, literary studies, and everywhere in the humanities, as well as the social sciences. His work is hard to define as a whole; he wished to challenge boundaries in thoughts. The title of his last academic post, Chair in the History of Systems of Thought at the Collège de France, clearly cuts across the disciplines.

Foucault's first really influential work was *Madness and Civilisation,* which looks like empirical social science but also contains his other constants of an implicit engagement with the philosophy of Immanuel Kant, G. W. F. Hegel, Friedrich Nietzsche, and Martin Heidegger; an implicit engagement with the classics of social theory; and a commitment to the aesthetic expression of reality. He argued that there was a major shift from a premodern to a modern view of madness, in which the modern view was not an obvious improvement. The premodern view gave some of truth to madness, allowing it to confront the sane in the open. The modern view of madness rested on the institutional confinement, "the great confinement" of the "mad," who were now defined clinically instead of with reference to the possible insights of those who stand aside from apparent rationality. The premodern world defined the mad as other and separated them from the sane, just as the modern world did, but the consequence was not to hide them or to deny the value of all they said.

Through many shifts in Foucault's work, a position emerges that always remains. Social distinctions and discourse are inseparable. What we call knowledge rests on that interweaving. Power is inseparable from the way our social reality is created. Institutions can be understood only as expressions of this unity of power, knowledge, discourse, and social distinctions. Institutions can be studied as paradigms of that unity. There is a break between the modern and premodern periods, with a possible transition in the "Classical Age" (the French 17th century) and the Enlightenment. The modern period claims to be more humane than the premodern period but is not necessarily the case. The premodern period has manifest systems of separating and controlling what is "other" to normality; the modern period hides others and denies them any voice. The premodern period is aesthetic and openly agonistic; the modern period is rational and conceals conflict behind apparent the normality of universal values. Individual consciousness should be defined in terms of social structures and constraints, including those imbedded in our values and discourse.

Madness and Civilisation belongs to an "archaeological" period in Foucault's thought, where madness, hospitals, knowledge, and discourse are studied in terms of conceptual oppositions and discourse abstracted from everyday reality. A later stage of power/knowledge and the disciplinary can be established with reference to *Discipline and Punish* (1975). As in *Madness and Civilisation,* Foucault contrasted

the premodern and modern periods with reference to institutions, social relations, discourse, and power. However, he now emphasized that power and knowledge were inseparable and their point of union was in violence on the body. Power/knowledge exists not in terms of abstract theory or the legal sovereignty of the state, but in the networks of power that coerce the body. Power/knowledge exists in a dispersed way in local tactics of physical force, which precedes any discussion of beliefs and consciousness.

Foucault associates the premodern world with power, which exists as spectacular punishments. He begins the book with a notoriously distressing account of the truly spectacular cruel torture and execution of the would-be regicide Damiens, in 18th-century France. For Foucault, that execution marked the end of the Ancien Régime in the broadest sense, as it marked the end of a whole history of spectacular punishment. Foucault challenges the idea that spectacular punishment was less humane than modern disciplinary punishment, where we are placed under observation in prison. Spectacular punishment offers the opportunity for the victim and the crowd to resist the sovereignty of power that guides the drama of execution. The discipline of the modern era turns the prisoner into a normalized passive individual, produced by supposedly humane practices such as prison psychiatry, which are in reality just another violence on the body. For Foucault, the prison is the paradigm of the modern institution: factory, school, hospital, army. There is a very specific paradigm offered of Jeremy Bentham's "panopticon." Bentham's design for a perfect prison is one in which cells are arranged around a central observation tower so that all prisoners can be observed but none of them know at which moments they are under observation. In the panopticon, everyone is potentially under constant surveillance and disciplinary control. Before the full emergence of this paradigm, Foucault sees it as anticipated in early modern "cameralist" theory, which defines state functions as branches of the police.

The next main phase of Foucault's thought concentrates on the aesthetic and ethical aspects of the body and individual autonomy. The three-volume *History of Sexuality* (1976–) is the most systematic product of that final phase, interrupted by Foucault's death. Here Foucault offers a classical model of self-perfection, defined through the erotic, as a guiding principle. He denies the existence of sex or sexual categories such as "homosexual," the status of trans-historical truths. What we now call "sex" was known as "the flesh"; "homosexual" is a recently invented word with no direct earlier equivalents. Sexuality arises in various ways in which pleasure is enhanced through the frustration of pleasure. Repression produces pleasure, there is no pleasure without frustration, and the history of sexuality is the history of different ways in which this happens. We should avoid the assumption that any one age is more "liberated" or "repressed" than any other. The *History of Sexuality* suggests an aesthetic ethic of hedonistic-libertarianism, but only on the condition of forms of self-discipline and self-perfection. These claims should be compared with the lectures he gave at the *Collège de France,* where he moves away from defining the modern era as purely disciplinary on the cameralist model. He distinguishes between a modern approach of state control and the tradition of political economy and civil society. In the latter tradition, the state can successfully limit itself to enable individual and economic freedom.

Foucault seems to evolve from an earlier sympathy for Marxism to a later sympathy for Classical Liberalism. However, deducing consistent political conclusions from Foucault's work is notoriously difficult. What is consistent is a strong libertarianism in which Foucault analyzes the sovereignty of power and discourse, while trying to find forms of autonomy that can successfully resist them. This was also a personal commitment for Foucault, who campaigned for the rights of prisoners, psychiatric patients, and gays (he was an out gay himself who died as the result of AIDS, while still working on *The History of Sexuality*).

— *Barry Stocker*

See also **Law and Society; Sexuality; Social Structures**

Further Readings

Foucault, M. (1988–1990). *The history of sexuality* (3 vols.). New York: Vintage Books/Random House.

Foucault, M. (1995). *Discipline and punish.* New York: Vintage Books/Random House.

Foucault, M. (1998). *Madness and civilization.* New York: Vintage Books/Random House.

Frazer, Sir James (1854–1941)

Sir James George Frazer was born in Glasgow, in 1854; he died in 1941 in Cambridge, where he spent most of his academic life. He was the best-known anthropologist of his time. His work was deeply influenced by Auguste Comte, Herbert Spencer, and E. B. Tylor; that is to say, he applied a comparative and evolutionist approach to all available data, old and new. His solid foundation in the classics provided much of his comparative material. His main work, *The Golden Bough,* appeared in several editions: the first one in 1890, the last, abbreviated one, in 1922. It is still in print. This work, a comparative study of the evolution of religion as well as his many other publications on a variety of topics, influenced anthropologists, classicists, folklorists, scholars in the humanities, and psychologists, as well as the general educated reader, to whom most of his works are addressed. He was elected member of the British Academy in 1902 and was knighted in 1914.

Frazer, trained as a classicist and lawyer, first wrote on classical topics: the Roman historian Sallust (1884) and a six-volume edition on the 2nd century CE Greek antiquarian Pausanias (1898). This guidebook, the *Description of Hellas,* lists objects worthy of visiting in Greece, adding legends, stories, and anecdotes about them. Pausanias lists "survivals" of earlier times, a phenomenon that had been extensively documented by Tylor in his *Primitive Culture* (1871). Both works greatly influenced Frazer, whose methods were slow and meticulous: For instance, the work on Pausanias may have begun in 1884 but only reached publication 14 years later, in 6 volumes, totaling 3,000 pages.

In that same year (1884), Frazer met W. Robertson Smith, a fellow Scotsman who had been hired by Cambridge after having been run out of the Free Church College at Aberdeen in 1881 because of his heretical views. Robertson Smith was an ordained minister and worked on biblical subjects; he was the (future) author of *Lectures on the Religion of the Semites* (1889). However, at that time, he worked as an editor for the 9th edition of the *Encyclopedia Britannica.* He invited Frazer to submit some articles, all on the letter "P" and beyond. Frazer wrote the entries for Penates, Priapus, Proserpina, Pericles, Taboo, and Totem. Especially the latter two topics pushed him further into the direction of anthropology,

Source: © Bettmann/CORBIS.

and in 1887, he created a list of questions for those going into the field: *Questions on the Manners, Customs, Religion, Superstitions, etc., of the Uncivilized or Semi-Civilized Peoples.* The purpose was for others to collect the data in a systematic manner everywhere, so that true comparatists (like Frazer himself) could analyze the whole, preferably from their armchairs.

Frazer's subsequent major work, *The Golden Bough* (first ed. 1890, 2 vols.), carried the subtitle: *A Study in Comparative Religion.* Its main topic was the Aryan myth of the dying king or priest, whose death reinvigorates life on earth. He supported his thesis with multiple anecdotes, both ancient and modern. He argued that survivals of primitive religion(s), the result of diffusion, could still be found among farmers and other backward populations in Europe and could also be detected in some religious practices current in Christianity. His Victorian readers were alarmed to see such festivals as the Roman Saturnalia, the Crucifixion of Christ, and Purim linked as rites of renewal. Frazer's opinions on religion, especially Christianity, were expressed most strongly in his first edition of *The Golden Bough* but were gradually

toned down or drowned in comparative detail. The thrust of his work, however, remained the same.

The second edition (1900, 3 vols.) carried the subtitle: *A Study in Magic and Religion.* It highlighted the inability of the "savage" to understand the difference between the natural and the supernatural. As civilizations matured, magic was replaced by religion, which in its turn was shown to make room for science. *The Golden Bough* grew to 13 volumes (1918) and was edited down to a single volume of 800 pages (1922). A supplement, *Aftermath,* appeared in 1936, 5 years after Frazer had gone blind and relied on the help of assistants. Frazer's constant need for money—and the flood of new information coming in from Australia courtesy of W. B. Spencer and F. J. Gillen—drove him to revise many of his works, bringing in a stream of steady advances from his friend and publisher, George MacMillan.

Later in life, Frazer returned to work in classics, publishing a translation and commentary of *The Library,* a collection of Greek myths attributed to Apollodorus (mid-2nd-century BCE) in 1921. He published a translation of Ovid's *Fasti* (1929), a compendium in verse of Roman beliefs and customs related to the calendar. As his reputation among professional anthropologists waned, it increased among the general public. He wrote the introduction to Malinowski's *Argonauts of the Pacific* (1922); Freud wrote his *Totem und Tabu* (1913), inspired by Frazer's *Totemism and Exogamy* (4 vols., 1910). Frazer also influenced the so-called Cambridge ritualists (Jane Harrison, Francis Cornford, Gilbert Murray, A. B. Cook), a group of classical scholars who believed that ancient Greek religion and myth provided the clue to the origins of tragedy.

— *Thérèse de Vet*

See also **Anthropology, Social; Magic; Religion; Religious Rituals; Totemism**

Further Readings

Ackerman, R. (1987). *J. G. Frazer and his work.* Cambridge: Cambridge University Press.

Dorson, M. (1999). *History of British folklore: The British folklorists, a history* (Vol. 1). London & New York: Routledge.

Stocking, G. W. Jr. (1995). *After Tylor: British social anthropology 1888–1951.* Madison: University of Wisconsin University Press.

Freeman, Derek (1916–2001)

John Derek Freeman was born in Wellington, New Zealand. He first studied anthropology when Ernest Beaglehole offered a course on the subject through the Psychology Department of what is now Victoria University of Wellington. In 1940, Freeman took up a position teaching in Samoa, where he remained until 1943. Freeman subsequently studied at both University College London (MA Phil., 1948) and Cambridge University (PhD, 1953), writing a master's thesis on Samoan social structure and a doctoral dissertation on the Iban of Sarawak, Borneo. This latter work grew out of Freeman's 1949 to 1951 field study of the Iban. Freeman returned to New Zealand, teaching briefly at the University of Otago in Dunedin, before taking a position at the Australian National University in Canberra in 1957, where he remained until his death.

Thus, while he must have read some American or Boasian four-field anthropology, notably the work of Margaret Mead on Samoa, Freeman was largely trained in and taught within the British tradition of social anthropology.

Despite the quality of Freeman's Iban work, he was best known for his role in the so-called Mead-Freeman debate. For Freeman, this debate, at heart, concerned evolution. Freeman had become interested in the subject in the mid-1960s, not long before he returned to Samoa to undertake fieldwork. His later, more developed, position held that humanity's evolutionary history had produced a creature capable of making choices but nonetheless one whose capacities for responding to the world were embedded in biology, hence derived from the evolutionary past. Freeman considered that most modern anthropology had abandoned a concern with evolution and with human biology. He understood his part of the debate as both an exploration of anthropology's history and a correction of anthropological theory.

Freeman's first major statement in the debate was his 1983 volume, *Margaret Mead and Samoa: The Making of an Anthropological Myth.* The book is organized into two broad sections.

The first section advanced a historical argument. According to Freeman, Mead's teacher, Franz Boas, had become alarmed at the rise of the eugenics movement within the generally racist societies of the

United States and Britain. Accordingly, Boas had encouraged his students to gather materials that tended to emphasize the variability of human beings and thereby call into question the notion of an underlying, universal human nature. One of Boas's nemeses, G. Stanley Hall of Clark University, published a major work arguing that adolescence is everywhere a time of so-called storm and stress. As part of Boas's general project, Margaret Mead went to Samoa in 1925, intent upon studying female adolescence. In her 1928 book, *Coming of Age in Samoa,* Mead concluded that the young women and the girls she studied, all things considered, led comparatively stress-free lives.

Mead's argument attained wide circulation when her publisher, William Morrow, insisted that Mead add two chapters of material comparing Samoan and American adolescence. More important, for Freeman, modern anthropologists, unaware of or indifferent to the shortcomings of Mead's analysis, would contend that her Samoan findings supported radically culturalist hypotheses, emphasizing the mutability of humanity over and against more biologically grounded theories of an evolving human nature.

In the second section, Freeman undertook what he insisted was a Popperian refutation of Mead's thesis rather than an ethnographic report per se. Freeman presented a range of materials designed to show that Samoa was considerably more violent than Mead allowed and that female chastity prior to marriage was highly prized. Under the traditional system, some daughters of high-ranking men, identified as *taupou,* had been publicly deflowered by members of the groom's family as part of their wedding ceremonies. While Christian missionaries had inveighed against the *taupou* system, their influence contributed to a subsequent general prudishness. Freeman mentioned briefly that most Samoan women eloped *(avaga),* asserting that such elopements established the women's previous virginity.

Beginning with this assertion about female premarital chastity, much of the debate came to be focused around Mead's accounts of Samoan female adolescent sexuality, especially the inference that adolescents undertook perhaps multiple casual affairs. Much of Mead's description of Samoan female adolescence receded into the background; for Mead, these young women were generally junior, socially minor members of a highly stratified society, in which not only did they have little of importance to do but also their daily activities were often of little interest to their social superiors. During his second period working in Samoa, Freeman was an older, married man. He had been given chiefly titles by his chiefly interlocutors. He likely would not have had easy access to young women, as Mead clearly did.

Freeman, in his second book, contended that a young and relatively inexperienced Mead had been attempting to undertake two unrelated projects at once: one on female adolescence and the other on Samoan social organization. Rather than having made up her results, he claimed, Mead had more simply fallen victim of a hoax. Two of her informants, Fa'apaua'a Fa'amã and Fafoa, while accompanying Mead on a trip had become embarrassed by Mead's questions. In a fashion well understood by Samoans, they told Mead what they thought she wanted to hear: They had lovers when, in fact, they did not. According to Freeman, Mead, having gathered her only explicit statements from young Samoans about their sexual experiences, then wrote Boas, claiming to have gathered information supportive of culturalist arguments.

Freeman's supporting evidence was of two sorts: a filmed statement by an elderly Fa'apaua'a Fa'amã, stating she had hoaxed Mead, and a range of documentary sources, including Mead's papers. Freeman's use of both of these sorts of evidences has been criticized.

Some have contended that Fa'apaua'a Fa'amã may have been hoaxing Freeman or, more important, that she may not have been and likely was not, given Mead's text, Mead's sole source.

More concretely, Freeman's chronology of Mead's fieldwork was not wholly convincing, his arguments were anachronistic, and his use of documentary evidences faulty. He neglected the continuing presence of biological or physical anthropology within the Boasian conception of anthropology's four fields. Aside from his references to eugenics in his first book, he did not discuss the biology of the pertinent era when Boas and the young Margaret Mead had engaged in the activities he criticizes; rather, Freeman spoke from a perspective defined by the biological understandings of the later 20th century. He largely ignored Mead's use of the concept of "temperament," the interest Boasians such as Goldenweiser had in biological ideas such as convergent evolution, as well as the relationship between Benedict's notion of cultural selection and Darwin's idea of sexual selection. He repeatedly took quotes out of context, in some

cases clearly misrepresenting the apparent or plain meaning of the text quoted.

— *Gerald Sullivan*

See also **Boas, Franz; Mead, Margaret; Samoa**

Further Readings

Freeman, D. (1983). *Margaret Mead and Samoa: The making and unmaking of an anthropological myth.* Canberra: Australian National University Press.

Freeman, D. (1999). *The fateful hoaxing of Margaret Mead: A historical analysis of her Samoan research.* Boulder, CO: Westview Press.

Mead, M. (1928). *Coming of age in Samoa.* New York: William Morrow.

French Structuralism

Structuralism is a powerful theoretical framework that dominated French thought in the 1960s. Deriving from the insights of the Swiss Linguist Ferdinand de Saussure and receiving its most comprehensive expression in the anthropology of Claude Lévi-Strauss, the structuralist paradigm also operates in the political philosophy of Louis Althusser, the psychoanalysis of Jacques Lacan, the "narratology" of Roland Barthes, the sociology of Pierre Bourdieu, the "history" of Michel Foucault, and the genre studies of Tzvetan Todorov.

Uniting a generation of intellectuals against the postwar hegemony of Sartre's existentialism, with its emphases on the individual will and the act but also defined against phenomenologists such as Merleau-Ponty, structuralists were interested in the ways that acts were constructed by forces beyond individual consciousness. Structuralists saw systematic patterning in human expressions and actions that indicated not individual free will, but rather, structures of language, power, culture, and the psyche that had more or less determinant influences on consciousness.

Saussure's Premises

Before Saussure, the field of linguistics had primarily consisted of cataloguing the world's languages and tracing etymologies. Saussure rejected the study of empirically available elements of language for the study of the independent formal relations between them. In his *Cours de Linguistique Générale,* delivered as a series of lectures in Paris in the first decade of the 20th century, but only edited after his death, Saussure put forward several propositions about language that are definitive for the later development of structuralism. He postulated that language was a coherent social system regulated by the principles of syntax and semantics and that the structure of language consisted in the relations (principally oppositions) between its elements.

He further maintained that any given "signifier" (word) stood in a purely conventional relationship to its "signified" (meaning), with nothing essential, intrinsic, or even stable about the association. To understand language, therefore, linguists needed to chart the logical relations governing the production of utterances rather than these surface forms themselves: grammar rather than speech or, in Saussure's terms, *langue* rather than *parole.*

A Russian disciple, Troubetzkoy, achieved great success in applying Saussure's postulates to phonology. Troubetzkoy's student Jakobson, founder of the Prague Linguistic Circle, who would be Lévi-Strauss's colleague at the New School before and during the Second World War, developed Saussure's science of signs to analyze poetics.

Structuralist thought holds other social systems to be analogous to language, as defined by Saussure. Just as language grammars, of which most speakers are not consciously aware, govern the production of utterances, cultural, political, and other social phenomena conform to grammars or codes. Furthermore, Lévi-Strauss and Jakobson shared with psychologist Jean Piaget and Biologist François Jacob a conviction that a genetic mechanism acts as a "structuring force" in man.

Structuralist Anthropology

Lévi-Strauss saw cultural variation as a difference of number and arrangement, like, to use a favorite analogy, various melodies composed from a determinate number of keys. He studied the variations to generate the laws of transformation that formed the essential cultural grammar and indicated universal innate structures of mind. The ultimate goal was *l'attitude totalisante,* the awareness of complex social structure as determined by "unconscious reason."

Confusingly for the student of the history of anthropology, English social anthropology had already been describing its approach as "structural" or "structural functional." Radcliffe-Brown developed this other "structural anthropology" using Malinowski's concepts of functionalism. For Malinowski, human societies were the analogs of biological organisms, and institutions were explained by their contributions to social homeostasis, just as the organs of the body were explained by their regulatory or therapeutic functions. For Radcliffe-Brown, "structure" was equivalent to social organization. The network of "actually existing" social relations formed a society's structure, and consistent with the natural science paradigm, their quality was intrinsic to this structure.

For Lévi-Strauss, however, structure was the code governing the form of social institutions rather than anything that was itself empirically available. His analysis would focus on the quality of the relationships between the elements of his object of study and their arrangement.

Both Lévi-Strauss and Radcliffe-Brown wrote about the pronounced cross-cultural variations in the quality of the relationship between a son and his mother's brother. Radcliffe-Brown took the "elementary family" consisting of "a man and his wife and their child or children" to be the basic unit of kinship. The relationships among the members of this family were first-order kinship relations, and those connecting family units were second-order relations. Lévi-Strauss believed this to be a fundamental misunderstanding.

For Lévi-Strauss, the biological family was a term of the second order. The essential function of kinship was not the individual reproduction performed by the elementary family, but the establishment of relations between elementary families. Only by taking as the basic unit of kinship a configuration, including two pairs of correlative oppositions and each of the three types of familial relation (consanguinity, affinity, and descent) in each generation, does one have a meaningful structural unit, the building block of elaborate kinship systems. That is, it is only by drawing the relations between the pairs—brother/sister, husband/wife, father/son, mother's brother/sister's son—that the incest taboo, and the avunculate as its corollary, can be explained.

Lévi-Strauss generated a model capable of expressing the apparently contradictory forms of behavior across cultures—a deep structure of avunculate expressions. Comparing the Trobriand Islanders and the Cherkess of the Caucasus, he found that "in both groups, the relation between the maternal uncle and nephew is to the relation between brother and sister as the relation between father and son is to that between husband and wife. Thus if we know one pair of relations then it is always possible to infer the other."

In taking the biological family as the basic unit, Radcliffe-Brown had taken an arbitrary system of representation for objective ties of consanguinity and descent between individuals. "Any concession to naturalism might jeopardize the immense progress already made in linguistics, which is also beginning to characterize the study of family structure, and might drive the sociology of the family toward a sterile empiricism, devoid of inspiration."

In the introduction to *The Raw and the Cooked,* Lévi-Strauss maintained that myth was a fundamental object of study for the structural program, because, unlike kinship, it was not directly tied to a different order of reality. In myth, "the mind imitates itself as object." For Lévi-Strauss, myths function as mediating structures. As the spatial, formal, or material dichotomies figuring in the narrative of a given myth (high/low, water/earth, raw/cooked, sun/moon) relate symbolically to the basic problems confronting the human mind (male/female, life/death, nature/culture), myths perform vital intellectual and cultural tasks. Myths symbolically resolve, rearrange, decide, or explain by playing with binary oppositions.

The *meaning* of a myth resides in the way the narrative elements are combined. It is only the relations between elements that transmit information, express beliefs, ritually explain behavior patterns, and mediate the paradoxes created by social life. For example, in the series of myths whose analysis comprises *The Raw and the Cooked,* the logical relations between the qualities of "rawness" and "cookedness" that appear in the narrative differentially express beliefs and behaviors surrounding the antagonism between nature and culture. The extension of these terms—raw→moldy and cooked→burnt—represents one of the ways binary oppositions can be mediated and resolved.

The codes governing the production of myths are distinguished by comparing variants of the same myth along different conceptual axes, such as in Lévi-Strauss's analysis of variants of the Oedipus myth in *Structural Anthropology.* Myth's basic element is more complex that that of linguistic production. The "mytheme" ("Cadmos kills a dragon," "Oedipus kills

his father," or "Oedipus marries his mother") stands in relation to the seme or word as that element does to the morpheme or indivisible phonological unit. To the dimensions of language—*langue* and *parole*—the mythic code adds a third time-out-of-history level of operation.

Lévi-Strauss has been criticized for abstracting symbols out of their sociocultural contexts—denying the meaning-giving operations of specific historic, cultural, and personal conjunctures. However, he considers rigorous ethnographic methods necessary to the semantic level of his project. In analyzing individual myths, he relates narrative elements to the concrete social organizations, ritual practices, subsistence techniques, and basic geographies of the societies to which they belong. He uses ethnographic data to draw out the mediating functions of the opposing terms in the collected narratives. Lane proposes, in Lévi-Strauss's defense, that the structural method achieves a synthesis between the thesis—general properties of social life—and the antithesis—particulars of social anthropology.

Additional Influences

Lévi-Strauss credits Marx, Freud, and geography with the inspiration for his method. Elaborating on Marx's understanding of the relationship between a society's material economic base and its social and ideological superstructure, Lévi-Strauss describes the myth as an epiphenomenon of concrete social fact. His analyses also depend heavily on Freud's notions of unconscious psychic operations and particularly the operations by which symbols are created and invested. With Freud, he reads the "reason of the unconscious" in the creation and operation of these epiphenomena. He credits geology with the methodological proposition of simultaneous synchronic and diachronic readings. Just as one needs both to survey a landscape and to excavate at a certain spot to reach a geological understanding, to understand a mythical structure, one needs to "excavate" the meaning at a particular juncture as well as reading along the irreversible temporal axis.

Also important as intellectual forbears of the structuralism of Lévi-Strauss are Swiss anthropologist Émile Durkheim and his son-in-law, Marcel Mauss. Durkheim identified cultural forms as collectively authored and susceptible to symbolic readings as fulfillments of basic social needs. He also saw basic homologies between social institutions and categories of thought, although he tended to read from the social to the individual, or in the opposite direction from Lévi-Strauss. Lévi-Strauss himself credits Mauss's *Essai sur le don* with the first example "in the history of ethnological thought" of "an effort to transcend empirical observation and to achieve a deeper reality" (Lane, 1970, p. 30).

Structuralism's Prehistory

Marx is a significant precursor for the work of many French structuralist social scientists, notably Althusser, Bourdieu, and Foucault. Marx provided a framework for understanding why the actions of individuals would ultimately conform to their structural class interests, but he also proposed that acts could transform the structures of social relations of production. Lévi-Strauss forsook Marx's dialectical historicism for a determinant structure—the innate capacities of the human mind—that existed outside of historical time and was not susceptible to dialectic change. Others returned to Marx's social analysis but frequently concentrated on the determinant force of social structures on consciousness to the neglect of the effects of consciousness on history.

Lévi-Strauss's philosophy, although widely admired for its intellectual force and its elegant expression, found only a few committed adherents in England and America. Foremost among his British followers is Edmund Leach, and David Schneider is perhaps the best-known American structuralist. The American response has primarily been a reassertion of the significance of individual consciousness, location, and "voice," informed particularly by the increasing awareness that the societies studied by anthropologists are characterized by internal conflict and differential access to power. Structuralism's synchronic approach was also distasteful to postcolonial critiques and their insistence that the societies studied by anthropologists be placed in specific moments in global history.

Deconstructionism and Poststructuralism

Ironically, the "deconstructionist" and "poststructuralist" movements that followed the structuralist ascendancy in Paris derive equally from Saussure's insights into the operation of language and include

some of the same figures—notably Barthes and Foucault—claimed by structuralism. Derrida, in particular, developed the Saussurian premise that meaning existed only in difference. But this intellectual generation, sometimes dated to the uprising of May 1968, forsook any belief in a stable code. In fact, for them, belief in the fixity of signification has politically suspect motivations.

— *Molly Dulcinea Roth*

See also **Structuralism**

Further Readings

Dosse, F. (1997). *History of structuralism* (Vols. I and II). Minneapolis: University of Minnesota Press.

Lane, M. (1970). Introduction. *Structuralism: A reader.* London: Jonathan Cape.

Lévi-Strauss, C. (1963a). *The elementary structures of kinship.* Boston: Beacon.

Lévi-Strauss, C. (1963b). *Structural anthropology* (Vol. I). New York: Basic Books.

Lévi-Strauss, C. (1969). *The raw and the cooked.* New York: Harper & Row.

Merquior, J. G. (1986). *From Prague to Paris: A critique of structuralist and post-structuralist thought.* London: Verso.

Freud, Sigmund (1856–1939)

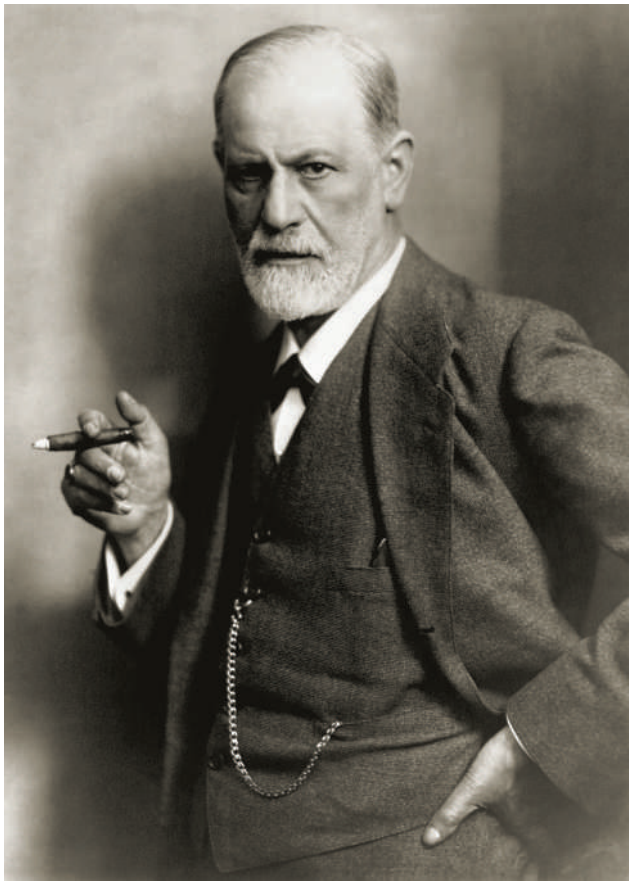
Sigmund Freud, born in Freiberg, Moravia, on May 6, 1856, and now known as one of the greatest minds of the 20th century, was a physiologist, medical doctor, psychologist, and the father of psychoanalysis. He postulated that many neuroses (mostly phobias, hysteria, chronic pain, and sometimes forms of paranoia) had origins in past traumatic experiences that were forgotten or hidden in the unconsciousness. Discoveries such as this made Freud one of the most provocative thinkers of his time.

Although Freud was an extremely influential thinker, his pioneering thoughts were set in motion by the works of other influential thinkers that preceded him. Two in particular are Charles Darwin, a naturalist, and Freud's early mentor Ernst Brucke, under whom Freud studied physiology while enrolled in medical school at the University of Vienna. Darwin revolutionized the conception of mankind when he published *The Origin of Species* in 1859. Up to that time, the human species was viewed as being distinct from the animal kingdom. However, Darwin theorized that not only is our species a part of the animal kingdom but it has also changed physically over time, just as all members of the animal kingdom have. This concept, known as *evolution*, suggested that mankind could be viewed as an object that can be investigated scientifically. Freud, first and foremost a scientist, accepted this idea implicitly and examined the human psyche analytically and scientifically.

The second groundbreaking concept that allowed Freud to develop his own original thought was work done by Freud's teacher Ernst Brucke. Brucke published work stating that all living organisms (including our species) are, like inanimate objects, energy systems, which are subject to the laws of thermodynamics, in particular the principle of conservation. The principle of conservation as formulated by physicists Mayer, Joule, and later Helmholz states that "energy is neither created nor destroyed, rather it only changes form." Brucke's application of this law of conservation to living systems was called *dynamic physiology*. Freud adopted dynamic physiology with enthusiasm, and it was only a short time before he conceptualized that such a thing as *psychic energy* existed and that the human personality was also an energy system. This concept would form the cornerstone of his psychoanalytic theory.

Two fundamental concepts developed by Freud are the *reality principle* and the *pleasure principle*. The pleasure principle, in a basic sense, tells the organism to do whatever feels good or whatever brings pleasure, such as satiating hunger or thirst or avoiding painful stimuli. However, the organism is particular in the sense that it acts to survive and to reproduce. Therefore, the urge to have sex is a powerful motivating force behind an organism's behavior. In addition, because the organism is a closed system and is dependent on the external environment that it experiences, it must be mindful of laws and rules involved with interacting with this environment. The reality principle tells the organism to subordinate pleasure to what is necessary, that is, procuring adequate food, work, and shelter, and so on.

In the human psyche, the conflict that arises between the pleasure principle and the reality principle is internalized by three properties explained by Freud, the *id*, the *ego*, and the *superego*. The inherited



Source: © CORBIS.

id operates in keeping with the pleasure principle, that is, the demand to take care of needs and, to an extent, instincts. Freud defined the translation of needs to wishes, provided by the pleasure-seeking id, as the *primary process*.

The ego is what relates man to reality by what Freud calls its *consciousness*. The ego functions in accordance to the reality principle. The problem-solving behavior that the ego uses to attain desired objects is known as the *secondary process*.

The ego struggles to satisfy the id but keeps track of the obstacles and strategies used to obtain its objects and the rewards and punishments encountered. This record of strategies and things to avoid becomes the superego, which also represents external society and its cultural restraints. According to Freud, the superego has two components, the *conscience*, which is an internalization of punishments and warnings, and the *ego ideal*, which is derived from rewards and positive models. In addition, the conscience and ego ideal relay their requirements to the ego with such feelings as pride, shame, and guilt.

According to Freud, the morals and ethics of a society may force an individual to repress desires and wishes presented by the id. Freud proposed a defense developed to cope with this dilemma and called it *sublimation*. He proposed that sublimation is the transformation of what society deems unacceptable impulses, such as sex or anger, into a socially acceptable form. An individual with a great deal of hostility may become a football player or a hunter. Someone with immense sexual desires may become an artist or a musician. Freud proposed that all creative activities were sublimations and were inherently motivated by the sex drive. (Freud called sexual energy the *libido*.)

Freud also believed that from the moment an infant is born, it is driven by the id to desire bodily pleasure. This is known as *infantile sexuality*. As a result of infantile sexuality, Freud proposed, early childhood sexual experiences were the crucial factors that influenced the development of the adult personality. He described five psychosexual stages in this process of development. The first stage is called the *oral stage*, which lasts from birth to 18 months. During this stage the focus of pleasure involves the mouth. The infant satisfies this desire by sucking and biting. The second stage is the *anal stage* and lasts from 18 months to 3 or 4 years of age. During this stage, the focus of pleasure is the anus and the act of holding in and letting go of feces. The third stage is the *phallic stage*, which lasts from ages 3 to 7. In this stage the focus of pleasure is the genitalia, and masturbation is common. The fourth stage is the *latent stage*, which lasts until puberty. During this stage, sexual urges are suppressed in favor of learning. The fifth stage is the *genital stage*, which begins at puberty. Freud believed that the resurgence of the sex drive occurs in this stage. During this stage, the focus is the pleasures of sexual intercourse.

During a child's development, Freud concluded, an *Oedipus/Electra complex* takes place. This complex is based on the psychology that a child's first love is the mother and that the child desires physical contact with her (this satisfies the id). A male child realizes that the father, the bigger, stronger male, gets the mother's love too and gets to sleep in the same bed with her. This eventually causes the male child to view the father as a threat, and this constitutes the Oedipus complex. With a female child, it becomes evident that there is a difference between boys and girls, that is, that boys have a penis and girls do not. It is also realized that the father has one, which is

why his relationship with the mother is different, and that the female child will never be able to have that (this is known in Freudian terminology as *penis envy*). So the female child's first love is the mother, but with all differences taken into consideration, she turns her attention toward the father and views the mother as a threat for his attention; this is the Electra complex.

The Oedipus and Electra complexes, according to Freud, may also influence sexual preference and bisexuality. He justified this theory with his fundamental concept of the id and the superego and believed that this was the time in which children begin (via the superego) to repress their attraction for one sex and develop an attraction for the other (usually the opposite). However, some children do not do so and instead develop attractions for the same sex or for both sexes. Freud also postulated that homosexuality and bisexuality were based in *narcissism*; however, he was never completely satisfied with his definition of homosexuality and bisexuality in respect to the human psyche.

Freud believed that an *unconscious mind* existed and based this idea on his belief that different mental states must exist. Freud pointed out that certain neurotic or compulsive behaviors could not be accounted for by the actions of the conscious mind. Therefore, an unconscious mental process must exist, which is hidden from consciousness. For Freud, instincts were rooted in the unconsciousness and were the principle motivating forces in the mental realm. He grouped instincts into two main categories: the *eros* (the life instinct) and the *thanatos* (the death instinct). Eros comprises the self-preserving and erotic instincts, whereas thanatos is geared toward aggression and self-destruction. *Eros* is motivated by the id and the sex drive. Thanatos is not motivated by the sex drive and is an irrational urge to destroy the self. According to Freud it was the root of suicidal urges in some of his patients. However, Freud also believed that the urge to commit suicide could not exist without a previously repressed urge to kill someone else.

Believing that an unconscious mind must exist, Freud went on to develop the *psychoanalytical method*, which in general terms was a method of reestablishing a harmonious relationship among the id, the ego, and the superego and of resolving any unconsciously repressed conflict. He developed this *talking cure* and encouraged his patients to relax by lying down on a couch. Then he reduced the amount of stimuli, even putting himself out of sight during the session. This method allowed his patients to discuss their problems freely and to relinquish the repression of the superego, allowing Freud to close in on the root of the problem. He also emphasized dreams and symbolism. He believed they were important because, during sleep, the superego is not able to repress the desires of the id and the feelings in the unconscious.

Today, many of Freud's ideas are still a predominant force in psychoanalysis, although some psychoanalysts disagree and disregard some of his ideas. However, what Freud accomplished in his day and age must be acknowledged. His pioneering ideas and vision have in fact made it possible for modern thinkers to attempt to disprove his ideas. He will always be remembered as one of the first to brazenly delve into the unconscious human mind, grasp its fundamental meaning, and then attempt to explain it to the people of his time.

— John K. Grandy

Further Readings

Freud, S., & Strachey, J. (1962). *The ego and the id (the standard edition of the complete psychological works of Sigmund Freud)* W. W. Norton & Company.

Freud, S., Strachey, J. & Gay, P. (1989). *Civilization and its discontents.* W. W. Norton & Company.

Freud, S., Strachey, J. & Gay, P. (1989). *The future of an illusion.* W. W. Norton & Company.

Gay, P. (1998). *Freud: A life for our time.* W. W. Norton & Company.

NEO-FREUDIANISM

Neo-Freudianism is a system of psychoanalysis based on Freudian doctrine, but modified by emphasizing social factors, interpersonal relationships, and other cultural influences on personality development or as causes of mental symptoms or diseases.

In the 1950s, some anthropologists called for a return to Freud, attempting to use his basic

insights into the relationship between culture and personality. However, they avoided some of his excesses and oversimplifications. Neo-Freudianism also pays attention to function rather than considering culture to be a projection of inner states. It considers social roles, too.

Later psychologists often believed in the underlying structure of Freudianism, but thought it was too narrow and stringent. Erik Erikson was one of the most prominent Neo-Freudians. He was a child psychologist and had trained with Sigmund Freud's daughter. He expanded upon Freud's theories, attributing greater status and autonomy to the ego, and considering it independent of the id in function and origin. He also put less emphasis on the psychosexual instinct and its influence on determining personality. Instead, he emphasized psychosocial development.

Freud's theories are all based on adult psychoanalysis. Erikson and others also included studies of infants and children. He believed parents' behavior was less important in shaping personality than Freud had thought.

August Aichorn, author of *Wayward Youth,* was one of the first Neo-Freudians to apply his theories to the psychoanalytic explanation of crime. He believed that an underdeveloped superego rather than an overdeveloped superego was the primary cause of crime. He popularized the notion that delinquents need unconditional love, rather than being institutionalized in a punitive setting. He believed many people who committed crimes had grown up without loving parents.

Healy believed that delinquents most frequently used displacement as a defense mechanism. This behavior includes compensating, substituting, and ditching. He discovered this while working at his psychiatric clinic in Chicago. He believed 91% of delinquents were emotionally disturbed, half because of a broken home and the rest because they were given too much or too little parental discipline.

Erich Fromm is sometimes cited as a Neo-Freudian, but his theory is a blend of Freud and Karl Marx, with the idea of freedom added. He believed people had the ability to transcend determinisms Freud had attributed to them.

– Pat McCarthy

Fried, Morton H. (1923–1986)

The highly influential writings of American anthropologist Morton H. Fried have made key contributions to explaining the origins of the state and its attendant modes of social stratification. Fried devised an evolutionary framework to describe the basic processes that account for general similarities in independent sequences of cultural complexity. Asserting that all significant differences among modern and historical world societies can be regarded as distinct stages of cultural development, from simple to complex, Fried argued that political integration covaries with economic differentiation.

By focusing on the interplay of resources, wealth, power, and political authority in the context of redistribution and reciprocity, Fried argued that states emerge from an ordered succession of less complex social forms, including egalitarian, ranked, and stratified societies. Egalitarian societies are those in which status differentiation and political leadership are situational and based on personal achievement (within the limits of age and sex) under conditions of generally equal access to economic resources. Out of these groups emerge societies that employ ranking as a structural principle for integrating multiple communities along kinship lines. Ranking of individuals and lineages is based on primogeniture, in which rank is hierarchically related to descent from an apical ancestor (the "chief" is Elman Service's typology).

According to Fried, stratified societies emerge from ranked groups that develop differential access to basic productive resources, such as land and water. Control and management of strategic resources provides opportunities for certain individuals to accumulate material wealth, which can be manipulated to generate social or political capital, for instance, by establishing reciprocal return obligations vis-à-vis contractual debt relationships. Fried believed that this social form is an ephemeral, fragile, and volatile condition that rapidly gives rise to complex political economies expressed as state developments or else breaks down into less complex socioeconomic forms. This is an important observation, because it acknowledges social devolution, in which complex societies decompose into less complex forms.

While many scholars have characterized Fried's framework as a unilineal evolutionary typology, Fried recognized an important distinction between

"pristine" (or "primary") and "secondary" developments. Pristine evolutionary developments refer to new levels of sociopolitical integration that emerge autochthonously in the absence of external influences from more complex societies. Secondary developments involve evolutionary changes that emerge as a result of intercultural interaction with more complex societies. Thus, Fried's model is dendritic and accounts for cases that fall outside of unilineal models of progressive cultural evolution (band → tribe → chiefdom → state), such as those of Elman Service and Marshall Sahlins.

Despite the elegance and explanatory power of Fried's model, a tremendous amount of variation in intermediate social formations has been documented with ethnological and archaeological evidence since Fried's initial publications in the 1950s and 1960s. This growing body of information suggests that an emphasis on nomothetic processes and general unilineal evolution is inadequate for explaining variability in specific sequences of change in complex social systems. Instead, recent scholarship contends that variation must be explained by historically contingent circumstances, where unique cultural trajectories derive from, or are shaped by, local differences in social and natural landscapes.

— E. Christian Wells

See also **Role and Status; Societies, Egalitarian; Societies, Rank**

Further Readings

Fried, M. H. (1960). On the evolution of social stratification and the state. In S. Diamond (Ed.), *Culture in history: Essays in honor of Paul Radin* (pp. 713–731). New York: Columbia University Press.

Fried, M. H. (1967). *The evolution of political society: An essay in political anthropology.* New York: Random House.

Friendships

The concept of friendship refers to a social phenomenon that is characterized by a diversity of ties and connections to a variety of degrees that are shaped by complex sociocultural codes. As a configuration of sociocultural practices, friendship remains an open concept used by researchers from different fields. Anthropologists, for example, experience their immersion in fieldwork through friendship. Personal relationships are central to the production of anthropologists' ethnographic enterprises. This is illustrated by the figure of the "key informant" in anthropology, which constitutes a highly polysemic medium that translates the cultural codes being studied by the ethnographer into intelligible fragments of understandings, recorded in field notes and transcripts. The relationship between the informant and the ethnographer is also the main theater in which contradictory emotions and feelings related to "social and cultural encounters" are played out.

Friendship (and its antonym, enmity), although undertheorized by anthropologists, is at the core of the anthropological textual mediation for understanding of differences, power relations, hierarchies, and cultural practices. This is reflected in many ethnographic reports and essays on a wide array of contexts. These range from anthropologist-informant relationships to gender and sexuality (including erotic subjectivity in the field and the role of gender, family, and intimacy in structuring friendship during the practice of fieldwork) as well as role and allegiances of anthropologists in the community being studied. Other foci related to friendship include the importance of friendship networks in creating access for anthropologists, how circumstances of fieldwork shape political repositioning of anthropology as a discipline distinct or separate from its colonial heritage, in addition to providing an analytical space for understanding mechanisms of oppression and social suffering. As anthropological study mostly takes place in contexts in which power relations underlie structures of oppression, anthropologists witness in-depth diverse human experiences of vulnerability that, in turn, contribute to their sympathy for the vulnerable, which may drive their narratives to the mainstream of the discipline in less of an ethnocentric or colonial way.

The conceptualization of friendship as relevant subject matter to think about sociocultural life is a recent endeavor, but its impact in helping reevaluate classical anthropological descriptions and analysis of sociocultural situations in both non-Western and Western societies is far-reaching. For instance, categories such as kin-friend and "idiom of affinity" were introduced in order to stress, in the first case, the

Source: PhotoDisc/Royalty Free.

equal importance of both kinship and friendship in social life and, in the second case, an ideology that ultimately confirms and strengthens hierarchies between groups and individuals while reaffirming the affinity of their shared imaginary world. Effort to think about friendship as a relevant social phenomenon has led to its cross-cultural conceptualization in a way that can only enrich anthropological discourses. Comparative studies of friendship help revise its Western-centered content and recall many stereotypes that used to prevent researchers from thinking about differences along a continuum rather than merely in terms of the duality "us versus them."

— *Louis Herns Marcelin*

See also **Ethnography; Social Structures**

Further Readings

Bell, S., & Coleman, S. (Eds.). (1999). *The anthropology of friendship.* New York: Berg.

Handler, R. (Ed.). (2004). *History of anthropology: Vol. 10. Significant others: Interpersonal and professional commitments in anthropology.* Madison: University of Wisconsin Press.

Kulick, D., & Margaret, W. (Eds.). (1995). *Taboo: Sex, identity and erotic subjectivity in anthropological fieldwork.* New York: Routledge.

Fromm, Erich (1900–1980)

Erich Fromm was born in Frankfurt, Germany, into an Orthodox Jewish family. A grandfather and two great grandfathers had been rabbis; an uncle was a Talmudic scholar.

Fromm studied at universities in Frankfurt and Munich before receiving his PhD in sociology from the University of Heidelberg in 1922. Though he lacked any formal medical training, Fromm soon began studying at the Psychoanalytic Institute in Berlin, under Hans Sachs and Theodor Reik. In 1926, he married Frieda Reichman, a psychoanalyst who later made important contributions to the study of schizophrenia. About this time, no doubt influenced by his studies and by the First War, Fromm abandoned

the practice of Judaism, though its influences would not be absent from his thought.

The Fromms moved to Frankfurt, where he was among the founders of the Frankfurt Psychoanalytic Institute. Max Horkheimer invited him to join the Institute for Social Research. During this period, Fromm worked on a study on the character structure of German workers, published posthumously as *The Working Class in Weimar Germany.* The Fromms divorced after 4 years of marriage.

Source: © International Erich Fromm Society.

In 1934, Fromm followed other members of the Frankfurt School to the New School of Social Research in New York. He would teach there, at Columbia, Yale, and Bennington, among other American institutions, until 1950. Early in this period, he was befriended by and came to influence Margaret Mead.

Fromm's first major book, *Escape From Freedom,* appeared in 1941. Showing the range of influences on Fromm's thought, its critique of the limits of Freudian psychobiology led to his expulsion from the New York Psychoanalytic Institute in 1944. Along with Harry Stack Sullivan and others, he then helped found the William Alanson White Institute; Fromm served as its clinical director from 1946 to 1950.

By then an American citizen, Fromm took up a post at the National Autonomous University in Mexico City. He taught there until 1965. He founded and until 1976 directed the Mexican Institute of Psychoanalysis but still remained active in American politics and intellectual life.

In 1976, Fromm, along with his third wife, moved from Mexico to Switzerland, where he later died.

Fromm's work was an extended meditation upon the social-psychological consequences of human existential separation. For Fromm, biological constraints, so important in the lives of other animals, has largely given way to social influences upon human life. Following Jakob Burkhardt, Fromm contended that individuals began to free themselves from the social regularities of feudal life during the Renaissance. The conventions of religious and economic life furthered this process, as Max Weber suggested.

These developments posed, however, a serious psychological problem. Without the psychological supports of an ostensibly preordained social order, freedom begat anxiety, what Fromm called "the inability of the individual to stand alone and live."

The ambiguities and ambivalences inherent in this situation led many to escape freedom in psychologically and sociologically unproductive ways. One unproductive response, exemplified in Nazism, involved a masochistic submission to one's social superiors and a sadistic exertion of authority over one's inferiors. Another unproductive response, exemplified in liberal democracies, involved a combination of alienated labor and consumerist social competition, yielding a conformity greater than required by the extant means of social coercion.

In contrast, a productive response would seek what Fromm termed "union with integrity." Such union fulfilled a human need for social engagement while simultaneously providing the conditions necessary for human beings to be not only free from social coercion but also free or able to respond to social life in ways that promoted broadly spiritual growth. This notion of productivity underlay Fromm's explorations of the

psychological preconditions of ethics, the art of loving, and his politics.

— *Gerald Sullivan*

Further Readings

Fromm, E. (1941). *Escape from freedom.* New York: Holt, Rinehart & Winston.
Fromm, E. (1947). *Man for himself: An inquiry into the psychology of ethics.* New York: Rinehart.
Fromm, E. (1950). *Psychoanalysis and religion.* New Haven, CT: Yale University Press.
Fromm, E. (1955). *The sane society.* New York: Reinhardt.
Fromm, E. (1956). *The art of loving.* New York: Harper & Row.
Fromm, E. (1959). *Sigmund Freud's mission: An analysis of his personality and influence.* New York: Harper & Row.
Fromm, E. (1984). *The working class in Weimar Germany.* (B. Weinberger, Trans.). Cambridge: Harvard University Press.

Functionalism

Functionalism was the predominant underlying theory in both British Social and U.S./American cultural anthropology from the beginning of the 20th century up through the early post–World War II era. Deriving largely from French sociologist Émile Durkheim's work, this school of thought saw societies largely through the lens of an organic metaphor, so that societies were believed to be parallel to living organisms, institutions parallel to bodily organs, and individuals parallel to cells. Like any organism, societies must sustain themselves over time, repair any damaged or diseased parts, and reproduce themselves. The functionalist imperative was to study, through proper scientific observation or fieldwork, the different ways that societies and cultures fulfill these necessary functions.

As a result of their reliance on this organic metaphor, functionalists came to their work with a variety of assumptions. The first functionalist assumption is that all healthy societies and cultures are well integrated and in a state of homeostasis. This meant that most functionalists assumed that societies and cultures, if left alone, would not change significantly. Instead, change was driven by outside interference. As a result of this assumption, functionalism as a theoretical paradigm was left without any method for studying change, other than to show the ways that a society regains homeostasis after "damage" is incurred from outside influences.

The second assumption is that societies or cultures are best studied synchronically, in one time period, rather than diachronically, or over time. Instead of relying on comparative work or grand theorizing, functionalism demanded of its practitioners that they engage in long-term participant observation to experience life in the society or culture firsthand. The resulting ethnographic writing produced by most functionalists took a "snapshot" view of the society or culture, primarily written in the present tense, the so-called anthropological present, to illustrate the assumed timelessness of what is being presented.

The third functionalist assumption was that the constituent parts of every society, from individuals to the largest political and social institutions, must be seen as interrelated and from a holistic point of view. While variations on this assumption divided British anthropologists from their U.S./American colleagues (see below), the important methodological ramification of this assumption, holism, remained true on both sides of the Atlantic. In other words, all constituent parts of a society must be seen as interacting with and influencing all others. As a result, it was impossible to study, for example, kinship in this paradigm without also looking at religion, politics, subsistence, and all other aspects of society.

Finally, as the name implies, the primary quest for understanding among functionalists was the search for the biosocial or social structural function of any given institution for maintaining the integrity of society. Functionalists assumed that all social institutions or cultural traits, no matter how obscure or seemingly maladaptive, were somehow integral to maintaining the society or culture within the ecological and social contexts in which it existed. Methodologically, this contributed to the development and refinement of anthropological relativism, the belief that all cultures and societies, as well as their constituent traits and institutions, must be looked at in their own context rather than judged by the values and norms of the anthropologist.

Two different kinds of functionalist theory emerged in anthropology fairly early on and served as

the primary split between British Social and U.S./American cultural anthropology. On the British side, A. R. Radcliffe-Brown, proponent of what has been called "structural functionalism," focused primarily on social structures and their systems of relationships in maintaining a well-integrated society. The structural functionalist school of thought, with contributors such as Meyer Fortes and Sir Raymond Firth, believed that the important level of analysis was society and its constituent institutions and roles. Individuals were seen as largely irrelevant as units of analysis. On the cultural side, Bronislaw Malinowski, one of the earliest functionalist anthropologists, focused his attention on the social and psychological functions of various cultural traits in the reproduction of both individuals and cultures. Malinowski and later U.S./American cultural anthropologists focused primarily on the ways that different cultures fulfilled the biological, psychological, and social needs of individual members, as well as the needs of the cultures themselves to maintain and reproduce themselves. Within cultural anthropology, various forms of functionalism emerged to explore different aspects of these individual and cultural needs, such as cultural ecology and its focus on the adaptation of cultural traits to ecological niches.

Functionalism emerged in reaction to earlier schools of thought in anthropology, primarily those focused on social evolution and the quest for the origins of social institutions and cultural traits, as well as those focused on the spread or diffusion of these institutions and traits. In reaction to the theorizing and historical guesswork of early anthropological work such as that of E. B. Tyler and Lewis Henry Morgan, functionalists abandoned the search for origins and the ranking of all societies in an evolutionary framework. Instead, functionalism developed a mode of synchronic analysis, such that each society or culture was to be studied as bounded and timeless. This move in the discipline coincided with a greater push toward positivism, the belief in value-free scientific method, and the development of the methods of participant observation.

In turn, functionalism has been criticized and largely abandoned in its purest forms, largely because of its inability to deal with change and history. While the synchronic method of analysis contributed many advancements in the field, such as the abandonment of historical speculation, later anthropologists began to seek ways to combine the strengths of synchrony with historical, or diachronic, views and to include change in their theoretical models. In addition, functionalism's belief in the possibility of a scientific, objective study of human societies and cultures has likewise caused later anthropologists to turn away from its somewhat mechanistic models and assumptions and toward more interpretive, humanistic, phenomenological, and "postmodern" approaches. At the same time, the functionalist imperatives of primary fieldwork, holism, and the "anthropological present" have continued to be cornerstones of most social and cultural anthropological research and writing to this day.

— *Barbara West*

See also **Durkheim, David Émile; Structuralism**

Further Readings

Durkheim, É. (1965). *The elementary forms of the religious life.* New York: Free Press. (Original work published 1915)

Malinowski, B. (1984). *Argonauts of the Western Pacific.* Prospect Heights, IL: Waveland Press. (Original work published 1922)

Radcliffe-Brown, A. R. (1964). *The Andaman Islanders.* New York: Free Press. (Original work published 1922)

G

Gaia Hypothesis

Developed by James Lovelock in his 1979 work, *Gaia: A New Look at Life on Earth,* the Gaia hypothesis offers an understanding of the earth as a living thing, capable of change and transgression. Lovelock named his theory *Gaia* after the Greek goddess responsible for drawing the living world forth from chaos.

The *Gaia hypothesis* suggests that the Earth, or Gaia, is more complex and mystical than anything imaginable. The enormity of the planetary system is something that we can never fully understand and we should acknowledge that when conducting planetary scientific research. The hypothesis also includes an explanation of life systems that exist on Earth. Gaia is not just the biota or the biosphere, but the conjunction of these systems. Gaia as the living planet refers to all parts of the earth: the rocks, the air, and the oceans. Atmospheric and hydraulic systems on the earth are constantly working in balance to maintain conditions necessary for its own continuation.

Because of this process, Lovelock argues that the Earth, similar to a human body, comprises systems that work in conjunction with one another to maintain the whole. If one part of one system is not functional, the others must react to sustain the whole. Lovelock also proposes that if we challenge Gaia and force a different set of conditions, because of clear-cutting forests, for example, the system will regulate itself but not necessarily in a way to support comfortable life for human and animal inhabitants of the Earth.

In essence, the Gaia hypothesis emerged from Lovelock's work with the National Aeronautics and Space Administration (NASA) to detect life on Mars. Through this work, he began to recognize planetary changes that suggested that planets are not simply stable environments, but living, changing organisms. Its purpose is to offer an understanding of the Earth as an organic system, one that is vulnerable, as any living thing is. Lovelock proposed the existence of a controlling mechanism on earth, one that keeps reactive gases in check, therefore keeping atmospheric and hydraulic conditions relatively constant. The Gaia hypothesis says that when the temperature, oxidation, state, acidity, and aspects of the rocks and waters are kept constant, this homeostasis is maintained by active feedback processes operated automatically and unconsciously by the biota. Many have debated this finding over the years and simply do not see the support for Lovelock's argument that classifies the earth as alive.

For others, the Gaia hypothesis is yet another proposition for how the earth emerged and why it remains the only planet on which life is found. In addition, characterizing the earth as alive recognizes that it is vulnerable. In doing this, one is forced to come to terms with the effects of human actions on a living, breathing planet. However, Lovelock proposes that although Gaia is vulnerable to human activity, it is not fragile. He offers clarification of this point by acknowledging the past devastation that has occurred on the planet and its ability to sustain life despite of this. Gaia is not in jeopardy of collapsing, but changing.

What is the relevance of the Gaia hypothesis today? It offers a holistic approach to understanding the earth as a system. We are not so much interested in the opportunity to prove the hypothesis correct or incorrect, but instead, what it may mean to see the earth as alive. One could argue that weather and natural disasters are examples of Gaia regulating herself in an effort to redirect balance from human impact. As Lovelock stated in 1979, Gaia has changed in the past to restore the imbalance of human activity. There is

no doubt that she will create planetary conditions necessary for the maintenance of her survival.

— *Erin Robinson-Caskie*

See also **Environmental Philosophy**

Further Readings

Lovelock, J. (1979). *Gaia: A new look at life on earth.* Oxford: Oxford University Press.

Lovelock, J. (1995). *The ages of Gaia: A biography of our living earth* (Commonwealth Fund Book Program Series). New York: Norton.

Primavesi, A. (2000). *Sacred Gaia: Holistic theology and earth system science.* New York: Routledge.

Galapagos Islands

On the Galapagos Islands, one has the exciting opportunity to walk in the footsteps of Charles Darwin on this primeval archipelago seemingly isolated from the destructive encroachment of human civilization and the ravages of time. This isolated archipelago consists of 15 major islands, along with numerous islets, uplifts, and reefs, located on the equator about 600 miles west of Ecuador in the Pacific Ocean. The "enchanted islands" reveal disturbing facts about this allegedly forgotten world of rock and life, often erroneously depicted as lost in time and enduring beyond the forces of change: The Galapagos flora and fauna struggle in the shadows of active volcanoes to survive against the increasing menaces of recently introduced species, particularly the human animal itself.

Darwin's eerie "cradle of life" appears as an inhospitable world of lava flows and desolate vistas: a cluster of igneous islands looking like a group of enormous chunks of lunar landscape haphazardly floating upon the swift Humboldt Current. When surrounded by mists and low clouds, these deceptively foreboding islands present a vivid scene reminiscent of our reconstruction of prehistoric times. In fact, this archipelago actually represents a delightful anachronism: present-day life forms eking out an existence in a pristine environment. Fortunately, the inhabitants enjoy a subtropical climate, which is cool, due to fresh trade winds and several capricious ocean currents.

The static first appearance of the Galapagos Islands is an illusion. An extremely strange but special place on the earth, this slowly changing archipelago testifies to the pervasive influences of evolutionary forces. This area of our planet is a geological hot spot of frequent and intensive volcanic eruptions, reflecting the restless and convulsive entrails of the earth: One sees craters, collapsed cliffs, and calderas everywhere. Within this century, wind erosion may finally cause the famous and official geological sentinel of these islands (Pinnacle Rock of Bartolome Bay, which rises 200 feet above sea level) to topple back into the ocean, which waits to once again reclaim its own.

The ages of these islands range from 600,000 years to at least 9 million years. (The discovery of fossil invertebrates and fishes in uplifted marine limestone layers between lava flows allows geologists to date the ancient strata of these rocks.) In fact, this entire archipelago is almost imperceptively drifting eastward on the Nazca Plate due to tectonic movement. The eastern uplift islands are oldest and may sink back into the sea, while the western volcanic islands may suddenly explode. Yet further geological building is likely to result in the eventual formation of new islands.

On the summit of a volcano on Bartolome Island, 364 feet above the ocean, one experiences the breathtaking panoramic view of a moonlike landscape of craters and spatter cones against the blue ocean. Populations of surface colonizer plants and lava cacti need only soil, moisture, and oxygen to survive in this rugged and demanding volcanic environment.

The Galapagos Islands were the catalyst that inspired Charles Darwin to formulate his theory of biological evolution. When he arrived here in 1835, animals displayed little fear of humans. Over time, the creatures have learned to fear our species. As a national park belonging to Ecuador, this ever-changing archipelago remains a refuge for numerous vulnerable species (especially a wide variety of birds), some found nowhere else on this planet. Winds and waters continue to bring living things to these islands where, as in organic evolution, survival is the exception and extinction is the rule.

Tower Island is a veritable ornithologist's paradise. This isolated area supports a rich bird population that includes the mockingbird, great and magnificent frigate birds, yellow warbler, red-footed crowned night heron, and the world's only nocturnal swallow-tailed gull (which is now found throughout this archipelago). On the other islands, one finds the penguin,

pelican, waved albatross, and vermillion flycatcher, as well as the flightless cormorant, red-billed tropicbird, and even the flamingo. The Galapagos also has its own hawk and two species of owl.

Yet the most beloved birds are the masked, red-footed, and blue-footed boobies. The comical appearance along with the humorous sounds and behavior patterns of the blue-footed booby have endeared this particular bird to every visitor of these islands. Like other animals, the boobies often seemed to be deliberately posing for their pictures to be taken.

Source: © iStockphoto/Chris Thompson.

Throughout this archipelago, the traditionally recognized 14 species of Galapagos finches actually represent a far more complex situation of about 52 distinct overlapping types, with genetic, physical, and behavioral similarities and differences attributed to adaptive radiation, natural selection, and extinction. These enigmatic "Darwin's finches," as they are now called, remain a puzzle to evolutionists, particularly taxonomists and geneticists, because certain populations prematurely defined as species are in fact capable of interbreeding. However, other groups of finches are reproductively indifferent, and still others even display altruistic behavior. (The iguanas and tortoises do exhibit clear biological variations to the point of speciation.)

Until recently, all the wild birds and animals had few if any predators and, as a result, were at first unafraid even of humans. As a sad demonstration of their capacity to learn and thereby acquire a new instinct, some finches and iguanas now exhibit a fear of our species (as do other animals among these islands).

The struggle of life on the Galapagos Islands demonstrates both the creative and destructive forces always at work in nature. The fragile ecosystems and precarious niches of this changing archipelago have been drastically altered by recently introduced plants and animals that are harmful to the endemic botanical and zoological specimens; such harmful feral animals include Norway rats, mice, pigs, goats, dogs, cats, horses, cattle, and burros. There have been over 200,000 wild goats on James Island. Of course, the most dangerous animal is the human species, and around 8,000 people now inhabit the Galapagos Islands.

About 600,000 years ago, violent eruptions formed the impressive Alcedo Volcano of Isabela Island, and Charles Darwin himself was the first to describe the resultant double crater. (Strangely, Captain FitzRoy's own stone engraving marking the historic visit of HMS *Beagle* to this island has never been found.) A population of giant tortoises now lives among streaming fumaroles in this volcano's wet and grassy caldera valley 1 mile above sea level. In fact, it is possible that a tortoise still survives that was living when the young geologist explored this captivating area in the 19th century. Here, on these lava flows at the base of this shield volcano, one comes close to experiencing the beginning of our earth.

The world's only seagoing iguana is found at the Galapagos and may even inhabit the same island with the land iguana. The black-red marine iguanas are found in seething colonies camouflaged against lava rocks while basking in the warm equatorial sun. These "imps of darkness" represent an evolutionary shift from land to water adaptation, and they feed on seaweed and marine algae to a depth of 36 feet. They can remain underwater for up to one hour. Retaining a land reptile metabolism, the marine iguanas eject salt water from their systems. The larger brown-yellow land iguanas feed primarily upon the buds and spiny pancake pads that fall from the giant prickly-pear *Opuntia* cactus. They live in colonies, dig burrows, and spend much time basking in the sun.

The Charles Darwin Research Station was established in 1964 at Academy Bay on Santa Cruz Island. Despite its status as a legally protected national park and

wildlife preserve since 1959, the ongoing conservation efforts of this scientific station have not prevented the archipelago from being exploited for personal gain and profit. Unfortunately, international scientists are more destructive than tourists in upsetting the normal natural conditions of the delicately balanced ecosystems and fragile niches throughout these renowned islands. In touching and banding rare birds, as well as netting and branding land iguanas, scientists have altered the total behavior of these life forms and even contributed to many needless deaths.

Fortunately, the Charles Darwin Research Station is successfully taking steps to restore the populations of giant tortoises. These huge reptiles seem like antediluvian animals reminiscent of the age of dinosaurs. One may weight up to 1,000 pounds and live to be 200 years old. In the past, they were killed by the thousands for their meat and the fresh water from their stomachs. Today, there may be less than 15,000 wild tortoises living on these islands.

At the research station, tortoise eggs of this endangered species are incubated and hatched, and the young are raised until they are from 5 to 10 years old, and then released only when they are capable of protecting themselves from predators in their appropriate natural habitats. This scientific station also helps eradicate the introduced pests, conserve other unique species and the differing natural environments of these islands, and maintain *Beagle III* for essential patrolling and communication throughout the archipelago.

The clear Galapagos waters are inhabited by fur seals, sea lions, and green turtles. There are even rays, sharks, dolphins, and whales further out at sea. Coastlines are usually spotted with red Sally Lightfoot crabs. At Tagus Cove (Isabela Island), one finds soft-colored sponges, beautiful cup corals, and brown sea anemones.

Under the Southern Cross, life has been evolving on these islands for millions of years. One may even speak of the evolution of the Galapagos Islands themselves. Yet if incisive measures are not continuously taken, this unique archipelago (as Darwin once knew it) will soon no longer exist. The loss would be irreplaceable. To paraphrase the words of the great naturalist: At the Galapagos Islands, both in space and time, one seems to have been brought somewhat nearer to those first appearances of new beings on this earth.

— *H. James Birx*

See also **Darwin, Charles**

Further Readings

Darwin, C. (2000). *The voyage of the Beagle.* Amherst, NY: Prometheus Books.

De Roy, T. (2000). *Galapagos: Islands born of fire.* London: Warwick House.

Jackson, M. H. (1993). *Galapagos: A natural history.* East Lansing: Michigan State University Press.

Moorehead, A. (1969). *Darwin and the Beagle.* New York: Harper & Row.

Weiner, J. (1995). *The beak of the finch: A story of evolution in our time.* London: Vintage.

Galdikas, Biruté Mary F. (1946–)

Perhaps no one knows more about orangutans than the renowned "professor of primates" who has spent more than 30 years in the wilds studying them. Biruté Mary F. Galdikas is a post–World War II baby boomer who has done quite well in the field of anthropology on a national and international basis. No doubt she will continue in her work and make additional substantial contributions. We can be grateful for her efforts to preserve and retain the presence of animals such as orangutans that might have been lost as a result of a lack of concern and insensitivity to the value of their presence among us.

Biruté had an early interest in animals, beginning with her childhood days in Canada. It was an interest in a field of inquiry that would sustain her for the rest of her life. She followed up this childhood interest in animals when she arrived in the United States. In 1966, she received her bachelor's degree from UCLA, and later received her master's degree in anthropology from the same institution. It was at UCLA that she met a person who inspired her. He was Dr. Louis Leakey, who was to become her mentor and supporter.

In 1971, Biruté arrived in Indonesia to study orangutans. It wasn't long before her arduous efforts resulted in substantial new knowledge about apes. Her professional efforts in the field of anthropology have also brought other benefits. Thanks to Biruté, there is a renewed interest in primates as well as a movement to help retain their presence in the world. Yet it is not only the primates that are the beneficiaries

Source: Photo by Richard T. Nowitz/National Geographic/Getty Images.

of her professionalism. Her work has also caused us to be more concerned with the ecological environment that sustains animals and its effect on us as living human beings. Biruté herself has been rewarded in that she was able to establish an impressive publication record concerning her specialized interests. In addition, she has received numerous awards and widespread recognition for her professional activities. Her efforts have also resulted in the establishment of the Orangutan Foundation International in order to bring about a better understanding of primates and the need to retain their existence. She continues to share her vast knowledge and valuable experiences concerning her specialized interests with a new generation of interested students by lecturing at various universities.

— William E. Kelly

See also **Leakey, Louis S. B.; Orangutans**

Further Readings

Galdikas, B. M. F. (1995). *My years with the orangutans of Borneo.* Boston: Little, Brown.
Galdikas, B. M. F. (Ed.). (2001). *All apes great and small.* New York: Kluwer Academic.
Galdikas, B. M. F. (2005). *Great ape odyssey.* New York: Abrams.

BIRUTÉ MARY F. GALDIKAS

Much as with Dian Fossey and the "silverback" gorillas of East Africa, Biruté Galdikas has made her name in natural history by her efforts to protect an endangered species: the Borneo orangutans. These primates had first come to the attention of the world in the 1930s through the buccaneering exploits of Frank Buck, the American explorer and scientist who served as the model for the movie series *Indiana Jones.* In books like *Bring 'Em Back Alive,* Buck not only brought excitement to an America struggling through the Great Depression but also focused attention on the rare wildlife of a wider world.

Galdikas's main concern is the threat to an endangered species through the lust for profit of her fellow humans. While outright poaching or killing of the gorillas incensed Fossey and ultimately caused her death, Galdikas's focus has been the illegal logging taking place in Borneo in Indonesia, which is severely endangering the orangutans' natural habitat. This, according to Galdikas, is in the Kalimantan National Forest. Once again, as with poaching, the motive is profit, as Asian hardwood trees are extremely valuable on the international timber market, where questions are seldom asked as acutely as they should be about the origin of the timber.

Indeed, one of the largest importers of Asian hardwood is the People's Republic of China. China imported about 1.5 billion cubic feet of timber in 2003, more than half of it from Malaysia, Indonesia, and Russia, according to the World Wildlife Fund (WWF). The group said imports are

expected to triple to 4.4 billion cubic feet a year by 2010. While China has acted to preserve its own timber, it has thus grown to be a major importer of hardwood. "Logging bans in China should not lead to forest loss in other parts of the world. Decisive action is needed to ensure that supply chains leading to or through China begin with well-managed forests," WWF international's director general, Claude Martin, said in a statement.

Meanwhile, Galdikas's crusade against illegal logging in Kalimantan continues, as the preserve of her beloved orangutans is continually placed at risk. Fossey, who died trying to preserve the gorillas of Rwanda, and Sister Dorothy Stang, who was murdered while attempting to save the Amazon rain forests of Brazil and its brutalized workers, share a legacy with Galdikas.

— John F. Murphy Jr.

Galton, Francis (1822–1911)

Sir Francis Galton was one of the most influential scientists of his time and is of systematic anthropological and bioethical interest for having introduced into the discussion the idea of eugenics.

Galton was born on February 16, 1822 near Sparbrook, south of Birmingham, England, and was the youngest of seven children of Violetta Darwin and Samuel Tertius Galton. Both came from distinguished families with scientific backgrounds. Already as a child he showed signs of extraordinary talent. Trips to Europe and attendance at different schools within England and abroad were part of his young adolescence. At the age of 16, he began a medical education. In 1840, he started attending lectures on mathematics at Trinity College, Cambridge. It was also during this time that he first experienced the effects of overwork but also discovered his passion for traveling and statistics. In 1844, his father died and left him with money that would finance his future lifestyle. In contrast to his father's wish, he did not finish his medical career. Instead, he spent his time traveling along the Nile together with friends.

Until then, his achievements had hardly been outstanding, but the expeditions into foreign countries set the tone for his future actions. In 1850, Galton followed the example of other famous people of that time and set off to explore Africa, namely, the area around Lake Ngami. After his return to England with a vast number of maps and measurements, he made a name for himself as an excellent cartographer. The Royal Geographical Society honored this work with the annual gold medal and soon made him a fellow of the Society. This was to be the starting point for his scientific career. In the following years, he wrote several books and gave lectures on traveling and basic survival skills, some of which are still in practice in today's army. In 1853, he married Louisa Butler, whose family included some well-known scholars. The marriage of the two quite diverse characters remained without children, but Galton's scientific life became more and more successful. For example, he was made a fellow of the Royal Society and received various other awards also from abroad. His love for statistics and measuring sometimes seemed to wander off in unorthodox directions, for example, when he scrutinized how to make the perfect cup of tea or studied the efficacy of prayer. But it was his unusual approach to a subject that would set him apart from all other scientists.

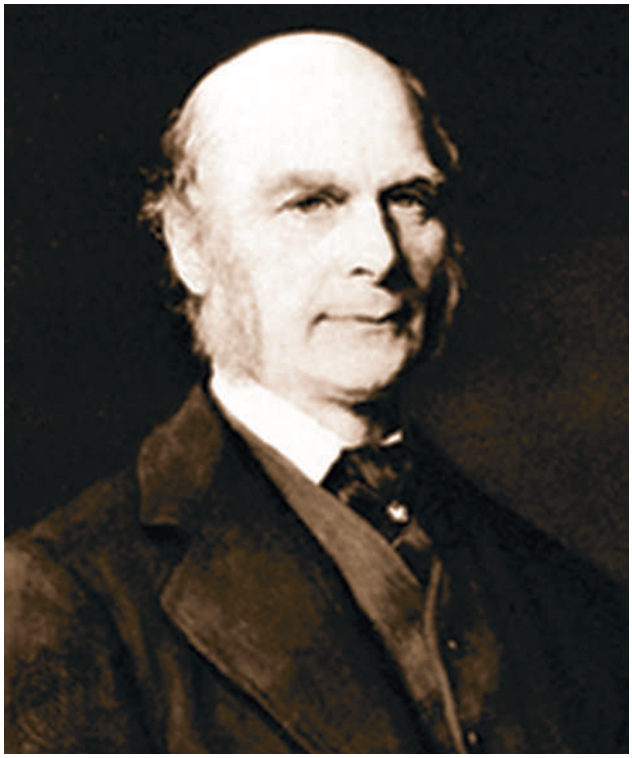
By coining the term *anti-cyclone* and developing a set of pictorial schemes for weather maps, he also left his mark on meteorology. Another part of his work was concerned with psychology and mental imagery. He also belonged to a group of scientists who published a new weekly magazine on science, literature, and art, *The Reader*. Although this project failed, it can be seen as the predecessor of *Nature* magazine.

He made other important contributions to science, for example, in the field of twin research or by opening an anthropometric laboratory where he gathered detailed information of almost 10,000 people. He also wrote the first systematic study on fingerprints and therefore introduced it as a means of identification. When trying to find a term that concisely illustrated the difference between environmental and hereditary influences on the development of a person, he coined the phrase "nature versus nuture," which is still found in recent debates to refer to that issue. As in many other cases, it was not only the content but also his methods that were new and setting future standards (for example, the questionnaire, the use of statistics or family trees for scientific purposes).

Galton worked on these studies and invented many methods while making his most important contribution to science, which he is famous for even today. In 1864, he published *Hereditary Talent and Character*, a work inspired by his half-cousin Charles Darwin and his work *On The Origin of Species*. Galton claimed that not only physical but also mental features and capabilities are subject to heredity, a thesis that was barely accepted at that time. In addition, he argued that we should improve the human race by allowing only the best to reproduce, just as we breed only those animals that are of good disposition. This idea of selected reproduction he called "viriculture." From then on, his ambition was to prove his thesis that mental and physical abilities are equally inherited and advocate the idea of viriculture. In his following books, *Hereditary Genius* (1869) and *Inquiries Into Human Faculty* (1883), the topic was further developed. In the latter, he coined the term *Eugenics* (from Greek: *eu* = good; *gignesthai* = to become) to describe the program of improving the human race by letting only the most capable men and women and the more suitable races reproduce. Already in 1869, Galton had formulated the thesis that it is possible to improve the inborn qualities of a race. Thereby, he reassumed an old idea the Greek philosopher Plato (427–347 BC) had already developed in his work *Republic*. Like Plato, Galton found the rationale for eugenic improvement directly in the successes of animal breeding. The prevalence of desirable features in livestock can be increased by selectively mating specimens with the desired trait (for example, in chickens, the increase of their egg production).

Especially toward the end of his life, he found many supporters of his idea of eugenics. In 1904, a research fellowship in eugenics was established at the University in London, and the first Eugenics Record Office was founded. By the late 1920s, some two-dozen American states had enacted sterilization laws according to their new eugenic political agendas. Galton's ideas were discredited as a result of the German Third Reich and their political agenda of eugenics but were reassumed in 1962 by the Ciba-Symposion in London.

In 1909, shortly before his death, Galton was knighted, and in 1910, he received the highest honor from the Royal Society, the Copley Medal. His work sums up to nine books and more than 200 articles and an unpublished novel. He died January 17, 1911, in Haslemere, Surrey, England. According to his will, a eugenics chair was established at the University of London.



Source: Courtesy, Wikipedia.

— *Nikolaus Knoepffler and Kerstin May*

See also **Bioethics and Anthropology; Eugenics**

Further Readings

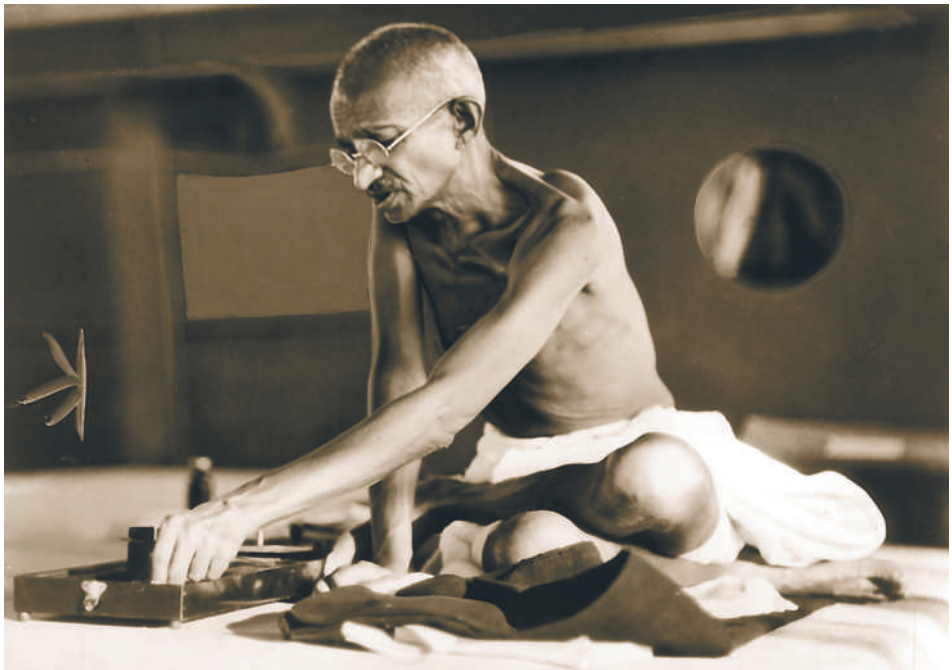
Francis, G. (1883). *Inquiries into human faculty.* London: Macmillan.

Francis, G. (1908). *Memories of my life.* London: Methuen.

Francis, G. (1985). *Essays in eugenics* (Reprint of London, Eugenics Education Society). New York: Garland. (Original work published 1909)

Gandhi, Mahatma (1869–1948)

Mohandas Karamchand Gandhi *(Mahatma)*, who is discussed in the anthropological literature for his adoption of nonviolent resistance (*Satyagraha*, the vindication of truth by infliction of suffering not



he developed concepts and techniques of civil disobedience and nonviolent resistance. For Gandhi, *Satyagraha* emerged as both a creed and tactic and was enacted by declaring opposition to an unjust law, breaking the law, and willingly suffering the consequences.

Upon returning to India, Gandhi joined the Indian National Congress, promoting the movement for independence through civil disobedience and fasting. Gandhi's economic policy promoted the *swadeshi* movement, the boycott of foreign-made goods, especially British goods, demonstrated by the advocacy for all Indians to wear *khadi* (homespun cotton cloth). In 1930, he led thousands of people to the sea to collect their own salt rather than pay salt tax (the Salt March).

on the opponent, but on oneself), which culminated in the "Quit India" movement against the British in Colonial India, is a modern example of the embodiment of classic Weberian charismatic authority. *Satyagraha,* developed by Gandhi as a way of life, has emerged more popularly as a political tactic, as in civil disobedience movements (Dr. Martin Luther King Jr. and Nelson Mandela). Combining spirituality with popular politics based primarily in interventions, Gandhi was able to rapidly ascend to the helm of nationalist politics in British India and by 1919 earned the title of *Mahatma* ("Great Soul") from Rabindranath Tagore (Bengali/Indian writer).

Gandhi believed life emerged from a unity of being with no division between the spiritual and the practical. *Ahimsa* (nonviolence) had clear implications for political conflict, specifically violence used against oppression. Such violence Gandhi believed to be wrong and a mistake that would not end injustice, but rather work to inflame the prejudice and fear that fed oppression.

The genealogy of Gandhi's political and spiritual thought developed during his years in South Africa (1893–1914), where he was hired as a barrister after his education in England. He drew inspiration from the *Bhagavad Gita,* the writings of Leo Tolstoy, John Ruskin, Ralph Waldo Emerson, and Henry David Thoreau. During his formative years as a sociopolitical activist,

Recently, scholars have criticized Gandhian politics and rhetoric in four areas. In South Africa, Gandhi's essays in the *Indian Opinion* have been cited as propagating racist colonial discourse. In contemporary India, he is held as an ideal citizen, based on his Hindu values, which create false and separatist ideals of citizenship for India. Critics also point to his economic policies, which, they argue, only helped the rich and made the poor even more disconnected from the larger national project. Gandhi is most heavily criticized for his stance against women. In his autobiographical statements, he talks about his relationship with his wife, which illustrates a view of women that is demoralizing, vilifying, and, ultimately, colonial.

Despite all criticism, M. K. Gandhi is well respected and remembered for the global legacy of his ideas in the disciplines of religion, philosophy and ethics, political science, economics, geography, and anthropology.

— *Uzma Z. Rizvi*

See also **Hinduism; India, Philosophies of**

Further Readings

Chatterjee, P. (1993). *Nationalist thought and the colonial world: A derivative discourse.* Minneapolis: University of Minnesota Press.

Gandhi, M. K. (2001). *The story of my experiments with truth: An autobiography* (M. Desai, Trans.). Ahmedabad, India: Navajivan. (Original work published 1927)

Rudolph, S. H., & Rudolph, L. I. (1983). *Gandhi, the traditional roots of charisma.* Chicago: University of Chicago Press.

Gangs

In every society, young people form loose or organized groups or networks around myriads of intertwining and competing interests and practices: It is a normal form of sociality based on generation. Members and outsiders, however, often see and label these formations in different, sometimes contradictory ways. And political institutions may define and public imaginaries understand these groups in ways that determine and justify interventions and programs that help to shape a group's public institutional status and their stake in the overall political process. If formations of groups, networks, or other forms of sociality are normal activities, and if this process is common across historical time and cultural space, then through what epistemological processes should some of them be labeled "gangs," with all that that implies. What is this modern link between the biopolitics of identity and the construction of sociopolitical groupings such that the notion of the gang makes sense? This is the challenge facing social sciences, anthropology included, for there exists an ideological predicament underlying the category "gang" and the phenomenon it purportedly refers to that threatens to subvert its epistemological status. Indeed, gangs as discussed in literature and official reports appear to be a production of the United States's social fabric that is becoming global. It is not surprising that the bulk of the anthropological discussion on gangs uses the materials from and takes place in the United States, and that this commentary is then projected outward into a compressing global space that this commentary is partly responsible for creating.

Though the term was part of the popular sociological vocabulary in Europe by the 18th century, it was not until the 19th century, when the cities of Britain and the United States were reconfigured by mass migrations and the Industrial Revolution, that the term became an established part of the urban lexicon. At this point, the term *gang* was used to identify outcasts, thieves, and other displaced groups considered highly dangerous for order and progress in society. Indeed, by the time Frederic Thrasher, Emory Bogardus, and Herbert Asbury sought to appropriate the term to analytically designate a wide array of delinquent behaviors associated with groups of marginalized youths living primarily in the Chicago, Los Angeles, and New York City ghettos, it had already become deeply engraved in law enforcement vocabularies and the popular imagination. Like gangs themselves, the term has tended to occupy an interstitial space, simultaneously suggesting popular, quasilegal, and analytical theoretical referents.

Thrasher laid down the first systematic work on the phenomenon by providing a cultural ecological framework that defines gangs in terms of the members' potential for criminality and deviance, and explains gang emergence in terms of socioracial marginalization, social disorganization, and shifting populations in poor, isolated neighborhoods. Gangs, he observed, consist primarily of "interstitial groups" of boys "originally formed spontaneously," then integrated through conflict, "more especially in corporate action, in hunting, capture, conflict, flight, and escape." In his view, conflict constitutes a central principle underlying the group dynamics of gangs and their oppositional interactions with larger state/societal institutions. According to Thrasher, fighting with other gangs and the world around them furnishes the occasion to find excitement and thrill that members could not find in mainstream society. Thrasher characterized gangs in cultural terms, with their peculiar language, rules, collective behaviors, symbols, and signs. These cultural but contained worlds are further alienated by their shared conditions and their geographic isolation.

In the United States, the Great Depression, World War II, and then the flow of African Americans from the South to the major cities of the North led to profound structural transformations that were accompanied by increasing poverty, drug use, and growing urban marginalization—conditions ripe for criminal gang development. So by the second half of the 20th century, analysts, many sponsored by

government grants, overwhelmingly conducted "gang studies" under criminological and juvenile delinquency premises. Urban policy development heavily inflected the formulation of research questions. Researchers placed emphasis on how the young boys who are recruited into gang activities develop "frustration." Robert Merton and Albert Cohen's work underlined that such frustrations were the result of "blocked opportunities." Accordingly, gang members in their experience of "status frustration" search to develop an alternative ensemble of values and cultural practices that set them apart from the rest of society and provide them with the identity and status they crave. The research questions from this period generated a new line of studies of gangs that placed the concept of subculture at the center of its analytical strategy. For example, Walter Miller suggested that lower-class subculture constitutes a fertile milieu that breeds delinquency. Other researchers have argued, however, that the notion of subculture has never really shaken off the ambiguity surrounding it.

By the mid 1980s, gang activity, along with drug trafficking and violent crime rates, were being made more visible to the general public through the media, law enforcement reports, and politicians. Crime-conscious citizens became alarmed and stated their growing concerns regarding law and order in their cities. Fear of crime, combined with a "moral panic" about gangs and drugs in inner-city neighborhoods, influenced what Richard Quinney identified as the "formulation and application of criminal definitions, the development of patterns related to criminal definitions, and the construction of criminal conceptions" of gangs as social reality. Youths, primarily black and Hispanic immigrants and natives, living in U.S. ghettos where criminality and gangs were perceived as developing and thriving, became the primary empirical unit for large-scale surveys and sociological investigations. But these rather formulaic "outsider" approaches were soon exhausted, and theorists began to search for alternative ways to conceptualize gangs.

In this vein, new qualitative perspectives on gangs and gang members began to generate a more thorough description of processes and activities. Not least, the evidence showed that both the internal structure of gangs and their external relationship to mainstream society was extremely variegated and could not be reduced to any predetermined formula. Joan Moore provided anthropological descriptions of gangs that tackled some of the common stereotypes put forward by public discourses and media representations. Among other things, her ethnographic work helped destabilize several stereotypes that inform public representations of law enforcement reports on gangs and gang members, including female memberships in gangs and modes of sociability among gang members that do not fit the stereotypes of "they're all drug users and criminals." Drawing from William Julius Wilson's work on the inner city and the underclass and Douglas Massey and Nancy Denton's on segregation in U.S. cities, and applying the ethnographic field research method, anthropologists demonstrated how the underclass predicament and racial segregation deny residents from U.S. ghettos economic opportunity and political integration. Ethnographic researchers like Elijah Anderson, Joan Moore, Felix Padilla, and John Hagedorn investigated how the growth of the urban underclass combined with socioracial segregation to perpetuate the reproduction of particular street identities with their code (Anderson), mechanisms of social isolation (Moore), and ethnic marginalization with particular Hispanic identity challenges (Padilla, Hagedorn, Vigil). J. Diego Vigil's concept of "choloization" (the mechanism through which social isolation alienates Chicano youth from mainstream society) allowed him to capture the ways in which the streets provide alternative avenues for socialization to Chicano youths in Los Angeles. In his view, Chicano youths are experiencing redundant and multiple levels of marginality from social institutions, their families, and themselves. Multiple marginality, Vigil argues, generates for marginal youths an integrated framework that "combines sociogenic and psychogenic elements and actions." After gathering data on ethnicity of incarcerated youths (who are overwhelmingly blacks and Hispanics) and the rate of gang members among them who are imprisoned, ethnographic studies conducted by researchers like Joan Moore and Loic Wacquant helped establish the importance of carceral institutions in producing structural relations between prison and the streets. Anthropologists Scott Decker and Barrick Van Winkle explored through ethnographic methods the relationships between family, friendship networks, and violence among gang members. The study shed light on humane aspects of gang members, reinforcing Daniel Monti's argument that gangs are not alien to the social world. Indeed, according to Monti, "gangs are merely one among many types of groups" that people create to structure their lives. The

anthropological approach on gangs had opened new explorations on the use of gender and masculinity in gang formation as well as on ethnicity, culture, and gang membership, thereby shedding light on the complexity of the gang phenomenon.

The process of alternative street socialization, what has been called the "underground economy," constitutes a critical area of investigation for anthropologists, such as Philippe Bourgois and Felix Padilla Sudhir Vankatesh. The scale of gang involvement in the underground economy, while largely reported by law enforcement institutions and the media, has yet to be scientifically established, despite the growing interest and body of research on the business of gangs. Although alternative definitions exist on what constitutes gang entrepreneurial activity, there is ethnographic evidence that points toward a positive relationship between gang membership and drug trafficking. Some have focused on how gang entrepreneurial activities have mediated the relationships between gangs and their surrounding communities. Others like Martín Sanchéz Jankowski went one step further to stress that a gang's dialectical connection with its larger community was key to its survival.

Gangs as a social phenomenon have captured the interest of the public as well as educational, political, and social institutions throughout the United States. Fueled by more visible gang activity in other nations, increasing opportunities for researchers to speak freely (that is, without political reprisal) about local gangs, and growing awareness of the value of studying gangs and allocation of resources in this direction, other countries are producing sizable bibliographies on gang life, particularly in South America, Australia, the Caribbean, Europe, and Southeast Asia. In Brazil, anthropologist Alba Zaluar suggests that the involvement of youth gangs cannot solely be explained by poverty and marginalization. There is growing evidence, she contends, that young males in gangs are mostly driven by a "hypermasculinity," fed by the performance of gang celebrity figures in the media. This can be captured, although tangentially, in Paulo Lins Ribeiro's *Cidade de Deus* (City of God), which gave rise to the movie with the same name. Youth gang, masculinity, and globalization are also thematized to think about gang formation and gang processes in other countries or across countries. White, for example, found that a great bulk of gangs in Melbourne, Australia, are "social gangs," wannabees that try to redefine the "cool pause" and "tough guys" in the mean streets projected in the media and reported in ethnography of gangs in the United States. In France, Colette Pétonnet produced one of the most powerful ethnographies of marginalized young people in a *banlieue* of Paris. *On est tous dans le brouillard* (We are all in the fog) decrypts how institutional politics articulate public representations and fear of the youths of the *banlieue.* Pétonnet used ethnography to destabilize public perceptions of these youths, who tend to be mostly Algerian descents and whose marginalized conditions estrange them from the sociocultural benefits that the society claims belong to everybody in the name of the republic. In Southeast Asia and the Caribbean, emerging studies are trying to unfold the intertwining between the globalization process, new configurations of inequalities, and formations of gangs as a locus of resistance. Haiti and Honduras epitomize the quintessence of how larger transnational politics and global economics may shape young people's lives in a way that criminality seems to be the shortcut for accomplishing their goals. While other countries have long histories of youth groups developing in various forms, ethnographic studies of countries in the Caribbean, such as Honduras and Haiti, have linked the deportation of convicted young offenders to the rise of gangs outside the United States. While in the United States, these offenders presumably mastered the technologies of gangs sufficiently to reconstitute the same organization upon return to their countries of origin. These deported youths, however, need to be situated within the larger sociopolitical context of civil war and political instabilities of their home countries and to which the United States has been an active protagonist.

Given the extensive history of gangs in the United States and the origin of gangs in other countries being attributed to the United States, the international research community has built upon the U.S. bibliography on gangs and is currently extending it in directions similar to those currently being pursued within the United States. This provides a common perspective on gang that is utilized as an entryway to think about marginality, delinquency, and the exotic other's cultural adaptation to the larger society (for example, young Algerians living in parts of France or young Vietnamese and Lebanese immigrants residing in Australia). This circulation of concepts between researchers in the United States and those in the rest of the world is concomitant with the global circulation of fear of gangs in these same societies and

people's simultaneous fascination of the youths characterized as comprising these "ethnic gangs." American projection of its popular culture, epitomized through movies on "gangs," MTV, gangsta rap, and other forms of commodified venues, which lead to a globalization of youth cultural practices in different segments of societies in the world, is happening at the same time that literature on gangs in the United States constitutes the primary references for researchers, policymakers, and social workers in other countries that already feel affected by youth gang problems, particularly crime, violence, drug use, and delinquency. Nonetheless, it is still worth asking whether youth in other countries are simply adopting the American concept of the gang or whether, correlatively, the socioeconomic and political conditions for the production of gangs are now evolving in those nations, leading to sociohistorically specific versions of what has become a globally modular form.

Gangs have had, and continue to play, a key role in the politics of the modern, stranger-based nation-state. In many countries, politicians have cited the presence of gangs and the need to control their behavior as part of a law and order platform but also to help mobilize voters to support a particular candidate. Politicians and state authorities have enlisted and sometimes funded gangs to function as unofficial arms of state policy and to suppress civil society opposition in ways outlawed to the police. In some cases, from South Africa to the Americas, gangs have been employed to intimidate and sometimes kill opposition candidates. Gangs have also appeared as ways to defend the community from state action or to serve as a community-based police in the absence of state law and order power. In these cases, gangs provide protection in ways that police either will not or cannot provide, though they may impose their burdens on the community, such as a tax/ransom for their services. Yet the importance of local histories and contexts as well as their articulations with the global process are critical to be understood for anthropologists to situate youth group formation as well as youth involvement in gangs in these countries.

Because of its condition of emergence, the concept of gangs has dubious epistemological status, since it is invested by morality and politics and structured by popular and scientific constructions as well as institutional stakes. It performs by creating its own reality. The analytical concept "gang," while imprecise and therefore incapable of rendering explicit the sociological unit it intends to describe and of defining the behaviors it vows itself to translate, becomes what Pierre Bourdieu called a "realized" category, in the sense that it analytically encompasses American cultural definitions of gang—definitions that conflate popular ideas of race, class, and gender—and thereby offers an open flank for contestation and struggle of classification. For example, in the United States, three young individuals standing on a street corner may go unnoticed. If these same three individuals were black and the street corner was situated in a poor neighborhood, they likely would call the attention of both the gang researcher and the police. What constitutes a gang is neither exact nor is it static.

Today, the anthropology of gang faces key issues related to definitions and conceptualization. The use of the concept of culture in describing gang behavior or gang cultural practices is, at best, in the United States, a shortcut for "race." In the field of gang research, anthropologists enter a complex semiotic terrain in which the very concept that defines their perspectives, the concept of culture, condenses a number of tenets held by gang researchers from many disciplinary (and political) perspectives. Moreover, anthropologists in their search for a new epistemology of gang studies must investigate the extent to which the concept of gang itself is culturally bounded, despite (and maybe because of) the abundant scholarship gang studies have generated. The anthropology of gangs should strive to render explicit the implicit meanings that underlie the concerns and questions generated by citizens and scientists alike in their fear of gangs and the cultural practices that are associated with it. The conceptualization of gangs as youth cultural practices in anthropology must attempt to deghettoize its strategy in order to relate the dynamic relationship the phenomenon refers to with the global political economy.

— Louis Herns Marcelin

Further Readings

Decker, S. H., & Van Winkle, B. (1996). *Life in the gang: Family, friends, and violence.* New York: Cambridge University Press.

Duffy, M. P., & Gillig, S. E. (2004). *Teen gangs: A global view.* Westport, CT: Greenwood Press.

Huff, R. C. (2002). *Gangs in America.* Thousand Oaks, CA: Sage.

Klien, M. W., Kerner, H.-J., Maxson, C. L., & Weitekamp, E.G.M. (Eds.). (2001). *The Eurogang paradox: Street gangs and youth groups in the U.S. and Europe.* Dordrecht, Holland: Kluwer Academic.

Lins, P. (2003). *Cidade de Deus.* Rio de Janeiro, Brazil: Andanzas.

Pétonnet, C. (1979). *On est tous dans le brouillard.* Paris: Editions du CTHS.

Thrasher, F. M. (1927). *The gang: A study of 1,313 gangs in Chicago.* Chicago: University of Chicago Press.

Venkatesh, S. A. (2000). *American project: The rise and fall of a modern ghetto.* Cambridge, MA: Harvard University Press.

Vigil, J. D. (2002). *A rainbow of gangs: Street cultures in the mega-city.* Austin: University of Texas Press.

White, R., Perrone, S., Guerra, C., & Lampugnani, R. (1999). *Ethnic youth gangs in Australia: Do they exist?* (Overview Report). Melbourne, Australia: Australian Multicultural Foundation.

Geertz, Clifford (1926–)

Source: Reprinted with permission from the *Annual Review of Anthropology, 31*, copyright © 2002 by Annual Reviews, www.annualreviews.org.

For the last 40 years, Clifford James Geertz has been the most influential and controversial anthropologist to capture the interest of both scholars and the general public. In contrast to the works of most anthropologists, Geertz's books, now numbering 19 individually authored and edited volumes that have been translated into 21 languages, are widely debated by anthropologists, historians, literary critics, political scientists, and other scholars. Since 1967, he has been a regular contributor to the *New York Review of Books*. Not since Margaret Mead has there been another anthropologist to engender such scholarly debate and to be incorporated into popular culture.

Underlying Geertz's symbolic approach to anthropology is his attention to philosophy. He was trained at Antioch with an BA degree in philosophy in 1950 and then was graduated with a PhD in anthropology from Harvard University in 1956. Drawing primarily on the humanities, he advocates using a variety of methodological and theoretically practices to study and understand culture in its own terms. His theory of culture as a system of symbols and meanings that are publicly exhibited in objects and actions and an interpretive strategy of regarding culture as text hold wide sway in contemporary anthropological analyses and literary criticism. According to him, the goal is to understand these texts within the same cultural context as the natives, in order to learn the local meaning. Ethnographies, like any other cultural expression, should be understood as texts to be read alongside the natives' own texts. His detractors view this as moving anthropology from a scientific orientation to one that is based on metaphorical and literary techniques, in which science and scholarship, in general, are rhetorical. Some have claimed that he influenced anthropologists since the 1970s to write about other societies rather than collect and analyze data.

Although Geertz has influenced anthropological scholarship to include interpretive and hermeneutic models of analysis, he is a consummate ethnographic fieldworker. He has conducted ethnographic research in Java since 1952, Bali since 1957, and Morocco since 1963, periodically revisiting these locations of the past 50 years. Most of this research was conducted while a faculty member in the University of Chicago Anthropology department, from 1960 to 1970, and then as a

faculty member of the School of Social Science Institute for Advanced Study until his retirement in 2000.

Geertz's ethnographic research has mainly centered on religion, first publishing on the topic in 1960 with the monograph, *The Religion of Java,* and then later in 1968, with *Islam Observed: Religious Development in Morocco and Indonesia.* In 1963, he published *Peddlers and Princes,* which analyzes economic development and cultural change in Indonesia. Geertz's most influential work, *The Interpretation of Cultures* (1973), is a collection of essays, which best exemplify his interpretive and humanistic approaches to anthropology. Subsequent collections of essays, *Local Knowledge: Further Essays in Interpretive Anthropology* (1983); *After the Fact: Two Countries, Four Decades, One Anthropologist* (1995); and *Available Light: Anthropological Reflections on Philosophical Topics* (2000) remain true to the rhetorical and philosophical approaches that Geertz employed to theoretically frame and interrogate his own ethnographic research and that of others in *The Interpretation of Cultures.* These works should not be seen as a rehashing of ideas, but as Geertz's distinctive ruminations and critical perspectives on his own life, the use of theory, the practice of anthropology, and contemporary culture.

— *Walter E. Little*

See also **Anthropology of Religion; Fieldwork, Ethnographic; Religion and Anthropology**

Further Readings

Geertz, C. (1973). *The interpretation of cultures: Selected essays.* New York: Basic Books.

Geertz, C. (2000). *Available light: Anthropological reflections on philosophical topics.* Princeton, NJ: Princeton University Press.

Shweder, R. A., & Good, B. (Eds.). (2005). *Clifford Geertz by his colleagues.* Chicago: University of Chicago Press.

GEMEINSCHAFT

Gemeinschaft, or "community," has always been an ambiguous notion. Particularly in the German context, it has been contrasted with the term *Gesellschaft* (society). Both notions represent aspects of the Ancient Greek term *κοινωνία,* the historical background of which is identical to "society."

In German, the term can turn up in connection with family, village, city, profession, or religion. Often, G*emeinschaft* (community) and *Gemeinde* (rural commune or parish) have been used as synonyms.

According to Kant, the ambiguity of the notion of community is such that it can be translated as *communio* as well as *commercium,* whereby the first stands for a formal negation of individuation while the second represents a proper relationship, a reciprocal influence, and the participation of individuals within a whole, which as dynamic community is ahead of solely local communities. Kant concentrates on the logical and metaphysical aspect of the notion. More important and influential is the moral and political meaning of the term.

Ferdinand Toennies

Toennies's work *Gemeinschaft und Gesellschaft* (Community and Society) contains the most influential discussion of these terms for German sociological theory. His description of a community is summarized as follows.

According to Toennies, communities are based upon organic relationships, whereas societies presuppose ideal relationships, by which he does not mean that relationships in a society cannot get improved, but that they are dependent on contracts, which were made between individuals.

The basic constituent of a community is the family, and the family analogously turns up at all levels of a community. The most basic relationships of a family are the following: First, mother-child relationship; second, husband-wife relationship; and third, the relationship between brothers and sisters. As a consequence, Toennies holds that if one studies a house, then one studies a community. A house consists of three layers, the inner, with husband and wife; the descendants and their spouses; and the outer sphere, which involves others. The next-larger group of a community is the clan, or the large family, which involves all distant relatives and relatives of relatives. It is structured analogously to the family, and so is the town, and the city. In this context, Toennies does not refer to really large cities, as it is difficult to uphold a family-like, organic structure in these.

Besides discussing the various levels of a community, Toennies further explains what it is that allows

men to form close bonds. It is obvious for him that blood, location, and spirit or character are especially important for men. The best communities are therefore based upon these aspects. These three aspects are closely interconnected, and they correspond to the human relationships of relatives, neighbors, and friends. With one's relatives, one shares the blood, with one's neighbors the location, and with one's friends the character. Family, friendship, and neighborhood are reached best by means of conventional sociability, which one can find in houses, towns, and cities.

Yet there are other relationships as well that are important for men, like that which one has in a guild, a brotherhood, or a religious community. In all of these, people share something that is particularly valuable for them, something basic to their character. In all of these groups, people form certain hierarchies, and the student, or anyone on a lower level, has respect for the dignity of the more advanced, the master of the respective profession. Here, Toennies employs the term *dignity* in a traditional sense. Dignity, *Wuerde* in German, is related to worth *(Wert),* and only someone special can be worthy and can have value. Nowadays, the term, particularly in Germany, is mostly used in a much wider sense, whereby it is attributed to all human beings. Toennies not only refers to the dignity of spirit, but expands the concept to other areas as well. Any kind of superiority, Toennies calls dignity. He distinguishes further between a dignity of age, strength, and spirit or wisdom. The superior do not abuse their superiority, but as Toennies stresses, within a bodily-organic relationship, there is an instinctual naive tenderness of the strong toward the weak, a generous will to help and protect them.

As a consequence of this mutual help, people feel safe and at home. In addition, one feels close to others, as one was born into the community, grows up in it, and is therefore familiar with all the practices traditionally performed there. This feeling of safety is also achieved in families, with neighbors, and with friends. Most men feel most serene and happy when they are together with their family. Neighborhoods allow people to form close bonds, as one is used to the others, one sees, helps, and gets to know them. One is familiar with their history, and one shares certain habits on which living together is based. Friendship is based on character, a similar way of thinking about things. Not only does this enable people to feel a bond between the various members of a community, but one also knows that these bonds are not instable, but rather long-lasting, real, strong, and alive. Such bonds are possible only within a community, as one can feel sympathy and be happy with others only if one understands others' characters. The consensus of a community consists in its common unifying character, and understanding presupposes an intimate knowledge of one another.

Related to the great amount of common features is the importance attributed to art and religion in communities, as both are concerned with the life of the people and matters regarding character, and values. The traditions of both religion and art are best sustained in families and can therefore be well promoted in a community. However, in the same way as families support the flourishing of art and religion, they, in return, help to preserve the idea of a family and to keep it alive.

Toennies's understanding of a community bears many similarities to Aristotle's ρόλιζ (city/state). In both theories, the most fundamental aspect is the family, which is there for the everyday wants of human beings. In the family, various types of relationship can be distinguished. Aristotle stresses the husband/wife, parents/children, and master/slave relationship, whereas Toennies refers to the mother/child relationship, husband/wife relationship, and the relationship between brothers and sisters. However, according to both, a clear hierarchical structure can be found both in the family, as well as in all other ideal types of social system. In addition, both stress the importance of a natural organic structure. Aristotle even gives a detailed account of the various levels of a city-state. According to him, several families united form a village to aim at more than their daily needs. When several villages are united to form a self-sufficient whole, the state comes into existence, for the sake of the good life.

Communitarianism

In the contemporary debate, many thinkers who stress the importance of common aspects within a social system and are referred to as "communitarians" mention Aristotle in order to support their own positions. In general, one can distinguish two main types of communitarians. First, there are the "right-communitarians," who stress the relevance of common values and, like Toennies, point out that that this leads to a hierarchical system. The most prominent right-communitarian thinker is A. MacIntyre. Within

the German context, there is a tendency to associate right-communitarianism with fascism, as people hold that each theory that tries to attain worldly power and has a detailed account of what is good concerning all relevant aspects of human life has to oppress the people and force them into a specific shape that does not take into consideration the specific nature of each individual. Second, there are the left-communitarians who demand stronger common values but combine these with equality. Many of these thinkers also have sympathies for communism. The most famous thinkers here are M. Nussbaum and C. Taylor.

MacIntyre holds that it would be best if we returned to an Aristotelian, neo-Thomistic type of Christianity. He sees modernity as a descent, and the Enlightenment as a moving away from the true Christian faith, which enables human beings to give order to their lives and the state. The Christian religion in its adequate form is supposed to help all the people to live a free and good life. MacIntyre's concept of freedom is a positive one rather than a negative one, which is being upheld by liberal thinkers. Positive freedom implies that one holds the true concept of the good, which one integrates in the political sphere so that it can help the people make the right choices, the choices necessary for living a good life. Negative freedom, on the other hand, implies an absence of constraint, as long as one does not intrude into the freedom of other human beings.

MacIntyre holds a strong, detailed, and inclusive concept of the "good." It is strong, as it includes all relevant human aspects, both with respect to public as well as private matters. A weak concept of the good does not include all relevant human aspects. It is detailed, as it puts forward a clear, many-layered description of the aspect in question. A vague concept of the good gives open hints instead of a specific description. It is inclusive, as it is valid for the political as well as the religious sphere. An exclusive concept of the good would be in favour of a separation of the political and the religious spheres.

Nussbaum, like MacIntyre, is a neo-Aristotelian, and in contrast to him, she holds a strong, but vague and exclusive, concept of the good. Her essentialist concept is based on two separate intuitive lists. The first gives a description of the *conditio humana* and lists 10 points that are relevant for all human beings (mortality, the human body, cognition, early childhood development, practical reason, community with other human beings, relationship to other species and nature, humor and play, individuality). The second list states abilities important for all human lives (live through all stages of life, health, sexual satisfaction, avoid pain, have a concept of the good, solidarity). Her concept is strong, as it deals with all relevant human aspects, but it is also vague, so that it leaves open the negative freedom for individuals to adapt the aspects to their own needs. In addition, it is exclusive, so that it can be applied in the various regions of the world.

In contrast to the other two communitarian thinkers, C. Taylor does not hold a strong concept of the good. He is in favor of a pluralist ethics, but in a world that is being interpreted in a Catholic manner, which is the reason why his position is detailed at least in one aspect. His writings are particularly noteworthy for his criticism of human atomism, which according to him is associated with both liberalism and libertarianism.

Although communitarianism is fairly strong in the present, there are also many liberals and libertarians. Both hold a weak, vague, and exclusive concept of the good. The most important liberal thinker is J. Rawls. He is the author of *A Theory of Justice.* Even more liberal is the libertarian R. Nozzick, who achieved fame with his *Anarchy, State, and Utopia.* In the history of philosophy, there have also been quite a few vehement critics of community. M. Stirner particularly upheld the importance of singularity in contrast to the community. According to F. Nietzsche, each community eventually has to make men common, but by being common, one becomes base and does not fulfill one's natural drive for power and excellence.

— *Stefan Lorenz Sorgner*

See also **Aristotle; Gesellschaft**

Further Readings

Bell, D. (1993). *Communitarianism and its critics.* Oxford: Oxford University Press.

Nussbaum, M. C. (1990). Aristotelian social democracy. In R. B. Douglass, G. M. Mara, & H. S. Richardson (Eds.), *Liberalism and the good* (pp. 203–252). New York: Routledge.

Toennies, F. (2001). *Community and civil society.* Cambridge: Cambridge University Press.

Gender

Gender is a social and cultural categorization defined by the meanings given to biological differences between the sexes. Gender roles are the social skills, abilities, and ways of acting thought appropriate to members of a society depending upon their sex.

Since the 1970s, there has been a growing anthropological interest in the construction of gender relations and the significance attached to gender. Anthropologists compare the similarities and differences found in various societies and look for explanations for them. The way in which gender intersects with other kinds of "difference" has become another focus of the work on gender.

History of the Gender Category in Anthropology

Until the 1970s, few anthropologists had given detailed attention to gender (Margaret Mead was one of the few). But in the 1970s, feminist anthropology started to investigate women's situations in different social, political, and economic order; the roots of women's subordination; and the general roles of women in different cultures and economies. In the 1980s, the focus shifted from "women" to "gender." "Gender" appeared to provide the key for talking about sex/gender differences without relying upon linked dichotomies based on Western ideas, which were seen as culturally specific. As the focus shifted from "women" to "gender," "men" and "masculinity" also came to be studied in their own right and investigated as cultural constructions. Both were considered as complex and changing categories, with masculinity itself viewed as just as problematic as femininity. Finally, during the 1990s, the distinction between sex and gender itself became murky. Increasingly, studies presented the sexed body itself as historically and culturally constructed.

Traditional Gender Roles

In Western and some non-Western societies, gender roles are traditionally strictly divided into feminine and masculine and are assigned to males and females at latest at the moment of birth. Powerful cultural mechanisms operate to ensure that "boys will be boys and girls will be girls." The process of training girls to be feminine and boys to be masculine is largely unconscious. Boys are supposed to grow up to be powerful, to hide their weaknesses, to be independent, demanding, and aggressive. Occupations thought appropriate for men are therefore mainly in politics, economics, and sports. Girls are encouraged to be good mothers and expected to become what is needed to fulfill this role, such as being giving, emotional, and intuitive. They are expected to sacrifice their ambitions and personal needs in order to please and care for others. If they do not adhere to these gender roles—if they are, for example, ambitious, demanding, and tough or rough—they are considered unfeminine. Males who do not evince the expected traits of masculinity are called "feminine" or "effeminate." As the system is a hierarchical one, these men and boys are degraded. Although these roles have diversified, gender roles limit what men and women can feel, think, and do.

Gender and Biology/Nature

Is gender determined by biology/nature, or is it the result of culturally given meanings to biological sex differences? Many cultures have a "natural attitude" with respect to gender. This attitude is made up of the assumptions that (a) gender behavior is the result of sex, not the result of cultural interpretations; (b) that there are only two genders; and (c) that one's gender is invariant and permanent. The question is not settled, but the data demonstrating that a gendered behavior is unquestionably biologically determined do not exist today.

The simple picture is complicated by the fact that biological sex itself is not set on a simple male/female switch, but may be composed of a variety of chromosomal and morphological "anomalies." Biological conditions in which a child's genetic sex (chromosomes) and phenotypical sex (genital appearance) do not match, or are somehow different from the "standard" male or female, are called *intersex.*

Gender Crossing, Third Genders

There are people who feel that their true gender is at variance with their biological sex. Some have sex change surgery or undergo medical treatment aimed at changing their sexual anatomy. These people are termed *transsexual.* Others take on opposite gender roles without changing their sex. The best-known case in the ethnographic literature is the so-called

berdache, found in a number of societies indigenous to North America. *Berdaches* are individuals who take on gender roles in opposition to their anatomical sex by adopting the dress and performing the activities of members of the other group. The case of berdache and other cases raise the questions of whether we should think of such phenomena in terms of a basic two-gender system, with the possibility of individuals transferring from one to the other, or whether it is more appropriate to think of them as constituting a distinct third gender. Among the Hijras of northern India, for example, males who dress in women's clothing and act more like women than men are considered neither male nor female.

Cross-Cultural Perspectives

Ethnographic evidence supports the notion that gender is a cross-cultural phenomenon, and the vast majority of individuals can easily be differentiated into sex classes on the basis of their genitalia. Nevertheless, in looking at different societies, past and present, anthropology has discovered a wide range of variation in gender construction and gender roles, in the value placed on activities performed by men and women, and in men's and women's access to important social resources.

Gender and the Future of Anthropology

There are now few if any areas of anthropological inquiry that have not been subjected to a "gendered" inquiry. Gender is an element in theories of biological, cultural, and linguistic anthropology, and of archaeology. The range covered by gender questions has come to parallel that of anthropology itself. The way in which gender intersects with other kinds of "differences," such as race, class, ethnicity, sexual preference, and physical ability, has become another focus of the work on gender. Although a woman may not outrank a man of her class, she may outrank men of lower classes. Nevertheless, some go as far as to argue that women and men do not exist anywhere, and therefore the responsible anthropologist will not even assume that there are women and men or third genders in a given culture until it has been shown that these are relevant social categories.

— Anne Siegetsleitner

See also **Sex Roles**

Further Readings

Mascia-Lees, F. E., & Black, N. J. (2000). *Gender and anthropology.* Prospect Heights, IL: Waveland Press.

Nanda, S. (1999). *Gender diversity: Cross-cultural variations.* Prospect Heights, IL: Waveland Press.

Robertson, J. (Ed.). (2005). *Same-sex cultures and sexualities. An anthropological reader.* Oxford: Blackwell.

Gene Distributions

The analysis of gene distributions throughout the world, called *population genetics,* is very important for estimating the date when human life originated and the timing and direction of human migrations throughout world history. Before DNA, the analysis of fossil remains was the major way of estimating human origins. With genetics, four major evolutionary forces are considered: mutations, genetic drift, gene flow, and natural selection.

Within anthropology, there has been an intense debate between the multiregionalists, who believe that humans evolved roughly simultaneously in multiple regions of the world, and the out-of-Africa proponents who believe that current human life originated in Africa. Based on their research on mutations, which shows much more genetic variation within Africa than within other regions of the world, geneticists support the African origins school. Because genetic mutations (and hence genetic diversity) happen randomly throughout history, by a process of extrapolation backward, the conclusion is, comparatively speaking, that a group with a larger number of mutations has had a longer time period in which to accumulate mutations and thus is older.

Mutations have also been very important in studying migrations and explaining gene distributions in different groups and regions of the world. Luigi Luca Cavalli-Sforza, a prominent population geneticist in the United States, has published much data showing the genetic distances between nationality groups and the genetic distance between ethnic groups throughout the world. The more genetic distance between groups, the more mutations have occurred to cause the distancing, and hence the further back one goes to find their common ancestors.

Brian Sykes has classified nearly all women in the world into one of seven groups, each having genetic similarities from ancient history. He showed how these seven groups are distributed throughout the world and suggested the migration history of the groups based on differences and similarities between the genetic compositions of the groups. Genetic research has shown that males and females have very different migration patterns, with the female more likely to leave her parental family and follow the male's family pattern.

For males, a selected number of markers (specific positions on the Y chromosome that are unique and can be measured) can be grouped together into haplotypes, and a number of similar haplotypes can be grouped into haplogroups, to show genetic relationships between different groups or geographical areas of the world. There are strong correlations between haplogroups and regions of the world. Each marker is given a DYS#, which stands for DNA Y-chromosome segment number, numbers that are increasingly being standardized and used internationally so that comparisons between different studies can be made more easily. A world database using nine markers (http://www.yhrd.org), for example, has haplotypes for over 25,000 males, allowing any of these men to see where they have nine-marker genetic matches from over 200 sites throughout the world. The less two men have mutated, the closer they match, and the more recently their MRCA (most recent common ancestor) lived.

Genetic drift affects a small population that does not have sufficient population size to randomly reproduce all the genes of its parent population. A principle called the Hardy-Weinberg Law says that genetic frequencies will not change (that is, changes will balance themselves out) in an infinitely large population with random mating. But, a small group can become nonrepresentative of its parent generation because of inability to reproduce all the previous genes. Hence, two small groups that come from the same parent population will, over time, develop dissimilar gene distributions as each loses some genes and moves further from its original gene distribution. Different mutations can also add to the genetic distance between the small populations.

A *bottleneck,* a catastrophe such as war or disease that kills or stops the reproduction of a significant number of people, also increases genetic drift if it results in only a small group to reproduce. The founder effect, when a small group of people, or even one male or one female, begin a group that then multiples greatly, also minimizes the genetic diversity of a group and increases the possibility of genetic drift. The founder effect also can be found among groups, such as Amish in the United States, who isolate themselves geographically or socially. This usually increases cousin marriages, which increases the likelihood of negative recessive genes being activated and can increase the likelihood of some diseases.

Gene flow is the introduction of genes into a group that previously did not have those genes. This usually results from migration of one group into another group's territory (if reproduction results), but it also can result from the mutual interaction and reproduction of two genetic populations. It can be voluntary or involuntary, although most gene flow has occurred very slowly over history. Over time, a new group can develop that is unique and differs from both of the original groups.

Natural selection is based on the principles that not all individuals survive and reproduce, and that some individuals have characteristics that increase their chances of survival and hence these successful characteristics become more common in a population. The fitness and probable survival of the population thus is increased. But environments change, perhaps rapidly, so the success or lack of success of a characteristic can change. Social attitudes can change definitions of what is rewarded, or even persecuted. Mutations can introduce variations that can increase or decrease an individual's chances of survival.

Figuring out the relative contributions of these four forces and when each had an impact can be very difficult, and controversies remain. The rate or frequency of mutations is still debatable, with important potential effects on the amount of time one goes backward to estimate a significant event. Genetic engineering is a new force, with unknown potentials and questions. DNA research has added a new layer of knowledge to fields such as genealogy, archaeology, and cultural history. Molecular archaeology, molecular anthropology, genetic archaeology, or genetic anthropology are new terms that might describe emerging new interdisciplinary approaches to gene distributions and related concepts.

— Abraham D. Lavender

See also **DNA Molecule; Genetics, History of; Genetics, Human; Genetics, Population; Human Genome Project; Mutations; Selection, Natural**

Further Readings

Cavalli-Sforza, L. L., Menozzi, P., & Piazza, A. (1994). *The history and geography of human genes.* Princeton, NJ: Princeton University Press.

Olson, S. (2002). *Mapping human history: Discovering the past through our genes.* Boston: Houghton Mifflin.

Sykes, B. (2001). *The seven daughters of Eve: The science that reveals our genetic ancestry.* New York: Norton.

Gene Flow

Gene flow is the transfer of genes from one population to another population, usually by migration of one population into the other population's territory. Descriptively, it is also referred to as gene migration, gene admixture, interbreeding, or gene exchange between populations.

Almost always, gene flow refers to migration taking place primarily in one direction. It is necessary that one group not only move into another group's area, but that the new group also reproduce with the group into which it migrates. Dispersal of one population into another population does not lead to gene flow if there is not reproduction between the two groups. In effect, new genes are introduced into the population into which the new group moves, and the two groups hence become more similar genetically over time.

Genetic drift (random changes in gene frequency within a small population, resulting in mutations) and sometimes natural selection tend to introduce more diversity between groups, but gene flow tends to decrease genetic differences between two groups. If gene flow is not opposed, over time, the two involved groups can develop a new genetic group, which can be unique, genetically located between the previous genetic composition of the two involved groups.

Gene flow can occur rapidly and can involve a large movement of one population into another population distantly located, sometimes with force involved, but history suggests that gene flow more likely has occurred with continuous slow movement of individuals of one population into another neighboring population. Contemporary human populations are relatively homogeneous genetically, suggesting that gene flow has been a major factor. Luigi Luca Cavalli-Sforza and his colleagues have shown that there is a strong relationship between geographic and genetic similarity (or, conversely, dissimilarity), suggesting that people frequently are genetically close to their neighbors. Gene flow is not the only reason for this, but frequently is a major reason.

Lack of gene flow also can characterize groups that have a small amount of genetic interchange with their neighbors, sometimes because one or more groups in an area want to remain separate identities. Eastern European Jewish males, for example, with an emphasis on maintaining their religion, averaged only about 1/2 of 1% of gene flow into their community per generation for about 50 generations.

Social relations between two groups can affect the speed and extent of gene flow. In the United States, for example, about 30% of people who identify as African Americans have White European male genetic backgrounds. This significant input of White European genes into the African American population is due largely to oppression of African Americans by European Americans, mostly of British background, under slavery. Native Americans also experienced significant gene flow, frequently following violent conquest, into their group by European Americans, mostly of Spanish background. Racial, ethnic, religious, and social class differences also can impede gene flow by discouraging reproduction between the groups.

— Abraham D. Lavender

See also **Genetics, History of; Genetics, Population; Human Genome Project**

Further Readings

Cavalli-Sforza, L. L., Menozzi, P., & Piazza, A. (1994). *The history and geography of human genes.* Princeton, NJ: Princeton University Press.

Olson, S. (2002). *Mapping human history: Discovering the past through our genes.* Boston: Houghton Mifflin.

Relethford, J. H. (2001). *Genetics and the search for modern human origins.* New York: Wiley-Liss.

Generative Grammar

Generative grammar is a theory of language that is generally said to have made its appearance in 1957,

with Noam Chomsky's *Syntactic Structures.* It is often contrasted with structural or taxonomic grammars. While the aim of structural grammar was to account for all the data in a given corpus, the aim of generative grammar was to *generate* any sentence in a given language, including those not yet uttered. Thus, the goal shifted from accounting for a body of data to modeling the mental functioning that allows humans to use language creatively. Put another way (Chomsky's), the goal shifted from the description of observed language behavior to the explanation of the observed behavior in terms of the mental states of language users.

In its early phase, generative linguists used a huge number of transformational rules to generate different surface sentences from the same underlying sentence. For example, the basic sentence *Mary saw the cat* can be transformed by different rules into a passive (*The cat was seen by Mary*), a yes-no question (*Did Mary see the cat?*), and various "Wh" questions (*Who saw the cat? What did Mary see?*). The grammars linguists tried to write using these rules were enormous and yet still incomplete, and the proliferation of rules made it difficult to explain the rapid and effortless way in which children, by the age of 3 or so, acquire the grammar of their language. As a corrective, generativists attempted to reduce the number of rules by developing general ones, such as *merge,* which allows smaller elements to combine into larger ones, and *move,* which accounts for the position of *what* in *What did Mary see?*

For a simple illustration of the power of generative grammar, take the noun phrase (NP) *the gray cat.* This phrase is generated by first merging the adjective *gray* and the noun *cat* to yield *gray cat,* which can then be merged with the determiner *the.* Using the traditional rewrite rules this looks like:

NP → Det N'

N' → Adj N

N: *cat*

Adj: *grey*

Det: *the*

Adding lexical items to the N, Adj, and Det lists very rapidly increases the number of NPs that can be generated. For example, adding the indefinite determiner *a(n),* the nouns *dog* and *goat,* and the adjectives *black* and *white* increases the number of potential NPs from one to 18.

More recently, generative linguists have incorporated *principles* and *parameters.* Principles are invariant; the *projection principle,* for example, requires that any properties of the lexical head of a phrase apply to the whole phrase. So, if the noun *woman* is [+human], the NP *the first woman in space* is also [+human].

Parameters require language learners to make a choice. For example, in English, verbs precede their objects: *eat* + *potatoes.* In some languages, like Aymara, objects come first: *ch'uq* (potatoes) + *manq'aña* (eat). This illustrates the *head parameter:* the heads of phrases may either precede or follow their complements. Once children "set" this parameter, they know other facts about their language:

Head complement

Verb phrase *eat potatoes*

Prepositional phrase *in the house*

Adjective phrase *afraid of spiders*

Noun phrase *president of the United States*

One of the claims of generative grammarians is that because language is innate, the forms that human languages can take are sharply constrained. This claim created some tension between these linguists and followers of the earlier tradition in linguistic anthropology that took languages to be infinitely variable and entirely determined by culture.

— *Ronald Kephart*

Further Readings

Chomsky, N. (1957). *Syntactic structures.* The Hague: Mouton.

Chomsky, N. (1995). *The minimalist program.* Cambridge: MIT Press.

Cook, V., & Newson, M. (1996). *Chomsky's universal grammar: An introduction* (2nd ed.). Oxford: Blackwell.

Lightfoot, D. (1982). *The language lottery: Toward a biology of grammars.* Cambridge: MIT Press.

Genetic Drift

One of the conditions of the Hardy-Weinberg equilibrium (the set of circumstances under which evolution does *not* occur) is that the population of breeding individuals is large enough that chance will not alter the allele frequency from one generation to another. When the population is small, however, all but one allele of each gene tends to go extinct. In a population with 20 females, for instance, for each gene with two equally common alleles, there is more than a 75% chance one or the other allele will be lost within 50 generations, independent of any selection. This chance variation in allele frequency in small populations is called *genetic drift.*

Drift can be enormously important. The most common scenario for speciation involves geographic isolation of a population. This typically occurs when individuals invade a new habitat or are cut off from the rest of the species at one corner of its range. These isolated populations are likely to be small, and they may well by chance be missing some alleles even before genetic drift can take place. The consequence of this kind of biased start in a subpopulation is called the *founder effect.* The same thing happens when a local population is reduced in size from disease, climate change, or habitat alteration—the so-called genetic bottleneck. Alleles not surviving the bottleneck event, the founding of a population, or subsequent genetic drift are simply lost.

In many cases, the rapid evolution (changes in allele frequency) of a population is caused by genetic drift and selection taking place simultaneously: Isolated populations or populations drastically reduced by external factors are typically subject to unusual selection pressures. The challenges of a new or marginal habitat, different diseases and parasites, or an altered climate select for novel allele combinations. Selection and genetic drift, taken together, seem to account for most of the cases in which an isolated population becomes unable to reproduce with the parent population by the time contact is reestablished. Reproductive isolation is the essential final step in speciation.

— *James L. Gould*

See also **Gene Distributions; Genetics, Population; Hardy-Weinberg Principle**

Further Readings

Gould, J. L., & Keeton, W. T. (1996). *Biological science* (6th ed.). New York: Norton.

Genetic Engineering

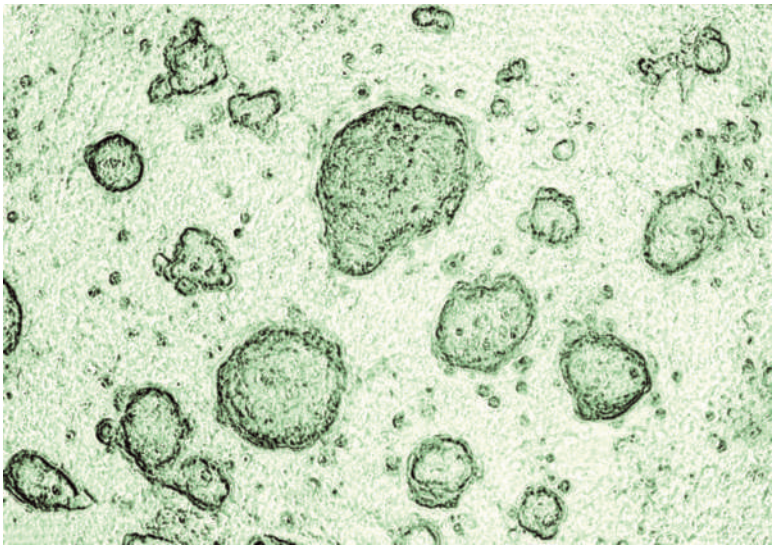
Genetic engineering denotes the process of changing the genetic constitution of cells by introducing, modifying, or eliminating specific genes through modern molecular biology techniques. It is applied in several fields, including medicine and agriculture. Its application in medicine comprises the production of medical substances in genetically modified organisms, genetically modified animals as models for the study of human diseases, and gene therapy. In agriculture, it is used to improve food products in a variety of ways. Some of the well-known genetically modified foods are rice, soybeans, carrots, and tomatoes. Genetic engineering has not only become a major topic of biological anthropology, but has important implications on cultural and social anthropology as well; the most controversial issue is the direct nonmedical application of genetic engineering techniques to enhance normal function in humans.

Cells, DNA, and Genes

In the midst of the 19th century, modern biology was born on the basis of Charles Darwin's theory of evolution and the finding that all living organisms are composed of cells. In the second half of that century, important discoveries were made in the fields of genetics and embryology, culminating at the turn of the century with the chromosome theory of heredity, which claims chromosomes are the structures that carry heredity information. From that point on, genetic research thrived. The chemical nature of the chromosomes, however, was unknown until 1944, when Oswald Avery and his colleagues used bacteria to demonstrate that genetic material is composed by *deoxyribonucleic acid* (DNA), which is found in all living organisms. In complex cells, DNA exists in the nucleus in the form of chromosomes (nuclear DNA) and in the mitochondria, structures found in the cytoplasm of cells (mitochondrial DNA). But without

knowledge of the structure of DNA, little could be understood about how it actually worked.

This changed in 1953 with the discoveries by Jim Watson and Francis Crick. They could show that DNA is organized into two combined strands in the form of a helix, the now famous *double helix*. The strands are built by four bases only: adenine (A), guanine (G), cytosine (C), and thymine (T). These are linked together with sugar units and phosphates. Moreover, the two strands are complementary: The sequence of the bases of one strand determines unequivocally the sequence of the other, due to the chemical affinity of the bases. Base pairs can form *only* between A and T and between G and C. This is essential to DNA's ability to duplicate and make an exact copy of itself (a process called *replication*). In this process, the two halves of the helix separate, and a new partner is fabricated to match each half exactly.



Source: © iStockphoto/Andrei Tchernov.

DNA controls unique features of an organism. Each cell of an organism contains the exact same DNA sequence, in which the instructions for certain gene products are encoded. There are systems in cells that read the DNA sequence and "translate" it into *proteins* (linked amino acids). Proteins then go on to be effective in many ways. Some are structural components of tissues (like collagen, a structural material of bone and many other tissues). Some are enzymes that initiate and enhance chemical reactions (like lactase for digestion). DNA contains the instructions, and proteins carry out the instructions. The process by which the DNA instructions are converted into the structures and functions of a cell is called *gene expression.* The rule by which the DNA sequence is translated into a protein is called the *genetic code.* This code is the same in all known living organisms. An organism's life, growth, and unique features depend on its DNA. A segment of DNA coding for defined information is called a *gene.* All the genetic material of an individual or species is called its *genome.*

In many species, however, only a small fraction of the genome's total sequence encodes protein. And with those that do, not all information is actually used for protein synthesis. Contained within DNA sequences are elements, known as *promoters* and *repressors,* which allow individual cells to control which genes are expressed. Expressing genes in the appropriate tissue at the appropriate time is very important. In the human body, for example, regulation ensures that fingernails grow only on fingers and hair grows only on specific parts of skin. But although genes determine many characteristics of an organism, we do not yet understand how specific genes contribute to the complex physical, cognitive, emotional, and behavioral traits of humans.

Types and Techniques of Genetic Modification

The alteration of DNA allows genetic engineers to change the genetic constitution of cells. Since DNA is passed on from one generation to the next, changes in DNA can be carried over generations. In this respect, however, an important distinction in genetic engineering occurs between *germ line* and *non-germ-line* cells. In most organisms, certain cells are set aside exclusively for reproduction. These are called *germ line cells* (in humans, the eggs and sperm). Non-germ-line cells are all the other cells in the body, muscle cells, skin cells, liver, and so on. If a genetic modification does not alter germ line cells, it has no effect on the genetic makeup of future generations. Genetic engineering is performed on germ line or non-germ-line cells, depending on the purpose of intervention.

Two basic types of genetic modification are the addition or deletion of function. To add a function to a cell, all that must be done is to introduce a new gene that codes for the given function. Deletion of

function can be performed by either *knocking out* a gene or introducing an *antisense gene* to interfere with the cell's ability to express a given gene. Although genetic engineering has a wide range of applications, only a few fundamental steps are required. These include the isolation of the donor DNA of interest and its amplification, transfer, and expression in a host cell.

The major tools for the *isolation* of the donor DNA are so-called restriction enzymes. They work by cutting up the DNA, a process called *restriction.* Most of them are very specific. They recognize short, specific sequences in DNA and cut at specific points within these sequences. For most tasks, the amount of DNA fragments that can be obtained from a cell is not enough; amplification is needed. Therefore, one of the most important practical developments in genetic engineering is the *polymerase chain reaction* (PCR), an achievement for which its inventor, Kary Mullis, was honored with the Nobel Prize in Chemistry. Using PCR, any short sequence of DNA can be amplified many times. Because even single DNA molecules can be amplified through PCR, the method is also applied in archaeology, forensic anthropology (the application of anthropological techniques to legal matters), and paleoanthropology (the study of earlier hominids). For example, anthropologists have been able to analyze mitochondrial DNA sequences of the Neandertals.

There are a number of techniques for introducing genes artificially into host organisms. Some use biological vectors (organisms to transport donor DNA), like plasmids or viruses. Plasmids are small circular pieces of genetic material found in bacteria that have the ability to cross species boundaries. Viruses are infectious particles, specialized over millions of years, that contain genetic material to which a new gene can be added. The vector DNA and the fragmented donor DNA are brought together. Afterward, the new combination of DNA in the vector is transferred into the cells of a host organism, in which the cells with the new genetic information are reproduced and the new genetic information is expressed. Such techniques have been around since the 1970s. Nonbiological methods of transfer comprise chemical and physical procedures. In *electro- and chemical poration,* pores or holes in a cell membrane are created to allow entry of the new genes. The method is now widely used with microorganisms, plants, and animals. So-called projectile methods use metal, such as gold, slivers, which are coated with the genetic material to be transferred. One projectile method, called *biolistics,* propels the coated slivers into the cell using a shot gun. This method has become the main method of choice for the genetic engineering of many plant species. Another method, used especially with animals, introduces DNA into a cell via *microinjection:* The genetic material containing the donor DNA is directly injected into the host cell by use of a fine-tipped glass needle. With some methods, the means by which genes are inserted in the host organism may be inexact and occur at random. Therefore, methods have been developed to insert genes at specific spots in the genome of even complex organisms. *Recombinase-mediated cassette exchange* (RMCE), for example, performs site-specific chromosomal integration in mammalian cells. The expression in the host organism becomes predictable, because a single copy of the DNA inserted into the genome is integrated at a known site. Several types of bacteria are favored as host cells, but higher organisms, such as fungi, yeasts, mammalian, or insect cells, and whole animals or plants, can also be transformed by foreign DNA.

Since DNA is universal among organisms, it can be transferred between unrelated organisms. Genetic engineering enables scientists to create plants, animals, and microorganisms by manipulating genes in a way that does not occur naturally. It even allows genes to be moved across species lines or to move artificially constructed genes. An organism into which foreign DNA has been introduced is called a *transgenic organism.* The transfer of genes across distinct species is called *horizontal gene transfer.* While in theory, the technology is available to transfer a particular gene from any organism into any other, in actual practice, there are numerous constraining factors. The single most limiting factor is the dearth of basic scientific knowledge of gene structure and function.

Applications of Genetic Engineering

Techniques of genetic engineering are applied in both the research and practice of medicine. In practice, for many years, genetic engineering has made it easier to gain various medical substances that are produced by bacteria, such as insulin, for example. As explained above, plasmids augmented with new genetic material can move across microbial cell boundaries and place the new genetic material next to the bacterium's own genes. Often, the bacteria will take up the gene and begin to produce the protein for which the gene

codes. If the new gene codes for insulin, the bacterium will begin to produce insulin. In addition, transgenic animals are used to produce medicine through the process known as *gene pharming.* Genetically altered sheep, for example, produce an enzyme in their milk that is present in most people and prevents a serious form of emphysema. Extracted from the milk and purified, it can be helpful to people who do not normally produce it. In general, genetic engineering provides the basis for a well-founded biological-causal understanding of certain diseases, thus opening up the development of new effective treatments oriented on the cellular-molecular causes of a disease. These are the hopes of *gene therapy.* Gene therapy is a technique for correcting defective genes responsible for disease development. Such therapies often try to replace or repair defective genes. In most gene therapy studies, a "normal" gene is inserted into the genome to replace an "abnormal," disease-causing gene. Hopes are high for some diseases (Parkinson's or Huntington's, for example), but gene therapy is still experimental. When gene therapy does not alter the germ line but only somatic cells *(somatic gene therapy),* the disease can still be inherited by children. In contrast, this is no longer possible when gene therapy is applied on the germ line level *(germ cell gene therapy).* At the moment, germ cell gene therapy is banned in many countries. The same holds for xenotransplantation, the transplantation of tissues and organs between species (for example, the use of a swine heart for a human). Here, genetic engineering plays a crucial role, because in order for this technique to work, it is necessary to knock out most of the strong, ordinary antigenic systems in swine. In medical research, transgenic animals have become important models for the study of human diseases, like cancer, multiple sclerosis, and diabetes. Due to its physiological closeness to man and its simple breeding, the mouse is the most common transgenic animal. However, there are also transgenic strains of farm animals, such as chickens, pigs, sheep, goats, and cattle.

Genetic engineering techniques have also been used to improve food products in a variety of ways. Some of the well-known genetically modified foods include rice, soybeans, carrots, and tomatoes. In agriculture, useful plants are optimized by genetic engineering through the addition of a resistance against pesticides or resistance against pests. Sometimes genes are transferred to add other useful characteristics in growing. Tomatoes are an example. These are sensitive to frost, and this shortens their growing season. Fish, on the other hand, can survive in very cold water. Scientists identified a particular gene that enables a flounder to resist cold and used the technology of genetic engineering to insert this "antifreeze" gene into a tomato. This makes it possible to extend the growing season of the tomato. Sometimes, genes are added to provide extra nutrients, like in "golden rice," a genetically modified rice that contains building blocks for vitamin A. Deficiency in this vitamin causes blindness and other diseases. Moreover, sometimes a gene is removed to enhance a product, such as removing the tear-producing element of onions.

Cattle and pigs are commonly treated with genetically engineered growth hormones to increase growth rates. A lot of other industries use genetically engineered products as well. For example, genetically engineered enzymes are used in the production of cheese and bread, in laundry soap, in the bleaching of jeans, and in the treatment of leather.

Genetic Engineering and Anthropology

What is already possible and what is probable to be possible in the future are both related to anthropology in various fields and ways. Biological anthropology includes the exploration of the implications of modern advances in genetics, including genetic engineering. For anthropological research, genetic engineering is a method to explore basic biological mechanisms, such as yet unknown principles of genetics. Biological anthropology also places particular emphasis on the interaction between biology and culture; for biological anthropologists, genetic engineering will help in understanding the complex relationship between biological constitution, culture, and environment. On a more future-oriented and general level, it is questioned whether genetic engineering poses evolutionary dangers and how it will change the understanding of evolution itself, what it is, and how it operates. Will traditional evolution be replaced by "intelligent design"? Will genetic engineering change the relationship between humans and other species? However, biological anthropology is not the only field concerned with genetic engineering. Social and cultural anthropology are interested in the social and cultural implications of genetic engineering. Genetic engineering is controversial due to numerous questions related to product safety, and environmental and social concerns. Many aspects are still poorly

understood and unexpected side effects may occur. More controversial still is the direct application of genetic engineering techniques on humans and especially the possible nonmedical applications for the enhancement of normal functions. Some see genetic engineering as a new tool for eugenics, the doctrine or practice of selective breeding in order to "improve" the human genetic pool. The effect genetic engineering will have on societies is a huge field of anthropological study.

— *Anne Siegetsleitner*

See also **Biomedicine; DNA Molecule; Evolution, Molecular; Genetics, Human; Human Genome Project**

Further Readings

Kahl, G. (2004). *The dictionary of gene technology. Genomics, transcriptoms, proteomics* (3rd ed.). Weinheim, Germany: Wiley-VCH.

Schmid, R. D. (2003). *Pocket guide to biotechnology and genetic engineering.* Weinheim, Germany: Wiley-VCH.

Smith, J. E. (2004). *Biotechnology* (4th ed.). Cambridge/New York/Melbourne/Madrid/Cape Town: Cambridge University Press.

Walker, J. M., & Rapley, R. (Eds.). (2002). *Molecular biology and biotechnology* (4th ed.). Cambridge, UK: Royal Society of Chemistry.

GENETIC ENGINEERING

Genetic engineering, including the completion of the historic Human Genome Project, has promised to bring the end of suffering to many who are victims of inherited genetic disorders, from diabetes to cystic fibrosis. By mapping the human gene sequences, researchers hope to unlock the keys that may in time wipe out genetic diseases that have blighted the lives of untold generations of humanity. Unfortunately, as with atomic energy, which gave the world new diagnostic and treatment tools in medicine as well as weapons to annihilate humankind, genetic engineering has become a two-edged sword.

While many researchers have devoted their careers to genetic engineering to improve the lives of men and women, others have worked equally hard to develop genetically engineered biological weapons. Perhaps no one has revealed this dark side of genetic engineering better than the Russian defector Ken Alibek, born Kanatjan Alibekov in now-independent Kazakhstan in 1950. In 1992, Alibek defected to the United States after having served as the first deputy chief of Biopreparat, the Soviet state organization dedicated to the development of biological weapons for use in war. Coincidentally, the greatest period of Soviet research into biological warfare, according to Alibek, took place after 1972, when Moscow endorsed the Biological Weapons Convention, which was meant to remove that scourge from the military arsenals of the world.

In simple terms, genetic engineering in biological weapons was to be used to increase the strength—and lethality—of bacteria, viruses, and other microbes that were known to exist in nature. Such experiments were carried out in the Soviet Union at great risk. In 1979, an anthrax outbreak took place as a result of a plant accident at Sverdlovsk, where Boris Yeltsin, later president of a non-Communist Russia, was the official in charge of the area. An example of genetic engineering for biological warfare took place when the dreaded Ebola virus was genetically "spliced" into smallpox to create a more lethal pathogen, or germ. Ebola, which created panic when it erupted in Kikwit, Congo, in 1975, was not considered a good risk as a biological weapon, or agent, because those who contracted the disease died too soon to spread it to many other potential victims. By splicing Ebola onto smallpox, the scientists at Biopreparat succeeded in developing a pathogen that took longer to kill its suffering victims—thus giving them more time to infect others.

Thirteen years after Alibek's defection, the real extent of Russia's biological weapons program is still unknown. Furthermore, those research scientists who have lost their employment as a result of the continued serious state of the Russian economy are now feared to be offering their deadly expertise to a foe far less predictable and far less inclined to act rationally than the former Soviet Union: the Islamic extremists of al Qaeda and its allied jihadist groups.

— John F. Murphy Jr.

STEM CELL RESEARCH

The announcement in 1998 of the isolation of human embryonic stem (ES) cells by James A. Thomson at the University of Wisconsin at Madison was greeted with controversial reactions. On one hand, the discovery promised great medical benefits, as it ensured an endless reserve of transplantable cells, offering hopes to people suffering from diseases such as Parkinson's and diabetes. On the other hand, it also provoked horrified responses, mainly from conservative religious circles, because of the embryonic and fetal sources of these cells. As a result of pressure from the Vatican and influential religious groups, stem cell research has been banned in several countries, while, in the United States, it does not receive any public funding.

The stem cells isolated by Thomson and his colleagues came from "spare embryos." These embryos, called blastocysts, have been created in a fertility clinic by in vitro fertilization but are no longer needed for transfer to a woman. The outer level of the blastocyst is destined to become the placenta. The remainder of the blastocyst, called the inner cell mass, is what will then become the fetus. Embryonic stem cells are isolated from this inner cell mass and this has raised ethical questions on the moral status of the embryo and the aborted fetus. These questions prompted Pope John Paul II to issue a statement of strong moral condemnation for "procedures that exploit living human embryos and fetuses—sometimes 'produced' for this purpose by in vitro fertilization—either to be used as 'biological material' or as providers of organs or tissues for transplants in the treatment of certain diseases. The killing of innocent human creatures, even if carried out to help others, constitutes an absolutely unacceptable act." This position clearly derives from the view that the human fetus is a person. This view was explicitly put forward by the Pope in his 2005 address to Vatican ambassadors: "The human embryo is a subject identical to the human being which will be born at the term of its development."

The debate over stem cells has given rise to some paradoxical situations. The most evident is the American case where in which President George W. Bush ordered that federal funding for research be limited to embryonic stem-cell lines already in existence, and that it not be used on any new cell lines created from donated surplus embryos. No limits have been put on private research.

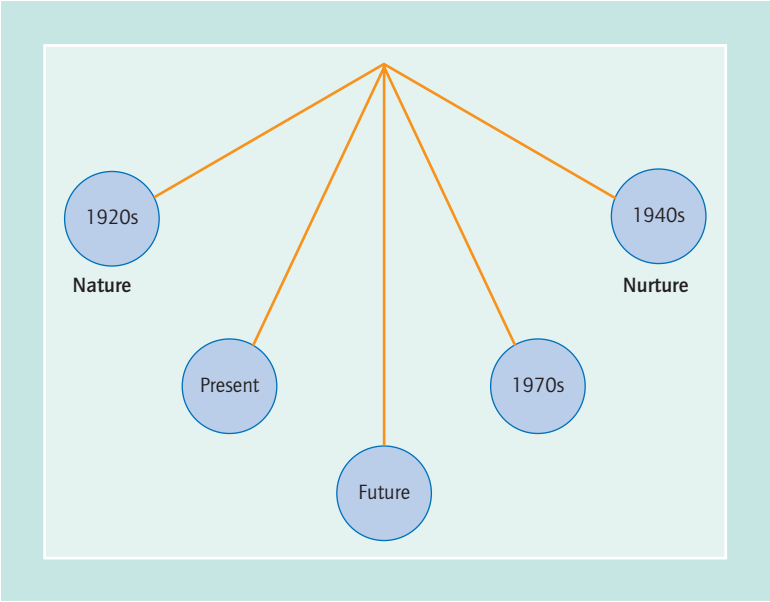
— **Luca Prono**

Genetics, History of

In its broadest sense, genetics is the science of biological variation. It focuses on variation that results from inheritance, the process by which characters are passed from parents to their offspring. This often places genetics in contrast to the environment, even though one is not sufficient without the other. For thousands of years, humans have been interested in how characters are inherited in plants, animals, and themselves. Much was learned over the centuries through observations and repetition of what seemed to work in agriculture and animal breeding. But it took an Austrian monk working in the middle of the 19th century to conceptualize what was happening when characters were passed on. The monk, of course, was Gregor Mendel, and we are now more than a century and a half into the discipline he fathered.

The history of genetics has been colored by the best and the worst of times. The field has suffered through periods of extreme controversy. Its practitioners have varied from those whose ideas could not help but be controversial given the views of the society in which they emerged, to those who quietly worked in their laboratories to develop the theories and technologies to drive the engine of genetics. Both scientific and societal concerns have driven the swings of the so-called nature-nurture pendulum (see figure). *Nature versus nurture* refers to the influences of biology, that is, genetics, versus the environment, in the determination of characters, be they physical or behavioral. The swings of the pendulum reflect periods of time during which the scientific community and society viewed either nature or nurture as the more important determinant. These swings have clearly influenced developments in genetics and will be highlighted as we trace the history of this science.

The following history of genetics covers first its roots in the 19th century. The next period, 1900 to 1953,



Swings of the nature-nurture pendulum.

Source: Adapted from Plomin, R., & Petrill, S. A. (1997). Genetics and intelligence: What's new? In *Intelligence, 24*, 53–77, copyright © 1997, reprinted by permission of Elsevier.

spans from the rediscovery and promotion of Mendel's seminal work to the discovery of the basic structure of deoxyribonucleic acid (DNA) in 1953 and the beginnings of molecular genetics. Next, a special section addresses the eugenics movement that began in the 19th century and slowly disintegrated in the aftermath of World War II. Finally, from the 1950s to the present day, the field of molecular genetics developed and tremendously influenced the way all of genetics is practiced, leading to the current era of genomics.

The 19th Century: Roots of Genetics

The names of three individuals dominate the 19th century relative to the roots of genetics: Charles Darwin, Gregor Mendel, and Francis Galton. In 1859, Charles Darwin was the first to present scientific evidence for what he called *natural selection* in his book *On the Origin of Species.* Met with skepticism, Darwin's theory profoundly influenced the ideas of scientists and geneticists of future generations, perhaps having more impact than any other naturalist on the course of genetics and society. However, Darwin never produced a satisfactory explanation for the genetic source of variation in characters that he understood to be the target of selection.

Only 6 years after Darwin's publication, Mendel published his papers regarding inheritance of characters in peas, which seems to have been virtually ignored by scientists of his time. His work was so advanced that it wasn't until its rediscovery in 1900 by three scientists that the results were finally understood. Between Mendel's initial publications during the 1860s and the rediscovery of his work, the third individual began his work.

Francis Galton, a cousin of Charles Darwin, and just as much a naturalist as Darwin, became the pioneer for the promotion of *eugenics,* a term that he coined, the direct meaning of which is "well-born." In 1865, Galton opined that if as much effort and cost went toward improving biological variation in humans as was spent on breeding improvements in farm animals, we could surely improve humankind's cognitive abilities. Galton thought that biological inheritance of leadership qualities determined the social status of Britain's ruling classes, seemingly a logical extension of Darwin's theory of evolution. However, whereas Darwin never discussed the nonscientific impact of his ideas in the face of society, Galton advocated them. Furthering Galton's naturalistic view of the world, the Englishman Herbert Spencer introduced the concept of Social Darwinism. He drew analogies between society and biological organisms in a book that sold more than 400,000 copies between 1860 and 1903. Using the principle of evolution as a universal law and considering competition as the key to evolutionary progress, Spencer ignited a society that wholeheartedly believed that government welfare interfered with the evolutionary process by favoring survival of the unfit. At the time, however, there was a lack of scientific knowledge about how the inheritance of specific traits occurred, and without the immediate results to confirm Spencer's and Galton's ideas, the public essentially lost interest. This was all about to change with the rediscovery of Mendel's experiments and the explanation of how characters were passed from parent to offspring.

1900–1953: Classical Genetics

Many pioneers in biology, only some of whom will be highlighted here, led the early work in genetics. At the turn of the century, research in genetics had greatly accelerated, and explanations for the transmission of traits were being found through the rediscovery of

Mendel's work. While Hugo de Vries and Erich von Tschermak were initially given credit as having independently rediscovered Mendel's work, their publications are now judged to have been vague. Some think they might have misunderstood Mendel's concepts. It was a third scientist, Carl Correns, who was able to demonstrate clearly how Mendelian ratios were derived theoretically. He indicated that discrete units, known eventually as *genes,* somehow factored into causing the traits observed in offspring. This exciting rediscovery of Mendel's work fueled the younger generation of geneticists because Mendel's laws served as a foundation for predicting the transmission of characters from parents to offspring.

As a consequence of the interest in and promotion of Mendel's ideas after the turn of the 20th century, two opposing scientific groups developed. One saw Mendel's ideas as providing the prime basis of explanation for the inheritance of characters and came to be known as the *Mendelists.* The other, known as *biometricians,* had its origins in the work of Galton on metric traits such as height and did not think that Mendelian principles offered the models to explain the inheritance of these traits. William Bateson led the Mendelists, while the statistician Karl Pearson and Walter F. R. Weldon led the biometricians. Ultimately, most geneticists of the time would reconcile the differences between the Mendelians and the biometricians. The culmination came in 1918, when Ronald A. Fisher published his classic paper showing that characters controlled by large numbers of Mendelian factors (genes) would show the type of continuous, quantitative distribution (normal bell-shaped curve) and correlations between family members like parents and offspring that Galton and later the biometricians described. This publication marks the beginnings of classical quantitative genetics, the analysis of the genetics of metric characters such as height, head length, and the like.

In the early 1900s, population genetics, the study of how genes are distributed and maintained in populations, had its beginning. In 1908, G. H. Hardy published a paper in the journal *Science* regarding the application of mathematical methods to biology. Hardy explained how the frequencies of genes in populations would remain the same from one generation to the next unless certain forces, now known as the mechanisms of evolutionary change, were operable in the population. That same year, Wilhelm Weinberg, publishing in German, stated the same principles as Hardy.

Gregor Mendel

Starting in the second decade of the 20th century, the mathematical basis and theories of population genetics were further developed by three individuals. Fisher has already been mentioned. Between 1922 and 1929, he developed a theory of evolution in which he combined Mendelian inheritance and Darwin's natural selection. During this period, he published several papers that led to the eventual culmination of his ideas in the book, *The Genetical Theory of Natural Selection,* in 1930. About the same time as Fisher, an English biologist, J. B. S. Haldane, was beginning his career. A paper published in 1915 by Haldane was the first to show genetic linkage in mammals. After returning to England from World War I, Haldane continued his research in population genetics. His publications from 1924 through 1932, and lectures presented in 1931, titled "A Re-Examination of Darwinism," led to the book *The Causes of Evolution* in 1932.

Sewall Wright, an American, was the third in the group of major contributors to population genetics. He was an early user of the principles of Hardy and Weinberg. He is probably best known today for having stressed the importance of random genetic drift as an explanation for changes in gene frequencies in small populations. Wright lived well into his 90s and contributed immensely to the theoretical development of

population genetics for more than 70 years, an extraordinary accomplishment. Fisher, Haldane, and Wright were essential to the vitality of population genetics from the 1920s and well beyond. They were conscientious enough to consider with an open mind not only evolutionary genetics but also the effects of environment on heredity. This was vastly different from the scientists who promulgated eugenics, who viewed the effects of heredity as primary.

Another major force in the development of genetics during the 1920s was Hermann J. Muller. His paper on "Artificial Transmutation of a Gene" was published in 1927 in *Science.* Earlier, Muller had worked in the lab of Thomas Hunt Morgan at Columbia University. Morgan and his students and coworkers originated the use of the fruit fly *Drosophila* in research to study the mechanisms of inheritance. In 1915, Morgan's research group published the important text, *The Mechanism of Mendelian Heredity.* After leaving Columbia in 1920 for the University of Texas, Muller became interested in the mutagenic effects of X-rays. His subsequent experiments leading to the paper in 1927 were the first time any laboratory had been able to cause a permanent, heritable change in the genes of an organism. Muller's work convinced him that almost all mutations are deleterious.

For many years, Mendelian genetics and Darwinian evolution were viewed by the geneticists of the day as two disparate entities. Fisher, Haldane, and Wright were the first to alter this thinking. However, their work was heavily mathematical and often difficult for biologists and others to comprehend. Into this situation came the Russian-born naturalist and geneticist, Theodosius Dobzhansky, and his book *Genetics and the Origin of Species,* in 1937. This was the first blow to be struck for the Evolutionary Synthesis, the melding of Darwinian and Mendelian thought with its application and testing in the field, the natural laboratories of population genetics and evolution.

Other architects of the Evolutionary Synthesis continued this work. Several publications, directly inspired by Dobzhansky's book, appeared in the 1940s. Ernst Mayr's book *Systematics and the Origin of Species* (1942) focused more specifically on systematics and the problem of speciation, a concept poorly understood by many biologists of the time. George Gaylord Simpson's *Tempo and Mode in Evolution* (1944) tied in evolutionary change from a paleontological viewpoint. Finally, G. L. Stebbins's *Variation and Evolution in Plants* (1950) broadened the synthesis to include botanical studies and plant genetics. These works together helped unify and strengthen Dobzhansky's original thesis and provided the basis for further developments in the Evolutionary Synthesis that impacted many fields of study, including biological anthropology and the study of human evolution.

Although the developing eugenics movement, discussed in the next section, applied genetics to human variation, it was not the only means by which human genetics began to develop. Some of the earliest attempts to apply Mendelian principles to human characters occurred in the early 1900s. An example of this was the description by the English physician Archibald Garrod of the first metabolic disease in humans, alkaptonuria, as being inherited in an autosomal recessive manner, meaning that both parents were carriers of the mutation for this disease and would pass it on with a one-quarter chance of transmission with each child.

Human genetics was already developing as a field during the first three decades of the 20th century, but it was not until the 1930s that it began to shed the baggage of eugenics. Garrod continued to form the basis for human biochemical genetics with his book *The Inborn Factors in Disease* in 1931. Three years later, Asbjörn Følling described phenylketonuria (PKU), one of the classic metabolic diseases. The first study of human identical twins, by Horatio H. Newman and his coworkers, was published in 1932. The same year Haldane made the first estimations for the mutation rate of a human disease gene, that for hemophilia. Fisher was also applying population genetics principles to human genetics with the publication in 1934 of a major work on ascertainment and linkage studies in human pedigrees. 1935 marked the publication of the book *Principles of Heredity* by Laurence H. Snyder, who was at the same time establishing a research program for human genetics at Ohio State University.

Beginning in the 1930s and continuing throughout the 1940s, there were signs that genetics would develop into a biochemistry-based and eventually molecular-based science. Muller's work on X-ray mutagenesis had stimulated a search for the chemical basis of mutation and at least two lines of research. The first began in an interesting fashion and illustrates that genetics, indeed any science, has sometimes relied on luck for advancement. This research was to broaden understanding of gene function and was contributed by Charlotte Auerbach and her colleagues. Auerbach, born a German Jew, left the increasingly threatening situation in Germany in 1933. She soon

held a position in genetics research at the Institute of Animal Genetics in Edinburgh, Scotland. Muller visited the Institute in 1938 and is credited with suggesting research on chemical mutagenesis to Auerbach before his departure to America.

Auerbach and her coworkers began to study the effect of mustard gas on the mutation rate of the fruit fly *Drosophila melanogaster* in 1940. They hoped to find a way to perform a directed mutation to enable studies of the nature of the gene. Mustard gas induced similar mutations to X-rays but produced more lethal mutations. The anticipated directed mutation did not materialize. Because of World War II, the results were not published until 1946. The delay did not dull the significance of the work. Further discoveries of other chemical mutagens, stemming from Auerbach's work, showed the desired directed mutation effect and proved to be invaluable to genetic research.

In the second direction taken from Muller's work, George Beadle and Edward Tatum in 1941 used *Neurospora conidia* treated with X-rays to revolutionize the way that geneticists searched for metabolic mutants. After treatment with ionizing radiation, these researchers grew each spore in two different media. The first, the complete media, contained everything a cell would need for optimal growth; the second, the minimal media, provided only the barest essentials for cellular survival. Once a spore was found that could survive on complete but not on minimal media, progressive metabolic precursors could be added to the minimal media to determine exactly what metabolic pathway had been disrupted at what point. Their findings seemed to show that one gene is responsible for the production of one, and only one, enzyme. Beadle and Tatum proposed the "one gene, one enzyme hypothesis," the first biochemical explanation for the function of the gene. Beadle and Tatum contributed two additional innovations. The first was the establishment of *Neurospora* as a microorganism ideally suited for genetic studies. This was crucial groundwork toward eventually making bacteria genetically useful in the laboratory. The most important innovation was the linking of the genes of the organism with its biochemistry, essentially establishing molecular genetics, or *biochemical genetics*, a term that Beadle preferred.

Another research discovery of the 1940s found its origins in a classic 1928 paper in which Fred Griffith reported that serological types of the bacteria pneumococcus were interchangeable. Specifically, it was shown that rough-coated pneumococci could be permanently transformed into the more virulent smooth-coated cocci capable of causing lethal infections. At the time that study was published, the laboratory directed by Oswald T. Avery in the Rockefeller Hospital of New York City had already been working with pneumococcus for over 15 years. Given his familiarity with the microorganism, Avery became convinced that the phenomena described by Griffith held the key to how pneumococci controlled the formation of the bacterial capsule.

Determining the nature of this key to pneumococcal virulence would take an additional 16 years, before Avery, Colin M. MacLeod, and Maclyn McCarty published their classic 1944 paper, "Studies on the Chemical Nature of the Substance Inducing Transformation of Pneumococcal Types," in the *Journal of Experimental Medicine.* In this meticulous, carefully analyzed study, the authors discussed the revolutionary evidence that DNA is the transforming principle that influences the construction of the capsule of the pneumococcus in a heritable way. The significance of this work was the idea that it is DNA, not nucleoprotein, that is the conveyor of inheritance in living things. It was truly a major shot toward initiating the DNA revolution.

The Eugenics Movement

Eugenics represents a special case in the history of genetics, as its advocates and practitioners had such a profound influence on genetics during its development as a science. The eugenics movement spanned the period from the late 19th century until well into the 20th century. As mentioned, it was Galton who coined the term *eugenics* in 1883 as the process of improving the human race through selective breeding. The idea of saving humankind from a perceived genetic and moral decline hit a very popular chord in nations such as England, the United States, and Germany. Indeed, over 30 countries worldwide enthusiastically embraced eugenics, each adopting the movement to fit its own local scientific, cultural, and political climate. It was supported in countries such as Argentina, Cuba, Czechoslovakia, Russia, Brazil, Colombia, Mexico, and Venezuela. Eugenics was seen by many cultures as the truest method to cleanse human society from what were then perceived as hereditary degenerations, such as moral decadence, tuberculosis, chronic unemployment, alcoholism, and a wide variety of social ills.

Scientifically, eugenicists mistakenly believed that most traits, even ones we would describe today as complex traits with multiple loci, were governed by

only one gene. With that being the case, they reasoned, the improvement of human populations would be a matter of controlling which Mendelian "factors" or genes were passed on to successive generations through aggressive selective breeding, to which livestock had been subjected for centuries. According to their thinking, the selective breeding of humans included not only encouragement of larger families within the middle- and upper classes of society in order to propagate their genes of material success and civility but also measures to prevent the reproduction of those individuals deemed unworthy, unfit, or a burden on society. Their solution was enforced sterilization by vasectomy or tubal ligation to people in asylums and convicted criminals. They pushed the idea of sterilization so that those who were sterilized could participate in society without the need for institutionalization, thus deferring the cost to the public.

In America, support for eugenics first became evident around the time of the heated debates between the Mendelians and biometricians. In 1904, Charles Benedict Davenport talked the Carnegie Institute of Washington into funding the creation of the Station for Experimental Evolution at Cold Spring Harbor in Long Island, New York, and in 1906, John Harvey Kellogg created the Race Betterment Foundation in Battle Creek, Michigan. Davenport was to play a major role in the development of eugenics in America.

Davenport, a well-respected scientist, had earned his undergraduate degree in civil engineering and received his PhD in biology in 1892. After short stints teaching at Harvard and the University of Chicago, Davenport arrived at Cold Spring Harbor. While investigating nonhuman breeding and inheritance, Davenport's lab contributed significantly to basic knowledge of genetic variation, hybridization, and natural selection in animals. However, sometime around 1910, his attention was drawn more and more to human genetics.

Davenport had trained in statistical methods under Galton himself during his graduate studies. This exposure as well as the results of his animal studies set in motion a lifelong devotion to eugenic ideals. Davenport was also an enthusiast of Mendel's work and applied these principles in humans. He became convinced that through human pedigree analysis, he would be able to predict in accordance with Mendelian principles the occurrence of such traits as feeble-mindedness or criminality as easily as hemophilia or six fingers.

In a classic example of well-intentioned but misinformed science, Davenport established the Eugenics Record Office (ERO) at Cold Spring Harbor with private funding, with himself as director. Harry H. Laughlin was appointed superintendent to take care of administrative affairs. Under Davenport and Laughlin, the ERO collected data on the inheritance of human traits, analyzed census data and population trends, encouraged courses in eugenic principles, and distributed eugenics materials in the United States and Europe.

The popularization of eugenics with the American people now began in earnest. Between 1910 and 1916, articles in periodicals written for the average citizen, such as *Good Housekeeping* and *The Saturday Evening Post,* increased tenfold. Books targeted for public consumption included such works as *The Passing of the Great Race* by Madison Grant (1916) and *The Rising Tide of Color Against White World Supremacy* by Lothrop Stoddard (1920). In 1917, *The Black Stork,* a decidedly prosterilization film, was released for American moviegoers. State fairs entertained and educated Americans through the use of eugenic displays and "Fitter Family" Contests, the first being held at the Kansas Free Fair in 1920. By 1930, eugenics was taught in many high schools. In American colleges and universities, over 350 eugenics courses were offered. Church-going citizens often heard the virtues of eugenics extolled from church pulpits. These efforts succeeded in widespread acceptance of eugenics.

Political action soon followed. As early as 1907, Indiana became the first state to pass an involuntary sterilization law, targeting individuals in mental institutions, criminals involved in more than one sex crime, and those determined to be feeble-minded via IQ tests. By 1935, 26 states had similar laws on the books, and 10 more states were poised to enact such legislation, testifying to the acceptance and popularity of eugenics in American culture. Before the repeal of the last eugenics laws (California, 1979), over 64,000 individuals had been involuntarily sterilized.

The second major arena of eugenics political action concerned immigration. The Johnson Immigration Act of 1924 (Immigration Restriction Act) was the most far-reaching and restrictive immigration act in America to that time. Congress, convinced by the limited evidence presented by Laughlin, voted for severely restricted immigration from "undesirable" nations in Eastern Europe and other countries. According to the evidence, immigrants from such areas possessed lower intelligence than Americans

(determined by English IQ tests given to non-English- or limited-English-speaking immigrants) and a much higher preponderance of negative traits such as alcoholism and insubordination, viewed as heritable traits. Obviously, Congress thought, American society needed protection from such negative effects.

The scientific community did not blindly accept the claims of eugenics. Opposition to the movement grew steadily. By the 1920s, geneticists understood that the traits emphasized by the eugenicists were the result of complex interactions between multiple genes and that no such trait could be attributed to a single gene. Still other research showed that environmental factors greatly influenced the expression of genes. Research also demonstrated mathematically that it would be virtually impossible to eliminate a recessive gene in a population.

Another factor of significance in contributing to America's waning support for eugenics was the Great Depression. This economic calamity turned American society upside down. Suddenly, people in the upper classes of society found themselves with no money and no jobs. More important, they were thoroughly confused. People at this societal level had been taught by eugenics that their genetic traits were virtual guarantees of material success and employment. Finally able to understand that social and economic variables affected social position more than any genetic explanation could, society began to abandon eugenics ideas. When Hitler and the Nazi party came to power in 1933, parallels and connections in eugenics between the United States and Germany were obvious. The embarrassment that America could be associated with the ideals of the Nazi Party resulted in drastic changes to the concept of eugenics in America, to the point that the ERO, which already had changed its name to the Genetics Record Office, closed in 1939.

The rise of eugenics in Germany, viewed by many as the ultimate expression of eugenics, actually paralleled this movement in America. It was introduced in Germany late in the 19th century by physicians and was viewed as the last, best hope for the improvement of the German people, with the focus on increasing national efficiency. Eugenicists in Germany were enthusiastic and supportive of work by Davenport and Laughlin and had read Grant's and Stoddard's books. The progress of eugenics in America in the 1920s fueled Germany's developing optimism that racial hygiene would prevent the total degradation of truly Germanic ideals.

Germany following World War I was a country left feeling hemmed in by enemies and alone in the global community. Early eugenic theories left many Germans, including well-known geneticists, worried that if Germany were not allowed to grow, her "best and brightest" would be forced to migrate from the country, taking their racially pure genes with them and leaving defective ones behind. With the passage of the Johnson Act and sterilization laws, the United States was sending the message to other countries that discrimination and racism were permissible if the ultimate goal was to preserve and promote the purity of human heredity. Later on, this message gave further confidence to the Nazi Party's pursuit of racial cleansing. However, up until the Great Depression and the Nazi takeover in 1933, eugenics in Germany focused on education and social reform.

The Great Depression hit Germany hard. Immediately, the debate intensified as to how to decrease the burden of unproductive individuals on the financial resources of the state. Legislatively, distribution of aid was restructured to support productive or desirable individuals, to the detriment of those viewed as burdens or unproductive citizens. Those deemed feeble-minded, such as individuals with schizophrenia and manic-depressive disorder; those born with disorders such as Down syndrome; and criminals were immediately reduced to near-starvation levels of support. Some have suggested that this devaluing of human life set the stage for the eugenics policies and actions of the Third Reich.

Nowhere was hereditary degeneration and racial impurity more feared or eugenics more accepted and acted upon than in Nazi Germany. By the time that Adolf Hitler rose to power in 1933, the Nazi drive to create a healthy German people, brimming with fit workers, farmers, and soldiers for the Third Reich, had come to a fever pitch. Many medical professionals who firmly believed in the contributions of eugenics to the good of the German people were forced to align themselves with the rabid anti-Semitism of the Nazis. It was with their help that the regime's 1933 compulsory sterilization law came into being. This law directed compulsory sterilization of those diagnosed with schizophrenia, manic-depressive disorder, many genetic disorders, and chronic alcoholism. By 1945, some 400,000 Germans had been forcibly sterilized.

Support for these efforts required a massive public education program consisting of posters, school

textbooks, and documentaries portraying the sterilizations as a humane means to protect the nation from boundless evils. This type of public campaign was used not only to extol the virtues of eugenics programs but also to encourage "good" Germans to produce many more "good" Germans. One of most notorious of these efforts was the Lebensborn project. This project originally encouraged men of the Nazi Schutzstaffel, the SS (which translates as "protection squad"), to produce children with as many willing German women as possible. Medals were handed out to those women who produced four or more children.

On a more ominous note, the Nazi regime first discussed involuntary euthanasia in 1933, but it was not put into place until the commencement of World War II. Hitler believed that the upheaval of the war would diminish public disapproval, and he was apparently correct. It was at this time that Nazi racial hygiene turned from controlling reproduction to "mercy killing" those individuals regarded as genetically inferior. This population of individuals included a wide range of conditions, such as Down syndrome, other birth defects, and elderly psychiatric patients. By the end of the war, nearly 200,000 Germans had been massacred, using such methods as starvation, lethal injection of morphine, and asphyxiation by gas, administered by physicians and nurses. These experiences led the way to the eventual murder of millions of Jews in the concentration camps.

The worldwide backlash against eugenics following World War II drastically diminished public support for the movement. As the horrors of the eugenics policies of the Nazis became known, the name disappeared from the titles of journals and university courses, albeit slowly. For example, one of the authors (Meaney), during his undergraduate training in the early 1960s, enrolled in a course titled "Heredity and Eugenics." A physician taught the course, and the content was basically what was then known about the genetics of human diseases. Despite these holdovers from the early days, the movement was essentially dead as genetics moved into its next phase.

1953–Present: Molecular Genetics

During this time period, genetics has probably changed the most and experienced its greatest acceleration in terms of discoveries and applications. It started with the discovery of the structure of DNA in 1953.

In the aftermath of World War II and the work of laboratory scientists during the 1930s and 1940s, we were on the brink of understanding the structure of DNA. Following the determination by Oswald and Avery that DNA was likely the genetic material, the race was on to understand this deceptively simple mix of nucleic acids. A group of scientists in the Cavendish Laboratory, at Cambridge University in England, worked diligently to understand how DNA was structured. A sense of academic camaraderie and youthful idealism combined with outright arrogance pushed the work ahead.

One of the young scientists in Cambridge was Rosalind Franklin, who worked in the X-ray diffraction laboratory. Since her arrival at King's College in Cambridge, she had already demonstrated a critical error in the work of her predecessors. She discovered that there are two forms of DNA in most sample preparations. There is an "A form," which is more crystalline, and a wetter "B form," more likely closer to that found in cells. A characteristic X-pattern on the X-ray diffraction screen showed her immediately that the B form was helical in shape.

At this same time, James Watson and Francis Crick, also at Cambridge, began a collaboration to model the structure of DNA. They attempted to solve the structure of DNA as one might put together a puzzle, matching likely pieces in an attempt to produce a coherent picture. In November 1951, Franklin presented the information about the two forms of DNA. Watson was among those who listened. Intrigued by her results, Franklin was soon invited to see the model that Watson and Crick had constructed so far. A brief meeting was held. Apparently, preoccupied with her work, Franklin was quick to discount the model and left as soon as possible. The reaction by their superiors was quick, and Watson and Crick were ordered to abandon their model. But the story did not end here.

The importance of Franklin's work, in particular the X-pattern on the diffraction screen suggesting the helical structure of DNA, was not lost on Watson and Crick. Forbidden to build models, the structure of DNA nonetheless was never far from their thoughts. Franklin had provided the "Eureka" moment, without her knowledge, when her data were presented. Maurice Wilkins, who worked with Franklin in the X-ray diffraction laboratory, also maintained an interest in the structure of DNA. On numerous occasions, he discussed the subject with his friend Crick. Wilkins was able to obtain one of Franklin's photos of DNA,

Photo 51, which was an unusually sharp image of the B form of DNA. It made its way to the Cavendish Laboratory, where Watson and Crick perceived themselves to be in the last leg of the DNA race with Linus Pauling. While Pauling had deduced a flawed structure, Watson and Crick knew that with a good X-ray image, Pauling would beat them. Perhaps even more important than the confirmation that the substance was helical, Wilkins had calculated that each turn of the helix contained 10 units per turn, with a spacing of 34 angstroms. Knowing the geometry, it remained to decide how the bases were stacked in the working model.

To beat Pauling to the secret of life, the group still had to publish. The scientists were up against a serious problem. They had no data. Without experimental evidence, they had a nice model but nothing to back it up. A solution was brokered. They would submit three interrelated papers to *Nature.* As it turned out, the three articles were published in a single issue of *Nature* in 1953. The one by Watson and Crick was first, then Wilkins, and finally Franklin and Raymond Gossling, a graduate student who had worked for Franklin. Franklin's work was presented as a confirmation of the model, not as a primary factor in its determination. Within her own previously written paper, she inserted a confirmation of the model, stating that the ideas of Franklin and Gossling were consistent with Watson and Crick's proposed model. Watson and Crick, who acknowledged that their work had been stimulated by the general knowledge of Franklin's research, also referenced Franklin's work.

Adding further significance to the discovery of the structure was research performed by Al Hershey and Martha Chase. Their work finally confirmed that DNA was the heritable substance, an idea still highly contentious even after Avery and Oswald. They were able to show viral DNA was still infective without its protein coats. It was still widely believed that DNA was too simple to be the genetic material and that the best candidates were the more complex proteins.

It almost goes without saying that the discovery of the structure of DNA launched the careers of Watson and Crick. There were still many questions that needed answering, such as how DNA replicated and how were proteins formed from DNA. But these watershed discoveries in the early 1950s were to forever change the landscape of genetics.

In retrospect, Crick's now famous announcement at a local pub that he and Watson had discovered the secret of life might have been a tad brash. Far from unlocking the mechanism of heredity, they had at this point been able only to describe the appearance of the key. This was a major step, to be sure, but only a step. There remained the question of just how it worked. How does DNA cause the formation of proteins, and how do these proteins assemble into an egg, a hand, a turnip, or an elephant? Key to this question was deciding if the geometry of the DNA molecule directly catalyzed protein assembly or if it carried the directions for other organelles to complete the assembly. Looking at the "recipe," it was obvious that a two-letter code would provide insufficient combinations to produce the required 20 amino acids, and a three-letter code provided an excess of possibilities. There were two solutions published for the mechanism, and both were wrong. Cosmologist George Gamow proposed his "sequence of diamonds" theory, based on overlapping triplets that were responsible for the direct assembly occurring on the surface of the helix. Elegant, as it allowed for the coding of exactly 20 amino acids, it was discounted by Crick because it would not allow for the complex protein sequences that Fredrick Sanger had been describing as he progressed toward the structure of the bovine insulin molecule. Crick preferred the "sequence hypothesis," in which the DNA coded for the remote assembly of proteins. While his hypothesis was correct, his code was flawed. He proposed a code wherein only one variation on a given three-letter codon would code for a single amino acid while other sequences of the same three letters were noncoding, allowing for exact start points. This model also gave precisely 20 amino acids. As perfectly simple and logical as this seemed, it has subsequently been shown that each variation of a triplet has a specific meaning, with several codes being possible for a given amino acid, and allowing for stop codons.

It would not be until the early 1960s that the mechanism for communicating DNA's message through the cell, messenger RNA (mRNA), would become known, providing a better understanding of the code. Ribosomes had already been identified in the 1950s as the site of protein synthesis, and scientists had synthesized RNA. Crick in 1958 described the central dogma of molecular genetics that information flows from DNA to RNA to protein. In 1961, he and Sydney Brenner conclusively demonstrated that the genetic code is a triplet code. Later in the same year, Brenner reported with François Jacob and Matthew Meselson

that mRNA is the molecular structure that carries the message from the nuclear DNA to the cytoplasm, where protein synthesis occurs. By 1965, the codons for all of the 20 amino acids that comprise proteins had been deciphered.

Molecular genetics was not the only area of genetics in which great strides were made during the 1950s and 1960s. Despite the aftermath of World War II and what had occurred in the name of eugenics, new technological breakthroughs in genetics were increasingly applied in human genetics and especially in the study of human diseases. It was not until 1956 that the correct number of chromosomes in a normal human cell was established to be 46. By 1960, methods had been developed to culture blood lymphocytes so that they could be fixed on slides and stained for viewing under the microscope for any abnormalities in chromosome number. These discoveries spawned research into many syndromes, which had been described clinically in earlier years, to investigate the cells of individuals with these conditions to see if there were abnormalities of the chromosomes. Many of the common chromosomal abnormalities, such as trisomy 21 in Down syndrome, were reported during the late 1950s and early 1960s. Cytogenetic techniques were also applied to the study of cancer. In 1960, a specific chromosome known as the "Philadelphia chromosome" was reported to be associated with chronic myeloid leukemia. Later in the 1960s, it was discovered that amniotic fluid could be cultured and the chromosomes in these cells viewed for abnormalities, paving the way for the development of prenatal genetics. Finally, in 1970, it was reported that human chromosomes could be stained through the use of DNA-binding fluorescent dyes to produce unique banding patterns. Thus, more than size and shape could now distinguish human chromosomes. All of these discoveries, in turn, led to the need for more laboratories to do cytogenetic testing and the trained professionals to direct them.

By the late 1950s, grant support was available for the training of physicians to oversee the clinical and laboratory evaluation of patients and the counseling of families. Prior to the developments in human cytogenetics, PhD geneticists provided some genetic counseling, almost exclusively in university-based settings. The training of physicians began a shift toward counseling being provided as part of clinics in which patients were seen and diagnosed, and counseling about the genetic disorder and recurrence risks was provided for their families. From their origin in the 1950s and 1960s, genetic services have increasingly broadened to include genetic evaluation and testing at all phases of the human life cycle, including prenatal genetics, newborn screening, testing for adult-onset diseases such as cancer, and more.

The 1970s began with much controversy. This stemmed from the publication in 1969 by Arthur Jensen, an educational psychologist at the University of California at Berkeley, of a paper in which he presented data suggesting that racial differences in intelligence, as measured by IQ tests, were primarily due to genetic differences between the populations. Jensen based his argument on data showing that the heritability of IQ in White European populations for which IQ tests were available (i.e., the proportion of variation in IQ scores that is due to genetic variation) was about 80%. Jensen asserted that if heritability of IQ is 80%, this also extended to the difference in average IQ between Blacks and Whites and therefore most of the difference was due to genetic differences between the populations.

Jensen's work instigated an avalanche of criticism from geneticists, led by the population geneticist, Richard Lewontin. Lewontin published a series of papers in which he explained the concept of heritability and how a within-population estimate of heritability like Jensen used did not explain differences between population, which are due to a combination of both genetic and environmental factors. He went on to investigate whether variation in genetic traits like the human blood groups and proteins is mostly among racial populations or within them. Lewontin's analyses showed clearly that 85% of the variation for these genetic traits is within and not between populations. Molecular geneticists in the 1990s used DNA markers to replicate Lewontin's research, and the results were strikingly similar. Therefore, the vast majority of genetic variation overall is within rather than among racial or ethnic populations.

Molecular genetics continued its rapid development during the 1970s. The first restriction endonuclease, an enzyme found in bacteria that can be altered to cut DNA of other organisms at specific recognition sites in the DNA, was isolated. This was a major technological advance in molecular genetics. David Baltimore and Howard Temin made important discoveries for both molecular and cancer genetics in 1970 through their work on RNA-dependent DNA polymerase or, as they called it, "reverse transcriptase," an enzyme

found in retroviruses that can be used to make DNA from an RNA template (the reverse of the usual transcription of DNA to RNA), and the report of the first oncogene, a gene that is able to change normal cells into cancerous ones. By 1973, the first recombinant DNA (rDNA) molecule, a DNA molecule that is a hybrid of fused sections of DNA from different species, had been reported by Stanley Cohen, Herbert Boyer, and their colleagues. Their publication now is regarded as a marker for the origins of recombinant DNA technology. This new technological advance prompted an international conference in 1975 to establish guidelines for the regulation of its use, due to concerns about the possible contamination of laboratory personnel, the public, and the environment through inadequate safeguards for biological containment.

Many other technological advances that impacted molecular genetics for years to come were made in the 1970s. DNA electrophoresis, a method used to separate DNA molecules, usually in a gel, by their electrical charge, shape, and size, was improved. The Southern (Edward M. Southern) blot, a method by which single strands of DNA are separated in a gel and transferred to a special filter in which radioactive probes are placed to identify specific DNA segments, was developed. Also, the first complementary DNA (cDNA) cloning was demonstrated. This depended on the method of reverse transcriptase and is a method of making multiple replicas of segments of DNA through reverse transcription, that is, using mRNA to make the DNA segments. By the late 1970s, several laboratories were developing methods for sequencing DNA. Frederick Sanger and his colleagues reported in 1977 a method of DNA sequencing that had a major impact on the research leading to efforts such as the Human Genome Project. Sanger and his group used the technique in a bacteriophage to produce the first fully sequenced genome. In the same year Boyer and Robert Swanson founded the first biotechnology company, Genentech. Genentech innovated the use of recombinant DNA technology to establish many pharmaceuticals of use in the treatment of human diseases, including Somatostatin, the first human protein produced through biotechnology. In 1978, scientists at Genentech cloned the human insulin gene, paving the way for the substance to be produced through rDNA technology. This happened in 1982, changing the treatment of diabetes from the use of nonhuman insulin to treatment using the biotechnology-derived insulin. One could see already that the impact of molecular genetics on medicine was going to be immense.

During the 1980s and 1990s and into the new millennium, genetics has continued to develop at an increasingly accelerated pace. The 1980s was a period of tremendous technological advances in molecular genetics and also in the application of this technology across all areas of genetics. Recombinant DNA technology continued to develop and be applied in such diverse pursuits as the improvement of industrial microbes, genetic engineering of plants, and the diagnosis of human diseases. Biotechnology companies were having major successes in the cloning of genes, which provided a stimulus for investments from the private sector. The DNA-sequencing technology that originated in the 1970s was advanced significantly through improvements in instrumentation to increase sequencing capacity. The United States and other governments worked to increase fiscal support for these efforts, with an eye toward a future that was to include the Human Genome Project and sequencing of diverse animal and plant genomes.

Many other technological innovations had their origins in the 1980s. Polymerase chain reaction (PCR), a method used to amplify specific DNA sequences rapidly from small amounts of double-stranded DNA, was developed by Kary Mullis and his colleagues. Today, PCR is not only used in genetics, but in all of the biological sciences and medicine. Its application made possible the rapid development of DNA markers for multiple uses and many diagnostic methods for human diseases. The development of restriction fragment length polymorphisms (RFLPs), varying lengths of DNA fragments resulting from the recognition by restriction enzymes of differences in the base pair sequence (mutations), and the application of this methodology, was another major breakthrough. David Botstein and his coworkers had proposed in 1980 the means of mapping the full human genome based on this technology, and it was soon being used as a marker or indicator of the chromosome location of specific genetic diseases. The first genetic disease to be mapped in this manner was Huntington's disease in 1984, when it was reported to be located on Chromosome 4. Instances of disease genes so identified rapidly multiplied. In 1987, the yeast artificial chromosome (YAC) technology, the use of synthesized chromosomes to make gene libraries and transfer genes among species, was reported. This

method, with other advances, allowed scientists to construct libraries of genomic DNA, a resource of significant application for any of the emerging genome projects. Another technological innovation of the 1980s was transgenic technology in both plants and animals. This technology allowed scientists to produce organisms into which genes from other species had been transferred and incorporated into the germ line of the new organism. Its use has been in transferring human disease genes into organisms such as mice (transgenic mice) in order to study the effects in mice with the ultimate aim of developing effective treatments.

Although the innovations of molecular genetics probably garnered the most headlines during the 1980s, there were many substantive developments in the use of genetics knowledge. In the United States, a federal bill and appropriation of funds led to the expansion of genetics services across the states, beginning in the mid-1970s, to ensure their availability in all sectors of the population. Although there were significant cutbacks in these funds during the early 1980s, clinical and laboratory services for genetic diseases continued to expand, as new genetic tests became available and other sources of support were tapped. The 1980s saw the first real attention paid to the quality of these services through the formation of public-health-funded, multistate networks to ensure that both laboratory and clinical services met a peer-determined standard of quality. Relevant to anthropology, there were public-health-funded projects starting in the late 1980s and continuing into the 1990s to improve the cultural competence of the delivery of genetic services. Finally, the 1980s produced an expansion of genetics support groups for individuals with genetic diseases and their families and a rapid expansion in the availability of genetics information, which was only the bare beginning of what was to come in the 1990s.

The Human Genome Project (HGP) was by far the most significant accomplishment in the 1990s. It began as a controversial proposal by the U.S. Department of Energy. Skepticism was deeply rooted. The project was initially viewed as technologically impossible and was likely to consume vast amounts of dollars to implement. The strong support from the National Academy of Sciences and U.S. Congress made it possible for the HGP to be initiated in the United States in 1990 by the National Institutes of Health (NIH) and Department of Energy. During the early part of the decade, the HGP converged with similar efforts in other nations to become an international investment.

The HGP officially kicked off in October 1990, with a budget of $60 million. Its primary goal was to determine the entire sequence of the 3 billion chemical bases in the DNA that comprises our genome, or, as some have put it, to uncover the "instruction manual" for *Homo sapiens.* James Watson was chosen to lead the project. He swiftly made a number of decisions concerning the goals of the HGP. One involved devoting 5% of the budget toward the study of ethical, legal, and social implications. Watson, among others, viewed this as extremely important considering the many issues concerning genetic discrimination, inadequate treatment options, and eugenics.

Watson, belabored by a series of conflicts and controversies for which his personality was probably ill-suited, stepped down from the directorship of the HGP in April 1992. Francis Collins, an accomplished and well-respected medical geneticist from the University of Michigan, was recruited to replace Watson. Collins provided the leadership for the HGP to reach its broad objectives, which included development of genetic and physical maps of the human genome and mapping and sequencing of simpler model organisms, such as bacteria, yeast, roundworm, and the fruit fly.

While Collins continued his work on the HGP, Craig Venter, a scientist who had been at the NIH during Watson's tenure, was about to engage in DNA sequencing and potential gene patenting. After his resignation from the NIH in July 1992, Venter set out to create the world's largest DNA sequencer, the TIGR. Venter, who headed a new company known as Celera Genomics, was applauded for his efforts to sequence the genome privately, because it would simply speed up the generation of the human sequence. At that point, only 4% of the genome sequence was complete. The U.S. House of Representatives Subcommittee on Energy and the Environment had a meeting to discuss the implications of Venter's entry into the human-genome-sequencing activities. Both Venter and Collins addressed Congress concerning genome sequencing. In his testimony, Collins stressed the importance of meeting the standards that had been developed by the international community of human genome scientists. The race to unlock the human DNA continued. Collins and Venter eventually would merge to complete the HGP, and on June 26, 2000, they announced in the White House with President Bill Clinton that the rough draft of the HGP was complete.

During the 1990s and into the new millennium, numerous other developments occurred. In 1990, the first attempt at human gene therapy took place, involving a child with an immune system disorder. In 1994, the highly publicized book *The Bell Curve,* by Richard Herrnstein and Charles Murray, was published. The book discussed the relationship between IQ and ethnic groups and was a throwback to the controversies 25 years earlier as a result of Jensen's article on race and IQ. It certainly produced a similar level of outcry by scientists and the public alike, mostly in response to the strong tones of genetic determinism and Social Darwinism. By 1994, genes that predispose individuals to disease were being identified, including the Ob gene, which predisposes individuals to obesity, and the breast cancer genes. In 1995, the sequence-tagged site (STS) gene-mapping technology was developed. This is a method by which short sections of cloned DNA (100–200 bases in length) are randomly selected and sequenced to mark the larger DNA sections in which they are found. It effectively speeded up the work of the HGP. A year later, a look at public interest in genetics took place through a national survey. It was found, not unsurprisingly, that the public viewed genetics with fear and mistrust. More fuel for public misgivings was loaded in 1997, when Scottish scientists cloned a sheep named "Dolly." Barely a year later, reports by teams of researchers working with embryonic stem cells added to public concerns. The same year, the draft of the human genome map demonstrated the locations of more than 30,000 genes. The complete map of the human genome was published ahead of schedule, 3 years later.

Completion of the human genome sequence is a major milestone for biology, health, and society. However, the role of genetic information for disease prediction and prevention has been viewed with uncertainty. This uncertainty is expressed in one sense by the number of DNA variants that are apt to be linked to such diseases as cancer, cardiovascular disease, and other complex diseases. In addition, early detection is an issue because there is uncertainty about the risk conferred. The patterns of transmission for developing a certain illness are not always predictable and in the case of many common adult-onset diseases are dependent on environmental effects, including social, economic, and other environmental exposures. Information about susceptibility to all diseases is certain to improve and therefore people in the future will have the ability to take steps to reduce their risks. Interventions such as ongoing medical assessments, lifestyle modifications, and diet or drug therapy will be offered to those at risk. For example, through a genetic test to identify people at risk for colon cancer, individuals receive regular screening of the colon that could help in preventing premature deaths. Another area of concern in this regard is the availability of drug therapy and interventions for genetic diagnosis for those who already have a major problem with access to health care. This may very well create another category of discrimination with respect to services for genetic diseases.

Genetics has entered the era of genomics and bioinformatics as a result of the sequencing work on a number of plant and animal genomes and the virtual explosion of databases and comparative information produced by these respective technologies. The convergence of molecular genetics with computer technology has produced a staggering amount of information for any single human being to comprehend. What we do know is that cracking the human and other genomes is just the beginning in our quest for a more complete understanding of genetics. The next challenges will be to understand how the genomes direct and coordinate the development of plants and animals, including humans, and how the environment is involved in developmental processes. Then, the ultimate challenge will be how to use the immense knowledge base of genetics to improve our lot, at the same time protecting the only planet we currently inhabit and its diverse biology.

— Karen Ahrens, Kara Rogers, Olin Feuerbacher, Kathy Prue-Owens, Jennifer Currie, and F. John Meaney

See also **DNA Molecule; Eugenics; Genetics, Human; Genomics; Human Genome Project**

Further Readings

Crow, J. F., & Dove, W. F. (Eds.). (2000). *Perspectives on genetics: Anecdotal, historical, and critical commentaries, 1987–1998.* Madison: University of Wisconsin Press.

Davies, K. (2001). *Cracking the genome: Inside the race to unlock human DNA.* Baltimore: Johns Hopkins University Press.

Harper, P. S. (Ed.). (2004). *Landmarks in medical genetics: Classic papers with commentaries.* New York: Oxford University Press.

Henig, R. M. (2000). *The monk in the garden: The lost and found genius of Gregor Mendel, the father of genetics.* Boston: Houghton Mifflin.
Kevles, D. J. (1995). *In the name of eugenics.* Cambridge, MA: Harvard University Press.
Mange, E. J., & Mange, A. P. (1999). *Basic human genetics* (2nd ed.). Sunderland, MA: Sinauer.

Genetics, Human

Human genetics is the study of the inheritance of epigenetic traits among humans, notably but not exclusively traits of medical interest. The overarching goal of human genetics is to apply knowledge of human heredity to a better understanding of diversity in development and adaptation as "nature is nurtured." Another central goal of human genetics is the public health function of reducing dysgenetic burdens on individuals, families, and society at large. Although the boundaries of subdisiplines within genetics are not precise, the term *anthropological genetics* is used to distinguish general human genetics from more clinical applications, with the latter sometimes denoted specifically as *medical genetics.*

Humans, like all species, have many genotypic and phenotypic variations. Such variation is ultimately derived from mutations that affect proteomic expression. Genes encode for proteins that ultimately arrange and regulate all manner of biological structures and processes, from the intracellular level to organismic and even on the ecological. Thus, mutant genes disrupt proper proteomics processes, and disease results to the extent such disruptions are evident as defects (pathophenotypes). Many mutations have no pathological effect, but there are more than 6,000 known single-gene disorders, or about 1 of every 200 live births. Moreover, there may be manifold causes of phenotypically similar disease; for example, some 60 congenital forms of deafness are known, with some the result of environmental factors such as rubella and others due to genetic mutations. Genetic disorders, as caused by abnormalities in genetic material, occur in four basic types: (1) single-gene, (2) chromosomal, (3) multifactorial, and (4) mitochondrial.

1. Single-gene (Mendelian or monogenic) defects are due to mutations of DNA at a single locus. Single-gene diseases arise in the classic familial patterns of inheritance: autosomal dominant, autosomal recessive, and X-linked. Major examples of such Mendelian diseases include cystic fibrosis, sickle cell anemia, Huntington's disease, pheylketonuria, alpha-1-antitrypsin deficiency, and hereditary hemochromatosis.

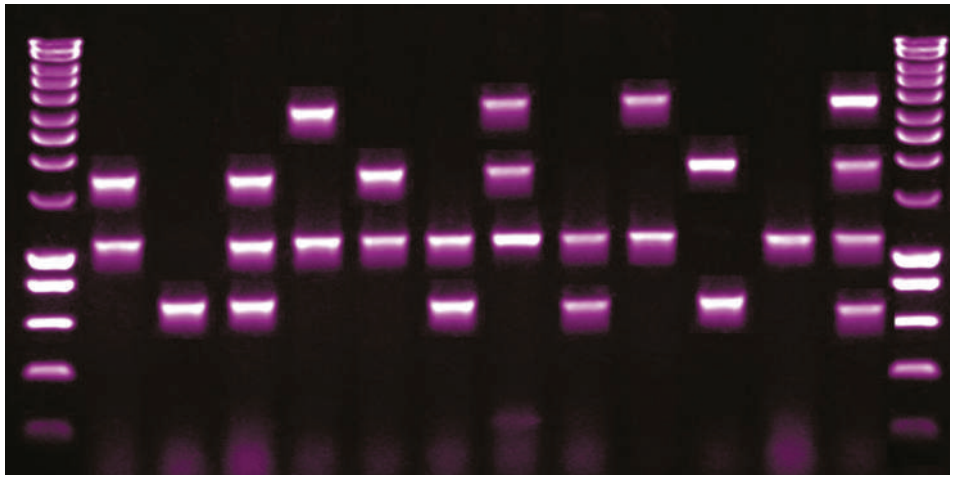
2. Chromosomal defects are due to abnormalities such as allelic deletions or redundancies; translocations of or even gross are evident on microscopic examination. Down's syndrome (trisomy 21) is a common disorder that occurs with a redundant portion of chromosome 21.

3. Multifactorial (complex or polygenic) defects are due to interactions of multiple alleles and the developmental environment. Many of the most common illnesses are multifactorial, including arthritis, cancer, diabetes, heart disease, and hypertension. Given such complexities of expression, multifactorial inheritance is more challenging to study.

4. Mitochondrial defects are due to mutations in mitochondrial DNA, which is distinct from the inherited nuclear-chromosomal genotype of the organism. Since mitochondria are the small organelles of cellular respiration in the cytoplasm of plant and animal cells, such anomalies can cause a variety of specific metabolic diseases.

Medical genetics historically developed in practical application for medical screening and advice for at-risk populations. Such screening requires not only adequate tests (valid, reliable, sensitive, specific) but also a sound grasp of the natural progression of and treatment options for the disease in question. A thorough family history augmented with a review of pertinent medical literature, preferably by an expert, is essential to inform families of the diagnosis and methods; identification of carriers; the phenomenology of the disorder, including complications; risk of recurrence for the patient and family; and therapeutic and reproductive options, including referral or support groups. This is a complex process of evaluation and education and carries considerable legal and ethic consequences.

Heterozygote screening is focused on susceptible populations with high rates of deleterious heterozygosity (for example, cystic fibrosis in Scandinavians,



Source: © iStockphoto/Bertrand Collet.

Tay-Sachs in Ashkenazi Jews, sickle cell anemia in Blacks, etc.). Prospective screening of parents, particularly where one is an identified heterozygote, allows more informed medical choices. Presymptomatic screening may be helpful within families with a history of Mendelian disorders. Such screening is most typical in certain dominant traits (for example, Huntington's disease) but can be very useful in other types of familial disease risk (for example, cancers of the breast and colon).

Medical genetics also entails other clinical procedures, such as *prenatal diagnosis* (sampling of chorionic villus tissue, umbilical cord blood, maternal blood sampling, or maternal serum, as well as fetal imaging via ultrasound or radiography). Prenatal screening is especially useful for prospective mothers over age 35 with family history of a condition diagnosed by prenatal tests, to evaluate abnormal maternal serum screening or some complications of pregnancy. Likewise, *neonatal screening* may be used to identify newborns in need of critical special treatments (special diets for phenylketonuria or replacement therapy for hypothyroidism).

Pedigree analysis is a classical technique of medical genetics by which a thorough family tree is depicted, with symbols for persons affected with known genetic disease. Thus is rendered a broad summary of inheritance patterns through generations that serves to clarify mode of transmission even for traits that may have identical phenotypes despite different causal genes (for example, cleft palate can be Mendelian autosomal dominant, autosomal recessive, or X-linked recessive; other types are multifactorial as they run in families without clear patterns).

However, with this progress, an increasing number of gene tests are becoming available commercially, although the scientific community continues to debate the best way to deliver them to the public and medical communities, who are often unaware of their scientific and social implications. While some of these tests have greatly improved and even saved lives, scientists remain unsure of how to interpret many of them. Also, patients taking the tests face significant risks of jeopardizing their employment or insurance status. And because genetic information is shared, these risks can extend beyond them to their family members as well.

As the role of genetics is made clearer with respect to diagnosis, monitoring, and treatment of diseases, medical scientists continue to make rapid progress in the identification of genes associated with disease. A key long-range aim is to formulate new means to diagnose, treat, and even cure or prevent diseases. Epigenesis is a complex process that entails regulators (i.e., promoters and enhancers), actively expressed units (exons), unexpressed but intervening units (introns), and termination signals.

The field of human genetics has been dramatically bolstered by the Human Genome Project (HGP) and related studies that began in 1991. These constitute the new field of genomics that use techniques of molecular analysis to map all human genes to specific locations and thereby identify elements of genetic structures and functions. With this progress, medical genetics is expanding from a focus on diagnostics and counseling toward more active evaluation and treatment, including the prospect for procedures to directly repair dysgenetic cell lines. Similarly, human genetics has also progressed rapidly toward the elucidation of diverse issues in the phylogenetic history and geography of human populations.

— *Daniel R. Wilson*

See also **DNA Molecule; Genomics; Human Genome Project**

Further Readings

Cavalli-Sforza, L. L., Menozzi, P., & Piazza, A. (1996). *The history and geography of human genes.* Princeton, NJ: Princeton University Press.

PRIMATE GENETICS

Scientists hope to find cures for many human diseases through the study of primate genetics. Eight National Primate Research Centers (NPRCs) are located across the United States. These centers are closely affiliated with academic institutions. The rationale is that primates are closely related to humans in their molecular, immunological, reproductive, and neurological characteristics. Therefore, they seem to be the ideal surrogates to stand in for humans in this sort of testing.

Over 20,000 nonhuman primates are maintained by the NPRCs across the country, the majority of which are macaques. Investigators who receive research funding from the National Institutes of Health may use these centers, but they also are open to scientists who are funded by other agencies, research foundations, or private funds. Many research projects involving primate genetics are occurring in other places, too. At Stanford University, tests with primates have shown that a pill developed by Pfizer may stop transplant rejection. It works in monkeys that have undergone kidney transplant, and scientists hope that facility carries over to humans.

The Tulane National Primate Research Center is studying the ability of some monkey species to resist developing AIDS. A $2 million, 5-year grant is funding the study. Scientists hope to determine how the African green monkeys can resist developing AIDS when infected with SIV, the monkey equivalent of HIV.

A Wisconsin team of molecular geneticists is working on a contract for characterizing nonhuman primates to enhance transplant biologists' work worldwide. The 5-year contract is from the National Institute of Allergy and Infectious Diseases. The team will be working with rhesus and cynomolgus monkeys.

The California Regional Primate Research Center is working to determine the toxic effects of certain agents that are likely to cause embryonic abnormalities. The Oregon Regional Primate Research Center is researching degenerative diseases. At the Southwest Regional Primate Research Center in San Antonio, TX, scientists are researching genetic bases for susceptibility to hypertension, osteoporosis, obesity, and infectious diseases. Research at the Caribbean Primate Research Center in Puerto Rico includes using primates to study such diseases as macular degeneration, glaucoma, and diabetes. These are but a few examples of the types of genetic research being done with primates.

— Pat McCarthy

TWIN STUDIES

Because monozygotic or identical twins have identical genes, they have been widely employed in medical and psychological research. The twin method compares sets of monozygotic twins to control sets of dizygotic or fraternal twins who have been raised in the same family environment to examine the relative importance of heredity over the environment in the development of certain diseases, in the formation of the personality and sexual orientation, and in intelligence. Through twin studies, researchers have, for example, demonstrated a strong genetic component in the development of schizophrenia, alcoholism, depression, obesity, and in the inclination to infectious diseases such as tuberculosis.

The 19th-century behaviorist Sir Francis Galton first noted in 1875 that "twins have a special claim upon our attention" because "their history affords means of distinguishing between the effects of tendencies received at birth, and those that were imposed by the special circumstances of their after lives." Since Galton's conclusion, twin studies have been a powerful if problematic tool in the hand of geneticists. Classical twin studies claim that any excess likeness in a given trait between identical

twins when compared to fraternal twins, who only share 50% of the genes, should be due to genes rather than environment.

More contemporary twin studies have also tried to establish the extent of the impact of a person's common surroundings (such as the family) and unique events in one's life on a trait. A founding assumption of twin studies is random mating, the idea that people are as likely to choose partners who are different from themselves as they are to choose partners who are similar for a particular trait. Otherwise, fraternal twins could share more than 50% of their genes. A second important hypothesis of twin studies is the argument that fraternal and identical twins raised in the same homes experience equally similar environments.

Twin studies have had to face numerous challenges. Some researchers have concluded that people are more likely to select mates with similar levels of intelligence, making the application of the discipline to the study of intelligence particularly problematic. In addition, twin studies do not acknowledge the possible interactions between genes and environments, but tend to consider their influence on a trait separately. Twin studies, however, have also been capable of taking into account several objections and improving research methodologies, which have expanded to include examinations of twins' extended families, longitudinal studies, and other variations. In the age of genomes and molecular genetics, the future of twin research seems to depend on its ability to combine its traditional methodologies with molecular genetics research.

— Luca Prono

Genetics, Population

Population genetics is the study of the inheritance, distribution, and fluctuation of allele frequencies as affected by the four main forces of evolutionary genomics: natural selection, mutation, genetic drift, and migration. Population genetics is the overarching discipline of which quantitiative genetics is a crucial subfield that calculates selective effects. Ecological genetics is another subfield that closely examines gene-environment interactions, particularly in wild populations. Molecular genetics deals with the structure and function of genes at a molecular level. Thus, quantitative and ecological genetics are cognate areas of population genetics, and taken together, they all extend classical genetics in unique ways.

Genetic variation is typically cited as the ultimate fuel of evolution, but as organisms adapt in constantly changing environs, it is more precisely *allelic* variation upon which operate the forces of evolution. Alleles are variations of the same genetic loci that can express different phenotypes. Novel alleles arise in genomic populations via random mutation, and the frequency of occurrence of an allele changes regularly as a result of mutation, genetic drift, and selection. Such study of genetic frequency is relevant to a wide range of issues to do with diploid genomic populations. All diploid organisms have two elements—one allele inherited from each parent—at each genetic locus. Where these two elements are different, the organism is said to be heterozygous. Mendelian principles allowed early population geneticists to study heritable form of allelic traits, that is, the genotype, with an emphasis on the observable phenotype: the outward, expressed traits or physical manifestation of specific genetic loci, including variant alleles and heterozygotes.

Meanwhile, in 1908, the mathematical foundation of population genetics was independently discovered by the British mathematician G. A. Hardy and a German physician, W. Weinberg. The Hardy-Weinberg formula establishes parameters by which to predict expected genotypic frequencies of alleles in diploid populations. In a large, randomly breeding population, intergenerational allelic frequencies do not change in the absence of unbalanced mutation, gene migration, selection, or genetic drift. This equilibrium is a mathematically simple expression (for example, $p^2 + 2pq + q^2 = 1$). Thus can be calculated how alleles evolve in serial generations to the extent that they vary from equilibrium parameters.

Variations of allelic frequency are quantified with respect to demographic adjustments of population structures in evolutionary environmental space and time. Hence, population genetics is the systematic elucidation of essential biological phenomena, such as adaptation and speciation—with *adaptation* here meaning enhanced reproductive success of a given anatomical, physiological, or behavioral feature evident by increased allelic frequency over successive

generations and *speciation* meaning the appearance of qualitatively novel species of organism. A key premise of population genetics is that inheritance of both quantitative and qualitative traits are based on similar natural laws.

Population genetics is the main technique derived from the so-called modern evolutionary synthesis of the early 20th century, which melded neo-Darwinism with the rediscovery of Mendel's elegant laws of genetics. It is neo-Darwinian in that Darwin could not have known the precise basis of biological inheritance as the mechanism of genetics. As a consequence, Darwin never fully rejected the Lamarckian notion of acquired-but-heritable traits. However, his intellectual heir, George John Romanes, dismissed such Lamarckian ideas and termed evolutionary mechanisms that were necessary, sufficient, and yet entirely epigenetic neo-Darwinism.

Yet only with the rediscovery of Mendelian genetics in 1900 was a neo-Darwinian evolutionary science made more complete and rigorous. Still, it was not yet immediately clear on what variations processes of natural selection operated most directly. A biometric approach was formulated by the pioneer statistician Karl Pearson, who also widely influenced modern medicine, epidemiology, and anthropology. Pearson focused study on the importance of subtle heritable differences as the basis of Darwinian evolution. A countervailing view was the Mendelian school formulated chiefly by William Bateson. Bateson thought Mendel's work indicated that more abrupt, large-scale differences were the major mechanism by which evolution progressed.

This conundrum was finally resolved in 1918 by the remarkable geneticist-statistician, Sir Ronald Fisher. Fisher's paper *The Correlation Between Relatives on the Supposition of Mendelian Inheritance* invoked a continuous variation model that could derive from diverse discrete loci. Other central figures who, from this starting point, helped propound the modern synthesis include Theodosius Dobzhansky, J. B. S. Haldane, Sewall Wright, Julian Huxley, George Gaylord Simpson, and Ernst Mayr. Clearly, the signal achievement of the modern synthesis is how it not only joined Mendelian and Darwinian perspectives on evolution but also placed the synthesis within a robust mathematical framework.

Among Dobzhansky's many contributions, he operationally defined evolution as being "a change in the frequency of an allele in a gene pool" and also famously averred that "nothing in biology makes sense except in light of evolution." For his part, Haldane firmly reasserted the primacy of natural selection as mathematically compatible with Mendelian genetics. Wright identified the importance of genetic drift in the course of evolution. Huxley, much like his grandfather T. H. Huxley, helped popularize evolution for a broader audience. Simpson, given his expertise as a paleontologist, introduced important considerations that enriched and leavened sometimes weighted mathematical reductionism of the modern synthesis. Mayr, a superb field biologist and trained physician, contributed in many ways, but perhaps particularly with his naturalist's understanding of the importance of mating schemes and population isolates.

Other imminent population geneticists of the mid- to late 20th century include Motoo Kimura, Richard Lewontin, Luigi Cavalli-Sforza, John Maynard-Smith, William Hamilton, and George Williams. Kimura, with innovative diffusion equations, calculated probability and time to fixation of alleles, whether adaptive, deleterious, or the heretofore underappreciated but very important neutral trait. Lewontin was a pioneer in molecular studies of evolution. Cavalli-Sforza, a research physician among the first to study how modern genomes constitute an "archeological" record of inheritance and prehistory, greatly systematized the genetical study of demography in a manner free of the racialist bias that constrained earlier eugenics. Maynard-Smith educed remarkable genetic and evolutionary psychological insights as he infused population genetics with game-theoretical mathematics. Hamilton published in zoology and genetics, including his theoretical analyses that established a rigorous genetic basis for the existence of kin selection, now among the most widely cited papers in all of science. Williams promoted a genocentric view that has taken Darwinian ideas in new directions.

Beyond the modern synthesis, more recent advances in biochemical techniques have fostered the study of single genes (or other markers) at the molecular level. Whatever may be the methods used to identify genes and their alleles, either qualitatively or quantitatively, population genetics relies on statistical analyses of allele frequencies to understand and make predictions about gene flow in populations past, present, and future.

— *Daniel R. Wilson*

See also **Gene Flow; Genetic Drift; Genetics, History of; Hardy-Weinberg Principle; Migrations**

Further Readings

Dobzhansky, T. (1937). *Genetics and the origin of species.* New York: Columbia University Press.

Fisher, R. A. (1930). *The genetical theory of natural selection.* Oxford: Clarendon Press.

Haldane, J. B. S. (1932). *The causes of evolution.* London: Longman, Green.

Maynard-Smith, J. (1982). *Evolution and the theory of games.* Cambridge: Cambridge University Press.

Mayr, E. (1942). *Systematics and the origin of species.* New York: Columbia University Press.

HUMAN DIVERSITY

Human beings are found almost everywhere in the world in a very rich variety of physical types and cultures. People vary physically to an enormous degree in height, hair color, skin color, weight, strength, mental capacity, and more.

Individual human diversity is due to personal genetic makeup. Viewed as groups of people who have transmitted their genes to succeeding generations, human diversity is due to both biology (genotype) and to cultural features of the environment (phenotype).

The phenotype is the outward manifestation of physical human features. Phenotype is everything that is physical, such as metabolism, reflexes, tissues, bone structures, and other body features. Anthropologists have theorized that the enormous diversity among humans is due to natural selection. Genotype is a product of human evolution.

Some attempts to explain human diversity have focused on environmental factors. For example, height aids in purging body heat in hot climates; stocky body structure conserves body heat in cold climates. Light skin color allows vitamin D to be absorbed more readily in cloudy northern climates, while darker skin is less prone to skin cancer. The effect in terms of evolution is that in each environment, some physical traits are more adaptable than other traits.

Humans vary in biology, but they also vary in their way of life. The overall culture of each region or each people is similar because generally, all people eat, sleep, marry, have children, work, and die. However, the practices that direct a particular culture are adapted to respective environments. Some researchers believe that cultural practices or sheer physical isolation can inhibit genetic variation and thus inhibit the evolution of humans.

The Human Genome Project was an international project that sequenced and mapped human genes in order to understand the diversity and unity of the entire human species, *Homo sapiens.* It was completed in April 2003.

The Human Genome Diversity Project is like the Human Genome Project. It is an international effort by anthropologists, geneticists, doctors, linguists, and other scholars. They are working to document the global genetic variation of the Earth's peoples. The Human Genome Diversity Project is seeking to understand why there is such enormous diversity in the people of the Earth, all of whom are widely believed to be ultimately related. However, this relation has been denied by some, which, if true, would have numerous implications for theories about race differences.

— Andrew J. Waskey

GENOCIDE

The term *genocide* is derived from the ancient Greek word *genos* (meaning a tribe or race) and the Latin *cide* (killing). Raphael Lemkin first used this term in 1944. Lemkin worked for the creation of international standards intending to outlaw the wanton and directed killing of identified peoples. Ultimately, Limkin's efforts were the driving force in the formation of the United Nations Convention Against Genocide.

Genocide is narrowly defined as a society or nation turning against a subgroup that is seen as an internal enemy. Helen Fein provides a broader and far more accurate understanding. She maintains that "Genocide is the calculated murder of a segment or a group

defined outside the universe of obligation of the perpetrator by a government, elite, staff or crowd representing the perpetrator in response to a crisis or opportunity perceived to be caused by or impeded by the victim." This expanded definition includes the occasion of one nation conducting a war of annihilation against another.

Acts of genocide share a common trait that also serves as a justifying mind-set for acts of extermination: The cultural or economic environment of the aggressive entity or nation must have reached a specific state where genocide is accepted and even embraced as necessary. Staub asserts that changes or shifts in life conditions within certain cultures (bearing distinct characteristics) may generate the necessary social/psychological reaction. He states, "Sometimes a whole society or substantial and potentially influential segments of society face serious problems that have a powerful impact and result in powerful motivations" (Staub, 1989, p. 13). The force exerted by change varies by the magnitude, degree, and intensity of the influencing condition.

Perhaps the most important condition conductive to a genocidal action is the rigidity or the inability of the aggressor culture to adapt. A society with inflexible values and ways of life is likely to be more affected by change. Rigidity makes the difficulties of life more stressful. Consequently, members of a culture are more easily accepting of radical solutions and the placement of blame for their immediate crisis, with the expended slaughter of a targeted population as the necessary solution.

Fein identified four distinct categories of genocide. *Developmental genocide* serves to remove the indigenous members of an area for the purpose of geographic expansion. *Despotic genocide* is a means of removing political opposition in the course of power acquisition. *Retributive genocide* addresses ethnic and similar social stratifications conflicts over power and dominance. *Ideological genocide* is grounded upon the intolerance of contrasting belief systems and the perceived inability to coexist.

The earliest known history of genocide is chronicled in the Old Testament, where reference is made to complete annihilation of the Amalekites. The most notable example of early genocide is the Roman destruction of Carthage, in 146 BC. One historically acknowledged act of complete genocide took place in 1806, when the British began the annihilation of the Tasmanian aborigines, allegedly over the spearing of livestock. By 1835, the few remaining Tasmanian were resettled on barren Flinders Island. The last full-blooded Tasmanian died in 1876. Acts of genocide have taken place throughout history, with numerous examples taking place during the 20th century. During World War I, the Turkish government planned and ordered the massive murder of Armenians within their borders. In World War II, Hitler ordered the systematic gathering and killing of Jews and other "undesirables" across Europe, in what was to be known as the Holocaust. In 1975, the communist Khmer Rouge exacted victory in the civil war in Cambodia. After assuming control of the country, they began a period of forced slavery, torture, and killing in which over 2 million persons lost their lives. In 1976, over 9,000 persons "disappeared" in Argentina in a wave of military actions following a coup.

— *Richard M. Seklecki*

See also **Eugenics**

Further Readings

Fein, H. (1984). *Scenarios of genocide: Models of genocide and critical responses.* London: Westview Press.

Kuper, L. (1981). *Genocide: Its political use in the twentieth century.* New Haven, CT: Yale University Press.

Mills, N., & Brunner, K. (2002). *The new killing fields.* New York: Basic Books.

Simpson, C. (1995). *The splendid blond beast.* Monreo, ME: Common Courage Press.

Staub, E. (1989). *The roots of evil.* New York: Cambridge University Press.

GENOMICS

Simply defined, *genomics* is the study of an organism's set of genes and their functions. An organism's genome could be considered its instruction manual, and genomics is the science of reading and interpreting that set of instructions. The information contained within an organism's genome controls every aspect of its life, including growth, maintenance, and development, and for humans, it includes instructions on behavior, physiology, and susceptibility to

some diseases. This is not to say that the environment does not count. We are only beginning to unravel the complexities of the interplay among genes and environmental exposures involved in growth and development and the occurrence of disease. On the genetics side, genomic scientists analyze the function of genes within an organism to determine how the genes determine or influence phenotypic outcomes. The study of human genomics will be applied in areas of research such as biological evolution, human migration, molecular medicine, and a vast array of other disciplines.

The field of genomics encompasses many areas of science, because it involves the smallest building block of life, DNA. Genes contain DNA, chromosomes contain genes, and genomes are comprised of all these levels of genetic structure. Almost every cell within an organism contains its unique genome. Genomes can be categorized by individual and by species. Each species has a unique genome, and every individual or organism within that species has certain derivations of that genome. Genomes of individuals within a species are similar enough that it is only necessary to study one or a few genomes to glean information for the population.

Some question why it is necessary to know the entire sequence of a genome instead of simply determining the sequence of individual genes. Not every gene is recognizable. Knowing the full sequence of a genome will help scientists determine what sequence is an actual gene and also allow them to examine how the whole genome works and how genes work together. In addition, knowledge of the entire genome sequence will help scientists study those areas that do not code for proteins in order to determine their importance and function.

Now that the Human Genome Project has published the full sequence of the human genome, scientists will begin to examine the variations among species closely and distantly related to humans. Studying the genomes of organisms distantly related to humans will provide information on species evolution. Sequencing and examining the genomes that are closely related to human, like that of the chimpanzee, with which we share 98.8% identity, could tell scientists exactly why we are different. Comparing the two genomes may show why the physical and mental development of humans is so much more advanced than that of chimps.

Along with studying the variation between species, the differences in the genomes of humans will be a tremendous tool for medical genetics, forensic anthropology, agriculture, and many more disciplines. For molecular anthropologists, genomes contain the history of the human species. Genomic studies can provide historical information on the migration and mating patterns of human populations. Genomics is also a tool for molecular geneticists studying human diseases and complex traits like personality. Scientists believe that slight variations between human genomes can make one individual have a higher or lower risk for heart disease, different forms of cancer, or Alzheimer's disease. Genomics will be an invaluable tool for all of science in the years to come. One can only hope that the real benefits of genomics for humankind will outweigh the effects this advancing knowledge is bound to have in terms of ethical issues, such as who will have access to its application in medicine and to the information derived there from.

— Jennifer Currie and F. John Meaney

See also **DNA Molecule; Human Genome Project**

Further Readings

Brown, T. A. (2002). *Genomes.* Hoboken, NJ: Wiley.

DeSalle, R., & Yudell, M. (2005). *Welcome to the genome: A user's guide to the genetic past, present, and future.* Hoboken, NJ: Wiley.

Inlow, J. K., & Restifo, L. L. (2004). Molecular and comparative genetics of mental retardation. *Genetics, 166,* 835–881.

Smith, G. (2005). *The genomics age: How DNA technology is transforming the way we live and who we are.* New York: AMACOM.

Geologic Column

The term *geologic column* brings to mind rock layers, laid one on top of another, representing the geologic history of the Earth. However, this picture is only a small part of what constitutes the geologic column. In no place on Earth do preserved sediments represent the entire geologic column; sediments representing significant portions of geologic time are missing in all localities. The complete column would be an estimated 360 km (200 miles) thick, and the Earth's crust is only about 70 km (39 miles) thick.

Source: © iStockphoto/Paige Foster.

The geologic column is best described as a project that has gone from simple, local correlations to an ongoing correlation of all rocks on Earth by their age. This postulated column has been created through comparison and correlation of individual strata from around the world made by thousands of researchers over the last few hundred years. It has traditionally been based on the concept of relative time—this stratum is older than that one but younger than this one. Recently, however, radiometric dates have been used to reconcile the relative dates with real time. Understanding the geologic column thus requires an understanding of the project itself and the history of its creation.

It must first be noted that two closely related concepts, the geologic column and the geologic timescale, are actually separate entities. The geologic column is composed of strata with reference to their relative positions based on time correlations, while the geologic timescale is a time chart tied to various rock formations around the world. The distinction is small but significant. The commonly used terms of *era*, *period*, *epoch*, and *age* are chronologic units of the geologic timescale. Equivalent terms of the geologic column are *erathem*, *system*, *series*, and *stage*. The geologic column was the original project of geologists, while the geologic timescale became important only after the discovery of radiometric dating techniques.

The attempt to understand the geologic column undoubtedly started when the first human seriously pondered the origin of observed rock sequences. Early researchers, including Pythagoras, Xenophanes, Thales, and Aristotle, contemplated the origin of the Earth's rocks and fossils in terms of natural causes. However, this concept was soon all but forgotten. The Judeo-Christian religious movement, with its "young Earth" interpretations, provided the dominant influence for nearly 2,000 years. During that time, the possibility of an "old Earth" was unthinkable (or at least unmentionable). This belief attributes virtually all the Earth's sedimentary layering to a single flood event and suggests a static Earth created in its current state. This concept went virtually unchallenged, and it was the mid-1500s before anyone again seriously questioned the origin and age of the Earth's rock formations.

Leonardo da Vinci was one of the first persons in recent history to actually research and write about the origins of sediments, but he wrote in mirror writing and kept his notes in his personal possession lest the

Church would find in them cause for persecution. It wasn't until the 1800s, when his notes were deciphered, that the extent of his research on the geologic column was known. However, rumors of da Vinci's research, along with his own observations and curiosity, sparked the interest of Nicholas Steno, a brilliant anatomist and the first recorded "geologist" of modern times. His 40-page publication, "Preliminary Discourse to a Dissertation on a Solid Body Contained Within a Solid," is the first modern publication on the topic of geology and proposes the concept of older layers of sediment occurring below younger layers, later called the *theory of superposition*. Among other concepts put forth in the paper, he also suggested that sediments were generally laid down in horizontal layers. This later came to be known as the *theory of original horizontality*. Unfortunately, his work received widespread criticism, and the dissertation promised in the title of this revolutionary work was never finished.

It is well-known that this preliminary work was the inspiration for many workers over the next century, including Robert Hooke, Abraham Werner, Giovanni Arduino, and James Hutton. Arduino's work is presented in the letter he wrote to Professor A. Vallisneri the younger on March 30, 1759. Arduino proposed a classification of Earth's rock into four great "orders": primary, secondary, tertiary, and quaternary. This work was a first attempt to apply systematic subdivisions to rock sequences. The subdivisions he proposed formed the foundation of the modern geologic column. Arduino's system was used extensively to describe rock sequences throughout Europe, and even the first geologic map of North America is based on his system. Hutton's 1785 paper, "Theory of the Earth, or an Investigation of the Laws Observable in the Composition, Dissolution and Restoration of Land Upon the Globe," was one of the first to state that the Earth's geologic features were the result of ongoing processes and events. As Steno's principles of superposition and original horizontality, Arduino's classification system, and Hutton's principle of uniformity became more widely disseminated, the stage was set for the project known as the geologic column.

William Smith, a surveyor who worked for canal builders at the end of the 18th century, arguably contributed the concepts and publications that actually shaped the geologic column. He noticed that not only did rock layers themselves seem to correlate across broad distances but also the fossil content of the rocks correlated. This led Smith to use the concept of "faunal succession" in addition to superposition to correlate the strata and the fossils of England in a map based on a time sequence. Smith, a commoner, found himself fighting an uphill battle to get his ideas published. At one point, he ended up bankrupt and in debtor's prison before a map publisher paid his way out of jail and eventually published his geologic map. This map, published in 1815, was the first iteration of the geologic column as we know it. With this publication, Smith single-handedly created the science of biostratigraphy and provided a means of correlating strata across large distances and across missing sections.

In 1830, Charles Lyell published the first of three volumes, collectively titled, *Principles of Geology*. In this work, Lyell summarized the history of the scientific works of geology to that point, expanded upon Hutton's uniformity, and laid the foundations for future geological studies. His treatise also included detailed investigations of faunal and floral succession through time, the processes of fossilization, and the idea of the same gradual processes observed today being responsible for the features preserved in the geologic record. With these volumes, Lyell formalized the study of geology and created the framework within which the geologic column has been created.

Since then, literally thousands of researchers have contributed, and the geologic column is being constantly fine-tuned. Today, the accepted geologic column is the one certified by the International Commission on Stratigraphy and its parent organization, the International Union of Geological Sciences. Information currently used comes from a variety of sources, including lithostratigraphy, biostratigraphy, magnetostratigraphy, and radiometric dating. Technology continually allows more precise observations, and the column is constantly being remodeled to reflect the more precise information. What started out as a simple observation of time correlation in the Earth's sediments has now grown into an effort to catalogue each rock unit on the Earth and accurately place it within the column. These correlations have, in turn, allowed discoveries of important mineral, oil, and coal deposits and have greatly enhanced our understanding of the processes and events that have shaped our world.

— David Trexler

See also **Excavation; Stratigraphy**

Further Readings

Cutler, A. (2003). *The seashell on the mountaintop: A story of science, sainthood, and the humble genius who discovered a new history of the earth.* New York: Penguin Books.

Gradstein, F. M., Ogg, J. G., & Smith, A. G. (in press). *A geologic time scale 2004.* Cambridge: Cambridge University Press.

McIntyre, D., & McKirdy, A. (2001). *James Hutton: The founder of modern geology (Scot's lives).* Edinburgh: National Museums of Scotland.

Winchester, S. (2001). *The map that changed the world: William Smith and the birth of modern geology.* New York: HarperCollins.

GEOLOGY

Perhaps the most dynamic concept of modern geology is tectonic shift. The theory is based on the fact that the surface of the Earth is not of one piece, nor are the different pieces stable. The Earth's surface is actually composed of a series of 12 massive geologic plates. As Kathy Svitil writes in *Savage Earth,* "The pieces of the shell are Earth's tectonic plates and they float across a layer of soft rock like rafts in a stream, their motions driven by forces generated deep in the Earth. At their boundaries, the plates spread apart, converge, and slide past one another."

These boundaries are the most geologically active regions on Earth. Here, new land is born of the Earth, and old land is consumed. Hot springs spew out mineral-rich waters, volcanoes erupt, and earthquakes tremble, resulting in devastating tsunamis, floods, and mudslides.

When these plates come into collision with each other, one usually slides over or under another, and this is when earthquakes occur. If such an earthquake takes place on the ocean floor, the resulting seismic shock can generate one of the most destructive forces in nature: the tsunami, or tidal wave. On the open seas, a tsunami wave can travel at speeds up to 500 miles per hour, almost as fast as a modern jetliner. On December 26, 2004, a seaquake took place that may have measured as high as 9.3 on the Richter scale, making it one of the most powerful earthquakes in history.

The seaquake originated off the island of Sumatra in Indonesia. Soon, it led to one of the worst natural disasters in modern history. Tsunamis spawned by the quake became waves of destruction that were carried as far as 5,000 miles from the epicenter, the point of origin of the quake. People were killed as far away as the coast of Africa in Kenya and Somalia. Perhaps the farthest extent of the tsunamis' rage was Port Elizabeth in South Africa, where people were washed away.

By far the hardest-hit countries were Indonesia, Thailand, India, Sri Lanka, Bangladesh, and other nations in South Asia. Estimates of the casualties can never be accurately made, since tens of thousands may have been washed out to sea again after the savage waves receded into the Indian Ocean. Some 300,000 people are thought to have died as a result of the tsunamis, and the count was not yet complete in early 2005. In Indonesia in particular, 500 bodies a day were still being found in February 2005, and the count was expected to continue past June.

A massive international relief effort continued to aid those who survived one of nature's worst calamities. Tragically, the earthquake hit one of the poorest regions of the world as well, where daily life, even before the tsunamis attacked, was a precarious challenge. It is a sad fact that the Indian Ocean tsunamis of December 2004 have probably not yet claimed their last victim.

— John F. Murphy Jr.

GEOMAGNETISM

The magnetic phenomena exhibited by the earth and its atmosphere is known as *geomagnetism.* The strong magnetic field generated from deep within the earth is continually monitored and studied, allowing scientists valuable information for precise indexing of time (geochronology, paleomagnetism), determining crustal position (paleogeography), and abetting perhaps the most important revolution to unify modern geology: plate tectonics.

Magnetism is a force of attraction and repulsion between various substances brought on by the motion

of electric charges of atoms. All planets in our solar system and several corollary moons have some variety of magnetic field that is distinctive to each body.

The Earth's magnetic field is similar to a typical bar magnet acting as a dipole, where the magnetic force is concentrated at the north and south poles. The north magnetic pole is defined by the direction that a north-seeking magnet would tend when used near the planet. These poles are not generally located at the poles of rotation for a planet. At present, the Earth's magnetic poles are approximately 11.5 degrees off the axis of rotation and are continually in motion.

A magnetic pole sets up a field in the space around an object that exerts a force on magnetic materials. The field can be visualized in terms of lines of induction or isolines drawn on an isomagnetic chart. The strength of the main magnetic field is mapped on isomagnetic charts. The contour lines representing constant values for horizontality are called *isolines.* However, the main polar fields are not the only sources of magnetism in a planet. Charts are individually drawn for the other components as well, such as nondipolar elements and for the total intensity. On Earth, there are many nondipole elements composing the total magnetic field that are local and more complicated than the main field. These additional elements make the Earth's total magnetic field more intricate and can be furthermore utilized for a more comprehensive understanding of the Earth's interior. The Earth can be seen to have an amalgamated field consisting of a strong dipolar main field and a superimposed nondipolar field, also known as the *lithospheric field.* Localized lithospheric magnetization, subsurface counterflow fluids processes, and magmatism create the independent multiple nondipolar poles.

From the clues and measurements of the ferromagnetic rocks and direct reading of the earth's magnetic field, scientists are able to glean some information as to how this phenomenon works and how it perpetuates. The field is self-perpetuating, and the present source of the field is called the "Magnetohydrodynamic Dynamo." Paleomagnetized rocks show that the Earth's magnetic field is continuously regenerated and has been doing so for over 3.5 billion years. This is thought to be due to a well-working convection mechanism inside the Earth in which hot fluid rock circulation facilitates electric currents and magnetic fields as Earth rotates. The differential rotational movement of Earth's layers furthermore complicates the motion of the fluid through a resistivity at the boundaries and a torque exerted by Earth's rotational movement known as the "Coreolis effect." The currents and the induced magnetic flux interact, with the existing magnetic field dissipating or reinforcing it continuously. These processes in concert with the Earth's rotation are predicted by the Magnetohydrodynamic Dynamo theory, which attempts to explain the perpetuation of the earth's magnetic field.

The configuration of the earth's magnetic field as a dipole allows for a phenomenon of colorful curtains that appear to dance across the sky. Known as auroras, they can extend for 100 km arcing near the northern (boreal auroral zone) and southern (austral auroral zone) latitudes. Auroras are the signatures of charged particles that are constantly bombarding the upper atmosphere. As the electrons traveling along a magnetic field line enter the high-altitude atmosphere, the collision with a higher-energy particle strips an electron from the air molecule. This ionizes the molecule and increases its electrical conductivity, releasing a photon of light and giving the auroras their distinctive appearance.

Through the science of geomagnetism, the study of the earth's interior has been greatly advanced. The complexities of the magnetic field beyond the dipolar orientation have allowed for a more complete picture of the interior of the earth. However, it is the dipolar element to the field that humanity relies on most for beauty and protection. The same field that generates the striking auroras in the northern and southern latitudes also protects the earth from the sun's harmful radiation. Without such a field, the earth could have never developed and flourished, teaming with life and wonderful splendor. Humans, as indeed all life, owe our very existence to the dynamic processes deep within the earth that we are just starting to recognize and understand.

— Christopher C. Matson

See also **Paleomagnetism**

Further Readings

Backus, G., Parker, R., & Constable, C. (1996). *Foundations of geomagnetism.* Cambridge: Cambridge University Press.

Biskamp, D. (2003). *Magnetohydrodynamic turbulence.* Cambridge: Cambridge University Press.

McElhinny, M. W., & Merrill, R. T. (1983). *The earth's magnetic field: Its history, origin and planetary perspective.* Orlando, FL: Academic Press.

Geomythology

Geomythology is the branch of geology that aims to discover the relationship between various ancient people's myths and the geological environments where their early civilizations developed.

The long history of the human being, *Homo sapiens,* is divided into two long periods: the historic period that starts with the invention of writing and the prehistoric one. For the purposes of geomythology, the prehistoric period should be further divided into two subperiods, specifically, when *Homo sapiens* is in the hunting-and-gathering stage (a food gatherer) and a later one, when *Homo sapiens* is a food producer, that is, after the initiation of agriculture and mainly after the cultivation of wheat.

The mythological period is the prehistoric period that refers to the acts of gods, deities, and heroes. These acts may not have been recorded in writing but have remained in the memory of different people, either through tradition or as they were later recorded by various authors. These texts constitute the different mythologies. Such characteristic texts are the "Gilgamesh epic," which refers to the people of the prehistoric Mesopotamia, and Hesiod's "Theogony," which represents the mythology of the Ancient Greeks.

Most people believe that the modern geoenvironment of a place, particularly of a coastal area, remains almost invariable, meaning that whatever landscape contemporary people see around them, no matter on which place on Earth they live nowadays, is the same as that seen by their prehistoric predecessors. This point of view is inaccurate, because the geoenvironment does not remain the same, but constantly changes. In fact, the geoenvironment that we can see around us was created in approximately 5,000 to 6,000 years BP (before the present). This period is known as "Holocene Climatic Optimum." Before that period, everything was different, especially in higher latitudes where the paleogeographic conditions were totally different in land areas as well as in coastal areas. On the contrary, in lower latitudes, the paleogeographic changes were very important, mainly in coastal areas, while at continental and intracontinental areas, the changes are of lesser importance, even though they still exist.

Examples from different parts of the Earth exist where these geographical–relief morphology changes are so drastic that the present-day picture is totally different compared to prehistory. For example:

1. The Persian Gulf did not exist until 12,000 BP.
2. The Sahara area became a desert just after the 5th millennium. Before this period, the climate in Sahara was more favorable for the prehistoric inhabitants of the area, as a great number of hydrotopes and even lakes existed between 4,500 and 8,500 BP.

Prehistoric people created gods directly connected to their geoenvironment. In the Scandinavian mythology, for example, ice is often related to the myth, while ice is nonexistent in the synchronous mythologies of the people of tropical Africa. Some gods, however, were common in almost all ancient mythologies. For example, the sun and the moon have been deified by nearly all prehistoric people. In most ancient religions, the sun belongs to the early generations of gods; in Greek mythology, the sun belongs to the fourth generation of gods but not to an older one.

The main physical and geological factors related to the ancient mythologies are some geodynamic phenomena, especially volcanoes and earthquakes. Another factor is the climate, mainly the climatic fluctuation during the last 18,000 years. The impacts of the climatic changes are various, but the ones that played a major role in the cultural development of *Homo sapiens* are

The variation of the extent of land covered by glaciers

The sea level changes

The shoreline displacements

All three consequences are connected to the fact that water, under the climatic conditions of our planet, is presented in three different forms:

as gas (clouds, vapor, H_2O[**g**])

as solid (ice, snow, H_2O[**s**])

as liquid (saline water, fresh water, surface or groundwater, H_2O[**1**])

The total quantities of the chemical compound H_2O that are bound in each phase are directly connected to the mean global air temperature of the Earth atmosphere during a particular time period.

On the other hand, it is accepted that the total quantities of water on our planet are stable, at least during the Cenozoic era (last 65 m.a.). This means that under different climatic conditions, while the quantities of the partial phases may vary, the sum of these three phases remains constant:

$$H_2O(s) + H_2O(g) + H_2O(1) = \text{constant, whereas}$$

$$H_2O(s) / H_2O(g) / H_2O(1) = \text{variable}$$

But we know that the climate changes periodically, connected primarily to astronomical causes. According to the Milankovitch theory, the Earth's climate depends on the solar radiation received by the planet, which in turn depends on the Earth's orbiting movement around itself and around the sun. So, finally, the quantity of solar radiation reaching the Earth depends on the *precession* of the Earth axis, the *obliquity* (the change in axial tilt), and the *eccentricity.* Because these parameters are not constant but present a periodicity, the climate changes also present a similar periodicity, which is the combined result of the partial ones.

These geoenvironmental changes were so important that they have forged the religious conscience of the prehistoric people during the most critical time of their evolution, which is the period of the transition from the food-gathering stage to food production stage.

The relationship between the myths of a people and its geoenvironment is in some cases direct and in others indirect.

Direct Relationship Between Gods and Geoenvironmental Factors

The relationship is direct when a god, a semi-god, or a hero is identified with a geological phenomenon. A characteristic example of such a case is God Hephaestus of the Greek mythology or Vulcan of the Roman mythology, who are the gods of volcanoes and volcanic activity in general. In this particular case, the relevant geological phenomena concerning the upsurge of magma toward the surface of the Earth have also been named after these gods.

The responsible deity for earthquakes in Greek mythology was initially a giant, Enceladus, who later was replaced by Poseidon, who was at the same time the god of water. This replacement took place after the Gigantomachy, when the generation of giants was defeated by the generation of Zeus.

Indirect Relationship Between Gods and the Geoenvironment

Tales of various mythologies do not correspond to reality but are inventions of the minds of the human beings who lived during this distant era. These views are probably connected to the fact that we have not yet realized the great changes that took place in the geoenvironment between 18,000 BP and 6,000 BP, especially at regions bordering the sea and along coastlines in higher latitudes.

During the Late Palaeolithic, the Mesolithic, and almost the whole Neolithic Eras, the coast geomorphology of the entire planet changed so much that it is impossible now to recognize the original coastal geomorphology. The most striking examples are the Aegean Sea (Hellas), the Persian Gulf, the region of Australia, and the coasts of Polynesia.

In the Aegean Sea 18,000 years ago, for example, both the number and the shape of the islands were entirely different, while the present Persian Gulf did not even exist, as the Indian Ocean extended up to the Straits of Hourmouz. These occurred because the sea level dropped at least 125 m during the glacial period, mainly due to climatic–eustatic movements. After a gradual rise in temperature and the commencement of glacier melting, water flowed from the glaciers into the oceans and caused the gradual rise of the sea. Coastal areas were inundated. This physical-geological regime, which commenced around 18,000 BP, continued until 6,000 BP. This means that the inhabitants of the planet's coastal areas watched the land on which they lived being engulfed by the sea, either rapidly or slowly but continuously for 12,000 years. During the same time period, earthquakes, volcanic activity, tsunamis, and other natural phenomena caused disasters from time to time.

We also have to take into account that, during the same period of time, *Homo sapiens* performed a great cultural, economic, and social revolution by inventing agriculture. The climatic change of 18,000 BP commenced when *Homo sapiens* was a food gatherer and hunter and ceased when man became not only a farmer but also developed navigation, trade, ceramics, and metallurgy.

To be able to realize the social-psychological reaction of the people of the era under flooding, we must

imagine how our society would react if the residents of Manhattan, Shanghai, Bangkok, or Piraeus ascertained that the sea level had begun to rise slowly and steadily for many years, for thousands of years, accompanied by all the consequences. Moreover in some other cases, as for example in Greece, in Indonesia, and in Japan, in addition to this sea level rise, volcanoes, earthquakes, tsunamis happened from time to time. This is how dwellers near the sea formulated many of their myths during this era. For the inhabitants of the regions of higher latitudes, such as Northern Europe and the Northern America, or people who lived on high altitude areas, such as the Alps, the retreat of the glaciers was accompanied by the migration of the inhabitants from the south to the north, in the first case, and from lower to higher altitude areas, in the second. This was the physical-geological scenery when the humans of this prehistoric era gradually formulated many of their myths, depending on the geographical environment they lived in and its local physical-geological peculiarities.

Geomythology tries to discover the connection that is hidden behind each myth with the paleoenvironment of a period. Because some of the earliest and most important human civilizations have been developed in areas around the East Mediterranean Sea and the Persian Gulf, we shall use these areas as striking examples of events described in the mythologies of these people.

The Destruction of Eridu

The Sumerians were the first ones to settle Mesopotamia in the middle of the 5th millennium BC. Sumerians invented cuneiform script and believed in life after death. Two of the most important gods to the Sumerians were Enki, who was the god of water, and Enlil, who was the god of wind.

The oldest city of Mesopotamia was Eridu, which is located at the southeastern part of the area, out of the Euphrates River. Some other well-known cities of this time are Ur and Uruk. Every city had its own protector god. The protector god of Eridu was Enki.

The myth says that Inanna, the goddess of love, was concerned about a new town, named Uruk, although it had neither the power nor the prestige of other new towns. During a symposium of the gods, Inanna seduced the god Enki, a philanderer who was drunk. At some moment and in exchange for her love, Inanna asked Enki to reveal the location of the "one hundred divine powers" that protected Eridu. As soon as Enki revealed the secret to her, Inanna escaped and took the one hundred divine powers from Eridu to Uruk. Enki never managed to save Eridu from decadence since that time, while Uruk gradually became one of the most powerful towns. Enlil, the god of wind, took Enki's position. Enlil continued to be more powerful than Enki, and thus according to the Sumerians' mythology, the city of Eridu has been without any trace of human life since, due to the desertification that followed the era of climatic optimum of the Holocene. In the same era, we have observed a similar change of climate toward arid conditions in other areas of the Earth, with a prime example being the Sahara desert.

The study of recent continental sediments, such as lacustrine deposits, paleo-soilsm and aeolian deposits found in the driest parts of the modern Sahara desert, has shown a succession of dry and wet climatic phases. According to Petit-Maire, at the end of Pleistocene, a phase of intense drought took place that reached its peak around 18,000 BP.

It appears that the paleoclimate in Central Europe follows a different course from the Sahara one, the Dead Sea, and Mesopotamia. While in central Europe, the climate was dry, in the Sahara, the Dead Sea, and Mesopotamia, a humid phase began that lasted from about 9,000 BP up to 4,500 BP (2,500 BC). It appears that the most favorable period in the region is temporally extended up to 4,500 years ago. During this wet phase, archaeological settlements have been discovered, dated between 8,200 and 6,800 BP, when the lakes reached their greatest extent. Since then, a dry period begins that extended up to 4,500 BP (2,500 BC). The conditions in the Sahara became unfavorable to the prehistoric inhabitants, the settlements were abandoned, and there are no similar archaeological findings since then.

Humans lived in this region for a relatively small time interval. The first settlements dated to 6,980 ± 320 years BP, while the last ones around 5,700 ± 100 BP. Consequently, the conditions in the Sahara were favorable, or relatively favorable, for the humans only during this period. As similar climatic conditions should happen in Mesopotamia during the same time period, the replacement of Enki, the god of water, by Enlil, the god of the wind, in Eridu is directly connected to the change of the climatic conditions of Eridu area.

Sodom and Gomorrah

The description of the total destruction of Sodom and Gomorrah is given in the Bible (Genesis 19:25). The precise position of the city of Sodom is not known, but some suggest it may be near Mount Sedom, on the east of the southern basin of the Dead Sea.

The Dead Sea is an active tectonic graben, which is bound by two roughly parallel faults. The faults are part of the central segment of the major north–south trending crustal rift separating the Arabian lithospheric subplate, on the east, from the Sinai, on the west. The Arabian subplate has been moving north continuously since the Miocene. The many faults in the Dead Sea region show continued seismic activity with a maximum earthquake magnitude of 6.9 (Richter scale) in the time period from 1909 to 1993.

Some geological evidences of a left-lateral fault movement and a great subsidence of the sediment filled basin and some others indicate that it was most likely a great earthquake that destroyed Sodom and Gomorrah.

The Struggle Between Greek Mythological Gods

The oldest and greatest poets of ancient Greece—Hesiod and Homer—wrote of the struggle between generations of gods or between gods of the same generation. This struggle sometimes resulted in the extinction or disappearance of whole god generations (for example, Titans or Giants), and some later used the struggles as an excuse to accuse the gods of the ancient Greeks of being immoral, cunning liars and criminals.

The struggles of these ancient gods, however, described in Greek mythology through the works of Hesiod, Homer, and others, reflect the physical and geological evolution of areas of the Aegean during the time between 18,000 and 6,000 BP.

The Greeks considered Heaven and Earth as the first generation and parents of Gaia (Gaea) or Mother Earth, whom they considered the oldest of their deities and the primary creator, born of Chaos itself. According to the myth, Earth brought forth Uranus (the Heavens) to be Gaia's mate, and the couple gave birth to the third generation of gods that included, among others, the Giants and twelve Titans.

The first struggle recounted in Greek mythology takes place when Cronus, a third-generation god and leader of the Titans, tried to overturn his father Uranus's power through assassination. Cronus did not succeed. Gaia stood by Uranus during this difficult time and through her contribution, the Giants were born.

Gaia and Uranus's son, Cronus, with another Titan, Rhea, parented the first six Olympian gods, among them Poseidon and Zeus. Cronus feared that his sons would eventually take over his power and, as he did with all his sons, he tried to eat Poseidon and Zeus at birth. Their mother Rhea protected them by deceiving Cronus. When Poseidon was born, Rhea told Cronus that she had not given birth to a child but to a small horse. In the case of Zeus, Rhea replaced the infant with a large stone, which she gave to Cronus to eat.

Subsequently, the children of Cronus and Rhea, which now made up the fourth generation of gods referred to as the Olympians, competed initially against the Titans in a battle known as *Titanomachy* (Titanomachia). The third-generation Giants assisted the Olympians in their battle against the Titans. Then the tables turned, and, in a second battle known as the *Gigantomachy* or *Gigantomachia*, the Giants fought the Olympians.

Through these battles, the Olympians exterminated the Titans and Giants and began their own period of dominance. Their reign was not without difficulties: the struggle of Zeus and Poseidon, Poseidon and Apollo (Delphi and Corinthos), Poseidon and Athena (for the protection of the city of Athens), Demeter and Hades, and others. In most of the battles, Gaia played a primary role, and the elder brother, Poseidon, was gradually defeated by his younger brother, Zeus, as well as by Apollo and Athena, who are gods of a younger generation. By these struggles, the older generations of gods have been replaced by younger ones.

From a geological perspective, the struggles of the generations of gods should have occurred during the time period of about 18,000 and 4,000 years BP. This time coincides with changes of the physical and geological regime in the Saronic Gulf, the Aegean, and circum-Aegean areas.

The physical-geological evolution of this period follows.

The last interglacial period begins at approximately 18,000 BP and spans to our times.

18,000 years ago, the sea level was around 125 m lower than the present shoreline. Between 18,000 BP and 6,000 BP, the sea level rose from 125 m to 2 m. Scientists have estimated that the rising rates varied from 1 cm/y–5 cm/y.

The rising of the sea resulted in a relative subsidence of the coastal areas, that is, a transgression of the land and permanent flooding of several coastal areas.

The rate of this transgression was different from place to place, depending on the slope of the landscape and varied from some meters a year rise to many hundreds of meters a year.

The result was a new physical-geological regime—permanent flooding conditions of several coastal areas—that replaced the older regime when the global air temperature remained more or less stable for many thousands of years. Evidently, the inhabitants of these areas suffered, and the catastrophes were enormous. In addition to the flooding conditions, earthquakes, tsunamis, and volcanic activity were continuously present, as Greece, from a geotectonic point of view, is a seismically and tectonically active arc.

The upper Paleolithic and Neolithic *Homo sapiens*, who were living in areas under the flooding regime, believed that very strong gods were responsible for all these disasters and general catastrophic phenomena, some primitive, some evil, gods who were active throughout the period of the climatic changes. During the same period, the upper Paleolithic inhabitants of the Aegean area needed to pray to benevolent gods to save them from the disasters caused by the primitive gods, so they created the fourth-generation gods Poseidon, Zeus, and so on. After the climatic stabilization (around 6,000 years BP), the evil gods were defeated by the benevolent gods. Thereafter, the struggle among the Olympians concerns a rearrangement of jurisdictions. As the new climatic regime required more water and a god who could regulate precipitation was more important than Poseidon, Zeus replaced him.

Hercules and the Lernean Hydra

In ancient Greek mythology, Hercules is one of the most famous heroes, known primarily for his labors, most having to do with fresh water and land reclamation. Water came either from karstic springs, such as that in the Labor of Lernean Hydra near Argos (Peloponnesus), or from lakes, such as in the Labor of Extinguishing the Birds in Stymphalia Lake (Central Peloponnesus), or from rivers, such as in the Labor of Cleaning the Stables of Augias, near Olympia. Apart from these labors, there are more, but not so well-known, such as those that relate to other rivers, thermal springs, or the destruction of draining sites.

The myth of extinguishing the Lernean Hydra is one characteristic example of a myth coinciding with the hydrogeological conditions of the area. The essence of this myth follows.

A repulsive snake-formed beast (the Lernean Hydra) lived in Argos, a region near Lorna Lake in eastern Greece. It had an enormous serpentine body ending in several snaky tresses with a head at each edge. The beast's breath was poisonous, and often it would spit out fire, even while asleep, which would destroy everything in the plain, including crops, animals, and even people.

Descriptions of the number of the Hydra's heads varied.

- On a reddish jug of 480–470 BC and on other representations as well, Hydra is shown with 12 heads.
- According to the ancient authors Alkaios and Apollodoros, Hydra had 9 heads.
- On clasps of the geometric period, Hydra is depicted with 5 or 6 heads.
- According to another author, Symonides, Hydra had 50 heads.
- According to Euripides, Hydra had 100 heads.

However many heads were presented, all agreed that Hydra's central head was immortal. In addition, the myth informs us that Hercules faced Hydra with a sword, a cudgel, or stones, and that when one head of Hydra was cut, two new heads sprouted.

The spring Lerna is a typical karstic spring, hydraulically connected to some sinkholes located at the bottom of a mountainous karstic basin. The connection between the myth and the geoenvironmental conditions is not obvious, but when we know the hydrogeological condition of the area, the geomythological interpretation is relatively easy.

Some of the hydrogeological characteristics of Lerna include

- The discharge of the spring's system occurred at several points.
- The altitude is at 0.50–1m, above the present sea level.
- In 1965, the mean annual yield of the main Lerna spring was about 60 by 106 m^3/year.

- While the annual discharge is relatively lower compared to some other karstic springs located close to it, the central spring has never been known to be dry.

The number of points where the karstic aquifer is being discharged differs during the year, as we might expect, depending on the season, the mean annual height of the atmospheric precipitation at the regional area, and the duration of the climatic period, that is, if the wet period is a 100-, 500-, or even 2,000-year cycle. In this way, we may interpret the differences in the numbers of the Hydra's heads, because each head can represent a point of discharge of the karstic aquifer and this number differs according to the climatic conditions existing during a longer or a shorter period.

The myth recounts Hercules's attempts to exterminate the Lernean Hydra by cutting off the beast's heads, one by one. This may symbolically represent a spring's discharge at a karstic point that may become possible by placing a rock at the point where the water discharges to prevent its exit or to force it to follow another route.

Geologists know well that the karstified rock body, through which the underground water circulates on its way to the spring, represents a complex system of underground intercommunicating erosion pipes or ducts. In addition, the tectonic discontinuities, even if the karstification is not very intense, are also permeable. Consequently, if we place a rock in front of the mouth of a karstic spring, the water will come out from two other or more side points. This corresponds with the Hydra's heads: each that Hercules cut off became two new heads.

Hercules should have used the sword to cut the thick vegetation that usually exists in the swamp in front of a spring. It is easy to imagine that the vegetation of this hydrobiotope of prehistoric Lerna would have been quite rich and, without fail, richer than that of the present period, especially during the period of the climatic optimum, when the sea level was a little higher than today. Hercules probably used the cudgel to smash the limestones at the spring mouth, and Iolaus, Hercules's nephew and assistant, used the sickle to cut the vegetation and facilitate Hercules's way to the spring, that is, the heads or the central head, as well as to facilitate the flow of water to the sea to dry up the swamp or lake.

— Ilias D. Mariolakos

See also **Geology; Myths and Mythology**

Further Readings

Leeming, D. A., & Leeming, M. A. (1995). *A dictionary of creation myths.* New York: Oxford University Press.

Mariolakos, I., & Mariolakos, D. (2004, 15–17 April). *The argon field in Arcadia, the sinkhole of Nestani Village, the God Poseidon and the Submarine Dini Springs in Argolic Gulf (Peloponnesus, Greece): A geomythological approach of the Poseidon Birth.* 10th Geol. Soc. Greece Congress, Thessaloniki, Greece.

Mariolakos, I., & Theocharis, D. (2003). Asopos River and the creation of Aegina and Salamis Islands (Saronic Gulf, Greece): A geomythologycal approach. In E. Fouache (Ed.), *The Mediterranean world environment and history* (pp. 305–311). Paris: Elsevier.

Neev, D., & Emery, K. O. (1995). *The destruction of Sodom, Gomorrah, and Jericho: Geological, climatological, and archaeological background.* New York: Oxford University Press.

Ryan, W., & Pittman, W. (1999). *Noah's flood. The new scientific discoveries about the event that changed history.* New York: Simon & Schuster.

Gerontology

Coined in 1906 by Russian biologist Eli Metchnikoff, the word *gerontology* is historically derived from the Greek word *geront,* meaning "old man," and *logia,* meaning "the study of." By definition, gerontology is the scientific study of the biological, psychological, historical, sociological, and economic aspects of human aging. Research is aimed at discovering the processes inherent in aging, as well as the most effective ways in which to apply the knowledge for the benefit of society.

Contributions to the study of the aging process are made from many of the basic science fields. For example, biochemical, genetic, and immunological research provide valuable information on the biological aspects of aging. Cardiological and neurological studies provide gerontologists with insights into the causes, epidemiology, and consequences of disease processes affecting the elderly. Social science and behavioral research are useful in providing gerontologists with a holistic view of the process of aging. Because of this, gerontology can be considered a true multidisciplinary and interdisciplinary field

Source: © iStockphoto/Mateusz Zagorski.

as it relies on the contributions of several scientific disciplines.

Disciplines of Gerontology

Historically, concern and interest in the aged of society has existed for thousands of years. However, gerontology as a unique and empirically based field of science is a relatively new concept. Methodological scientific inquiry began as early as the late 16th and early 17th centuries, when Sir Francis Bacon studied the relationship between poor hygiene and rapid aging. Later, Ben Franklin contributed to the legitimacy of the study of aging in his research on the uses of lightning and energy to rejuvenate and to retard death.

By the early to mid-20th century, several basic themes had emerged in the study of aging. One was that the problems associated with aging are complex and can be better understood within an interdisciplinary framework. Second, scientists had begun to recognize that there were social consequences of an aging population, and due to this, there was a need for basic information on both normal and abnormal aging processes. Third, there appeared to be an interaction between one's biological predisposition and the environment that affects age.

Biological Gerontology

This aspect of gerontology focuses on physical longevity and causes of death. Research is directed at understanding both normal and abnormal physical changes that can be directly associated with an aging biological system. Factors include age-related hormonal changes, cell mutation, wear on tissue, degenerative influences of physical illness and disease, and related functional incapacitation.

Of important interest to the gerontologist is the ability to understand and differentiate between normal aging and pathological disease processes. Age-related changes of the biological system do occur naturally in the normal population in the absence of illness or trauma. However, it would seem that as we age, we become more vulnerable to disease for a variety of reasons, such as central nervous system (CNS) cell loss, inefficient myocardial functioning, and reduced immunologic response.

Multidisciplinary gerontological research is frequently centered on preventative interventions aimed at extending and improving the quality and span of life. Not surprisingly, findings suggest that exercise and nutrition improve cardiovascular health, increase bone and muscle structure, and reduce weight. Complex genetic manipulation studies have also shown effectiveness toward maintaining and restoring aging biological systems of the human body.

Psychological Gerontology

Psychological concepts such as depression, anxiety, low self-esteem, thrill-seeking behaviors, antisocial personality, and introversion are all variables that can affect the aging process by putting people at high risk for injury or disease. This subspecialty of gerontology looks at the role of interpersonal relationships (social support) and intrapersonal factors (age, gender, cognition, coping mechanisms, and genetics) and their impact on life and aging.

There appear to be several age-related changes that affect cognitive status, in particular, memory functions, the ability to learn new things, intellectual flexibility, and thought-processing speed, all of which can

directly affect one's level of functioning in society. In addition, the elderly deal with a plethora of psychological factors associated with age that younger adults don't typically face (grief, loss of employment status, infirmity) that can complicate or reduce one's ability to deal with stress and change.

Sociological Gerontology

This approach examines how the unique norms and values a society holds can impact individual perception and reaction to growing old. Gerontologists hold that aging itself is a socially defined and constructed process. The ways in which a society conceives of the capabilities and expected roles of its older members vary by location, historical time period, religion, and culture. For example, the role a 75-year-old woman plays in an extended family might be much more involved in an Asian society compared with an industrialized Western society.

In addition, there appear to be political and economic factors that can influence the process and quality of human aging and life expectancy. These factors include national industrialization, sanitation, diet, hygiene, poverty, harmful substance exposure, medical accessibility, and infant mortality rate.

Gerontology vs. Geriatrics

Gerontology is often confused with its sister science, *geriatrics,* as both are concerned with the biological aspects of aging. However, geriatrics is more restricted in scope, concerning itself primarily with clinical diagnosis and medical management of disease and illness within the elderly population. Geriatrics is the study of the medical aspects of old age and suggests an active role as practitioner, or caregiver. In contrast, gerontology strongly implies a scientific mission, focused on the understanding of the etiology, frequency distributions, and consequences of disease and illness.

Technological and medical advances in the late 20th and early 21st centuries have contributed to the increase in size of the aged population. As the scientific community continues to search for more effective treatment methods and cures for disease and illness, it is likely that this population will continue to grow. As such, it can be assumed that interest in the field of gerontology will rise at a similar rate in an effort to meet the social, economical, and psychological needs of the elderly. Future research in gerontology will likely be applied to the development of new and improved treatment and social policies intended to improve the quality of life and extend the years of healthy functioning among the rapidly increasing aged population.

— Zoe Proctor-Weber

See also **Dementia**

Further Readings

Birren, J. E. (Ed.). (1996). *Encyclopedia of gerontology: Age, aging and the aged.* San Diego: Academic Press.

Ferraro, K. F. (Ed.). (1990). *Gerontology: Perspectives and issues.* New York: Springer.

Maddox, G. L. et al. (Eds.). (2001). *The encyclopedia of aging* (3rd ed., Vol. 1, A–L). New York: Springer.

Roberts, P., & Irons-Georges, T. (Eds.). (2000). *Aging: Vol. I. Abandonment–injuries among the elderly.* Pasadena, CA: Salem Press.

GESELLSCHAFT

Gesellschaft, which I will here translate as "society," is one of the most ambiguous sociological notions. One talks about caste societies, class societies, open and closed societies, agrarian, socialist, capitalist, industrial, civil, and pluralist societies, static and dynamic societies, and many other types of societies. All types of societies are particularly being dealt with within *sociology,* a term coined by A. Comte, which can be translated as "study of societies." Society in the German context is mostly contrasted with the term "community" *(Gemeinschaft).*

Historical Background

In Ancient Greece, the terms associated most directly to society are *κοινωνία* (community/society), *ρόλιζ* (city/state), *oÏkoz* (family/household), and *φιλία* (friendship). All four terms are of central significance in the ethical theories of Plato and Aristotle. According to Aristotle, the terms κοινωνία, πολιτική, and ρόλιζ are synonymous. There are societies based on nature (husband/wife, parents/children, master/slave) and

others based on agreement (some laws of a city-state). According to Aristotle, human beings are political animals, which implies that human beings can only be *eudaimonious* (live a good life) within a city-state, a civil society. It can be discussed whether a ρόλιζ is a type of society or community. The political leaders have to be free male citizens who rule above other free male citizens who are their equals; unfree slaves; children who are not yet free human beings; and free women who are slightly subordinate to free male citizens. It is clear, however, that for Aristotle, human beings were divided up into the free and the unfree, without there being the concept of equality of all human beings, which is closely linked to the concepts of human rights and human dignity.

In Roman antiquity, the notion *κοινωνία πολιτική* was translated as *communitas, conciliato, societas civilis, societas humana,* and *societas* by Cicero. Cicero was the first to hold that all human beings are equal because of their dignity as human beings, and he did refer to all human beings as belonging to the *societas humana,* or to the *societas,* and when referring to all human beings, he normally employed the term *societas.* It needs to be stressed that it can be problematic to employ the term *society* in order to refer to humanity as a whole, because in that case, a sociological notion and a term for a species is being mixed up, as L. Gumplowicz has already pointed out. When referring to human organizations that have more in common (family, friendship, city-state), Cicero, on the other hand, tended to use *communitas* more often. It would be misleading, however, to hold that Cicero already had a clear-cut distinction between societies and communities. It can only be said that he employed the term *societas* to refer to all type of human organizations, the largest being the group consisting of all human beings and the smallest being related to family and friends.

From the 13th century onward, the Aristotelian κοινωνία πολιτική was translated as *communitas, communication civilis,* or *politica.* In the same century, Thomas Aquinas introduced the distinction between a public and a private society, which can be related to Aristotle's ρόλιζ/*oĬkoz* distinction. During the Enlightenment, Hobbes identified the civil society with the Greek ρόλιζ. A similar position was presented by Locke in the *Second Treatise of Government,* in which he wrote a chapter titled "Of Political or Civil Society." In the same century, English moral philosophers (A. A. C. Shaftesbury, A. Smith) employed the term *society* to refer to civil societies. Around 1800, German writers (Herder, Goethe, Schiller) used the term to refer to civilized humanity in general. Kant identified the state *(civitas)* with the *societas civilis,* and Hegel, in his philosophy of law, understood the state (synthesis) as the combination of family (thesis) and civil society (antithesis). A basic thought in Marxist theory is also concerned with societies. It is claimed that the history of all past societies is the history of class struggles.

Ferdinand Tönnies

Tönnies's work *Gemeinschaft und Gesellschaft* (Community and Society) contains the most influential discussion of these terms for German sociological theory. Here, his description of a society is summarized as follows:

In a society, individuals with arbitrary goals are brought together, which is the reason why societies have to be governed by obligatory rights. Societies demand people who live in big cities, stick to conventions and public opinion, and live a cosmopolitan life.

Given this background, it becomes clear what Tönnies means when he claims that a society is something public, is linked to the world, to trade, to the sciences. A joint stock company is a type of society but never a community. A society is always something transitory and artificial, as it is rather like a machine that is there for some purpose, as opposed to a living organism. Human beings within a society also live together peacefully but without being much connected to one another, separated from another like disintegrated atoms. No deeds come about due to an existent solidarity, unity, a feeling for the others, but rather each one does what is good for himself and lives in a permanent tension with the others. No one does anything for anyone else without expecting anything of at least equal value in return. The laws of exchange are important, and the subjective exchange values become the absolute criteria for value. These individuals can be serving a society by serving themselves, and they are dependent on a society. Money in such a system is a way of regulating the exchange and becomes particularly important. Each good is equivalent to an amount of money, and the better a good is, the more money one gets for it. The system is based on scientific reasoning. When two people exchange goods, it is done on the basis of a contract, which is a place where two singular wills or individuals can

meet. Contracts are often made without explicitly formulating them. All things including one's work turn into a good. This is the reason why civilized society is an exchange society. However, it is natural to create order to enhance the preservation and promotion of pleasure in a community, but the trade undertaken in a society is the opposite of such behavior. One does it to enhance and support only one's own interests. Tradesmen and capitalists (the owners of money) are the lords and leaders of a society. People without money do not have any rights; they are like slaves. The tradesperson is educated, without a home, is knowledgeable of foreign morals and arts, without love and piety for a particular culture, speaks many languages, is well spoken, is adaptable, changes and adapts his character according to his surroundings, and employs everything to his own advantage. Tradespeople buy things not because they are in need of them, but in order to sell them for more money. The difference is the gain. Three deeds describe the structure of a society, namely, to buy work, to employ work, and to sell work as products and pay much less for the work and the raw material than you receive for the final product. The meaning of making money is to exchange the money into semiluxury. Money is power, but it has to be given away in order to receive something for it.

Current Western states are closer to societies than they are to communities. Capitalism is dominant in them, the importance of traditional families diminishes, people think globally, they travel, live in foreign countries, and thereby lose and abandon their traditional organic roots. All these are reasons that make it necessary to classify our Western states as societies. Whether this is praiseworthy or not is a matter of dispute. A contemporary discussion in the English-speaking world in which Tönnies's distinction could have been employed was the liberalism/communitarianism debate. Liberalism can be linked with Tönnies's understanding of a society, and communitarianism with his understanding of community.

Tönnies's distinction is also closely associated with the culture/civilization distinction in the German-speaking context, whereby the society/community distinction includes only types of human organization, whereas the culture/civilization distinction not only refers to types of human organization but also includes the ideas and works created by the respective human beings. All cultures include a community, and all civilizations a society. In the Middle Ages, in Europe, Christian culture was dominant, and human beings were all part of a community with close, organic ties. At the end of the 20th century, European states represented models of pluralist civilizations in which the importance of the individual is extremely strong and human beings are part of a society.

Karl Popper

Karl Popper introduced another currently significant distinction, namely, that between an open and a closed society. Both represent types of social order. In contrast to a closed society, an open society sets free the critical ability of human beings. The different notions can be distinguished on a sociological, historical, and ethical level. Concerning the sociological aspect, the notion can be employed to describe contemporary social organizations. In that respect, they can be compared to Tönnies's community and society. Concerning the historical aspect, Popper regards the two types of society as separate developmental stages in cultural history, whereby the closed society came first, and it was replaced by the open society only during the last couple of centuries. According to Popper, this transition was one of the most important revolutions in the history of mankind. Closed societies were held together by eternal laws, morals, and taboos. The herd or the tribe formed a semiorganic unity, with the members being connected in a semibiological way. All decisions had to be approved by the tribe, and thinking was collective. Open societies, on the other hand, are constituted of individuals who have to make personal decisions and have to employ their own critical abilities in order to grasp situations and give structure to their lives. The third aspect on which Popper's distinction can be analyzed is the ethical. He polemicizes against Plato and Hegel by accusing them of totalitarianism, upholding an ideal of rationality, which according to him can be the only basis for a humanitarian attitude.

Final Thoughts

It seems as if Popper's distinction between open and closed societies bears many similarities to Tönnies's between community and society. Given the vast variety of contemporary positions concerning social organizations, it might be useful to employ Tönnies's basic distinction and then distinguish between an

open and a closed version. In that case, we would have an open and a closed community, and an open and a closed society. An open society would be one in which a worldview like R. Nozick's libertarianism is predominant. A closed society is still based on liberalism and pluralism but has a greater amount of formal aspects in common, as in G. Vattimo's philosophy, which stresses the aesthetic elements of Catholicism. In a closed community, one specific worldview would be dominant, as is demanded by A. MacIntyre, who upholds that a return to a pre-Enlightenment type of Christianity would be desirable. An open community, on the other hand, does not try to determine the behavior of human beings in all aspects, but intends to promote some important basic virtues within a liberal environment, as is the case in H. Küng's Weltethos theory. The distinction between open and closed societies and communities was introduced by S. L. Sorgner.

— *Stefan Lorenz Sorgner*

See also **Aristotle; Communities; Gemeinschaft; Popper, Karl; Societies, Complex**

Further Readings

Aristotle. (1996). *The politics* (T. J. Saunders, Trans.). Oxford: Oxford University Press.

Jarvie, I., & Pralong, S. (Eds.). (2003). *Popper's open society after fifty years: The continuing relevance of Karl Popper*. London and New York: Routledge.

Popper, K. R. (1962). *The open society and its enemies* (Vol. 1). London: Routledge & Kegan Paul.

Tönnies, F. (2001). *Community and civil society.* Cambridge: Cambridge University Press.

Ghost Dance

The Ghost Dance originated among the Great Basin Paiute as a religious movement arising out of the extreme social, political, economic, demographic, cultural, and personal stress brought about by the rapid incursion of Europeans and, later, Americans into North America. Anthropologists refer to such movements as revitalization, nativistic, new religious, and/or transformative social movements. As such, they renew past cultural beliefs and practices with revitalizations of selected aspects of these beliefs, while actively adapting them to various non-Native (usually Christian) beliefs and practices. These movements are also not simply religious but also political and social in their scope.

The 1870 Ghost Dance movement was led by the Paiute prophet Wodziwob, who predicted that the performance of a prescribed dance would bring about the disappearance of all Whites, the return of all deceased Natives, and a restoration of a halcyon precontact life. This religious movement primarily spread west to California and Oregon. The Ghost Dance of 1890 was a more widespread spiritual movement that originated under the inspired leadership of the Numu (Northern Paiute) Indian Wovoka (Jack Wilson). The dance was taken up by a large number of Native American groups from the West Coast to the Great Plains. (Other Native American religious leaders who lead movements of this type include Handsome Lake, Neolin, Smohalla, and John Slocum.) While the movement begun by Wovoka is best known in English as the Ghost Dance, the Northern Paiute referred to it as the *nanigukwa* (Circle Dance). Forms of both Ghost Dances continued in California and the western United States and Canada until the 1960s in some regions. There was a brief revival of the dance among groups of Lakota in the 1970s.

The leader of the more influential 1890 movement, Wovoka ("woodcutter" in English) was born between 1856 and 1863. Reputed to have spiritual powers, his father, Numu-tibo'o (Buckskin), born around 1835, and himself took part in the 1870 Ghost Dance movement. Wovoka's mother Tiya was known as a very hard worker whose work ethic became central to Wovoka's religious message. At 14, Wovoka went to the staunch Presbyterian home of the Wilson family, from whom he derived his own English name and elements of his religious teachings. Wovoka married an Indian named Tumma, whose English name was Mary. They had six sons, all of whom died young, and four daughters, one of whom was not fathered by Wovoka. Mary Wilson died in 1932, the same year as Wovoka.

Wovoka previously experienced some minor visions, and it was on New Year's Day of 1889 that he received his Great Vision, reportedly brought on by a severe fever or the shock of a great sound. Wovoka went into a deep trance, "died" along with the sun during an eclipse that day, and returned to life, as did

the sun. While dead, he went to heaven, where he conversed with God and saw many dead people who lived rejuvenated and happy lives. During this trance, he was taught the round dance and instructed to conduct it for 3 to 5 consecutive days at a time. He received five songs that gave him power over the weather. Wovoka also claimed he was invulnerable to bullets and reportedly made ice appear on a hot July 4th. Wovoka validated his spiritual power through trances, his control of the weather, and other extraordinary feats. He stressed that his religion was meant for all people and that it was a religion of peace and harmonious coexistence.

Wovoka instructed his own people in this faith and received representatives of over 30 different tribal groups, including the Pawnee, Shoshone, Bannock, Arapaho, and Gros Ventres. He also communicated with these groups by letter. While different groups adapted his teaching according to their own cultural patterns, the prophet instructed all visitors in the round dance, told them to work hard, not to steal or lie, and to be at peace with all.

Despite Wovoka's message of peace, the Ghost Dance is best known in history as being one of the precipitating factors in the Wounded Knee Massacre. The reconstituted 7th Cavalry was called out during the Ghost Dance on Pine Ridge Reservation and rounded up Big Foot's band, which was traveling from the Cheyenne River Reservation to Pine Ridge on December 29, 1890. Shooting broke out at Wounded Knee Creek while the Lakota were being disarmed, and a general massacre ensued. Between 270 and 300 women, children, and men were killed.

In response to the massacre, Wovoka told people not to dance any more, lest there be more violence. He remained committed to his vision and continued to act as a religious leader and healer, distributing the paints, bird feathers, and Stetson hats that were central to his spiritual practice.

Modern descriptions of the Ghost Dance movements of 1870 and 1890 rely on critical reading of contemporary newspaper accounts of the dance, as well as on missionary correspondence and journals, transcribed Native accounts, documents by Indian agents on the various reservations, and military reports. (With the exception of James Mooney, no anthropologist directly observed these ceremonies or interviewed Wovoka or other participants.) Beyond describing the dance and relating a sequence of historical events, anthropologists attempt to understand the dance from the Native and non-Native perspectives, and they employ ethnohistoric and symbolic analysis in discussions of the causes of the dance movement. Finally, anthropologists restudy the descriptions and theories generated by their own predecessors to correct the historical record and better understand the social processes and symbolic meanings involved in the Ghost Dance.

In considering any interpretation of the dances, keep in mind that culture is engaged in by individuals, not just groups. Not all Indians would have participated in a local Ghost Dance. Groups and the individuals within them varied in their understanding of the dance. Some groups, such as the Navajo, did not engage in the dance at all because the dead were considered malevolent and not to be summoned back for contact with the living. Wovoka himself felt that some people misinterpreted his teachings.

James Mooney of the Bureau of American Ethnology wrote one of the earliest and most comprehensive accounts of the Ghost Dance. He personally visited Wovoka in 1892, participated in one of the dances, and interviewed many people who had taken part

Source: © Kathleen Cohen.

in this movement. Michael Hittman is the main biographer of Wovoka and chronicler of the Ghost Dance religion. Shelley Osterreich created a helpful annotated bibliography on the Ghost Dance. Alice Kehoe provides broad historical and cultural contexts for this religious phenomenon, and Raymond DeMallie provides an example of an analysis of the Ghost Dance in the specific context of Lakota culture.

— *Raymond A. Bucko*

Further Readings

DeMallie, R. J. Jr. (1982). The Lakota Ghost Dance: An ethno-historical account. *Pacific Historical Review, 51,* 385–405.

Hittman, M. (1997). *Wovoka and the ghost dance.* Lincoln: University of Nebraska Press.

Kehoe, A. B. (1989). *The Ghost Dance: Ethnohistory and revitalization.* Fort Worth, TX: Holt, Rinehart & Winston.

Mooney, J. (1991). *The Ghost-Dance religion and the Sioux outbreak of 1890.* Lincoln: University of Nebraska Press.

Osterreich, S. A. (1991). *The American Indian Ghost Dance, 1870 and 1890: An annotated bibliography.* Westport, CT: Greenwood Press.

Gibbons

Gibbons are members of the order Primates, family Hylobatidae, and genus *Hylobates.* They are most notably known for their unique vocalizations and long arm spans, which can reach twice the length of their bodies. Slender and agile, gibbons usually locomote using their long arms in a movement known as *brachiation.* Their hands, equipped with long, curved, and slender digits, are used as hooks as they swing from tree branch to tree branch. Some of the smaller species appear to throw themselves from tree to tree, crossing gaps of 10 meters or more. While feeding, however, gibbons often use quadrumanous climbing.

Gibbons are considered to be a "lesser ape." Like all apes, they are characterized by an absence of tails, broad chests, and an upright body posture. However, unlike the great apes (chimpanzees, bonobos, gorillas, and orangutans), they have smaller cranial capacities and body sizes. In addition, they are more numerically successful and specifically diverse than the great apes.

Currently, there are 11 species of gibbons, all found in Southeast Asia. The 11 species are generally divided into four subgenera, which are grouped together based on chromosomal numbers and coloration.

The first of the four subgenera has the same name as the genus, *Hylobates,* and is also known as the "lar group." Lar gibbons have 44 chromosomes and variable pelage colors. Species in this group include the white-handed gibbons *(Hylobates lar),* silvery Javan gibbons *(H. moloch),* agile or dark-handed gibbons *(H. agilis),* Mueller's Bornean gray gibbons *(H. muelleri),* pileated or capped gibbons (*H. pileatus),* and Kloss's gibbons *(H. klossii).*

The second group comprises the hoolock or white-browed gibbon *(H. hoolock),* subgenus *Bunopithecus.* White-browed gibbons have 38 chromosomes and are sexually dichromatic. Females are more tan colored than males, which are black. Also, females have whitish hairs encircling their faces, while males have only white eyebrows.

The concolor group, subgenus *Nomascus,* has 52 chromosomes and is sexually dichromatic. Males of the black gibbon *(H. concolor),* golden-cheeked gibbon *(H. gabriellae),* and Chinese white-cheeked gibbon *(H. leucogenys)* tend to be black, while females are buff.

The fourth group is the siamangs, the largest of the gibbons, belonging to the subgenus, *Symphalangus.* Like the *Nomascus* group, siamangs have 52 chromosomes but are not sexually dichromatic. Unlike the gibbons, however, siamangs have webbing between their second and third toes. Also, males are slightly larger than females.

Gibbons mainly live in primary moist forest and spend virtually all of their time in the canopy. The bulk of their diet consists of ripe fruits but may also include leaves, flowers, and small invertebrates. Gibbons live in single, monogamous family units. Monogamy in gibbons is thought to have resulted from the need to spend large amounts of time rearing offspring. With no male to help defend a territory, females may not be able to obtain enough resources to conceive and/or rear the slow developing young. Offspring can stay with their parents for up to 10 years. At this point, they leave the family group and "bud off" (i.e., usurp a part of the parents' home range) and look for a mate of their own.

Gibbon vocalizations are well-known. Most pairs sing duets in the mornings and evenings, with their

Source: © Lynn Kilgore.

calls carrying for over 1 kilometer. The vocalizations are used for territorial defense, maintenance of the pair bond, and general communication. Gibbon species can be distinguished by their calls.

Due to their propensity to spend their lives in the forest canopy, gibbons are extremely sensitive to habitat loss due to logging and agriculture. In fact, of the 11 species, three are considered to be vulnerable, two endangered, and two critically endangered.

— Lisa M. Paciulli and Jamie L. Neary

See also **Apes, Greater; Apes, Lesser; Hylobates; Primate Taxonomy; Siamangs**

Further Readings

Chivers, D. J. (1974). *The Siamang in Malaya: A field study of a primate in tropical rain forest.* Basel, Switzerland: S. Karger.

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego, CA: Academic Press.

Preuschoft, H. (1985). *The lesser apes: Evolutionary and behavioral biology.* Edinburgh: Edinburgh University Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Rumbaugh, D. M. (1972). *Evolution, ecology, behavior, and captive maintenance (gibbon and siamang).* Basel, Switzerland: S. Karger.

Rumbaugh, D. M. (1974). *Gibbon and siamang: Natural history, social behavior, reproduction vocalizations, prehension (Progress in Biochemical Pharmacology).* Basel, Switzerland: S. Karger.

Teleki, G. (1979). *Aerial apes: Gibbons of Asia.* New York: Coward, McCann & Geoghegan.

Whitten, T. (1982). *The gibbons of Siberut.* London: J. M. Dent.

GIGANTOPITHECUS

Gigantopithecus is the name given to an extinct ape discovered by G. H. R. von Koenigswald, in 1935. The two species, *Gigantopithecus blacki* (named after Koenigswald's late friend and colleague Davidson Black) and *G. giganteus* (formerly *bilaspurensis*), are known primarily by teeth and jaws. The first tooth (as

Source: © Russell L. Ciochon.

well as many of the more than 1,000 found after the original discovery) was discovered in a Hong Kong apothecary, where traditional Chinese pharmacists use fossils, referred to as "dragon bones," in medicinal recipes.

As the name implies, these fossil apes were enormous. Based on the teeth and jaws, *Gigantopithecus* is estimated to have been 9 to 10 feet tall (3 m) and 600 to 1,200 lbs (270–550 kg). They were the largest primates known, more than twice the size of a mountain gorilla.

The great size of *Gigantopithecus* would have required it to spend most, if not all, of its time on the ground. Most scientists believe that *Gigantopithecus* was quadrupedal, walking on four legs. They may have walked on their knuckles, like a modern gorilla, or on their fists, like a modern orangutan. There are also some scientists who believe *Gigantopithecus* was bipedal, walking more like humans. Unfortunately, postcranial elements (such as pelvis or leg bones) have not been found. This makes accurately reconstructing its posture and locomotion difficult.

Because of its massive teeth and jaws, scientists originally believed that the diet of *Gigantopithecus* consisted of hard objects such as nuts and seeds. Later, analyses of residue left on the teeth led scientists to conclude that their diet probably consisted primarily of fibrous leaves. The fact that many of the *Gigantopithecus* fossils are found together with remains of ancient pandas suggests that they inhabited and exploited bamboo forests. Their predominantly leaf diet was most likely supplemented by fruit, based on the high rate (10%) of dental cavities found in *G. blacki.*

Fossils of *G. giganteus* are known from deposits in the Siwalik Hills of India. They have been dated to the Miocene approximately 6 to 7 million years ago. Fossils of *G. blacki* have been found in China and Vietnam and are much younger. Here, it appears that the species may have lived up to 500,000 years before becoming extinct.

It is possible that the species became extinct when climatic changes caused large die-offs of the bamboo forests they inhabited. It is also possible that competition with giant pandas or early hominins, such as *Homo erectus,* may have caused their extinction.

Since their discovery, *Gigantopithecus* has been interpreted variously as a human ancestor, as an overspecialized side branch of human evolution, or as an unusual fossil ape that had nothing to do with human evolution. Most scientists now recognize *Gigantopithecus* as an extinct ape that was more closely related to orangutans than to African apes or humans.

Some people have suggested that Bigfoot and/or Yeti (abominable snowman) are modern-day descendants of *Gigantopithecus.* However, there is no indisputable physical evidence to support this hypothesis. Scientists generally feel that if these modern-day creatures existed in numbers large enough to be a breeding population, they would leave physical remains and would have an observable effect on the environment.

— *Shara E. Bailey*

See also **Apes, Greater; Apes, Lesser; Primate Taxonomy**

Further Readings

Ciochon, R. L., Olsen J., & James, J. (1990). *Other origins: The search for the giant ape in human prehistory.* New York: Bantam Books.

Ciochon, R. L., Piperno, D. R., & Thompson, R. G. (1990). Opal phytoliths found on the teeth of the extinct ape *Gigantopithecus blacki:* Implications for paleodietary studies. *Proceedings of the National Academy of Sciences, 87,* 8120–8124.

Pettifor, E. (2000). From the teeth of the dragon: *Gigantopithecus blacki.* In M. Scully (Ed.), *Selected readings in physical anthropology* (pp. 143–149). Dubuque, IA: Kendall/Hunt.

Globalization

The Contested Territory of Globalization

The term *globalization* has entered modern parlance with increasing frequency, but in such varied contexts with such varied meanings as to render the term less than useful. All agree that it describes a perspective beyond the personal, local, and national, an awareness that human actions and institutions can have worldwide repercussions and implications. But which ones does globalization describe? Have borders been eclipsed and cultures merged in a peaceful rendering of the "global village"? Have peoples of the world been homogenized by drinking Pepsi and eating McDonald's hamburgers while their children play with Pokemon Balls? Have transnational corporations succeeded in moving production at will to exploit the cheapest labor on the planet to manufacture their goods for ever-expanding world markets? Have nation states begun to hand over their dominion to overarching world governance? Is Western culture threatening to destroy indigenous or less dominant cultures through its control over media and commerce? Is there an accelerating sense of interconnectedness among people based on knowledge of the earth as a single ecosystem?

The answer to all of the above is a qualified yes and no, which only adds to the confusion surrounding the term *globalization.* Most commonly people use it to describe economic globalization. Since at least the Middle Ages, the system of market capitalism, or the pursuit of expanding markets and cheap labor beyond borders, has been the standard modus operandi for companies and enterprising individuals. However, the accelerating pace of modern life, with electronic movements of capital, instantaneous worldwide communications, and overnight delivery of goods and services has made the global economy more transparently global and market capitalism more blatantly exploitative.

It is interesting to note that only recently has the noun *globalization* been added in Webster's dictionary. Although our world is becoming globalized, the process is by no means as complete as the noun form "globalization" would indicate. Nation states and borders do still exist, different cultures maintain separate languages and distinct identities, and the world of most individuals is still ordered by their allegiances to specific regional and cultural values. Nevertheless, there is a greater awareness among people in most parts of the world that our political, economic, and social spheres are expanding and intertwining more than ever before. Perhaps it is the unprecedented scope and speed of the changes taking place that promotes the use of an all-encompassing term like globalization.

A working view of globalization comes from Professor Rudd Lubbers of Tilburg University, in the Netherlands. It is short and descriptive, yet sufficiently open-ended to include multiple perspectives, including the educational perspective: "such acceleration of becoming or making worldwide that it gives rise to a great many new phenomena." Lubbers's definition emphasizes the speed at which changes affecting the entire planet are taking place and the great number of new phenomena that result, influencing economics, politics, and society.

Our ability to conceptualize and manipulate global systems of information, commerce, and governance makes some new demands on human ingenuity, for the scope of the globalization project necessitates new ways of responding to common issues like security, resource management, and human rights. The call for more global-oriented school curricula that respond to these societal changes has been advocated in the scholarly and practical work of Alger, Cummings, Kolker, Lynch, Pike, Rasmussen, Reardon, Tye, and others; but colleges and universities and other important institutions in civil society have been slow to respond.

What Is Global Education?

Global studies (education) is an interdisciplinary approach to learning concepts and skills necessary to function in a world that is increasingly interconnected and multicultural. The curriculum is grounded in traditional academic disciplines but taught in the context of project and problem-based inquiries. The learner examines issues from the vantage point of the individual, the local community, and the nation and the world community. As social

conditioning, an essential component of schooling, global studies takes an international stance that respects local allegiances and cultural diversity while adhering to the principles of the United Nations Declaration of Human Rights.

There is, however, no standard definition among proponents of global education. The Center for Human Interdependence (CHI), an educational training program that emphasizes global awareness, begun in 1984 in Orange County, California, constructed the following working definition:

> Global education involves learning about those problems and issues that cut across national boundaries, and about the interconnectedness of systems, ecological, cultural, economic, political and technological. Global education involves perspective taking seeing things through the eyes and minds of others, and it means the realization that while individuals and groups may view life differently, they also have common needs and wants.

John Dewey was possibly the most influential educator of the 20th century. Dewey was a progressivist, and progressivism was his movement. Progressive education included several components, one of which was the emphasis placed on the democratic educational approach, accepting the interests and needs of an increasingly diverse student body in an increasingly interdependent world. Therefore, with John Dewey as the intellectual powerhouse, we see in the 1920s the rebirth of comparative studies. In the 1940s, we see that global education was reclassified as intergroup education. In the 1950s, we observe more name changes to fit the times, those of area studies, race relations, and ethnic studies. In the 1960s, the changes continued, and we had peace and conflict studies, human rights education, international studies, intercultural studies, and open classrooms. In the 1970s, as the Vietnam War was ending, we witnessed the women's liberation and African American liberation blossom, both in positive and negative terms. In the field of education, this was reflected by introducing multicultural and environmental education. In the 1980s, reflecting the reality of world affairs, we see the introduction of global education and world studies. From the 1980s to the present, we see that the global education as well as multicultural education have remained constant in the historical context.

In the 21st century, global education needs to distinguish its agenda from the current buzzword concept "globalization," the forces of market capitalism, which tend to focus the discussion on global economic systems and information technologies. From a pedagogical standpoint, economic prosperity and technological progress are part of a broader emphasis on planetary interconnectedness, interdependency, and sustainability. Key concepts in global education include human rights, environmental responsibility, cultural studies, and sustainable economies. Global education views national politics and transnational economic policies with an eye toward international accountability. It stresses the role of global ethics in shaping humane, environmentally sound attitudes toward a world as a single ecosystem, and it teaches that a global conscious citizenry can effectively overcome such problems as climate changes, ocean pollution, and resource depletion with ingenuity, leadership, and cooperation.

The emphasis in global education on human rights awareness, environmental studies, cultural understanding, and sustainable economies addresses the multiple concerns in our "globalized" world. Global education views national politics with an eye toward international accountability, which must be governed by a shared international sense of global ethics. This ethic can be used to govern socioeconomic decision making based on a system of universal values found in the United Nations documents of human rights, agreements of the Council of Europe Committee of Ministers, the proposals of Amnesty International and other nongovernmental organizations (for the realization of human rights), and the Earth Chapter project.

For advocates of global education curricula in schools, it is particularly important to enter the current debates over globalization and to articulate where the aims of global education overlap with some of the arguments that have been discussed. Schooling will inevitably reflect the cultural biases on which it is established, but as a general rule, global education aims to:

- Find a cross–cultural foundation for knowledge and human values
- Refine understandings of globally applicable ethical attitudes
- Consider how international organizations might affect national political and economic decisions

- Foster a global civic culture with a capacity for altruism and empathy, one that encourages social action and community service

Much of current education planning is focused on preparing students for the increasingly interdependent world and the diverse societies they will graduate into. The need for educators to have a sound awareness of other nations and their social milieus, cultures, customs, political and economic processes, and education systems is now well understood by professional educators, parents, and policymakers. Accordingly, teacher education programs in colleges and universities around the world have responded by introducing courses of study and program components to help meet this need.

Such courses and program components fall under the generic heading of *global education* but may have different labels such as *global comparative education* or *comparative education*. Postsecondary education has indeed reacted to the globalization phenomenon in a way that seeks to use the technological, economic, social, and political developments of recent decades to develop a shared vision of global responsibility and economic sustainability.

The value and utility of global education in education is that there is a sense that current international events are such that all societies and their citizens must become very knowledgeable about the world beyond their national borders. Usually, this imperative is cast in economic terms. Business and political leaders constantly warn us that the world's economies and financial systems are incredibly interconnected and our material well-being is dependent upon professionals and workers who have a sophisticated knowledge of this new global economy.

As we are at the beginning of the 21st century, we simply cannot afford the luxury of parochialism. There is no place to hide; the world is such that our professional, political, economic, social, cultural, and moral decisions and actions are intimately tied into new global realties. We must be possess the knowledge and skills to act wisely and prudently. Unless people are able to grasp issues and events well beyond their homes and national borders, they will not be able to anticipate, understand, and intelligently respond to such events. The 21st century demands sophisticated citizens who are competent to deal with rapidly changing realities. In other words, as much as we may wish to, we cannot turn back the clock to the days when family and local community to a large degree defined our values. Rather, the more complex and cosmopolitan viewpoint of the urbanized world traveler must merge practical and parochial concerns of the subsistence farmer: Both can play beneficial roles as global citizens. The answer may lie in integrating community-based values into the large-scale social institutions that currently govern our lives and allow us to conceive of a unified planet.

Another major rationale for global education switches our focus from the global to the local. That is, as teachers both at the secondary and postsecondary levels, we would want to be the most competent professionals that we could possibly be. To accomplish this, educators, and educational professional associations cannot limit themselves only to the knowledge and experience that local practitioners and education systems possess and generate.

Global education is schooling in all its aspects. Pedagogical strategies, curricular content, evaluation, classroom management, organization, and administration are conducted in fundamentally different ways around the world. Research into how children learn, what constitutes "best practices" in pedagogy, and how schools serve social and class interests is being conducted in many societies and in many different national and cultural contexts.

All around the world, educators, departments of education, education research institutes, professors of education, and others are working conscientiously to produce pedagogy, curricula, and diagnostic tools to better serve students, parents, society, and the teaching profession.

Courses in global education tend to fall into two general categories: survey courses and courses dealing with specific issues. Survey courses have three basic objectives. First, they seek to introduce students to the field of global/comparative studies in education. Students begin to learn about the nature of this interdisciplinary field, to appreciate its value, significance, and relevance, and to understand how global/comparative studies are pursued. Second, examinations of selected countries are undertaken as case studies. These case studies provide the database and substantive content for the third learning objective: comparing national systems of schooling; discerning common themes and trends; appreciating differences; understanding problems and controversies; and drawing conclusions, insights, and lessons.

A second category of courses focuses on specific issues in contemporary schooling, examined in an international context. In such courses, pressing issues in education are illuminated through an examination of how they are manifested in and grappled with in different societies and different national contexts. The scope of issues addressed by the current literature is quite remarkable; for example, equality of educational opportunity; educational achievement; evaluation and examinations; the treatment of minority groups; women in education; formal, nonformal, and informal education; delivery modes; teacher training, certification and supply; citizenship education; politics, ideology, and schooling; language and literacy; schooling and the economy; education, modernization, and development; education reform; accountability; effective schooling; school administration and governance.

The Development of Global Perspective in U.S. Education

Global perspectives in education is not a new idea. While efforts in this direction can be traced in earlier history, World War II was something of a watershed in its development. After the war, a widespread movement began around the world to foster education for "world understanding," with the purpose of preventing a third world war. Children's books in war-torn Europe, Japan, and the USSR featured peace and antiwar themes and empathetic stories about children of other lands.

In the United States, the Cold War chilled and slowed the movement for a time, especially in the 1950s, when McCarthyites saw "communism" behind every effort to increase international cooperation. But even in this climate, some educational leaders foresaw that the United States could not remain isolated forever from the rest of the world and that "international education" was in the national self-interest. The Soviet launching of Sputnik in 1957 was a spur not only to improved science education but also to increased pressure in the United States for international education. A year later, Congress passed the 1958 National Defense Education Act (NDEA). Under Title VI, it mandated the teaching of foreign studies, languages, and cultural understanding. However, practice did not match preachment; allocations were minimal. Years of effort followed as groups of educators and others in the United States pressed for congressional support for substantive international and global education programs. Then, for a time under the Carter administration and the leadership of Ernest Boyer as Commissioner of Education, major breakthroughs seemed imminent. Boyer wrote:

> Education that fails to acquaint students with their dependence on their fellow [humans], or with the fragility of human life itself on a planet besieged with burgeoning population and dwindling resources, is not essential education; it may be largely irrelevant data exchange.

In this period, 14 states adopted global education guidelines or programs. And although the notion of global education came under fire in the Reagan administration, there is now growing support among some United States business and educational leaders.

But even among those who do accept the need for global education, there is no widespread agreement on its definition, purposes, or objectives. Phrases such as "education for world understanding"; "intercultural," "international," "global," or "foreign affairs" education; "global perspectives in education"; "transnational" or "planetary" perspectives; or "education for spaceship earth" are used interchangeably, even by professionals, blurring important distinctions. This ambiguity may be symptomatic of the new and tenuous nature of thought in the field and of the different emphases of different persons and institutions at a given time.

The various terms also represent a certain historical development, with "global," "interdependence," "transnational," "planetary," and "spaceship" references emanating in part from the new vision of the planet from outer space, in which national political boundaries were seen as artificial human creations, the real subject being the life and functioning integrity of the planet as a whole. Even here, debates regarding terminology ensured, with some concerned that words such as "global" and "spaceship" were too mechanical and homocentric, and others that "planetary" seemed to obscure the significance of human activity and cultural difference.

Perhaps most important, the different terms are symptomatic of changing—and sometimes conflicting—worldviews or paradigms. For example, phrases such as "foreign affairs" or "international" education suggest a state-centric vision in which the major actors are seen as governments, usually from the

perspective of how one's own national interest is served. In contrast, terms such as "global," "planetary," "transnational," or "interdependence" suggest a frame of reference in which variety of actors—economic, environmental, cultural, and people's movements as well as governmental—are considered for their impact on the world as a whole. National interest here is seen as inseparable from world interest.

However, such distinctions remain largely theoretical because of the lack of consistency in their use. In a period of competing worldviews, the more interesting and significant question is not what terms are being used, but: What is the underlying vision and purpose of education? And how will it affect our children and the people and world of tomorrow? Even the sharpest critics concede some need for "global education"—but what is really at stake here is not *whether* global education is needed, but *what* will be its underlying purpose?

Three Views of Global Education

View 1: Win the Superpower Contest

This view merges from a bipolar vision of the world that assumes that the most important fact of life as we approach the 21st century is the ideological conflict between the superpowers and their competition for world hegemony. One of its more prominent spokespersons is former U.S. Secretary of Education William J. Bennett. In his December 5, 1986 speech to the Ethics and Public Policy Center Conference, Bennett said:

> Nowadays we are global power. We have global responsibilities, and international politics have a more pressing claim on our attention than ever before. We need to know—and pass on to our children—as much about the world as we possibly can.

What is it that should be passed on? In Bennett's view, "the central fact of today's political world is the defensive opposition of the United States and its democratic allies to the Soviet Union and its empire." After criticizing other approaches to global education, Bennett suggested that "global education properly understood" should include "geography and foreign languages, some foreign literature, and a lot of European history." But most important, our children should know first about themselves, about American literature and American history and American democracy. What are its basic elements, its fundamental ideas? What are the values necessary to sustain it and the conditions for its success or failure?

And then they should know about totalitarian/theocratic regimes. What are their ideological roots? How have they acted in the past? And how do they act in the present, toward their own people and toward other nations?

And, of course, our students should know about the graduations of social, political, and economic arrangements in today's world between the few islands of the despotic, dictatorial, and theocratic countries and the vast encroaching ocean of the free and the democratic nations.

Finally, our high school students should learn about the key events of the last 60 years, particularly after the events of September 11, 2001, which have shaped relations between the United States and the Muslim world.

I would agree that all young people, from whatever nations, need to learn their national histories and how to be effective participants in their societies. They also need to distinguish between various forms of governance and to uphold basic human rights. But these are only starting points. A limitation of this approach is that it is *not particularly global.* It provides little understanding of other nations or cultures or of the deeper life processes of the planet. In its most benign form, it is an incomplete education—inadequate preparation for life in an increasingly interdependent world. Taken to extremes, it could lead toward fascism.

View 2: Win the Global Economic Contest

A second view of the need for global education in the United States emanates from international economic competition. In this view, the most important fact about today's world is not superpower competition, but the *emergence of one world economy*—global capitalism—and shifting centers of economic power within it. In the United States, this shift has the potential power of a Sputnik II in reshaping the purposes and direction of education, except that now, the major competitor concerning national leaders is not Russia or Japan, but the European Union. The possibility of the United States losing its economic leadership to the European Union, is having the United States looking to European education for clues to economic sustainability.

Not only Japan and Korea but also Hong Kong, Singapore, Taiwan, and the European Union have rapidly been gaining economic ground. Together, they represent a shift of economic power away from the West toward Asia. This carries not only economic importance but also potential significance with respect to political, cultural, military, and other forms of power in the future.

In the 1950s, the United States enjoyed a trade surplus; by the 1980s, it was experiencing chronic trade and payment deficits. The 1990s were healthy economic years for the United States. The country managed to eliminate the trade and payment deficits, but as the United States entered the 21st century, economic uncertainty coupled with the events of September 11, 2001 managed to reverse the American economic forward momentum to a crawl. Thus, in contrast to the "peace" focus of international education efforts after World War II and the military security goals that characterized the post-Sputnik emergency passage of the National Defense Education Act in 1958, some U.S. leaders now see the fundamental purpose of international education as helping to maintain U.S. economic strength.

With this in mind, when Congress decided in 1980 to make the Title VI NDEA international education programs part of the "mainstream" Higher Education Act, the strong national security rationale for these programs was augmented to include not only military but also economic security. A special business and international education provision was added to establish "export education programs," among other things. Congress stated:

1. The future economic welfare of the United States will depend substantially on increasing international skills in the business community and creating an awareness among the American public of the internationalization of our economy.

2. Concerted efforts are necessary to engage business schools, language and area study programs, public and private sector organizations, and United States business in mutually productive relationship which benefits the Nation's future economic interests.

The relationship between education and economic security was underscored by the National commission on Excellence in Education in its 1983 report *A Nation at Risk,* which stated that since "our once unchallenged preeminence in commerce, industry, science and technological innovation is being challenged by competition throughout the world," a revolution in U.S. education is called for.

The Southern Governors Conference also addressed the problem of "international illiteracy" in the United States and its negative effect on U.S. ability to compete in the international marketplace. The conference's advisory council, made up of leaders from business, education, and government, issued a no-nonsense report in November 1986, which came right to the economic point:

> Americans have not responded to a basic fact: the best jobs, largest markets, and greatest profits belong to those who understand the country with which they are doing business. . . .
>
> We operate in a global economy. There are no more guaranteed markets for our goods. We must compete—and to compete we must be able to communicate. . . . We cannot trade goods or ideas unless we understand our customers and they understand us.

The advisory council's recommendations for redressing the problem included increased emphasis in the schools on geography, international studies, and foreign languages; "sister-school" programs abroad; and teacher and student exchanges. They also recommend special educational programs and assistance to businesses, including programs on languages, foreign business practices, and cultural training.

View 3: Persons, Peoples, and Planet

It is clear, then, that when the pocketbook is affected, international or global education suddenly takes on a pragmatic importance that the purpose of peace alone could not give it. One can be grateful for increased U.S. interest in these aspects of global education—and yet sad, too. Certainly, economic strength and well-being is an important objective for all societies: How do we define it? And what is a truly global perspective in education?

As I look at the picture of the words in the above two approaches, I ask: What is the future of our children?

Africa (and Latin American, Asian, the Middle East) seems not to be included in either approach—except for a potential source of resources and markets.

Are our children to be educated to use their global competencies to take all they can from the world without giving to it? Are they to be educated to be cast in a global economic machine—to learn each other's languages only so the corporations they work for can get richer? What of their lives, their growth in their communities and cultures, the human hearts, their humanness?

And who speaks for the earth? What languages do we need to learn to understand our one earth better, with its limits and possibilities; to understand that in the end, all we really have is the earth—the source of our health, wealth, and wisdom?

What Are the Right Questions?

Approaching the global education debate from the third viewpoint, we must therefore start by asking ourselves: Have we even begun to *ask the right questions* about the kind of education we need for the future?

Today, we have new powers over life and death never dreamed of by our ancestors—but we have no idea how to use them wisely and well. We who are from the earth and of the earth cannot determine the next states in the earth evolution. We can intervene in the DNA—the delicate genetic coding that has built up through eons of natural selection. We can create new species test tubes. We can cause millions of plants and animal species to go out of existence—a part of the earth, ourselves, of the divine, lost forever. And we can through our human decisions render this planet uninhabitable for our unquestioning assaults and our weapons of mass destruction.

Such powers over life and death were in the past ascribed only to God. They demand of us that we become more morally mature, more deeply attuned to the life processes at work on the planet and that we assume adult responsibility for the future of the earth and the future of ourselves and our grandchildren.

Until we ask the right questions, how can we help our children learn to find the right answers? Acid rain, CO_2, deforestation, nuclear terror, hunger, overpopulation, alienation, despair, and terrorism—these challenges arise from our past failure to ask the right questions about education and our future together on the earth. Can such challenges be the starting place now for our shared journey into the future? By the very process of taking responsibility for finding solutions to these common threats, can we become more truly human and more truly a human community?

I believe what we need to know *already exists* among us—in our minds and hearts and deepest yearnings—and that we need to begin to plumb our own depths for insight. We can begin by asking about our children. What would we want them to know if they were the ones to determine our fate and the fate of the earth?

Would we not want them to have a deep understanding and appreciation of their shared evolutionary past—the story of the earth, of its creative life forces, of human becoming, and of the common human subsistence in that one earth—as well as of their more local and distinct social, cultural, economic, and political roots? Would we not want them to understand the increasingly interdependent nature of the world and to learn how to take a creative and responsible part in its life? Would we not also want them to understand how their choices will affect us and therefore how to choose wisely, not only on their own behalf but also on ours? And would we not want them to be aware of the future and the way in which their choices will dramatically affect those yet to come?

What of their own personhood? What would we want them to experience as they go through life? What of laughter and joy, friendship, sharing, struggle and pain, celebration, community, beauty, empathy and compassion, meaning? We see so many youths alienated, on drugs, killing themselves one way or another; what do we want for these newborns? This too needs to be accounted for in our educational vision.

If we knew these babies held our future and the future of the earth in their hands, what values would we want to guide their decision making? Only the maximization of their own profit? Or would we want them to know how to create and maintain the conditions for peace, freedom, human rights, social justice, and ecological balance—and how to think critically, resolve conflicts, and solve problems creatively?

The central paradox in education is the fact that the millions of babies born this year do hold our future and the earth's future in their hands, even as we who nurture and educate them, by the very way we do so, will be shaping theirs. By the educational legacy we give them, we will be preparing them not only for

the future we hope they will have, but also for the future they will make for us.

Thus, the axial question as we go into the future is: "Education for what?" What will our children need to know, not only to survive in the interdependent world we are entering, but to become more truly human in its midst, more truly human community? It is the mission of every educator to struggle with these questions in our minds and hearts as we confront the most awesome task of nurturing and educating the world's children.

Finally, we need teachers who understand that society is inside all of us and all of us are inside society. We need teachers who are aware that unquestioning docility and compliance will pose more serious threats, anger, and turbulence in our world. We need teachers who recognize the value of the United Nations organization and its firm standing on humane principles against the power of totalitarianism. We need teachers who see themselves as agents of change, rather than defenders of the status quo. We need teachers who will commit themselves to the promotion of building global goodwill and to the elimination of all those cultural, religious, and traditional practices that alienate and dehumanize all of us. History tells us that we should have done more than train or teach others to think and feel in morally and politically adequate ways. It is never too late.

— *John A. Xanthopoulos*

See also **Cultural Conservation**

Further Readings

Banks, J. A. (1997). *Educating citizens in a multicultural society.* New York: Teachers College Press.

Diaz, C., Massialas, B., & Xanthopoulos, J. (1999). *Global perspectives for educators.* Boston: Allyn & Bacon.

Hyerle, D. (1996). *Visual tools for constructing knowledge.* Alexandria, VA: Association for Supervision and Curriculum Development.

Leming, J. S. (1992). The influence of contemporary issues curriculum on school-aged youth. In G. Grant (Ed.), *Review of research in education* (Vol. 18, pp. 111–162). Washington, DC: American Education Research Association.

Mander, J., & Goldsmith, E. (Eds.). (1996). *The case against the global economy.* San Francisco: Sierra Club Books.

Marzano, R. J., Kendall, J. S., & Cochineal, C. (1999). *What Americans believe students should know.* Aurora, CO: Mid-Continent Regional Educational Laboratory.

O'Riordan, T. (2001). *Globalism, localism, and identity: Fresh perspectives on the transition to sustainability.* London: Earthscan.

Parker, W. (1996). *Educating the democratic mind.* Albany: State University of New York Press.

Spring, J. (2000) *American education* (9th ed). Boston: McGraw-Hill.

CULTURAL CONVERGENCE

Cultural convergence takes place in a society almost inevitably if two or more groups are brought together in close proximity. It can occur whether the social groups are equal or whether one or more are subject to a dominant group. This is the social atmosphere in which voodoo arose in the Western Hemisphere. When the slaves from Africa were brought across the Atlantic Ocean in unknown thousands, they brought with them their ancient religion, which would be their only source of security in a frightening and very hostile world. Historically, it is believed that the religions from the Yoruba region, now part of Nigeria, and the Congo, as well as today's Benin and Togo, became the source for what would become the New World adaptation of the African belief system: voodoo.

The slave masters hated and feared the ancient African beliefs because they provided a way for slaves to retain their ethnic and cultural identity on the plantations. Any slave found to be practicing voodoo, or Voudun as it is properly known, would be executed, sometimes by being burned alive. To avoid such a ghastly fate, practitioners of voodoo embarked on what was known as *syncretism,* or the

conscious grafting of their African beliefs onto the Roman Catholicism of the Caribbean Islands, which was their first American home. (The first Africans would not be brought to the North American mainland until in Virginia in 1619). In French-speaking colonies, the syncretism gained its more commonly known name: voodoo. However, in the Spanish domains, it would become known as *Santeria:* literally, the worship of the saints. To make the fusion complete, the native practitioners appropriated Roman Catholic saints to stand symbolically for their own deities, which they could no longer openly worship. For example, the god Dambalawedo took on a new personification as St. Patrick, since Dambalawedo was a god associated with snakes, and St. Patrick was believed to have driven all snakes out of Ireland.

Gradually, Whites became devotees of voodoo and Santeria as well, a unique example of cultural convergence that flourishes today. Few of the spectators—and perhaps not more of the participants—of the Mardi Gras celebration held each year in New Orleans on Fat Tuesday, the last day before the beginning of Lent, probably know that part of the celebration's origins stem from the frenetic voodoo dancing that took place more than 200 years ago in the city's Congo Square.

— John F. Murphy, Jr.

VANISHING CULTURES

As globalization increasingly becomes the battle cry of the 21st century, the West is not always aware of the threat this process is posing to thousands of cultures across the world. Anthropologist Wade Davis has warned that what he calls "ethnosphere," the wealth of human diversity and the potential of traditional cultures to teach about different ways of living and thinking, is continuously eroded and homogenized, and that such erosion will diminish us all. "The human imagination is vast, fluid, infinite in its capacity for social and spiritual invention," Davis argues, and reminds us that "there are other means of interpreting our existence, other ways of being" different from ours. Cultures do not vanish through spells. Their disappearance has often a material and economic base. As a 2001 *National Geographic* article put it, "Can dugout canoes and medicinal herbs withstand the cultural muscle of jets and cola drinks? About 300 million people in at least 5,000 distinct indigenous cultures still hold to their roots. But governments coerce minorities to modernize and join mainstream society, and economic interests appropriate their lands."

Global culture does not only entail multiculturalism and a hybridization of national cultures, as its supporters claim. As critics of cultural globalization point out, there is a darker side to this process, as cultural globalism destroys local traditions and regional distinctions, creating in their place a homogenized world culture. According to this view, human experience everywhere is under threat of becoming essentially the same. Local cultures are replaced by a uniform and single culture, often dictated by the same powerful corporations that control the global economy.

The link between the vanishing of a given culture and economic exploitation is well illustrated by the execution in 1995 of the Nigerian author Ken Saro-Wiwa. The poet had taken a leading position in the Ogoni people's campaign against the human, ecological, and cultural destruction of the Niger Delta due to Royal Dutch/Shell's oil drilling. A Nobel Prize nominee and the leader of the Movement for the Survival of the Ogoni People (MOSOP), Saro-Wiwa had blamed the Nigerian dictator General Sani Abacha for the murders and tortures of thousands of Ogoni to silence their exposure of Shell's exploitation of their land and consequent destruction of their culture. At his trial that would end with the death penalty, Saro-Wiwa told the court that "Shell is here on trial. The company has, indeed, ducked this particular trial, but its day will surely come." The Saro-Wiwa incident was a powerful catalyst for the emergence of antiglobalization activism, as it showed the interconnectedness between issues of social justice, environmental exploitation, labor policy, and destruction of local cultures. As Naomi Klein makes

clear, "In Saro-Wiwa, civil liberties came together with anti-racism; anti-capitalism with environmentalism; ecology with labor rights. The bright yellow bulbous logo of Shell, Saro-Wiwa's goliath of an opponent, became a common enemy for all concerned citizens. Appropriately, it was Saro-Wiwa's brother who summarized the multiple significances of the author's execution: "In this case, at the twilight of the 20th century, Shell has been caught in the triangle of ecosystem destruction, human rights abuse, and the health impairment of the Ogoni people."

— Luca Prono

Glottochronology

Glottochronology is a method that tries to calculate when two languages separated in the past. It is analogous to a kind of linguistic Carbon-14 test, but it usually cannot give absolute dates. The later term *lexicostatistics* is often used synonymously with glottochronology, though occasionally it simply refers to any kind of statistical comparison of lexical items from two languages.

It is obvious that languages change over time. Consider the opening lines of this poem by Chaucer written circa 1360. (The spelling has been standardized, and a modern rendition given to the right):

> *Almightly and all mercy-able queen* [Almighty and merciful queen],
> *to whom that all this world fleeth for socour* [to whom everyone in the world runs to for help],
> *to have release of sin, of sorrow, and teene* [for release from sin, sorrow, and hurt],
> *Glorious virgin of flowers flower* [Glorious virgin and flower of all flowers],
> *To thee I flee confounded in error* [To you I come, confused and in error].

Even though this poem was written almost seven centuries ago, it is no doubt transparent to any native English speaker today, and only a few archaic words are found. However, if we go back another few hundred years to Old English, things begin to look more and more like a foreign language as more and more of our familiar words drop out. Proponents of glottochronology argue that we might be able to measure the time depth of languages if we examine this rate of disappearance.

The glottochronology project rests on a number of assumptions. The first is that some words are more stable than others. Thus, an examination of basic core vocabulary will be more reliable than words that are more likely to change. There have been several proposed lists, based on several criteria, but a 100- or 200-word list is most commonly used. It includes terms referring, for example, to body parts, numbers, pronouns, and universal geographic features.

The second major assumption is the rate of change—that is, the loss of basic cognates (forms that have a common historical origin)—is the same for all languages at all times. Early proponents like Robert Lees and Morris Swadesh, comparing languages for which historical time depths were known, like the divergence of the Romance languages from Latin, conclude that anywhere from 80% to 86% would be retained over a thousand years. Using languages for which the time of separation was accurately known, they proposed the following logarithmic formula:

$$t = \log c / 2 \log r,$$

where time depth (in years) is represented by t, c the percentage of cognates shared between the two languages in question, and r the assumed retention rate (percentage).

As an example, we might compare five modern words from German and English, all core vocabulary items:

animal *(Tier)*

four *(vier)*

head *(Kopf)*

I *(ich)*

sun *(sonne)*

We find 60% agreement, as two pairs (animal/*Tier* and head/*Kopf*) do not appear to be related. If we assume that languages change at the rate of 85%

every 1,000 years, after looking up the appropriate logarithms, the above formula gives:

$$t = \log(60\%) / 2 \log(85\%) = -.511 / 2 \times -.163 = 1561$$

In other words, English and German diverged 1,561 years ago, around the year 400 CE.

Glottochronology was been used to track the time frames of many languages and families, from Native American languages, the languages of the Pacific, to Indo-European. Thus, for at least the more modest goals of obtaining relative dates of separation or for looking at languages within specific families, glottochronology seems to have proved it usefulness.

However, there are at least five important criticisms—or limitations—that might be leveled at glottochronology, both at the level of assumptions and practice. First, the list, whether the 100- or 200-item variety, invariably is not culturally neutral. Words for sun, moon, or certain colors, for example, no doubt carry varying symbolic weight across languages. Second, the method looks only at cognate lexical items and does not include an examination of pronunciation or grammar or changes in meaning over time. Third, it ignores borrowing and language contact, and this could easily skew results. For example, anywhere from 5% to 10% of the daily vocabulary items used in Japanese may come from English, including words for numbers and colors. Thus, a lexical statistical analysis might suggest that Japanese and English are more closely related than they actually are.

Fourth, it is not clear that the rates of retention are the same for all languages. Nor are we sure that even a single language will change at the same rate throughout its history. For example, the rate of change of English on a 200-word list is about 76% per 1,000 years, as is Coptic. However, German is 85%, Chinese 79%, and Greek 83%. But some languages are more retentive, such as rural Icelandic's 97% and Armenian's 94%. However, there are also less retentive languages, such as East Greenlandic, which appears to only hold 34% of its vocabulary over 1,000 years.

Finally, because of the nature of logarithms and the size of the word lists, the estimations tend to get more mathematically imprecise the further back in time you go. In fact, there is even a kind of linguistic "event horizon" (like that surrounding a black hole in physics, from which no light or information can escape), beyond which no comparisons can theoretically be made. This is around 25,000 years of separation (though even the most ardent glottochronologist would probably not trust figures past 10,000 years)

Because of these difficulties, there have been many critics of glottochronology, some particularly harsh. For example, the noted structural linguist George Trager (1972) claimed that in its enthusiastic and polemical history, the mathematical basis of glottochronology has proved untenable "and the supposedly 'acultural' and universally usable set of basic vocabulary . . . is, anthropologically speaking, a chimera, and is often unuseable. . . . Where it has been taken seriously, it has sometimes led to ridiculously long or short periods of separation . . . [which are] just as likely to result from chance resemblance as a real relationship" (pp. 175–176).

Despite these attacks, there has been renewed interest in glottochronology in recent years. Dyen, Kruskal, and Black, in an exhaustive lexicostatistic study of the Indo-European family, found that glottochronology reflects the generally accepted language classifications made by other means, suggesting that the method may be more accurate than critics suppose. Various new methods of constructing phylogenetic trees (as in biostatistical research) have been added to glottochronology's arsenal, so it "may be that the 21st century will see increasing application of these methods in work on language prehistory" (Wang, 1994, p. 1450).

And when there are few other avenues of investigation open, sometimes only glottochronology can offer insights. For example, Edda Fields, a social historian of Africa, reconstructed the early history of the coastal Guinea-Conakry area with the help of lexicostatistics, as there were no good methods of dating oral narratives and no written documents before the entry of the Portuguese in the 15th century. She examined how rice-planting vocabulary was borrowed among the local languages to examine lines of culture contact, trade, and technological innovation. She used glottochronology to establish a tentative history of the Guinea coast, concluding that coastal speech communities have not migrated very far from their present-day locations, thus giving a picture of a settlement pattern very different from oral narratives that tell of the ancestors migrating from the interior seeking to grow rice. In the absence of other evidence, this may be the only resource we have to find out about this important, but largely unknown, period of African history.

— *James Stanlaw*

See also **Linguistics, Historical**

Further Readings

Bynon, T. (1977). *Historical linguistics.* Cambridge: Cambridge University Press.

Fields, E. (2001). *Cutting down the trees and sowing seeds: A social history of costal Guinea, 2000 BCE to 1889 CE.* Doctoral dissertation, University of Pennsylvania, Department of History.

Hymes, D. (Ed.). (1964). *Language in culture and society: A reader in linguistics and anthropology.* New York: Harper & Row.

Trager, G. (1972). *Language and languages.* San Francisco: Chandler.

Wang, W. S.-Y. (1994). Glottochronology, lexicostatistics, and other numerical methods. In R. Asher (Ed.), *Encyclopedia of language and linguistics* (Vol. 3, pp. 1445–1450). New York: Pergamon Press.

Gluckman, Max (1911–1975)

The founder of the Manchester School of Social Anthropology, British born Max Gluckman completed his PhD at Oxford University in 1936. His role as director (1941–1947) for the Rhodes-Livingston Institute helped him to later establish the Rhodes-Livingston Institute as a field research site for a great deal of the work conducted by the Manchester School. Upon leaving the Rhodes-Livingston Institute, Gluckman became a lecturer at Oxford University. In 1949, he began his tenure at Manchester University and worked there until he passed away.

Gluckman is known for his studies on legal systems in traditional African societies. He focused on conflict and conflict resolution in parts of colonial Africa. Gluckman also advocated an anticolonialism stance and was against other forms of social injustice, including racism and classism, at a time when it was not particularly fashionable to do so.

Gluckman's anthropology was viewed as being unconventional by many outside of the Manchester School, at least partially because of his loyalty and dedication to the Manchester United soccer team. At the time, soccer was viewed as a game for the working class, and Gluckman viewed his department's support of the Manchester United as symbolic of his desire to lead the Manchester School in examining issues of oppression. Similarly, Gluckman emphasized the importance of history in understanding contemporary societies and was careful to note that social anthropologists study modern societies in all of their forms, rather than viewing less developed societies as being prehistoric or even without history. The Manchester School was also known for having a Marxist orientation, and Gluckman encouraged his students to examine the historical and cultural contexts that influenced colonialism and its impacts on the colonized. As a result of Gluckman's concern for class issues, he tried to dissociate his department from British anthropology's historical connections to the upper middle class of England and the conservative ideologies by which it was influenced.

The Manchester School was at its peak from 1949 to the mid-1960s. The link between the Rhodes-Livingston Institute, which served as a field research site for the department during this time, and the Manchester School helped increase the productivity of the department. By the late 1960s, Gluckman began to withdraw from the department, and from 1971 to 1975, he served as a research professor at the Manchester School.

The numerous honors and awards earned by Gluckman include the Wellcome Medal and Rivers Memorial Medal, both awarded by the Royal Anthropological Institute; Mason Lecturer at Birmingham University; Manro Lecturer at Edinburgh University; Frazer Lecturer; President of the Sociology Section of the British Association for the Advancement of Science; and Member of the Human Sciences Committee of the Department of Scientific and Industrial Research of Her Majesty's Government. Gluckman's published work includes numerous articles, book chapters, and several books.

— *Kristine McKenzie Gentry*

See also **Law and Society**

Further Readings

Gluckman, M. (1954). *Rituals of rebellion in South-East Africa* (The Frazer Lecture 1952). Manchester, UK: University Press.

Gluckman, M. (1962). *Order and rebellion in tribal Africa: Collected essays with an autobiographical introduction.* Glencoe, IL: Free Press.

Gluckman, M. (1965). *Politics, law, and ritual in tribal society.* New York: Mentor Books.

God Gene

The belief in and attempt to manipulate the supernatural is widespread throughout humanity. Although the particular content of any people's religious or spiritual beliefs is dependent on their specific environment, lifestyle, social configuration, and history, the presence of spiritual or supernatural beliefs of some sort in virtually every society suggests that there may be a biological basis to the capacity to believe. Dean Hamer, a biologist and head of the genetic unit of the National Cancer Institute, claims that he has discovered at least one of the biological traits that fosters spiritual belief: a gene responsible for the production of one of the chemicals used to regulate emotion in the brain.

The God Gene (2004) is the title of Hamer's book presenting his research on the relationship between genes and spirituality. Specifically, the "god gene" refers to a particular variant of the gene that codes for protein VMAT2 (vesicular monoamine transporter 2), which plays a role in regulating levels of serotonin and dopamine in the brain. In Hamer's research, subjects whose VMAT2 gene contained either one or two molecules of cytosine generally scored much higher on tests designed to measure spirituality than those with only adenine in the same position.

In the course of research on smoking and addiction, Hamer administered a set of psychological tests to 1,388 subjects, including a set of questions based on the research of psychiatrist C. Robert Cloninger intended to measure a subject's self-transcendence. Cloninger's test measures three qualities: self-forgetfulness, the tendency to focus so intently as to lose track of the world around oneself; transpersonal identification, the feeling of connectedness to the universe and its inhabitants; and mysticism, the willingness to believe in things not approachable through reason. The test is intended to measure individual spirituality, divorced from the particular content of organized religious belief and orthodoxy.

Hamer's findings suggested a strong link between the presence of the cystosine variants of the VMAT2 gene and spirituality as measured by Cloninger's test. In test cases where one sibling had a cytosine variant, almost all scored markedly higher for self-transcendence than their non-cytosine-bearing siblings. After correcting for other possible influences, Hamer was convinced that a significant correlation existed. What was left was to propose a mechanism by which VMAT2 might influence spirituality.

VMAT2 regulates the brain's use of monoamines, chemicals that play a crucial role in both motor control and emotional status. Among other things, monamines and, thus, VMAT2 play an important role in coordinating the responses of the thalamocortical complex, responsible for perception and reflection, and the limbic-brain stem system, which produces emotional responses. During periods of heightened spiritual awareness, the Buddhist's meditative state, for instance, or the shaman's trance, the thalamocortical system draws more and more of the brain's blood flow and energy to itself, reducing the efficacy of the other centers of the brain in a process called *deafferentation.* One system affected by deafferentation is the part of the brain responsible for locating the body in space. As more and more energy is drawn by the thalamocortical system, these other parts of the brain send "panic signals" to the limbic system. The limbic system, in turn, signals the thalamocortical system, forcing it to draw even more energy to itself and setting up a feedback loop in the brain that produces a greater and greater feeling of detachment from or expansion beyond the body, a situation easily understood by most as describing a mystical experience. According to Hamer, those with the cytosine-holding variants of the VMAT2 gene might find it far easier to produce these kinds of feedback loops than those with the adenine-bearing variant, making them more open to mystical experiences.

Hamer himself notes that VMAT2 likely plays only a small role in spirituality, noting that spirituality is too complex a phenomenon to be reduced to a single gene or even a single neurological process. But even taking this into consideration, his work as it stands presents a number of difficulties. The first is the way in which he, following Cloninger, defines spirituality itself. Cloninger based his tests on a study of people he considered to be extremely spiritual—Albert Schweitzer, Mahatma Gandhi, Catholic saints, Buddhist monks—then chose the traits that he felt marked them as spiritual. It is hard not to wonder if his criteria might not represent a Western notion of individual spirituality that may not have much meaning in significantly different cultural contexts. Although the tests have been administered to Americans from a variety of ethnic backgrounds, the fact remains that they have yet to be administered outside of the United States and may only reflect

widely shared Western notions of spirituality. One has to ask if statements such as "I am fascinated by the many things in life that cannot be scientifically explained" or "I believe that miracles happen" would tell us anything useful about the spirituality of, say, an Amazonian hunter-gatherer or South Pacific horticulturalist.

Hamer's hypothesis is further burdened by his uncertainty about how to weigh religious behavior as evidence. While at some points, Hamer insists on the noncommensurability of religion and spirituality, at others, he relies primarily on aspects of religious behavior, for instance, the role of religion in fostering and maintaining social solidarity, to ground his argument for the evolutionary importance of the god gene. In the first case, religion is opposed to spirituality, reflecting contemporary usage that associates "spirituality" with the individual and "religion" with the community. In the second, religion is presented as interchangeable with spirituality, so that the Venus figurines of Eastern Europe or the cave bear clans of Paleolithic France are seen as evidence of early human spirituality.

Ultimately, Hamer's work presents more questions than answers. While his fundamental assumption—that regardless of what we believe, there must be some neurological structure within which believing occurs—is sound, his conclusions are broader than his research and evidence support. Basing universal conclusions about human biology on culture-specific evidence seems hasty and even dangerous. At best, he has produced a very preliminary hypothesis about one possible factor in spiritual behavior, one that demands much more rigorous testing.

— Dustin M. Wax

See also **DNA Testing; Religious Rituals**

Further Readings

Cloninger, C. R. (2004). *Feeling good: The science of well-being.* Oxford: Oxford University Press.

D'Aquili, E. G., & Newberg, A. B. (1999). *The mystical mind: Probing the biology of religious experience.* Minneapolis, MN: Fortress Press.

Hamer, D. (2004). *The God gene: How faith is hardwired into our genes.* New York: Doubleday.

Gods

The term *god* is very vague; its common uses include reference to an extremely wide range of sorts of thing, including living human beings (for example, the Egyptian pharaohs and the Roman emperors), humanlike beings with superhuman powers (for example, the Greek pantheon), and impersonal or even abstract concepts (for example, the Hindu Brahman). The aim of this article is to distinguish between some of the most important of these notions and to introduce some of the main ways in which different cultures have thought about and behaved toward their gods.

It's perhaps worth pointing out at the beginning that the notion of gods is, while not independent of that of religion, certainly not coextensive with it. It's even more difficult to give a single, universally accepted definition of *religion* than to do so for *gods*, but few would deny that it's possible for a religion to do without gods (as, for example, do many forms of Buddhism) and for someone to believe in the existence of gods while engaging in no religious practices or committing herself or himself to any particular set of religious doctrines.

Types of Belief

A narrow, technical use of the term *theism* picks out the belief that god continues to be active in the world, as opposed to *deism* (common especially in 18th-century Christianity). Deists believe in the god of *natural religion*—that is, religion based solely on the use of human reason—and typically hold the view that god set up the world to be governed by perfectly designed laws and then stepped back and let it run according to those laws, taking no further part in its affairs. In what follows, however, the term *theism* will be used in its broader, more everyday sense, referring to any belief in the existence of a god or gods. There are many types of theistic belief, though the following are the most common.

Polytheism is the belief in and worship of more than one god. It seems that most if not all religions were originally polytheistic, the gods usually being seen as powerful versions of human beings or as anthropomorphized animals, heavenly bodies, or other natural phenomena whose origins predate humanity and who often figure in creation stories.

Surviving polytheistic religions include Shinto, Vodoun, and certain types of Hinduism. Some non-Christians, especially Jews and Muslims, consider the Christian doctrine of the Trinity to be polytheistic; indeed, Christian thinkers have also sometimes held this sort of view, most notably the Arians. The belief in just two gods is sometimes distinguished under the label *ditheism* (or *bitheism*); in most religions involving two gods, however, only one is worshipped—see below.

It should be stressed that mere belief in more than one god isn't enough to make a religion polytheistic in the strict sense; the issue of worship is also crucial. *Henotheism* is the belief in a multiplicity of gods but the worship of only one. The one worshipped god might be picked out because it is seen as being especially powerful or important, and this is sometimes labeled *monolatry*; some Christian sects take this view of the Trinity, holding that only God the Father should be worshipped, Jesus and the Holy Spirit being distinct and lesser gods. On the other hand, different cultures might be seen as having each its own god, so that though other gods exist, they are worshipped each by members of their own peoples (as appears to have been the case at one stage of early Judaism). The distinction between the two versions of henotheism isn't very clear cut, as most people consider their own culture superior to others, and in the same way are very likely to hold that their culture's god is more powerful or important than other gods. *Kathenotheism* is a similar sort of belief, but rather than worshipping one god throughout their lives, believers worship different gods at different times or in different places. Thus kathenotheism is a sort of serial henotheism.

Henotheism is to be found in narrower forms, especially *ditheism*, and can also develop into *monotheism*. Ditheists hold that there are two gods, usually one good and one evil; typically, the universe in which we live is thought to have been created by the evil god (hence the prevalence of evil in the world) and the good god to be involved in a battle with its evil counterpart; Zoroastrianism is an important example of this sort of belief. This is often, especially in later versions such as that of the Manichaeans, accompanied by the view that the material world is evil, while the spiritual world, good.

Monotheism is belief in the existence of just one god, but there are a number of very different sorts of belief fitting that description. The commonest sort of monotheism is that found in the Abrahamic religions, such as modern Judaism, Christianity, and Islam. Believers typically hold that there exists a being that is the transcendent cause of the universe in which we live—that is distinct (or usually separate) from it—and that this being is worthy of worship. The god in which most monotheists believe is personal.

The main alternative form of monotheism is *pantheism*, the thesis being that god is the world and the world is god; thus everything that exists constitutes a unity, which is thought of as divine. This should be distinguished from *panentheism*, which is the thesis that the world is part of god (sometimes that it is god's body), but that god is more than just the world. The pantheist notion is rarely if ever of a personal god; indeed, its critics have often complained that the difference between atheism and pantheism is little more than linguistic. Pantheist beliefs have generally been restricted to philosophers and theologians, but panentheism has an important place in religions such as Judaism and (though to a much lesser extent) Christianity. Somewhere between standard monotheism and pantheism is the Hindu notion of Brahman—an impersonal, eternal, qualityless Absolute, which when qualified by qualities is the immanent and continuous cause of the universe.

Types of God

The concept of god with which most readers will be familiar is probably that associated with the standard monotheistic religions: an infinite being described as the omnipotent, omniscient, transcendent creator of the world. This notion is extremely variable, though, even leaving aside pantheism and panentheism. For example, the one god is sometimes thought of as a person and sometimes as an abstract existence; sometimes as eternal (that is, outside time) and sometimes as sempiternal (that is, in time but without beginning or end); sometimes as involved with the world and sometimes as detached from it. The single god of religions such as Christianity and Judaism is regarded by some believers as being less than infinite in its qualities—even as being imperfect. For example, process theology holds that god is "dipolar"—has two aspects or natures, one being transcendent, but the other being part of the world, suffering and changing with it.

Once we get on to the notions of gods found in nonmonotheistic religions, things become even more

varied. Clearly, such gods must be finite (as two infinite beings would limit and thus cancel out each other's infinity); they tend to be exaggerated versions of things existing in the natural world—most often humans or animals (or combinations) but sometimes inanimate objects or phenomena, such as winds, fire, or mountains. Even in nonmonotheistic religions that aren't henotheistic or kathenotheistic, there will often be preferences—either personal, or by sex, family, or caste—so that certain gods or groups of gods are worshipped more than or even instead of the other gods of the religion. This can be seen, for example, in Hinduism, with its many sects (perhaps mirrored in Christianity by attachments to various saints).

Attitudes To and Uses of Gods

Generally speaking, the attitude to gods is positive (partly as a matter of definition; a being who is regarded negatively is likely to be—though not inevitably—seen as something other than a god, such as a demon). However, the benevolence of few if any gods can be taken for granted, and worship in most theistic religions involves some form of bargaining, which most commonly takes the form of praise, appeasement, or petition. This is often bound up with another common use of the notion of gods: to explain natural phenomena (often including the very existence of the world, through creation myths). Thus the bargaining will frequently concern the averting of natural evils or the encouraging of natural goods; these can take the form of occasional events such as earthquakes, of regular occurrences such as the migrations of prey animals, the flooding of a tidal river or even the rising of the sun and moon, and of background conditions such as health and sickness. Similar activities can also be designed to ensure that one's actions won't provoke anger or retaliation or to ensure the success of a project. (This sort of bargaining activity can also take place with spirits other than gods, as in most animistic cultures.)

In fact, appeals to gods are rarely genuinely explanatory in form, though they may have the psychological effect of reducing or banishing puzzlement in the believer's mind. That's largely because they fail to offer an answer to the question, How did that happen? instead answering the question, Who did that? One important exception to this is the use of gods to justify or to explain religious and secular authority. Such justifications might involve the claim that a ruler is a living god, that he (or more rarely she) is descended from gods, that he or she will become a god after death, or that he or she has either been given authority by a god or gods or is descended from one who has been given such authority. In Western cultures this last approach is best known through the doctrine of the divine right of kings.

Not all religious activity is concerned with bargaining, however; other purposes include praise, thanks, and reminding people of the existence and nature of the gods.

The Bifurcation of Beliefs

It's fair to say that, as cultures develop more critical and reflective thought about their religious beliefs, a split inevitably appears (and steadily widens) between the beliefs of ordinary people and those of the thinkers—philosophers and theologians. This normally involves a move from the notion of gods as personal—indeed, as more or less human, though exaggeratedly powerful people—to a more abstract notion of (usually) a single god, and then to a notion of god as some sort of idea or symbol, not literally real but important in some way. The notions of divinity (as well as of other aspects of religion) produced by this sort of theological development may be more consistent, but they're generally of little use for religious practice, nor do they fill the psychological roles played by more primitive notions; in cultures that have produced such thinking, therefore, the split is commonly not merely between philosophy and religion but between philosophy and theology on the one hand, and organized religion and ordinary beliefs and practices on the other.

— *Peter J. King*

See also **Buddhism; Cosmology and Sacred Landscapes; Creationism, Beliefs in; Evil; Pantheism; Taboos**

Further Readings

Leonard, S., & McClure, M. (2003). *Myth and knowing: An introduction to world mythology.* Boston: McGraw-Hill.

Levine, M. P. (1994). *Pantheism: A non-theistic concept of deity.* London: Routledge.

Salamone, F. A., & Adams, W. (Eds.). (1999). *Anthropology and theology: God, icons, and god-talk.* Lanham, MD: University Press of America.

von Goethe, Johann Wolfgang (1749–1832)

Johann Wolfgang von Goethe was born on August 28, 1749 in Frankfurt a.M. Main and died March 22, 1832 in Weimar. He was a poet, playwright, and novelist but also a natural philosopher, scientist, and minister (*Geheimer Rat*) of the duchy of Sachsen-Weimar-Eisenach.

His parents—Katharine Elisabeth neé Textor and Johann Kaspar Goethe, a lawyer who held a property big enough to make a living—belonged to the Frankfurt bourgeoisie (Bürgertum). Goethe studied law in Leipzig (1765–1768) and Strassbourg (1770–1771), later working for a short time as a lawyer in Frankfurt a.M. and Wetzlar.

His first drama "Götz von Berlichingen" was published in 1773 and his novel *The Sorrows of Young Werther* (*Die Leiden des Jungen Werthers)* in 1774. The epistolary novel describes how a young man called Werther loses his heart to Lotte, who has already decided to marry another man, and ends tragically with the protagonist's suicide. These two works, particularly the last, made him very renowed in Europe.

In September 1775, Goethe was invited to Weimar by duke Karl August, where he was to spend the rest of his life, apart from his travels. He soon became acquainted with Karl August, who appointed him as a member of Saxe-Weimar's government in June 1776 and raised him to nobility in 1782. In 1784, he discovered the human premaxilla jaw bones (*Os intermaxillare),* but because all recognized anatomists (but for his teacher, Justus Christian Loder) denied his discovery, Goethe gave up and did not publish it before 1820. From 1786 to 1788 Goethe traveled in Italy, where he met many German artists (for example, Deutschrömer) and studied painting. He published his experiences in *Italian Journey* (*Italienische Reise*) in 1816. While in Rome he wrote *Iphigenia in Tauris* (*Iphigenie auf Tauris*), one of his most important dramas. In 1789, a son named August was born to Goethe and a woman he would marry in 1806, Christiane Vulpius.

In his work "Attempt to explain the metamorphosis of plants" (*Versuch die Metamorphose der Pflanzen zu erklären,* 1790), Goethe asserts that all plants developed by metamorphosis from one primal plant (Urpflanze). His major scientific work is the "Theory of Colour" (*Farbenlehre 1805–10*) in which he denies the ideas of Newton.

Source: Courtesy, Wikipedia.

In 1796, Goethe published the epos *Hermann and Dorothea* and the novel *Wilhelm Meister's Apprenticeship* (*Wilhelm Meisters Lehrjahre)*. The latter is considered to be the most important German Entwicklungsroman, describing the intellectual development of a young bourgeois (Bürger) to an artist. The second part of this novel, *Wilhelm Meister's Travels* (*Wilhelm Meisters Wanderjahre*), was published in 1821 and 1829.

Goethe's friend Friedrich von Schiller, one of the most important intellectuals and authors of the age, died in 1805 in Weimar. One year later, Goethe finished his work *Faust, a Tragedy* (*Faust—Der Tragödie erster Teil,* published 1808), in which the scholar Faust sells his soul to the devil Mephisto. In return, Mephisto has to serve him until he is content and wants "the moment to stay." Faust falls in love with Gretchen, who gets pregnant but kills the newborn out of despair. He tries to save her from execution, but Gretchen, feeling she has to pay for her sins, refuses to take flight. In *Faust II* (*Faust—der Tragödie zweiter Teil,* published postmortem in 1833), Faust experiences

the European history of ideas. In the end, he is mighty but blind and dies looking forward to eternal glory. Mephisto tries to claim his soul but is tricked by angels, and Faust finally attains salvation.

Goethe also wrote his autobiography, *Poetry and Truth* (*Dichtung und Wahrheit*), and just as important as his novels and dramas were his lyrical works, from early poems such as "Prometheus" and "Roman Elegies" to his late poems, especially in "Der Westöstliche Divan."

Goethe never had a homogeneous theory of the nature of humankind, but he did present a few main ideas to which he often referred. In *The Origin of the Species*, Charles Darwin calls Goethe one of the first who spoke "the law of compensation or balancement of growth." Trying to discover the nature of humankind, Goethe considered both the results of his natural studies and his life experiences. Seldom does he refer to specific philosophers, although he presents the ideas of Spinoza, Rosseau, Herder, Diderot, Pico della Mirandola, Manetti, Kant, and his friend Schiller in his thinking. Theory unproved by data was mere speculation to him.

Goethe's central aim in his research was to provide evidence for the primordial unity of all species. According to Goethe, they originated in one primal type of species. One of the missing links to this unity was found when Goethe discovered the human premaxilla jaw bones. Goethe believed that the highest creature in nature was man, in whom all natural laws of morphology are present at an enhanced level. A single individual cannot represent the original type of a species, but all individuals of one species can. One of Goethe's famous remarks is "Only all humans live the human." We must read Goethe's literary work as explanation of his ideas about mankind. Faust is the paradigm of man in his quest for insight and creativity. He wants to enjoy all that is allotted to mankind as a whole. This immoderate desire cannot be fulfilled, finally leading to his failure.

There are five major constants in the human existence: individuality, polarity, aging, metamorphosis, and, finally, that human beings are an end in themselves.

According to Goethe, individuality distinguishes human beings from the moment of our births from every other human being. Polarity, the second principle, is the everlasting conflict of sublime and primitive, of nature and spirit or body and soul. Every period in a human life offers a unique range of possibilities not present at any other moment. Metamorphosis is another central paradigm in nature and therefore also in humankind. Every being changes the world and is, in return, changed by it in an everlasting process. One of Goethe's central metaphysical thoughts was that human beings can change themselves and react consciously, but, at the same time, we are still part of the wholeness of the world.

— *Markus Helmut Friedrich Peuckert*

Further Readings

Boyle, N. (2000). *Goethe: The poet and the age* (3 vols.). New York: Oxford University Press.

Witte, B. (1999). *Goethe-Handbuch-in vier Bänden.* Metzler: Stuttgart and Weimar.

Goodall, Jane (1934–)

Jane Goodall is a world-renowned primatologist who was born in London on April 3, 1934 to Mortimer and Vanne Goodall. Her family decided to move to England when Hitler began invading areas of Europe. She spent most of her childhood on the south coast of England in Bournemouth. She lived with her mother, her maternal grandmother, and sister Judy at the Birches. After high school, at age 19, she attended a secretary training school in London.

In 1956, a schoolmate invited Goodall to visit in Kenya. Goodall had dreamed of Africa since early childhood, possibly as early as 1 year old, when her father gave her "Jubilee," a stuffed chimpanzee. After a few weeks, Goodall went to Nairobi to work as a secretary and arranged to meet Louis Leakey, who hired her as his personal secretary. Leakey soon invited Goodall to join him and his family for archaeological research at Olduvai Gorge. Leakey then gave her the opportunity to study the chimpanzees of Gombe, despite her lack of university education. He recognized Goodall's potential, and it was her scientific naïveté that Leakey believed would give her an observational advantage leading to wonderful new discoveries.

Research with the Gombe chimpanzees began in July of 1960 with funding from Leighton Wilke of Illinois and later by the National Geographic Society and others. Goodall arrived in Gombe with her mother,

Vanne, two scouts, and their cook, Dominic. She had enlisted her mother's companionship because the British government did not like the idea of a young English woman alone in the jungles of Africa. During the beginning hardships of setting up the camp and working on getting the chimpanzees to accept her presence, Vanne was a comforting source of support for Jane. She stayed at Gombe with Jane for the first 5 months.

Source: Photograph courtesy of the Library of Congress.

Leakey also did not like Goodall being alone at Gombe. He sent Hugo van Lawick, a filmmaker and photographer for *National Geographic,* to work with Goodall. They got along well and married in 1964. Goodall and van Lawick also had a child in 1967, Hugo Eric Louis. He is better known as "Grub." Grub stayed in Gombe with Jane when the couple divorced in 1974.

Goodall received her PhD from Cambridge University in Ethology, in 1965. She is one of only eight people to have earned this degree without first earning a bachelor's degree. Her thesis advisor thought her research was unprofessional, especially because she named her subjects. Goodall believed it was important to see the chimpanzees in an anthropomorphic light if she was to study their emotional lives.

In 1975, Goodall and the Gombe camp endured one of the most terrible hardships possible when four students working at Gombe were kidnapped. A ransom was eventually paid for their safe return. However, scandal and rumors regarding the situation followed Goodall for many years. For her own safety, it was 2 years before she was able to return to Gombe.

Also in 1975, Goodall remarried to Derek Bryceson, a politician, the only voluntarily elected White official at the time and former head of the national parks in Tanzania. Sadly, Bryceson died of cancer in 1980, after only 5 years of marriage.

Goodall has been the Scientific Director of Gombe Stream Research Center (GSRC) since 1967. Goodall's research at GSRC directly led to observation of many previously unknown behaviors in wild chimpanzees, including tool use. Among the most startling observations were of intracommunity infanticide and cannibalism in 1971, as well as intercommunity fatal violence as demonstrated by the "Four Years War" (1974–1977). During this period, Goodall observed one of the Gombe chimpanzees troops, the Kasakela group, systematically hunt down and terrorize a smaller splinter troop, the Kahama group, which had recently split from the others. Eventually, all of the members of the Kahama group were killed.

Other important observations made by Goodall include the discovery of elaborate courtship patterns, in which males force females to have exclusive relationships during the female's estrous cycle, the period when she is sexually receptive and fertile. These consortships occur in remote spots and last for days or even months. Also, in 1987 Goodall and her field staff observed an adolescent chimpanzee named Spindle adopt a 4-year-old orphaned chimpanzee named Mel. This was startling, because the infant was not a close relative of Spindle's and would have certainly died without the adoption.

In 1977, Jane founded the Jane Goodall Institute for Wildlife Research, Education, and Conservation (JGI), a global nonprofit organization now located in Washington, DC. Along with raising funds to further research at GSRC and other projects, JGI "advances the power of individuals to take informed and

compassionate action to improve the environment of all living things." JGI also began Shoots and Roots, an international program for children that teaches conservation of all creatures.

Goodall has received a multitude of honors, which include the J. Paul Getty Wildlife Conservation Prize in 1984 and the United Nations "Messenger of Peace" presentation in 2002. In 2003, Queen Elizabeth II named Goodall a Dame of the British Empire, and she received the Prince of Austria's Award for Technical and Scientific Research. As well as receiving honorary doctorates from several universities, Goodall has a list of publications ranging from her scientific research at Gombe to her personal biography.

Today, Goodall still calls Bournemouth home. She continues to travel the world lecturing and sending out a message of hope for the future of conservation of habitat and protection of the African great apes. Goodall is especially fond of encouraging young people to make a difference in the world. She created the Chimpanzee Guardian Project, which allows the public to contribute financially to the care of orphaned chimpanzees living in sanctuaries in Africa. Chimpanzee research and conservation efforts at Gombe continue and are largely carried out by local villagers who have been scientifically trained. The population of wild chimpanzees has declined drastically during the four decades of Goodall's research. One of her resounding understandings is that it is the local people who must understand and care about conservation in order for efforts to be affective, be it in Gombe or elsewhere in the world.

— *Jackie L. Orcholl*

See also **Chimpanzees; Chimpanzees, Saving; Leakey, Louis S. B.**

Further Readings

Goodall, J. (1986). *The chimpanzees of Gombe.* Cambridge, MA: Harvard University Press.

Goodall, J. (1999). *Reason for hope: A spiritual journey.* New York: Warner Brothers.

Goodall, J. (2000). *Africa in my blood, an autobiography in letters, the early years.* New York: Houghton Mifflin.

Goodall, J. (2000). *In the shadow of man.* New York: Houghton Mifflin.

Goodall, J. (2001). *Beyond innocence, an autobiography in letters, the later years.* Houghton Mifflin.

JANE GOODALL

Jane Goodall is a naturalist, ethnologist, conservationist, and author who has revolutionized knowledge about chimpanzees and animal ethics. She was born in England in 1934. In 1960, after working in Africa with Louis S. B. Leakey's research team as a secretary, she began a study of a band of chimpanzees in the Gombe Stream Game Reserve in Tanganyika (now Tanzania). For months, Goodall followed a band of chimpanzees, constantly studying them while moving ever closer to them. She recorded many behaviors that researchers had previously not seen.

Goodall's legacy includes the very important discovery that chimpanzees are not strict vegetarians, as previously thought, but also eat meat. She found that they eat meat for a period and then return to a vegetarian diet for other periods. To get meat, they will sometimes engage in chimpanzee cannibalism. Goodall also discovered that chimpanzees will organize hunting parties. She was also able to describe chimpanzee "wars" between different groups of the primates. Goodall's field observations contributed enormously to the understanding of the complexity of chimpanzee social order and hence shed light on human behavior.

Goodall also described the use by chimpanzees of small tools for foraging insects, especially termites from termite mounds. This discovery about chimps overthrew the older idea that only humans made tools.

Working with chimpanzees inspired Goodall to engage in conservation work to stop poachers from killing them for meat or taking baby chimpanzees to sell. To protect chimpanzees, she has promoted creating chimpanzee sanctuaries in the wild and improved ethical standards for the treatment of all animals in zoos.

Goodall's legacy also includes numerous books for scientists, lay readers, and children. *In the Shadow of Man* and *The Chimpanzees of Gombe* have provided scientists with new knowledge. She has authored many children's books in order to make young readers aware of animals in general and chimpanzees in particular. Her children's books

include the "Family" series about a number of animals, including the *Chimpanzee Family Book.* In addition, she has published *Dr. White,* a book about the therapeutic play of a dog in a children's hospital ward, and *With Love: Ten Heartwarming Stories of Chimpanzees in the Wild,* and *The Chimpanzees I Love.*

Goodall founded the Jane Goodall Institute in Washington, DC., to promote healthier ecosystems. Her "Roots and Shoots" program encourages environmental education for teenagers.

— Andrew J. Waskey

Goode, William Josiah (1917–2003)

"Si" Goode was born in Houston, Texas in 1917. He died in 2003, holding the position of Emeritus Professor of Sociology at Stanford University. In his career, he held many distinguished positions within academia, including his election as 63rd president of the American Sociological Association, in 1970. Goode earned a long list of academic awards, beginning with his career as a student. In 1994, he earned the William J. Goode Award, established in his honor. Goode published 20 books and over 80 articles. As a sociologist, Goode's research focused on social organization and social structure. He contributed to anthropological literature in his cross-cultural analysis of love, marriage, family life, and divorce. He also contributed to sociological theory in his study of social control, violent force, and religion. Goode's most widely recognized research, *World Revolution and Family Patterns,* was published in 1963. The data covered over a half century and over 50 countries. It called upon Goode's mastery of nine languages to complete. Thirty years later, Goode published *World Changes in Divorce Patterns,* in which he introduced the conceptual basis for analyzing and predicting divorce patterns across the globe. He was particularly interested in the consequences of divorce for women.

Goode believed in the role of theory in scientifically generated knowledge. His contributions were greatest in the practice of middle-range theory and the use of multiple research methods. While he was trained as a classic sociologist, Goode practiced rigorous anthropological methods. He introduced his students to systematic and comparative analysis of social structures and functions across cultures. He had an uncanny ability to make his work accessible to the very people he studied, a method typically attributed to anthropologists.

Goode was a distinguished success in all pursuits, both academic and personal. He left his PhD studies at Pennsylvania State University to enlist in the Navy during World War II. He served as a radarman on a trans-Pacific troop transport ship between 1944 and 1945. In 1946, Goode became an Assistant Professor at Wayne State University. He moved to Columbia University in 1950, where he earned tenure (1952) and was promoted to full professor (1956). At Columbia, he became quite active in the feminist movement as a scholar and an activist. He coedited *The Other Half: Roads to Women's Equality* with Cynthia Epstein and worked with Betty Friedan as she wrote *The Feminine Mystique.* Goode joined Stanford University in 1977 and Harvard University in 1986.

Goode was described by friend and colleague Amitai Etzionia as "the man who studied with much gusto and to perfection, anything that sparked his interest, the list of which was very hefty indeed." Si Goode was a fellow of the American Academy of Arts and Sciences. Referred to as a "renaissance man" by his friends and colleagues, Goode was internationally recognized as a scholar and a teacher. He served as a guest lecturer and visiting professor in many foreign countries. His legacy continues in the form of the William J. Goode Award, established during his lifetime, and the William J. Goode International Fellowship, which was established in his memory.

— Brian Q. Flannery

See also **Family, Forms of; Sex Roles; Social Structures**

Further Readings

Goode, W. J. (1963). *World revolution and family patterns.* Glencoe, IL: Free Press.

Goode, W. J. (1964). *The family.* Englewood Cliffs, NJ: Prentice Hall.

Goode, W. J. (1965). *Women in divorce.* New York: Free Press.

Gorillas

The wild gorilla of equatorial Africa is the largest of the four great apes; the mountain subspecies was discovered in 1847 but first scientifically described in 1902. Until recently, this primate was thought to be a brutish and ferocious animal of the jungle. However, field studies have revealed that this huge pongid is shy, gentle, and introverted but curious, intelligent, and powerful.

In prehistoric times, wild gorillas ranged freely throughout central Africa. Today, however, this great ape is represented by only three geographically isolated subspecies: the lowland or valley gorilla of central West Africa, *Gorilla gorilla gorilla;* the slightly smaller highland or mountain gorilla of central East Africa, *Gorilla gorilla beringei;* and the lowland gorilla of East Africa, *Gorilla gorilla graueri.* The minor differences between the two major subspecies are that the mountain gorilla has longer hair (an adaptive advantage) and has a longer palate than the lowland gorilla and does not share its forest with chimpanzees.

Now a critically endangered species, the wild gorilla needs to be understood and appreciated in order to ensure both its protection and survival in captivity, as well as in its natural environment. It is estimated that fewer than 1,000 mountain gorillas inhabit the lush forest areas of central East Africa. Their ecological niche is gravely threatened by hunters, farmers, and poachers—thus the desperate plight of this mountain ape.

George B. Schaller, a zoologist, was the first scientist to seriously study the wild mountain gorillas in their natural habitat. His pioneering 20-month research project (1959–1960) remains a classic contribution to primate ethology. He has presented his important findings in two books: *The Mountain Gorilla* (1963) and *The Year of the Gorilla* (1965).

Gorillas are primarily terrestrial, quadrupedal climbers and knuckle walkers, living in the humid rain forests of Africa. In his extensive study of the mountain subspecies, Schaller concentrated on the ecology and general behavior of this remarkable great ape. His 466 hours of direct observation were made from the safety and viewing advantage of trees. Schaller was able to watch free-living gorillas wander through the dense jungle, forage on succulent herbs and vines (they prefer young secondary forest growth), groom and play, and build nests in the trees or on the ground. The zoologist observed no tool use, no meat eating, and no drinking of water. Both vocalizations and sexual behavior were infrequent. Of particular interest, however, is the gorilla's chest-slapping behavior—an elaborate sequence of nine distinct acts by a provoked gorilla in order to frighten away a threatening intruder, thereby preventing physical contact.

Despite his dedicated study of this wild ape for nearly 2 years, Schaller never made physical contact with these mountain gorillas. Yet this incredible feat was later accomplished by the remarkable primatologist Dian Fossey.

During 1967–1985, anthropologist Fossey lived among the wild highland gorillas of the Virunga Volcanoes in central East Africa. (The lowland or valley gorillas of central West Africa still await rigorous study.) Her research camp, Karisoke, was located in the ancient rain forest of Mt. Vasokie—a tropical world of jungle, fog, and mist in Rwanda near Zaire. Encouraged by anthropologist Louis S. B. Leakey, Fossey had followed gorilla groups on the ground in order to observe them at close range during their leisurely day-long search for food. Fossey was very successful in establishing a rapport with

Source: © iStockphoto/Kevin Tate.

these great apes; she patiently learned to imitate their feeding methods, general sounds, and basic gestures. As a result of her relentless efforts, these curious and gentle giants of the primate world had slowly accepted the anthropologist's presence. This acceptance allowed her to examine the uninhibited behavior of mountain gorillas under normal conditions in their natural range.

Fossey's more extensive long-term, close-range, more intimate study of the mountain gorilla had been a rich and rewarding experience for her and science. Unlike Schaller, she had actually made physical contact with this great ape—the first time a scientist had touched this pongid in its own habitat.

In the glorious rain forests, this magnificent great ape is a peaceful vegetarian and primarily a ground dweller. A nervous gorilla will hoot, mouth a stick or leaf, thrash branches and vegetation about, slap its chest, run sideways, and finally thump the ground with its palms. It may even bluff a roaring "charge" as protective action, if necessary. The pongid's alleged savagery toward humans is grossly exaggerated, for this fierce-looking and powerful ape will try to avoid physical contact with intruders. In short, unprovoked gorilla brutality is a myth.

Most gorillas live in small, stable, tight-knit, scattered groups that roam through the rain forests of central Africa and wander on the slopes of the Virunga Volcanoes. A social unit is dominated by the adult alpha silverback male. Other members include subordinate blackback males, adult females, juveniles, and infants. Protected by the dense jungle foliage and its huge size, an adult male mountain gorilla may live in an all-male small group or even as a loner. (Apparently the leopard, buffalo, and elephant are no threat to this great ape.) Each gorilla seems to possess a unique personality and a distinct voiceprint and noseprint. A gorilla's staple diet is primarily folivorous; it consists of fruit, bark, thistles, nettles, celery, blackberry leaves, gallium vines, and other wild succulents. In its natural environment, the mountain gorilla has never been observed eating meat, insects, or birds' eggs.

The gorilla is an intelligent animal, but in the rain and bamboo forests of mountainous central Africa, more fully developed mental capabilities and ingenuities probably would not have increased its fitness. Its awesome size and placid nature make it very difficult, if not impossible, for humans to train and manage this pongid. In zoos, the gorilla is prone to fatal pneumonia and tuberculosis, and therefore the artificial environment must be watched carefully. Unfortunately, it is also very difficult to mate this great ape in captivity; gorillas require privacy and conditions similar to their natural habitat for sexual activity.

Fossey's research had added to the knowledge of the gorilla diet, feeding and grooming habits, and vocalizations. Her work was an outstanding contribution to ethology. Even so, the mountain gorilla still faces the grave danger of extinction. Civilization is now slowly engulfing the shrinking wild domain of this magnificent ape. The pongid's precarious existence is threatened by human encroachment. If serious measures are not taken, then this unique primate may vanish.

— H. James Birx

Further Readings

Bright, M. (2000). *Gorillas: The greatest apes.* London: Toucan Books.

Fossey, D. (2000). *Gorillas in the mist.* Boston: Mariner Books/Houghton Mifflin.

Galdikas, B.M. F. (2005). *Great ape odyssey.* New York: Harry N. Abrams.

Robbins, M. M., Sicotte, P., & Stewart, K. J. (Eds.). (2001). *Mountain gorillas: Three decades of research at Karisoke.* Cambridge, UK: Cambridge University Press.

Schaller, G. B. (1963). *The mountain gorilla: Ecology and behavior.* Chicago: University of Chicago Press.

Schaller, G. B. (1965). *The year of the gorilla.* New York: Ballantine.

Vedder, A., & Weber, B. (2001). *In the kingdom of gorillas: Fragile species in a dangerous land.* New York: Simon & Schuster.

GORILLAS IN CAPTIVITY

Gorillas are the largest of the great apes. They exist in small numbers as at least three closely related subspecies: western lowland gorillas *(Gorillas gorilla gorilla)*, eastern lowland gorillas *(Gorilla gorilla graueri)*, and mountain gorillas *(Gorilla gorilla beringei)*. They are all native to

central Africa. Gorillas were not identified as a separate species until 1847.

The first extensive description of gorillas to be published was by Paul Du Chaillu (*Explorations in Equatorial Africa,* 1861). Du Chaillu described several gorilla hunts where the hunting party encountered "ferocious" gorillas. Fieldwork by George B. Schaller, Dian Fossey, and others in the 20th century demonstrated that Du Chaillu misunderstood the ferocity of gorillas; their ferocity is basically a protective measure.

Unfortunately, the continued hunting of gorillas in Africa for food and trophies has reduced their numbers, threatening their survival. Conservation measures to protect gorillas in wildlife parks have been established in Africa.

The capture of gorillas in the wild for placement in zoos around the world is a practice of the 20th century. In early 2005, there were no mountain gorillas in captivity. Only western lowland gorillas were in captivity.

Zoos around the world have agreed to no longer accept gorillas from the wild. Instead, they now breed gorillas and then distribute them to other zoos. These breeding programs are like genetic "backups." To have a genetically healthy gorilla population in captivity, detailed genealogies are kept of gorillas bred from a "founder" of the line. The founder has usually been born in the wild.

Having gorillas in captivity has created a dilemma. Zoos are not the natural place for gorillas. They thrive best in the wilds, where they roam in groups. Study of the animals in captivity has shown that gorillas need companionship and are healthiest when in groups. This has led to the conclusion that single gorillas in captivity decades ago probably often died of loneliness.

Today, gorillas are placed in ecologically friendly habitats rather than being warehoused in cages. Researchers have developed large, open areas similar to gorillas' native habitat for them to roam. There, they can live together as a gorilla group and have the best opportunities to flourish. Research on gorillas in captivity seeks to know their individual behaviors, group dynamics, diet, breeding habits, parenting, and diseases.

— Andrew J. Waskey

Gorillas, Saving

Saving gorillas poses a great challenge to conservationists. Currently, gorilla populations suffer from habitat loss, hunting, and disease. The four subspecies of the large, black-haired great apes are found in Uganda, Rwanda, Zaire, Congo, Cameroon, and Nigeria. There are approximately 94,000 western lowland gorillas *(Gorilla gorilla gorilla),* 17,000 eastern lowland or Grauer's gorillas *(G. g. graueri),* 700 mountain gorillas *(G. g. beringei),* and 200 Cross River gorillas *(G. g. diehli)* left.

Gorillas belong to the same family as humans, Hominidae. They have the most herbaceous diet and are one of the most terrestrial primates. They locomote using quadrupedal knuckle-walking. Gorillas typically live in harem groups, consisting of one male, multiple females, and offspring.

Most of the early information on gorilla behavior was compiled by George Schaller and Dian Fossey, the famous aggressive mountain gorilla conservationist, and their associates. Fossey founded Karasoke Research Station at Parc National des Volcans (PNV) in Rwanda in 1967. Gorilla ecotourism was founded at PNV in 1978. Today, tourists pay between $250.00 and $400.00 (U.S.) for a permit to see the mountain gorillas for a few hours. Even with strict guidelines, such as most ecotourism agencies allowing only one visit of no more than six to eight people per day per gorilla group, the annual revenue earned directly from gorilla tourism has been estimated at $3 million. When this figure is combined with the additional income received by funds earned indirectly (by hotels, restaurants, etc.), the total revenue may exceed $20 million. This money is shared between Rwanda, Uganda, and the Democratic Republic of Congo (formerly Zaire). Such programs have aided mountain gorilla conservation by preventing farmers, poachers, trophy hunters, and loggers from endangering the gorillas and their habitat.

However, wars, conflict, and civil unrest beginning in the 1990s caused many gorilla ecotourism programs to close intermittently. Wars also drive many refugees into the mountain gorillas' previously undisturbed habitat, resulting in gorillas being hunted for food. Research on gorillas indicates that hunting pressure generally has a greater effect on gorilla populations than habitat disturbance. In 1996, the World Society for the Protection of Animals (WSPA) and the Cameroon Ministry of Environment and Forests (MINEF) held a conference

in Cameroon and addressed such issues. Although the official title of the conference was "The Impact of Forest Exploitation on Wildlife," it is commonly referred to as "The Bushmeat Conference." The attendees concluded that the bushmeat crisis is directly linked to the timber industry and is having a devastating affect on many animal populations, including gorillas. Gorilla meat is considered a delicacy in wild game markets. Logging brings humans and gorillas into closer contact. It is responsible for the demise of gorilla populations due not only to habitat loss and hunting but also to transmission of diseases such as cholera.

Western lowland gorillas and Eastern lowland gorillas are endangered, while mountain gorillas and Cross River gorillas are critically endangered. It is hoped that as research and conservation efforts continue, awareness of the plight of gorillas will increase so that our largest living relatives can be saved.

— Lisa M. Paciulli and Adam M. Isaak

See also **Apes, Greater; Chimpanzees, Saving; Fossey, Dian; Orangutans, Saving; Pongids**

Further Readings

Cowlishaw, G., & Dunbar, R. (2000) *Primate conservation biology.* Chicago: University of Chicago Press.

Fossey, D. (2000). *Gorillas in the mist.* Boston: Mariner Books, Houghton Mifflin Company.

International Gorilla Conservation Programme. (2005). *Tourism in the realm of the mountain gorilla.* http://www.mountaingorillas.org/

Mowat, F. (1988). *Woman in the mist.* Boston: Warner Books.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pongonias Press.

Vedder, A., & Weber, B. (2001). *In the kingdom of gorillas: Fragile species in a dangerous land.* New York: Simon & Schuster.

Gosse, Philip (1810–1888)

In Victorian England, Philip Henry Gosse made an unusual attempt to reconcile the glaring discrepancy between the empirical facts of the earth sciences that supported the theory of evolution and the revealed beliefs of traditional religion. As a fundamentalist creationist of the Plymouth Brethren sect, he held to a strict and literal interpretation of the story of Genesis; this Mosaic cosmogony required rigidly accepting both the sudden creation of Adam and the Noachian Deluge. Yet, as an avid naturalist, Gosse was unable to ignore that growing and compelling but contrary evidence in historical geology and comparative paleontology that supported the rational claims of the early evolutionists in the 19th century. His own scientific interests included ornithology and marine zoology. This well-traveled author and illustrator wrote nearly 50 volumes and even invented the aquarium. Yet he rejected outright the evolutionary framework.

Gosse hoped to resolve the contradiction between evolutionist science and fundamentalist religion by offering his own unique account of the planet, which would seemingly, at least for him, do justice to both conflicting conceptual worldviews. He presented a ridiculous explanation of terrestrial creation in two books, *Life* (1857) and *Omphalos: An Attempt to Untie the Geological Knot* (1857), both appearing in print just 2 years before the publication of Charles Darwin's *On the Origin of Species* (1859).

Gosse's argument clearly gave preference to biblical authority and direct experience rather than to empirical facts and rational inquiry. It is grounded in a crucial distinction between two modes of existence: preternatural, prochronic, or ideal time in the infinite and perfect mind of the personal deity before the act of divine creation and natural, diachronic, or real time of actual objects and events and relationships in our material world of change and development. Furthermore, the course of everything in both inorganic and organic nature is claimed to be a circle.

In his attempt to reconcile the biblical cosmogony with scientific evolutionism, Gosse firmly argued that the geological column with its sequence of rock strata and record of fossil patterns was divinely created all at once, along with the earth's existing flora and fauna types (including the human animal.) Therefore, at a single point, our planet suddenly came into being as an ongoing world containing a developmental series of fossils in rock layers that only suggest both an extensive physical past and a creative biological evolution before the earth's actual origin in the real space and diachronic time of nature itself. In this metaphysical scheme, the distinction between appearance and reality is crucial.

In short, our planet is at the same time as old as demonstrated by science and as young as claimed in the sacred scriptures. How is this possible? It is, if one assumes with Gosse that God created the earth with a built-in past: The stratigraphic sequences of rocks were suddenly formed at the instant of creation along with all plant and animal fossils in their respective places. This appearance of evolution accepts the results of the process while rejecting the real process itself.

As such, according to Gosse, the appearance of all geopaleontological evidence merely implies the preexistence of rocks and fossils prior to the abrupt moment of a special creation through the omnipotent fiat of a divine creator only about 6,000 years ago. The formation of the earth occurred at a distinct point in prehistoric time, and the origin of life on the planet, along with our own species, was a violent eruption of organisms into the continuing circles of cosmic reality. The first forms of life suddenly appeared *as if* they had a historical past in the natural world.

Consequently, following this argument, all the geopaleontological evidence for a succession of countless epochs over millions of years, as well as for the progressive development of life on earth, is utterly deceptive, since preexistence is simply an illusion. The pristine world of divine creation had instantly intruded into diachronic time as if it had been partaking in an ordered continuity of early history spanning untold aeons. Briefly, this unorthodox interpretation allowed Gosse simultaneously to admit and dismiss all the accumulating geological, paleontological, and biological data for the enormous age of this planet and the vast inventory of inorganic structures and organic beings both upon it and within it.

Gosse rejected the eternity of inorganic and organic matter, as well as the mutability of species in the biosphere, since the flora and fauna of our earth are fixed and only a few thousand years old. In arguing his position, he even performed a thought experiment: although stressing that there was no human observation of antediluvian history, Gosse boldly imagined himself observing the first plants and animals of earth just after the moment of creation. In keeping within his view of things, these growing organisms would appear to have had a history, but in fact such an inference is fallacious, according to this interpretation.

As if this interpretation were not a sufficiently strange form of natural theology, Gosse even went so far as to propose that all the fossils of so-called early life found in the alleged ancient rocks of our earth were placed in these geological strata by a personal God in a plausible paleontological sequence so as to deliberately test the faith of their discoverers, or perhaps even cunningly deceive the faithful. For example, he argued that Adam and Eve had been created with a navel by this same clever deity in order to simulate natural births from biological parents.

For Gosse, evolutionists are simply studying the divinely imprinted appearance of a seemingly ancient globe, because he claimed that there had been no gradual change of the earth's surface over the supposed vast aeons of planetary time and no slow evolution of plant and animal species throughout the equally assumed ages of organic history. Needless to say, this argument of *Life* and *Omphalos* was not taken seriously and had no major effect on the scientists, philosophers, theologians, or even the general public of the time.

Gosse was heartbroken and could not understand why his effort at reconciling evolutionary science with fundamentalist religion was rejected with equal force by both naturalists and religionists. Actually, since he believed that divine creation had taken place instantly, his own theistic cosmogony is not in step with the traditional 6-day story of Genesis.

Gosse's worldview is neither empirically convincing nor logically defensible. It is scientifically unrepeatable in principle, and it ignores the law of parsimony. There is simply no reason to appeal to an improbable possibility that today flies in the face of empirical evidence and common sense. A modified form of this position does surface now and then in the biblical fundamentalist and religious creationist literature of today. This whole scheme remains as the residue of a desperate attempt to synthesize the old beliefs of an outmoded theistic cosmogony with the advancing evolutionary sciences.

Gosse's belief in a sudden creation is grounded in an arbitrary point for the beginning of natural time. In fact, we could claim that everything still exists in the mind of God, waiting to burst into natural time. We may even ask, *Why was this universe created?* Or *Is this the only created universe?* There are numerous scientific, philosophical, and theological interpretations of this evolving universe. Gosse's metaphysical imagination rejected evolution in order to avoid a slippery slope from traditional spiritualism to pervasive naturalism.

— *H. James Birx*

Further Readings

Birx, H. J. (1991). *Interpreting evolution: Darwin & Teilhard de Chardin.* Buffalo, NY: Prometheus Books.

Gosse, E. (1890). *The life of Philip Henry Gosse.* London: K. Paul, Trench, Trübner.

Gosse, P. H. (1998). *Omphalos: An attempt to untie the geological knot.* Woodbridge, CT: Ox Bow Press.

Gramsci, Antonio (1891–1937)

Antonio Gramsci is considered one of the foremost Marxist theorists of the 20th century. Though he was not an anthropologist, his work has had a tremendous impact on the field of anthropology, and he was a major influence on social theorists of such stature as Louis Althusser, Raymond Williams, Pierre Bourdieu, Michel Foucault, Jürgen Habermas, E. P. Thompson, Eric Hobsbawm, and Stuart Hall. He reworked many of classical Marxism's key concepts (for example, ideology, class consciousness, base and superstructure) in ways that opened them up to engagement with anthropological analyses of society, and his concept of *hegemony* has been particularly key to critical explorations of the intersection of culture and politics. The field of "cultural studies" is rooted largely in interpretations and applications of his ideas.

Born in Sardinia and shaped by a difficult childhood, Gramsci was no armchair theorist, but an activist deeply engaged in political struggles, especially the factory council movement in Turin. As a young man, he abandoned a promising academic career to dedicate himself to journalism. His columns, articles, theater reviews, and translations of labor news from around Europe (especially Russia) were widely read, and he eventually became a leading figure in the Italian Socialist Party and, later, the Italian Communist Party. His political activity became increasingly confrontational after Mussolini's rise to power in 1922. He was a member of the Italian Parliament from 1924 until his arrest, along with other Communist Party deputies, in 1926. At his trial, prosecutor Michele Isgrò reportedly declared: "We must prevent this brain from functioning for 20 years." Despite suffering severe health problems in prison, Gramsci repeatedly refused to ask for clemency from the fascist government. He was granted conditional freedom in late 1934 (though he continued under constant police surveillance), but he never regained his health and spent his last few years as an invalid, transferring from one hospital to another; these efforts proved futile, and he succumbed to a brain hemorrhage at the age of 46.

Gramsci's most influential writings were produced in prison. Eventually collected as the *Quaderni del Carcere,* or *Prison Notebooks,* they were published piecemeal after World War II, and attracted great attention and critical commentary not only in the West but also in the new nations emerging from European colonialism. Paradoxically, the limitations under which Gramsci produced his theoretical formulations are partly what made them such fertile ground for later scholars. In order to escape the vigilance of the prison censors, Gramsci wrote in a purposefully ambiguous style, avoiding explicit references to Marxism-Leninism. The theoretical framework that he sketched out was both concrete and open-ended, inasmuch as his formulations were usually framed within specific historical struggles or political questions, but pregnant with implications that extended beyond the particular case at hand. It is precisely this flexible, nondogmatic quality of his ideas that has allowed them to be engaged by numerous disciplines and applied to a wide range of social themes and contexts.

The *Notebooks*' content is wide-ranging, but it is Gramsci's concern for integrating political action with organized cultural activity that holds particular relevance for anthropology. Central to Gramsci's vision of political struggle is the notion of hegemony, which he conceived as a social order based on a combination of coercion and consent. Hegemony is totalizing in intent but never total in practice; since it accommodates and incorporates oppositional strains rather than repressing them by brute force, it must be constantly shored up and negotiated, and it often contains the ideological seeds of its own undoing. In order for the dominant sectors of society to construct a *hegemonic bloc*—a political consensus that incorporates a range of disparate social groups—the interests of the dominated must be articulated to the dominant interest. Since ideology plays a key role in this articulation, it can no longer be viewed as a merely superstructural phenomenon, derivative of economic relationships; rather, it is one of many elements shaping the evolution of political processes. This rejection

of a rigid division between an exclusively determining economic "base" and a determined "superstructure," in favor of a more dialectic relationship between levels of social activity, distinguishes Gramsci's thought from that of more orthodox Marxists, whom he criticized for their economism and reductionism.

It is this same idea that makes the concept of hegemony so attractive for anthropologists. Whereas classical Marxism relegated symbolic activity to the realm of superstructure (recall Marx's example from the *Grundrisse,* which assigned the labor of the piano maker to the base and that of the pianist to the superstructure), Gramsci recognized that cultural activities, values, and loyalties are also active elements in the maintenance and reproduction of a social order. From this perspective, many of the domains of human activity that have traditionally interested anthropologists—artistic expression, language, popular culture, religion, and ethnic and regional solidarities—take on a greater political significance.

The concept of hegemony also required a more nuanced theorization of ideology than was possible within classical Marxism. Political observers had long noted that people do not always act in accord with their apparent class interest, nor are their ideologies necessarily predictable from their class position. Whereas classical Marxism resorted to the notion of "false consciousness" to explain (or rather, explain away) the failures of the working class to assume their historical role, theorists in the Gramscian tradition view ideology as too complex and multifaceted to be characterized as mere mystification. Individuals are nexuses of multiple interests, not just class interests; hegemony consists of evoking certain interests and muting others, to the point where the dominant consensus assumes the mantle of "common sense." The work of articulating the common sense of the masses to "the upper level of philosophy" is the stuff of politics, that is, the construction of a hegemonic bloc. Key to this task are the "organic intellectuals," who express the interests of their class through their cultural work, while endeavoring to bring other social groups under the leadership of their ideological vision. This "war of position" tends to be protracted, engaging multiple institutions within civil society before attempting to take control of the state. Within Gramsci's view of hegemony, neither ideological domination nor class unity can be assumed a priori; they must be *produced.* Thus, ideology becomes not simply a reflex of one's position in the class structure, but crucial terrain on which political struggles are waged and political outcomes (partly) determined.

Gramsci's rejection of the notion of an automatically unified class consciousness and his recognition that the common conditions of existence shared by members of a class are crosscut by other interests and loyalties led many anthropologists to analyze the origins of those conflicting interests and the ways in which other dimensions of oppression and identity intersect with the class dimension. In this way, Gramsci's thought became of crucial interest to anthropologists concerned with ideological constructions of race, gender, ethnicity, religion, and the social movements and cultural forms arising out of these different types of collective experience. Social classes exist not as coherent social groups but as abstract categories that are fragmented in any actual historical formation. Politics thus cannot be seen as reducible to class, and identity itself is reconceived as multiple, fragmented, and contradictory. Ironically, the thinker who perhaps did the most to bring Marxist thought into anthropology also laid the groundwork for the decentering of Marx's most fundamental concept—economic class—from the stage of social reproduction.

— *Aurolyn Luykx*

See also **Marxism; Societies, Class**

Further Readings

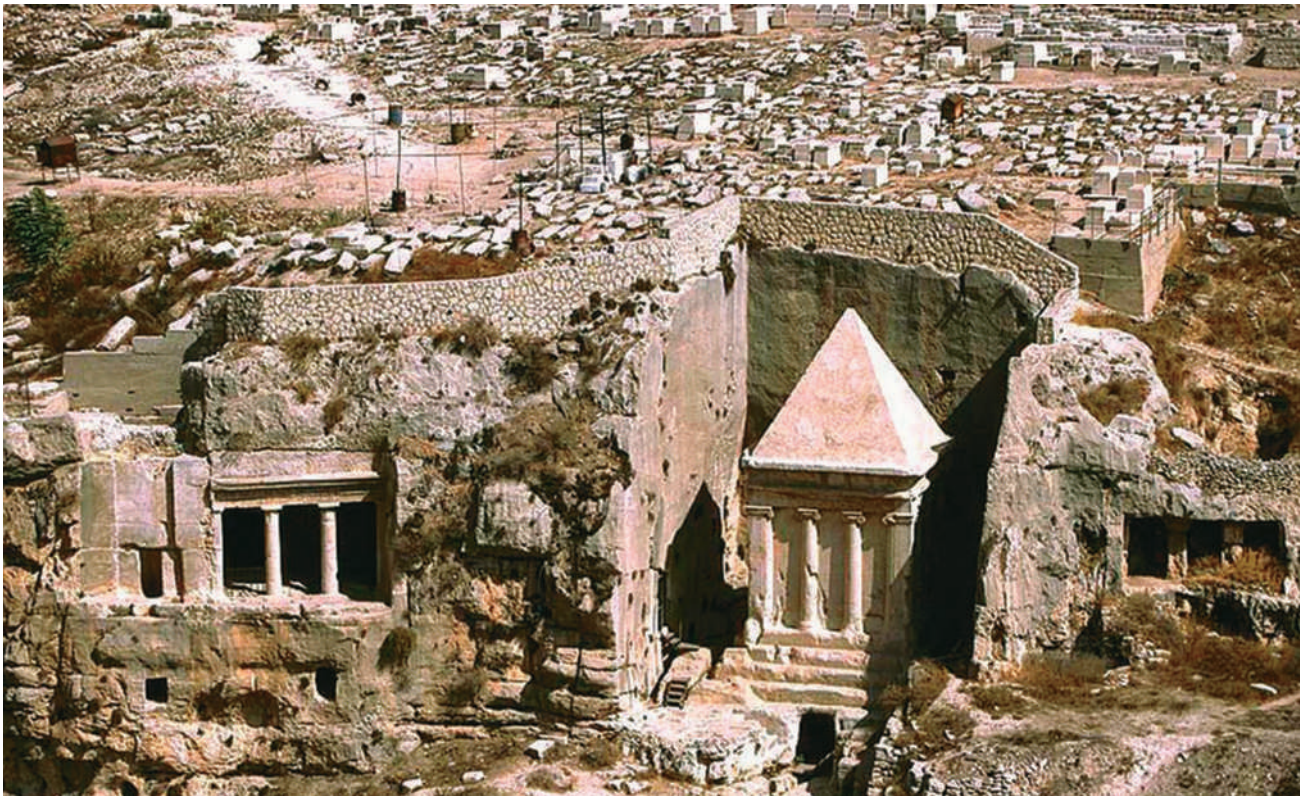
Boggs, C. (1985). *The two revolutions: Antonio Gramsci and the dilemmas of Western Marxism.* Cambridge, MA: South End Press.

Gramsci, A. (1971). *Selections from the Prison Notebooks* (Q. Hoare & G. Nowell, Eds., Trans. by N. Smith). London: Lawrence & Wishart.

Laclau, E., & Mouffe, C. (2001). *Hegemony and socialist strategy: Towards a radical democratic politics* (2nd ed.). London: Verso.

GRAVES

The depositing of the dead in graves is only known from *Homo sapiens* and *Homo Neandertalensis.* Graves belong to the earliest and most important testimonies of human culture. But in many recent cultures, burials do not imply as a necessary accompaniment any kind



Source: FreeStockPhotos.com.

of grave. The act of burying associated with ritual practices is a universal element of human culture and documents a dimension of human thinking beyond their individual lifespan, an awareness of the afterlife and of the highest social behavior. It manifests the emotional attachment between the living and the dead. Its universality is a strong argument for existing burials in the last common ancestor of all recent human populations. As the dispersal of humans started from the Middle East about 70,000 years ago, it seems plausible that burial practices evolved before that event. This corresponds with the early graves in famous Qafzeh (today's Israel).

Several criteria must be fulfilled to accept a site as a grave. Graves are defined as the deposition of remains of one or several dead clearly indicating an intentional act independent of specific locations. Graves can be situated close to settlements in caves or *abri* or far from them in the open field. It should always be possible to assign the cranial and postcranial skeletal remains individually. The mortuary practice is identified by the posture of the corpse, its orientation, any kind of decoration (for example, ocher), or burial objects. Stones or flagstones protect the dead against scavengers but also "prevent" them from returning to the living. Unfortunately, former excavations have very often not reported many of these criteria.

Body position is a significant part of the mortuary program in many recent cultures. Corpses are laid down in mainly two types of posture, stretched out mostly in supine position or in crouch, where the degree of flexion may be different. Various interpretations of the crouch exist: It may adopt a posture close to the natural one during sleep, it may be imposed by the surrounding conditions, or it may prevent the dead from returning. The latter assumption is partly based on corpses found in bonds.

The orientation of the body can follow pragmatic reasons such as the topography of the terrain. Although data on grave orientation are scarce, an east-west orientation is often found already in early burials (Qafzeh, La Ferrassie) following the course of the sun. But other sites containing most burials (Skhul, Shanidar) show no grave orientation.

Burial objects comprise adornment, for example, pierced animals' teeth or snail shells, and are supposed

to indicate a group membership and/or a hierarchical position. Other objects are animals' remains, for example, bone or antler tools, or stone tools. Burial objects serve as support or nourishment of the dead in the other world, have magical purposes, or are oblations for the powers that be. Whenever the graves are excavated close to previous settlements, burial objects may also be just simple leftovers. Half of the burials of the Middle Paleolithic contained grave goods, while the vast majority of the Early Upper Paleolithic seems to have already contained such goods.

There is an ongoing debate whether humans of the Middle Paleolithic have already buried their dead or whether this only begins after the "symbolic explosion" characterizing the Early Upper Paleolithic period. At the end of the 19th century graves were denied because the Paleolithic humans were considered to be too primitive, but recent views challenge the idea by arguing that all early graves can be explained in terms of natural processes. Accepting the idea of early graves does not necessarily mean to accept an early "Homo religiosus" but to accept that taking care of dead may be a cultural constituent.

The site of Qafzeh has revealed that the oldest known graves dated to 100,000–90,000 years. Altogether, remains of 21 individuals were discovered, babies, children, and adults. It is a burial site of *Homo sapiens,* which also contains a 13-year-old Neandertal. All skeletons were oriented along a common axis. Qafzeh also contained ocher, which is only found in a few graves in the Middle Paleolithic but common in Upper Paleolithic graves. From the Middle Paleolithic, around 20 graves are unambiguously known that contain *Homo sapiens* and *Homo Neandertalensis.* In the Early Upper Paleolithic, the overwhelming majority of graves are *Homo sapiens.* Lake Mungo in Australia includes an ocher burial and the first recorded cremation already at about 40,000 years ago.

Though the subject of Neandertal burial is a hotly debated topic, the archaeological evidence indicates that Neandertals indeed buried their dead. About two dozen unambiguous examples of Neandertal burial are known dating from after about 70,000 years ago. These burials are found in southern France, the northern Balkans, the Middle East (Israel and Syria), and possibly from Central Asia, including the possible burials of infants at Mezmaiskaya Cave in the Caucasus and at Teshik Tash Cave in Uzbekistan near the Afghan border. A famous example is "Moshe," a skeleton missing his head and most of his lower limbs. It was found in the Kebara Cave (today's Israel) dated to 60,000 years. The grave also contained stone tools, like the one at Qafzeh.

Intriguingly, the earliest burials were all of modern humans. This has led to speculations that the chronologically later burial of Neandertals may have been a cultural assimilation. Another important aspect is that burials were never the norm for "ordinary" people. From the scarcity of graves and from the principle of actualism taken from all later cultures, it seems convincing that graves are privileged burial sites. It is worth mentioning that only since less than 200 years a grave with the personal name is accessible for everyone in Europe.

— *Barbara Happe*

Further Readings

Akazawa, T., Aoki, K., & Bar Yosef, O. (Eds.). (1998). *Neandertals and modern humans in Western Asia.* New York: Plenum Press.

Riel-Salvatore, J., & Clark, G. A. (2001). Middle and Early Upper Paleolithic burials and the use of chronotypology in contemporary Paleolithic research. *Current Anthropology, 42* (August-October), 449–479.

Greenberg, Joseph (1915–2001)

A distinguished anthropologist and linguist, Joseph Harold Greenberg was most well-known for his work in universals of language and comparative language studies. He was born in Brooklyn, New York, on May 28, 1915, and died from pancreatic cancer on May 7, 2001. He was gifted musically, taught himself Hebrew, and in high school studied Latin and German while learning Greek on his own. He taught himself Classical Arabic in college. He graduated from Columbia in 1936 and received his PhD from Northwestern in 1940. He then served in the Army Signal Intelligence Corps for 5 years, taught for a year at the University of Minnesota, and taught at Columbia from 1948 to 1962. In 1962, he went to Stanford as a full professor, served as chair of the anthropology department from 1971 to 1974, and served as chair of the Committee on African Studies from 1964 to 1981.

During the academic year 1958 to 1959, Joseph Greenberg, James J. Jenkins, and Charles E. Osgood drew up a memorandum on universals in language at the request of a staff member, Joseph B. Casagrande, of the Social Science Research Council. That memorandum provided a framework for studying universals of language and was the organizing document for the Conference of Language Universals held in New York, April 13 to 15, in 1961. Ten papers presented at this meeting were published in *Universals of Language,* in 1963, which Greenberg both contributed to and edited. Greenberg's contribution, titled "Some Universals of Grammar With Particular Reference to the Order of Meaningful Elements," discusses 45 universals of language grouped into the following categories: basic order, syntax, and morphology. One of the most important notions that came out of the Conference of Language Universals was the concept of implicational language universals. Such universals can be generalized as "If a language has Structure X, then it must also have Structure Y." For example, Greenberg writes, "If a language is exclusively suffixing, it is postpositional. If it is exclusively prefixing, it is prepositional." Studies in language typology—which is concerned with understanding the structure of language at all linguistic levels: phonology, morphology, syntax, semantics, and discourse—were profoundly influenced by the papers that came from the Conference of Language Universals.

In 1963, Greenberg published *Languages of Africa,* which provided a linguistic basis for grouping Africa's 1,200-plus languages into 4 language families: Afro-Asiatic, Khoisan, Niger-Kordofanian, and Nilo-Saharan. Greenberg used a method called "mass comparison" to determine language family groupings. This method has been criticized by some linguists. Despite the criticism, his classification of African languages is still widely accepted.

Greenberg also classified native languages of the Americas into three families: Eskimo-Aleut, Na-Dene, and Amerind. He published his findings in *Languages in the Americas.* Despite supporting evidence from genetic studies and archaeology, this classification of Native American languages continues to be debated by many scholars.

Greenberg's ultimate goal was to compare all the world's languages, which he believed were genetically related to each other.

— *Richard R. Jones*

See also **Glottochronology; Language; Linguistics, Descriptive**

Further Readings

Greenberg, J. H. (1963). *Languages of Africa.* Bloomington: Indiana University Press.

Greenberg, J. H. (Ed.). (1966). *Universals of language* (2nd ed.). Cambridge: MIT Press.

Greenberg, J. H. (1987). *Languages of the Americas.* Stanford, CA: Stanford, University Press.

Grooming

Grooming is a common everyday activity of many members of the order Primates. Grooming consists of going through the fur, using either the hands or teeth, to remove debris. Some species of primates have specific adaptations for grooming. For example, in prosimians, the incisors and canines of the lower jaw jut out, forming a comblike structure. Other species, such as tarsiers *(Tarsius),* have a distinctive grooming claw on the second digit of the foot that aids in grooming.

Source: © Robert Jurmain.

There are two main types of grooming, autogrooming and allogrooming. Auto- or self-grooming consists of an individual grooming itself, while allogrooming is an interactive process in which one or more primates groom each other. While autogrooming is mainly used for self-cleansing, allogrooming may not be and is of particular social importance. In addition to simply cleaning the recipient's fur, allogrooming is an important mechanism for strengthening social relationships as well as being a display of affection. Allogrooming is used to reinforce social bonds between mating males and females as well as same-sex friendships.

During the process of grooming, individuals sit close to one another and are in constant touch. As a result of this close contact, relationships are strengthened and tensions are reduced. Recently, allogrooming among primates has been compared to massages. In humans, massaging newborns helps make babies healthier and calmer. In primates, grooming is done from the moment of birth throughout adulthood. It can be used to calm emotions following aggressive outbursts, and primates become much calmer when they are groomed by their partners or relatives. Among some species, the amount of grooming received is directly correlated with social rank. Higher-ranking individuals receive more grooming than individuals of lower rank.

The social-cognitive skills obtained via allogrooming may allow primates to live together in a cohesive fashion. Allogrooming also probably contributes to survival in large groups. Primates learn at a young age to keep some group members at enough of a distance to prevent ecological and reproductive costs, while at the same time not drive them away altogether. Allogrooming is also a means of communication. In some species such as chimpanzees *(Pan troglodytes)*, prolonged periods of allogrooming occur when an old friend rejoins the group. In addition, some go so far as to suggest that grooming in primates helped promote language development and may have given rise to the evolution of gossip.

Grooming serves as much more than just a means of cleansing the fur and obtaining tiny treats (such as lice). It is also used to strengthen bonds, communicate, reduce tensions, and as a display of affection. In other words, grooming is the social glue of primate groups.

— Lisa M. Paciulli and Jenna M. Lawson

See also **Chimpanzees; Primate Behavioral Ecology; Primatology; Prosimians; Tarsiers**

Further Readings

Falk, D., & Byram, J. (1999). *Primate diversity.* New York: Norton.

Freeland, W. (1981). Functional aspects of primate grooming. *Ohio Journal of Science, 81, 4,* 173–177.

Nowak, R., Konstant, W., Nowak, R. M., Rylands, A., Mittermeier, R., & Walker, E. (1999). *Walker's primates of the world.* Baltimore: John Hopkins University Press.

Terry, R. (1970). Primate grooming as a tension reduction mechanism. *Journal of Psychology, 76,* 1, 129.

Guaraní Ñandéva Indians

The Guaraní Ñandéva are an Amerindian group located in the Gran Chaco. Though most currently reside in Paraguay, Bolivia and Argentina also have communities. They are considered one of Paraguay's 17 to 20 indigenous groups. The following ethnonyms have been applied to them: Ñanaigua, Tapieté, Tapii, and Yanaygua. The last Paraguayan indigenous census (2002) notes that there are 1,984 Guaraní Ñandéva, 957 females and 1,024 males, in 14 villages located in the Central and High Chaco. Most live in the Central Chaco, Department of Boquerón. The majority are classified as rural (98.1%). While they speak a dialect of Guaraní and are placed within the Tupí-Guaraní linguistic family, their native material culture and way of life resembles that of other non-Guaraní Chaco groups (for example, the Nivaclé and Manjui). Use of the native language is still vigorous in most communities.

Little is known about the Guaraní Ñandéva's cultural history. It is unclear whether they were originally Guaraní or if the Guaraní, who undertook several migrations in search of the "land without evil," acculturated them. Some scholars hypothesize that they are descendants of the Chané, Chiriguano, or Mataco Indians (or a combination of these and possibly other groups). The archaeology and history of the Gran Chaco, the greater environmental zone that includes the Paraguayan Chaco, reveal that this large area was an ethnic melting pot during pre-Hispanic and colonial times. Contacts between Bolivian, Argentinean, Paraguayan, and Brazilian indigenous groups were common.

Until after the Chaco War between Bolivia and Paraguay (1932–1935), most Guaraní Ñandéva lived in the drier and largely uninhabited northern area of the Chaco. The Ayoreo, considered Paraguay's least-acculturated group today, also lived in that area and sometimes had skirmishes with the Guaraní Ñandéva. Other traditional neighbors were the Toba and Manjui, and today the Chiriguano figure prominently as neighbors. The Guaraní Ñandéva were semisedentary agriculturalists who did much hunting and gathering. Some also kept a few goats and cattle. Survival required extensive knowledge of the flora and fauna and, most important, of water resources (where water was and how to obtain it). For instance, they used water stored in the bromeliad *caraguatá* and the tuber *yvy'á (Jacaratia sp.)*. They also harvested plants like the *sachasandía (Capparis salicifolia),* which, though toxic, could be rendered edible by baking. Such knowledge, however, is dwindling.

After the Chaco War, there was an expansion of cattle ranching in the region, and most Chaco tribes became sedentary. The Paraguayan military actually helped the Guaraní Ñandéva establish themselves in the frontier zone of Nueva Asunción, since they sought to reaffirm Paraguayan control of the Chaco. But the Guaraní Ñandéva migrated to other areas once official support ceased. In time, incursion by nonnatives into native areas made it difficult for the Indians to maintain their previous way of life. Another event that brought more outsiders to the region was the opening of the Trans-Chaco Highway. This highway brought poor Paraguayans and Brazilians to the area seeking employment with the Mennonites or others as available.

Today the Guaraní Ñandéva continue to have a mixed economy, but it is one that increasingly involves the use of cash. In terms of wage-earning jobs, it is mostly the young men who have access to such jobs. The Guaraní Ñandéva, as the last census revealed, suffer chronic underemployment and unemployment. In the 1980s, some Guaraní Ñandéva participated in a prodevelopment and self-determination project sponsored by the Indigenist Organization of Paraguay (AIP); however, that project led mainly to the relocation of several Guaraní Ñandéva groups that had lived in worker villages of the Mennonite colonies. Today, they receive some assistance from the Association of Indigenous and Mennonite Cooperation Services (ASIM), a Mennonite nongovernmental organization that works with indigenous peoples advancing health care, education, and economic programs (mostly agricultural).

The Mennonites have promoted indigenous colonies, entities that are divided into villages comprising several households. The Guaraní Ñandéva community of Canaan, in the colony of Laguna Negra, is the most populous village. It has an elementary school where both Guaraní and Spanish are taught, a bilingual basic health care provider, and a modest Christian church originally promoted by a Mennonite missionary who resided among the Ñandéva during the early stages of the founding of the settlement. Canaan's residents have kinfolk in other locations, such as the northernmost Guaraní Ñandéva villages of the High Chaco. When these relatives must seek medical help in Filadelfia or go there for some business or official transaction, they often stop in Canaan. Canaan can be reached from Filadelfia, the principal urban center in the Central Chaco, by a dirt road. Those who have great financial need will sometimes request financial assistance during Sunday church services. Much singing—accompanied by the playing of guitars and the beating of a drum made from animal hide—takes place during a religious service; males and females sing, and both display great receptiveness to music. Christianity has not eradicated the practice of shamanism. The Guaraní Ñandéva have some shamans and consult them when ill or in need of other services, for example, bringing rain.

Traditional houses were generally small and flimsy. They were made with several ingredients: mud, wood, and grasses. Current dwellings are made with a combination of materials, including wood, mud, bricks, and some cement. Though floor mattresses are now common, they formerly slept in hammocks the women made with *caraguatá* fiber or on mats of animal hide. They had few material possessions and wore scant clothing. Today, they wear Western-style clothing, which is often modified for rural living. Some keep a few goats, sheep, cattle, and chickens. The gardens, meager when compared with those of other South American lowlanders, generally contain various types of squashes, beans, corn, and watermelon. While men clear garden areas, women and older men generally are the ones most involved in the planting and harvesting of crops. Men hunt when feasible, but very rarely fish. Older male and female Guaraní Ñandéva will gather various wild products, such as hot pepper and cacti fruits.

— *Lourdes Giordani*

See also **Ethnography; Shaman**

Further Readings

Gutiérrez, R. (1995). Chaco ethnography, the case of the Tapietés of the Pilcomayo. *Magazine of the National Museum of Ethnography and Folklore, La Paz, Bolivia, 6,* 74–106.

Renshaw, J. (2002). *The Indians of the Paraguayan Chaco: Identity and economy.* Lincoln: University of Nebraska Press.

Gutenberg, Johannes (1397–1468)

Johannes Gensfleisch zum Gutenberg is generally credited with the simultaneous invention of movable metal typefaces as well as the concept of mass production through the use of a printing press. The invention of printing using a form of durable and movable type would eventually serve the needs of the masses. It was to be hailed as one of the most important and influential catalysts affecting the course of human interaction and history.

Sparse local history and records have been handed down that make much of the private history and life of Gutenberg unknown and hypothetical. But records do reveal that Gutenberg was born into a Europe prime for a cultural revolution. Gutenberg was born in Mainz, Germany, in 1397, when Europe had recently come out of the Middle Ages and the Renaissance was just beginning.

He was baptized at the church of Saint Christoph and lived in a large house that his father Friele had inherited from the family of Gensfleisch zur Laden zum Gutenberg. Historical records support he was born into a patrician family. His father was one of four accountants in the city of Mainz. His mother, Else Wirich, was the second wife of Friele and the daughter of a wealthy Mainz merchant. 1414 records indicate Johannes was probably the youngest child, as a Friele and Else are mentioned as an older brother and sister. Into this patrician atmosphere, the Gutenberg children would have had some schooling or private instruction and would have enjoyed the pride of a self-confident and well-respected family.

There is nothing to indicate that Gutenberg as a young man had any leanings toward the church, political life, or scholarly study, but later records indicate he did have a talent for technology—especially a familiarity and skill with metal working and manufacture.

Records indicate his relatives belonged to a guild or fellowship of coiners that supplied metal for the minting of coins for the church. But because he and his brother could not pass the necessary ancestral test, he never assumed this career. After his father's death in 1417, he later left for the city of Strasberg, Germany, and took up residence. Records indicate he lived on an income from annuities, paid taxes to the city of Strasberg, but never became one of its citizens. City tax lists enter him as either semipatrician, semi-craftsman, or as one who serves under no other individual. The influence from his contact with metal working translated into his becoming an independent craftsman. He ran a respected workshop, from which he was able to augment his living expenses by teaching a variety of handicrafts.

Court records also indicate he was quite active in pursuing court matters regarding errant family annuities from the city of Mainz as well as a vexing case involving a breach of promise to marry a patrician girl. However, no clear records exist indicating he was ever married.

In 1439, court records provide information about his involvement in a business venture to supply cast metal objects. It is in these records a reference surfaces to a "secret art" involving "something to do with printing." Unfortunately, no written records by Gutenberg himself have ever been produced, but historical records indirectly reveal his persistent involvement with perfecting this new process.

Gutenberg moved back to Mainz and set up his workshop, eventually borrowing large sums of money to finance his laborious venture. Not long after, between 1452 and 1455, he printed about 200 copies of his famous masterpiece, the hand-cast 42-line Gutenberg Bible. However, a judicial hearing regarding his loans and debts resulted in the ultimate loss of his business and its eventual takeover. He died in Mainz around February 3, 1468. The process of printing he perfected, however, was to spread and become a major influence on Europe by the end of the 15th century.

Gutenberg's process of producing printed material for the masses through the use of a printing press using movable type established itself in major urban centers in Europe within the first few decades of the 1500s. By the end of the 1500s, the reproduction of written materials had moved from the scriptoria (scribal desk) and

well-organized book trade guilds to that of the printer's craft shop. This resulted in fundamental changes to society. A mainly scribal society became a typographical one. Average copies of early printing editions ranged between 200 to 1,000 copies, compared with a single book that took a scribe nearly a month or, depending on its complexity, a year or more to complete.

Prior to printing, scholars had great difficulty in accessing uniform data, especially concerning chronologies, maps, tables, diagrams, and other reference guides common today. Library collections were subject to contradiction and corruption after subsequent editions were copied over the course of time. Print publishing slowly evolved within these confines and conventions of the day. Old scribal systems and technologies eventually petrified, giving way to the emergence of new occupational groups, including type founders, correctors, typographers, indexers, translators, copy editors, illustrators, print dealers as well as the expansion of new commercial centers and related industries such as paper making, ink production, and marketing. Cross-cultural exchanges within these groups stimulated new forms of enlightenment and intellectual ferment. By the end of the 15th century, the expertise of medievalists had given way to the beginnings of the modern era.

A commercial revolution resulted as other closely interrelated changes began to affect the entire fabric of man and society. Market demands shifted to meet the demand for books. The revolution of having knowledge, references, and reliable resources available had a direct bearing on the economic, historical, political, legal, technological, and educational developments of society. The correction of false and erroneous data, especially pertaining to a wide range of reference materials, medical and scientific data, and so on, was enormous. The ability to cross-reference and compare texts resulted in the formation and dissemination of new ideas and thinking. Religious ideologies, educational opportunities, exploration to new lands, major discoveries, and the Renaissance itself began to reflect the impact printing began to have on society.

In particular, this sharing and discussion of facts, concepts, perspectives, and discoveries related to scientific research in the 19th century resulted in the publication of major books in biology, physical anthropology, and archaeology as well as specific ethnographic studies in the social sciences. In academic books and professional journals, topics ranged from geology and paleontology to ethnology and linguistics. The publication of such works paved the way for Charles Darwin's *On the Origin of Species* (1859), which both revolutionized the conception of humankind and life forms in natural history and inspired new areas of scientific research from primatology to psychology.

While there have been many waves of change that have had far-reaching effects on society, we can hardly imagine their impact without Johannes Gutenberg's invention of printing. Johannes Gutenberg's collaboration helped solve one of the most vexing problems of man's persistent compulsions—to communicate easily, cheaply, permanently, and quickly. Thanks to Gutenberg, the invention of movable type became one of the most far-reaching technological achievements in history, and our achievements today can trace their roots back to his genius.

— *Veronica Young*

See also **Archaeology, Medieval**

Further Readings

Eisenstein, E. (1983). *The printing revolution in Early Modern Europe.* New York: Cambridge University Press.

Geck, E. (1968). *Johannes Gutenberg.* Berlin: Briider Hartmann.

Johns, A. (1998). *The nature of the book.* Chicago: University of Chicago Press.

Gypsies

The Western use of the term *gypsy* denotes an ethnic group believed to have migrated out from India approximately 1,200 years ago, spreading throughout Europe, the Americas, and other countries. Known by many names (*Tattare* in Sweden; *Tsiganes, Getan,* or *Manus,* in France; *Tchingheane* in Turkey; *Zingare* in Italy; *Zincali* in Spain; *Zigeuner* in Germany; *Cigany* in Hungary; *Tsygane* in Russia), this ethnic group often, but not always, identifies themselves as *Rom* (singular), *Roma* (plural), *Romni* (feminine singular), *Rom* (masculine singular), *or Romani* (adjective). The origin of the term *Rom* is believed to be a modification of the Sanskrit word *Dom,* a man of low caste who performs song and dance for a living.

Gypsies are what is termed a *diaspora population* (dispersed group living outside a homeland). Believed to have left India for reasons that are still unclear, it is speculated they were connected with military activity in India against the Turk, Afghani, and other military forces invaders leading to migration 1,200 years ago.

Current Gypsy population size is difficult to accurately establish due to absence of accurate census data, but estimates range from 8 to 10 million Gypsy people worldwide, who are residing in at least 40 different countries. During the past 1,200 years, this ethnic group has experienced a history of widespread mobility and marginality, while enduring momentous, continuous, and extreme prejudice, hostility, and violence against them by the people in the countries they moved into. The frequent moving within countries was motivated by either their choice or others' force and depended upon the social climate of the host country at the time. They were the ultimate strangers, feared and used as scapegoats for whatever problems local peoples were coping with at the time that needed a concrete explanation—hence, blame the strangers.

Adaptation and segregation are key factors to understanding the Gypsy way of life. They tend to live simultaneously in two different worlds: the exterior imposed non-Gypsy world and the internal constructed Gypsy world. The differences between the two lifestyles reinforce prevailing Gypsy practices; unique Gypsy language usage, social customs, religious practices, and political and economic institutions are all effectively used to mark the boundaries that divide them from others. Ethnic boundaries in the nature of Fredrik Barth's dichotomy of "we" versus "they" are established, reinforced through contrasts, and maintained to divide and separate. Unique identifying characteristics have been developed over time that reinforce the necessity for group separateness, and for the Gypsies these include the group-reinforcing tendencies of being biologically self-perpetuating, internally sharing specific cultural values, and using shared internal communication forms and other unique characteristics that function to enhance and maintain border divisions. These peoples then can identify themselves as being necessarily different from others, reinforcing the separation. It is useful to add Manning Nash's (1978) description of an ethnic group as being a "self-conscious group within a nation state" with "boundary marking values" that include defining cultural regulators of "kinship" (family, partners, friends), "commensality" (food preferences and taboos) and "common cult" (religious practices), which form a strong barrier between a specific ethnic group and the larger society. The boundary-maintaining mechanisms then allow Gypsies a cohesive reinforced coexistence within the boundaries and also provides a means of distancing themselves from non-Gypsies *(Gaje)* through reflection, interpretation, and reinforcement of the absolute necessity of reinforcing the differences.

The Gypsy ethnic group is primarily an endogamous (in-marrying), kinship-bound group, with preferences for unique ingroup edible food selection, preparation, and consumption practices. They do not eat with others out of fear of pollution. Their religious practices center on standards required for maintaining the ethnic group solidarity, being regulated and reinforced by known rules of purity *(marime)* and pollution. Objects that come into contact with the upper body are not to come in contact with the lower body. Separate basins and soap are used to clean upper- and lower-body parts and materials that come into contact with each, thus building contact walls between Gypsies and non-Gypsies.

Two different systems of political control operate concurrently within Gypsy life. One is the non-Gypsy institution law, customs, and structure and the other is the traditional internal ethnic group political institutions, laws, customs, and structure. They are often at odds with one another, causing conflict between Gypsy and non-Gypsy. Internal Gypsy political institutions operate within what is known as the *Kumpania (*extended-family group within the same geographical location), which is controlled by the interpretation and application *Romania* (traditional Gypsy law). The laws are interpreted by *Rom baro* (internal leaders) and enforced by internal gossip systems. Varying states of purity *(marime)* and attempts to avoid polluting states regulate the rhythm of daily life. When internal mechanism processes fail to produce the necessary and desired political and legal result, leaders will occasionally turn to outside *(Gaje)* authority for reinforcement. An unruly person may be turned over to the police for theft.

Expulsion is the ultimate punishment for a group member's violation of the rules that regulate internal harmony and control. Expulsion can be either for a defined time period or, in extreme cases, permanently. Failure to comply with the outside *(Gaje)* political and legal structure can also have consequences for members. Non-Gypsy legal systems and

laws are frequently at odds with internal Gypsy regulatory laws, practices, and values. Claude Cahn, the editor of a cross-discipline series of articles on the *Rom,* explores issues of *Rom* human rights violations, equality issues, hate speech practices against them, educational system inadequacies for them, media stereotyping and misrepresentation, justice systems misinterpretations and failures, and racial issues in connection with Gypsies living in both Europe and the United States. Gypsy populations frequently have been the object of extreme prejudice, persecution, negative stereotyping, imprisonment, expulsion, and enslavement, the ultimate example being that of the Nazi death camps with the goal of total genocide.

In the United States, Gypsies frequently borrow one another's social security numbers and American names, believing both to be the property of their entire kin group. This switching of identities creates legal dilemmas between the Gypsies and the exterior legal system practices. This common sharing of social security numbers allows Gypsies to follow their tradition of maintaining anonymity when in contact with *Gaje* and works to reinforce separation from non-Gypsy society. Incarceration in prison can cause a Gypsy tremendous hardship because of strictly enforced Gypsy purity *(marime)* and pollution practices and violations of these rules in connection with proper Gypsy relationships with food, body, cleanliness, and ritual separation from non-Gypsies.

Economically, Gypsies generally support themselves with low-status occupations that are often on the margins of the larger-society economic endeavors, with time-honored occupational traditions of fortune-telling, auto repair, used-car sales, migrant agricultural workers, peddlers, entertainers, hawkers, and metal workers. Explanation and interpretation of economic choices for minority groups are explored by Sway, using what is called the "middleman minority theory." The theory investigates how marginal or minority group occupation practices are selected, established, and maintained by those involved. Sway looks at how employment practices function to strengthen avoidance of full assimilation of minority groups into the larger social structure. He demonstrates how Gypsy *kumpania* and *vitsa* (extended-family groups with authority under a specific chief) divide up specific geographical locations among groups and members of groups. They then can control the overlapping of Gypsy economic opportunity, while allowing adaptation to a hostile host environment. This control also provides for necessary occupational roles to be fulfilled that are not desired or undertaken by the elite and middle classes of a society. The Gypsies, in other words, fill a vacuum in the existing work market.

Frequently, the status of being either nonliterate or marginally literate further reduces occupational opportunities, while concurrently enforcing intergroup cohesiveness and dependency. The traditional language of the Gypsy, *Romani* is a verbal not a written language. This increases the necessity for face-to-face communication and group dependency. Reinforcing this practice is the preference for internal enculturation of the children, rejecting extensive inclusion in formal government or religious educational institutions. This is not to imply that Gypsy children do not attend schools. They do attend when convenient, and particularly when receipt of government financial assistance is predicated on children's school attendance. Questions need to be asked regarding length of stay, attendance, and level of achievement for the children. The Gypsies are known to prefer internal nonformal systems of education for their children, thereby reinforcing Gypsy values, practices, and beliefs. There are, of course, also Gypsies that are well educated and work within the economic structures of mainstream society.

Kinship structures are designed to enforce ingroup cohesiveness, with the extended family holding a position of primary importance. The Kalderas, or Coppersmith, of New York can be used as an example of kinship practices. The Kalderas migrated from several countries, primarily Russia, Serbia, and Greece. They share the *Romani* dialect and have almost identical cultural institutional values, beliefs, and practices. Membership is within a federation of patrilineal bands *(vitsa)* with heads of extended families serving on governing councils. Internal arranged marriage is preferred and occurs between *vitsa* groups. First cousin marriage is strongly frowned upon, further reinforcing cross-group, appropriate-mate selection and creating linkages between groups. Typically, the elders arrange marriages, with residence after marriage and until the arrival of the first child with the groom's parents. This means that the couple is considered to be members of the groom's *vitsa,* becoming a recognized adults within the ethnic community attached to being married. Age grade status is established, with specific privileges and responsibilities attached to each maturation level in the life cycle

as defined by the ethnic group. Both consanguine (by blood) and affinal (by marriage) relatives are vital in forming the networks of dependency and reciprocal support necessary for daily existence. *Vitsa* (kin group) solidarity is dependent on both group cohesiveness and on lineage tracing, occurring along both the male and the female lines. The status of all *vitsa* members is affected by the behavior of each and every individual member, reinforcing solidarity of the group.

Elaborate funeral practices reinforce continuation of the descent system over time, with beliefs in ghosts and spirits of ancestors of deceased relatives interacting with persons still alive. Material goods of the deceased relatives can cease being used, destroyed, sold, or otherwise disposed of. Williams recounts how a form of solidarity continues between the dead and the living by recounting how two members of the French "Manus" Gypsy group were in the midst of an argument when one of the men went into a nearby trailer and returned with a gun. Upon seeing the gun, the other man in the argument turned and walked away. This could be misinterpreted as the fear of being wounded that caused the man to walk away, but in fact it was the gun itself, having been previously owned by a dead family member, that provoked the leaving. The leaving was a sign of respect for the dead person and not fear of the other man's using the gun. The actual physical disappearance of the body of the dead person is reinforced by removal, destruction, disuse, transference, or sale of the deceased's earthly material goods, but the spirit existence of the deceased family endures across time and is kept alive in the survivor's thoughts. Material objects that belonged to a dead person and that are retained represent the deceased person and must be shown.

Gypsies frequently adopt the dominant religion of the nation, state, or country where they reside. In part, this is an adaptive measure, an attempt to avoid past experiences of religious persecution inflicted on the Gypsies for not being one religion or another: "In Spain, Italy, France, they become Roman Catholic; in England usually Protestant; and in southeast Europe they are either Muslim or Greek Orthodox" (Gropper, 1975, p. 109). Within their own religious practices, they greatly fear the influence of supernatural ghosts, spirits, and souls of the dead that can influence their lives. This can be seen as a departure from the dictates of traditional Christian religions that place much less emphasis on the dead influencing the living. Gypsies also have a belief in the "evil eye," using various objects and rituals to deflect evil influences. In addition, the color red can be used to counteract the effects of the evil eye, along with a wide range of religious taboo practices and rituals aimed to influence unseen forces. Gypsies believe and also fear the ghosts of evil spirits that can make their children sick. In an attempt to "fool" the deviant ghost, they may rename a very sick child to divert attention. Gypsies also are known to believe in the magical use of numerology and the use of combination of herbs and charms to ward off evil spirits. This demonstrates how they maintain their own Gypsy religious beliefs and practices separately from those of the outside world.

Gypsy cultural practices are not static, and what is written here should be seen as ideal practices subject to individual person and group variation. Culture is a tapestry, with multiple threads that crisscross to create the design of ethnic group unification, choice, modification, adaptation, or separation, depending on the needs of the specific group, time, and place involved.

— Beverly J. Fogelson

Further Readings

Cahn, C. (Ed.). (2002). *Roma rights.* New York: International Debate Education Association.

Gropper, R. C. (1975). *Gypsies in the city.* Princeton, NJ: Darwin Press.

Lemon, A. (2000). *Between two fires.* Durham, NC: Duke University Press.

Nash, M. (1989) *The cauldron of ethnicity in the modern world.* Chicago: University of Chicago Press.

Spradley, J., & McCurdy, D. (Eds.). (2003). *Conformity and conflict.* Boston: Allyn & Bacon.

Sway, M. (1988). *Familiar strangers.* Urbana: University of Illinois Press.

Tong, D. (Ed.). (1998). *Gypsies.* New York: Garland.

Williams, P. (2003). *Gypsy world* (C. Tihanyi, Trans.). Chicago: University of Chicago Press.

Haddon, A. C. (1855–1940)

Alfred Cort Haddon can take credit as the man most responsible for establishing and legitimating anthropology as an academic discipline in Britain. There were anthropologists before Haddon, but no one did as much as he did for the discipline in its early years. In Haddon's words, anthropology was the "Cinderella science."

Haddon was born on May 24, 1855, and was educated at Christ's College, Cambridge. From 1880 until 1901, he was Professor of Botany at the Dublin College of Science. In 1900, he moved back to England, where he lectured in ethnology at Cambridge and, after 1904, at London University as well. Haddon served as President of Royal Anthropological Institute and President of Ethnological Section of the British Association between 1902 and 1905.

Haddon's prominence as an anthropologist came as a result of the influential expeditions to the Torres Straits islands. The first tour, in 1888, was originally undertaken to study coral reefs of the islands, reflecting Haddon's original interest in zoology. The second tour, in 1898 to 1999, was specifically devoted to anthropological issues and included a team of people, several of whom were destined to make large contributions to the development of anthropology in Britain. The photographs and film from that tour remain very valuable to this day. Haddon wrote up his conclusions from the tours in articles in *Nature* and in the proceedings of the Royal Dublin Society. A large compendium of works covering all aspects of the Torres Straits expeditions was put together, which spanned six volumes. Haddon had the largest single role in the six-volume *Reports of the Cambridge Anthropological Expedition to Torres Strait* (Cambridge, 1901–1935), being involved in some capacity in five of the six volumes. The first volume, on ethnography, was one of only two that came from a single author (the other being the second volume, on physiology and psychology, by W. H. R. Rivers). Less helpfully, Haddon's volume was not published until 1935, more than 27 years after Volume 5 had been completed.

Haddon was unusual in his ability to appreciate the power of relationships involved in his study of native peoples. He was more anxious than many of his colleagues to study native cultures in a climate of respect and with some attention given to helping them preserve their customs in the face of Western encroachments. Haddon appreciated the friendliness of the Torres Straits Islanders, particularly in view of their earlier sufferings "from the malpractices of white men." Haddon was strongly opposed to the often casual use of the word "nigger" by his colleagues.

He was also a consistent opponent to the fashionable theory of diffusionism, whose main champion was the Australian anthropologist Grafton Elliot Smith.

Haddon was brought up a Baptist but lost his faith, becoming an agnostic. He was a member of the Rationalist Press Association (RPA) and, after 1927, an honorary associate. He cooperated with the RPA on a couple of occasions. In 1910, his *History of Anthropology* was published as the fifth title in the *History of Science* series, a pioneering series of popular science published by Watts & Co., the publishing arm of the RPA. A revised edition of that work was published in 1934, as Number 42 of the Watts & Co. *Influential Thinker's Library* series.

Haddon's last works reflect well his progressive opinions. For instance, he wrote a preface (as did Sir Arthur Keith) for Ettie Rout's *Stand Up and Slim Down* (1935), a health book for women with obesity and constipation problems. Ettie Rout was a very

controversial woman, having achieved notoriety during World War I for helping prevent sexually transmitted diseases among soldiers by encouraging the use of contraceptives. In the same year, Haddon collaborated with Sir Julian Huxley and A. M. Carr-Saunders in a publication called *We Europeans,* which was devoted to demolishing the racial theories of the Nazis, in particular the claims of so-called Aryans to being a race apart and superior to all others.

In 1883, Haddon married and had a son and two daughters. His wife died in 1937, and Haddon died on April 20, 1940. The faculty of archaeology and anthropology's library at Cambridge is named after him.

— *Bill Cooke*

See also **Anthropology, History of**

Further Readings

Cooke, B. (2004). *The gathering of infidels: A hundred years of the Rationalist Press Association.* Amherst, NY: Prometheus Books.

Haddon, A. C. (1934). *History of anthropology.* London: Watts & Co.

Stocking, G. W. (1995). *After Tylor: British social anthropology, 1888–1951.* Madison: University of Wisconsin Press.

Haeckel, Ernst (1834–1919)

In Germany, Ernst Heinrich Haeckel devoted his life to defending Darwin's theory of biological evolution. He was not reluctant to consider rigorously the philosophical ramifications and theological consequences of cosmic evolution in general and human evolution in particular. As a natural philosopher, he contributed to a sound scientific understanding of the nature of humankind and its proper place in the universe (despite the unavoidable limitations of his Victorian epoch).

In Haeckel's major philosophical work, *The Riddle of the Universe at the Close of the Nineteenth Century* (1900), he presented a naturalist interpretation of evolution within a cosmic perspective. The dogmatic dualism of Kant and Spencer was rejected, showing Haeckel's familiarity with the chemistry, biology, anthropology, psychology, and history of philosophy during his time. He was particularly influenced by Spinoza, Goethe, and Darwin. A major zoologist and evolutionist, he is primarily remembered for his early defense of Darwinism in Germany and for establishing his "biogenetic law." Committed to the view that both science and speculation are necessary for a sound interpretation of the cosmos, he developed his own scientific cosmology. His monistic philosophy rejected the following three theistic dogmas: a personal God, the personal immortality of the human soul, and the freedom of the individual will. Also, he rejected the concept of empty space but supported strict determinism.

Haeckel's philosophy of nature relied upon experience and inference (rational speculation), both sources of knowledge being held indispensable. It rejected anthropism, that is, that powerful and worldwide cluster of erroneous opinions that opposes the human organism to the rest of nature and represents it to be the preordained end of an organic creation, an entity essentially distinct from it, a godlike being. As a result, he rejected (a) the anthropocentric dogma, which maintains that humankind is the preordained center and aim of all terrestrial life (Haeckel advocated a cosmic perspective), (b) the anthropomorphic dogma, which maintains that God, the creator, sustainer, and ruler of the world, has human attributes and that the human being is therefore godlike instead of the other way around (Haeckel rejected all forms of theism but was sympathetic to scientific pantheism), and (c) the anthropolatric dogma, which maintains an ontological dualism and the personal immortality of the human soul (Haeckel's own view was monistic and, as such, strictly naturalistic).

Briefly, the antropistic view of the world that sprang from these three dogmas is in irreconcilable opposition to Haeckel's monistic system. Indeed, it is rejected by his new cosmological perspective. Likewise, he held that his evolutionary monism was capable of resolving the following problems: (a) the nature of matter and force, (b) the origin of motion, (c) the origin of life, (d) the order in nature, (e) the origin of simple sensation and consciousness, (f) rational thought and speech, and (g) freedom of will. Consequently, he maintained that the great law of substance remained the only simple, comprehensive, mysterious, and enigmatic riddle of the universe. He espoused the view that this law is the fundamental cosmic fact of reality establishing the eternal persistence of matter and force (this was the law that guided

his monistic philosophy through the complexity of the universe to a solution of world problems).

What emerges as crucial in Haeckel's philosophy is his severe criticism of the fallacy of anthropism with its anthropocentric, anthropomorphic, and anthropolatric dogmas. Clearly, he denied the basic assumptions of theism, for he held that his monistic, pantheistic, and evolutionary cosmology would eliminate these errors. In place of these dogmas, he advocated the law of substance, with its naturalist implications supported by scientific knowledge. Humankind is seen as a product of biological development, and all of its faculties are totally within nature. To Haeckel, there is no need for transcendental or supernatural assumptions (the independent existence of the external natural world prior to the emergence of humankind and the limited constituting ability of human consciousness are both accepted as basic facts of physical reality).

Haeckel found empirical support for his evolutionary perspective in paleontology, comparative embryology, comparative anatomy and physiology, and comparative psychology. Comparative morphology demonstrated that our species is a vertebrate, tetrapod, mammal, primate, and hominoid. There was even biological proof for the asserted close affinity of our species with the great apes. In all important respects, the symboling human animal presents all the anatomical marks of a great ape, with reason being the only aspect that essentially distinguishes it from all its lower or earlier evolutionary relatives.

Paleontology supported an evolutionary interpretation of the great chain of being, or *scala naturae,* previously acknowledged by the nonevolutionists. There is a hierarchy in nature represented by successive chronological developments, for example, protozoa, protista, metazoan, invertebrates, fish, amphibians, reptiles, birds, and mammals, as well as developments in plants and insects. As such, the paleontological record supported the evolutionary unity of nature and documented Haeckel's monistic view.

Embryology or ontogeny demonstrates a common parentage of all organisms in general and of all primates in particular. Embryology implies that all existing primates share a common ancestry, our species and the great apes (orangutan, chimpanzee, and gorilla) being the latest products of primate evolution. Haeckel formulated his own biogenetic law to express the causative connection that exists between ontogeny and phylogeny: "*Ontogenesis is a brief and rapid recapitulation of phylogenesis,* determined by the physiological functions of heredity (generation) and adaptation (maintenance). . . . In man, as in all other organisms, the embryonic development is an epitome of the historical development of the species." Haeckel's biogenetic law of recapitulation was regrettably exploited by extreme cultural evolutionists and condescending racists at the expense of technologico-economically little developed and nonliterate societies arbitrarily described as primitive and backward peoples. Later, this law was misinterpreted even more cynically by racist politicians in unethical ways of which Haeckel certainly would have disapproved.

Physiology and psychology demonstrated that the vital processes in our species are subject to the same physical and chemical laws as those of all other animals. Likewise, its mental faculties or psychic life (including its rational faculty) are said to differ from those of the nearest related animals only in degree and not in kind, that is, quantitatively but not qualitatively. The human mind or soul (consciousness) evolves during the ontological development of the human individual and is dependent upon the common structure and normal functioning of the psychic organ, the human brain. As a result of this naturalist interpretation of the development of mental activity, personality can lay no claim to immortality.

Haeckel acknowledged that reason does distinguish our species from the other animals, but reason is not a supernatural aspect of the human mind. He held that reason is an activity of the human mind that has evolved along with the evolution of the brain. To account for the evolutionary emergence of consciousness (and eventually the emergence of reason), Haeckel adopted a position of panpsychism. His position of panpsychism resulted from the investigation of comparative psychology. However, a distinction should be made between a moderate and an extreme form of panpsychism. A moderate form of panpsychism merely maintains that all living objects manifest an aspect (and therefore a degree) of psychic development or sensitivity (this is Haeckel's own position). However, an extreme form of panpsychism advocates that ultimately everything in reality is psychic in nature, and therefore an ontological monism grounded in mind is necessary. A naturalist may support an ontological monism grounded in naturalism, for the degrees of sensitivity manifested

Source: © Hulton-Deutsch Collection/CORBIS.

by biological organisms depend upon the development of the central nervous system and brain. As a result, one may speak of the naturalistic emergence of psychic activity. By maintaining that the human mind differs from the psychic activity of lower animals merely in degree, rather than in kind, Haeckel's view agreed with those of Huxley and Darwin. His position does not imply anthropocentrism, a doctrine that he rejected. He merely acknowledged that in the long series of biological organisms that have evolved, our species is the most complex, and that degrees of sensitivity in the function of mental activity are directly related to the degrees of complexity in the structure of the central nervous system and brain. Therefore, since its central nervous system and brain are the most complex in the animal kingdom, it is not surprising that the human animal should manifest the highest degree of consciousness. In fact, our species is capable of self-consciousness primarily because of its superior central nervous system and brain and their role in sociocultural interaction.

Haeckel accepted Huxley's pithecometra thesis, that is, that the differences between our species and the great apes are not so great as those between the apes and the lower monkeys. Denying the different proofs that have been given for the immortality of the human soul (i.e., theological, cosmological, ontological, teleological, moral, and ethnological), he thought that there are sound scientific arguments to support this denial (i.e., physiological, historical, experimental, pathological, ontological, and phylogenetic arguments grounded in empirical evidence).

While acknowledging the incompleteness of the fossil record in rock strata, Haeckel maintained that, in the course of human evolution, an ape-man without speech, or the "missing link" (*Pithecanthropus alalus*), had once existed between the prehistoric apes and the present human animal. Unlike Darwin, who correctly held that Africa was the birthplace of our species, Haeckel taught that Asia was the cradle of hominid evolution. In fact, he even hypothesized that an Asian landmass, which he referred to as Lemuria (now vanished), had been the geographical location where our species had its origin from a hominoid ancestor. Haeckel's own lectures on the evolution of our species were very popular. His hypothesis that the missing link would be found in Asia even inspired Eugene Dubois to travel to Java, where he subsequently discovered the fossil hominid *Pithecanthropus erectus* (1890–1892). Haeckel's hypothesis had actually led to a major scientific discovery in emerging physical anthropology.

Haeckel's monism rested upon the law of substance, which in turn rested upon two great cosmic theorems: (1) the conservation of matter (Lavoisier's chemical law of the persistence or indestructibility of matter presented in 1789) and (2) the conservation of energy (Mayer's and Helmholtz's physical law of the persistence of force presented in 1842). On the basis of all of this, Haeckel concluded that the sum total of force or energy in the universe remains constant, no matter what changes take place around us. Energy is eternal and infinite, like the matter on which it is inseparably dependent. The two cosmic laws are fundamentally one, their unity being expressed in the formula of the law of the persistence of matter and force. Haeckel referred to this fundamental cosmic law as the supreme law of substance (axiom of constancy of the universe). The law supported universal causality and cosmic unity. Haeckel's monistic ontology has benefited in the wake of Einstein's theory of

relativity. The demonstrated interchangeability of matter and energy scientifically justifies a naturalist monism, for matter and energy are merely two manifestations of the one ontological stuff of this universe.

There are six essential characteristics of Haeckel's view of the cosmos: (1) the universe is infinite in space, (2) the universe is eternal in time, (3) the universe is a *perpetuum mobile* (movement is an innate property of substance), (4) there is no internal purpose whatever in the universe), (5) there is an eternal repetition in infinite time of the periodic metamorphosis of the cosmos, and (6) the idea of God is identical with that of nature or substance. Haeckel's scientific and pantheistic interpretation of reality is reminiscent of the positions held by Bruno, Spinoza, Goethe, Humboldt, and Einstein.

Haeckel argued that evolution and theism are irreconcilable. The evolutionary perspective led to the paradoxical conception of God as a "gaseous vertebrate" or gaseous being (by the expression "gaseous vertebrate," Haeckel is referring to the invisible and personal aspects of the traditional Christian conception of God). He concluded that monistic pantheism is necessarily the world-system of the modern scientist and that the modern thinker who has science and art needs neither a special church nor a narrowly enclosed portion of space.

Haeckel thought it very probable that unicellular evolution had taken place on planets elsewhere in this universe and that higher plants and animals have evolved on these planets; very questionable that these higher plants and animals are identical in development to those on earth; wholly uncertain whether there are vertebrates, mammals, and humans on other planets; much more probable that there are different plants and animals elsewhere, and perhaps higher beings transcending the intelligence of earthy human beings. He was also confident that future progress in astronomy, geology, physics, chemistry, biology, and anthropology would bear out his positions.

Haeckel's cosmological and evolutionary perspective is expressed in the following fundamental theorems: (a) the universe is eternal and infinite, (b) its substance, with its two attributes (matter and energy), fills infinite space and is in eternal motion, (c) this motion runs on through infinite time as an unbroken development, with a periodic change from life to death (from evolution to devolution), (d) the innumerable bodies that are scattered about the space-filling ether all obey the same law of substance (while the rotating masses slowly move toward their destruction and dissolution in one part of space, others are springing into new life and development in other quarters of the universe), (e) our sun is one of these countless perishable bodies, and our earth is one of the countless transitory planets that encircle them, (f) our earth had gone through a long process of cooling before water, in liquid form (the first condition for organic life), could settle on it, (g) the ensuing biogenetic process, the slow development and transformation of countless organic forms, must have taken millions of years, (h) among the different kinds of animals that arose in the later stages of the biogenetic process on earth, the vertebrates have far outstripped all other competitors in the evolutionary process, (i) the most important branch of the vertebrates, the mammals, were developed later (during the Triassic period) from the lower reptilian, (j) the most perfect and most highly developed branch of the class mammalian is the order of primates, which first put in an appearance (by development from the lowest prochoriata) at the beginning of the Tertiary period, (k) the youngest and most perfect twig of the branch of primates is our species, which sprang from a series of humanlike apes toward the end of the Tertiary period, and (l) consequently, the so-called history of the world (i.e., the brief period of a few thousand years that measures the duration of civilization) is an evanescently short episode in the long course of organic evolution, just as this episode, in turn, is merely a small portion of the history of our planetary system.

As our earth is a mere speck in the infinite universe, so humankind is but a tiny grain of protoplasm in the perishable framework of organic nature. Haeckel proposed that it is very probable that on many planets of other solar systems, plants and animals have evolved similar to those on earth, perhaps even higher plants, animals, and vertebrate-like beings with intelligence that may even far transcend our own species on earth. As such, he had envisioned the new science of exobiology with its logical consequence for exoevolution.

In *Monism as Connecting Religion and Science* (1892), Haeckel's science-oriented evolutionary philosophy had rejected outright homotheism (theoanthropomorphism), that is, attributing human shape, flesh, and blood to the gods. He held that the Christian concept of a personal God is totally erroneous in light of scientific evidence and the evolutionary

perspective. Unlike Darwin, Spencer, and Huxley, Haeckel was not reticent in expounding the naturalist and atheist implications of the theory of evolution as he understood them. His philosophy of humankind was grounded in the special sciences informed by critical reason. He held that the evolution of our species could be sufficiently accounted for by the sciences, that is, there is no need to distort or ignore established natural facts by dogmatically holding to unverifiable philosophical assumptions for the sake of retaining a theological orientation. He was bold enough to clearly point out that there are no longer any legitimate reasons for believing in a supernatural origin and spiritual essence of humankind. Hence, for Haeckel, there is no need to construct elaborate philosophical systems in an attempt to reconcile the special sciences with theistic theology. Theology is simply being replaced by ethically inspired and morally responsible scientific understanding and philosophical appreciation. His strong reaction to the dogmatism of the churches was reinforced by their refusal to acknowledge the implications of a naturalist interpretation of biological evolution. Few natural philosophers have been so honest and persistent in their quest for truth as Ernst Haeckel, who, even when considered solely within the limits of his time, remains a major scientific figure of undeniable historic significance.

Haeckel's *Last Words on Evolution: A Popular Retrospect and Summary* (1905) restated his philosophical position for the last time. The work contains three essays given at the last public delivery by the great man who was rightfully referred to as the "Darwin of Germany." He continued to maintain the thesis that naturalism, or evolutionary monism, and supernaturalism are diametrically and irreconcilably opposed. He wrote that the papacy is anything but a divine institution (describing it as "the greatest swindle the world has ever submitted to"). In his essay "Charles Darwin as an Anthropologist" (1909), Haeckel acknowledged his indebtedness to the great genius for the fact of organic evolution and its mechanism of natural selection, which support a monistic view of the origin and nature of humankind; but unfortunately, Haeckel resisted the new theories of mutation and the gene.

In his last book, *Eternity* (1916), Haeckel once again maintained the cosmic unity of matter and energy within the endless "becoming and passing away" of things in this universe, as well as the role of chance throughout organic evolution. Of course, his respect for the special sciences, especially biology and anthropology, had not diminished. And he continued to stress the critical need for keeping church and state separated in the quest for truth.

Haeckel's works consistently discarded vitalism, teleology, positivism, agnosticism, and mysticism. They defended mechanism, hylozoism, a moderate form of panpyschism, pantheism, monism (matter-energy or matter-force), and the use of reason. Within his evolutionary framework, he never veered from his basic assumptions, that is, that naturalist or anti-spiritualist monism supports an eternal, infinite, self-sufficient, indestructible, uncreated, and endlessly evolving universe. Today, the empirical evidence to support the doctrine of evolution is sufficient to convince any open-minded scientist, philosopher, or even an enlightened theologian. In its general implications, Haeckel's *Weltanschauung* (worldview) remains untarnished after more than a century of continued scientific advancement. The fact that his millions of years have become billions of years is a correction resulting in a greater perspective that he would have happily embraced. It may be charged that Haeckel neglected to establish a rigorous epistemology, avoided mental analysis, underestimated the influence of social evolution (he could have added a supplementary set of cultural theorems, including a less ambiguous and more elaborate ethical stand), and even deified the universe. He was primarily a zoologist, and a great one, who, like Giordano Bruno and other pantheists, did not experience a need for a special divinity apart from and beyond that of the evolving cosmos itself.

Haeckel's views were the source of considerable controversy in biology, philosophy, and religion. He distinguished himself in zoology, making contributions to embryology and taxonomy. Unfortunately, he advocated a limited form of spontaneous generation to account for the origin of the simplest protoplasmic substance from inorganic carbonates. Nevertheless, he was convinced of the essential unity of the inorganic and organic worlds. In fact, he upheld the essential unity of the entire universe. His doctrine of substance (ontological monism) maintained that the ultimate nature of the stuff of the universe is unknown, but it rejected traditional dualism as well as atomistic materialism and idealistic monism. Yet, Haeckel's scientific writings advocated naturalism and rejected supernaturalism. His evolutionary

monism was grounded in the law of the conservation of matter and energy.

Haeckel advocated the reconciliation of science (empiricism) and philosophy (rationalism), but rejected religious faith as a substitute for critical inquiry. He held that introspection must be supplemented with experimental psychology and physiology. Clearly, for him, consciousness itself is a natural phenomenon and the product of biological evolution. Haeckel's pantheism advocates monism, a "natural equality" of egoism and altruism, the improvement of education and the human condition through more science, and is grounded in naturalism, humanism, and the evolutionary viewpoint within a cosmic perspective. With only a few but important modifications, this philosophical worldview remains in step with modern thought.

Ernst Haeckel died in Jena on August 9, 1919. He had spent an incredibly successful life as a professor and author, who belonged to over 90 learned societies and received many honors for his scientific research. An unabashed atheist, Haeckel had been courageous enough to take seriously the far-reaching consequences of evolution, while many of his contemporaries remained either indifferent or silent to the growing empirical evidence in the special sciences, from geopaleontology to comparative morphology, that documented the fact of evolution. Indeed, it is a fitting tribute to this daring evolutionary naturalist, with a cosmic perspective, that his book *The Riddle of the Universe* (1900) remains an important popular work of lasting intellectual value.

— H. James Birx

Further Readings

DeGrood, D. H. (1965). *Haeckel's theory of the unity of nature.* Boston: Christopher.

Haeckel, E. (1878). *Freedom in science and teaching.* London: C. Kegan Paul.

Haeckel, E. (1892). *Monism as connecting religion and science: The confession of faith of a man of science.* London: Adam & Charles Black.

Haeckel, E. (1904). *The wonders of life: A popular study of biological philosophy.* New York: Harper & Brothers.

Haeckel, E. (1905). *Last words on evolution.* New York: Peter Eckler.

Haeckel, E. (1905). *The riddle of the universe* (1900). New York: Harper & Brothers.

PRIMATE EMBRYOLOGY

Scientists hope that research on primate embryology will one day lead to finding a cure for many of the diseases humans now suffer from. Because primates are the humans' closest relatives in the animal kingdom, primate research is considered more useful than the use of rodents and other customary research animals. Humans share 95% of their genes with primates.

In October 2000, the Oregon Health Sciences University's team of scientists created the first genetically modified primate. The baby rhesus macaque was named ANDi, a reverse acronym of "inserted DNA." The little monkey was healthy and played normally with other baby monkeys. ANDi carries an extra gene that was inserted when he was an unfertilized egg. The gene is for a green fluorescent protein found in jellyfish and was inserted as an easily identified marker. This gene was used because it is known to be harmless and is easy to detect.

Scientists modified 224 eggs by injecting them with a genetically modified virus. The eggs were fertilized by injecting them with sperm. Forty embryos were produced. These embryos were implanted in 20 surrogate mothers. Five of the 20 adult monkeys became pregnant. Two infants were stillborn, and the other three were healthy males. ANDi is the only one proven by tests of his cells to show a successful integration of the transgene.

Scientists believe the process shows great potential for finding cures for human diseases. They contend that, for example, an Alzheimer's gene could be introduced into a monkey in order to study the effects of various Alzheimer's treatments. Researchers claim that the genetically altered mice and flies already being used in laboratories are poor models for human disease. Primates, being genetically closer to humans, should provide better models.

Many scientists hailed ANDi's birth as a great achievement. However, not all shared their enthusiasm. For example, members of the People for the Ethical Treatment of Animals (PETA) are alarmed. PETA is opposed to the use of animals in laboratories, and regard the animals as being

mistreated. PETA also doubts that genetically altered monkeys will prove useful in studying human disease. That remains to be seen. The procedure is difficult to accomplish with monkeys because of the complexity of harvesting monkey eggs and the scientists' inability to artificially control a monkey's reproductive cycle.

— Pat McCarthy

Haidas

The word *Haida* is a derivative from the words *Ou Haadas,* meaning "inlet people," the name replied when asked by the first Europeans what tribe or people they were. Their homeland is called Haida Gwaii and is situated along the archipelagos of the Queen Charlotte Islands of Canada and the southern extremities of Prince of Wales Island in Alaska. There are two main moieties (two equal subdivisions of the tribe) within the Haida people: Raven and Eagle. Under these are various sub-clans (e.g., Sculpin, Frog, and Double-Finned Killer Whale). The two moieties make up the political group within their society. One of the important rules in Haida antiquity was that people could not marry within their own clan; even if they came from another village, they were considered family, and so Raven clan members could marry only Eagle clan members and vice versa. Through the life of the Haida, the opposite clan plays an important role, especially through the potlatch, and at the death of a family member. It is at the potlatch that the opposite clan will witness the important events in the Haida life. It is the opposite clan that will attend to the funeral details during the time of grief. Whatever competitive potlatch may be happening, or feuds, there was always the knowledge of the interdependence upon the opposite clan.

The Haida were fierce warriors, feared by the surrounding tribes as well as those to the north and south. Accounts of their conquests were noted in the address of Dkh^{w}'Duw'Absh Chief Seattle *(Si'ahl),* where he mentioned that of the few benefits he could find of the takeover of his homeland by Euro-Americans was that their presence and military would protect them from invasions of the Haidas and Tsimshians. In the Haida society, however, it is not the conquests that make one great, as it is with the European cultures, but rather the person's ability to hold a potlatch. These ceremonial parties took place in the later part of the fall and winter months and required the host to be proficient in amassing and distributing wealth and property, which was proclaimed within their oratory tradition at these festive occasions. The wars were acts to procure the slaves and wealth of other tribes, which, in turn, were utilized in the potlatch preparation (for example, commissioning carvings and trading) and carrying out of the rituals within the potlatch.

The following factors led to the decline of the strength of the Haida people: the advent of European colonization of Canada and Alaska, which brought devastating diseases that spread and nearly decimated the Haida People, causing their forced relocation to the two main villages of Masset and Skidegate to escape the diseases; the ban of the potlatch in 1885, which lasted over 60 years; and the exodus to the new cities for work, which brought about the demise of the potlatching economy of the Haida people and their indigenous neighbors, making it difficult for them to live in the manner of their ancestors, and making way for the mercantilism of the industrial economy upon Haida Gwaii land.

Haida Life

The Haida, like their surrounding northwest neighbors, lived in a communal lifestyle, with several families sharing a "big house," or more popularly known, a "long house." Within their society were three statuses of people, the high caste, the commoners, and the slaves. The high-caste villagers were the families of chiefs; clothed in rich sea otter and martin pelt robes, they were the main citizens who gave potlatches. The commoners were the clan members who usually supported the chief in his potlatches, as well as their own, if they were able to acquire the material wealth to give one. The slaves were either born from slaves or were obtained through trade or war and made slaves; there were also debt slaves who worked for the person until his debt was paid. Within a village was a main "high chief" or "town chief," and within each house was a chief or "house chief." Usually, the successor of the chieftainship was acquired upon the death of a chief, and it was within a potlatch that the new chieftain became official. A chief could also hand

the responsibility over to the next in line (in a matriarchal society, it would be one of his brothers or nephews). Chief Albert Edward Edenshaw is an example of a well-known leader, who gave many potlatches during his life, initiated war expeditions, and carried on a slave trade. In later years, he changed direction toward Christianity, no longer wanted to participate in the rituals that were not approved by the church, and conferred his chieftainship on his nephew.

The original house posts from Old Kasaan, transported to New Kasaan. This was one of the last of the "Big Houses" to be lived in. Haida/Thlingit Pamela Rae Huteson is seated in the "Chief's" area of the house.

Source: Photograph by Ann James.

The training of children is important to cultures that survive with the knowledge of living in harmony with the natural and the supernatural. Leslie Drew Douglas Wilson was told during his research for *Argillite* (1980) that the "philosophical" knowledge was given from the *Naanas* (grandmothers) and *Chin-naas* (grandfathers) and that the uncles and aunts are given the role to teach the day-to-day lessons of survival and clan etiquette. There were strict rituals in training of the children as they approached puberty. As with other matriarchal societies among the Northwest tribes, when a boy was near the age of 10, he was sent to his maternal uncle to be instructed in fishing and hunting and the rights and property he would be inheriting from his uncle. The uncle would also train him in the ways of combat. For a girl, there were special provisions for her puberty training, which required isolating her from the rest of the community. During this time, upon entering this special location, she would be taught the etiquette of her people, as well as how to weave baskets and also to devote her time to learning other skills that would prepare her to become a matriarch of her clan and her people.

Food

With the wealth and bounty the ocean provided, the Haida were supplied with an abundance of salmon, halibut, red snapper, and other fish. They also had access to various sea mammals, seal, sea lion, and otters, for example. This abundance included many other types of sea creatures, such as crab, chitons, and scallops. They also gathered sea cucumbers, seaweed, and shoreline vegetation to supplement their diet. The various salmon runs that returned to spawn would arrive from July to November. The fish were hung to dry in the sun; they were also smoked on beams suspended over a low fire, within a smokehouse, as is done to this day. These were then stored in bentwood boxes to be used for feasting and sustenance during the winter months. They also hunted deer and bear and gathered seagull and murrelet eggs. Some of the plants gathered were wild rhubarb, various berries, fern, and Hudson Bay teas.

Artistic Expression in Daily Life

From their grand totems to the everyday utility objects of baskets, hats, bowls, and spoons, these were decorated with uniform and complex designs called "formlines," as identified by Professor Bill Holms in *Northwest Coast Indian Art: An Analysis of Form.* The Haida and other Northwest tribal art was so prevalent

Whale totem at New Kasaan

Source: Photograph by Pamela Rae Huteson.

that Johan Adrian Jacobsen proclaimed them to be "nations of artists."

With cedar in abundance and in close proximity of the Haida people, this provided the material for not only the memorial and "totem" poles but also houses and canoes. Fishing and hunting gear was fashioned out of the wood, roots, and withes into ropes, nets, bows, and arrows. There were bentwood boxes carved and steamed for storage and cooking. Mats were woven for eating, wearing, and sleeping. Woven and shredded bark skirts were also made. Among the indigenous tribes, the Haida have developed fine spruce root basketry, with designs woven in false embroidery. Sometimes formline designs were painted over the surfaces of their baskets and intricately twined spruce root hats by renowned artists, such as Charles Edenshaw. Each design woven or painted had a name, some of which are related to a specific clan lineage story.

The Haida artistic expression was also worn: tattoos; woven Chilkat robes; painted designs on skins that were crafted into tunics; Shaman's aprons and leg coverings; hats and headdresses; and jewelry. Their jewelry had been made from bones, walrus tusks, and antlers, as well as shells of abalone and dentalium, argillite stone they called "black stone," and copper. In the beginning, the argillite was used to create blades and other utility items. Its high luster made a prized regal material. As the fur trade began to wane and the collecting of "native curios" expanded, argillite carvings became highly sought after. This craft quickly developed into a "fine art," with artists like Charles Edenshaw and Tom Price among the early masters of argillite carving. The introduction of wool blankets and ready-made buttons to the tribes of the Northwest revolutionized clan expression of blankets worn by those of high caste. One maritime fur trader noticed jewelry fashioned from iron, and he instructed his men to begin crafting jewelry out of their available iron and soon had to expand on his new trade item, as his Haida customers preferred unique jewelry. With the influx of silver and gold coins, these were fashioned into priceless bracelets, pendants, and earrings.

Belief System

As with the other surrounding Northwest tribes, the potlatch was not a religious ceremony. There was no systematic religion that was followed by rote; spirituality was reflected as more of a personal relationship with the universe as a whole, as they prayed to the "Power-of-the-Shining-Heavens." It is not the humans that are superior, reveals Dr. W. F. Morrison JD, "There is nothing to be believed, everything just 'is.' Throughout our history are stories of animals, rocks, birds, fish, trees and other Beings carrying on conversations with human Beings."

When death is near, it is believed that the family members who have passed on are near the person and upon death, the soul goes to a place of potlatch. The soul also has the choice to go back and be reborn within its family. This belief was brought into warfare tactics. When George Dixon, in 1787, had asked Chief Cumshewa of the tribes on the mainland, he was told that they were the Haida enemies and that

the chief had not only "killed many of them" but also had their heads. Morrison explains that this action would prevent the soul from being able to find its way back and be reborn within its people. This would thereby eliminate these enemy warriors' opportunities to return as potential warriors to fight the Haidas in future battles.

Death

When it was apparent that a death was near:

- There would always be some of the family singing the clan's war chants, until the death occurred.
- An announcement that the time was near would usually be made by the family of the mate (widow).
- The opposite clan would see to the funeral procession, relieving the family during its sorrow.
- A shaman would prepare the person, painting the face and singing.
- The person was dressed in clean/new clothes for the spiritual journey.
- The family's sacred ceremonial artifacts were placed all around the person.
- The grave box was placed near the person while he or she was still alive.
- After death, the body would be taken out of an opening in the wall of the house, not through the door.

Haida Trading and Influence

The currency within the bartering of the Northwest tribes consisted of some shells but for the most part of furs, especially the rich sea otter pelts. Trade items came from the surrounding neighbors, such as the Tsimshians for soapberries and eulachon oil in trade for furs. The regal Chilkat blankets were also secured from the Tsimshians. These were so costly only those of high caste could afford the price of furs for this prestigious item. The Haidas also traded with the Chinook, as they offered a rich assortment of goods from their trade with other tribes. The cedar in the Queen Charlotte's was of a height and girth not found common in the forests of the Haida neighbors; this enabled the Haida to craft their coveted large canoes for trade items. Slaves were the labor behind the potlatch and daily life. It was not uncommon for each member of a high-caste family to have a slave to dress and prepare food for them. Their children especially would have a slave to watch over them and make sure that they were safe; sometimes the child's slave would be near the age of that child. Slaves were distributed as property during the potlatch. They could also be killed when a chief died, so that the slave would assist him in the spirit life. This dependence on slaves required much trading for them and acquisitioning through war expeditions.

"The Haidas are coming!" Haida Carver Sáádúúts-Robert Peele enacting the Haida enemy's fear upon seeing the Haidas arriving.

Source: Photograph by Pamela Rae Huteson.

The Haida were canoe voyagers. Their voyages provided the opportunity to observe many peoples and their traditions along the Pacific Coast, down as far as south as South America and Hawaii, and north to the Aleutians, for either trade or war. This is evident within their culture, through songs of other tribes (for example, Tsimshian and Chinook). The Haida language stands by itself and contains only "borrowed"

Haida Beaver Button Blanket, with dentalium and abalone sewn with sinew, circa 1880

Source: Photograph courtesy of Flury and Company, www.fluryco.com.

words, perhaps through trade. The Haida Gwaii land was in the early stages of cultivation when the Europeans arrived. One of the plants resembled the tobacco plant, which could have been obtained from the Californian tribes. Potato gardens were also found and thought to have been given by early explorers, yet there have been no journals to support that theory; Morrison tells how potatoes were acquired through the Haida's expeditions to Peru, as well as Hawaii. Oceanic travel was earlier refuted by Frederica de Laguna, yet it is noted that the Haida also have many traditions akin to the Pacific Islanders. Anne Cameron in *Daughters of Copper Woman* describes songs of the Nootka tribe in Canada, which start upon their journey and end when they land (e.g., in Japan or China). Alfred L. Kroeber noted the Northwest coast tribes have some characteristics that are similar to other oceanic indigenous people (for example, Māori and Hawaii), with their festivities employing wealth distributions and an elaborate and detailed carving style to represent their clan and heraldic lineage. The Haida and Tlingit culture have been influenced by the ancient Asian battle gear, seen in the close resemblance of their slate wooden armor to that of the Asian warriors. The Haida also share the Raven culture, which is found in other indigenous cultures, ranging from Siberia to Washington State.

Potlatch

Within the Northwest coastal societies, the Haida, Tlingit, Kwakiutl, and Tsimshian were very adept and had the ability to acquire large stores of food during the spring to fall months. These provisions enabled them to use the winter months in creativity and socializing, as well as allowing their carvers and weavers the luxury of tending to their craft to create clan and commissioned pieces, while the remaining clan members devoted their time to obtaining and storing food and creating daily utility objects. The potlatch was not just a feast or festival; it was the purpose of living. During the potlatch, the goals of wealth and status were realized for the clan through their participation in these important cultural events. The original intent of trade and war expeditions was to accumulate property in preparation for their potlatches. If the parents were commoners, they may spend their life in the pursuit of raising the status of their children.

The word *potlatch* is a generic term from the Chinook trade jargon meaning "to give." The Haida words for this occasion are:

- *Wāùgal:* When the property of land was distributed, the tattooing of crests and labrets were given to the children. Only the high-caste could have tattoos and be gifted at a potlatch. It was a time when adoptions were made and the highly coveted and honored names were bestowed. The families of chiefs carried the oldest and highest names; the Wāùgal was also a time that described a clan house-raising event.

- *Si ìk!:* This was a memorial potlatch given when a grave post (memorial totem) was raised. It is the opposite clan that takes the responsibility of attending to the funeral procession, and it is within the Si ìk! that the opposite clan is honored for the gratefulness of the services rendered during the time of sorrow.

It could take years to prepare and accumulate the wealth for a potlatch. These festivities were given for the children. In Haida culture, people could be high caste only if their parents had given potlatches. If their parents were commoners, they themselves

could not rise in status; they could only make a better future for their children. The more tattoos the person wore (i.e., on the arms, legs, back, or chest), the more visible was his or her status, as each series of tattoos displayed represented a particular potlatch, or potlatches, held by their parents.

In an oratorical society, it is crucial to have witnesses present when the wealth is displayed and to orally and visually record the prestige transferred via property (for example, of names, tattoos given, land, trade routes, crests, stories, and so on). Without the witnesses, there is no proof the action took place, and the credibility and evidence is lacking for the prestige claimed. The witnesses are then paid, first, by providing them lodging and meals during their stay and, second, with a wealth of gifts at the end of the festivities. Great care was given to the gifts/payments and to make sure that the gift matched the caste and position of the guest/witness. The guests were also gifted with food to see them through their journey home.

Along with the ancestral reenactments within the dances of the potlatch, there were also dances done by the shaman and high chief, as they trained their apprentices and "put the power" into those "inspired," as told to John R. Swanton, and also that the spirits, such as the dog-eating spirit, "came through" the dancer. There were spirits that would come through both men and women and those, like the grizzly bear spirit, that came only through women. In Ullie Stelzer's *Haida Potlatch,* some of the songs were sung with no dancing, as reported by a Haida Elder, due to either the "sadness" of the song or the "seriousness" and solemnity of the occasion. This was done by the singers at Klawock Alaska in 1994, when two teenage boys of both Tlingit and Haida ancestry were dealt within a traditional manner by the Tlingit banishment court. Since the boy's were also of Haida descent, a Haida "judge" was appointed a commission to preside with the Tlingit "judges" to administer these unique alternative and traditional tribal justice proceedings, and was consulted throughout the duration of the banishment.

Kasaan totem depicting the arrival of the "white man" by sea. Note the water underfoot.

Source: Photograph by Pamela Rae Huteson.

Acculturation

It is surmised that Spain was the first to encounter the Haida. The journal of Frays Juan Crespi and Thomas de La Penn, who accompanied Juan Perez, in 1774, and the Haida story of the first contact with Europeans contain many of the same elements. For example, there was a canoe that went out to meet the ship, wherein an elder stood within the canoe and danced, and the eagle down of peace was spread upon the water. The acculturation of the Haidas began with the

Chief Saanheit's totem and two house posts at the Sitka National Historic Park in Alaska.

Source: Photograph by Pamela Rae Huteson.

maritime European fur traders and explorers. Due to their extensive travels and witnessing other cultures to the north and south of them, these contacts were viewed as a positive enrichment of their culture, and as a result, Chief Edenshaw exchanged names with Captain Douglas upon the second contact.

Little was known of the customs and traditions of tribal people, in the early years of maritime trade. Although there were protocols of international law and fair dealing among the nations, the indigenous people were seldom apprised of these accords by the dominant society. Etiquette was still in its infancy concerning the interactions with tribal people in the "new worlds." The rash treatment of some Americans created a distrust of "Bostons" among the Haidas. One well-documented incident happened at the southern extremity of the Queen Charlotte Islands, at Houston Stewart Channel, in 1791. Chief Coya's people were not interested in weaponry or iron; they, however, observed the prestige associated with the new apparel that the maritime traders modeled. As a result, what clothes couldn't be bought through trade were taken while the newly washed clothes enticingly hung to dry on deck. For this "crime," two chiefs, one being High Chief Coya, were assaulted by having their hair cut (only slaves had their hair cut), whipped (another slave treatment), and their legs forced into canon barrels, to name a few of the indignities forced upon these chiefs. Their people were not only made to return the articles, but their remaining furs, for which Kendrick claimed that he gave them a "fair" deal when he'd paid for the them. In these actions levied against Coya, he and his people were belittled, insulted, and unreasonably penalized, out of proportion to the nature of the purported criminal offense. An attempt to regain his position was made the following year with the attack on the *Lady Washington,* which not only went bad, but also inspired a shaming song called "Bold Northwestman" thereafter sung by the sailors. Coya was reduced to the lowest of the commoners.

During the time of colonization of Canada and Alaska, totems and other artifacts were collected for exhibits, world fairs, and museums of natural history. Haida Chief Saanaheit of Kaasan, on Prince of Wales Island, in Alaska, donated his house posts, Fog Woman pole, and canoe to collector John G. Brady, with the understanding that these treasures would be returned to Alaska to become "memorials" of his people. These memorials now stand in the Sitka National Historic Park in Alaska. When the exodus to major villages started happening in Alaska, there was a yearning by the Tlingit and Haida tribes alike to have totems there with their people. The Civilian

Conservation Corps (CCC) was created to make new jobs. In Southeast Alaska, this took the form of a joint partnership with the forest service, which employed village carvers to transport totems to make parks; the totems that could not be restored were recarved. This not only satisfied the Alaskan Tlingit and Haida tribes by having their totems in their new villages but also rekindled the art of carving.

Haida Carver Sáádúúts-Robert Peele standing by his third dugout canoe, the second that he will be giving to a community, to reintroduce their cultural connections. Robert says, "We are here to take care of the earth. Somebody will have to be responsible for its [the canoe's] care."

Source: Photograph by Pamela Rae Huteson.

Present-Day Haida

For a time, the only carving that was done was for tourists and collectors; the masks and hats that were made by the carvers in the mid-20th century tended to be for artistic pieces only, as some were too heavy for actual use. As the revival of potlatches spread, new totems began appearing on Haida soil as a new generation of apprenticing carvers began studying their craft. The Haida Elders were sought for their wisdom and knowledge of the nearly extinct Haida tradition, which prompted Elders like Robert Cogo and his wife Nora to document the Haida legends, foods, and language for future generations. Today, the Haida language in its various dialects is being taught to the youth and adults alike, as the interest in the Haida culture increases. Songs and dances were revived for the reintroduction of the ceremonies. In some communities, there were no examples of male dancing, and either a dancer from another village had to come to teach the new male dancers or they had to go out and learn the movements of the animals they were representing and put them into their dance, as Haida carver Robert Davidson experienced when preparing for his potlatch, which was recorded by Steltzer.

Today's Haida are a modern people, living in a high-tech world, wearing the latest fashions, and dealing with the negative effects upon our environment. Beginning with the prized Chilkat dancing robes, there is a long history of people willing to pay high prices for fashionable and prestigious works of art. There are a growing number of artisans who are applying the beauty and complexity of formline art to clothing. Leading this trend within the international realm is Dorothy Grant, from the Queen Charlotte Islands. Her designs are not only in the height of fashion but also contain price tags ranging in the thousands. It is not uncommon to see Grant's creations worn at potlatches and other prestigious occasions.

In the past, a costly war could mean lives lost on the battlefield of their fellow northwestern-coast neighbor's homeland. Today's wars with the Haidas are battled in the courtroom or in the media, as a small business called "HaidaBucks," originating in Masset, experienced. When Starbucks filed a lawsuit against them, it was assumed the small business would back down and change their name. Not only did the Haida business not back down, but they obtained powerful backup legal support and launched a campaign for their right to use the word *Bucks*. The HaidaBucks Web site contains the story of how the mighty Starbucks company backed down.

As populations have migrated and intermixed, animals have also accompanied them. Islands in the "new worlds" have felt negative impacts from the introduction of some animals, such as the rabbit hordes in Australia. The environment and maintaining a balance on their islands is of concern to the Haida people. The murrelet eggs from the Auk family of diving sea birds have been in the Haida diet from

time immemorial, and certain families owned the sought-after egg-gathering privileges of the islands and rookeries of the Queen Charlottes. However, due to the increased human activity of visitors from outside of the Queen Charlottes, Norway rats have invaded the satellite islands that have been the nesting grounds of the murrelet. This has caused a decrease in not only the numbers but also in the varieties of the nesting population, causing emergency measures to eradicate these predators.

The Haidas have became a very well-traveled people and have integrated many customs and technologies not only into their lives but into the lives of their neighbors as well, for example, the introduction of cultivation to the northwestern area. They have become a modern people, drawing stability from the roots of their culture, standing resolute, yet bending like the ancient cedar; and they are spreading their wings and soaring like the Eagle to great heights, into the new age and technology that surround them. The Raven culture, once denied them, is becoming reborn within the people and taking new dimensions and meanings. Truly, the Ancient Ones, the "Power-of-the-Shining-Heavens" are still watching over "Ou Haadas," the "inlet people."

— *Pamela Rae Huteson*

See also **Aleuts; Feasts and Festivals; Potlatch**

Further Readings

Holm, B. (1965). *Northwest Coast Indian art: An analysis of form.* Seattle: University of Washington Press.

MacDonald, G. F. (1990). *Ninstints: Haida World Heritage Site.* Vancouver, Canada: University of British Columbia Press in association with the U.B.C. Museum of Anthropology.

Morrison, W. F. (1997). *Haadas history.* Unpublished manuscript.

Patrick, A. (2002). *The most striking of objects: The totem poles of Sitka National Historical Park.* Anchorage, AK: U.S. Department of the Interior, Alaska Support Office, National Park Service and Sitka National Historical Park.

Smith, R. E. (1982). *Ethnohistoric study of Haida acculturation, Parts I, II, and III.* Nortorf, Germany: Volkerkundliche Arbeitsgemeinchaft.

Steltzer, U. (1984). *A Haida potlatch.* Seattle: University of Washington Press.

Swanton, J. R. (1975). *Contributions to the ethnology of the Haida* (Vol. 5, Pt. 1). New York: AMS Press.

Wilson, L. D. D. (1980). *Argillite: Art of the Haida.* North Vancouver, Canada: Hancock House.

HAITI

Haiti is a country in the Caribbean that occupies one third of the island of Hispaniola. When Christopher Columbus set foot in Haiti in 1492, the island was inhabited by the Tainos Indians, who were put into slavery by the Spanish conquistadors. Within 30 years, the Indian population was decimated by the harshness of their new conditions and the diseases brought by the colonizers. To continue expanding their empire, the colonizers turned to West Africa as a new source of people to enslave. Struggle between colonial rivals to control the gold mines in Hispaniola ultimately led the Spanish to agree, in 1698, to a treaty granting the French control over the western part of the colony. Under French colonial rule, the western part, renamed Saint-Domingue, was transformed into a complex plantation system based on a sophisticated capitalist enslavement of Africans, who composed the majority of the population. The wealth of the colony attracted bitter struggles and wars between colonial challengers such as the British, the Dutch, and the Spanish, and after brief periods of conquest by each of these powers, the French again prevailed. During the 1700s, the century of philosophical enlightenment and revolution, Saint-Domingue was the richest colony of France, the major source of power and wealth that underwrote every sphere of French society. The contradictions inherent to the colonial and slavery systems in Saint-Domingue and the circulation of ideas of freedom and equality fostered by the Enlightenment (and culminating in 1789 in the French Revolution and the General Proclamation of the Rights of Man) generated the ultimate conditions for a general slave revolt. It started in 1791 and climaxed in the revolution that overthrew the plantation system and, after a 13-year war of independence, transformed the colony into a new country renamed *Haiti* (the original name of the island prior to colonization).

The epistemological status of Haiti and its social formation in the social sciences, specifically in history

and anthropology, is as problematic as Haiti's positioning in the latter disciplines. The Haitian revolution (1791–1803), against three centuries of slavery and colonialism, took place during the Enlightenment project; and this along with the emergence of Haiti in the modern world at the onset of the 19th century (1804) challenged the dominant paradigm of racial differences and hierarchies well ingrained in Western modern thoughts and narratives. For the philosophers of the Enlightenment, the precursors of modern history and anthropology, humans were internally differentiated on the basis of biology and culture, which provided the basis for a hierarchy of races and cultures, of which Westerns Europeans constituted the finest achievement of civilization. The revolution that transformed Saint-Domingue into Haiti was at the time deemed an inconceivable embarrassment, for it did not fit the project of men as defined in Western thought, even though liberty and equality were the ideals pursued by the Western thinkers of the time and concretized by the revolutionaries in the Caribbean. Indeed, the emergence of a Black republic was an impossible contradiction. The dominant Western narratives conceptualized and characterized Haiti as a "state of exception" in that for Europeans and Americans in the 19th century, the very existence of a former slave/Black-African-run republic tapped deeply into the contradictions that lay behind the Rights of Man proclamation, namely, a universalism on one hand and an evolutionism on the other. And from this latter perspective, it was necessary to discredit Haiti in order for Euro-Americans to enunciate their notion of civilization. This act, by its very nature, served to centralize the exception, which explains why Haiti figured so centrally in the entire narrative of the present. Haiti's exceptionalism was intrinsic to Euro-America's conception of itself, just as the power of Euro-America to normalize itself became intrinsic to the imagination of Haiti.

While all the great colonial powers and slave-holding societies conspired to contain the Haitian revolution at the margins of history, anthropological reports too were questioning the viability of a nation-state made of "black people," plagued by cannibalism, cruelty, and immoral promiscuity. The Comte Arthur de Gobineau summed up the racial ideas that at the time dominated anthropology (scientific racism) to lay down the fundamental inferiority of the "black race" and its unfitness for progress and civilization (the inequality of human races). Based on these ideas, Gustave d'Alaux reported in 1856 how Haiti due to the barbaric nature of its race was destined to failure. Alaux took on the new political system that was being built in the country to illustrate the despotic nature of Haitians and situate them in African tribal traditions. Others described an absolute incompatibility between the idea of a Haitian country and modernity itself. In his widely read book *Hayti or the Black Republic*, Sir Spencer St. John (1889) showcased Haiti to demonstrate that the "negroes in the great scheme of nature" continuously make apparent that they have no capacity "to hold an independent position." "As long as he [the negro] is influenced by contact with the white man, as in the Southern of the United States, he gets on very well. But places [*sic*] him free from all such influence, as in Hayti, he shows no sign of improvement" (p. 134). According to St John, in absence of the "white master," the Haitians are "falling into the state of the inhabitant of the Congo" in Africa. As William Cohen, among others, has shown in the context of the French colonies in Africa, images of Black people carved during the 18th century were critical in the development of discourses in anthropology, the science of "man," which, at least through the 19th century, viewed *culture* as shaped by *biology*. In these discourses, Africa epitomized the "heart of darkness," and Haiti was its expression. Since then, the historiography and anthropology of Haiti have been able only to define the country in negative terms when not systematically engaged in "silencing the past" when it comes to Haiti. The "horror of Saint-Domingue" during the time of the revolution, despotic political leaders after Haiti's independence, voodoo, cannibalism, black magic, poverty, human degradation, and failed nation-state narratives about Haiti in the social sciences have all cultivated a rhetorical depiction that Haiti is a reverse mirror of the West, the location of barbarism versus civilization.

These rhetorical depictions also provided the very frame within which Haiti would define itself in relation to the world and would rely upon throughout the 19th century to formulate its responses to anthropology. While Haiti was being conceptualized as a state of exception—the Black-run nation that proves that Blacks cannot run a nation—it was simultaneously being constructed in Haitian anthropology in terms of hybridization, imbrication, melding, and intersplicing of African and European values and practices. For instance, voodoo is at once an indice of

barbarism in terms of political ideology of the modern Euro-American but also the intersecting of Catholicism and African worship systems in ways that cannot be reduced to any simple combination of the two. The result is a notion of the indigenous that is, conceptually, the inverse of the state of exception, the transcending of the latter implicating the abolishment of the former, though this has always remained difficult to formulate, let alone practice, because the notion of the indigenous is one of the chief ideological weapons used to fend off intellectual imperialism.

On one hand, Haitian elites challenged Haiti's images in Western discourses by embracing a positivist anthropological perspective to locate their country and its people in a position that supplants the Africans closer, however, to the Europeans. Early Haitian anthropologists, while rejecting scientific racism and its thesis of racial inequality, embraced the barbarism-versus-civilization paradigm to situate Haitian society and its elites at the avant-garde of African backwardness. According to this view, even when the majority of the inhabitants of the new republic are practicing "barbaric" religious practices (for example, voodoo, or *vodoun*) and are judged, like the Africans, to have no clear concept of religion, the Haitian elites stand as an enlightened guide for the masses (and the "black race" in general), which with time will become civilized. Among many other writers, Louis Joseph Janvier published *Equality of Races* (1884), Antenor Firmin wrote *Of Equality of Human Races (Positivist Anthropology)* (1885), and Hannibal Price wrote *Of Rehabilitation of the Black Race by the Republic of Haiti* (1891) in response to the thesis of inequality of races and the inferiority of the "black race" that dominated 19th-century discourse in Europe and the United States, articulated in anthropological thoughts of Arthur de Gobineau's biologization of history and Herbert Spencer and other Western writers' Social Darwinism. In these publications, the writers tried to displace the focus of anthropology to its "true" object: how human races are evolving toward "the" civilization, epitomized by Western Europeans. To do so, these authors called attention to a new understanding of uncivilized cultures as a necessary step toward civilization but not as a biological mark that prevented people from these cultures becoming civilized. Haiti (through its elites), according to this model drawn essentially from Auguste Comte's sociological theory, showcased how African people would move away from barbarism.

The dilemma, of course, for the Haitian elites was how to anthropologically write on Haitian subjectivities as they simultaneously challenged the discursive depictions and constructed images of Haitians and Africans (Black people in general) without recourse to the very categories provided by 19th-century anthropology in the first place. How can a discipline such as anthropology, constitutive of colonialism that provided the categories that depict Haiti as the quintessence of difference and alterity be appropriated and used by Haitian elites to "scientifically rehabilitate the black race" in general and Haiti and the Haitian people specifically.

As the first Black Republic in the modern world, Haiti's singular dilemma consisted in whether to reject its African heritage and fully embark in the Western project in order to show the world that it is a "civilized" country or to embrace its African heritage and reconfigure it within the confines of the nation-state. This dilemma resulted in the development in Haiti of two different cultural worlds: (1) the Western (French)-oriented sociocultural project, embraced by the upper classes and instrumentalized through the control of the apparatus of the state and the official (public) institutions as well as the social valorization of the French language and Catholic religion, and (2) the African-oriented rural project, agriculturally based with its Creole language, vodoun religion, and West-African-inspired traditions and cosmology. These constituted a system of two autonomous cultural worlds within which discourses on identities as well as sociopolitical practices would develop. Curiously, while the depiction of Haiti's nonviability was reinforced by anthropological discourses on races, it was to anthropology that the Haitian elites turned to seek to formulate their responses to questions raised by Western writers. Even more curious is the fact that no significant segment of Haitian elites has ever fully embraced Africa or Europe. Yet in their responses, Haiti's rural classes, the vodoun religion, the Creole language, and the rural family configurations and traditions were relegated to mere folkloric practices—when not represented as barbaric, retarded, or pathologies to be cured by civilization. Paradoxically, this mode of writing about Haiti by Haitians themselves strengthened the negative depiction it intended to challenge; it constituted what Gustav Desai referred to, in the case of African intellectuals' production of colonial Africa, as "dangerous supplements" to the dominant rhetorical depictions of Haiti.

Haitian elites' dilemma about Haiti's African heritage is constitutive of the Haitian soul and therefore addresses the question of the extent to which narratives intended for Euro-American consumption must be internalized locally (for example, the Creole language as inherently inferior or vodoun as barbaric). Indeed, these narratives generated counternarratives embraced by other segments of the same elites, with a political background formulated around color lines opposition (Black versus mulattoes) in their struggle for hegemonic powers in Haiti. In other words, the Haitian anthropology is not a unified stand in relation to Haiti's dominant characterization abroad.

During the 20th century, anthropology in Haiti introduced a new realm of interpretations, due to a combination of circumstances both in Haiti and in the Americas. The struggle between factions of Haitian elites over political and economic control of Haiti throughout the 19th century only reinforced the marginalization of urban and rural masses and precipitated the collapse of Haiti's public institutions. At the beginning of the 20th century, Haiti's political instability was seized by the United States as an opportunity to gain control of the country. The United States' invasion of Haiti in 1915 led to the development of strong nationalist and indigenous movements. A segment of the Haitian elites, including Haitian anthropologists like Jean Price-Mars, inaugurated a different approach on Haiti and its sociocultural life. Religious practices, family life, the Creole language, and cultural materials that constitute the environment of the masses came to be sources of inspiration for this segment. Carrying on reflections initiated by some Haitian writers in literature, such as Frederic Marcelin, Price-Mars's publication *So Spoke the Uncle* launched an ethnographic program that placed at the center of investigation Haitian vodoun and its cosmology. In a larger regional context, the postslavery situation required a new approach on and understanding of "Black people" in White societies. In the United States and Brazil, the debate between Melville J. Herskovitz and Franklin Frazier about the impact of slavery on African American sociocultural life in the United States renewed discussions about Blacks' adaptation/assimilation in White-dominated societies. Later, Herskovitz took Haiti as a case in point to illustrate the survival of African cultural practices through religion, cultural materials, language, and traditions among Haitians. Herskovitz's team, comprising both Haitian and American anthropologists, helped develop professional anthropological studies at the Bureau of Ethnology of Haiti, which later led to the creation of the Faculty of Ethnology at the State University of Haiti.

Haiti is a site, spatially, conceptually, and politically, of battle for the two anthropologies. The first is anthropology as a political discourse, the second anthropology as a discourse belonging to the field of science. The struggle lies in that they were originally one discourse, the second gradually emerging from the former, not least by the struggle to grasp what Haiti is. Today, current debates in Haiti are still self-consciously that of the second discourse taking account of the first, and also of the reality that the first racist discourse not only has currency in the politics of this hemisphere but also, at a deeper level, is still present in the second discourse in terms of the way in which it inflects the forms of supposition and misrecognition.

Although Haiti and Haitian sociocultural practices are, today, the object of study by many anthropologists from different perspectives in different languages, Haiti's excess of political turbulence, violence, socioeconomic degradation, and AIDS has provided new grounds for the resurgence of the notion of the state of exception. These foci illustrate the continuing symbolism of Haiti as representative "Blackness" (characterized in its radical negativity) in a world where race and racialization can be hinted at without having to cite it specifically. Hence, the evolution of political histories in terms of the evolution of a historically expository narrative that is mutually constitutive—Haiti and Europe/America—can only be imagined in terms of separate and sovereign spaces, which is itself a dimension of their mutual constitution, placing anthropology in a predicament for which it is still deciphering its own interpretations.

— Louis Herns Marcelin

See also **Enlightenment, Age of; Slavery**

Further Readings

Brown, G. S. (2005). *Toussaint's clause: The founding fathers and the Haitian revolution.* Jackson: University of Mississippi Press.

Dayan, J. (1995). *Haiti, history, and the gods.* Berkeley and Los Angeles: University of California Press.

Desai, G. (2001). *Subject to colonialism: African self-fashioning and the colonial library.* Durham, NC: Duke University Press.
Firmin, J.-A. (2002). *The equality of the human races.* Champagne: University of Illinois Press.
Fischer, S. (2004). *Modernity disavowed: Haiti and the cultures of slavery in the age of revolution.* Durham, NC: Duke University Press.
Price-Mars, J. (1983). *So spoke the uncle.* Washington, DC: Three Continents Press.
St. John, S. Sir. (1889). *Hayti: or The Black Republic.* London: Smith, Elder.
Trouillot, M.-R. (1995). *Silencing the past: Power and the production of history.* Boston: Beacon Press.

Harappa

Since the beginning of excavation at this complex of mounds in 1920 to 1921, Harappa has remained the type site for the so-called Harappan Civilization, also known as "Indus" or "Indus Valley Civilization." During the period from circa 2600 BC to 1900 BC, hundreds of settlements, some of them quite large, dotted the transborder region of northwestern India and eastern and southern Pakistan. Each of these Bronze Age sites has its own story, but in one way or another, they all shared a sophisticated and distinctive cultural tradition that continues to inspire archaeological research and impress visitors.

Years ago, scholars suggested that Harappa along with another famous Indus site, Mohenjo Daro (located circa 400 miles to the southwest), were twin capitals of an empire. More recent surveys and excavations indicate that Harappa was, instead, one of a number of urban centers (including Ganweriwala, Rakhigarhi, Dholavira, and Mohenjo Daro) that served as hubs, perhaps like city-states, in a vast network of local and long-distance trade, all of which depended on the region's agricultural productivity. Harappans kept many species of domesticated animals, and various crops were grown, but wheat and barley were especially important. There is no hard evidence for irrigation, like that found in Egypt and Mesopotamia, but it is possible that floods destroyed such tangible remains or that the Harappans used less elaborate systems to divert water. This economic network, which was concentrated in the alluvial plains of the Indus River and its tributaries, covered an area of at least 250,000 square miles and at least in size could be said to rival the territories united by rulers of ancient Egypt and Mesopotamia. The lack of historical accounts from this period and region makes it impossible to describe the political organization that created or protected this territory, or to explain precisely how a site like Harappa fits into the whole picture.

Harappa itself is located in northeastern Pakistan's Punjab province, on the left bank of a dry bed of the Ravi River; the modern Ravi continues to flow about 6 miles north of the site. Named after the village that stands adjacent to the archaeological site (now represented by exposed and preserved ruins, as well as considerable unexcavated remains), Harappa's ancient name remains unknown. Harappa was certainly one of the large towns of its day; the ruins cover an area of at least 375 acres. The site's size is extremely difficult to determine because of thick deposits of alluvium that have covered ancient ruins. Population estimates for the ancient city vary widely, of course, with figures that range from 20,000 to 50,000.

Parts of Harappa were occupied from circa 3300 until perhaps as late as 1300 BC, a framework much longer than the period to which the site has loaned its name. This history has been subdivided into various periods through the careful study of the site's stratigraphy and a large number of radiocarbon dates. This is especially important, since the site of Harappa has yielded occupational evidence from the entire seven centuries spanned by the Indus civilization, a further justification for its role as a type site. Changes in Harappa's material remains are obvious over this period of 20 centuries, but there is enough continuity to suggest that this ancient city, and the civilization named after it, developed internally and probably declined as a result of natural occurrences (for example, shifting river courses, floods), including the dessication of the Ghaggar-Hakra drainage system. Nowadays, fewer scholars attempt to explain the rise and fall of the Indus civilization with reference to invasion and migration (for example, the Aryan invasion).

The ongoing research at the site is multidisciplinary in scope and continues to refine the site's occupational history and to address topics like ecology, agriculture, and procurement of resources. The

modern excavations at Harappa rest on the pioneering efforts of both local and British scholars, including the important contribution made by Mortimer Wheeler.

During the current phase of research at Harappa and in the region at large, new data and sites have been discovered, and earlier interpretations of various architectural features have been called into question. For example, Wheeler's identification of a fortified "citadel" on Harappa's western mound (Mound AB) has been questioned by many scholars. What he and other scholars called a "granary" has been identified by others as a palace, and the function of large circular platforms near the "granary," once identified as a grain processing area, is still open to debate. Streets and housing blocks followed a well-organized grid plan. Extensive use of baked bricks and the construction of wells and a drainage system also reflect the talents of the Bronze Age planners in Harappa.

Like the other cities in the Harappan realm, the affluent classes of this city acquired luxury products through exchange with distant lands, through a system of overland and maritime trade. Prized imports included gold, silver, copper, carnelian, lapis lazuli, and turquoise. Objects from the Indus Valley have turned up at distant sites in India and in Mesopotamia. Wheel-made pottery and terra cotta figurines and the occasional piece of sculpture in the round reflect an aesthetic flair, but the real artistic accomplishment of the Harappans is seen in their small, square-stamp seals (most of them carved in steatite). These were used to show ownership and have been found in large numbers; they are the principal medium for the 4,000 brief inscriptions in the still indecipherable Indus script. Though no temple has been identified at any Indus civilization site, insight into Harappan mythology and religion may be provided by some intaglio scenes on these steatite stamps, which display other plant, animal, and human figures.

The Indus civilization and each of its component sites are a virtual laboratory for the investigation of early political and economic centralization and decentralization. Sites like Harappa contain valuable data for studying continuity and change within a regional context, in south Asia and beyond.

— Gerald L. Mattingly

See also **Indus Civilization**

Further Readings

Kenoyer, J. M. (1998). *Ancient cities of the Indus Valley civilization.* Karachi, Pakistan: Oxford University Press and American Institute of Pakistan Studies.

Meadow, R. H. (Ed.). (1991). *Harappa excavations 1986–1990: A multidisciplinary approach to third millennium urbanism.* Madison, WI: Prehistory Press.

Possehl, G. L. (2003). *The Indus civilization: A contemporary perspective.* Walnut Creek, CA: Alta Mira Press.

Hardy-Weinberg Principle

Darwin's theory of evolution by natural selection requires heritable variation for selection to work on. In Darwin's time, thinking about heritability centered on the idea of "blending inheritance"—the hypothesis that the offspring receive some average mix of the parental characters. If this were true, each generation would be more average than the last and variation would steadily decline. To make natural selection work, Darwin had to suppose that the frequency of mutations—"sports" as they were often called—was high.

In 1900, the pioneering work of Gregor Mendel was independently rediscovered by Hugo De Vries, Carl Correns, and Erich von Tschermak-Seysenegg. Mendel had proposed that each character is controlled by two genetic factors (genes), one from each parent. Most characters have a dominant form and a recessive form (phenotype). The different phenotypes result from different versions of the gene, called alleles, whether they are the same or different in the two chromosomes. The dominant phenotype is expressed when one or both alleles are dominant; when both alleles are recessive, the recessive phenotype is seen.

It was not immediately obvious that Mendel's model had anything to say about evolution; biologists assumed that dominant alleles would slowly displace their recessive counterparts, thus inexorably reducing variation. In 1908, however, G. H. Hardy and W. Weinberg independently realized that Mendelian inheritance would, in fact, maintain variation at current levels under most circumstances.

The conditions necessary for this Hardy-Weinberg equilibrium in a sexually reproducing population are:

1. The population needs to be large; otherwise, chance effects could lead to genetic drift—a random change in allele frequencies that usually leads to the local extinction of one of the two alleles.
2. Mutations must not be common, since mutations produce new alleles.
3. There must be no immigration or emigration that alters allele frequency.
4. Mating must be random with respect to alleles.
5. Reproductive success must be random with respect to alleles.

If any of these conditions is violated, evolution (a change in allele frequency) will occur. Violation of condition 5, of course, is the essence of natural selection. (Condition 4, which Darwin called "sexual selection," is only a special case of condition 5.)

The Hardy-Weinberg formulation not only accounts for how variation is maintained, it identifies alternative mechanisms for evolution—genetic drift, for instance. What Hardy and Weinberg could not know at the time is that most genes are pleotropic; that is, each has multiple effects of the phenotype. Moreover, most phenotypic characters are controlled by a combination of many genes. Each of these genotype/phenotype interactions helps preserve variation. In addition, sexual recombination operates to produce a nearly infinite number of novel combinations of alleles in each generation.

— James L. Gould

See also **Genetic Drift; Human Variation**

Further Readings

Gould, J. L., & Keeton, W. T. (1996). *Biological science* (6th ed.). New York: Norton.

Harlow, Harry F. (1905–1981)

Harry F. Harlow is best known for his studies of mother love and the importance of social interaction in primate learning. He was born in Fairview, Iowa, in 1905. He received his BA and PhD in psychology from Stanford University and immediately joined the faculty at the University of Wisconsin, where he established the Psychology Primate Laboratory. It expanded and merged with the Wisconsin Regional Primate Laboratory in 1964, with Harlow as its director. The Wisconsin Primate Center drew in several leading scientists, including humanistic psychologist Abraham Maslow.

Harlow questioned current theories, which stated that love was a function of the feeding bond between mothers and a means of regularizing sexual contact. To examine the significance of mothering and the universal need for contact, Harlow studied baby rhesus monkeys, because they demonstrated a range of emotions similar to human babies and needed to be nursed. In his famous "wire mother study," Harlow took infant monkeys away from their biological mothers and assigned them to two wire surrogate mothers. One model was made entirely out of chicken wire and had a bottle with a nipple that could feed the baby monkeys. It also had an electric light for warmth. The other model was made of soft cloth but did not have a light or a bottle. Harlow observed that the babies rarely stayed with the wire model any longer than it took for them to feed, but they cuddled with the softer cloth model, especially if they were frightened. When Harlow outfitted the cloth model with the bottle of food, the baby rhesus refused to go to the wire model at all. Harlow also observed that in times of fear, it appeared that the cuddling between "mother" and baby was stronger than the physical drive to feed or the need for warmth. Baby monkeys would cling to the cloth mother for days instead of eating if a fear stimulus was added to the cage. Harlow concluded that cuddling with the cloth model provided the babies with a sense of safety and security that was more important to them than the feeding bond.

Harlow's studies also found that young monkeys reared with live mothers and young peers learned social skills faster than those reared with cloth mothers, although they appeared to catch up socially in about a year. Harlow also found that babies raised by biological mothers but with no playmates were socially incompetent, demonstrating fear or aggression toward other young monkeys. This also affected their ability to mate successfully. In addition, females who did not develop social competency and who had babies were very neglectful of them. They did not seem to know how to create secure attachments with them. From these studies, Harlow concluded that sex

alone did not organize societies. He also concluded that mother love was not sufficient to enable individual social relations. And Harlow argued that although children need love and affection from a caregiver, early childhood social development is dependent on a wide range of emotional ties with both family and peers.

Harlow's provocative theories regarding normal sexual and parental behavior furthered the scientific study of love. His empirical research made significant contributions toward understanding general and child behavioral development in the areas of learning, motivation, and affection. His work contributed to the field of anthropology because he showed that humans can learn strategies from one another to solve problems, contributing to their ability to adapt to a wide range of stimuli.

Dr. Harry Harlow died in 1981. He served as President of the American Psychological Association, 1958 to 1959. He earned the National Medal of Science in 1967 and the Annual Award from the Society for the Scientific Study of Sex in 1972. He was a member of the National Academy of Sciences and the National Academy of Arts and Sciences.

— *Adam W. Nurton*

See also **Primate Behavioral Ecology**

Further Readings

Blum, D. (2002). *Love at Goon Park: Harry Harlow and the science of affection.* Cambridge, MA: Perseus.

Harlow, H. (1958). *Biological and biochemical bases of behavior.* Madison: University of Wisconsin Press.

Harlow, H. (1979). *The human model: Primate perspectives.* New York: Wiley.

Harris, Marvin (1927–2001)

Marvin Harris is one of the most prominent contributors to 20th-century anthropological theory. He is best known as the originator of cultural materialism, a theoretical paradigm and research strategy aimed at providing causal explanations for differences and similarities in cultural behavior. Cultural materialism assumes that cultural patterns are ultimately derived from the practical problems of human existence.

Born in Brooklyn, New York, Harris received his undergraduate and graduate training at Columbia University, where he earned his PhD in 1953. He taught at Columbia for nearly three decades, and from 1980 until his retirement in 2000, he was graduate research professor of anthropology at the University of Florida.

Like others in his student cohort in the Department of Anthropology at Columbia, Harris was trained in the four subfields of the discipline. His first exposure to anthropology came in Columbia's introductory course taught by Charles Wagley, who later became his mentor. The course took a four-field approach, and according to Harris, the basic outline of the course could be traced back to Franz Boas, the dominant figure in the Columbia department as well as in American anthropology for the first half of the 20th century. Although Harris was a severe critic of Boas's method for studying culture, he was a staunch defender of Boas's vision of four-field anthropology and of the Boasian stance on race, language, and culture. As a result of his early training, Harris addressed large questions in and across the subfields of anthropology throughout his professional career.

The Rise of Anthropological Theory

The impact of Marvin Harris's ideas can be gauged from his 1968 magnum opus, *The Rise of Anthropological Theory,* an overview of anthropological theory from the perspective of cultural materialism. Harris introduced the term *cultural materialism* in this volume—"the Rat," as it is known to three generations of anthropology students. The book's contribution to anthropological theory was highlighted in 1991, when both the Social Science Citation Index and the Arts and Humanities Citation Index named it a "citation classic."

In the book, Harris argued that previous social theorists had never developed an entirely satisfactory materialist and nomothetic (generalizing) research strategy dedicated to explaining the evolution of sociocultural differences and similarities. As such, the yardstick he used to evaluate specific theories and schools of thought was the degree to which they aided an understanding of and provided explanations for cross-cultural variation.

The Rat is truly a history of anthropological theory. Through the lens of cultural materialism, it analyzes individual theories and schools of thought

from the 18th century through the 1960s. It begins with the Enlightenment, the era Harris identifies as the one in which naturalistic causal explanations of cultural phenomena were first established, a modern conception of culture began to evolve, and materialist explanations of cultural similarities and differences first appeared. Harris explores the subsequent reaction against naturalism and materialism in the early 19th century and their eventual replacement by hardcore biological determinism that, with the notable exception of Marxist materialism, held sway over anthropological theory into the early 20th century. Franz Boas and his followers rescued anthropology from biological reductionism only to replace it with an idiographic strategy that, from Harris's perspective, did little to advance anthropology as a scientific enterprise.

The Rat concludes its theoretical journey with discussions of neoevolutionist and ecological approaches to the study of culture, both of which Harris believed came closest to the cultural materialist paradigm he was championing. While admiring his nomothetic cultural evolutionary approach, Harris faulted anthropologist Leslie White for his lack of interest in environmental variation. The anthropologist treated most favorably in the work was Julian Steward, whose combined interests in cultural evolution and cultural ecology and whose concept of culture core came closest to Harris's own model of technoenvironmental, technoeconomic, and demographic determinism.

A central theme of the volume was the critique of what Harris saw as prevailing idealist and idiographic schools of thought in anthropology. The ongoing influence of such paradigms in contemporary anthropology, which he eventually analyzed in their various transformations—symbolic and interpretive anthropology, structuralism and postmodernism—concerned Harris throughout his career. His last book, *Theories of Culture in Post-Modern Times* (1998), was a series of essays debunking such approaches to the study of culture.

Cultural Materialism

Although the *The Rise of Anthropological Theory* used cultural materialism as a framework for evaluating previous theories, the full elaboration and defense of Harris's materialist paradigm was realized in *Cultural Materialism: The Struggle for a Science of Culture* (1979). Cultural materialism evolved from and was influenced by a number of theoretical currents including evolutionary theory, cultural ecology, and Marxist materialism. Harris acknowledged his debt to all of them, most especially the latter. But he emphatically differentiated his own model from *dialectical* materialism as well as from the program for political action that is so closely associated with Marxist materialism.

Cultural materialism "is based on the simple premise that human social life is a response to the practical problems of earthly existence" (Harris, 1979, p. ix). This statement highlights the central tenet of cultural materialism, infrastructural determinism, the assumption that explanations for cultural similarities and differences ultimately lie in the material conditions of human life. A society's infrastructure (or material base) is its system of production and reproduction, which is determined by a concatenation of ecological, technological, environmental, and demographic variables. The study of a society's infrastructure investigates "how people obtain food and shelter, maintain a population base, and satisfy other basic biological and emotional needs and drives" (Harris & Johnson, 2000, p. vi).

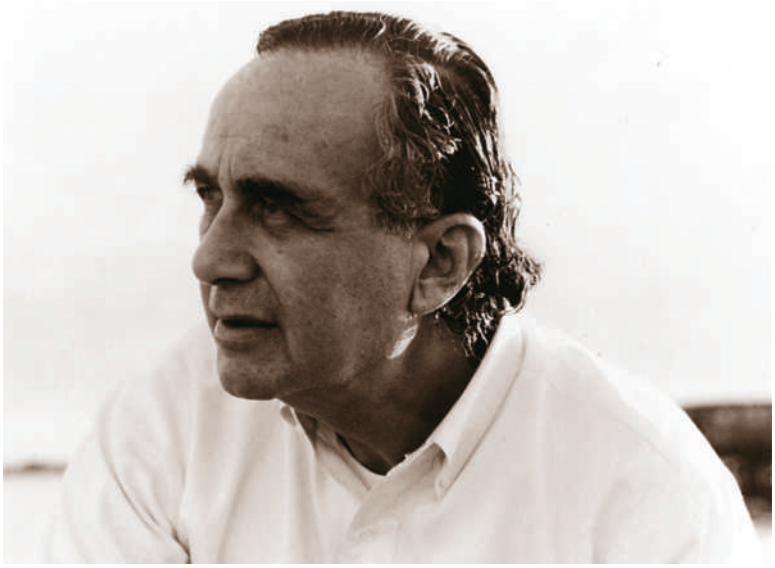
A society's infrastructure, in turn, shapes its structure and superstructure. A society's structure comprises its domestic economy (social organization, kinship, division of labor) and its political economy (political institutions, social hierarchies), while its superstructure consists of the ideological elements of culture, its religious, symbolic, and artistic and intellectual activities.

The study of infrastructure should be a "strategic priority" because it is "the principal interface between nature and culture," according to Harris; if the goal of science is to establish lawlike generalizations, then one should begin by studying those aspects of sociocultural systems "under the greatest direct restraints from the givens of nature" (Harris, 1979, p. 57). But contrary to some of his critics, Harris does not hold that all changes in sociocultural systems stem from alterations in their infrastructures, nor does he suggest that structure and superstructure are mere passive reactors to shifts in a culture's material base. Nevertheless, if structural or superstructural changes are not compatible with the existing modes of production and reproduction, they are unlikely to persist and spread.

In sum, cultural materialism holds that over time and in most cases, changes in a society's material base

will lead to functionally compatible changes in its social and political structures, along with modifications in its secular and religious ideologies. The ultimate goal of cultural materialism is to explain, not merely describe, cultural variations in the way people live.

As part of this model, Harris distinguished emic and etic approaches to cultural data. In an emic approach, the observer learns the cultural rules and categories from the native's perspective. If informants agree on a description or interpretation of data, the data are considered accurate. With an etic approach, in contrast, the observer does not use native rules or categories, but rather those derived from independent observers using agreed-on scientific measures. Quantifiable measurements such as fertility rates, caloric intake, or average rainfall are employed in order to develop general cultural theories without regard to whether those measurements "mean" anything to the native populations themselves. Harris argued forcefully that a science of society cannot be based solely on informants' interpretation of their own behavior.



Source: Photo by Susan Harris, courtesy of the University of Florida, Department of Anthropology.

Harris also viewed cultural materialism as a vehicle for understanding and solving contemporary social problems. After all, before problems like poverty and racism can be solved, their causes must be understood. In his words, "If it be anthropology to struggle against the mystification of the causes of inequality and exploitation, long live anthropology" (Harris, 1979, p. 340).

Cultural Materialism Applied: Research in Brazil, Mozambique, and India

Harris's field research, most of which was guided by the principles of cultural materialism, took him to three continents; he worked in Brazil, Mozambique, and India. His early Brazilian research resulted in *Town and Country in Brazil* (1956), an ethnographic study of Minas Velhas, a historic mining community in Bahia state. Harris provided a vivid description of racial prejudice in Minas Velhas, but he also showed that prejudice did not necessarily translate into systematic discrimination, taking issue with the notion that attitudes and temperament are the best predictors of behavior.

Harris's work on race and race relations received its fullest treatment in *Patterns of Race in the Americas* (1964), in which he used a cultural materialist framework to systematically compare the divergent racial patterns that emerged in Brazil, the United States, the Caribbean, and highland Latin America. Here, Harris took issue with cultural heritage and national character explanations of racial patterns, particularly those advanced by Brazilian social theorist Gilberto Freyre. Freyre had stressed the role of Portuguese national character in forming Brazilian race relations, and indeed in creating a "new world in the tropics" based on a penchant for racial tolerance and miscegenation. In *Patterns of Race in the Americas,* Harris argued persuasively for the role of material conditions in forming the patterns of race in different parts of the Americas. And he debunked Freyre's contention that slaves received more humane treatment in Brazil than in the United States, supposedly because of differences in Portuguese and Anglo national character, religion, and attitudes toward darker-skinned peoples.

Harris is also known for his work on Brazilian racial classification, especially his research on the multiple racial categories in everyday use throughout Brazil. To understand how racial classification and behavior in regard to race differed in Brazil and the United States, Harris and anthropologist Conrad Kottak coined the term *hypo-descent*. Because a rule of hypo-descent exists in the United States, children of mixed parentage, that is, those from a union of an African American and a Euro-American,

are always assigned to the minority category. But hypo-descent is absent in Brazil, where racial classification is based more on individual phenotype and social perceptions than on parentage. Harris concludes that the evolution of these different systems of racial classification arose out of the material conditions of divergent settlement and subsequent histories of Brazil and the United States.

In his last field research in the early 1990s, Harris returned to Brazil and to the issue of Brazilian racial classification. This time, he contrasted the categories used by Brazilians themselves in designating their own race and the racial categories employed in the Brazilian census. Because of differences in the racial terminology used in each instance, Harris found that Brazilian census data overestimated the White segment and underestimated the mixed-race segment of the national population.

Harris traveled to Mozambique, then a Portuguese colony, in 1955 to 1956 to study acculturation among the Ba Thonga people. However, after his arrival in Mozambique, Harris became more interested in politics and did not complete his planned fieldwork. He became good friends with the academic Eduardo Modlane, the leader of Frelimo, the Mozambique liberation movement, who later became the first president of an independent Mozambique. Advocating Mozambican independence from Portugal, Harris wrote *Portugal's African Wards* (1958). Harris's field study in Mozambique and his subsequent denunciations of the plight of Africans under Portuguese rule were influential in the eventual abolition of the forced-labor system in use there.

Harris's fieldwork in India was inspired by the reading he did for his article "The Cultural Ecology of India's Sacred Cattle," published in *Current Anthropology* (1966). Again attacking the primacy of the ideological over the material, Harris demonstrated the many roles that sacred cattle play in the Indian ecosystem. He interpreted Hindu doctrine as using the full force of religion to help conserve a vital resource, the sacred cow.

Cultural Materialism for a Wider Audience: Popular Writings

Harris published 19 books, collectively translated into 14 languages. He applied his theoretical principles in several popular books written in a compelling, accessible style. In all of them, Harris turned his materialist gaze on and attempted to provide scientific explanations for what he called "the riddles of culture," an approach that made him both highly influential and controversial. He also employed a materialist paradigm in writing two widely used introductory textbooks that have gone through several editions each, *Culture, People, Nature* (1997) and *Cultural Anthropology* (with Orna Johnson, 2002).

Cows, Pigs, Wars, and Witches (1974), arguably the most persuasive and prominent of his popular books, was the first one written for a general audience. It was inspired by Harris's fascination with the sacred cow in India as well as other puzzling cultural phenomena such as religious dietary restrictions (including the Jewish and Muslim taboos against eating pork), cargo cults, and witch hunts.

This was followed by *Cannibals and Kings,* which took a historical view of some of the cases examined in *Cows, Pigs, Wars, and Witches.* But Harris also extended his inquiry to new riddles of culture. One of the most controversial was his analysis of Aztec cannibalism, which Harris interpreted in the context of protein shortages resulting from the lack of significant animal domestication in Mesoamerica.

Good to Eat (1985) was a critique of anthropologist Claude Lévi-Strauss's contention that classificatory systems involving animal food taboos could be understood mainly because they were "good to think." To the contrary, Harris argued, a better approach is to see animals first as food for the body rather than for the mind. Harris's popular books showed an enduring fascination not only with Lévi-Strauss but also with the Yanomamo Indians of Venezuela and Brazil, as described by anthropologist Napoleon Chagnon. Harris rejected Chagnon's initial sociopolitical explanation for Yanomamo warfare, as well as Chagnon's subsequent use of explanatory models from human evolutionary ecology. Harris insisted that protein shortages provided the best explanation for the "riddle" of Yanomamo raiding patterns.

Our Kind completes a quartet of Harris's books aimed at explaining the riddles of culture to students and an educated lay audience. Harris's renown beyond academic circles spread through these readable, intriguing, and controversial works. Harris liked to compare the riddles of culture to potato chips: No one can eat just one. That is, whenever he offered a solution for one riddle—the sacred cow, for example—someone would say, "Yes, but what about the abominable pig or primitive warfare?" Of the

books in the quartet, *Our Kind* is most like a bag of potato chips. In it, Harris provides very short explanations for dozens of cultural riddles.

In *Why Nothing Works* (1987), Harris moved from the study of cultural riddles in "exotic" societies to an analysis of shifts in the material base of his own society. Here, he sought to highlight and explain the deficiencies of an economy changing from heavy goods manufacture to services and information. Employing a well-reasoned cultural materialist analysis, Harris showed how changes in the American economy were reflected in shifts in the nation's social organization—its marriage and family patterns, gender roles, and sexual relations—and its attendant ideology.

The influence of Harris's theories was not limited to cultural anthropology. As archaeologist David Hearst Thomas has noted, "roughly half of the practicing American archaeologists consider themselves to be cultural materialists to one degree or another." As a result of the forcefulness of his ideas elaborated in his many publications, Marvin Harris's theoretical paradigm has become one of the best known in contemporary social science.

— Maxine L. Margolis

See also **Emics; Etics; Materialism, Cultural; Yanomamo**

Further Readings

Harris, M. (1964). *Patterns of race in the Americas.* New York: Walker.

Harris, M. (1974). *Cows, pigs, wars, and witches.* New York: Random House.

Harris, M. (1977). *Cannibals and kings.* New York: Random House.

Harris, M. (1979). *Cultural materialism.* New York: Random House.

Harris, M. (1985). *Good to eat.* New York: Simon & Schuster.

Harris, M. (1998). *Theories of culture in post-modern times.* Walnut Creek, CA: Alta Mira Press.

Harris, M. (2001). *The rise of anthropological theory.* Walnut Creek, CA: Alta Mira Press.

Harris, M., & Johnson, O. (2002). *Cultural anthropology* (5th ed.). Boston: Allyn & Bacon.

Murphy, M. F., & Margolis, M. L. (Eds.). (1995). *Science, materialism. and the study of culture: Readings in cultural materialism.* Gainesville: University Press of Florida.

Harrisson, Barbara (1922–)

Barbara Harrisson is an art historian, archaeologist, and naturalist renowned for her work on primate conservation and the prehistory of Borneo. Born into a German family in Silesia, Poland, her early academic studies were interrupted by the events of World War II. From 1953 to 1972, she conducted research in Borneo, mostly in collaboration with her husband, Tom Harrisson, curator of the Sarawak Museum. During this period, she was actively involved in primate conservation, especially with the rehabilitation of captive and orphaned orangutans and their reintroduction into the wild. The results of this work were published in her popular book *Orang-utan* (1962) and in *Conservation of Nonhuman Primates in 1970* (1971). For her contributions to primate conservation she was awarded an honorary DSc from Tulane University in 1973.

Harrisson is best known, perhaps, for her investigations into the prehistory of Borneo, particularly her research with Tom Harrisson at Niah Cave in Sarawak. Excavations at Niah from 1954 to 1967 yielded extensive archaeological remains and a series of human burials dating back to the late Pleistocene. It still represents the most complete archaeological record documenting the prehistory of the region. Harrisson excavated and described the human burials from Niah and published research on the imported ceramics. The oldest human material from Niah, the so-called Deep Skull, was recovered from "Hell" trench in 1958, associated with Paleolithic stone tools and charcoal dated by carbon 14 to older than 40,000 years before present. Although some doubts have been raised about the validity of the dating, it is likely that the find does represent the oldest modern human from Southeast Asia. The cranium belonged to that of a young adult female, closely resembling those of native people today from Australia and Melanesia.

Harrisson's most recent research has focused on Asian trade ceramics, which led to the publication of *Later Ceramics in South-East Asia: Sixteenth to Twentieth Centuries* (1995) and *Pusaka: Heirloom Jars of Borneo* (1999). In 1977 she was appointed director of the National Ceramic Museum in The Netherlands, the Princessehof in Leeuwarden, in which capacity she served until her retirement in 1987.

—Terry Harrison

Further Readings

Harrisson, B. (1986). *Pusaka: Heirloom jars of Borneo.* Oxford, UK: Oxford University Press.

Harrisson, B. (1987). *Orang-utan.* Oxford, UK: Oxford University Press.

Harrisson, B. (1995). *Later ceramics in South-East Asia: Sixteenth to twentieth centuries.* Oxford, UK: Oxford University Press.

Heimann, J. M. (1999). *The most offending soul alive: Tom Harrisson and his remarkable life.* Honolulu: University of Hawai'i Press.

Health Care, Alternative

The developed world has transformed from industrialized societies organized around the production of goods by machines into technocracies: societies organized around evolution through the development of sophisticated technologies and the global flow of information through these technologies. Thus, Davis-Floyd has labeled its dominant health care paradigm "the technocratic model of medicine" to highlight biomedicine's precise reflections of technocratic core values. The technocratic model emphasizes the separation of mind and body and metaphorizes the body as a machine and the patient as an object ("the gall bladder in 212"). The resultant mechanicity and often impersonal nature of biomedical care have been mitigated in recent years by increasing emphasis on humanism within biomedicine. The "humanistic model" stresses the importance of "mind-body connection," defines the body as an organism, and sees the patient as a relational subject; it views the relationship between patient and practitioner as an essential ingredient of healing. While encompassing the relational values of humanism, most alternative healing methods are ideologically grounded in a third transnational paradigm, the "holistic model of medicine," which recognizes mind, body, and spirit as a whole, and defines the body as an energy field in constant relation to other energy fields, demanding attention to energy-based healing—a radical departure from the mechanistic approach of biomedicine.

The holistic "revolution" has arisen within the technocracy but outside of technomedicine in the United States since the 1970s, driven by a wide variety of nonallopathic practitioners and consumer activism. In European countries, holistic, energy-based treatments, such as homeopathy (all but eliminated in the U.S. in the early 1900s), have been available and widely used for over a century. In the developing world, many elements of traditional and indigenous healing systems are increasingly being incorporated into holistic or alternative health care. Concomitantly, indigenous folk practitioners are actively expanding their knowledge bases to incorporate elements of internationally known alternative methodologies into their folk practices. Such folk practitioners recognize a continuity of ideology between their own traditions (which often include appreciation for the "spirit" or "energy" present in a wild herb, an attentive massage, or a shamanic encounter) and the ideologies behind internationally known alternative systems like homeopathy, reflexology, moxibustion, and iridology.

At present, a small percentage of physicians worldwide define themselves as "holistic," but in general, biomedical practitioners have been resistant to accepting other knowledge systems as valid and continue to regard their own system as exclusively authoritative. Nevertheless, as the limits of biomedicine (which cannot cure many common ailments) become increasingly evident, millions of people continue to rely on or are beginning to revalue indigenous healing systems and to incorporate holistic or "alternative" modalities into their care.

Various terms have been bandied around over the past several decades for this wide array of heterodox health care systems, which range from professionalized to folk/indigenous. In Australia, for example, the most commonplace term for these is simply *complementary medicine;* in the United States, it is *complementary and alternative medicine* (CAM), although many proponents prefer the terms *holistic* or *integral* medicine to avoid the connotations of inferiority to biomedicine that the other terms entail. Medical anthropologists have tended to focus on various folk medical systems, such as *curanderismo* or *espiritismo;* more recently, a growing number have studied professionalized heterodox medical systems, such as chiropractic, naturopathy, and direct-entry midwifery, as well as biomedical physicians and nurses who utilize alternative therapies.

The medical systems of all complex societies today, from India to Indonesia, Brazil to Bangladesh, consist of both biomedicine and alternative systems that coexist in generally competitive, sometimes collaborative,

and sometimes co-optive relationships. This *medical pluralism* is characterized by a pattern in which biomedicine exerts dominance over alternatives, professionalized or not. Patterns of medical pluralism tend to reflect hierarchical relations in the larger society based upon class, caste, racial, ethnic, regional, religious, and gender divisions.

The U.S. medical system, for example, consists of several levels that reflect such hierarchies. In rank order of prestige, these include (1) biomedicine; (2) osteopathic medicine as a parallel medical system, focusing on primary care and incorporating spinal manipulation as an adjunct; (3) professionalized heterodox medical systems (chiropractic, naturopathy, acupuncture, and Chinese medicine); (4) partially professionalized or lay heterodox medical systems (for example, homeopathy, herbalism, bodywork, and direct-entry midwifery); (5) Anglo-American religious healing systems (for example, Spiritualism, Christian Science, Pentecostalism, and Scientology); and (6) folk medical systems (for example, southern Appalachian herbal medicine, African American folk medicine, *curanderismo* among Mexican Americans, and Native American healing systems). With some modification, this dominative model can be applied to other modern societies. For example, whereas medical doctors (MDs) tend to be upper- or upper-middle class and male, folk healers tend to be working-class members of various ethnic groups. Alternative medical systems often exhibit counterhegemonic elements that resist, often in subtle forms, the elitist, hierarchical, and bureaucratic patterns of biomedicine.

New medical systems or synthetic ensembles of therapies often emerge as popular health movements that undergo a process of professionalization that may open them to biomedical cooption. The holistic health movement in the United States began as a popular movement that challenged the bureaucratic, impersonal, and iatrogenic aspects of biomedicine. Far from monolithic, it encompassed numerous alternative medical systems (listed above). Although the philosophical premises of each of these are divergent, they share in common the holistic definition of the body as an energy field responsive to treatment from the energy in the herb, the homeopathic remedy, the Reiki treatment, and the chiropractic adjustment. Practitioners of such modalities today can be found in almost every country.

Beginning in the late 1970s, an increasing number of biomedical practitioners began to adopt alternative therapies for two reasons: (1) recognition of the limitations of the biomedical paradigm and (2) loss of many of their more affluent patients to alternative practitioners. More and more biomedical schools have begun to offer courses on alternative medicine as it became apparent that the "bread-and-butter" patients of biomedicine, those with disposable incomes, could afford to pay for alternative therapies out of their pockets. In a sense, the alternative health care movement has won its battle, and medical pluralism instead of biomedical dominance is the norm of the day in most contemporary technocratic societies.

In most countries, biomedical practitioners accept the existent medical plurality in their countries, yet work to remain hegemonically reinforced by government policies that pay for medical, and not alternative, care for their citizenry. In the United States, biomedicine has fought back by working at various times to remove herbal supplements from health food store shelves, to incriminate particular holistic practitioners, and to prevent insurance companies from paying for alternative care. Nevertheless, today over one half of all Americans utilize some form of CAM. Around the world, health insurance companies, health maintenance organizations, hospitals, and national governments have become increasingly interested in alternative therapies as a way of satisfying patients' demands and curtailing costs.

When CAM is systematized, although its practitioners often continue to adhere to some notion of holism, it can come to function as a style of health care in which biomedicine treats alternative therapists as subordinates and alternative therapies as adjunct. Some have even argued that alternative medicine in various national contexts is being co-opted by biomedical institutions, including centers of integrative medicine, biomedical schools and hospitals, the NIH (National Institutes of Health) National Center for Complementary and Alternative Medicine, and allopathic physicians who advertise themselves as "holistic" because they prescribe a few herbal supplements along with pharmaceutical drugs.

In contrast to the examination of indigenous or folk medical systems, the anthropological study of professionalized alternative health system remains in its infancy. Much remains to be learned about the specific ideologies behind each alternative system, the efficacy of its treatments and to what extent that efficacy depends on cultural or individual belief, and

what happens to them in practice when professionalization and integration into "the system" occur.

— *Hans A. Baer and Robbie Davis-Floyd*

See also **Biomedicine; Ethnomedicine**

Further Readings

Baer, H. A. (2001). *Biomedicine and alternative healing systems in America: Issues in class, race, ethnicity, and gender.* Madison: University of Wisconsin Press.

Davis-Floyd, R., & St. John, G. (1998). *From doctor to healer: The transformative journey.* New Brunswick, NJ: Rutgers University Press.

Heath, Shirley Brice

Shirley Brice Heath is professor emeritus of linguistics and English at Stanford University and has made significant contributions to both cultural and linguistic anthropology. Her focus is primarily within the United States, but she has also taught and carried out research in such diverse settings as Stockholm, Johannesburg, and Papua New Guinea. Her deeply engaged, longitudinal studies across a variety of cultural and institutional settings have contributed greatly to anthropology's understanding of children and youth in postindustrial societies, as well as to the role of language, cognition, and organizational structures in learning. The common thread among her various foci has been a concern for how the linguistic practices of children and youth from subordinated groups contribute to the development of learning and identity, both within and beyond school.

Though she has also written on the history of language policy in both the United States and Latin America, Heath is best known for her classic ethnography *Ways With Words,* which has become a standard work in university courses in ethnography of speaking and educational anthropology. *Ways With Words* examines in vivid detail how children from two neighboring communities in the southeastern United States learn to use language at school. It combines insights from child development and language acquisition, literacy studies, anthropology, and social history to contrast the linguistic practices of two working-class communities, one African American (Trackton) and one White (Roadville), and to show how both differ from the practices of the "mainstream" townspeople (White and Black), who hold social and political power in the region. Heath's analysis of the uses of literacy and oral narrative in both communities sheds light on how cultural differences manifest themselves as communication problems in school settings, with unfortunate results for working-class students. The book stresses possibilities for bridging the cultural differences between home and school, while also recognizing the structural and institutional constraints that make this difficult.

Like much school ethnography from the 1970s and 1980s, *Ways With Words* locates the principal causes of minority school failure in the cultural differences between mainstream and minority groups, rather than in political-economic structures or racist ideologies. This has been grounds for criticism from anthropologists of a more explicitly political bent; nevertheless, the work remains a touchstone of linguistic and educational anthropology for its detailed comparative analysis of the communicative practices of neighboring social groups and how these practices lead to social stratification over the course of students' educational careers.

Heath later turned her attention to learning among older adolescents in nonschool contexts, with particular attention to young people's involvement in community organizations and the arts. She directed the prize-winning documentary *ArtShow,* which has been shown in numerous prestigious galleries in the United States and Europe. The film, which is accompanied by a book/resource guide, highlights the ways in which certain kinds of organizations can aid young people in challenging the public perception of youth as apathetic, disengaged, and "at risk." Intended for a broader audience than most of her scholarly work, *ArtShow* continues and expands Heath's focus on the symbolic representations and linguistic practices of youth, showing how culturally based programs in the arts can help youth "practice adulthood" while they develop their own leadership and initiative in solving problems within their communities. In this, as in other studies, Heath has made a point of including her young research subjects as members of the research team.

— *Aurolyn Luykx*

See also **Childhood Studies; Language Use, Sociology of**

Further Readings

Heath, S. B. (1972). *Telling tongues: Language policy in Mexico, colony to nation.* New York: Teachers College Press.

Heath, S. B. (1983). *Ways with words: Language, life, and work in communities and classrooms.* Cambridge, MA: Cambridge University Press.

Heath, S. B., & Smyth, L. (1999). *ArtShow: Youth and community development.* Washington, DC: Partners for Livable Communities.

Hegel, G. W. F. (1770–1831)

Georg Wilhelm Friedrich Hegel was born on August 27, 1770, in Stuttgart, Germany, and died on November 18, 1831, in Berlin. He was born into a family of Swabian civil servants. In 1783, his mother, Christine Luise Hegel, neè Fromm (1741), died. After successfully completing his school exams at *Gymansium illustre,* he started studying at the famous Tuebinger Stift in autumn 1788. He took courses in philosophy, classics, and mathematics, and received an MA in philosophy, which was regarded as equivalent to a doctorate at other universities in 1790. From 1790 to 1793, he studied for and passed a further exam in theology.

Among his friends and fellow students were Friedrich Wilhelm Joseph Schelling and Friedrich Hölderlin. It has to be noted that Hegel was ponderous and precocious, and he was referred to as "the old man" when he was still a student. Throughout his life, he remained clumsy, and he was a poor public speaker. After successfully finishing his studies in autumn 1793, he started working as a private tutor *(Hauslehrer)* in Bern, Switzerland, where he remained until 1796. From January 1797 until 1800, he lived as a private tutor in Frankfurt am Main. An inheritance enabled him to give up his post as a tutor, and he moved to Jena in the beginning of 1801, where his friend Schelling as a successor of Fichte lectured in philosophy.

In summer and spring 1801, Hegel wrote a thesis (Habilitation, postdoctoral qualification, necessary condition for lecturing in Germany, connected to the *venia legendi*) on the orbits of the planets *(De orbitis planetarum),* which comprises only about 25 pages and which he defended on August 27, 1801. In the same year, he also published his first philosophical work, *Differenz des Fichte'schen und Schelling'schen Systems der Philosophie.* Schelling and Hegel frequently cooperated and edited a philosophical journal *(Kritisches Journal der Philosophie),* which was, however, discontinued after Schelling left Jena in 1803. In 1805, Hegel was appointed as a sort of associate professor *(außerordentlicher Professor)* by Goethe, who was the acting secretary of state.

During his time in Jena, Hegel wrote his first main work, *Die Phaenomenologie des Geistes* (1807), and he also fathered an illegitimate son with his landlady, Christiana Charlotte Burkhardt, neè Fischer (Jena), who before had two children by two other lovers. As a result of financial problems, he gave up his position in Jena and became first the editor of the *Bamberger Zeitung* (1807), and then the headmaster of a high school in Nuremberg (1808). There, he married Maria Helena Susanne von Tucher, who was 22 years his junior. Together they had two sons. A daughter died shortly after being born, and there were two miscarriages. While Hegel taught in Nuremberg, he wrote *Die Wissenschaft der Logik* (1812–1816, 2 vols.). In 1816, he accepted the offer to teach at the University of Heidelberg, and while he was there, his work *Encyclopaedie der philosophischen Wissenschaften* came out (1817). In 1818, he accepted the offer of the chair in philosophy at the University of Berlin, which was formerly occupied by Fichte. His work *Grundlinien der Philosophie des Rechts* came out in 1820. He died on November 18, 1831, in Berlin, during a cholera epidemic. The first edition of his complete works was published from 1832 to 1845. Although this edition was very influential, it is not very reliable.

Theory

The three most fundamental realms of Hegel's philosophy are the realms of logic, nature, and spirit. Even though he distinguishes between nature and spirit, these realms are connected within a monist metaphysics. His understanding of logic is also different from our understanding of logic as it is taught in symbolic logic courses. Logic, according to Hegel, is the science of reason, and reason is both a human as well as an ontological ability, in the same way, as according to Heraclitus, the world is governed by the Logos, and we human beings grasp this by means of our Logos. Within the discipline of logic, Hegel presents his

Source: Courtesy of the Library of Congress.

theory of categories. Hegel distinguishes between subjective and objective logic. Objective logic deals with notions such as "being," "nothingness," "becoming," "cause and effect," "necessity," and other abstract notions. He bases his analysis on the assumption that to each category, there is another one opposed to it, which upon closer inspection reveals that it is part of the meaning of the original category. Subjective logic, on the other hand, is concerned with the theory of notions, judgments, and inferences. Within his discipline of logic, Hegel also presents his dialectical method, which he himself often refers to as speculative method, which represents a very difficult if not problematic aspect of his philosophy, since one of the premises of this method is that all things are in themselves contradictory. The dialectical movement starts from something, then via the negation of that, something comes to something else, whereby the something else may not be nothing, and via a further negation, or absolute negation, reaches a further beginning. This movement is often described as leading from thesis to antithesis and then synthesis; however, this is not how Hegel described the method. It is one of the tasks of logic to get to know the realms of nature and spirit, as the absolute idea that encloses these two realms is the main topic of logic. As his highest definition, Hegel puts forward the absolute as spirit. However, as the absolute is an all-inclusive process, it as a whole is not only spirit but also nature.

In his philosophy of nature, Hegel is concerned with forces, laws, and types. The realm of the spirit is divided up into the realm of the subjective, objective, and absolute spirit. The subjective spirit comprises anthropology, and psychology, the objective spirit, law, and morality, and the absolute spirit, art, philosophy, and in particular religion. The realm of nature is linked to causality and the realm of spirit to freedom. Nevertheless, according to Hegel, these two opposite realms are united in a monistic metaphysics. It might help to know that his metaphysics bears some similarities to the neoplatonic systems, in which the one, the *hen,* which is the origin of everything, flows over and brings about *nous,* the realm of the spirit, and *physis,* the realm of nature.

Hegel applied his basic insights to various topics. He was also concerned with history. In his philosophy of history, Hegel gives an overview of the whole of world history from early civilizations to the French Revolution and his own times. Thereby, he interprets history by means of his own basic concepts as, according to Hegel, everything in history happened for a certain purpose and had a specific meaning and significance: "The history of the world is none other than the progress of the consciousness of freedom."

"True history," according to Hegel, begins in early Persia, where the ruler justified his position by reference to a general spiritual principle instead of accepting it just as a natural fact. This represents the beginning of the growth of the consciousness of freedom. When the Persian Empire attempted to expand its realm and defeat the Greek city-states, and the city-states of ancient Greek won, the focus of world history was also passed on. In Ancient Greece, some people, the citizens, were free, whereas in the oriental world, only one, the leader, was free. This shows that the idea of freedom then was still a limited one. In addition, the Greeks and the Orient people lacked the concept of individual conscience, according to Hegel,

which was supposed to be the reason why, for example, the Greeks did not distinguish between individual and common interests. Freedom was still incomplete type then.

With Socrates, who took up the command of the Greek God Apollo, "Man, know thyself," a strong force that went against the order of the Athenian state entered history. Although Socrates was sentenced to death, the principle of individual thinking remained active, and it brought about the downfall of Athens. The Roman world represents the next stage of world history, as it consisted in a collection of many different types of peoples, held together by the absolute power of the state, which represents the natural world. There was a constant tension between the natural world and the individual wills. As a consequence, human beings recognized their own spirituality, and in that way the natural world became less important and the Christian religion came about. Christianity is special because it is based on Jesus Christ, a person who is both a human being and the Son of God. He is supposed to reveal that all human beings participate in God or are made in the image of God. It is not the natural world to which humans belong, but the spiritual. This step represents the negation of the main focus of the natural world. The next step took place in the Germanic world, as there within the Reformation, it was recognized that it is not sufficient to solely concentrate on one's spiritual life but that it is necessary for living an appropriate religious life, if one adapts the natural world to the needs of free spiritual beings.

The Enlightenment and the French Revolution with their focus on the rights of man are seen as the next and almost last step in the unfolding of freedom. The significance of the French Revolution lies in the fact that it passed on the right principles to other nations—again, Hegel had Germany particularly in mind. The idea of freedom is present only in a state in which both *subjective freedom*, which consists of the convictions of all the individuals, and *objective freedom,* which encloses laws and a rationally organized state, are realized and responsible for governing the state. Only then, the history of the world will have reached its goal. Although Hegel does not explicitly say so, it seems that Germany of his own time came pretty close to such a conception.

— Stefan Lorenz Sorgner

See also **Kant, Immanuel**

Further Readings

Beiser, F. C. (Ed.). (1993). *The Cambridge companion to Hegel.* Cambridge: Cambridge University Press.

Hegel, G. W. F. (1979). *Phenomenology of spirit* (A. V. Miller, Trans.). Oxford: Oxford University Press.

Taylor, C. (1977). *Hegel.* Cambridge: Cambridge University Press.

Heidegger, Martin (1889–1976)

The fields of phenomenology and existential philosophy found a powerful voice in Martin Heidegger, a German philosopher best known for his concept of *Dasein.* A controversial figure who initially embraced and later repudiated Hitler and the German Nazi Party, Heidegger's philosophical and even cultural influence remained strong until late in his life.

As a university student, Heidegger abandoned early clerical leanings in favor of mathematics and philosophy and made significant contributions in the latter field. While on the faculty at Freiburg University, Heidegger affiliated himself with Edmund Husserl, a man widely regarded as the founder of the philosophical discipline of phenomenology. Heidegger published his best-known work, *Being and Time,* in 1927, while a professor at Marburg University. In *Being and Time,* Heidegger took very strong exception to the prevailing tendency of professional philosophers of the time to focus on questions relating to theory of knowledge (epistemology). In stark contrast, Heidegger took up classical metaphysical questions from the fresh standpoint of the early 20th century. Rather than quibble about how or whether we can know this or that, Heidegger resurrected many of the deep questions that occupied the earliest philosophers. His enquires focused on the question of being and the nature of existing things in general.

Although much of Heidegger's thought is rightly regarded as abstract, it is no less true that he sought to temper his pursuit of the larger question of *Sein* (being) with the equally significant question of *Da-sein* ("being there"). *Dasein* is a difficult word to translate and is typically rendered in English simply as "being there." This awkward translation does not, however, even begin to capture the nuances

Heidegger intended with Dasein, which has the sense of "human existence" or, rather more broadly, "what it means to be human."

Dasein is the central concept of Heidegger's philosophy. So concerned was Heidegger with capturing and explaining the meaning of Dasein that his *Being and Time* begins with an analytic, or explanatory analysis, of Dasein. Among other descriptions, Heidegger characterizes Dasein as "average everydayness," the ordinary condition of typical human existence. Dasein represents, among other things, the emergence within the individual of a conscious awareness of his presence in the world as an emerging manifestation.

In his concept of Dasein, Heidegger gives voice to the idea that "existence precedes essence." While Jean-Paul Sartre, a French contemporary of Heidegger, would make more explicit use of this notion than did Heidegger, this idea remains in the background of Heidegger's thinking about human existence. Although the idea that "existence precedes essence" dates back to at least the beginning of the second millennium, it figures prominently in the existential philosophies of Heidegger, Sartre, and other existentialists. As applied to existential philosophy, the notion that existence precedes essence means that there is no set "human nature" and that consequently each individual must create his or her own identify. To create one's identify out of the bare fundaments of the fact of one's existence in time and place is to live authentically, to take responsibility for one's own life and character, and to become in the end the person one has chosen to be.

— Daniel Horace Fernald

See also **Buber, Martin**

Further Readings

Brown, J. (1955). *Kierkegaard, Heidegger, Buber, & Barth.* New York: Collier Books.

Heidegger, M. (1962). *Being and time.* San Francisco: Harper/Collins.

Henotheism

In the mid-to late 19th century, the eminent linguist, Orientalist, and comparative religions scholar Max Müller (1823–1900), one of the founders of the "scientific study of religion" *(Religionswissenschaft)* and the "father of nature mythology," coined the term *henotheism* from the Greek words for "one" (*hen,* neuter) and "god" *(theos)*. Müller had translated the Vedas from Sanskrit and had observed that a Vedic poem would praise a personification of nature in the most exalted terms—"Creator," "Giver of Life"—as though (s)he were the only one, true god, which would be monotheism (*monos,* "one," "only"; *theos,* "god"). However, other poems were just as laudatory in praising other gods/goddesses, which would be polytheism. Müller sought a new term for this phenomenon. His usual language was *henotheism,* literally "one god" (but not the *only* god). Occasionally, however, he also used the term *kathenotheism,* which captures the parallel idea that one god(dess) after the other was being praised (*kath'* + *hen,* "one-by-one"; *theos,* "god").

Henotheism (kathenotheism) should be distinguished from *monarchial polytheism* and *monolatry.* In monarchial polytheism, Müller's polytheism, one god becomes supremely powerful among the gods in a fixed hierarchical arrangement. Examples are Zeus in the Greek pantheon or Isis in the Egyptian pantheon. Monolatry (monolatrism) describes the affirmation that only one god of those admitted to exist (polytheism) is truly efficacious and therefore worthy of *worship* (Greek *monos,* "one only"; *latreuō,* "I worship"): "Our god" is greater than "your god(s)."

Henotheism was conceived in a 19th-century European intellectual climate influenced by colonial contact with non-Western religions and the quest for the origin and evolution of religion. Ernest Renan (1823–1892) had claimed that the unique contribution of "the Semites" was monotheism and that, moreover, monotheism was the earliest form of religion. Müller countered by claiming that Renan's theory simply echoed the medieval view that an original revelation had fallen victim to polytheistic idolatry in all the nations but the Jews. Influenced by the Romantic philosopher Schelling (1775–1854) and armed with the Vedas, Müller held that henotheism came first. As dialects evolve into a formal language, he argued, so henotheism evolves into hierarchical polytheism. The evolution continued: First came the quest for an underlying unity, either monistic pantheism (the *Upanishads*) or monotheism (the Jewish Bible), and finally, there might also appear an atheism

that leads to true faith, as in the case of the Buddha, Socrates, and "the blasphemer" Jesus.

Müller's henotheism concept had elements from the psychology of religion. One of his definitions was the belief in and worship of objects in which humankind first suspected the presence of the invisible and infinite. These objects, Müller believed, were raised into something "more than finite, more than natural, more than conceivable." Müller offered many examples from the Vedas to show how natural objects (for example, the sun) evoked awe and were given names, then personified, then placed in a divine family, and finally described with exalted titles.

Müller argued that henotheism also appeared among the Greeks, Romans, Germans, and Israelites. With respect to the last, descriptive phenomenologist James Livingston has recently referred to the revelation of God's name as "Yahweh" in the Sinai theophany (Exodus 3:4–14), as follows: "It is not a fully conceived monotheism but a henotheism that, for intents and purposes, can be called 'practical monotheism.'" Recent specialists in Israelite religion seem less inclined to use the term, perhaps reflecting the tendency to abandon the quest for origins and evolution in general. However, scholars still debate related phenomena: the Hebrew plural form of God's name *(Elohîm);* God's image as "male and female" (Genesis 1:27); Yahweh's connection with Canaanite gods; the divine court; and monotheism as a late (post-Exilic?) historical development.

— Dennis C. Duling

See also **Religion**

Further Readings

Livingston, J. C. (2001). *Anatomy of the sacred: An introduction to religion* (4th ed). Upper Saddle River, NJ: Prentice Hall.

Müller, F. M. (Ed.). (1867). *Chips from a German workshop: Essays on the science of religion I* (4 vols.). London: Longmans, Green.

Müller, F. M. (Ed.). (1878). *Lectures on the origin and growth of religion as illustrated by the religions of India.* London: Longmans, Green.

Smith, M. S. (1990). *The early history of God.* San Francisco: Harper & Row.

Van den Bosch, L. (2002). *Friedrich Max Müller: A life devoted to the humanities.* Leiden, The Netherlands: Brill.

Heraclitus

Heraclitus was a Greek pre-Socratic philosopher, born in circa 540 in Greek colony of Ephesus, in Ionia, Asia Minor, where he is said he have spent all of his life, and died there circa 480 BC. He was known as "The Obscure" or "The Riddler," due to his difficult, elliptical, and paradoxical style of writing. The fragments of his philosophy have survived only through citations by other classical authors in the form of some 100 proverbial sentences. By expounding the nature of things, he intended to observe the anthropological consequences for human life. Heraclitus aimed at true wisdom and moral virtue, which is based on the knowledge of nature even if not limited to it. For instance, he advised humans not to fear conflicts and opposites and regard these as normal conditions of life. In his writings, he basically claimed, in opposition to Thales, Anaximander, and Pythagoras, that everything is derived from fire, rather than from air, water, or earth. For Heraclitus, the eternal fire was not only the primary material and cosmic principle, out of which and to which all phenomena arise and return, but moreover, it was the symbol of universal and constant flux by which everything could be explained.

By Heraclitus's flux doctrine, exemplified in his famous aphorisms *Panta Rhei,* or "Everything is in flux," and "You cannot step into the same river twice, for fresh waters are ever flowing in upon you," he opposed ideas such as those of Parmenides, who argued that change is an illusion and that everything is fundamentally static. Heraclitus further associated fire with god, soul, life, and intelligence. Fire is not destructive; it is a transformative force, the source of life and the light of thought and knowing.

Another of Heraclitus's aphorisms, "All things are one," shows that he was also in search of an ordering principle of the world. The multivalent idea of *Logos,* meaning "the word," "the god," "the law," "the reason," "the mind," "the rule," "the common," and so on, served him in this respect as the cosmic uniting formula for all change, differences and opposites. Logos also served as the moral law for human beings. To understand the world, human beings must listen to the Logos of nature as well as the Logos within their selves. The human psyche must inquire into itself, which is one of the most difficult things, in order to become wise and cultivated. Moreover, Logos can

serve as the guidance for moral human action. This is the way to avoid the relativity of values and acquire genuine human dignity.

Heraclitus attacked many human prejudices, including fear of death and desire for the afterlife. According to him, human beings should consider themselves as a very unique but integral part of nature. Their uniqueness consists precisely in their intelligence, allowing them to live an examined life. Thus, Logos provides the unity of nature and the human world. Heraclitus's influence on later philosophers, such as materialists, pantheists, and dialecticians, has been substantial.

— *Emil Visnovsky*

See also **Aristotle**

Further Readings

Guthrie, W. K. C. (1962–1978). *A history of Greek philosophy.* Cambridge: Cambridge University Press.

Kahn, C. (1979). *The art and thought of Heraclitus.* Cambridge: Cambridge University Press.

Kirk, G. S. (1962). *Heraclitus: The cosmic fragments.* Cambridge: Cambridge University Press.

McKirahan, R. D. (1994). *Philosophy before Socrates.* Indianapolis, IN: Hackett.

Robinson, T. M. (1987). *Heraclitus: Fragments.* Toronto, Canada: University of Toronto Press.

HERMENEUTICS

Hermeneutics is both the science and art of interpretation and understanding and has been applied to a broad span of disciplines and forms of scholarly inquiry. The roots of the term trace back to the Greek verb *hermeneuein,* which means "to interpret" and is found in the works of both Aristotle and Plato. However, Grondin maintains its emergence in the 17th century. Hermeneutics is commonly applied to the theological study of biblical interpretation, as well as literary theory, foundationalism, deconstruction, philosophy, politics, and a host of others.

Hermeneutics challenges (within disciplines) the historical or established meaning of an object or a given work. A work is most often seen as being man-made, whereas an object is the craftwork of nature. Works and objects are commonly understood within the established content or framework of a scientific discipline. The disciplinary content includes both the focused theoretical perspectives and specific terms unique to that field of study. It is the creation and application of this disciplinary understanding with which hermeneutics takes issue. Hermeneutics asks, "How do we know that the traditionally applied understanding of a work or object is correct" and "How do we know that anything is correct"? These fundamental questions are asked with the realization that disciplines have established laws or methods as a formal framework that guide their analysis. These guidelines for interpretation may be inherently inappropriate for an objective examination and untainted understanding of a given work or object. This condition is attributable to their principal beliefs being grounded in myopic or flawed thinking.

The meaning of words can change from one generation to another and most certainly from one century to another. Consider how diverse the English language is and the dynamic and ever-shifting meaning of words. Imagine attempting the translation of English into Hebrew and the inability to capture the accurate meanings. Who can know the true intent of an artist's work, the motivation of a composer, or the crafters of a constitution hundreds of years old?

Hermeneutics views the historical analysis of works and objects as generally laboring under the weight of applied cultural values of its contemporary society. These values are a central component of the process of problematic interpretation. Cultural values impacting interpretation are manifest in many forms. Examples are found in numerous areas, including law, art, social fields, religion, literature, economics, and language. Often, interpretations rise to the status of accepted understanding, frequently consistent with being a certainty. Hermeneutics looks at the sciences as making interpretations and arriving at understandings by following the law of their own subject matter and taking on the position of the "purveyor of all truth." All truth is seen as problematic when determined in the absence of a hermeneutic perspective.

The science of hermeneutics applies the philosophy of *phenomenology,* which means, according to Palmer, "letting things become manifest as they are, without forcing our own categories on them. It means a reversal of direction from that one is accustomed to. It is not we who point to things; rather, things show

themselves to us." There are several philosophical perspectives of phenomenology; however, it can best be looked upon as a lying open of consciousness or a disclosing of being as a method of hermeneutical investigation (or also known as a "hermeneutic"). The hermeneutic requires the intersubjectivity of the investigator and for the investigator to achieve interpersonal distance from the object of study.

— *Richard M. Seklecki*

See also **Critical Realism in Ethnology**

Further Readings

Caputo, J. D. (1987). *Radical hermeneutics.* Indianapolis: Indiana University Press.

Crusius, T. W. (1991). *Philosophical hermeneutics.* Urbana, IL: National Council of Teachers of English.

Grondin, J. (1994). *Introduction to philosophical hermeneutics.* New Haven, CT: Yale University Press.

Palmer, R. E. (1969). *Hermeneutics.* Evanston, IL: Northwestern University Press.

Silverman, H. J., & Idle, D. (1985). *Hermeneutics deconstruction.* New York: New York University Press.

Weinsheimer, J. (1991). *Philosophical hermeneutics and literary theory.* New Haven, CT: Yale University Press.

Herskovits, Melville (1895–1963)

Melville Jean Herskovits spent most of his career in the anthropology department of Northwestern University, which served as a base for research focused on West and East Africa, the Caribbean, and the United States. He began as an assistant professor at Northwestern (1927), where he soon became chair (1938), created the first department of African Studies (1951), and coaxed the library into developing one of the best African Studies collections in the world. He was born on September 10, 1895, in Bellefontaine, Ohio, and died on February 25, 1963, in Evanston, Illinois. Herskovits studied briefly to be a rabbi at Hebrew Union College in Cincinnati (1915–1918), served in the army (1918–1919), received a BA in history from the University of Chicago (1920) and an MA in sociology (1921) and then a PhD in anthropology (1926) from Columbia. Herskovits carried out research in Dutch Guyana (now Surinam) during summers of 1928 to 1929, Trinidad (June-September 1939), Haiti (summer 1934), and Brazil (1941–1942), as well as more frequent work in Africa (West, East and South).

Herskovits became known for espousing a cultural anthropology combining cultural relativism and a theory of ethnicity rooted in cultural history derived from Boas. Herskovits countered widespread theories about African American societies being pathological (in the sense of culturally damaged and disorganized) with a detailed argument about the evidence for a rich African heritage within current African American social organization, rooted in the similar societies found between Senegal and Angola during the time of the slave trade. Herskovits maintained that both African American and African societies have evolved since this time and cannot be expected to have developed in the same way.

This argument, also espoused by W. E. B. DuBois, became popular among African Americans because it provided a basis for ethnic solidarity and an explanation, other than poverty or social collapse caused by racism and the surrounding hostile social or urban environment, for the frequency of traits such as extended-family child care, rather than exclusively nuclear-family child care on the European model. Herskovits also documented continuity in language features and kinship systems as well as slave rebellions to counter arguments that African American society had been broken by slavery.

In his dissertation, Herskovits first theorized about what he called a "cattle complex" among pastoralists, especially in East Africa. This involved a cultural set of attitudes toward cattle that involved religious and social aspects that acted to counter what Western economists would call "maximizing behavior." The idea was not that those with the cattle complex were irrational, but rather that these cultural beliefs supported a long-term adaptation that was arguably superior to the short-term maximizing behavior economic theory would consider optimal.

Herskovits drew from numerous social sciences to make his points, but he viewed culture as learned behavior and took an ethical position (cultural relativism) that precluded ethnocentric judgments. His tendency was to minimize, though not ignore, the

influence of national or global forces on culture and emphasize endogenous development. Herskovits maintained extensive ties with African intellectuals and invited African scholars to Evanston. He was an advocate of civil rights and supported with his name and membership numerous groups that by mere virtue of their advocacy, or due to the U.S. Communist Party's infiltration, became viewed as communist front groups by the House Un-American Activities Committees. Freedom of Information Act documents indicate Herskovits was suspected of communist sympathies but regularly stated his antipathy to any form of totalitarianism and was apparently not deemed a communist by the committees or the Federal Bureau of Investigation.

— *Thomas K. Park*

See also **African American Thought; Cultural Relativism**

Further Readings

Herskovits, M. J. (1938). *Acculturation: The study of culture contact.* New York: Augustin.

Herskovits, M. J. (1952). *Economic anthropology: A study in comparative economics.* New York: Knopf.

Herskovits, M. J. (1953). *Franz Boas: The science of man in the making.* New York: Scribner.

Herskovits, M. J. (1962). *The human factor in changing Africa.* New York: Knopf.

Herskovits, M. J. (1964). *Cultural dynamics.* New York: Knopf.

Herskovits, M. J., & Herskovits, F. S. (1958). *Dahomean narrative: A cross-cultural analysis.* Evanston, Il: Northwestern University Press.

Simpson, G. E. (1973). *Melville J. Herskovits.* New York: Columbia University Press.

Heyerdahl, Thor (1914–2002)

Thor Heyerdahl, noted explorer and author, was born in Larvik, Norway, on October 6, 1914. After studying zoology and geography at Oslo University, he married and traveled to Polynesia. After a period of familiarization with the island way of life and culture, the Heyerdahls chose a primitive lifestyle on a remote Pacific island, Fatu Hiva, in the Marquesas group. While there doing research on the transoceanic origins of the island's flora and fauna, Heyerdahl observed that the prevailing winds and currents came from the east, bringing with them many local plants that were unique to the American continent. As a result, Heyerdahl became convinced that because the oceans served as a natural means of transport that enabled people to move around the world, perhaps the first migrants to Polynesia might also have come from this same direction.

Scientific opinion at the time maintained that it was an impossibility for early navigators from South America to reach Polynesia. This was a theory Heyerdahl refused to accept. So, he embarked upon the construction of a primitive raft, a replica of those used by early South American Indians. Made of nine balsa wood logs from the forests of Equator and lashed together with crossbeams and covered by a deck, the *Kon-Tiki* set sail from Peru on April 18, 1947, intending to demonstrate that navigation was possible for pre-Incan peoples sailing from east to west, using the South Equatorial Current to settle Polynesia.

In contrast to European craft, the raft owed its safety and seaworthiness to its ability to rise and fall with any threatening sea and the wash-through construction, which allowed the water to drain through the logs like a sieve.

On the perilous journey, Heyerdahl and five companions, dependent on the sea and sky for their survival and with logs increasingly becoming waterlogged, made landfall 101 days later on Raroia Atoll, Tuamotu Archipelago, south of the Marquesas, after some 4,000 miles. The exploits of the voyage are recorded in *Kon-Tiki Expedition* (1948), which sold millions of copies and is documented in the film of the same name. The journey demonstrated that migration from South America to Polynesia was possible, despite much skepticism. However, currents theory and supporting evidence from archaeological, cultural, linguistic, blood-grouping, and genetic sources showed that the Pacific Islanders had made long and gradual colonization of the Pacific from the Old World.

Following the success of the *Kon-Tiki* expedition, Heyerdahl organized and led expeditions to the Galapagos Islands and experimented with Peruvian centerboards, called *guaras,* used for steering, which allowed a raft under sail to turn about and resume a new course into a contrary wind and current, as does a rudder in a European craft. This added further credibility to his claim that sustained voyages were possible to and from the South American coast.

Source: Courtesy of the Library of Congress.

Thor Heyerdahl continued his research on ancient navigation with expeditions to Easter Island in 1955 to 1956 and the *Ra I* expeditions of 1969 to 1970, when he devoted his energy to the ancient reed boats made of papyrus. These boats were thought to become waterlogged after less than 2 weeks on open water. With 12 tons of papyrus reeds, a 15-meter vessel was constructed and was launched from Sofi, Morocco, and sailed 2,700 miles in 56 days before foundering and being abandoned 1 week short of Barbados due to storms and deficiencies in construction. Ten months later, Heyerdahl tried the same voyage with a smaller vessel, *Ra II,* from Sofi to Barbados, showing once again the possibility of travel using ancient technologies. This gave reinforcement to his theory of linking the similarities of the Mayan and Aztec cultures to Egypt and Mesopotamia by establishing the possibility of an oceanic connection.

In 1977, Heyerdahl sailed 3,600 miles on the largest of his reed ships, *Tigris,* to suggest the possible linkage of Egypt, Mesopotamia, and the Indus Valley by open ocean, rather than long-distance camel routes.

Thor Heyerdahl died on April 18, 2002. Although evidence contradicts most of his theories, he used tools and techniques from the past and materials available to an adventurous people to expose the world to different ideas through his epic journeys.

— *Paul Young*

See also **Migrations**

Further Readings

Conniff, R. (2002). Kon artist? *Smithsonian, 33*(4), 26.
Heyerdahl, T. (1950). *Across the Pacific by raft.* New York: Rand McNally.
Heyerdahl, T. (1971). *The Ra expeditions.* New York: Doubleday.
Heyerdahl, T. (1974). *Fatu Hiva.* New York: Doubleday.
Heyerdahl, T. (1981). *The Tigris expedition.* New York: Doubleday.

Hinduism

Hinduism is arguably one of the most difficult of the major world religious traditions to accurately define and explain in any concise manner, especially using Western models and modes of understanding. Unlike the Judeo-Christian approach to religion, in which a specific text, a unique prophet or set of prophets, and the teachings attributed to these prophets establish the main parameters of the faith, Hinduism cannot be contained or defined in this way. What has come to be called "Hinduism" has had multiple influences in its origins and evolution, and it has myriad different manifestations. Yet amidst all these differences, there are certain basic concepts, beliefs, and approaches to life that, in one form or another, provide a continuum and a thread to link present to past. These will be discussed herein.

Hinduism, like most of Asian-based traditions, is difficult to understand when viewed and analyzed through Western religious paradigms. Moreover, many of the methodologies for understanding religion in the academic environment today were developed by Europeans using Christian patterns and preconceptions. Thus, while these tools may be valid for dissecting and analyzing those traditions that

Hindu offerings placed throughout a family compound guarantee the protection of everyday life.

Source: © Jenn Reese.

originated in the Middle East, they are far less valid, and sometimes even distracting, when using them to look at indigenous or Asian traditions.

For many practitioners, Hinduism is not a religion in the Western sense, but more a philosophy, value system, and set of guidelines by which they lead their lives. Hinduism has no founder, no specific doctrine to which all followers must adhere, and no one leader. Membership is not dependent on faith in a specific text or prophet. For the most part, it is not viewed by its adherents as the only way everyone must live. Instead, many Hindus compare the various religious traditions to differing paths up a mountain. Each one follows a different route, but they all eventually end up at the top. This does not mean that Hindus see their tradition as no different than any other. It is that they tend to accept others and their traditions at face value and feel no need to convince them to follow the Hindu path. In fact, more orthodox Hindus feel that one must be born into the tradition.

Origins

Like all indigenous religious cultures and traditions, Hinduism arose out of the peoples and cultures of its birthplace, the land of India. Its origins are a topic of great debate and discussion by Hindus and by Western-educated scholars. While the former see the beginnings of the tradition going back thousands and even hundreds of thousands of years, the latter theorize a much more recent origin, perhaps three to four millennia ago. What is generally agreed upon, though, is that there was a thriving civilization in the Indus Valley region (now in Pakistan) prior to the second millennium BCE. Unfortunately, our knowledge of it is limited due to a lack of any historical records. What is apparent is that there, very early in the history of the tradition, was a rich heritage of sacred chants, the earliest of which are the Vedas. These come to be viewed within the orthodox tradition as the supreme source of truth and to this day are revered as the ultimate authority by many. Subsequent to the Vedas, yet a part of them, came the Upanishads. These texts are highly philosophical and address the nature of human existence, its relationship to divinity, and ultimate reality. The Puranas, another class of texts, focus on the origins of the universe, of the *devi*s and *devata*s (female and males divinities), and of humans. They are the major literary source for Hindus' understanding of their history and their rich mythological tradition. The two ancient Epics, the *Ramayana* and the *Mahabharata,* are integral in the understanding and devotion to the two major forms of the divine in Hinduism, Ram and Krishna, respectively.

By the time Alexander the Great invaded India and the late fourth century BCE, the various elements of the developing religious tradition of India were both rich and diverse. Jainism and Buddhism were coming into form, although more as aspects of a broader tradition than as separate religions. Yet there was a thread of common beliefs and practices that connected most of the diverse streams. These commonalities have continued up to present day. They include a belief in transmigration of the soul, the concept of karma, the importance of nonviolence, the central role of the guru/disciple relationship and of religious practice, and acceptance of religious and philosophical diversity. In the last two millennia, there have been

myriad philosophers, teachers, and movements within the tradition, as well as invaders from the West. All these have added to the fabric of what Hinduism is today.

The Theory and Practice of Hinduism

Western religious traditions, especially Christianity and Islam, place a central focus on belief, both in the uniqueness and supremacy of their respective traditions, prophets, and scriptures, which they typically promote as being absolute, unique, and inerrant. In the case of Hinduism, however, there is no one prophet or one sacred text. Instead, there are many of both, and each Hindu is relatively free to pick the text or teacher he or she wishes to follow. With regard to texts, Hindus generally give perfunctory deference to the Vedas, although most actually know little as to their content and have never read any parts of them. Instead, the sacred stories found in the *Ramayana* (in its various tellings), the *Mahabharata,* the *Bhagavad Gita,* and in the multiple Puranas have been the primary written sources that have provided the vast majority of Hindus their understanding of their tradition, its beliefs, and its practices. However, more important than texts as sources of knowledge and practices for Hindus have been local traditions, the teachings of wandering *sadhu*s (commonly translated as "ascetics" or "holy men") and storytellers, and the words of one's personal guru, or religious teacher. Thus, the way a Hindu typically understands and practices the religion is much more based on these sources than on any text or doctrine.

As a consequence of the enumerable written sources and the many teachings from wandering *sadhu*s and gurus, Hinduism has a philosophical diversity, eclecticism, and tendency toward tolerance not found in other major religious traditions. Broadly speaking, each individual's understanding and practice of Hinduism is grounded in his or her guru's specific interpretation of the tradition, with an emphasis on practice over belief. Orthopraxy is stressed over orthodoxy. Moreover, a central focus of Hinduism is on what one does more than what one believes. It is the various religious practices (collectively known as *sadhana*) that define the religion for many of its adherents, far more than specific beliefs. For the faithful, to be a Hindu means to live the tradition by doing the practices associated with it. These can involve material things such as what one does or does not eat or wear; it can involve external practices, such as devotional singing and chanting, doing rituals at home or at a temple, or going on a pilgrimage; or it can involve one's internal practices, such as meditation or prayer. Any or all of these can define what the practice of Hinduism is for its devotees.

Rituals, both personal and collective, make up an important part of the practice of Hinduism. It is not so much that a particular ritual is so important or even that a particular way is important, but what is most important is that one does rituals. This is because, for the most part, rituals are believed to have the power to effectuate an elevated state of religious or spiritual purity and consciousness, and they may grant power as well.

It would be virtually impossible to record all the diverse beliefs and practices found under the name Hinduism. There are hundreds of diverse ethnic and linguistic groups, hundreds of different caste groups, and thousands of different religious denominations and belief systems. While most of these share some common beliefs and practices, each also has its own peculiarities and unique elements. The Vedic and Tantric traditions have been the primary sources for many of the more popular orthodox rituals, especially the *agnihotra,* or fire ritual, but also various forms of chanting, fasting, and so on. The group of texts known as the Upanishads is the primary repository for many of the more popular Hindu theological and philosophical beliefs. Although there is a wide diversity of views expressed in these texts, they have several concepts in common, such as the unity of the divine, the inseparable connection between the individual soul *(atman)* and the Supreme Transcendent *(Brahman),* the importance of truth, wisdom, right action, reincarnation, and so forth. The Epics and Puranas and various devotional texts are important sources for popular beliefs, both mythological and doctrinal. These texts have also given rise to many rituals and practices as well. The following sections will be a discussion of some of the beliefs, rituals, and practices most commonly in found in Hinduism, both in India and in the Hindu Diaspora.

Beliefs

The Divine

Hinduism is generally called a polytheistic religion by outsiders to the traditions. However, it is more rightly considered panentheistic, a belief in which all existence is subsumed in God, but is also transcended

by God at the same time. In short, all is in God, but God is beyond all. Added to this is the belief that God is also omnipotent and omniscient. This being the case, Hindus then see all existence, all knowledge, and all power as, on one level, divine. However, because the totality of this Absolute Divinity is beyond human conception, it takes multiple forms through which it makes itself knowable and available to humans. These forms are known as *devi*s and *devata*s. Although the terms are usually translated as "goddesses" and "gods," they should not be confused with these Western theological concepts. A *devi* is a manifestation of the Absolute's feminine energy, power, and divinity, formed to fulfill a particular function or serve as an expression of a particular quality. Likewise, a *devata* is a masculine expression of the Absolute. Therefore, because all the *devi*s and *devata*s are aspects of the One, Hindus may pray to or worship many different ones simultaneously, while still seeing them all as none other than the expression of the One Absolute. Last, because of the omnipresent view of the divine, all aspects of nature are seen to contain divinity as well, including plants, animals, and rocks.

Most Hindus actually tend to focus on one or several related manifestations in their daily worship. They may actually believe a particular one as the ultimate manifestation of the Absolute, while also acknowledging other manifestations as being divine and praying to them as well. It is also for this reason that Hindus can easily attend religious services of other faiths, such as Christianity or Islam. After all, the divine being worshipped in those religions must either be the One or a manifestation of it. Thus, while Hinduism appears as polytheistic to outsiders, it is not so either in the ultimate Hindu vision, in the complexity of the tradition's theological views, or in the minds of its practitioners.

Brahman/Atman

Upanishadic philosophy is the primary source for understanding the concept of the Transcendent Absolute, as mentioned above. It is said to be undescribable, unknowable, and imperceptible, and it is the source and reality of all that exists, both visible and invisible. It is called *Brahman.* It is not only that which becomes manifest as the *devi*s and *devata*s, but it is also the life force in each living being, called *atman.* Atman is qualitatively, but not quantitatively, equal to *Brahman,* the relationship between the two being somewhat like that of drop of ocean to the ocean, separate yet not separate, of the same essence but not the same. One's true reality is *atman,* as is the reality of all living beings, and because of the intimate relationship between *atman* and *Brahman,* all beings are connected as well. With this belief, then, nonviolence, truth, compassion, and tolerance all follow naturally. The *Brahman/atman* concept is foundational to much of what is believed and practiced within Hinduism.

Karma

There are various approaches to the law of *karma.* In the Jain tradition, *karma* is the product of the interaction of soul *(jiva),* which is the life force in all visible and invisible creation and nonsoul *(ajiva),* which includes time, space, matter, and inertia. Every action, then, results in the production of *karma*, of which there are 148 different types. Those types that are particularly bad and lead to suffering and low rebirths include killing, violence, cheating, stealing, lying, and so forth. Other forms of *karma* can be uplifting, such as nonviolence, compassion, truth telling, charity, and so on. Although the latter help offset the former, the goal is to stop all karmic production in order to be liberated. The Buddhist concept of *karma* is somewhat similar, except that there is much more of a focus on intention over action. Selfless actions rid one of bad *karma* but do not necessarily create more karma. Thus, nonattachment is the vehicle to liberation, for which a teacher is important to point the way. It is this concept of *karma* that for the most part reflects the common Hindu view.

Ahimsa (Nonviolence)

The worst *karma* in Jain, Buddhist, and Hindu traditions is the consequence of murder and violence. It is believed to weigh down the soul and lead it to rebirth in a hell realm, a realm of evil spirits, as an animal or possibly as a tortured human. The corollary to this, then, is nonviolence *(Ahimsa),* which elevates the soul, rids it of bad *karma,* and furthers its progress along the path to liberation.

Punarjanam (Rebirth)

Both Jains and Hindus believe in a soul and in rebirth *(Punarjanam).* Just as a student must go through a variety of courses and grades in order to gain the knowledge necessary for graduation, so the soul *(atma)* must go through a variety of births in

order to learn all the lessons necessary for liberation. If a student fails to pass a course, he or she must retake it. In the same way, an individual who fails to learn certain lessons in a particular life must then reexperience them in a subsequent one. Both traditions, along with Buddhism, believe that liberation is an inevitable and ultimate goal, even though they disagree somewhat on what liberation actually is.

Guru/Disciple Relationship

The relationship between the teacher and the disciple has been one of the most enduring aspects of Hinduism since its roots in ancient history. Teachers, or *guru*s, have been the primary vehicle through whom Hindus have learned their religious culture. The purpose of a teacher is to instruct the student on the path to liberation. Ideally, a *guru* is someone who has already traversed the path and thus knows the way, with all its pitfalls, signs, and curves. Because one's *guru* is said to have the ability to guide each disciple on his or her path to the divine, the *guru* is to be treated with highest respect. More than a scripture, a particular school of thought, a sect, or a doctrine, the teachings of one's *guru* are to be followed as truth. The role of the *guru* has earned such a high degree of importance within Hinduism that devotion to one's *guru* has come to be seen as integral with devotion to God. While the orthodox tradition suggests only a Brahmin (a member of the priestly caste) as being qualified to be a *guru,* the reality is that most village Hindus learn more about the traditions and practices from wandering *sadhus*, many of whom are not Brahmins. Thus, the Hindu renunciant is a pivotal figure in the perpetuation of the tradition.

Dharma

There is no single English word with which to translate *dharma,* no term to describe its complete meaning, which includes belief, moral duty, righteousness, justice, virtue, cosmic law, and harmony. *Dharma* compels humans to act in a manner in accordance with the virtues just mentioned so that their actions move them in the direction of enlightenment. Thus, it is the vehicle through which liberation is gained. Mahatma Gandhi considered both truth and nonviolence as the highest expressions of *dharma.* In contemporary times, it is also used in place of the English term *religion.* The term is used in all the religious traditions that are indigenous to India, including Jainism, Buddhism, and Sikhism. However, in each one it has a slightly different meaning.

Bhakti (Devotion)

The term *bhakti* is used in reference to several aspects of the Hindu tradition. On one level, it simply means "devotion" or "love" and as such refers both to emotional feelings of love and respect toward a particular form of the divine as well as to any of a number of practices that one might do as a consequence of such feelings. It is the primary focus of the practice of Hinduism today. As mentioned above, because Hindus believe that the Absolute Brahman is unknowable, the focus of devotion and worship is generally on its manifestations. The most common of the many *devi*s and *devta*s are in the form of male/female couples, which include Ram and Sita, Krishna and Radha, Shiva and Parvati, Vishnu and Lakshmi. Each couple is seen either as dual expression of the Absolute or as the supreme expressions, depending upon the focus of one's *bhakti.* Thus, Hindus can simultaneously express devotion to multiple forms as well as to the One. Since *bhakti* is fundamental in contemporary Hinduism, Hanuman, usually depicted in the form of a monkey, is one of the most popular divinities. He is an incarnation of Shiva, the servant of Ram, and the highest manifestation of devotion, humility, and selfless service. Devotion to him, then, brings together various manifestations into one. For most Hindus, *bhakti* defines their practice of their tradition.

Caste System

Easily, the most controversial aspect of the Hindu tradition is the caste system. It is the ancient social and religious hierarchical stratification of Hindu society that has persisted up to present times. It is defended as a religious expression of one's progression toward liberation or as a formalized division of labor. It is condemned as systematized oppression and racism.

Devotional Rituals and Practices

It is virtually impossible to list all the different beliefs and practices that are connected with devotional Hinduism. However, there are several that tend to be

prevalent in most regions of India and have come to represent the general core of beliefs and practices. One category includes specific ritual practices done either at home or in a temple, such as sacred name chanting (*nam jap* or *nam smaran*), devotional singing *(kirtan),* and image worship *(murti puja).* Another category includes lifestyle practices, such as vegetarianism, nonviolence, abstinence from intoxicants, and charity.

Rituals found in contemporary Hinduism combine elements of indigenous, Brahmanical, and Tantric aspects and tend to be focused on a particular deity, although devotion to one or more associated deities is generally included. There are various ways to categorize the different types of rituals, such as who is actually performing the ritual, what it involves, what is its purpose, and where it is taking place.

Mediated Rituals

This category of rituals involves those done by any of several types of individuals for the benefit of another. Brahmin priests (or someone recognized by a community to serve as one) are the major ritual officiants. All rites of passage and many periodic rituals are traditionally overseen and performed by priests. In some areas, shamans exist as well and are often called upon to mediate specific types of rituals, especially dealing with sickness, possession, and other instances needing intercession with the spirit world. While most *sadhu*s, or renunciants, do not generally perform mediated rituals, some do, especially for their immediate disciples.

One element often found in mediated rituals, especially those performed by priests, is the fire sacrifice, commonly known as *yagya* (or *yajña*), *homa,* or *havan.* This practice is one of the earliest known Aryan rituals that has survived up to present day. The central element of the ritual is the fire itself, *agni.* Originally seen as a mediator between the divine and human worlds, Agni came to be viewed as a deity himself, while the priest now acts more as the mediator. The ritual involves the offering of various combinations of foodstuffs (including black sesame seeds, grains, nuts, dried fruit, clarified butter, and so on) into a sacred fire made of sandalwood, wood from the mango tree, or other woods considered sacred. A *havan* is generally a smaller fire sacrifice with only one priest in attendance, while a *yagya* often has more and can have as many as 108. When a yagya is performed, it is usually followed by a *bhandara,* which involves a feast for those in attendance and/or the poor.

Personal Rituals

These are rituals done by individuals for their own or their immediate family's benefit. In most Hindu homes, there is an altar of some sort, where women perform daily rituals. These may be as simple as lighting a candle or piece of incense in conjunction with a small prayer, or they may be elaborate observances, involving the bathing and worship of an image, incense, food offerings, and meditation. At the same time, men, unless they are a priest, shaman, or *sadhu,* tend to do rituals less often, and then usually only for themselves. Among the various elements one might find in personal rituals are prayer, image worship, name recitation *(jap),* chanting, scriptural recitation, breath control practices, and meditation.

Chanting and *Jap*

Traditionally, most Hindu chants have come from Sanskrit sacred texts, as Sanskrit is said to be the language of the gods, thereby possessing great power. Even though only a minuscule number of the population has ever understood the language, this fact has mattered little: The gods understand it, and that is what is important. Chants usually involve invocation of a deity, through praise, supplication, or requesting forgiveness. In more recent times, non-Sanskrit chants have also become an integral part of Hindu practice. *Jap* refers specifically to either murmured or silent repetition of a particular mantra, sacred name, or collection of sacred names. *Nam jap,* or name repetition, is one of the most common forms of religious practice for Hindus today.

Prayer and *Kirtan*

Unlike chants, most prayers are understood by their speakers and are usually in the speaker's native language. If a prayer happens to be in Sanskrit, the person reciting it likely knows what it generally means, if not its exact translation. Prayers can be and are recited at any time of day, in any situation, as is the case in all religious traditions. They can be internal and personal, or they can be spoken or sung aloud, alone, or with a group of persons. When done with a group, there maybe some sort of musical accompaniment as well. Such activities are called *kirtan* or *bhajan* and comprise a major element of the practice of Hinduism.

Yoga

Yoga is arguably of the earliest religious practices known in the Indian subcontinent. The eight-limbed system has long been primarily practiced by renunciants and has never been commonplace among the lay population. Its traditional purpose is to attune the body and focus the mind to assist on the path to enlightenment. However, in more recent times, yogic practice has become a popular activity in urban areas of the West, primarily for the purpose of keeping physically fit. As a consequence, its popularity in urban India is also increasing.

Vrat (Fasting)

The taking of a restrictive vow, or *vrat,* is an important religious undertaking for a Hindu. This can involve any form of sensual-pleasure restriction, and a food restriction fast is the most common. Many Hindus include some sort of dietary *vrat* on a regular basis, such as vegetarianism, a weekly fast (such as on Tuesdays for Hanuman or Fridays for the goddess), or a several-day fast once a year. The actual type and length of fast is to be self-determined. For renunciants, undertaking *vrat*s is integral to that way of life.

Sacred Texts

Reading or chanting from sacred texts has increasingly become a popular form of Hindu religious practice, and of all the major religious traditions of the world, none has the diversity of sacred texts as does Hinduism. Starting with the Vedas, the number of texts that have been written and are viewed as sacred, by one group or another, is vast. Although formal deference is generally given to the orthodox texts, the Vedas and Upanishads, the vast majority of Hindus neither read them nor know much about them. Instead, devotional writings are the scriptural focus of Hinduism today. In north India, the primary sacred text is the *Ramcharitmanas,* a 16th-century telling of the Ramayana story by Tulsidas in a dialect of Hindi. It is regularly read, chanted, memorized, and recited in homes and gatherings thought north India. It was also made into a serialized television program in the early 1990s, and whenever it was being shown, urban India almost came to a standstill. For Krishna devotees, the *Bhagavad Gita,* the *Mahabharata,* and the *Bhagvata Purana* are the most popular texts. In south India, the *Periya Puranam* both inspires and reflects the devotion to Shiva in the hearts of the populace.

Diaspora Hinduism

Starting in the 1830s, the British government began shipping thousands of impoverished Hindus to British-owned plantations around the world to work as indentured servants. By the time the practice ended, more than a million Hindus had been sent to Fiji, the Caribbean, Mauritius, and South Africa. In the process, the Hindu Diaspora was born. Although the indentured servants were primarily rural, illiterate, and poor, and missionaries in these lands worked hard to convert them to Christianity, their faith in their Hindu traditions persisted, and today Hinduism is thriving in these lands. Moreover, many Diaspora Hindus have become important spokespersons for international Hinduism. Diaspora Hindus have also migrated to Western Europe, Canada, and the United States, taking with them a form of Hinduism that also reflects the Diasporic experiences and cultures.

The Diaspora religious practices mirror many of the practices in India, especially *bhakti,* and the *Ramcharitmanas* is likewise the most popular scripture. Unlike the Hinduism of India, however, there is essentially no caste system in Diaspora Hinduism, since the indentured servants wisely chose to reject the system in their new lands. The consequence is that Diaspora Hindus have also become important figures in the fight to remove the prejudice of the caste system from the practice of Hinduism altogether.

— *Ramdas Lamb*

See also **Buddhism; India, Philosophies of**

Further Readings

Eck, D. (1998). *Darsan: Seeing the divine image in India* (3rd ed.). New York: Columbia University Press.

Flood, G. (Ed.). (2003). *The Blackwell companion to Hinduism.* Stirling, UK: University of Stirling.

Fowler, J. (1997). *Hinduism: Beliefs & practices.* Brighton, UK: Sussex Academic Press.

Johnsen, L. (2002). *The complete idiot's guide to Hinduism.* Indianapolis, IN: Alpha Books.

Klostermaier, K. K. (1989). *A survey of Hinduism.* Albany: State University of New York Press.

Krishnamurthy, V. (1989). *Essentials of Hinduism.* New Delhi: Narosa.

Narayanan, V. (2004). *Hinduism.* Oxford: Oxford University Press.

Historicism

Historicism is a theory of discerning the past truth from the study of history with man at the pivot. It was applied by 18th-century philosophers of Enlightenment and gained momentum since then, with the insistence that history is knowledge. It is the implication of the knowledge of history in explaining, besides history, a vast range of traditional subjects, like theology, philosophy, art, and literature. *Historicism* is a sort of tag attached to different disciplines, meaning things in the said discipline can be explained and understood by the knowledge of history. Previously, it was believed that such knowledge is apocalyptic. In history, it is applicable to Darwinian interpretation of social evolution and Marxist interpretation of dialectic materialism.

Broadly, the theory of historicism means that man may learn from history something the great religions believed that they learned from revelation. The application and value of history increased a hundredfold by this theory. As such, this is a theory of historical inevitability, a sort of historical determinism. It is the science of answering questions through historical records and repudiates the early belief of God guiding the steps of human beings (apocalypse). On the contrary, it theorized the materialistic view of the universe, insisting that man himself made certain laws through experiments and systematic observations that guided his steps, giving meaning to human life. Man is constantly thriving to derive and explain these laws. The scientific methodology of history as a collection of a mass of data together with constantly increasing ability to classify and analyze those data—encompassing facts related to socioeconomic changes, the beginning and growth of institutions, lands, and the people bearing upon individual and mass psychology—have made the task easy.

The historians have discovered uniform tendencies governing movements of religious enthusiasms. They are the same for the rise of Christianity, Islam, and Buddhism. Also, the same is applicable for the rise of nationalism in Europe, America, and Asia. This implies that there are certain laws through which historical events occur and can be explained.

Historicism derives its roots from the law of change, which proclaims that what existed in the past would not exist today—and in the same manner, what exists today would not exist tomorrow. One should think historically about this law of change, and a historian should not accept the verdict of past authors without criticism. Historicism claims that there can be a preimagination of social future on the basis of historical understanding of the law of change. The German philosophers, however, conceived of the term *historicism* differently. Dilthey, being influenced by the 17th-century religious mysticism, believed in the historical concept of the solidarity of human race and its inevitable progress through an inner strength. He is the theoretician of that moderate spirituality that escaped positivism and thus, in turn, generated the so-called crisis of historicism.

For Ernest Troeltsch, historicism was the radical historicization of our knowledge and thought. All objects are determined by the past and are directed toward an unknown future; hence, state, law, art, and all others are dissolved in the stream of history intelligible to us as constituent parts of historical development. Troeltsch considered naturalism and historicism as the two great scientific creations of the modern world, conceiving them as homologous and juxtaposed. Though he was against the idea of unlimited historicism, he perceived it as an absolute universal and extrahistorical truth, which was the presupposition of any historiography (the conquest of historicism).

Friedrich Meinecke referred to historicism as the sense of the value of individual and individuality of nations that had been derived from the 18th-century European secular standpoint, from which the Germans had investigated the essence of individualism (cosmopolitanism and the national state), and traced the history of the 18th-century thought (the origin of historicism). Bendetto Croce used the term *historicism* to mean freedom of historical thought by rigidly defining the competence of each and showing that none had the right to usurp the place of historical thought. He insisted that historical attitude does not have to justify the object of its knowledge through other thoughts, but that historical thought stands both at the base and at the summit of all genuine truth. Hegel and Karl Marx used the term *historicism* to explain the historical philosophy of determinism. Hegel used it to explain "knowledge": the concept of social science that can derive and produce knowledge from the study of past for the benefit of society. For Hegel, it was a historical philosophy of "knowledge." M. C. D'Arcy used the word *historicism* as being identical with a philosophy of history.

Historicism thus became a term of multiple meanings. In the 19th and 20th centuries, it became all the

more important, because as a consequence of this school of thought, people were convinced that they understood where the forces of history were leading and that they could further help and hasten the process, thus gaining a mastery over the secrets of universe. Historicism is not just knowledge, but the science of making predictions with the knowledge of history. It leads to positivism in interpretation.

With the publication of *Poverty of Historicism* (1957), by Karl Popper, the theory came into vogue, creating a wild storm of heated discussions in the mid-20th century. In the introduction, he described historicism as "an approach to the social science which assumes that historical predictions is its principal aim." Popper thus made use of the term to mean a method of approach solely aiming at predicting the future course of history. It is unfortunate that he chose the term *historicism* to denote an intellectual frame that is only a species of the genus and may take many forms and could not understand what the German philosophers meant by it in totality.

In *Poverty of Historicism,* Popper discredited historicism, arguing that a constant growth of knowledge keeps influencing the human history and it is therefore impossible to anticipate the future and make predictions with any amount of certainty as in science. He gave an inventory of arguments against the scientific character and capacity of history, such as the complex nature of the subject, insufficient causal explanation, lack of quantification and experimentation, and an unavoidable selectivity of presentation. He utterly rejected the possibility of a theoretical history ruled by any laws. Furthermore, in *Logic of Scientific Enquiry,* he has stated that his theory of explanation in science can be generalized to include historical explanation. Historicism as used by Karl Popper is a doctrine that assimilates history to science and is also a doctrine sharply different from science: This is highly ambiguous and baffling.

— *Abha R. Pal*

See also **Ethnohistory; Hegel, G. W. F.; Popper, Karl**

Further Readings

Antoni, C. (1962). *From history to sociology: The transition in German historical thinking.* London. Merlin Press.

Brinton, C., Christopher, J. B., & Wolff, R. L. (1957). *Modern civilizations in history of the last five centuries.* Upper Saddle River, NJ: Prentice Hall.

Burston, W. H., & Thompson, D. (1967). *Studies in the nature and teaching of history.* London: Routledge & Kegan Paul.

HIV/AIDS

Human immunodeficiency virus (HIV) is the retrovirus responsible for the clinical spectrum of the acquired immunodeficiency syndrome (AIDS). Once infected by the virus, an individual is said to be *HIV-positive.* HIV then attacks and progressively destroys key elements of the immune system, rendering victims susceptible to a host of opportunistic infections and rare cancers. The development of one or more of these characteristic illnesses is what defines AIDS. "HIV/AIDS" is used to refer to the entire spectrum of disease progression from onset of infection through the advanced stages of illness.

The emergence of HIV/AIDS grew into the first worldwide epidemic since the influenza outbreak of 1918 to 1919. Unlike influenza, which struck more or less uniformly, the epidemiology of HIV/AIDS has been remarkably varied and dependent on a complex array of sociocultural elements. Politics, poverty, sexual behavior, science, and gender all conspire to produce measurable disease effects on individuals, communities, and nations. The holistic perspective of contemporary anthropology is central to understanding and managing the enormous impact of this global pandemic.

Biology of HIV

The Virus

There are two primary subtypes of HIV, designated HIV-1 and HIV-2. HIV-1 is the predominant form worldwide, while HIV-2 is limited mostly to West Africa. Both belong to a broader family of retroviruses and contain two identical RNA strands as their genetic material. A unique enzyme, reverse transcriptase, allows retroviral RNA to be copied to DNA that then integrates within a host cell. The genomic organization of HIV is similar to other retroviruses

but also has a striking predilection for genomic variability that contributes to diversity in phenotype and cell tropism. This genomic mutability is a major obstacle to the development of vaccines and effective antiviral therapies.

Infection and Life Cycle

The surface protein coat of HIV preferentially binds with a subset of circulating immune system cells known as T cells. T cells are essential for immunosurveillance and disease control, with a variety of important functions. Both T cells and macrophages (as well as some other cell populations) contain a high-affinity HIV receptor called the CD4 antigen. Once inside a host cell, HIV replication begins, and vast numbers of new particles are released, killing the host cell in the process. Newly created particles bind and infect other CD4 cells.

Clinical Phases

Acute infection is sometimes marked by "flu-like" symptoms known as the acute retroviral syndrome. Symptoms are often unrecognized by the victim or by health care professionals. The viral load is initially high, and people in this stage are capable of transmitting the virus to others. Antibodies are made to HIV but take weeks to months to develop. This interval between the onset of infection and the rise of measurable antibodies is referred to as the "window period," a clinically important time where seronegative individuals can be infectious. The antibodies are usually detectable within 3 to 6 months.

As the immune defenses activate against HIV, a balance is struck between virus and host, but inexorably, the virus eliminates immune cells faster than they are replaced. The process can take several years. During this time, an infected individual is usually asymptomatic and can unknowingly spread the virus. A gradual fall in CD4 cells accurately reflects disease progression. CD4 counts normally range from 1,200 to 1,400 cells/mL. When HIV reduces those numbers to around 200/mL, opportunistic illnesses begin to appear and the person is said to have AIDS. In the absence of treatment, the prognosis from the onset of an AIDS-defining illness (or a CD4 count less than 200) to death is usually 2 to 24 months.

Transmission

Science has documented only three established modes of HIV transmission: (1) sexual intercourse with an infected partner, either via heterosexual or homosexual contact; (2) parenteral (blood-borne) exposure to contaminated blood, usually via transfusions or intravenous drug use; (3) perinatal spread from infected mother to fetus, either in utero or at birth or through breast-feeding. Within each of these modalities, there is a wide range of infectivity rates, depending on host, viral, and environmental factors. Interventions directed toward these exposures form the medical basis for most HIV control programs. Anthropologic research, however, further asks what political, economic, or behavioral factors exist to influence people's willingness to accept such interventions.

Diagnosis, Treatment, Vaccines

Confirmation of HIV infection is made through a variety of laboratory testing methods. Samples are usually taken from blood but can also be taken from saliva or urine. Standard ELISA and western blot methods detect HIV antibodies but are usually not sensitive enough to detect early infection in the window period. When clinical suspicion is high, a viral-load assay using polymerase chain reaction (PCR) technology can identify an acute infection before antibodies are measurable. Although all the tests are very accurate, a thorough understanding of the natural history of HIV infection is crucial for correct test interpretation and awareness of various diagnostic pitfalls.

Once HIV is confirmed, testing can be done to determine the virus subtype and/or its genotypic resistance to antiviral drugs. Some of these measures, such as the quantitative viral load and CD4 counts, help predict a person's survival time as well as his or her risk of an AIDS-defining illness.

From an anthropologic perspective, the treatment of HIV/AIDS involves a holistic approach that addresses the socioeconomic context of the individual and not merely the medical aspects. Recent advances in antiretroviral drug therapy, for example, have greatly improved survival times but raised a host of ethical questions regarding access, cost, monitoring, and research protocols. Pharmacologic therapies against HIV started with azidothymidine (AZT) in 1997 and have expanded to include over 20 agents currently licensed by the U.S. Food and Drug Administration, available in an array of combinations. While these agents have proved remarkably successful, results are tempered by the cost (up to $20,000/yr), the potential for multiple side effects and drug interactions, and complicated dosing regimens.

This increasing complexity has also meant that fewer health care providers are equipped with the necessary expertise and access to the best HIV/AIDS care, and thus treatment has been further restricted, with wide-ranging consequences.

In contrast to the success of the antiretroviral drugs, HIV vaccine development has yielded numerous biologic insights but no practical results. As an alternative, there has been success in some trials of antiretroviral prophylaxis, especially in the area of perinatal exposure. Prophylaxis has reduced the maternal-to-child transmission to less than 2% in developed countries, where mothers generally have access to medications and C-section expertise. The success rate is substantially reduced, however, in the developing world, where such infrastructure does not exist.

History of the Pandemic

The first cases of AIDS were reported in June 1981 by the U.S. Center for Disease Control (CDC). Physicians identified unexplained clusters of pneumocystis carinii pneumonia (PCP) and Kaposi's sarcoma, two rare illnesses known to be associated with immunodeficiency from other causes. The outbreaks occurred in homosexual men and were described initially as "GRID," or gay-related immunodeficiency disease. Subsequent investigations led to the discovery of a similar disease pattern in other groups, such as hemophiliacs and IV drug users, and the name was modified to acquired immunodeficiency syndrome, or AIDS.

Within 2 years, laboratories had isolated the HIV virus, and by 1985, the first serologic tests became available. Doctors could now establish HIV infection in patients without AIDS and effectively screen the supply of blood bank products.

HIV is currently thought to have evolved from the simian immunodeficiency virus (SIV) and is estimated to have first appeared in humans in the early 20th century. HIV-2 has proven to be less virulent than HIV-1 and remains confined largely to West Africa and India.

The current burden of HIV/AIDS is indeed staggering. 2004 data from the Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated the global number of infections at 39 million. Over 20 million have already died, including 3.1 million in 2004. The seroprevalence among the living ranges from 0.2% in Oceania to 7% to 8% across sub-Saharan Africa. Many local communities have much higher prevalence rates. Around the world, the number of people with HIV continues to rise in every geographic region, including sharp increases in China, Eastern Europe, and parts of Asia. Women now represent 57% of adults with HIV in sub-Saharan Africa and 25% of the cases in the developed world. The increasing numbers of infected women implies an increase in perinatal acquisition.

Life expectancy has dropped by up to 15 years in some countries within Africa and the Caribbean. The number of AIDS orphans is estimated at 15 million. Despite the original description as a disease of homosexual men, 80% of global infections are now acquired heterosexually. Epidemics in Eastern Europe appear to be driven by increasing intravenous (IV) drug use, which also fuels epidemics in some areas of China and East Asia. The future of HIV/AIDS remains uncertain, given the mutability of the virus, the current limits of therapy, and the uneven application of control efforts to the culturally diverse populations of the world.

Anthropologic Perspectives

Anthropologic research methods, with their historical depth and engagement in society, culture, and evolution, have an almost limitless relevance to the global complexities of HIV/AIDS.

At the core, anthropology asks: Given our biological knowledge and the availability of effective medical and behavioral solutions, why does HIV continue to spread? What impacts does this have on human populations? These questions can be addressed in the context of individual behavior, moving to various risk groups, and ultimately to whole communities or regions. Clinical anthropologic subfields have been at work at each level.

Biological Anthropology

Biological anthropologists focus on the relationships between human biology and culture or disease spread. This approach has been especially important in examining the variables of HIV infectivity within different population groups. For example, within the three known modes of HIV transmission, infectivity rates vary widely. The risk of transmission from a contaminated needle stick injury is limited to less

than 1%, while the risk of transmission from transfusion of infected blood products approaches 100%. Infectivity rates among IV drug users fluctuates in between. Likewise, the risk from receptive anal intercourse is higher than for other types of sexual transmission, and the presence of concomitant sexually transmitted diseases (STDs) (especially ulcerative genital diseases) is associated with yet higher risk. Mathematical and epidemiologic models have been used to evaluate these variables with a host of other factors, including number of exposures, the probability of encountering an infected partner, and the mutability and virulence of HIV strains. Physical anthropologists also address the coevolution of HIV in both human and other primate hosts.

Linguistic Anthropology

Linguistic anthropologists study the usage and meaning of language, both within and across cultures. Language studies have helped evaluate the way HIV and illness are perceived and acted upon, from isolated Asian hill tribes to urban gay men. One UNAIDS scholar has recently addressed the imperative for integrating indigenous African cultures to Western technological discourse through an effective "language policy." Such a policy would allow modern ideas about HIV/AIDS to be better incorporated at the local level. The problem was contrasted with Asian countries, such as Japan and Singapore, where indigenous language and culture have been preserved while still absorbing the language of modern science.

Symbols such as the AIDS quilt have been studied to better understand societal mechanisms of grief and remembrance.

Cultural Anthropology

Methodologies from cultural anthropology have had tremendous influence on our understanding of HIV. The basic health belief model, developed in the 1950s, has been employed in various forms to obtain information about an individual's perceived susceptibility, severity, benefits, and barriers regarding any threat to health. Standard ethnographies provided a framework for understanding which practices exist in a given culture that could contribute to disease spread, such as the Masai practice of brothers who take in widowed sisters-in-law. KABP surveys (Knowledge, Attitudes, Beliefs, Practices) have been widely applied to obtain data sets from which to analyze behaviors. These techniques helped identify such causal associations as the use of recreational drugs and heightened HIV transmission among gay men, as well as the ways in which HIV misinformation propagates stigma and discrimination by health care workers toward AIDS patients. Many of these surveys have emphasized how even sound practical knowledge of HIV and its effects has failed to translate to meaningful behavior change.

The development of rapid anthropologic assessment techniques, largely qualitative, has improved the acquisition of cost-effective comparative data that help govern priorities in many aid programs.

Anthropology and Policy

As if the challenges of data acquisition and interpretation were not enough, there remains the essential work of translating social knowledge and theory about HIV into political action. Social scientists of all brands have been consumed with the monumental tasks of advising governments, negotiating goals, and assessing results. The immediacy of the human suffering has given rise to AIDS activism and thereby also exposed the face of AIDS apathy. One of the most dramatic examples of political controversy has played out in South Africa, where government leaders actively resisted organization of a national antiretroviral treatment program until 2003. Their concerns were based partly on skepticism about Western-generated HIV information and the racist implications. South Africa's president publicly questioned the profit motives of giant pharmaceutical companies. As the debate escalated with data from both within and outside the country, public policy slowly shifted to embrace antiretrovirals. Worldwide pressures also helped convince drug makers to lower prices and thus improve access in both rich and poor nations. Currently, however, only 4% to 5% of HIV patients in the developing world even have access to antiretroviral regimens, so the mandate to address this gap will require both political will and the necessary funding. Of course, political structures themselves will necessarily change, as HIV/AIDS continues to affect demographics and economics by claiming younger men and women, who traditionally make up the healthy skilled workforce.

— Scott D. McKee

See also **Bayang Medicine Man; Biomedicine; Ethnomedicine**

Further Readings

Barnett, T., & Whiteside, A. (2002). *AIDS in the 21st century: Disease and globalization.* New York: Palgrave Macmillan.

Farmer, P. (1999). *Infections and inequalities: The modern plagues.* Berkeley: University of California Press.

Feldman, D. A., & Miller, J. W. (Eds.). (1998). *The AIDS crisis: A documentary history.* Westport, CT: Greenwood Press.

Green, G., & Sobo, E. J. (2000). *The endangered self: Managing the social risk of HIV.* London: Routledge.

Piot, P., & Coll Seck, A. M. (2001). International response to the HIV/AIDS epidemic: Planning for success. *Bulletin of the World Health Organization, 79,* 1106–1112.

Schoepf, B. G. (2001). International AIDS research in anthropology: Taking a critical perspective on the crisis. *Annual Review of Anthropology, 30,* 335–361.

UNAIDS. (2004). *AIDS epidemic update.* Geneva: Joint United Nations Programme on HIV/AIDS. http://www.unaids.org

Hoaxes in Anthropology

Virtually all fields of science are afflicted to some extent by hoaxes. Anthropology is no different, with each of its subfields having been subjected to at least a measure of intellectual dishonesty and fakery. Though the motives behind anthropological hoaxes have varied, the element underlying their success has always been the same: an audience predisposed to believe the implications of the fabricated data. There is, perhaps, no better example of this than the most notorious hoax in paleoanthropology—and, perhaps, in all of science—Piltdown Man.

Hoaxes in Biological Anthropology: Piltdown Man

The world first heard of the discovery of human fossil remains at Piltdown in a short announcement published in the British science weekly *Nature.* On December 5, 1912, that publication reported the discovery by Charles Dawson, a lawyer by trade but a collector of scientific specimens by avocation, of fragments of a human cranium and mandible in Sussex, in the south of England. The remains appeared to be greatly ancient, having been recovered from a stratigraphic layer in which the bones of extinct animals had already been found. A follow-up article in the same journal two weeks later provided sufficient detail to grab the attention of both the scientific community and the world at large.

The discovery of ancient human remains has long been newsworthy, but the initial and subsequent published descriptions of the bones found at Barcombe Mills Manor, in the Piltdown region of Sussex, indicated that they were more than simply newsworthy, they were revolutionary. The bones were perceived to be extraordinarily important precisely because they were so different from ancestral human remains discovered previously. Consisting of several humanlike cranial fragments and part of an apelike mandible, the fossils were given a new taxonomic name reflecting their unique characteristics: *Eoanthropus dawsoni* (Dawson's Dawn Man).

The Intellectual Context of the Hoax

The supposed significance of the Piltdown remains is comprehensible only within the context of evolutionary thinking in the period of their discovery. Charles Darwin's *On The Origin of Species* had been published in 1859. Though there was substantial resistance to the theory of evolution as espoused by Darwin, the book was a best seller, and many became convinced that Darwin had presented a viable mechanism, called by him "natural selection," by which plant and animal species had originated and changed through time. Though Darwin avoided in *Origin* explicitly applying that mechanism to humanity, at the end of the book, he predicted that through the application of the concept of natural selection, "much light will be thrown on the origins of man and his history."

If Darwin were correct, if all plant and animal species, including human beings, were the products of the evolutionary process of natural selection, there should be evidence of this process in the fossil record. In other words, fossil remains reflecting previous forms of humanity should be found. But what might previous forms of our species look like, and how would we recognize their bones when we find them?

By Darwin's time, it had long been recognized that the contemporary animals most closely resembling human beings, both morphologically and behaviorally,

Source: © Robert Jurmain.

were the great apes, in particular, chimpanzees. Creationists took this merely to be a reflection of God's will, while evolutionists believed that this signified that human beings and apes were closely related, sharing in deep time a common evolutionary ancestor from which we had diverged. It was argued that the feature that most clearly and significantly demarcates and distinguishes modern people from modern apes was not seemingly trivial physical characteristics, like the morphology of our hands or feet, the size of our canine teeth, or nose shape. Instead, most thinkers reasonably concluded that the single most significant distinction between people and apes was our far greater level of intelligence made possible by our much larger brains—ours are 4 times larger than those of chimps.

Because we are most significantly different from our contemporary evolutionary cousins in terms of brain size and attendant intelligence, it was further concluded that brain size was our most developed or most evolved attribute, the physical feature most changed from an ancestral state and that, therefore, must have been evolving longest. This, in turn, was taken to mean that the initial characteristic to distinguish the human from the ape line in our evolutionary chronology must have been an expanding cranial volume necessitated by an enlarging brain. As a result, when perusing the fossil record to find the first human ancestors, scientists initially expected to find evidence of a creature with an apelike body but a cranium much larger than that of an ape. Grafton Eliot Smith, head of the Anatomy Department at University College, London, in the early 20th century, went so far as to predict that a hypothetical early human ancestor should be "merely an ape with an overgrown brain." This view that the human brain had evolved before the features of the modern human body is labeled the *brain-centered paradigm* of human evolution.

Though it became the preferred view, mounting fossil evidence in the late 19th and early 20th centuries appeared to contradict the brain-centered paradigm. Scientists excavating for ancient human remains simply were not finding the bones of apes with overgrown brains. For example, just 3 years before the publication of *On The Origin of Species,* a discovery had been made in the Neander Valley of Germany that appeared to throw light on human antiquity. A calvarium (or "skullcap" consisting of the top of the cranium, lacking the face and lower jaw) had been found that although as large as that of a modern human being seemed otherwise apelike, with a flattened profile, a prognathous (jutting-out) lower face, and a large ridge of bone above the eyes. The calvarium also lacked the typically steep forehead of modern humans. Similar crania were found in Europe in the 19th century and together these fossils were assigned the name *Neandertal.*

The bones of the postcranial skeletons (the bones beneath the skull) of these Neandertals belied the prediction of the brain-centered paradigm. Though there was substantial controversy concerning the precise method of Neandertal locomotion, it was clear that they were, like modern human beings and unlike the apes, upright walkers. With their apelike cranial shape, the Neandertals seemed to be not the predicted apes with overgrown brains, but something quite different.

Later, in 1891, Dutch physician Eugene Dubois obtained a calvarium and femur from an ancient stratigraphic layer on the island of Java. The skull fragment was substantially smaller than that of a modern human—at about 940 cc, it was only 65% of the modern human mean (1450 cc). However, the femur found in association with the calvarium was indistinguishable from that of a modern human. Like the Neandertals, the so-called Java Man also was not an "ape with an overgrown brain," but apparently the reverse, an upright human with a small, apelike brain.

Thus, before the discovery at Piltdown in 1912, the fossil evidence for human evolution implied, contrary to the preferred brain-centered view, that it had been

an upright stance and bipedal locomotion, not the size of our brains and, therefore, not our great intelligence, that had early on distinguished our human ancestors from our evolutionary cousins.

The Key to Piltdown's Success

Herein lies the key behind the significance of the discovery at Piltdown. Piltdown Man presented researchers with a very ancient human ancestor—perhaps at least as ancient as Java Man and far older than the Neandertals—with a very modern-looking, large braincase but a very primitive-looking, in fact very apelike, lower jaw. Though no postcranial remains of Piltdown Man were recovered, the humanlike cranium with an apelike jaw implied that Piltdown had possessed a humanlike brain but had been apelike from the lower jaw down, a compelling bit of evidence in apparent support of the brain-centered paradigm.

Thus, in this singularly dramatic discovery, the brain-centered paradigm had been revived, all other ancestral human fossils were displaced from the main line of human evolution, and, in addition, England, formerly devoid of any significant remains of ancient human beings, had found an ancestor.

Piltdown Unmasked

The discovery at Piltdown inspired a flood of paleoanthropological investigations, launched in the predictable attempt to confirm with additional evidence the existence in the human genealogy of a precociously large and humanly configured brain associated with a still unevolved, apelike body. However, no confirming evidence was forthcoming from any post-Piltdown investigations in Africa or Asia. In fact, the only investigator able to find an ostensibly confirming fossil was none other than Charles Dawson, the discoverer of the original, who claimed to have found a similar specimen just a few miles from where he had found the original.

Due to the scarcity of any convincing confirming evidence and the distinctly singular morphology of the Piltdown remains in the context of a growing sample in the 1920s, 1930s, and 1940s of small-brained bipeds deep in the human past, *Eoanthropus* was relegated to the status of a footnote in discussions of human evolution. When, finally, definitive dating tests were developed and then applied to the remains in the late 1940s and early 1950s, the hoax was definitively revealed. The cranial fragments of Piltdown Man were those of a modern human being, ultimately radiocarbon dated to only about 600 years ago. The mandible, whose apelike morphology seemed to support the notion that early in the evolution of our species, our human ancestors retained their simian characteristics below the all-important brain, was apelike for the rather obvious reason that it had come from an ape, specifically, a modern orangutan, intentionally broken at exactly the right place to make it appear to belong to the Piltdown cranium. Filing marks on the teeth made by a metal tool clinched the diagnosis of fraud.

The identity of the perpetrator of the Piltdown hoax is still somewhat of a mystery. Dawson's culpability seems clear, as he had much to gain (the fossil was named for him, and his fame grew as a result) and was present at every one of the discoveries at Piltdown as well as at the second site (labeled Piltdown II). Many others have been named, including highly respected scientists (Arthur Smith Woodward of the British Museum and Sir Arthur Keith, knighted for his contribution to science), a museum worker (Martin Hinton), a Jesuit priest (Teillard de Chardin), and even a world-famous author (Arthur Conan Doyle of Sherlock Holmes fame), but the evidence is not compelling that any one of these individuals contributed to the hoax. Each had a plausible motive, sufficient expertise, and, perhaps, adequate opportunity to produce and plant the false fossils, but ultimately, the identity of the guilty party is not all that important. The important lessons of the Piltdown hoax are these: (a) Piltdown was successful because it lent support to an expected, widely accepted view of evolution, the brain-centered paradigm; (b) scientists can be susceptible to hoaxes, especially when faked data conform to and support a preferred hypothesis; and (c) science is self-correcting, and when the implications and predictions drawn from evidence that turns out to be fabricated are not realized, the hoaxes themselves are debunked and relegated to the dustbin of history. It may have taken 40 years, but this is precisely what occurred in the case of Piltdown.

Hoaxes in Archaeology: A Mysterious American Past

Hoaxers have long been busy in archaeology as well, providing ostensible evidence supporting a representation of the past that conforms better to the desires

of many. Consider, for example, the Newark Holy Stones, artifacts with Hebrew inscriptions found in 1860, immediately to the east of an authentically ancient earthwork in Newark, Ohio.

The Moundbuilder Myth

The mid-19th century was awash in speculation about who had built the thousands of earth mounds that dotted the landscape of the American Midwest. Some were massive tumuli, containing human remains buried along with an impressive and technologically sophisticated array of grave goods of stone, clay, and copper. Other earthworks had been made in the shape of animals. Serpent Mound in Ohio is one of the most impressive, a sinuous embankment of earth depicting a snake more than 405 meters (1,330 feet) in total length, from its gaping mouth to the tip of its coiled tail. Other mounds were extensive berms of earth enclosing the tops of hills. Still others had been constructed in the shape of huge, flat-topped pyramids, apparent platforms for temples or the conduct of ceremonies. Monks Mound, at the site of Cahokia, located in Collinsville, Illinois, looms 30 meters (100 feet) above the landscape and contains more than 560,000 cubic meters (20 million cubic feet) of earth, making it, by volume, the fifth-largest pyramid in the world. Monks Mound is the largest in a cluster of more than 100 found at the Cahokia site, a near-urban settlement at its peak more than 700 years ago.

Many naively believed that the native people of America could not have been responsible for the construction of these impressive earthworks because their culture was too primitive. These skeptics denied even the possibility that American Indians were capable of the methodical, coordinated labor necessary to have built the mounds. But if they had not constructed the mounds, someone else certainly must have. This led to rampant speculation in the 18th and 19th centuries concerning who that someone could have been. A host of possible ancient Old World visitors to the New World were suggested as having been responsible.

As seen in the case of Piltdown, the desire for material evidence in support of a preferred explanation fuels anthropological hoaxes. The desire to solve the "mystery" of who had built the mounds—and to solve it in a way that denied the involvement of native people—provided powerful inspiration for a number of archaeological fakes.

Moundbuilders From Israel? The Newark Holy Stones

The "Newark Holy Stones" were found in 1860 by professional land surveyor and ardent amateur archaeologist David Wyrick in Newark, Ohio. The first artifact discovered, the so-called Keystone, looks a bit like a plumb bob with Hebrew lettering on all four of its faces. Unable to read Hebrew, Wyrick brought the object to a local reverend that he knew, John W. McCarty, who translated it. On each of its four faces, the messages read, respectively: "the laws of Jehovah," "the Word of the Lord," "the Holy of Holies," and "the King of the Earth."

An artifact with Hebrew writing on it found in association with an ancient mound site seemed to lend support to the claim that a group other than Native Americans had built the mounds. Specifically, perhaps it had been ancient Hebrews who had had been responsible for the construction of at least some of these remarkable earthworks.

There was at least one significant problem with this interpretation. Scientists who examined the Keystone soon after it was discovered, the most important being geologist Charles Whittlesey, concluded that it could not have been a genuinely ancient Hebrew artifact. The inscription had been written in an essentially modern version of Hebrew. This represented a clear anachronism in an artifact that was supposed to date to the most active period of mound construction in Ohio, some 2,000 years earlier.

Whittlesey was a highly respected scholar with significant experience investigating and excavating mound sites in Ohio. His conclusion that the Keystone was a fake was accepted by many who, as a result, viewed it as a mere peculiarity, a prank perpetrated by someone who knew it would draw attention because of public fascination with the moundbuilder mystery. Then, just 5 months after the discovery of the Keystone and its rejection by most scholars, another anomalous artifact was found only about 6 miles from the Keystone find spot, by the same fellow who found the first one, David Wyrick. Called the "Decalogue" because it bore a version of the "Ten Commandments," this second inscribed stone rather conveniently appeared to counter precisely the primary criticism leveled at the first. This artifact's inscription was far more convincing, bearing an archaic version of the Hebrew language dating to a time that seemed a much better fit for the period of mound construction. Rather than convincing scholars of its legitimacy,

however, this feature of the Decalogue stone was interpreted by many as evidence of fakery. How likely was it, skeptics inquired, that a genuinely ancient Hebrew artifact would be found just a few miles from where a fake Hebrew artifact had been found 5 months previously by the same individual? It seemed far more likely that the hoaxer had learned from the criticisms leveled at the first artifact and used this knowledge to produce another, more convincing piece.

Researchers Brad Lepper and Jeff Gill have delved into the details of the Newark Holy Stones and present a convincing argument for the specific motives behind them. They discovered that the Keystone and Decalogue's translator, Reverend McCarty, served under a bishop, Charles Petit McIlvaine, who had already publicly predicted that artifacts linking the moundbuilders to the Bible would one day be found. In Lepper and Gill's view, McCarty simply supplied the "proof" that fulfilled his bishop's prediction. Lepper and Gill suggest that McCarty had the fake stones made, planted them in the ground, and, perhaps, directed the artifact collector Wyrick to them. McCarty's motive may have been to lend support to his and McIlvaine's belief in an intimate connection between the native inhabitants of the Old and New Worlds, both having descended from the people of the Old Testament.

Beginning in 1872, a team of researchers led by Cyrus Thomas of the Smithsonian Institution gathered data on 2,000 earthworks in 21 states, collecting 40,000 associated artifacts. This work led to the publication of an enormous volume in 1894, proving conclusively that the moundbuilders had not been a mysterious race of settlers of North America, but were the ancestors of the native people who Europeans had encountered in their expansion across the continent in the 18th century. Thomas discussed the Holy Stones and agreed with Whittlesey's conclusion that they were fakes. The Keystone and Decalogue today are on display at the Johnson-Humrickhouse museum in Coshocton, Ohio. Though their authenticity is still championed by some, the vast majority of historians and archaeologists view them as little more than a historical curiosity.

Hoaxes in Cultural Anthropology: The Tasaday

In a short article appearing in the December 1971 issue of *National Geographic* titled "The Tasadays: Stone Age Cavemen of Mindanao," the magazine revealed the discovery of a small group of native people living in caves on the island of Mindanao in the Philippines. These people captured the attention of *National Geographic* and were about to capture the attention of the Western world because they appeared to be the last human group on Earth untouched by modern civilization. The Tasaday seemed to represent the final remnant of a way of life that, perhaps, had characterized all of humanity for much of the history of our species. Social scientists and laypeople alike were intensely interested because, as *National Geographic* author and visitor to the Tasaday Kenneth MacLeish phrased it, the Tasaday were the equivalent of "time travelers in a time machine," individuals plucked from an ancient period and deposited in the modern world, where we could gaze at the primitive innocence we, as a species, once had.

We All Want to Be Tasaday

Worldwide interest in the announcement of the existence of the Tasaday is understandable when we consider the context of the early 1970s. Americans were in the midst of an unpopular war and middle-class youth across Europe and America were actively questioning and rejecting the materialism that seemed to dominate and define the lives of their parents. Racism and sexism were being addressed, perhaps as never before, the deleterious impacts of 20th-century technology on the environment were being recognized and assessed, and repressive attitudes about sexuality were being questioned. Many were reconsidering Western civilization as a whole, viewing it not as the pinnacle of cultural evolution, but as a hopelessly sterile existence characterized by inequality, oppression, death, and destruction.

The language and phrasing of the articles announcing the discovery of the Tasaday were a perfect match for this period of social upheaval. The 26 (or 24, depending on who was doing the counting) Tasaday seemed to be living a natural, pristine, pure way of life, as MacLeish phrased it, "much as our ancestors did thousands of years ago." The Tasaday were unpolluted by materialism, acquisitiveness, hatred, and war. They were living a way of life that many in the early 1970s wanted desperately to recapture for themselves. In her 1970 composition about the Woodstock music festival held in New York State in 1969, a cultural event that represents a coalescence of the political and social sea changes of the period, popular singer and songwriter Joni Mitchell plaintively cried out: "We've

got to get ourselves back to the garden." The Tasadays were, in a sense, the embodiment of the "Woodstock Nation." Their homeland and way of life were, literally and figuratively, viewed as that Edenic "garden" that so many hoped existed and to which they hoped to return.

The Tasaday were, as one wag phrased it, "paleo-hippies." In a time when materialism was being rejected in the West, the Tasaday didn't even have a concept of private property. Desiring nothing, they had no unfulfilled desires. Though lacking in virtually any material comforts, they were described as being a truly "affluent society." They shared everything, they recognized no leader, and all decisions were made by friendly consensus. The Tasaday didn't hunt or grow crops, but subsisted almost entirely on the wild plants that grew abundantly in their small territory. Perhaps most significantly, in a time when those of us in the West lived in constant fear of imminent and utter nuclear annihilation and anthropologists wondered if territoriality, aggression, murder, and war had been inextricably etched into our genes, the existence of the Tasaday challenged this pessimism. They were a peaceful people who made no weapons and who did not even have a word in their language for war.

Writing for *National Geographic,* MacLeish's characterization of his visit to the caves on Mindanao reflects the fundamental reason why the Tasaday so captivated the Western world. Describing this friendly confrontation between bearers of Western civilization and the simple, natural people of the Philippine forest, MacLeish put it this way: "Creatures of man's most advanced and *tormented* society, and they [the Tasaday], perhaps the last of the world's innocents, watched each other across the full span of cultural evolution. And they felt love for each other." It was the perfect paradox. Proud bearers of Western civilization, with its complex technologies, innumerable material comforts, enormous scientific achievements, and great social and political sophistication, were the pitiable element in this equation, facing off against the simple innocence and blissful happiness of the primitive Tasaday, a people who had nothing—except bliss and happiness. With all of our material advancements and comforts, it was we who envied them.

Upon their "discovery," the Philippine government moved to protect the Tasaday from the depredations of the modern world. Their champion was found in Philippine official Manuel Elizalde, who held the governmental post "Presidential Assistant on National Minorities." Elizalde had the ear of the dictatorial ruler of his country, Ferdinand Marcos. With Marcos's blessing, Elizalde created a 46,299-acre preserve—this, for 26 people—that was to be off-limits to loggers, miners, developers, and the vast majority of anthropologists. This was done, ostensibly, to protect the Tasaday, to allow them to continue to live their way of life unobstructed by the interference of those who might exploit them. This policy, not coincidentally, also served to isolate them from those whose only agenda was to study them. Elizalde also initiated a fundraising campaign, establishing a foundation whose purpose was to help protect the Tasaday from the outside world. It is estimated that the foundation collected more than $35 million for this ostensible purpose.

Paradise Lost: Revelation of a Hoax

During the period of 1974 to 1986, the Tasaday remained an ensconced and insulated people, an icon of paradise lost, a living fossil reflecting the idyllic way of life abandoned by our ancestors in the devil's bargain offered by the evolution of cultural complexity.

Then, in 1986, this neat little scenario came crashing to earth. The dictatorial regime of Ferdinand Marcos was overturned. Cronies of the regime, including Elizalde, ultimately fled, and the tens of millions of dollars he oversaw to protect the Tasaday disappeared along with him. More important, the forest preserve of the Tasaday was reopened, not to those bent on despoiling the habitat of Mindanao, but to scientists who wished to revisit the Tasaday and take the metaphorical time machine once more.

There was only one problem. In 1986, no one was living in the caves that were purported to have been the homes of the Tasaday. When surviving individuals in the original cohort of 26 were tracked down, they were found living in houses in villages, planting crops, wearing T-shirts and jeans, smoking cigarettes, and living a lifeway that was indistinguishable from other native residents of the forests of Mindanao. Most damning of all, when questioned about what had happened in the 15 or so years since the announcement of their existence in 1971 and the renewed contact in 1986, some stated that nothing at all had happened—and that, in fact, their lives as simple, primitive, nearly naked cave people had been nothing more than a bit of theater they had been

coerced into by none other than Manuel Elizalde. As one Tasaday reported:

> We didn't live in caves, only near them, until we met Elizalde. . . . Elizalde forced us to live in the caves so that we'd be better cavemen. Before he came, we lived in huts on the other side of the mountain and we farmed. We took off our clothes because Elizalde told us to do so and promised if we looked poor that we would get assistance. He gave us money to pose as Tasaday and promised us security from counter-insurgency and tribal fighting.

Appalled by the apparent humbug that had taken in so many, including most anthropologists, the American Anthropological Association asked linguist Thomas Headland to organize a symposium on the Tasaday for their 1989 annual meeting. Contributions to the symposium were published in 1992 in a book edited by Headland and titled *The Tasaday Controversy: Assessing the Evidence.* Scholars involved with investigating the Tasaday in the early 1970s as well as other specialists with crucial insights about the controversy participated. Though some raised to the defense of the claim that the Tasaday at least were an isolated, distinct cultural group, most concluded from the evidence that the Tasaday had been manipulated to play the role of a primeval cave people as part of a cynical hoax.

For example, the Tasaday had been presented as a people completely isolated from their neighbors on Mindanao, whose villages, by the way, had been a mere 3-hour walk from the Tasaday caves. However, a careful reexamination of their language by linguist Clay Johnston indicated that it was virtually identical to that of their neighbors, people with whom Johnston had lived for 10 years, sharing in common 90% of their words. The claim that the Tasaday were nonagricultural and nearly completely vegetarian, lacking even simple weapons for hunting, was shown by Thomas Headland, the symposium organizer, to be improbable at best. A careful analysis showed that they could not have survived on what they were actually seen eating in the early 1970s. That they were a "Stone Age" people whose simple toolmaking was a model for the technology that characterized ancient humanity was shown to be farcical by anthropologist Robert Carniero. He pointed out that the few stone tools the Tasaday used were childish and nonfunctional. These supposed tools were further characterized by another symposium participant, anthropologist Gerald D. Berreman, as "amateurish tools such as seventh graders might be expected to invent in response to a classroom assignment."

Finally, even if one could argue that the Tasaday had abandoned the caves only recently, there should have been in 1986 physical evidence of the kind archaeologists find reflecting past habitation, things like middens, living surfaces littered with broken bits of stone, and trash accumulations. But, as Berreman pointed out, the caves where the Tasaday were supposed to have lived for generations lacked any physical sign of human habitation. No human group is that assiduously neat, and the lack of any physical evidence of occupation of the caves seems definitive in showing that the Tasaday had never lived in them.

Elizalde ultimately absconded to Costa Rica with the Tasaday foundation money, squandering it there and dying of drug abuse in 1997. His motivation for the hoax, likely with the approval of Marcos, had been to create a situation in which a large swath of valuable forest lands could be set aside for him to control and to profit from, and a gullible world would fund his lifestyle by supplying huge sums of money for what was thought to be the worthwhile and valuable effort to protect and preserve a fascinating lifeway on the brink of extinction.

Self-Correction in Science

That the Tasaday hoax worked for 15 years is a sad testament to the shamelessness of its perpetrators. The success of the Tasaday hoax, like the success of Piltdown and the Newark Holy Stones, is emblematic, showing that hoaxes in anthropology have been successful when they gave an audience what they wanted, whether it was a preferred evolutionary ancestor, Old World visitors to the New World in antiquity, or the existence of a paradisial way of life that reflects the essential goodness of the human species. Fortunately, the success of these hoaxes was relatively short-lived. Science is self-corrective, and the irony is clear. The hoaxes discussed here each inspired additional research, as new data with revolutionary implications always do, and this is precisely what led to their unmasking.

— *Kenneth L. Feder*

See also **Darkness in El Dorado Controversy; Ethics and Anthropology**

Further Readings

Feder, K. L. (2005). *Frauds, myths, and mysteries: Science and pseudoscience in archaeology.* New York: McGraw-Hill.

Headland, T. N. (Ed.). (1992). *The Tasaday controversy: Assessing the evidence.* Washington DC: American Anthropological Association.

Lepper, B. T., & Gill, J. (2000). The Newark Holy Stones. *Timeline, 17*(3), 16–25.

MacLeish, K. (1972, August). The Tasaday: Stone Age cavemen of Mindanao. *National Geographic,* pp. 219–248.

Russell, M. (2003). *Piltdown Man: The secret life of Charles Dawson & the world's greatest archaeological hoax.* Gloucestershire, UK: Tempus.

Hobbes, Thomas (1588–1679)

Born April 5, 1588, in Westport, England, Thomas Hobbes claimed that his birth was premature due to his mother's fear of the Spanish Armada. Son of a minister of the Church of England, he was able to receive an education at Magdalen Hall, Oxford, from which he graduated in February 1608. Hobbes was then recommended to William Cavendish as a tutor for Cavendish's son William. Hobbes remained close to the family right up until his death at the family's home at Hardwick on December 4, 1679. Much of Hobbes's life was mired by political unrest in England; during the span of his life, the country saw the fall of the monarchy, a civil war that lead to the rise of the Commonwealth, the fall of the Commonwealth, and the restoration of the monarchy. Fearing for his life, Hobbes fled to the continent in 1640, and there, he honed his philosophical skills through exchanges with Descartes and on tours of the warring principalities of Italy. He remained there until the winter of 1651 to 1652, returning only months after the publication of *Leviathan.* He used the principles of *Leviathan* to justify his taking an oath of allegiance to the Commonwealth, asserting that while he was a supporter of the monarch, he could also support any other form of government that was sufficiently powerful enough to protect his rights. Hobbes was full of contradictions: He was a royal sympathizer who supported democratic philosophies and a Christian whose naturalistic and materialistic philosophies could be interpreted as having atheist tones.

An influential philosopher and mediocre mathematician and physicist, Thomas Hobbes laid down the philosophical framework for the philosophers of the Enlightenment. His most widely recognized piece would be *Leviathan,* which was published in England in May of 1651 while he was in exile in France. Hobbes's political theory is centered around psychological egoism, which states that each person will always act upon what he or she thinks is best for himself or herself. The fundamental axiom on which Hobbes based his theory of politics rested upon what he considered to be the natural state of man. Previously, it had been thought that governmental institutions, such as monarchies, were natural entities, but Hobbes concluded that any government was not consistent with the natural state of man. The natural state of man, according to Hobbes, was a war of all against all. Hobbes felt that this war was generated by the relative equality of each individual, in that every person more or less would be capable of destroying another. In man's natural state, Hobbes said that each person has unlimited rights; for example, they have the right to kill anyone. However, this poses a contradiction: If A has the right to kill B and B has the right to live, then it must be concluded that no one has the right to anything. Thus, according to Hobbes, people willingly invests their sovereignty (rights) into a absolute sovereign whose responsibility is to keep law and order in hopes of reducing general pain, suffering, and death, for it would be in the best interest of each individual to reduce these conditions. This investment is known as the "social contract," an idea that bases the power of government in the will of the people and was instrumental to the development of writers during the Enlightenment.

— James Paul McMillan

See also **Darwinism, Social; Enlightenment, Age of**

Further Readings

Kinney, A. (2000). *Thomas Hobbes.* New York: Twayne.

Martinich, A. P. (1997). *Thomas Hobbes.* New York: St. Martin's Press.

Rogers, G. A. J., & Ryan, A. (1988). *Perspectives on Thomas Hobbes.* New York: Oxford University Press.

Hoebel, E. Adamson (1906–1993)

E. Adamson Hoebel was an American anthropologist whose major contribution to anthropology and other social sciences was the development of the "trouble case method" for analyzing the legal systems of nonliterate peoples. Prior to 1940, the legal systems of the world's peoples were seldom studied by anthropologists, and when they were, it was a listing of rules without any data on their application. On his own and in collaboration with legal scholar Karl Llewellen, Hoebel developed the field of legal anthropology. Major works included his dissertation on the Comanche Indians (1940), a volume on the legal system of the Cheyenne, coauthored with Llewellen (1941), his anthropology textbook, which went through four editions (1949, 1958, 1966, 1972), a treatise on the law of nonliterate peoples, which was aimed both at professionals and students (1954), and an ethnography of the Cheyennes, designed for students (1960, an extended version appeared in 1978). *The Cheyenne Way* has been described as a classic ethnography and an opus magnum. By focusing upon the disputes and the manner in which they are resolved, and by whom, a legal system of a nonliterate society can be derived and analyzed. In *The Law of Primitive Man,* Hoebel added a time dimension, thus permitting the study of legal dynamics. In the years that followed, scholars have elaborated upon Hoebel's approach. "The extended-case method" traced disputes back to their origins and forward, to see how new social relationships developed. The method has been applied to the study of feuding. Trouble cases, referred to as "encounters" or "episodes," are linked in a "feud sequence" that may span decades.

Edward Adamson Hoebel, known to his friends as "Ad," was born in Madison, Wisconsin, in 1906. He received his BA from the University of Wisconsin, his MA in sociology from New York University, and his PhD from Columbia University. Hoebel's fieldwork was undertaken among the Comanches of Oklahoma in 1933 as a member of an ethnological field group led by Ralph Linton, his undergraduate professor. He conducted further fieldwork in 1934 with the Fort Hall Shoshones of Idaho. His dissertation on Comanche law-ways was successfully defended in 1934, published in 1940, and his PhD awarded in 1941. He married Frances Gore in 1930; she died in 1962. Although his anthropology advisor was Franz Boas, his intellectual mentor was Karl Llewellen, a distinguished jurisprudent well-known for devising the Commercial Code and advocating a position known as "legal realism." Hoebel liked to tell the story of how Boas sent him to meet with Llewellen, which he did in June 1933, to discuss his Comanche research. Llewellen advised Hoebel to focus on how disputes are settled, an approach known among legal anthropologists as "dispute settlement processing."

Hoebel and Llewellen together conducted field investigations during the summer of 1935 among the Northern Cheyenne. In 1936, Hoebel returned for an additional summer's work. Later fieldwork was with the Pueblo Indians of New Mexico, 1945 to 1949, and in West Pakistan in 1961. Hoebel taught from 1929 to 1948 at New York University, and from 1948 to 1954 at the University of Utah, where he was chair of the department of anthropology and dean of Arts and Sciences (1953–1954). His next position was at the University of Minnesota, where he taught until 1972. He chaired the department until 1969, for a total of 15 years. He was elected President of the American Ethnological Society in 1946 and President of the American Anthropological Association in 1957. After retirement, he served as an adjunct professor at the University of Minnesota and a visiting professor at the University of Arizona. He attended professional meetings where he was the featured speaker, such as the Law and Society Association (June 1982). In 1973, this association had dedicated an issue of their journal to him. E. Adamson Hoebel died at his home in St. Paul, Minnesota, on July 23, 1993, at the age of 86. He was survived by his wife of 30 years, Irene Holth.

— *Keith F. Otterbein*

See also **Dispute Resolution; Feuding; Law and Anthropology**

Further Readings

Hoebel, E. A. (1940). *The political organization and law-ways of the Comanche Indians.* Menasha, WI: American Anthropological Association, and Contribution of the Laboratory of Anthropology.

Hoebel, E. A. (1949). *Man in the primitive world: An introduction to anthropology.* New York: McGraw-Hill.

Hoebel, E. A. (1954). *The law of primitive man: A study in comparative legal dynamics.* Cambridge, MA: Harvard University Press.
Hoebel, E. A. (1960). *The Cheyennes: Indians of the Great Plains.* New York: Holt, Rinehart & Winston.
Hoebel, E. A., & Llewellen, K. N. (1941). *The Cheyenne way: Conflict and law in primitive jurisprudence.* Norman: University of Oklahoma Press.
Pospisil, L. (1973). E. Adamson Hoebel and the anthropology of law. *Law and Society Review, 7,* 537–559.

Hominization, Issues in

One of the most important discoveries of recent times, related to our origins, is the verification of a close genetic affinity between human beings and chimpanzees. Such affinity is so significant (98.8%) that it is estimated that both phylogenetic lines that led to the two species had a common ancestor approximately 6 to 8 million years ago. Since that moment, and after the branching occurred, begins the most amazing and passionate history, that of our own family.

The "hominization process" refers to the origin and evolution of the hominid family (forms that comprise both our ancestors and ourselves). When trying to reconstruct this process, paleoanthropology acquires an especial relevance, because while giving us the historic evolutionary fundamentals of man, it shows us the same basics of anthropology as science. If the uniqueness of this is its approach to man as a bio–psycho–socio–cultural unity, that of paleoanthropology resides in its intent to answer the question of how this unity was developed.

Hominization was not only a process of biological transformation nor a simple adding of unidirectional causes and effects. On the contrary, we think that this process was a complex event, characterized by the succession of particularly significant synergic phenomena resulting from a dynamic interaction of biological, psychological, spiritual, social, and cultural variables.

Our knowledge about this process has undergone remarkable improvement during the last decades. Nevertheless, there are still some questions of complex solution. One of them derives from the fact that when we go back in time to track down our biological past in search of our own family first members, we face a great difficulty in identifying them in the fossil record. In our opinion, the main reasons for this difficulty are the following:

1. The material known until now, between 4 to 8 million years ago, is barely representative due to its scarcity and to its being usually fragmented and deteriorated.
2. To define which are the physical features that show hominid nature in a fossil is an act always conditioned by each historical moment ideology.
3. Despite the current establishing of these features, the valuations of fossils' anatomic traits are so varied that they do not obtain consensus among scientists.

The first reason becomes obvious if we think about the amount and quality of available material to be studied and analyzed by specialists. As for the second, we discuss below two illustrating occurrences: the famous Piltdown "discoveries" and the one performed by the so-called ramapithecines. In both cases, we will see how they were highly valued in their moment, for they clearly fulfilled the expectations of the time. Finally, we will discuss the varied interpretations supported at present concerning the finds of likely hominids with over a 4-million-year dating.

In the first decades of the 20th century, scientists thought that the most significant hominization phenomenon was the development of the brain. In this way, the existence of a decisive step or "cerebral Rubicon" was supposed, between 700 to 800 cc, the so-called step to reflection. Therefore, a skull fossil with a cranial capacity below 700 cc could not be regarded as human, while one over 800 cc could.

This explains the impact that the Piltdown "discoveries" had at their time. These "discoveries" were made in Sussex, England, including a modern-looking braincase, with cranial capacity over 800 cc, and a very primitive lower jaw. It was regarded as obviously "human" and was named *Eoanthropus* ("The Dawn Man").

For 40 years, the Piltdown "discoveries" were considered legitimate. But in 1953, the British Kenneth Oakley, using the "fluorine technique" on the bones, proved that owing to their different fluorine percentages, those fragments could not belong to a single individual. In fact, it would be soon found out that those "discoveries" were fakes, and the whole affair turned out to be a big fraud. The braincase had actually

belonged to an Upper Pleistocene individual, while the jaw came from a modern orangutan, deliberately altered to make it look primitive and ancient.

Some years later, "ramapithecines" would come on the scene. Ramapithecine fossil fragments were considered representative of the "first hominid" and had unanimous acceptance during the 1960s and 1970s, then they were completely abandoned. This episode's significance in paleoanthropology history deserves more detailed discussion.

In 1932, during a Yale University expedition to Siwalik Hills (north of India), graduate student G. Edward Lewis found a maxilla with two first molars, two premolars, and canine and incisor teeth alveoli. From the alveoli shape, it could be derived that the canine barely exceeded other teeth in height and that the incisor was inserted almost vertically, reducing its prognathism.

The aforementioned features led Lewis to name this specimen *Ramapithecus brevirostris* (*Rama,* alluding to a hero in Indian mythology; *pithecus,* ape; and *brevirostris,* Latin, "short face"). When trying to place it within the family it belonged, Lewis recorded, "hominid"? This question was left without an answer because nobody cared about it in those days. It is obvious that if *Australopithecus* was not regarded as a hominid, much less would be the more primitive *Ramapithecus.* Almost 30 years were necessary for the topic to be considered again during the 1960s.

In 1961, Helson Mukuri, Louis Leakey's first field assistant, found a fragment of a left upper maxilla that still had the canine tooth, the first premolar alveolus, the second premolar, and the two first molars. This find took place in Fort Ternan, northeast of Lake Victoria (Kenya). Leakey immediately noticed the hominid characteristics of the finding and named it *Kenyapithecus wickeri,* after Kenya Colony and the man who owned the site, Charles Wicker.

In his first scientific communication, Leakey called attention to the resemblance between *Kenyapithecus* and *Ramapithecus,* pointing out that both had features that put them closer to hominids than to pongids. Yet he gave greater significance to *Kenyapithecus.*

Meanwhile, Elwyn Simons, of Yale University, would revitalize the *Ramapithecus* significance as probable first hominid, due to its small canines, its reduced diastema, its thick dental enamel, and its nonprotruding short face (unlike apes). Later, in 1963, David Pilbeam joined the team. Together, they would carry out a remarkable synthesis task by observing that not only were *Ramapithecus brevirostris* and *Kenyapithecus wickeri* alike, despite the very long geographic distance between them, so were fossils found in other locations (Greece, Turkey, Hungary, to name a few). By this reason, they proposed to include all of them into the generic name *Ramapithecus* (which had priority because of its being coined first).

Furthermore, Simons and Pilbeam endorsed the idea, speculative but in agreement with the thoughts of the time, that the canine reduction in *Ramapithecus* was not an isolated trait. It was, as Darwin had expressed it, a result of a greater use of the hands owing to the manufacturing of tools and weapons. This would suggest bipedalism.

By then, the "granivorous hypothesis" was known, proposed by Clifford Jolly of the University of New York, who, in the 1970s, provided valuable data gathered from his studies on the gelada baboon *(Theropithecus gelada)* of Ethiopia. These data reasserted the significance of the canine reduction (thus consolidating *Ramapithecus* as likely first hominid). However, they also showed that this reduction was not a result of a greater use of the hands (as the Simons and Pilbeam hypothesis propounded), but of ingesting tough foods, such as grains and seeds. To eat this kind of food requires premolar and molar movement from side to side, for grinding it, an impossible procedure with very large canines.

In the meantime, during the 1960s, there were interesting innovations in the biochemistry, molecular biology, and genetics fields. These innovations would have a strong influence regarding *Ramapithecus* within the primate phylogeny. In 1962, Emile Zuckerkandl and Linus Pauling proposed to apply molecular biology to the study of human evolution. They thought the molecular study could provide equal or greater information than fossils in matters involving the construction of genealogical trees. Thus, "molecular anthropology" was born. By then, biologist Morris Goodman, of Wayne State University (Detroit), had published some data about the immunological properties of albumin. These properties showed that chimpanzees, gorillas, and human beings were closely related, while gibbon and orangutan were more distant relatives of that group.

Some time later, in 1967, American biochemists Vincent Sarich and Allan Wilson, of the University of California (Berkeley), studied the chemical structure of protein molecules in gorillas, chimpanzees, and human beings. As a result of this work, they

concluded that the perceived differences among them could give some accuracy about the time their evolutionary lines drifted apart. In this way, the "molecular clock" was created, based on the principle that when these two groups began to split, each of them started to accumulate mutations that would create differences between them. Therefore, the greater the elapsed time, the more accumulated differences between the two groups would exist.

By applying the "molecular clock," estimates were made about the branching of the lines that led to present chimpanzees and hominids. This branching would have occurred approximately 5 million years ago. Also, taking this split into account, for molecular biologists, it was clear that to search for a hominid in the fossil record before this branching was useless, despite appearances that might suggest the contrary. This obviously made *Ramapithecus,* at 14 million years ago, lose every chance for being regarded as a hominid, although most paleoanthropologists still believed that at the time.

In fact, paleoanthropologists regarded *Ramapithecus* as a hominid for almost 20 years. But in the early 1980s, some revealing finds would be made, particularly face fragments of two fossils named *Sivapithecus.* One of these was found in Turkey, and Pilbeam and his team found the other one in Pakistan. At once, the resemblance between *Sivapithecus* and *Ramapithecus* was recognized. Furthermore, attention was paid to the new fossil resemblance to the present orangutan. Then, it became obvious that *Ramapithecus* was more related to the phylogenetic line that led to present orangutans than to hominids.

This corroboration, along with the available biochemical, molecular, and genetic evidences, convinced David Pilbeam and most paleoanthropologists in the following years that *Ramapithecus* could no longer be regarded as a hominid. Moreover, nowadays its name has been completely lost, being absorbed by *Sivapithecus.*

Today, there is ample consensus in the international scientific community that bipedalism alone is a clear identifying trait for the hominid nature of a being. It is an anatomic change of major importance not only due to what it means in itself but because it became a "trigger" of significant later changes. Yet even agreeing with this point, some authors consider the possibility that early hominids did not develop bipedalism, although they had dental modifications (for example, the canine reduction) that could be regarded as an indicator of the beginning of the evolutionary process that led to modern humans.

Fortunately, the last 12 years have been especially plentiful for findings of probable hominids 4 to 7 million years old. Here, we will proceed from the more recent to the older ones, starting with the only one that is indisputably hominid. We speak about the one found in 1995 by Meave Leakey, of the Kenya National Museum, and her team, southeast of Lake Turkana in Kenya, named *Australopithecus anamensis* (*anam* means "lake" in the Turkana language). The found materials were a jaw, some face and forearm fragments, and a tibia, dated between 4.1 and 3.9 million years ago. It is the oldest of all australopithecines known until now.

Unlike chimpanzees, which have a deep oval depression in the lower part of the humerus against which the ulna is flexed to improve the elbow articulation strength and make possible the typical displacement on the knuckles, *A. anamensis* lacks this feature. Moreover, the anterior ridge of its tibia is a clear indicator of bipedalism.

Also in the 1990s, more precisely between 1992 and 1993, Tim White, of the University of California (Berkeley), directed a research project in Middle Awash, Ethiopia, where his team discovered hominid fossils in the Aramis Basin. Afterward, these fossils were named *Ardipithecus ramidus* (*Ardipithecus* means "ground primate," and *ramidus* means "roots" in the Afar language). It was dated 4.4 million years ago, and from the kind of related fauna, its habitat was a densely wooded zone.

At first, the occipital hole location led the finders to think that *Ardipithecus* was biped, which would have made it the oldest hominid known up to that moment, but new studies do not seem to corroborate this idea. However, the hominid nature of *Ardipithecus* could reside in its canine reduction.

Between 2001 and 2004, Tim White, together with Gen Suwa, of the University of Tokyo, and Ethiopian paleontologist Yohannes Haile Selassie, of the Natural History Museum of Cleveland (Ohio), found teeth and several bone fragments. At first, they were attributed to an older and more primitive variety of *Ardipithecus ramidus.* Afterward, these fossils were confirmed to belong to a different species, *Ardipithecus kadabba,* with an established antiquity of 5.2 to 5.8 million years. In the opinion of these authors, *A. kadabba* could have been the last common ancestor of chimpanzees and hominids.

In October 2000, a French-Kenyan team directed by Martin Pickford, of the Community Museums of Kenya, and Brigitte Senut, of the National Museum of Natural History (Paris), found some fossils within the Lukeino Formation at Tugen Hills (Kenya). These fossils comprised small mandibular fragments, isolated teeth, manual phalanxes, and upper and lower limbs bones of several individuals. They were named *Orrorin tugenensis* (*Orrorin* means "original man" in the Tugen language) and dated about 6 million years ago.

While its canines are long and the arms bones and the fingers show climbing adaptations, *Orrorin tugenensis* was probably biped. Its lower limbs were strong, and it had a long femoral neck, with a groove in its back, a possible consequence of the pressure exerted by the obturator externus muscle during bipedal locomotion.

In July 2002, a finding of the prior year was published. Michel Brunet, of the University of Poitiers (France), and its French-Chadian team made this finding in the Toros-Menalla site, Djurab Desert, northern Chad (Central Africa). A well-preserved skull, two maxilla fragments, and three teeth were named *Toumaï* ("hope of life" in the Goran language) and scientifically classified as *Sahelanthropus tchadendis.* Potassium-argon or paleomagnetism could not been applied, but the surrounding fauna were compared to that of Lukeino, at Tugen Hills (6 million years), and that of Nawata, at Lothagam (5.3–7.4 million years). As a result of this, Toumaï antiquity was estimated between 6 and 7 million years ago (closer to the last figure).

The fossil shows a real "mosaic of characters," a mix of both primitive and advanced features. In the opinion of Bernard Wood, of George Washington University, the front of the Toumaï skull is that of a true australopithecine, while the back is that of a chimpanzee. For Michel Brunet, the traits that suggest its hominid condition are the face structure, the kind of superciliary arches, and the small canines. Since there are not postcranial bones, nothing can be said about its locomotion mode, save the fact that by its occipital hole location, Brunet maintains that Toumaï probably had been biped.

However, Milford Wolpoff, of the University of Michigan, John Hawks, of the University of Wisconsin, and the aforementioned Martin Pickford and Brigitte Senut disagree with Brunet; they claim that the indicated traits do not ensure a hominid diagnostic in any way. Thus, the canine smallness, for example, would not be such because its width is similar to the mean of chimpanzee males or females and of gorilla females. On the other hand, while these authors set aside the continuous supraorbital torus as a result of strong sexual selection, as Brunet states, they think that the size and form of the supraorbital structures are a mechanical response to strain from anterior teeth.

But Brunet disregards that *Sahelanthropus* had a powerful masticatory complex. Based on experimental investigations that seem to demonstrate that the strains exerted by mastication on primate eyebrow arches are always very small, too small as for generating bone growth responses, he firmly claims that the supraorbital size is due to a strong sexual selection. For Brunet and his colleagues, Toumaï is indisputably the oldest hominid ancestor known up to date. If it were so, it would show that first hominids had a much greater geographic dispersal than what was thought until now.

Undoubtedly, it is very difficult for authors to establish a distinction among the members of the oldest ancestors of present chimpanzees, the members of the oldest hominids, and the ways these two lines drifted apart. The whole is a real "Gordian knot" if we consider its remarkable complexity. The distinction between these two groups always depends on the evaluations of different physical characters authors could make. When something is significant for some researchers, sometimes it may not be so for others. Owing to this, the chances of conciliation in these matters are rather complex because, in common practice, authors tend to overvalue the significance of their own findings.

Thus, Martin Pickford and Brigitte Senut think that *Orrorin tugenensis* would be the common ancestor of all hominids, while *Ardipithecus* would be the common ascendant of australopithecines, not of *Homo.* On his part, Tim White rejects this interpretation, questioning the *Orrorin* hominid status and regarding it as a likely ancestor of present chimpanzees. On the other hand, for Michel Brunet, *Sahelanthropus* is the oldest hominid ancestor known until now, while White regards it as a kind of archaic ardipithecine, and Wolpoff, Hawks, Pickford, and Senut disregard it as a hominid candidate, assuming it is an ape, probably a gorilla female ascendant.

These varied interpretations of the same facts show the high degree of subjectivity existing in the studies of our origins. Certainly, in paleoanthropology there is not an objectivity concept equal to the Newtonian physics-mathematics one. Is all this a

display of paleoanthropology vulnerability as a scientific discipline? We do not think so. On the contrary, we are sure that the variety of opinions and discrepancy among authors is proper to science and, without doubt, enriches the discussion. Advancements of knowledge of our past have always happened, and they will keep happening, as a consequence of hypotheses modifications and their adjustment to new data or new available information. Only in this way will paleoanthropology keep achieving increasing acknowledgment at the scientific level.

In time, the best, most-convincing explanations are the ones that last, while the others are put aside. But frequently, an explanation that had been put aside some time before is revitalized afterward with more available information, or a good explanation is replaced by a better one. If this is absolutely natural in science, we must understand that the same will happen in such a young discipline as paleoanthropology.

The available fossil documentation related to first-hominid origin shows great complexity. No morphological discontinuity is observed, and, as we know, in continuity it is very hard to establish clear differences. Besides, if their evolution was not linear but treelike, as most authors propound nowadays, we must think of a significant diversification of forms, in such a way that some hominid-like anatomic traits could have existed in several groups at the same time. If it were so, it would be extremely hard to identify which of them first became *Homo.*

Surely, the discussion about the "first hominid" will not end. Nevertheless, we think it is important to point out that we run the risk of "not seeing the woods for the tress," as the saying goes. Hence, our opinion is that beyond any singularity of character and relevant significance of the "first hominid" determination (if this were possible), we must not lose sight of an even more significant fact: the process as a whole. The significant thing is the process, and this is indisputable. Very slight differences at the beginning would later increase progressively in changing the phylogenetic line, which led to something absolutely original. It is the process as a whole, and not just a moment of it, that explains our present nature. We are what we are because we have a long and complex evolutionary history behind us.

— *Alberto A. Makinistian*

See also **Australopithecines; Biological Anthropology; Evolution, Human; Hominoids**

Further Readings

Brunet, M., et al. (2002). A new hominid from the Upper Miocene of Chad, Central Africa. *Nature, 418,* 145–151.

Haile Selassie, Y. (2001). Late Miocene hominids from the Middle Awash, Ethiopia. *Nature, 412,* 178–181.

Leakey, M. G., et al. (1995). New four-million-year-old hominid species from Kanapoi and Allia Bay, Kenya. *Nature, 376,* 565–571.

Senut, B., Pickford, M., et al. (2001). First hominid from the Miocene (Lukeino Formation, Kenya). *Académie des Sciences de París, Sciences de la Terre et des planetes, 332,* 137–144.

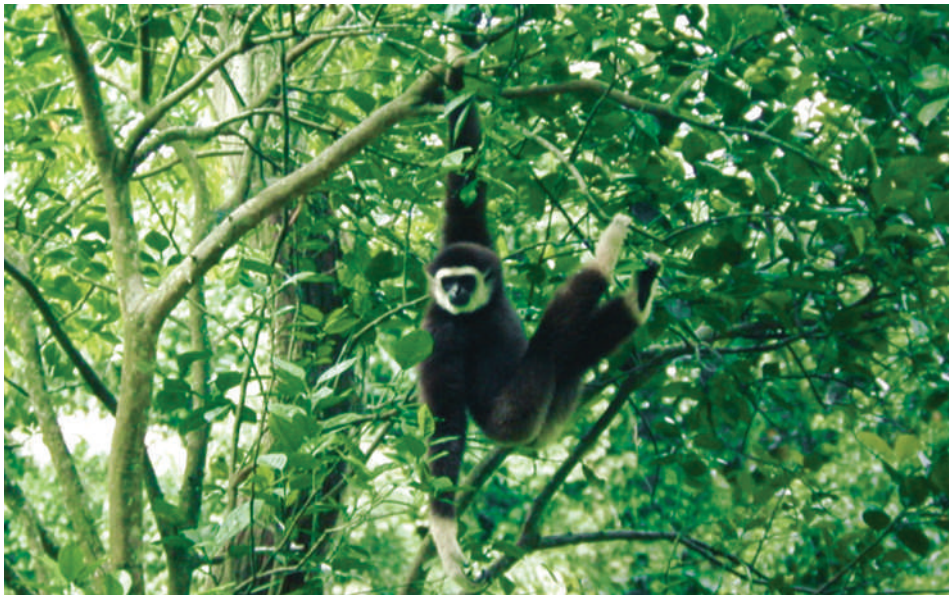
Wolpoff, M., Senut, B., Pickford, M. Y, & Hawks, J. (2002). Sahelanthropus or Sahelpithecus? *Nature, 419,* 581–582 (includes Brunet et al. reply).

Hominoids

Hominoids are the superfamily to which apes and humans belong. Hominoids are distinguished from cercopithecoids (Old World monkeys), the catarrhine group to which they are most closely related, in having primitive nonbilophodont molars, larger

Source: © Robert Jurmain.

brains, longer arms than legs (except in humans), a broader chest, a shorter and less flexible lower back, and no tail. Many of these specializations relate to a more upright posture in apes, associated with a greater emphasis on forelimb-dominated vertical climbing and suspension.



A white-handed gibbon (*Hylobates lar*) in the forests of Thailand

Hominoids can be classified into two families: the Hylobatidae, which includes gibbons and siamangs, and the Hominidae, which includes the great apes and humans. The gibbons and siamang *(Hylobates)* are the smallest of the hominoids (with average body weights ranging from 5–11 kg), and for this reason, they are sometimes referred to as the "lesser apes." The 12 or so species are common throughout the tropical forests of Asia, ranging from southern China to the Indonesian islands. They are remarkable in having the longest arms of any primates, being 30% to 50% longer than their legs. This is related to their highly specialized mode of locomotion, called *brachiation*, in which they progress below branches using only their forelimbs to swing from support to support. Gibbons are specialist fruit eaters, while the larger siamang incorporates a higher proportion of young leaves in its diet. Hylobatids live in monogamous family groups, in which males and females are similar in size (unlike most catarrhines). Both sexes defend a territory, mainly through complex vocalizations or songs (with male and female pairs of most species producing a duet), which serve to advertise their presence to neighboring pairs. Siamangs have large specialized throat sacs that they inflate during calling. As in Old World monkeys, hylobatids sit upright on branches to sleep, resting on their ischial callosities (i.e., sitting pads on the buttocks), rather than sleeping in nests like great apes.

The great apes include the orangutan *(Pongo)* from Asia and the gorilla *(Gorilla)* and chimpanzees *(Pan)* from Africa. These were formerly included together in their own family, the Pongidae, to distinguish them from humans, who were placed in the Hominidae. However, recent anatomical, molecular, and behavioral evidence has confirmed that humans are more closely related to the great apes, especially the African apes, and for this reason most scientists now classify them together in a single family, the Hominidae. The orangutan is restricted to the tropical rain forests of Borneo and Sumatra. Traditionally, the Bornean and Sumatran populations, which are morphologically and behaviorally quite distinct, have been separated as subspecies, but there is growing support to recognize them as two separate species, *Pongo pygmaeus* and *P. abelii*. They are large (35–80 kg) arboreal primates that climb cautiously through the trees using all four limbs for support. When they descend to the ground, they move quadrupedally, with clenched fists, or bipedally, with the arms raised for better balance. Orangutans subsist mainly on ripe fruits, but they do eat a variety of leaves and small animal prey. Modified sticks are used as simple tools by Sumatran orangutans to extract honey, insects, and seeds as food sources. As is typical of other great apes, they lack ischial callosities and build simple nests to sleep in at night. Adult male orangutans are about twice as heavy as females, and the sides of their faces are adorned with huge fatty flaps. Orangutans are the least sociable of the hominoids and tend to lead solitary lives. Males aggressively defend their territory from other males, which encompasses the ranges of several female consorts. The male long call, a series of reverberating grunts, which can be heard at a distance of 1 km, serves to attract receptive females.

An infant orangutan (*Pongo pygmaeus pygmaeus*) from Borneo

The gorilla, the largest of the hominoids (70–175 kg), has a disjunct distribution in tropical Africa. Because of their great size, gorillas are almost entirely terrestrial, although females and young individuals frequently climb trees. Nests are often built on the ground. They move quadrupedally, and like chimpanzees, the hand is specialized for knuckle-walking, in which the weight of the animal is borne on the dorsal surface of the middle joints of the fingers. Three subspecies of gorillas are generally recognized: mountain gorillas *(G. gorilla beringei),* from the volcanic highlands of Uganda, Rwanda, and Democratic Republic of Congo; western lowland gorillas *(G. gorilla gorilla),* from West Africa; and eastern lowland gorillas *(G. gorilla graueri),* from the Democratic Republic of Congo. Mountain gorillas eat a variety of leaves, stem, and roots, while lowland gorillas eat a greater proportion of fruits and insects. Groups consist of a dominant male, called a "silverback" (because of the silvery white hair on their backs and hips), as well as several adult females, subadults, and infants. The silverback male defends the troop from neighboring groups, which have overlapping home ranges.

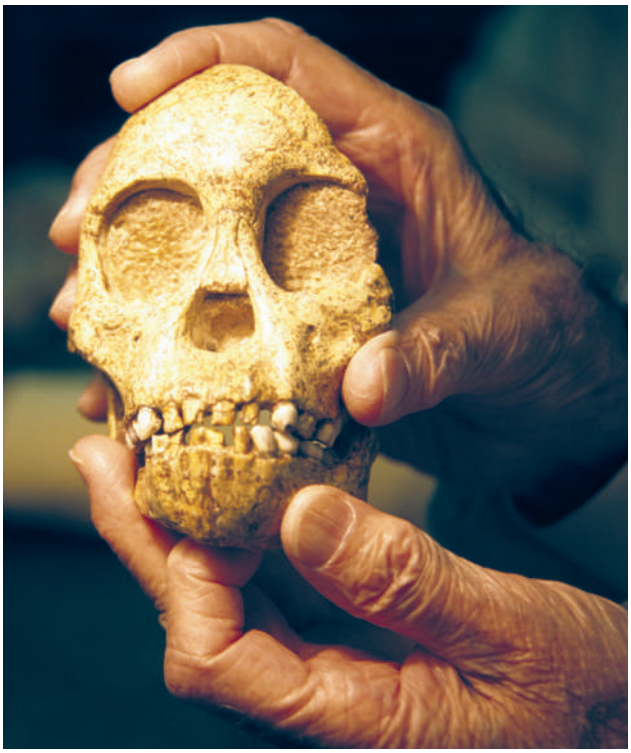
There are two species of chimpanzees, the common chimpanzee *(Pan troglodytes)* and the bonobo or pygmy chimpanzee *(Pan paniscus).* The common chimpanzee is widely distributed in the forests and woodlands stretching across equatorial Africa, while the bonobo is restricted to the tropical rain forests of the Democratic Republic of Congo. Bonobos differ from the more familiar common chimpanzee in having a more slender build, with longer limbs (despite their name, they are not smaller than common chimpanzees); the face is black with pink lips, the hair on top of the head is parted in the middle, breasts are more protuberant in adult females, and they are more adept at walking bipedally. Both species feed and build their nests in trees, but they mostly travel on the ground. Chimpanzees have

A young male gorilla *(Gorilla gorilla)* knuckle-walking

an eclectic diet of fruits, leaves, insects, and small vertebrates. Common chimpanzees also include meat in their diet, which they obtain by hunting small to medium-sized mammals, especially colobus monkeys. Tool-using behaviors are common, and more than a dozen simple tool types have been identified. Differences in tool use and other behaviors between populations of common chimpanzees have led some researchers to interpret these as cultural traditions. Examples include termite fishing in Tanzania and the use of rocks to crack nuts in West Africa. Chimpanzees are gregarious and sociable, and they live in large multimale-multifemale communities (20–200 individuals), which divide into smaller subgroups (3–15 individuals) for foraging. Common chimpanzees have a hierarchical social structure, in which males maintain their dominance through intimidating displays and overt aggression; they have been known to kill members of other communities. Bonobos are much less aggressive and are able to reduce tension within the group through more intensive use of sexual behavior.

— *Terry Harrison*

See also **Apes, Lesser; Apes, Greater; Hylobates**



Source: © Robert Jurmain.

HOMINID TAXONOMY

The taxonomic classification system developed by Carl Linnaeus (1707–1778) is still used in modified form today. It organizes all living things into a hierarchical system composed of different levels *(taxa).* These levels are kingdom, phylum, class, order, family, genus, and species. The system is also used for classifying human beings.

Humans have been included as members of the class of mammals. They also belong to the order of primates, which includes apes. Humans are included in a superfamily called *Hominoidea.* The *Hominoidea,* or apes, include humans, chimpanzees, bonobos, gorillas, orangutans, gibbons, and siamangs and their prehuman ancestors, until a common ancestor is found.

The apes are often divided into two families: *Pongidae* and *Hylobatidae.* Because there is relatively little genetic difference between them, many scientists put them into a single family, the *Pongidae.*

The current controversy over hominid taxonomy involves the issue of the evolutionary lineage of humans and other apes traced back to a common ancestor in remote time. It is focused on the place of humans in nature and the evolutionary process that produced both humans and apes.

Paleoanthropologists believe that the common ancestors of humans and apes lived between 11 million and 13 million years ago. As new fossils have been uncovered, there has been difficulty deciding where to place them. In the hominid taxonomy, the bipedal apes—all of the fossils as well as living humans—would fall into the group *Hominini.* Fossils such as *Australopithecus, Ardipithecus, Kenyanthropus,* and *Homo habilis* would also fall into this category.

To what exactly should the terms *hominoid, hominid,* and *hominin* refer? In general, *hominoid* refers to the order of primates. The term *hominid* refers to the human side of the family *Hominidae.* It is composed of all humans and those ancestors back through the generations to the common ancestor that humans share with the apes.

The term *hominin* (singular), or *hominini* (plural), refers only to human lineages. Thus, humans are *hominini.* However, *hominini* are included in the

group of hominids, which includes both humans and their prehuman ancestors through to a common ancestor also related to the apes.

In the old system, *hominid* refers solely to the bipedal ape lineage. The hominid in current understanding includes both the lineages of the apes back to a common ancestor and the lineages of humans back to a common ancestor.

— Andrew J. Waskey

HOMO ANTECESSOR

Homo antecessor is the designation given a fossil hominid from the Lower Pleistocene of Atapuerca, Spain, defined in 1997 by Bermúdez de Castro, Arsuaga, Carbonell, Rosas, Martínez, and Mosquera, in *Science* magazine. The name *antecessor* is the Latin word meaning "explorer," "pioneer," or "early settler." Assigning this name, they emphasized that these hominids belong to the first population as yet known in the European continent. The fully modern midfacial morphology of the fossils antedates other evidence of this feature by about 650,000 years. The midfacial and subnasal morphology of modern humans may be a retention of a juvenile pattern that was not yet present in *Homo ergaster.* Consequently, *Homo antecessor* may represent the last common ancestor for Neandertals and modern humans.

From 1994 to 1996, nearly 80 human fossil remains were recovered from level six *(Aurora stratum)* of the Pleistocene cave site of Gran Dolina (TD), Sierra de Atapuerca, Burgos, Spain. These remains were found in sediments located about 1 m below the Matuyama-Brunhes boundary. In 1997, Bermúdez de Castro and his colleagues described the TD6 fossils and defined a new species, which exhibits a unique combination of cranial, mandibular, and dental traits. Midfacial topography shows a modern pattern and infraorbital surface with true canine fossa. The supraorbital torus is double-arched. The superior border of the temporal squama is convex, and there is the presence of a styloid process. The mylohyoid groove extends anteriorly nearly horizontal and courses into the mandibular body, the thickness of which is clearly less than that of *H. ergaster* and *Homo habilis* s.s. There is an absence of alveolar prominence at the M1 level.

Source: Photo by Eustoquio Molina.

The extramolar sulcus is narrow. The lateral prominentia is smooth and restricted to the level of M2. The design of the inner aspect of the corpus is similar to that of European Middle Pleistocene fossils. Mandibular incisors are buccolingually expanded with respect to *H. habilis* s.s., but postcanine teeth are smaller and within the range of *H. ergaster, Homo erectus,* and *Homo heidelbergensis.* The maxillary incisors are shovel-shaped. The mandibular canine is mesiodistally short.

The holotype is a fragment of right mandibular body with M1, M2, and M3 (ATD6–5) and an associated set of teeth from the same individual. Holotype and paratypes are provisionally housed in the Museo Nacional de Ciencias Naturales, Madrid, Spain. The final repository of the fossils is the Museo de Burgos, Spain.

— *Eustoquio Molina*

See also **Atapuerca; Arsuaga, J. L.; Bermúdez De Castro, J. M.; Hominoids**

Further Readings

Bermúdez de Castro, J. M., Arsuaga, J. L., Carbonell, E., Rosas, A., Martínez, I., & Mosquera, M. (1997). A hominid from the Lower Pleistocene of Atapuerca, Spain: Possible ancestor to Neandertals and modern humans. *Science, 276,* 1392–1395.

Carbonell, E., Bermúdez de Castro, J. M., Arsuaga, J. L., Díez, J. C., Rosas, A., Cuenca-Bescós, G.,

Sala, R., et al. (1995). Lower Pleistocene hominids and artifacts from Atapuerca-TD6 (Spain). *Science, 269,* 826–830.

Fernández-Jalvo, Y., Díez, J. C., Bermúdez de Castro, J. M., Carbonell, E., & Arsuaga, J. L. (1996). Evidence of early cannibalism. *Science, 271,* 277–278.

HOMO ERECTUS

Homo erectus (literally "upright man") is an extinct hominin that lived between 1.8 million and 50,000 years ago. The first fossil found of this species (the type specimen) was a skullcap discovered in 1891 by Eugène Dubois. However, the species was not named until 1894, after a femur (thigh bone) was discovered not far from the skullcap. The femur was nearly identical to that of a modern human, prompting Dubois to name a new species: *Pithecanthropus erectus* (literally "upright apeman"). Both fossils were found in Trinil, Java. The type specimen was named "Trinil 2" and the femur "Trinil 3." They are more commonly known as "Java Man."

In 1927, Davidson Black named a new species *Sinanthropus erectus* (literally "Northern upright man"), based on a tooth discovered at Zhoukoudian near Bejing (Peking), China. The later discovery of 14 calvaria (skull caps), limb bones, and many more teeth strengthened his claim. One of these calvaria became better known as "Peking Man." As more fossils of *erectus*-like hominins were discovered, paleoanthropologists began to recognize the similarities between *Pithecanthropus*/*Sinanthropus* and specimens that had been assigned to the genus *Homo.* Eventually, both *Pithecanthropus* and *Sinanthropus* fossils were subsumed into the species *Homo erectus.*

The morphology of *Homo erectus* changed very little over its 1.8 million years of existence. Compared with australopithecines and earlier *Homo, Homo erectus* had smaller teeth, a shorter face, and a humanlike projecting nose. The numerous skulls that have been discovered show a significant increase in brain size compared with earlier hominins. On average, the cranial capacity of *Homo erectus* was about 900 cc, although its range (750 cc–1,250 cc) overlaps that of modern humans (1,000 cc–2,000 cc).

Compared with modern humans, *Homo erectus* possessed a robust and somewhat primitive-looking skull, face, and dentition. In general, the skull is long, and the forehead is low in profile. The face has marked brow ridges, and the back of the skull has a marked projection for attachment of strong neck muscles. The skull bones are thick compared with modern humans. Many of the Asian specimens (in particular) exhibit a sagittal keel, a ridge running along the top of the skull. All *Homo erectus* specimens lack the projecting chin of modern humans.

Their robusticity notwithstanding, below the neck *Homo erectus* looked very much like modern humans. Much of what we know about their postcranial skeleton (below the skull) comes from a nearly complete skeleton from Lake Turkana, known as "WT 15000" or "Nariokotome Boy." Nariokotome Boy would have been quite tall if he had reached adulthood (perhaps 180 cm, or 6') but the average height of *Homo erectus* was about 170 cm (5'7"). This size represents a dramatic increase in stature compared with earlier *Homo.* Postcranial remains establish that *Homo erectus* was a committed biped with none of the adaptations to tree climbing observed in earlier hominins. It has been suggested that their somewhat narrower hips indicate that there were more efficient bipeds than the average modern human.

Compared with earlier hominins, *Homo erectus* exhibited greater control over its environment. This species developed a more sophisticated tool kit and may have mastered how to control fire. In addition, it was very likely the first hominin to move outside Africa. *Homo erectus* is known for developing Acheulean tools. These tools are found in high densities in Africa, Europe, and western/south Asia and are rare in East Asia. Like the Oldowan tools used by *Homo habilis,* Acheulean tools did not have specialized purposes. The Acheulean hand axe (a pear-shaped tool with sharp edges on all sides and a picklike point) was likely a kind of "Swiss Army knife" used to cut, scrape, pound, and dig. In addition to hand axes, the Acheulean tool kit included cleavers, scrapers, and notched tools. The greater diversity of tools likely indicates greater reliance on them.

Where and when hominins first began to use and control fire is the topic of much disagreement. Some paleoanthropologists attribute this innovation to *Homo erectus.* The earliest, although highly questionable, claim comes from East Africa (Koobi Fora) and dates to about 1.5 million years ago. Other, also dubious evidence comes from South Africa (Swartkrans), dating to 1 million years ago. Until recently, the best-supported

evidence was said to come from Zhoukoudian, in China, dating to between 400,000–500,000 years ago. However, a recent reanalysis of this evidence concluded that there is no direct evidence of in situ burning. So the jury is still out on whether or not *Homo erectus* was the first hominin to have had controlled use of fire.

Other cultural aspects of *Homo erectus* are also strongly debated among paleoanthropologists. While some hypothesize that *Homo erectus* was a big-game hunter, others do not agree. This is also true of the hypothesis that *Homo erectus* constructed shelters. Both the evidence of the "shelters" and the interpretation that *Homo erectus* was responsible for making them have come under scrutiny. So far, no hominin remains have been associated with what some consider the earliest evidence for man-made shelters. Finally, some claim that *Homo erectus* used watercraft. This is based on evidence for their occupation of islands in Southeast Asia, like Flores, where Acheulean tools (but no hominins) have been found dating to more than 800,000 years ago.

Homo sapiens excluded, *Homo erectus* was the farthest ranging of all the hominins. Their skeletal remains or their tools are found in Europe, India, and East and Southeast Asia. Evidence suggests that *Homo erectus* was the first hominin to migrate out of Africa (although recent discoveries in Dmanisi, Georgia, may ultimately disprove this). The oldest *Homo erectus* fossil from Africa is 1.6 million years old. In Java, scientists have recently dated fossils to 1.8 million years ago. If these dates are correct, it indicates that *Homo erectus* left Africa much earlier than once believed. Recent dates from different sites in Java (Ngandong and Sambungmacan) suggest that *Homo erectus* existed for 250,000 years longer than once believed. If correct, these dates would indicate that the species survived in Southeast Asia until between 27,000 and 53,000 years ago. Since modern humans were also present in Southeast Asia by this time, it would mean that the two species coexisted.

The status of *Homo erectus* as a species has a long history of controversy. The first *Homo erectus* fossils found were not accepted as hominins, because they had small brains and at that time it was thought that humans evolved large brains before becoming bipedal. Later, as more fossils of *Homo erectus* and other hominins were found, the validity of *Homo erectus* as a taxon was accepted. But more fossils meant more variation, and by the 1970s it was suggested that *Homo erectus* be split into more than one species: *Homo ergaster* for the African fossils, *Homo heidelbergensis* for the European fossils, and *Homo erectus* for the Asian fossils. For those who advocate splitting the species, *Homo ergaster* represents the common ancestor of *Homo erectus* and *Homo heidelbergensis; Homo heidelbergensis* then gave rise to Neandertals (or Neandertals and modern humans), while *Homo erectus* in Asia became extinct. In many respects, much work still needs to be done to define the species and its culture.

— *Shara E. Bailey*

See also **Acheulean Culture; Axes, Hand; Hominoids; Homo Ergaster; Paleoanthropology**

Further Readings

Rightmire, G. (1990). *The evolution of Homo erectus: Comparative anatomical studies of an extinct human species.* Cambridge: Cambridge University Press.

Rightmire, G. P. (1995). Geography, time, and speciation in Pleistocene Homo. *South African Journal of Science, 91,* 451–454.

Weiner, S., Xu, Q., Goldberg, P., Liu, J., & Bar-Yosef, O. (1998). Evidence for the use of fire at Zhoukoudian, China. *Science, 281,* 251–253.

Wood, B. A. (1994). Taxonomy and evolutionary relationships of *Homo ergaster. Courier Forschungs-Institut Senckenberg, 171,* 159–165.

HOMO ERGASTER

Homo ergaster (literally "work man") is an extinct hominin that lived in Africa about 1.9 to 1.6 million years ago. The species was named by C. Groves and V. Mazak in 1975, based on the discovery of a mandible known as "KNM-ER 992." This fossil for which the species is named was found at a site called Koobi Fora, Kenya. It is 1.5 million years old. Important specimens assigned to this species include a very well-preserved cranium (KNM-ER 3733), which is 1.7 million years old, and the famous "Turkana Boy" (KNM-WT 15000), a nearly complete skeleton, which is 1.6 million years old.

As the name suggests, *Homo ergaster* was a toolmaker. Its fossil remains are typically found in association with stone tools ascribed to the Acheulean tool

tradition. These tools consist of primarily hand axes (large tear-drop-shaped stone tools) and cleavers. It was once thought that the invention of these tools led to the spread of early humans outside of Africa. However, it is now known that hominins migrated out of Africa before developing Acheulean tools.

Homo ergaster is a controversial species. Some paleoanthropologists include it within the species *Homo erectus,* while others consider it a distinct species. Those who agree that there are two species split *Homo erectus* into early African and Asian species. *Homo ergaster* is designated as the early African species and *Homo erectus* is reserved for later hominins found in Asia. These differences reflect disagreements among paleoanthropologists about how many species of hominins are represented by the fossil record.

Many aspects of *Homo ergaster* and *Homo erectus* anatomy are similar. Compared with earlier hominins, both have smaller teeth, a shortened face, and projecting nasal bones. The last feature marks the first appearance of the humanlike external nose with the downward-facing nostrils. In addition, both show a significant increase in brain size compared with earlier *Homo* (*Homo habilis).* The brain size of *Homo ergaster* (860–910 cc) was about 75% the size of modern humans (1,000–2,000 cc).

Homo ergaster is primarily defined in terms of how it differs from *Homo erectus.* Relative to *Homo erectus, Homo ergaster* had a more rounded, higher cranium with thinner cranial bones. It also lacked a number of distinctive characters seen in *Homo erectus.* These include the supraorbital sulcus (depression behind the brow ridges), the sagittal keel (a ridge on top of the skull), and the occipital torus (a projection in the back of the skull).

Many paleoanthropologists believe that the differences between *Homo erectus* and *Homo ergaster* are too few to warrant assigning them to separate species. However, some recent analyses of the evolutionary relationships among the genus *Homo* have found that *Homo ergaster* differs from *Homo erectus* in many of the same ways that modern humans do. For this reason, other paleoanthropologists consider *Homo ergaster* the probable ancestor of later *Homo* populations (for example, *Homo sapiens*) and that *Homo erectus* represents an evolutionary dead end.

— Shara E. Bailey

See also **Acheulean Culture; Hominids; Homo Erectus; Paleoanthropology**

Further Readings

Strait, D., Grine, F., & Moniz, M. (1997). A reappraisal of early hominid phylogeny. *Journal of Human Evolution, 32,* 17–82.

Wood, B. A. (1992). Origin and evolution of the genus *Homo. Nature, 355,* 783–790.

Wood, B. A. (1993). Early *Homo.* How many species? In W. H. Kimbel & L. B. Martin (Eds.), *Species, species concepts, and primate evolution* (pp. 485–522). New York: Plenum Press.

HOMO HABILIS

Homo habilis is an extinct hominin that lived in Africa between 2.3 and 1.6 million years ago. The type specimen, OH 7 (Olduvai Hominid #7), was discovered by Louis Leakey at Olduvai Gorge, Tanzania, in 1960. It consists of a mandible and two parietal (skull) bones that are 1.7 million years old. The species (literally, "handy man") got its name from the association of the fossil with stone tools.

Homo habilis is distinguished from *Australopithecus* primarily on the basis of a larger brain, smaller molars, and aspects of the hand that support an anatomical basis for toolmaking. The brain of *Homo habilis* is estimated to have been between 500 and 710 cc (depending on the specimen). On average, it is larger than that of australopithecines but smaller than that of *Homo erectus.* The body size of *Homo habilis* has been estimated to be about 32 kg (70.5 lbs). Relative to its body size, *Homo habilis* had a large brain.

There is a great deal of variation among specimens attributed to *Homo habilis.* Some specimens show limb proportions that are similar to australopithecines (longer arms relative to legs), while others do not. It is clear, however, that *Homo habilis* was a biped. A nearly complete foot from Olduvai Gorge clearly shows characters associated with bipedal locomotion. These include the presence of both middle and longitudinal arches, the alignment of the second through fifth toes, and the enlarged big toe that is in line with, rather than opposable to, the other toes. There is some indication from the foot, however, that *Homo habilis* also spent some time in the trees. Muscle markings on the bone suggest that the foot

could be easily inverted (turned sideways), which would facilitate tree climbing.

Homo habilis was once associated with the earliest evidence for making stone tools, and paleoanthropologists considered them to be the first toolmakers. These tools consist of choppers and flakes and belong to the Oldowan tradition. The tools made by *Homo habilis* were most likely used for scavenging meat, not hunting prey. Interestingly, there is good evidence that *Homo habilis* was a major staple in the diet of large cats and other predatory animals. Therefore, rather than being "man the hunter," *Homo habilis* was more likely "man the hunted."

Recently, Oldowan tools that predate *Homo habilis* have been found in Ethiopia. These date to 2.5 to 2.6 million years ago. The younger tools are associated with *Australopithecus* remains *(A. garhi).* The older tools are not associated with any fossils. Based on this new evidence, it now seems possible that *Australopithecus,* rather than *Homo,* was the first hominin to make and use stone tools.

To date, indisputable *Homo habilis* fossils have not been found outside Africa. This suggests that the migration of early humans to Europe and Asia came later in human evolution. In fact, most human cultural evolution occurred in later *Homo* species. There is no clear evidence that *Homo habilis* controlled fire or buried their dead. Neither is there unequivocal evidence that *Homo habilis* was capable of vocalizing sounds recognizable as language today.

Since the original discovery of the OH 7 specimen, many more specimens attributed to *Homo habilis* have been discovered. Their remains vary quite a bit in size and shape. Based on this variation, there is debate among paleoanthropologists about whether or not the fossils attributed to *Homo habilis* represent a single species. Those who believe there is more than one species separate the fossils into *Homo habilis* and *Homo rudolfensis.*

The *Homo rudolfensis* specimens are distinguished from the *Homo habilis* specimens by having larger postcanine teeth with more complex premolar roots, larger brains, and more humanlike limb proportions (shorter arms/longer legs). The species *Homo rudolfensis* was proposed in 1986 by V. P. Alexeev for the specimen KNM ER 1470, which was originally assigned to the genus *Homo* but had not been assigned to a species. Since then, several other fossils once attributed to *Homo habilis* or *Homo erectus* have been reassigned (by some) to *Homo rudolfensis.* For those who accept dividing *Homo habilis* into two species, there is little agreement about where in human evolutionary history *Homo rudolfensis* lies.

When *Homo habilis* was discovered, it was thought to be the ancestor to all later *Homo.* It was more humanlike than the australopithecines that had been found and less specialized than the known *Homo erectus* fossils from Asia. However, as more fossils have been discovered, the position of *Homo habilis* in the human lineage has become less clear. In the conservative interpretation (one species), it may have been the ancestor to both *Homo erectus* and *Homo ergaster.* In a less conservative interpretation (two species), *Homo habilis* may have given rise to *Homo rudolfensis* (which, in turn, gave rise to *Homo erectus/ergaster*), or it may have been an evolutionary side branch.

Toolmaking was once considered to be one of the defining characteristics of humanity. It was its association with stone tools that led paleoanthropologists to hypothesize that *Homo habilis* was more similar to modern humans than it was to australopithecines. We now know, however, that there is a diversity of toolmaking and tool-using behavior among chimpanzees. This has forced paleoanthropologists to revise their assumptions about what makes us human. Tool use can no longer be used as the criterion for a genus.

Wood and Collard claim that in order for a specimen to be classified as *Homo,* it should meet a number of criteria. These include showing greater similarity to *Homo sapiens* than to australopithecines in body size, body proportions, and in the size and shape of teeth and jaws. To be included in the genus *Homo,* a specimen should also show evidence of modern humanlike bipedal locomotion (with limited climbing capability) and of a modern humanlike extended period of growth and development. These researchers argue that *Homo habilis* (including *H. rudolfensis*) does not meet these criteria. As a result, they have suggested that it be removed from the genus *Homo* and reassigned to the genus Australopithecus (for example, *A. habilis*).

— Shara E. Bailey

See also **Hominoids; Leakey, Louis S. B.; Oldowan Culture; Paleoanthropology**

Further Readings

Asfaw, B., White, T., Lovejoy, O., Latimer, B., Simpson, S., & Suwa, G. (1999). *Australopithecus garhi:* A new species of early hominid from Ethiopia. *Science, 284,* 629–635.

Delagnes, A., Brugal, J.-P., Feibel, C., Kibunjia, M., Mourre, V., & Texier, P.-J. (1999). Early hominid stone tool production and technical skill 2.34 Myr ago in West Turkana, Kenya. *Nature, 399,* 57–60.

Wood, B., & Collard, M. (1999). The human genus. *Science's Compass, 284*, 65–71.

Homo sapiens

Age of *Homo sapiens*

The *Homo sapiens* lineage may be as old as 500,000 years. Although the oldest fossil remains only date to about 200,000 years, there is growing evidence that the *H. sapiens* lineage may be much older. Assuming that *H. neandertalensis* is its own species (and evidence for this assumption grows), then the last common ancestor of both terminal species of hominoid evolution may have lived around that time. Paleoanthropology has not yet sufficiently resolved the taxonomic status of earlier *Homo* fossils such as *H. antecessor* (more than 800,000 years from Spain), which might as well be a grade as *H. heidelbergensis.* The oldest Neandertal lived at least 250,000 years ago.

A caveat of paleoanthropology and the reconstruction of the evolutionary history of *H. sapiens* is first the decoupling of fossilized information (such as skull anatomy) from the crucial processes (sexuality, social organization, cognition, cultural evolution) in *H. sapiens* evolution. And second, the transition from archaic sapiens to modern sapiens was a continuous process.

Scenarios of Hominization

For quite a while, two contrasting models, the "out-of-Africa hypothesis" and the "multiregional hypothesis" and their modifications, dominated the discussion of the origin of *H. sapiens.* The out-of-Africa hypothesis (synonym, "Arche Noah-model," "replacement hypothesis," "Eve-hypothesis," or "Lucky-Mother–hypothesis") assumes a common origin of all modern humans in Africa and thus that their morphological divergence of all recent human population is the result of a relatively recent differentiation. According to the "multiregional hypothesis" (or "candelabrum model"), modern human populations are derived from regional precursor populations, and Asians and Europeans are thus descendants of earlier endemic humans. The "assimilation model" tries to reconcile both diametrically opposed hypotheses, assuming a somewhat "mixture" of modern immigrants with endemic populations. Very recent findings even suggest a genetic bottleneck more the 50,000 years ago, which would even more contradict a multiregional origin of all modern human populations.

The discussions in all models are limited to the last 150,000 years of *H. sapiens* evolution.

The Fossil Record

The indisputable fossil record of *H. sapiens* actually starts in Ethiopia with the specimens Omo I and Omo II from the Kibbish formation now dated at 195,000 years, followed by *H. sapiens idalto* from Afar, Ethiopia (160,000 years), and by the remains from Border Cave, South Africa (> 100,000 years). Evidence gathered from both molecular genetics (for example, mitochondrial genes) and linguistics support an African origin of all *modern* humans. This does not necessarily imply that the origin of early *sapiens* is also found in Africa.

Short-term climatic changes in the Pleistocene led to a habitat fragmentation in Africa. The cooling effect of the climate change fragmented forests, whereas the warming effect expanded savannahs. Humans, by having to react to these relatively short-term climatic alterations, learned to adapt to changing environments. This later enabled their universal dispersal (not to be confused with migration) seen in no other mammalian species. Occurrence of *H. sapiens* outside Africa is documented as being younger than 100,000 years in the Middle East (Shkul V, Israel, 90,000 years; Qafzeh IX, Israel, 90,000–100,000 years). Note that recent redating of the sites contradicts a simple succession of Neandertal and modern humans. The dispersal out into the rest of the world started more than 60,000 years ago. Humans reached Asia about 60,000 years ago, Australia around 50,000 years ago, Europe 40,000–35,000 years ago ("Cro magnon"), and America 35,000–15,000 years ago. The splitting of human ethnic groups is also documented by a similar splitting of their parasitic bacterium, *Heliobacter pylori,* into various subgroups.

Group size has become a key word in recent discussions on human evolution. Although we have no data whatsoever on the size of human groups during their dispersal, many anatomical traits indicate "genetic drift," the fixation of randomly distributed alleles in relatively small original groups. Many traits used for ethnic distinctions have continuously escaped all functional arguments.

Anatomy of *Homo sapiens*

There is no purely anatomical-based definition of *H. sapiens* due to the difference in modern anatomy and behavior. Linnaeus distinguished between *H. diurnus,* corresponding to humans, and *H. nocturnus,* referring to the orangutan. It is the only Linnean species without a holotype of Linnaeus himself.

Diagnostic (not necessarily autapomorphic) cranial characteristics (or even better, trends) of *H. sapiens* are as follows:

- Appearance less robust than in other members of the genus *Homo*
- Reduction of tooth surface
- Tooth arcade with parabolic shape
- Rounded occipital region
- Straight forehead, therefore less prominent supraorbital ridges (but still present in early members)
- Face orthognathous
- Orbitae more rectangular than rounded
- Deep zygomatic fossa
- Prominent chin probably due to posterior displacement of dentition indicated by the For. mentale below P_2 instead of M_1

By summarizing cranial and dental characteristics, it becomes evident that changes in mastication affect most of the above-mentioned characters. It led to reduced tooth surfaces, bite force (herewith supraorbital ridges), and reshaping of the chin. Only after these dominant constraints onto the skull shape had been reduced was the inflation of the temporal and forebrain that led to the straight forehead and orthognathous face possible.

Diagnostic postcranial characters follow.

Body Shape

During their evolution, humans have increased in body size by approximately 150% and doubled their body weight. Most probably already in early members of the genus *Homo* (if not earlier), a new mechanism of bipedal locomotion evolves, using a torsional mechanism of the trunk and spine in walking. Amplitudes of these torsions depend on walking speed and indicate the use of resonance mechanisms (energy saving), which at higher speeds show significant gender differences. Torsion is driven and countered by the oblique abdominal muscles. The human body forms a hyperboloid, the "waist."

According to an idea of Weber and Weber, the legs and arms act as physical pendula during walking. Their resonance occurs at the energetically optimal speed of about 1,1 m/s—just the speed at which trunk torsion shows a relative minimum, indicating an adapted mechanical interaction between extremities and trunk. To increase the energetically optimal speed, muscles of the legs are concentrated near the trunk. The consecutive cone shape of the legs allows for great step length with short pendula and thus short swing times, leading to maximized speed. The concept was summarized under the term *inverted pendulum.* Human arms are shorter than the legs, with a more cylindrical shape and more mass distally, thus comparable pendulum length and thus dynamic properties as legs.

In walking, hip joints create about twice the force as shoulder joints, and mechanically relevant shoulder width (biglenoidal width) is double that of pelvic width (biacetabular width). More mass is concentrated in the pelvic segment than in the (air-filled: lungs) thoracic segments. Thus, the center of mass is situated in the pelvis. In the front and side views of the long trunk (in relation to our nearest primate relatives extended) with mass concentrations at its end has an asymmetric dumb bell shape. Seen from the top, the cross-sectional area of the trunk is stretched into an ellipsis instead of the more rounded shape of, for example, chimpanzees. Changes in body shape are a necessary prerequisite for an important action of hominids in throwing.

Hands

A comparison of modern human hands with those of nonhuman primates reveals features unique to humans that are related to two main functions: from power grip to precision grip, and the importance of gestures. But the basis of the manipulatory abilities that involve structural changes as well as demands for a high speed in the execution of movements should be seen more in brain development than in anatomical

changes of the hand itself. Unique human hand movements are first the ulnar opposition (moving the ulnar side toward the thumb) forming the "cup of Diogenes." Second, the precision and squeeze grip (and many more grips) between the thumb and the fourth and fifth finger is made possible ("basket grip"). (Lucy already had a grip between the thumb and the second and third finger, according to M. Marzke.) The latter involves reorganization of the thumb muscles, especially the long flexor muscle.

Nakedness

The nakedness of humans is the result of a miniaturization of the body hairs (not loss) to a maximum size of 1–2 mm. In addition, the body hairs have lost their pigmentation. In *correlation,* the sweat glands, formerly restricted to the palm and sole in primates, are now covering the whole body, providing a maximum area of cooling by transpiration. The human ability of sweating is unique within mammals. But nakedness cannot only be seen in the context of thermoregulation but also of sexuality and postnatal development (see below). The naked skin and touch play an outstanding role in the development of emotion. The taboo of skin contact in many different recent cultures indicates the high importance of such skin contacts for the stabilization of group-adherence but also for the development of self-consciousness.

Third, nakedness together with the enormous development of hairs on the head and subcutaneous body fat has reshaped the outer appearance of humans. While subcutaneous body fat makes only 3% of body mass in primates, it makes 16% in men and up to 25% in females. Its function is related to the inflation of the brain. Normally, the brain only consumes glucose, but in the state of starvation it may cover up to 85% with ketones, which are mobilized from the fat tissue.

Already on the naked skin of chimpanzees, melanocytes (pigment-producing cells) produce melanin under UV radiation. Melanin molecules bind free radicals. Any color in humans is only due to the amount of melanin in the skin, which itself is controlled by only a few genes. They regulate the activity of an enzyme (tyrosinase) that catalyzes the first step in the biosynthesis of melanin and control the package and size of melanosomes, which finally cause the difference between the individual pigmentation.

Human colors are a subtle balance between two vitamins. The first vitamin is folate (folic acid), a B vitamin, which is highly sensitive to sunlight. Especially during gestation, a lack of folate can cause multiple malformations. It is also indispensable for rapid mitosis such a sperm production.

In contrast, vitamin D biosynthesis needs UV radiation. Vitamin D is necessary for calcium and phosphate metabolism, for calcium uptake from the gut, and therefore for osteogenesis. In the epidermis, cholesterine is transformed into provitamin D, which is synthesized to vitamin D in the kidneys. To ensure this biosynthesis, the skin gets lighter the more northern individuals live, and even, theoretically, there is not enough sunlight for this biosynthesis beyond 50° of latitude. In the latter case, it has to be compensated by food.

Sexuality

The sexuality of *H. sapiens* differs dramatically from their closest living relatives, the chimpanzees. The subcutaneous fat tissue has increased to as much as 16%–25% of total body weight. It now shapes the human body in both sexes. The breasts of adult women are permanently developed independent of their function for lactation. In nonlactating periods, the breasts are formed by fat tissue and serve only as a sex signal. The external female genital organs are completely hidden by the major wings of the vulva as well as by pubic hair. These hairs are so different from cephalic hairs that even the lice living in the respective regions are of a different species. In contrast to chimpanzee and bonobo females, women do not signal their estrus in any way, neither by swollen anogenital skins nor by any specific secretion. The estrus of women is cryptic, and their sexual activity independent of it. Together with the unique sensibility of a naked body, and of specific erogenous zones, humans of both sexes are probably the only mammals able to orgasm, a type of brief unconsciousness ("little death" in East-Asian literature). Sexuality plays a crucial role in partnerships even beyond the period of the female reproductive age. A milestone in human evolution is the separation of sexuality from reproduction. Homosexuality as a constitutive character of all human cultures can also be considered an effect of this clear distinction.

One of the possible evolutionary consequences of the new sexuality of humans is the "liberation" of males from their sex-dominated role of achieving access to females, or defending them in harem-organized species (for example, gorilla, chimpanzee, and to a lesser

degree bonobos). Men are the only primates who cooperate to a large extent with nonrelated individuals. This male cooperativeness, together with the plesiomorphic cooperation among primate females, is one of the key structures in social organization, which preceded cultural evolution. It also allows for the first time in primate evolution a group size that is well above any biologically constrained size.

Birth

Humans have an unusually long gestation period relative to their body weight. Especially in the last 6–8 weeks, when fetal body growth ceases, the brain and subcutaneous body fat develops, of which the latter can be seen as a supply for the former in case of postnatal starvation. Human birth is unique in that the head is rotated 90° within the birth channel and the newborn is facing dorsally. The complexity of birth and the enormous risk for the mother—also unique within mammals—and for the newborn has led to the idea that assistance during birth by other women is a key factor in human evolution.

Postnatal Development and Social Behavior

Human social behavior develops from an already extremely advanced behavior of their ape sistergroups. In particular, two innate abilities are highly evolved within these groups. Apes can detect the social and emotional status of their counterpart from very small, almost nonvisible signals such as changes in body posture, and they can anticipate its implication. They can recognize other individuals as intentional agents whose attention can be shared and even manipulated. Together with a high degree of vocalization, apes have herewith evolved the highest emotional intelligence among all existing mammals.

By building upon these abilities, human evolution is characterized by a unique "sociability," an extreme behavior directed toward immediate relatives but also psychological parents ("primary intersubjectivity"). Newborn primates have the well-known reflex of grasping at their mother, but they start very early to move on their own, and within only a few weeks or, rarely, months they are independent from their mother in regard to their locomotion and mobility. In contrast, human babies—although their gestation lasts 6–8 weeks longer than in chimpanzees—are highly retarded in their locomotory abilities. The neocortex and motor tracts descending from the cortex to the spinal cord are extremely immature at birth, for example, axon diameter of the corticospinal tract is 10 times smaller than in adults. Descending brain control does not develop before the end of the 1st year of age. Simple spinal central pattern generators cause the action of stepping.

Babies are carried for at least the first half year and often much longer. In contrast, this extraordinary retardation in the first postnatal year allows the baby to fully concentrate on his or her mother's actions. While being carried or lying, the child's brain is highly active in following verbal and nonverbal indications, and long before babies can speak by themselves, they have learned to discriminate their mother's language from other sounds. Language establishes in mother-child dyads with the communication of simple needs and desires by one- to two-word utterances. Typically, not only in humans, the way of investigating the surface and 3-D haptic properties of an object is with the lips and tongue. From haptic to optic inventory, the baby's world changes from being purely sensomotoric to an increasingly abstract comprehension. Together with the gradual understanding of words and their meaning, abstract thinking capability is gained. It is worth mentioning that the individual constituents of humans acquired within the first 4 years cannot be remembered.

Only in its second year does the child start to develop motor abilities, including ultimately bipedal locomotion and speech by again imitating the surroundings. Note that the adult appearance of myelin is not attained up until 2 years of age. And it is only at the age of 4 that children recognize their surrounding persons as acting, thinking, and feeling in the same way as themselves, and that they develop self-consciousness (theory of mind). As a consequence, children are able to act responsibly and develop a feeling of guilt. A unique feature of humans is the extraordinarily long period of adolescence, which might even last beyond puberty. It will always remain a matter of debate whether cosmological-religious thinking was a constitutive feature of becoming human. The remains of doubtless buried people 100,000 years ago are a strong argument of the very early occurrence of such a belief in the other world. A second strong argument is the ubiquity of such a belief in human cultures. The human brain mass has increased by 3.5-fold as compared to the chimpanzee. Whereas the cerebrum increases fourfold, the brain stem remained almost unchanged. But only a closer look reveals the real changes. Some regions, for example,

the optic and acoustic area of the cortex as well as the primary motor area, are almost not enlarged. The secondary areas of association are doubled in terms of their extent, but the tertiary area of association is formed almost de novo, occupying about half of the cortex surface. Especially the frontal and frontobasal cortex show the major increase with respect to the temporal, parietal, and occipital regions. Accordingly, the appropriate parts of the basal ganglia are enlarged, such as the nucleus caudatus and putamen.

The inflation of the human brain is accompanied by an extremely long development of the intracortical connections, even beyond puberty. While all neurons and interneurons are present at birth, cytologically differentiated and in their proper place, they show a continuous growth until late adolescence. During postnatal growth, the thickness of the cortex doubles too among others due to the enormous growth of pyramide cells and their basal dendrites. Primary and secondary areas highly depend on multiple inputs in their postnatal development, for example, the differentiation of the visual cortex lasts at least 3 months before a baby can recognize persons clearly. It is probably the unique development of the tertiary areas that makes us humans, because their differentiation is only controlled and supported by imitation, socialization, and the deliberate, long-term learning within an intact social group. Increasing neurobiological insights have led to a profound understanding of the developmental processes in ontogenesis as well as right- and left-side hemisphere differentiation. Left-right cerebral hemispheric asymmetries exist in extant pongids and also the australopithecines, but neither the pattern nor direction is as strongly developed as the genus *Homo.*

The Evolution of Speech and Language

Vocalization is known in many different animals and mammals. In chimpanzees, more than 35 different sounds are used but in a strongly defined context. All such vocalizations are controlled by the midregion of the brainstem. In humans, the baby's vocalizations and all sorts of sounds during fights or sex in adults are of such a type. Unique vocalizations of *H. sapiens* are crying and laughing, which are also controlled by the brainstem but initiated cortically. Vocalization should not be confused with language.

The informational content of language is exponentially higher than in vocalization. In a second, four to six syllables, each consisting of up to six consonants or vowels, can be communicated. Production and reception of language is situated exclusively in the newly evolved associative tertiary areas of the cortex. In particular, the left hemisphere is specialized to conduct complex arbitrary actions in gesture and the vocal domain. This may have created a left hemispheric bias not only in gestural communication but also in the execution of all technical ideas.

The development of the Broca's area (the "motor speech" area) in the gyrus frontalis is intimately correlated with the evolution of language. It is unilateral in the left hemisphere. Note that a well-developed Broca's area is present in early members of *Homo* more than 1.6 million years ago, for example, KMN-ER 1470. The Wernicke's area, which is involved in the interpretation of spoken language, is not a speech center but the secondary auditory cortex and is always bilateral. The Wernicke's area of the dominant hemisphere (mostly the left side) integrates sounds more rationally, whereas that of the nondominant hemisphere "understands" the melody, which is of the highest importance in early postnatal development.

For a long time, any definition of language, as the basis of speech, has been restricted to audible sounds produced by the action of the vocal, laryngeal organs. Consequently, speech was restricted to human communication through spoken language. Only recently the possible gestural origin of language has been seriously debated. Seen in this light, for most of our evolution language would have been gestural, although more and more punctuated by (vocalizations) the production of speech phonemes. The discovery of a mirror system in primates by Rizzolatti and Arbib and its probable homology with the Broca's area in the human brain, together with the unique human ability for imitation, has strongly supported the idea that language originated in a complex system of gestures and phonemes. Articulate speech would have been completed relatively late in the evolution of *Homo.* If we accept that the Neandertals are fully capable of language, this would have occurred before both species split. It remains unclear whether humans are the only ones who used speech alone for vocalization of language and to communicate ideas and feelings. Some scientists suggest that syntax emerged only very late as a result of cultural evolution, whereas other scientists argue that language evolved exclusively in the vocal domain.

Gestural and vocal communication implies anatomical changes in the hand (see above) and vocal

system, which can be followed in ontogeny. Set free from thermoregulation due to the extension of sweat glands over the body, the upper respiratory tract changed dramatically. Motor activity in ordinary language comprises the activation of laryngeal muscles, including vocal cords, throat muscles, soft palate, tongue, jaw, and facial muscles in a highly ordered but fast sequence.

Evolution of Culture

By defining culture as the difference between learned and vested behavior of different populations, one of the keys of human evolution becomes obvious: risks are minimized and advantages are maximized by imitating successful behavior. Cultural history began when the survival of the fittest took in tow the imitation of the fittest (Eckhard Voland). This process inevitably leads to cultures and not culture—and to competition of cultures as a driving force of evolution.

— *Martin S. Fischer and Hans-Rainer Duncker*

See also **Graves**

Further Readings

Christiansen, M. H., & Kirby, S. (Eds.). (2003). *Language evolution: The states of the art.* Oxford, UK: Oxford University Press.

Damasio, A. R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness.* New York: Harcourt International.

Dehaene, S., Duhamel, J.-R., Hauser, M. D., & Rizzolatti, G. (Eds.). (2005). *From monkey brain to human brain.* Cambridge, MA: MIT Press.

Diamond, J. (1997) *Why is sex fun? The evolution of human sexuality.* London: Weidenfeld & Nicolson.

Grupe, G., Christiansen, K., Schröder, I., & Wittwer-Backofen, U. (2005). *Anthopologie.* Berlin, Germany: Springer.

Johanson, D., & Blake, E. (1996). *From Lucy to language.* New York: Simon & Schuster.

Nadel, J., & Camaioni, L. (Eds.). (1993). *New perspectives in early communicative development.* London: Routledge.

Tattersall, I. (1998). *Becoming human: Evolution and human uniqueness.* New York: Harcourt Brace.

Tomasello, M. (1999). *The cultural origins of human cognition.* Cambridge, MA: Harvard University Press.

Homosexuality

Homosexuality generally refers to sexual and/or emotional attraction to members of the same sex. Homosexuality is considered to be a sexual orientation along with heterosexuality, or attraction to members of the opposite sex, and bisexuality, or the potential for attraction to members of both sexes. In addition to attraction, sexual orientation may also refer to the practice of sexual relations with members of the desired sex.

The term *homosexuality* is a relatively recent Western creation. It was initially used by European scientists who considered sexual relations among members of the same sex to be abnormal. Western views of homosexuality have had an impact on the ways in which anthropologists and other scientists have studied the topic. Changing societal attitudes in the past century have allowed for more in-depth research on homosexuality. This research, in turn, has influenced social changes.

Cross-culturally, there are diverse ways in which people perceive their attraction to members of the same sex or engage in sexual relations with them. In many cases, same-sex relations exist in addition to opposite-sex relations. They are sometimes limited to particular contexts, such as rites of passage, certain periods of life, or specific age-based relationships. In other cases, same-sex behavior is connected with gender variance, where an individual takes on the social role of the opposite sex. There are also cases where same-sex acts that would be labeled as "sex" by many Westerners do not qualify as "sex" to the local participants.

Although it exists in human societies around the world, as well as in some other animal species, homosexuality is often an issue of great contention. Its existence is considered natural or tolerable in some cultural areas, and in some cases, unions between members of the same sex are legally or socially recognized. In other locations, this is considered unnatural and is prohibited, sometimes to the extent that individuals thought to have transgressed this taboo are severely punished by imprisonment or death.

Western Notions of Homosexuality

Nineteenth-century Europe was characterized by tensions between scientific and Christian thought.

However, even scientists who tried to break from religious teachings to explain human existence and behavior were influenced by their ideological upbringing when it came to matters of sexuality. Ideas about what constitutes normal and moral sexuality are heavily influenced by religious ideology in any society, and the religious teachings in Europe at the time taught people that sexual relations between members of the same sex were immoral. Therefore, scientists rarely questioned the assumption that this behavior was abnormal and unnatural.

In addition, important research regarding human evolution during this time concerned natural selection, which is directly concerned with reproductive success and the transmittal of adaptive genes as forces of physical and behavioral change in living species. With an emerging scientific worldview that considered reproduction to be a driving human force, any behavior that appeared to deviate from it was unsurprisingly viewed as counterproductive and unhealthy in terms of the individual or group that participated in such acts.

This view of homosexuality had an impact in the field of anthropology. Physical anthropologists, concerned with human evolution, rarely considered the possibility of the existence of homosexual behavior in early human societies. In addition, early ethnographers and other observers of worldwide cultural behavior had a tendency to project Western values and ideas upon other societies. The existence of same-sex emotional attachments or sexual behavior in many areas was therefore frequently overlooked, since the evidence was not visible to Westerners who had predetermined criteria for what constituted this behavior.

In the 20th century, scientists from various disciplines, including anthropology, began to seriously question the scientific validity of this view of homosexuality. One important contribution to a more comprehensive study of homosexual behavior was the work of Alfred C. Kinsey and his research team, which included anthropologist Paul H. Gebhard. Their research brought to light a spectrum of sexual behavior among American males and females that is far more complex than the binary opposition between exclusive homosexuality and exclusive heterosexuality that existed in Western scientific and popular ideologies. Due in part to these findings, there is now a greater acknowledgment of the existence of bisexuality.

Today, there is still dispute in the scientific world regarding the causes of same-sex attraction. While some biologists continue to seek genetic sources, some cultural anthropologists, sociologists, and psychologists focus on the function and meaning of same-sex attraction and sexual relations, in particular, social structures and contexts. Some scholars in all fields disagree upon whether homosexuality is a choice or a biological predisposition. However, there is a tendency among many anthropologists to recognize an interplay between biology and culture.

These scientific disagreements are representative of the general social and ideological tensions in Western societies that have been ongoing since the 1960s. Movements for the rights of homosexuals and bisexuals have been ongoing in various Western nations. Among the rights sought by these groups are the inclusion of sexual orientation in antidiscrimination hiring policies, the right to have a same-sex partner as a beneficiary for insurance purposes, the right to adopt children, and, more recently, the right to legally recognized marriage. However, in these same nations, segments of the population are opposed to the advancement of these rights. In many cases, they perceive homosexuality and bisexuality as an affront to their religious and moral beliefs. Others cite economic reasons for their opposition to the recognition of same-sex social benefits.

Homosexuality Cross-Culturally

To avoid the pitfall of projecting Western ideas about sexuality upon the subjects of anthropological research, ethnographers examine sexual practices, including same-sex attraction and sexual relations, with reference to the cultural contexts in which they take place.

There is a growing acknowledgment that Western categories such as "homosexual," "heterosexual," "bisexual," and "sexual orientation" are inadequate for explaining sexual behavior cross-culturally. While same-sex attraction and sexual behavior are frequently used as markers of identity or selfhood in the West, they are not used this way in all societies. In fact, individuals' sexual relations with members of the same sex sometimes have no bearing on their social identities. Accordingly, references to homosexuality in anthropological literature tend to imply actual homosexual behavior rather than homosexual identity.

More is known by scholars about male than female homosexuality. Explanations for this disparity in the anthropological and historical literature are manifold. Historians point out that societies that left behind documents describing social customs and daily life, such as Ancient Greece and Rome, were male dominated. The resulting information therefore contains a focus on male activities in general.

Some ethnographers have claimed that female invisibility in general ethnographic material was due to women's confinement to the domestic sphere. Information about women's sexuality is therefore said to be difficult to obtain. Feminist anthropologists point out that most early ethnographers were men, who often conversed primarily with male informants, either by choice or because of local norms regarding male-female relations, and who focused mainly on women's reproductive and productive roles.

For both males and females, homosexual behavior is frequently associated with particular life stages. Where sexual experimentation is permitted for children and youths, it sometimes takes the form of same-sex activity. Among the Ju/'Hoansi of the Kalahari desert in Africa, for instance, the first sexual contact a child has is often with members of the same sex.

In some cases, the connection between homosexual activities and life stages are more formalized. One well-documented example is that of some Melanesian societies where boys go through a series of initiations over the course of several years. The first two initiation stages include the practice of ingesting sperm by performing fellatio on older boys. Sperm is thought to help boys become big and strong and to combat the feminizing effect of mother's milk and womb. From the third stage of initiation onward, boys contribute to the initiation of younger boys by being fellated. This practice continues until fatherhood. The boys therefore go through a bisexual period where they engage in both homosexual and heterosexual acts.

There are contexts other than initiation where homosexual contact may be limited to individuals that are differentiated by age. This was the case in Ancient Greece, where upper-class warrior men would form homosexual relations with males in their teens. Homosexual relations among men of similar ages were frowned upon. Furthermore, men were eventually expected to marry women and create families. More recently, Azande warriors of Central Africa took *boy-wives,* who would accompany them during warfare, in addition to their female wives.

Another example of age-based homosexual relationships is that of the "Mummy-Baby" game among girls and young women in Lesotho, South Africa. This is a form of relationship where young women become "mummies" to younger "babies." These relationships resemble courting relationships, with the "mummy" buying gifts for the "baby" and the presence of emotional bonds and sensual affection. These bonds occasionally last into adulthood.

An important aspect of various homosexual activities cross-culturally, including the examples described above, is that they often coexist with or are a precursor to heterosexual activities. The Western definition of homosexuality then becomes limiting, since it implies exclusive homosexual activity. Furthermore, this aspect of homosexual behavior calls into question the assumption that homosexual behavior is a maladaptive force that preempts reproduction.

Another aspect of many of the homosexual activities documented in the ethnographic literature is that they are sometimes not classified as sex by local participants. Where the cultural definition of sex is limited to coitus and is perceived as a reproductive act by nature, acts such as same-sex genital-genital rubbing, digital-genital, oral-genital, digital-anal, or genital-anal contact may not be considered to be sex. It is partly for this reason that homosexual behavior has little bearing on the identity of the participants.

There are also examples of homosexual behavior that is related to identity, especially gender identity. Where sexual behavior contributes to the construction of gender identity or where it is an important component, engaging in homosexual behavior may be an indicator of an alternate gender identity.

One example is that of several Latin American societies where there is a strong male-female dichotomy. The act of sexual penetration comes to symbolize a power relationship, where the male penetrator possesses the penetrated female. This symbolism extends to homosexual penetration. The man who penetrates another sexually maintains his status as an active male, whereas he who allows himself to be penetrated assumes the status of a passive "non-male." Although he is not considered to be female, the passive "non-male" is expected to take on other aspects of femininity, such as dress and demeanor. In some cases, he may ingest female hormones to modify his body. In this example, it is not the act of homosexual behavior itself that alters the gender identity of the participants, since the active partner

maintains his social status. Rather, it is the act of being penetrated that alters one's identity.

Another example of homosexual behavior that is associated with a change in gender identity is that of Native North American gender variants. A gender variant is one who assumes the social role of the opposite sex. While more documentation is available for male gender variants, or biological males who take on female social roles, female gender variants do exist. For both male and female gender variants, there is a range of the degree to which they take on the characteristics of the other sex. In some cases, they may take on some of these characteristics while keeping some that are appropriate to their biological sex, whereas in other cases, they may take on the entire range of characteristics of the other sex.

In cases where the gender variant takes on the entire set of characteristics that are socially ascribed to the opposite sex, he or she will also practice sexual relations with members of the appropriate sex as defined by his or her social role. Therefore, the female gender variant in this situation will engage in sexual practices with women, since she is socially a male. In cases where there is a combination of gendered traits that are adopted, the gender variant may or may not engage in homosexual activities. In this example, homosexual behavior does not lead to an alternate social identity. It is, instead, a product or component of it.

Homosexual behavior is not always limited to particular life stages or contexts of gender variance. There are recorded cases where long-term same-sex arrangements were socially validated and recognized. One prominent example is that of formal lesbian relationships among Azande women. In some cases, these relationships were formed among cowives within polygynous households, where two or more women were married to one man.

There are societies where homosexual behavior of any kind is forbidden and the transgression of this norm can lead to heavy legal or social penalties. This is often the case in nations that have a strong Judeo-Christian or Muslim influence, since the various religious systems encompassed by these general categories tend to have an unfavorable view of homosexuality. For many participants in these religious systems, homosexual behavior goes against basic moral values.

Even within various religious organizations, there is disagreement about the acceptance of homosexual and bisexual identity and behavior. Recent events worldwide, such as transnational movements to appropriate the right to marry for same-sex couples, have created divisions within the Anglican Church, for example.

Various societies where homosexual behavior is considered to be immoral also differ with respect to the social sanctions leveled against transgressors. In some cases, social stigma may result, whereas some nations have legal penalties for individuals thought to engage in homosexual activities. These penalties range from fines to imprisonment to death.

Homosexuality and the Modern Human Experience

Regardless of the various social perceptions of homosexual behavior that exist in the world, people continue to participate in same-sex erotic activities. Although there is enormous variation in the way these activities are defined and explained cross-culturally, there have been waves of large-scale cultural diffusion contributing to the spread of Western ideas about homosexuality.

Colonization by Europeans in the past few centuries initially spread Christian ideas about sexuality and the belief that homosexual acts are immoral to parts of the world where homosexuality may have had a positive or neutral value in previous times. More recently, globalization has propagated other ideas about homosexuality throughout the non-Western world, including former colonies. Some of these ideas stand in contrast to the belief systems that were previously instilled through colonization, while others support them.

While movements for the rights of homosexuals, bisexuals, and other categories of people who are often connected with them, such as transsexuals, are assuming transnational proportions, religious and political groups that are opposed to these rights are doing the same. Given this current circulation of ideas, it is difficult to assess the actual extent of homosexual behavior around the world. Homosexuality becomes a delicate topic of discussion for many anthropological informants.

The only thing that can be stated with certainty is that homosexuality is a part of the human experience and that human cultures vary widely in the ways in which they interpret and give meaning to this behavior. Indeed, there is no unique way to understand

homosexual behavior, and it may be the case that there will always be a struggle between those who consider it as a form of deviance and those who perceive it as a positive aspect of human relations.

— *Nancy Leclerc*

See also **Gender; Sex Identity; Sexuality**

Further Readings

Herdt, G. H. (1984). *Ritualized homosexuality in Melanesia.* Berkeley, CA: University of California Press.

Middleton, D. R. (2002). *Exotics and erotics: Human cultural and sexual diversity.* Prospect Heights, Il: Waveland Press.

Nanda, S. (2000). *Gender diversity: Crosscultural variations.* Long Grove, Il: Waveland Press.

Suggs, D. N., & Miracle, A. W. (Eds.). (1993). *Culture and human sexuality.* Pacific Grove, CA: Brooks/Cole.

Hopi Indians

Hopi, which means the "Peaceful People," have lived in the Black Mesa region of the Colorado Plateau since their emergence into this, the fourth world. Living in this world is therefore referred to as the "Fourth Way of Life" and is reflected in the fact that when Maa'saw offered groups of people ears of corn, the Hopi were given a short, blue ear. After a period of clan migrations, the People settled on the mesas, where they still reside today and follow the Hopi way—*Hopivötskwamî*—the Hopi Path of Life, to preserve the good things of Hopi life. In Hopi philosophy, all life is a journey, and each group of people has a path that should be followed with humility, cooperation, and respect. According to Emory Sekaquaptewa, Hopivötskwamî includes every part of Hopi society and culture and is a comprehensive philosophy that touches the lives of Hopi on a daily basis. It gives Hopi a strong sense of security in an often-troubled world by relating the past to the present and ensuring cooperation with supernaturals, who provide rain, abundant crops, health, and well-being.

The Hopi speak a Uto-Aztecan language related to O'odham (Pima) and Ningwi (Southern Paiute), called Hopiikwa. This language has dialectical difference among the communities. Hopi population has grown throughout the 20th century, from a low of about 2,200 in 1900. In 1995, the Hopi numbered 7,785 tribal members, with a labor force of 2,170. A highly educated group, 63% are high school graduates. Many Hopi work in Southwestern urban areas, returning frequently to Hopi to fulfill social and religious obligations. It is in this way and through oral tradition that the Hopis transmit the essential parts of their history and the perspectives needed to follow Hopivotskwani.

A basic tenet of Hopi philosophy is that humans live in harmony with nature. In their view, religion permeates all aspects of an inextricably interwoven life. Nature, gods, spirits, animals, plants, the land, and the people are one in an unchangeable relationship. This philosophy is community based, and each of the 13 Hopi villages, located in the mesa and canyon country of northern Arizona in Coconino and Navajo counties, is ritually considered to be the center of the world, and each respects the others' independence. The Hopi belief that mankind evolved during life in four underground worlds, with a final emergence of the Hopi in the Grand Canyon, through a *sipapu* (place of entry to the present world), Hopi villages in their layout and architecture serve as living reminders of their emergence.

Hopi villages are located on three mesas, extending south from the southern escarpment of Black Mesa (First Mesa: Walpi, Sichomovi, and Tewa-speaking Hano, with Polacca located at the mesa base; Second Mesa: Shipaulovi, Mishongnovi, and Shungopavi; Third Mesa: Old Oraibi, Hotevilla, Bacabi, Kykotsmovi/New Oraibi) and 40 miles to the west, along the Moencopi Wash (Lower and Upper Moencopi). Each village consists of a series of multistoried, terraced structures, containing a number of living units, arranged in long rows or irregularly around a central plaza, the *kisoni.* The *kihu,* the individual matrilineal/matrilocal residence, is a rectangular structure constructed of sandstone and adobe mortar, with a roof of timber, cedar bark, and adobe mud. Today, such traditional houses are supplemented by the Department of Housing and Urban Development (HUD) concrete block housing below the mesa tops, especially in new communities, such as Polacca and Kykotsmovi. There are larger houses with hipped

roofs, electricity, and indoor plumbing. Some of the more traditional villages have decided not to introduce such evidence of the outside world into their religious centers on the mesa tops.

Each village is situated around *kivas,* semi-subterranean religious structures built in the form of a rectangular keyhole, located in the plaza, in the broad street, or at the ends of the house-blocks. The architecture of the kiva is highly symbolic of Hopi origins, and the sipapu is represented in each as an opening in the floor. The ladders that stand against the doorless walls or extended above the entrance into the kiva remind Hopis of the trees they climbed during their emergence to this world. It is predominantly a man's space. The sipapu and kivas are the centers of each village, and the plazas and houses are built around them.

The central plaza of each village is the focal point for a complex ritual calendar that is basically composed of two sections. These are divided by the summer and winter solstices, with priestly ceremonies involving the Snake, Antelope, Wuwutsim (ceremonies of the four men's societies), and women's societies in the summer and fall and kachina *(katsina)* ceremonies in the winter and spring. *Niman* (Home Dance), which takes place in July, is the last katsina dance of the cycle. At the end of this daylong ceremony, the katsinam return to their spiritual home at the San Francisco Peaks, Kisiau, and Waynemai. "Social Dances" include the Buffalo Dance, a winter ceremony that deals with hunting and immediately follows the winter solstice, and the Butterfly Dance, which immediately follows the summer solstice and is associated with agriculture. Hopi rituals constitute communication and exchanges (prayers and offerings) between the world of the living and the world of the spirits, to the mutual benefit of both. Many ceremonies seek to maintain harmony with nature, enhance prospects for good health and a long, happy life, or are supplications for rain. Through the rituals that include dancing, Hopi celebrate the renewal of life, their history, and their spiritual connection with their ancestors.

Much of Hopi religion is concerned with fertility and sustaining life. In this regard, corn is an exceedingly important symbol. In fact, corn provides Hopi with a central metaphor: how to survive and grow in a difficult world. Hopi ceremonies are founded in an emergence text and clan traditions. This sacred knowledge *(wiimi)* is given expression in prayer offerings and ritual. Only those who have been initiated into the religious societies or members of the clan who have access to certain bodies of knowledge and the sacred objects that embody it are allowed to use it. The Hopi have been extremely vigilant in protecting this powerful knowledge so that it will not be used inappropriately by those without the right and sacred protections to use it properly.

All of Hopi land is bounded on four quarters by holy mountains. Within this area are sacred shrine, trails, pictographs that mark the activities of ancestors, and places from which Hopis gather sustenance. This is the landscape in which the Hopi reside in harmony with spirits contacted through sacred rituals performed to ensure prosperity and the proper functioning of Hopivotskwani. It is in this area that the Hopi welcomed the Tewa and let them establish the village of Hano on First Mesa in 1775. Today, the people of Hano are tied to the Hopi through their social and ceremonial system in complex ways that allow each to retain their independence. Supernaturals have designated the land on which Hopis live and over which their ancestors have walked as sacred. It cannot be bought or sold, and Hopis cannot give it away, for they are entrusted with preserving it. The Hopi have an extensive body of oral tradition that underlies and reinforces this belief.

The Hopi are the westernmost Puebloan people. Their reservation, a subset of their sacred land, was established by executive order on December 16, 1882, with an area of 2.6 million acres. They were surrounded by the Navajo reservation. About 300 Navajos lived within the boundaries at the time, and more moved in over the years, settling closer and closer to the villages. In 1936, the Bureau of Indian Affairs (BIA) divided the Hopi and Navajo reservations into 18 land management and grazing units, reserving for the Hopi only one, District 6, a mere one fifth of their original allocation. This action and later court decisions establishing a joint use area in 1962 have meant the Hopi have had to spend a great deal of time regaining control of their original lands. The Navajo-Hopi Land Act Settlement (1974) led to the partitioning of the land. Today, Hopi land covers over 1,561,213 acres and is bounded on four sides by the Navajo reservation. Land issues have continued up to the present day.

Hopi social structure is a complex of important interlocking social groups. Some of these are named

and some unnamed. Named groups include villages, clans, and religious societies; unnamed groups are households, lineages, and phratries. Kinship and relatives are the most important part of Hopi social organization and form its core. Phratries (groups of clans that emerged together from the underworld or migrated together) and clans are exogamous and carry obligations and responsibilities for members. Clans consist of multiple families who trace their origin to a common ancestor. Membership is traced through a mother, and women inherit property through their mothers' clans. Originally, there were approximately 75 clans, of which 34 still exist, extended throughout the current villages. Clan members must take care of each other and treat relatives with great respect. While the father's relatives are important (they care for a mother after a child's birth and name the child), an individual's primary responsibilities are to the natal clan.

Each clan has its own village, which documents how they came to be and recounts their migrations to the Hopi mesas. The first clans that came from the ancestral Pueblo territories to the north and east have seniority. The Water clan and others came from the south. Clans came to each village one at a time and were admitted based on negotiations and commitments for certain ceremonial and secular services to the people. There is a prime clan in each village, and others cluster around this social group in arrangements of dependency and support. Each clan is important, however, since it protects ritual knowledge, hosts ceremonies, and protects sacred objects. Each clan has critical responsibilities to ensure that it functions in accordance with Hopivötskwamî. Clan membership requires specific duties be performed and ceremonial offices be fulfilled. Flexibility is inherent in the system to take advantage of environment opportunities or overcome demographic problems. Satellite clans may shift from one grouping to another, based on changing conditions and opportunities. The prime clan has the responsibility to make reassignments of any ceremonial office or duty not being carried out. Of primary importance is that continuity is ensured.

Hopi is a federally recognized tribe with a BIA agency at Keams Canyon, 32 miles east of First Mesa, even though each village considers itself an autonomous political and social entity. The Hopi are also governed separately in each village by traditional means, based on social and religious structures. The Hopi Tribal Council was established by constitution in 1936, under the 1934 Indian Reorganization Act; prior to this, the separate villages did not constitute a single political entity or "tribe." After lying dormant for a number of years, it was reorganized in the mid-1950s. Today, the government is composed of a chairman and vice-chairman, each serving for 4 years, and council members with 2-year terms. Representatives from four districts (First Mesa, Second Mesa, Third Mesa, and Moenkopi District) meet quarterly at the tribal headquarters in Kykotsmovi.

The Hopi are noted traditionalists who have spent a great deal of time and effort preserving their way of life on their isolated lands and deciding after careful reflection which part of the global economy and popular culture to embrace. This does not mean that they are unsophisticated about television, cellular phones, or VCRs. They have simply considered carefully which parts of American culture and society work for them. Housing has also changed, with many families living at the base of the mesas in order to make it easier for children to attend schools, obtain electricity, and to drive to work. The traditional villages are still important, however, and serve as the sites of social and religious integration.

The Hopi were traditionally agriculturalists, hunters, and sheepherders, supplemented by trade, and while farming has declined, many families still plant corn, beans, squash, and tobacco on clan lands every year. Many still raise a small number of cattle and sheep. Gardens near the villages are tended by women; men care for cornfields and livestock farther away. The Hopis also engage in wage work, both on and off the reservation, in skilled and professional jobs. Many Hopi earn their living as artists, specializing in silver and gold jewelry, pottery, carving, painting, and basketry. Producing beauty is a long-standing tradition, and there has been a ready market in Anglo-American society since the 1880s for both utilitarian and fine art. Many Hopi artists are internationally famous, and different villages are noted for particular art forms. The Hopi also produce significant pieces for themselves, for trade with other Indian communities, and for kinship and ritual purposes. Fathers and uncles produce kachina dolls *(tithu)* for children, a groom produces a special dress for a bride, and a bride's family supplies baskets or pottery to the groom's family, cementing all important social relationships.

The tribal government has undertaken several economic development projects as the Hopi economy changed from subsistence activities to wage work. While the Hopi have few natural resources that an industrial society values, in 1966, the tribal council allowed the Peabody Coal Company to strip-mine 25,000 acres on Black Mesa. There was great opposition to this lease, however, in many sectors of Hopi society. The Hopi tribe also engages in housing construction, industrial parks, retail facilities, and tourism. Hopi are employed by the mines, the government, and in service and tourism industries. Like other rural areas, unemployment is unfortunately high: 27% in 1995.

The Hopi have six elementary, one middle, and one high school on the reservation. They have a substantial scholarship program to help members attend accredited colleges, and an adult vocational training program. There are two health clinics and two full-service hospitals in Keams Canyon and Tuba City. Residents are served by a weekly and a biweekly newspaper. The Hopi tribe has recently established a Hopi Water Utility Authority. Arizona Public Service Company provides electricity to most villages, and water and sewage services are obtained from the U.S. Public Health Service and the Navajo Tribal Utility Authority. There is also an airport, laundromats, gasoline stations, and small retail stores. Residents still need to travel to Winslow, Tuba City, or Window Rock to shop at large grocery stores.

The Hopi government operates a very active cultural preservation office, which regulates archaeological activity, protects sacred sites, and conducts projects of interest to tribal members. Hopis are actively working on language preservation through the development of a Hopi dictionary and courses in the Hopi high school. On Second Mesa, they run a small museum and an arts-and-crafts establishment. Tourism and the sale of art fulfill economic functions and serve as a source of identity.

The Hopi way of life is a living tradition that shapes every aspect of their lives. The preservation of this way of life and the protection of sacred place is paramount.

— *Nancy J. Parezo*

See also **Native Peoples of the United States; Native Studies; Navajo**

Further Readings

Kelsea, J., & Vivian, R. G. (1995). *Guide to American Indian museums and cultural centers of Arizona.* Tucson: University of Arizona.

Rushforth, S., & Upham, S. (1992). *A Hopi social history.* Austin: University of Texas Press.

Sheridan, T., & Parezo, N. (Eds.). (1996). *Paths of life: America Indians of the Southwest and Northern Mexico.* Tucson: University of Arizona Press.

Tiller, V. E. V. (1996). *Tiller's guide to Indian Country. Economic profiles of American Indian reservations.* Albuquerque: BowArrow.

HORTICULTURE

For most of the 20th century, anthropologists were keen typologists, preferring to categorize and classify the diversity of social and cultural phenomena they encountered. The diverse ways in which people engaged in production to satisfy their subsistence needs fell within five broad categories. One of these adaptive strategies is known as *horticulture.* Horticultural production is found throughout the world in a wide variety of climatic and geographical circumstances. To some extent, the more common association of horticultural production to tropical climatic zones skews our understanding of this adaptive strategy.

The general, defining characteristics of this form of production include a nonintensive use of land and labor, simple technology, varying periods of fallow, and human labor as the only means of working and fertilizing the land. More specifically, horticultural activity involves a preliminary clearing and burning of vegetation in an area determined by the group to be ready for production. Following a season of growth and harvest, the area is abandoned and left to regenerate until needed again. This is known as *fallow* or *shifting cultivation.* The period of fallow can range from 2 to 25 years, depending upon the location and fertility of the soils. When burned and the vegetation reduced to ash and charcoal, the area is cleared of debris and readied for planting. Apart from the use of adzes, machetes, and fire in the preparation of land for planting, the simple digging stick or hoe is the primary tool of production.

Once cleared, the horticultural plot is planted with suitable cultigens, depending upon climatic and soil conditions. Generally, horticultural production is associated with tubers, such as yams, potato, taro, and manioc, or seed production, including cultigens such as maize, beans, and squash. While all populations plant a variety of food crops in their cleared plots, there is always a dominant cultigen that people regard as their staple and around which much social and ritual activity revolves.

Apart from periodic bursts of activity during a growing season, depending upon the needs of the cultigen and the conditions in which it has to grow, the plot is maintained with little effort, leaving the group plenty of time for other activities. As in all other forms of subsistence, horticulturalists engage in other activities to secure food. Hunting and gathering available foodstuffs are often a daily part of people's lives, as is the raising of domesticated animals, such as pigs, chickens, goats, and sheep. Harvest brings on a new urgency as the crops are removed from the ground and people celebrate the results of their labor. Soon after, other areas are identified for clearing and a new cycle begins of clearing, burning, planting, growth, and harvest.

Other terms used for horticultural production are *slash-and-burn, swidden,* or *shifting cultivation.* Slash-and-burn refers to the seasonal clearing of new ground, emphasizing how vital the burning of vegetation is to the fertilization of the land. Slash-and-burn methodology also enables a relatively labor-free means of clearing. Swidden refers to the characteristically small tropical forest clearings found in South America, Melanesia, the Pacific, Indonesia, South Asia, and Africa. Although horticultural production is capable of supporting large populations, there is a tendency for these to be dispersed into smaller village groups, who in some areas relocate their villages to remain close to the newly cleared garden plots, hence their "shifting" strategies as a form of adaptation.

— *Shirley F. Campbell*

See also **Agriculture, Origins of; Aztec Agriculture**

Further Readings

Clarke, W. C. (1971). *Place and people: An ecology of a New Guinea community.* Berkeley: University of California Press.

Cohen, Y. A. (1974). *Man in adaptation: The cultural present* (2nd ed.). Chicago: Aldine.

De Schlippe, P. (1956). *Shifting cultivation in Africa.* London: Routledge & Kegan Paul.

Kunstadter, P., Chapman, E. C., & Sabhasri, S. (Eds.). (1978). *Farmers in the forest.* Honolulu: University of Hawaii Press.

Howell, Francis Clark (1925–)

Francis Clark Howell, better known as Clark Howell, is one of the most influential and respected physical anthropologists in North America today. Howell pioneered an integrative multidisciplinary approach to

the study of human origins that combines vertebrate paleontology, evolutionary biology, geology, ecology, and prehistoric archeology. This comprehensive Howellian approach is now the standard against which all early hominid excavations are measured. Howell is distinguished by his five decades of continuous work and contributions to the field of paleoanthropology. He has published prolifically, organized and participated in important conferences, and has mentored numerous students such as Leslie Freeman, Geoffrey Pope, and Don Johanson. He is genial, personally warm, and renowned for his encyclopedic mind. He was one of the first physical anthropologists to adopt gender neutral terms, something he attributes to his wife's (Betty's) influence.

Born in Kansas City, Missouri, Howell was raised on a farm where he developed an interest in natural history that influenced him throughout the rest of his life. After serving as a signalman in the U.S. Navy during World War II, he studied anthropology and related geological and biological sciences at the University of Chicago, where he completed his bachelor's, master's, and doctorate degrees in a record 6 years under the direction of Sherwood Washburn. In 1955, after teaching in the department of anatomy, School of Medicine, at Washington University in St. Louis, Missouri, Howell joined the faculty at the University of Chicago, where he became chairperson of the anthropology department in 1966. In 1970 he moved to the University of California, Berkeley, where he is currently professor emeritus, directing the Laboratory for Human Studies.

In 1957–1958 Howell conducted excavations in Isimilia, Tanzania. His most notable accomplishments include initiating and directing the Torralba (1961–1963) and Ambrona (1980–1983) research projects in Spain, where he brought his integrated approach to bear on excavations of Acheulian sites. Howell's leadership of the U.S. contingent of the International Omo Research Expedition to southern Ethiopia between 1966 and 1973 was another important achievement. He organized and directed the multidisciplinary studies conducted by the group. Besides providing an exemplary record of excavation and data collection, this expedition documented that australopithecines existed 4 million years ago, instead of the 2 million years that had been previously thought. In addition, Howell brought back two mandibles, including a massive one that validated Phillip Tobias's and Ron Clarke's reconstruction of such a massive mandible for the OHS (*Zinjanthropus*) cranium. More recently in 1988–1989, Howell was codirector of the Yarimburgaz Research Project of cave excavations in Turkey.

Howell has been active in professional organizations, serving as vice president of the American Association of Physical Anthropologists and as a member of the executive board of the American Anthropological Association, among others. He was elected to the National Academy of Sciences in 1972 and to the French Academy of Science in 1990. In 1975 Howell led the first paleoanthropological delegation from the United States to the People's Republic of China. This was followed in 1987–1988 by a study tour of Miocene, Pliocene-Pleistocene fossiliferous localities and fossil vertebrates in Yunman, China. In addition to his numerous scientific publications, Howell published a popular book, *Early Man,* which was widely read and influential and was also involved in a television special, "Man-Hunters." Howell's influence continues through his cochairing the science and grants committee of the L. S. B. Leakey Foundation.

— *Biruté Mary F. Galdikas*

Further Readings

Howell, F. C. (Ed.). (1963). *African ecology and human evolution.* Chicago: Aldine.

Howell, F. C. (1965). *Early man.* New York: Time.

Howling Monkeys

Howling monkeys are a group of New World Monkeys (NWM) belonging to the subfamily Alouattinae and genus *Alouatta.* There are eight species of howling monkeys—the red-handed howler (*Alouatta belzebul*), black-and-gold howler (*A. caraya),* Coiba Island howler (*A. coibensis),* brown howler (*A. fusca*), mantled howler (*A. palliata*), black howler (*A. pigra*), red howler (*A. seniculus*), and the Bolivian red howler (*A. sara*). Howling monkeys are so named because of the loud territorial calls they make. The vocalizations are created by air being forced through a specialized, hollow hyoid bone. The resonance results in a loud, howling-like roar that can be heard up to 5 kilometers away.

Source: © Tom Brakefield/CORBIS.

Howling monkeys are diurnal and live in a variety of forests in Central and South America. They can be found in tropical rain forests, secondary forests, montane forests, llanos forests, and dry deciduous forests. Males and females are sexually dimorphic, meaning that the males are bigger (4.5 kg–11.4 kg) than the females (3.1 kg–7.6 kg). Some species are also sexually dichromatic, with males and females having different color coats. Other species exhibit no obvious differences in hair color.

Howling monkeys have forelimbs and hindlimbs that are almost equal in length. They are arboreal and quadrupedal, moving slowly through the canopy. Howlers have prehensile tails that are used for suspensory behaviors, especially when feeding. The tail acts as a fifth limb, allowing howlers access to foods they normally might not be able to exploit without the help of the grasping tail. Their thumbs are almost absent, and thus they hold objects between their second and third fingers. This phenomenon is called "schizodactyly," which literally means "between fingers."

Howling monkeys are one of the most folivorous NWMs. They feed on leaves (both young and mature), fruits, flowers, buds, and petioles (stems that support the blades of a leaf). Since the majority of their diet is made up of leaves, howling monkeys have a special sacculated stomach in which the high amounts of cellulose in leaves are digested. Howlers also have large mandibles and specialized teeth indicative of their folivorous diet. They have shearing and grinding crests on their upper molars, which help them process the fibrous plant materials they consume.

Compared to other NWMs, howling monkeys have relatively small home ranges (4 ha–20 ha), with day ranges sometimes as short as 100 m. This could be due to their leafy diet, which does not afford them a lot of energy for traveling long distances. Howlers also spend a lot of time resting, possibly to conserve energy.

The social organization of howling monkeys varies by species. Red-handed howlers live in one male-multifemale groups, while mantled howlers have multimale-multifemale groups. The black-and-gold, Coiba Island, brown, black, red Bolivian, and red howlers have variable social structures. Some species

consist of one male-multifemale and/or multimale-multifemale groups. The status of howling monkeys in the wild is variable. The International Union for Conservation of Nature and Natural Resources lists five species as Lower Risk, one species as Vulnerable, and two species at Critically Endangered due to habitat loss.

— *Lisa M. Paciulli and Jamie L. Neary*

See also **Monkeys, New World**

Further Readings

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego, CA: Academic Press.

Milton, K. (1982). *The foraging strategy of howler monkeys.* New York: Columbia University Press.

Reid, M. E. (2000). *Howlers and other new world monkeys.* Chicago: World Books.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Hrdlicka, Ales (1869–1943)

American physical anthropologist Ales Hrdlicka is most widely known for theories concerning *Homo Neandertalensis* and New World migrations. Born in Bohemia in 1869, Hrdlicka entered the United States in 1882. Similar to other immigrants, he held a nominal job as a cigar maker while attending night school. Encouraged to seek a profession in the medical field, Hrdlicka entered the Electic Medical College of New York City. After graduating in 1982, he entered the New York Homeopathic College, whereby he graduated in 1894. Hrdlicka's internship in the New York Homeopathic Hospital for the Insane resulted in an academic publication (1895), possibly resulting in the opportunity for research at the College of Physicians and Surgeons in 1897 to 1898. Returning to Europe, Hrdlicka went to Paris, France, to study anthropology under the auspices of L. P. Manouvrier. After completing his studies, he returned to the United States as an associate for the New York Pathological Institute. Moreover, he was the director of physical anthropology for the American Museum of Natural History in 1899 and curator of the physical anthropology collection at the Smithsonian Institution in 1910.

Ales Hrdlicka's contribution to physical anthropology was extensive. Inquiries into the taxonomical relationship between *Homo Neandertalensis* and *Homo sapiens* resulted in several publications, most of which entailed critical analysis of the evidence within a logical framework. In viewing *Homo sapiens*' development as being a product solely in the Old World, Hrdlicka developed a theory of migration that could account for the populating of the New World. Besides his achievements in these academic areas, he established the American Journal of Physical Anthropology (1918) and the American Association of Physical Anthropologists (1928). Always open-minded, Hrdlicka continued his point of inquiry throughout his professional career, stressing morphological variation of our species, phenotypic expressions among all populations within the Americas, and the evaluation of hominid taxonomical structures in light of new evidence. These qualities can be seen throughout his life and anthropological career.

Contributions and Perspectives

Taxonomical structures and origin of descent have become controversial and uncertain. Questions concerning essential morphological features and shared characteristics have compounded an already complex problem. In this manner, the exact nature and placement of *Homo Neandertalensis* in relation to *Homo sapiens* is a point of critical inquiry. Hrdlicka came to view *Homo Neandertalensis* as a continuous branch in human evolution, unlike the commonly held view that it is an extinct ancestor from *Homo sapiens.* This view was imparted to his definition of Neandertal man within a continuous evolutionary framework.

Hrdlicka defined Neandertal man as being *the man and the period of the Mousterian culture* (his italics). This phase can be found in multiple encampments found in Europe, Crimea, and parts of North Africa and Asia Minor. Primarily associated with the Mousterian culture, this phase or "Mousterian man" cannot be strictly defined by the fauna that was prevalent during that period of time. Rather, Mousterian Man existed during the last part of the interglacial and well into the final glacial period. According to Hrdlicka, Mousterian man is a transitional phase between Acheulean man and Aurignacian man. This can be seen in the sequences of culture depicted among them. Perhaps dictated by the

ebbing then advancing glacial periods, cultural evidences could be found in both open and sheltered sites. From the Chellean to the Aurignacian, the same occupational behavior can be seen: the utilization or reutilization of sites by the previously held distinct phases of Acheulean, Mousterian, and Aurignacian man.

To further this continuity, Hrdlicka illustrated the cultural similarities shared among these phases of humankind. Thus, accordingly, each phase is characterized as being chiefly hunters with association with the use of fire. Bones and other refuse can be found in the area of inhabited caves. Agriculture, domesticated animals, and food storage are unknown. Clothing was probably made from animal skins, as suggested by the evidence of tools (for example, stone and bone). In this manner, the sequence of industries is seen as being progressive, whereby the Mousterian industry can be viewed as being transitional phase between Acheulean man and Aurignacian man. Without any significant and abrupt advancement between phases, the development of art that is associated with Aurignacian man cannot be the sole factor in the segmenting of these phases. Varying artistic expressions, though not pictorial, can be found in the Mousterian culture. Any discontinuity or advancements can be viewed as being accumulative and localized. In fact, evidence suggests that sporadic discontinuity between phases (for example, when the earliest Aurignacian does not follow Mousterian) discounts a total collapse or cultural extinction.

The greatest distinction in the Neandertal phase from any other phase is within the morphological features exhibited by Mousterian man. According to Hrdlicka, the Mousterian period should be arranged in three stages, inferior, middle, and superior. However, the act of stereotyping this phase by specimen Spy No. 1 and La Chapelle had far removed the possibilities of a prototype Mousterian man, perhaps casting shadows of doubt on specimens such as the Gibraltar skull, Banolas jaw, and Ehringsdorf jaw. Traditionally, the classical description of the Neandertal includes moderate stature with stocky build. The skull is oblong, with a low forehead and prominent supraorbital torus. The facial region exhibits both low vault and forehead, a large nose, full maxilla, and a heavy mandible with large teeth. These characteristics, including variations, suggested to Hrdlicka that Mousterian or Neandertal man was a transitional phase to modern *Homo*. Although it is easy enough to compare and contrast the morphological subtlety between these forms, Hrdlicka suggests that the cranial capacity, including variation, is comparable to both the Aurignacian and present primitive man. Furthermore, as archaeological evidence suggests, *Homo sapiens* always followed the Mousterian phase, never coexisting or preceding. In Hrdlicka's evaluation, some of the morphological features of Neandertal present in primitive *Homo* seem to suggest a branching lineal progression from one form to another.

Questions concerning the placement of this form within an evolutionary taxonomical structure are a source of discussion. Similar to controversies surrounding other hominid forms, the lack of sufficient number of specimens and gaps in the evolutionary ladder, including cultural aspects, will always be a point of critical inquiry. Though not deterred or dejected, anthropology does have the ability to reconstruct the past based on physical evidence with rational speculation. There are three carefully examined theories about the fate of the Neandertal. The first suggests that Neandertal underwent extinction and was replaced by *Homo sapiens*. The second theory states that Neandertal coexisted with *Homo sapiens* and eventually formed a hybrid. The third theory states that Neandertal evolved into *Homo sapiens*. Hrdlicka was in favor of the third theory. Based on the archaeological evidence, weather patterns based on periods of glaciation, the adaptive capabilities of *Homo* (cultural), reduction of morphological features, and variation, Hrdlicka supported the basis of his conclusion. Today, DNA analysis suggests that Neandertal phase had diverged (branched) around 650,000 years ago, only to be displaced by *Homo sapiens*. Vying for the same ecological niche, *Homo sapiens* probably had out-competed Neandertals for valuable resources and reproductive power, all of which translates into extinction. This process had eventually contributed to their extinction. Although Hrdlicka's view still resonates with some anthropologists, Neandertal represents an extinct phase in human evolution.

Besides his interest in hominid evolution, Hrdlicka was also known for his evaluation of the American aborigines. According to Hrdlicka, the evidence suggests that the Americas were never a place of origin; thus, the aboriginal population must have migrated to the Americas. The following characteristics mark them as having a common ancestor: color of skin

(from yellowish to solid brown), straight black hair, mental characteristics, low heartbeat rate, dark-brown eye color, well-developed nasal bridge and large malar regions, and moderate-length neck, hands, and feet. Considering the phenotypic expressions exhibited by aboriginal populations, the placement of their origin points to the inhabitants of the Tibetans, Upper Yenisei natives, and some northeastern Asiatic populations. Whether by land, ice, or water, this population came to the North American continent via the Bering Strait during the Holocene period. In a short period of time, this population spread rapidly and underwent differentiation. In its totality, the aboriginal population represents one *homotype,* with variation on both the phenotypic and cultural level.

Against the odds, Ales Hrdlicka attained the American dream. Intelligence, hard work, and perseverance created the foundations for the possibilities of his future contributions. Considering all forms of evidence (for example, physical specimens and cultural artifacts), Hrdlicka presented a logical hypothesis concerning the sequence of hominid phylogeny. Furthermore, his analysis of the populating of the New World had contributed to the overall understanding of natural history in the Americas. Though today, his understanding would draw severe criticism, and perhaps sociopolitical sanctions, his contributions, nevertheless, increase the awareness of the unity of our species in its origin and development.

— *David Alexander Lukaszek*

See also **Acheulean Culture; Aurignacian Culture; Hominoids; Neandertals**

Further Readings

Hrdlicka, A. (1904). *Directions for the collecting information and specimens for physical anthropology.* Washington, DC: Government Printing Office.

Hrdlicka, A. (1907). *Skeletal remains suggesting or attributing to early man in North America.* Washington, DC: Government Printing Office.

Hrdlicka, A. (1936). *The coming of man from Asia in the light of recent discoveries.* Washington, DC: Smithsonian Institute.

Huari [Wari]

Huari represents one of the few civilizations that were actually lost from historic records only to be rediscovered by archaeologists centuries later. Since its rediscovery in the 1940s, it has become almost synonymous with the era known as the Middle Horizon (AD 550–900), though deep excavations at several large sites suggest the civilization has roots as early as about AD 400. From its home in the central highlands of Peru, Huari spread out to control an empire that spanned two thirds of the Peruvian Andes, stretching from the Moquegua Valley in the south to the Cajamarca Valley in the north.

Max Uhle found remnants of the Huari civilization in his studies of Andean archaeology at the turn of the 20th century. The ceramic materials bore designs similar to those found on the stone carvings at the site of Tiwanaku. Hence, Huari materials were initially classified as "Coast Tiahuanaco." Through a series of discoveries, excavations, and publications in the late 1940s and 1950s, archaeologists came to recognize two separate prehistoric states: Huari to the north and Tiwanaku to the south.

The capital site of the Huari Empire may represent the first truly urban setting in South America. The core of the site, located near Ayacucho, Peru, contains approximately 400 hectares of dense architectural remains and refuse, surrounded by a less dense periphery. Walls of cut masonry, rubble, and rounded cobbles may have stood as high as four stories in some places. Buildings were organized as interconnecting sets of narrow rooms, surrounding open plazas that created an overall pattern of large, square cells. Interspersed with the square architecture are specialized and religious structures consisting of platforms, large D-shaped buildings (10 m diameter), and large stone slab tombs. Canals may have been used to supply the site with water.

The city of Huari does not exhibit signs of urban planning, but associated settlements in other areas show intense organization. At sites such as Pikillacta, Jargampata, and Viracochapampa, the Huari used units of square plazas, narrow rooms, and platform mounds to create large repeating units that could be used for residential, administrative, ritual, and storage purposes, depending on the specific organization of the individual units. These compounds often reached several hundred meters on a side. It is likely

that these installations were connected by roads, some of which were later used by the Inca.

Huari culture arose from a blending of low sierra (Nasca) and high sierra (Pukara) traditions. Economically, Huari depended largely on dry farming of corn, with probable additions of other Andean staples, such as potato and quinoa. Huari domination of other areas was probably intended to extract agricultural surplus and control trade in rare materials, such as shell and salt. Specialization can be recognized at sites like Conchopata, which seems to have served as a ceramic production and ritual center. Well-defined and distinctive ceramic styles provide a tight chronology for Huari sites in its core territory near Ayacucho. Huari militarism, statecraft, and engineering are thought to represent antecedents of the later Inca Empire.

— Jo Ellen Burkholder

See also **Peru**

Further Readings

Isbell, W. H., & McEwan, G. F. (Eds.). (1991). *Huari administrative structure: Prehistoric monumental architecture and state government.* Washington DC: Dumbarton Oaks.

Schreiber, K. J. (1992). *Wari imperialism in Middle Horizon Peru.* Ann Arbor: University of Michigan Museum of Anthropology.

Human Canopy Evolution

For more than 50 million years, the canopy environment has placed stringent evolutionary conditions upon existence within its domain. Primates are a result of that process. Some examples of primate adaptations traditionally attributed to evolution within the canopy include binocular and color vision, long arms and legs, fingernails, grasping thumb, broad shoulders, enlarged brain, vertical posture, giving birth to one young, and a head that sits at a right angle to the spine. Certain features once thought to have originated in the terrestrial environment have now been added to this, including bipedalism among large-bodied apes and a long, opposable thumb. Over the last decade and a half, fossil discoveries have continued to strengthen the view of the canopy as a source of protohuman adaptations.

Since the time of Darwin, theories of human evolution have taught that the arrival of bipedalism brought an end to our dependence on trees. That event cut us loose from our boorish primate origins, freeing us to fulfill our destiny. Arrival at the ground was a fundamental turning point in our lineage that set our hands free to work miracles, and with that, we never once looked back at our arboreal birthplace. Yet since the discovery of *Australopithecus afarensis,* there has been a growing list of potential ancestors that have turned this view upside down. Not only were they active bipeds, they were also active climbers. These climbers are prominent names in our ancestry, such as *A. africanus, Homo habilis,* and *H. rudolfensis,* to name a few. Naturally, the ancestors of those early bipeds were also thought to have been climbers. As shown below, even *H. erectus,* who is viewed as exclusively terrestrial, used tools designed for canopy applications.

Oddly, the knowledge that our early bipedal ancestors spent considerable time in the canopy has not percolated down into theories about the evolution of human nature and the brain. The original theories, formulated from strained academic efforts to hide our affinities with apes over the past 150 years, promote an outdated terrestrial view of evolution that remains largely accepted and intact. "Canopy theory" unifies myriad disparate data into a single, cohesive, commonsense framework. Comparing terrestrial mammalian evolution during the Cenozoic with primate and marine mammal evolution raises doubts that the terrestrial environment could have been a habitat that promoted encephalization. Canopy theory encompasses early primate evolution and shows that the arboreal process of primate encephalization did not cease once our ancestors arrived at the ground. On the contrary, it shows that a reinvigorated arboreal encephalization process ultimately led to the human-sized brain. To demonstrate the strength of the canopy viewpoint within the space permitted, several of the more intractable problems that, as yet, lack satisfactory explanation will be discussed. These include the loss of thick body hair, tree platforms, and early weapons, such as the Acheulean hand axe.

Naked Ape in the Canopy

Primates are most noted in being quadrumanous, having four hands that are essential appendages for

safe travel in the canopy. Quadrumanous primate young cling to the mother's body until they are capable of independent travel. A few million years ago, evolution sidestepped when the hands at the end of our legs began to evolve into feet. From the canopy point of view, nothing could be more radical. Becoming bimanous greatly altered the behavior of our ancestors in their treetop habitat and led directly to changes in our morphology. This impacted reproductive behavior and drastically undercut the proven primate suite of coevolved adaptations between mother and young that determined how infants were transported from place to place.

Transforming a hand into a foot was a major engineering modification. Long fingers were converted into short stumps called toes, and what was an opposable thumb was realigned to become a nongripping big toe. This made the infants' toes useless for hanging onto the ancestral primate mother's gripping-fur. The infant had lost a pair of gripping hands, reducing its attachment points to the mother's body by 50%. This was a revolutionary mechanical shift in load that resulted in extremely high selective pressure. Gripping-fur and infant hands were a tight coevolutionary duo. Change in one immediately forced a complementary change in the other.

An example of coevolution can be seen between trumpet blossoms and hummingbirds. Some trumpet flowers gain reproductive advantage by limiting access to their nectar. This can occur simply by elongation of the floral tube. Over evolutionary time, hummingbird species responded with longer bills to match the changing depth of floral tubes. Close coevolutionary relationships like this have enriched the diversity of the planet's life by promoting new species.

The ancestral bimanous infant had a less secure grip on its mother's body. The traditional view explains that the bipedal mother accommodated this change by simply retaining her gripping-fur and holding the baby with her arms, while her hips broadened into a sort of saddle on which to carry her young. But the fossil record tells us that broad hips did not arrive until the infant developed a larger cranial size, a more recent adaptation. Therefore, large hips could not have played a role in the adaptations needed to support the bimanous ape infant. In addition, the fossil record indicates that we still climbed trees when we were bimanous bipeds, and it can be reasonably inferred that hand carrying an infant while climbing would not have been possible. More than ever, we needed our two remaining hands to climb; there were no spare hands to help an infant.

So, how were the young carried? Did they hang with full body weight from two fistfuls of gripping-fur as the mother clambered amongst limbs? From a purely mechanical point of view, climbing is a tortuous activity that can require swings, rapid turns, accelerations, decelerations, and other acrobatic feats. For an infant trying to cling to its mother, the loss of two attachment points would have resulted in a major and deadly mechanical instability. At times, a bimanous infant would pendulum, shifting full body weight from hand to hand. This would produce forces well over a 100% greater than those endured by the infant quadrumanous ancestor. Either the gripping-fur would have pulled out or the infant would have lost its grip. Hanging from two hands or being supported in the mother's arms would have led to extinction.

One coevolutionary solution to the reduction in attachment points would have been to increase the holding power of the infant's remaining two hands. Babies today do seem to have an unusually strong grip reflex. The increased strength of the infant handhold would have been matched by an increase in the strength and length of gripping-fur on the mother's body. This would help ease the tension that developed between the coevolved hand/gripping-fur pair. And this is exactly what happened. Of all apes, we have the thickest, strongest, and longest hair, but that gripping-fur does not cover our bodies. It is found only on the head.

So, why do we have long, strong gripping-hair only on our heads? Because the bimanous grip on body hair was still risky. Safety (natural selection) required that long, strong, gripping-hair be located adjacent to a stout support position for the lower part of the infant's body that no longer had gripping hands. There is but one location on the human body where that evolutionary formula fits: the shoulders. If this sounds awkward, remember that infant size was smaller, and the infant might have been more precocious than today. Perhaps this is why children love to be carried in that fashion. Humans have longer necks than apes, suggesting the ancestral neck may have lengthened around the time feet lost their ability to grip.

With hands clutching the mother's gripping-hair and legs securely around the neck, the infant's weight rested in the only mechanically safe position available. Long head hair, a long neck, and lack of gripping-fur

on the body are the results of a coevolutionary process associated with successful reproduction. We are the only "naked ape" specifically because we are the sole extant bimanous ape. Other explanations that have been advanced for the loss of hair, such as thermoregulation, parasites, swimming, and sexual selection, may have acted to reenforce the coevolutionary changes between mother and infant, but not necessarily.

Grip-Climbing in the Canopy

The structure and function of the feet of all mammals require or allow certain forms of behavior and preclude others. The bimanous ancestor that led to humanity would have climbed differently from a quadrumanous ape and would have used the spaces within a tree differently. The shorter fingers, expanded apical tufts, and longer thumb of the bimanous biped are adaptations for grip-climbing: not for toolmaking, as has always been claimed, and not for suspensory climbing. Grip-climbing requires holding onto large-diameter limbs and trunks that have bark grooves; it employs the thumb to a greater degree. The bimanous ancestor was specialized for climbing within tree crowns among the larger branches where weight is borne on the foot while standing in a vertical position.

Conversely, the quadrumanous ape's long fingers and a shorter thumb are well designed for suspension from branches, providing much safer access to the distal portion of limbs. Sometimes, fossils that have humanlike features are compared to chimpanzee skeletons to try to decide whether or not the fossil ancestor was arboreal. But since the bimanous hand evolved for grip-climbing and for access to the internal tree crown, rather than for suspensory climbing, one cannot directly compare a bimanous skeleton to a chimpanzee and come away with a reliable estimate of the time a bimanous ape spent in trees.

Neocanopy

All great apes build nests, including humans, so there is little doubt that our bipedal ancestors would have built nests much like those made by apes. Recent views on the origin of human nature accept that our bipedal ancestors would have spent time sleeping in the canopy, and there is some acceptance that sleeping-tree locations may have contributed to various aspects of the fossil record. However, these meager acknowledgments fall short of explaining what must have been taking place in the canopy.

H. sapiens, the only living bimanous apes, build tree platforms of a much different style than apes. This style is another facet of the transformation that occurred when our four-handed, bipedal ancestor lost the ability to grip with its feet and became a bimanous biped with an enlarged brain. This places the origin of improved "tree nests" during the time of *H. habilis.*

Becoming bimanous reduced safety, which would have been compensated for by building a stronger nest in a safer location. Safety translated into larger diameter limbs and stronger "nest" materials. Bimanous ancestors would have used trees with a shape and form that supported larger and stronger tree platforms. Ideal tree limbs were situated over water, where a soft landing was possible after a fall. Optimal tree locations inhibited predation by large cats and allowed simple aerial hunting. Stronger nests took more time to make, leading to reuse of nests. At some point, the bimanous tree nest became a tree platform.

Tree platforms were designed for the terrestrial foot. In subtle ways, the redesign of the quadrumanous nest into one that was bimanous created a totally new environment. That environment would have been unlike any canopy refuge of the past as it evolved into a kind of aerial home base. Canopy theory calls this neocanopy habitat the *terrarboreal habitat.*

Theorists have long sought an evolutionary feedback process that would promote ongoing brain evolution. The origin of the terrarboreal habitat offers a new explanation for the expansion of the brain of *Homo habilis,* about which little is understood. Canopy theory proposes that the terrarboreal habitat, along with associated inventions that improved safety and access to the canopy, was the principal force behind the evolution of the human mind. Specific activities that took place in the terrarboreal habitat led to humanlike social interactions, the earliest use of language in the command form, the development of weapons for defense and hunting, early aerial hut designs, and inventions such as roofs, knots, rope, and many others.

The archeological record is practically devoid of terrestrial home base and sleeping sites used by early and later bimana. Tree platforms would have provided dependable security from terrestrial predators,

whose strength and competitiveness have been routinely underestimated. Our ancestors spent most of their sleeping hours on canopy platforms. When boughs broke or trees fell, platforms crashed to the ground and were demolished, not likely to be exposed by the trowels of future scientists. Canopy theory speculates that our ancestors routinely used tree platforms until some time after around 50,000 years ago. Our move to a full-time terrestrial existence would have to remain tentative until we could protect ourselves against carnivorous competitors. Once that was achieved, we bade farewell to our birthplace in the trees and began a far different and in some ways more challenging and dangerous journey at the ground.

But such inferences bring us to a theoretical landscape, an uncharted "arboreal continent," that has never been explored by human evolution theory. There are numerous partially written stories and vignettes locked in the attic of human origins waiting to be brought down and dusted off. One well-kept secret is that strength alone can turn a human into an active climber. *H. erectus* had basically the same body design as humans, but with a distinct arboreal advantage. Researchers describe the *H. erectus* arm and shoulder girdle as apelike and robust, meaning exceptionally strong. The upper arm and grip strength of *H. erectus* would have made the species better climbers than strong humans. *Robust* is a frequently used word in terrestrial theories. It is another secret that had been locked in the attic. Whenever a primate skeleton is robust and its body is human size and smaller, it is *always,* without exception, associated with arboreal activities. Although *H. erectus* is viewed as a terrestrial primate species, its body form tells us it climbed into the canopy. What was it doing there?

Hand Axe: A Canopy Tool

The hand axe is considered the calling card of the African *H. erectus,* but its exact use is still being debated. These axes are found from South Africa to Europe in the west and India in the east. Hand axes come in many different sizes, with a general trend toward reduction in size over time. The earliest Acheulean hand axes are dated at about 1.5 million years old and were found at Peninj, in West Natron, Tanzania, Africa. This section concentrates initially on early hand axes that have a general tear-drop shape, are about 10 inches long, and weigh about 5 pounds. Issues that remain unresolved are: Why was such a large, hand-held tool bifacial? Why are they found in dense accumulations associated with ancient water? And why did the design remain basically unchanged for over a million years? All are answered by a single canopy explanation.

Hand axes resemble large spear points, but some weigh up to 50 pounds. This huge difference in size has given rise to several views on the tool's use. There is no chance that the largest hand axes were thrown or used as spear points. Some researchers believe large hand axes represent early religious symbols, perhaps worshipped by a kind of Stone Age, hand axe cult. Even the 10-inch-long varieties could not have been hafted as a terrestrial spear, as the butt end would have been too thick. Some say these tools were large carving-and-skinning knives, and still others feel they were thrown at prey. However, neither underhand nor overhand throws would produce the velocity needed to make the hand axe a weapon.

A discuslike throw could produce the necessary velocity to debilitate prey, were it not for a glaring limitation of *H. erectus.* The vertebrae of the Turkana Boy, an *H. erectus* approximately 11 years old, show that the spinal cord opening of his species was considerably smaller than ours. Since the opening is for motor and sensory neurons, it has been concluded the species could not have had great coordination. It would have been impossible for *H. erectus* to perform the precise spinning motion needed to hurl a hand axe like a discus, even if such a throw could be aimed effectively. This limitation would apply to any hunting technique that requires highly coordinated activities.

Like empty gun-shell casings, hand axe sites are forensic evidence of their principal targets and form of use. Hand axes are typically found in unexpectedly high densities and in clumped distributions. Some locations have thousands of these artifacts piled on top of one another, while others have tens of thousands. If hand axes were used as hand-thrown terrestrial spears and throwing rocks, we would expect to see them more widely distributed, coinciding with animal distributions. But they aren't. They are in large piles where they fell after they were used. The key to their use is the one-on-top-of-another accumulations.

Hand axes typically are found near ancient riparian habitats where large trees were likely to have grown. The hand axe was actually a "drop-chisel." It was dropped from high arboreal positions onto prey.

Counterintuitively, the working end of the hand axe was not the pointed end; it was the chisel-shaped, blunt end. Kinetic energy of the falling hand axe was focused on a chisel edge, giving *H. erectus* a simple-yet-powerful hunting strategy that required little physical coordination. From lofty perches over ideal hunting grounds—watering holes, fishing pools, and river crossings—a vigilant eye kept watch over a diversity of creatures that congregated below. Hunting that took place in the same location, day after day, year after year, over hundreds if not thousands of years, would have been simpler from the comfort of a tree platform.

What about that meter-long, 22-kilogram hand axe? Was it really the first religious idol, or was it something far more practical? Carrying a heavy rock into the treetops could have been accomplished by a robust bimana, but holding the stone over a target while balancing on a limb would have been difficult. Use of this unwieldy tool would have required a tree platform. No longer can it be claimed bimana lacked an effective killing weapon.

Drop-Tools

The drop-chisel did not appear out of thin air; it had a predecessor. Drop-chisels evolved from "drop-rocks" associated with *H. habilis* and more ancient ancestors. These rocks would have been collected from riverbeds and talus slopes. Their use stemmed from the common primate habit of bombarding potential terrestrial threats with falling objects. Recognizing that drop-rocks would stun or kill small mammals and surface-feeding aquatic vertebrates, such as turtles and fish, would have been a natural outgrowth of typical primate behavior. Masses of irregular rocks, spheroid and choppers, have been found in the geologic strata known as Bed I at Olduvai Gorge. The present view of these accumulations is that they are stone caches; however, some appear to be deposited within light sediments and in aquatic settings. This indicates these "caches" were actually drop-rocks that settled to the bottom of a mud hole and/or accidentally fell off a tree platform and were lost.

Over time, an understanding of the merits of a tear-drop or fusiform rock over a round drop-rock would have dawned on our ancestors. A fusiform rock penetrates into water and therefore would have been a better fishing tool. As a hunting tool, a fusiform rock cuts through skin, as opposed to a round rock that bounces off. This naturally occurring shape can be found in both talus slopes and fractured shale deposits, and superficial adjustments wouldn't have required great intellectual prowess.

A natural, tear drop-shaped stone was used to test the manner in which the original drop-chisels were held. This stone was dropped from a height of 13 meters, a distance from which one can reliably strike a soup can. Practice is needed to guarantee a drop-chisel will strike edge first. How the drop-chisel is held is critical. Any rotation whatsoever imparted to the tool when it begins to fall tends to turn the leading edge parallel to the earth before it strikes the ground. Prey struck in that position might be stunned, but perhaps not killed. Think of a hand axe as a pendulum. It must be held by the pointed tip, and no matter how still it is held, it will swing a little at the chisel end. A thinner trailing end is easier to hold and more likely to fall true. A bifacial edge on the hand axe could have resulted from paring down the trailing end to provide a steadier grip. With sharp edges, even a near miss could result in a deep gash that would be at least debilitating. Continued tapering of the pointed end would produce a more stable drop-chisel shape known as an "Auchealean pick."

Onetime use of some drop-chisels accounts for why they are often found in nearly perfect condition. It is unlikely that drop-chisels were ever discarded intentionally. They were retrieved from water and mud until lost, or at times, they may have been abandoned due to the ill intent of predators lurking below the surface.

Investigators report wood deposits on the Pininj drop-chisels, suggesting they may have been used to cut down straight saplings or branches for shafts. The drop-chisel's sharp-pointed end was a self-hafting blade. Driving the blade into a shaft of green wood would split the wood, creating a pinching force that held the blade in place. The thick end remained the killing end. A wooden shaft combined with the stone would have weighed about 10 pounds. This increased weight improved killing power, and a long shaft fell straight and simplified hunting. The drop-spear was a huge step in drop-tool evolution, as it permitted the use of more recent, flatter hand axes and other shapes that were sharpened around the perimeter. Unwieldy as a terrestrial spear, the drop-spear was an ideal canopy weapon. Thrown at an angle rather than a

straight-down trajectory, the drop-spear became the first step in developing a terrestrial spear with a stone point.

Canopy Hunting Platforms

Hunting platforms probably originated during the early Stone Age. A huge effort has gone into trying to divine an answer as to whether or not our bimanous ancestors were hunters or scavengers. It is presently believed these early ancestors were scavengers based on the frequency of tooth marks found on fossil bones. But this determination has not taken canopy-hunting activities into account.

Early bimana would have discovered that leftovers tossed from tree platforms attracted animals. We also know that bimana accumulated stones from the countryside for use as tools. This brought them in contact with kill sites, where they collected long bones previously gnawed by carnivores and scavengers. Back on the tree platform, the bones were crushed, and the marrow was eaten. The remains were then dropped off the platform where they lay strewn below on a stream bank or possibly in the water. There, the leftovers would act as bait, attracting both terrestrial and aquatic vertebrates. After killing one of these scavengers, large chunks of meat were slashed off. Most writing about the subject assumes without question that during such butchery, the stone knives would have scratched the bone. This would not be true if the amount of food made available was in excess of the needs of the hunter. In that case, butchery would have taken place without scratching the bone, while leaving behind plenty of meat for scavengers to consume. Canopy hunting would likely guarantee kills in excess of needs. Below a hunting platform, one would expect to find bones that had been gnawed upon by predators, with few cut marks, as well as cracked and splintered shards of crushed long bones. Obviously, cut marks and tooth scrapes on bones do not tell us much about the activities of our ancestors, whereas bone assemblages, stone piles, drop-chisel design and accumulations, and the robust morphology of our ancestors point to a single conclusion: Our bimanous ancestors were effective canopy hunters.

Turning to some of the sites at Olduvai Gorge, site FXJj50 at Koobi Fora has characteristics that indicate it was a refuse pile from an ancient hunting platform where bait may have been used to attract prey. Bones may have been brought to the site that were already gnawed by carnivores. One of the more interesting bone accumulations studied by Mary Leakey was the FLK- Zinj excavation in Olduvai Gorge. The bones in a portion of those accumulations had an arc-shaped assemblage, once interpreted as a windbreak. The "canopy view" is that the arc-shaped area may have resulted from the fallout shadow of an arboreal home base. Long bones of ungulates are the most frequently found bones in the pile, and it is thought that these were brought to the location from elsewhere. These could have been killed at platforms near watering holes, then brought back to the living platform in the canopy. At another Olduvai site, the percentage of carnivore remains in the bone assemblage reached 21%. This is an extremely high figure that is very unusual. This indicates carnivores were being attracted to bait under a tree platform, then killed as prey.

King of the Jungle

The present terrestrial view of our ancestors is that they were poor at protecting themselves, which was probably true out on the savanna. But an arboreal, bimanous biped who was capable of transporting heavy rocks would have been a formidable forest species. From a lookout in the canopy, movements of dangerous animals below could be observed vigilantly. Predators within the forest were driven off and/or injured. Our ancestors, not large cats, dominated select regions of closed and riparian forests.

The evolution of drop-chisels and drop-spears strengthened our ancestor's control over forested areas. This long-term control is demonstrated by fossil discoveries at Olorgesailie, Kenya. Artifacts there span hundreds of thousands of years and led to the discovery that hand axes did not change in shape over an extended period of time. One of the more intriguing bone accumulations at Olorgesailie included more than 60 giant-baboon skeletons intermingled with lost drop-chisels. A variety of scenarios have been suggested, but the logical explanation is that these formidable animals were slaughtered through stealth from above. Drop-spears were probably the weapons of choice. Olorgesailie is a classic canopy-hunting site. Data on changing biota and climate establish that over a long period of time, canopy hunting was a reliable way to obtain food. The long life of the drop-chisel establishes that its design was an invention like the wheel. When a tool fits its function, the function defines its form.

Neocanopy Brain Evolution

From the end of the Cretaceous period, the canopy environment stood apart from the ground as a habitat that could promote brain evolution. Primates evolved within that aerial habitat, where they developed a brain-to-body-weight ratio greater than all terrestrial mammals. This ratio changed little over tens of millions of years. During the proliferation of Miocene apes around 15 to 20 million years ago, many species of apes developed larger brains as a result of attaining a larger body size, but they still possessed a brain-to-body ratio little different from that of monkeys. At that point, brain expansion reached a plateau where chimpanzee brain size remains today, but in our lineage, a new spurt began about 3 million years ago. Encephalization in the canopy recommenced as our ancestors were becoming bimanous. The terrestrial habitat played only an indirect role limited to the transformation of a pair of grasping feet into nongrasping feet.

The physical adaptation process produced grip-climbing and modified the hand into its humanlike form. This precipitated simultaneous mental and behavioral adaptations. All of these were associated with the origin of terrarboreal platforms. Two or more individuals were needed to build the larger terrarboreal platforms. The terrarboreal habitat included platforms, roofs, walls, and probably, as with bonobos, more than a single family might have built within a single tree. When one individual was on the ground and another on the platform, the distance between them encouraged verbal and visual communication that led to rudimentary sign language and the first commands of a spoken language. Practical inventions of the terrarboreal habitat could have included rope, twine, knots, bags, and several types of drop-weapons. This author is confident that terrarboreal habitats and inventions needed to keep bimanous apes safe while living in the canopy will prove to be the single most important suite of mental changes and adaptations that acted together synergistically for the evolution of the human mind.

Traditionally, encephalization is attributed to activities taking place on the ground as a result of bipedalism. However, there are no biological examples that demonstrate that the terrestrial habitat can produce primatelike encephalization. On the contrary, when primatelike encephalization has occurred, it was a result of a "multiple-habitat effect," a process described by canopy theory. The parochial, paleoanthropological view that a terrestrial habitat promoted human brain encephalization lacks rudimentary biological support. No biological doubt exists about the canopy's ability to promote encephalization. Given the existence of the terrarboreal habitat, we have arrived at the most compelling biological explanation to date for the growth of the brain: that growth was a neocanopy phenomenon that took place above ground in the evolving terrarboreal habitat.

Our ancestors did not walk along a dusty path on their journey to become human; they traveled arboreal highways of a lost, treetop world. Signposts from our passage through a canopy world can still be seen in ancient Greek columns, cathedral design, skyscrapers, hunting platforms, tree houses, children's playgrounds, and the innate reflexes of infants. These represent vestigial sentiments and behaviors that sustained us during millions of years of intimate treetop evolution. The interwoven boughs of majestic forest trees, like mother and infant to be, were the nurturing womb of the human mind.

— Donald R. Perry

See also **Brain, Evolution of Primate; Hominoids; Homo erectus; Oldowan Culture**

Further Readings

Clarke, R. J. (1999). Discovery of complete arm and hand of the 3.3 million year old *Australopithecus* skeleton from Sterkfontein. *South African Journal of Science, 95*(11/12), 477–480.

Dawkins, R. (2004). *The ancestor's tale.* New York: Houghton Mifflin.

Dominguez-Rodrigo, M., et al. (2001). Woodworking activities by early humans: A plant residue analysis on Acheulian stone tools from Peninj (Tanzania). *Journal of Human Evolution, 40,* 289–299.

Isaac, G. (1977). *Olorgesailie: Archaeological studies of a Middle Pleistocene lake basin in Kenya.* Chicago: University of Chicago Press.

Klein, R. G., & Blake, E. (2002). *The dawn of human culture.* New York: Wiley.

Perry, D. R. (1986). *Life above the jungle floor.* New York: Simon & Schuster.

Tattersall, I. (1995). *The fossil trail.* Oxford: Oxford University Press.

Walker, A., & Shipman, P. (1996). *The wisdom of the bones.* London: Weidenfeld & Nicholson.

Human Competition and Stress

One common characteristic seen across the whole primate species is its competitive nature. Whether it's competing to rise in the status hierarchy or competing in the Super Bowl or Stanley Cup Finals, primates as a whole engage in competition regularly. During the competitive stages, several physiological and psychological changes take place. The physiological changes have been examined by way of measuring blood pressure, heartbeat, respiration, and perspiration. Though these measures help in the understanding of the physiological responses of stress, researchers are now able to further understand the nature of stress from a hormonal standpoint. One popular method of measuring one's physiological response to acute and chronic stress is by measuring salivary cortisol. This noninvasive method of analysis is especially useful in the athletic environment. Athletic competition is the preferred environment in which to study hormones and competition due to its highly organized and structured setting. This environment provides for clear rules and regulations and can also measure performance by way of wins/losses or other measures of individual performance. Understanding the underlying physiological and psychological responses to stress can have a significant effect on the way we view diseases such as heart disease, depression, anxiety, and even cancer. It has been well documented that chronic stress can have a debilitating effect on the immune system's ability to fight off infection and disease. Therefore, with the increasing demands of life, it comes as no surprise that stress is now having a significant impact on the quality of life that one lives.

Hormonal Responses to Stress

Stress can be defined as a physical and/or psychological response to life experiences that may challenge or threaten us. Furthermore, stress can be experienced both subjectively through anxiety, fear, anger, and depression as well as physiologically. Stress can be brought on by several negative life events, such as a death in the family, divorce, or relocation, or even positive events such as a big job promotion or winning the lottery. When faced with a stressful situation, the body activates the sympathetic nervous system, which through the hypothalamus-pituitary-adrenal (HPA) axis mediates a wide range of adaptive functions. The stress response first begins in a deep structure within the brain known as the hypothalamus. The hypothalamus releases a protein known as the corticotopin-releasing factor (CRF), which then stimulates the pituitary gland. The pituitary gland then releases adrenocorticotropin hormone (ACTH), which, in turn, stimulates the release of cortisol from the adrenal gland. One way to measure HPA axis activation is by assessing cortisol levels. Cortisol has been found to be the most accepted marker of HPA axis activation. Furthermore, increased cortisol has been known to be an adaptive mechanism of the organism when stressed. Moderate increases in cortisol are known to prepare individuals for immediate or forthcoming action. This moderate increase enables one's blood to move from the extremities to the large muscles that are used in physical activity, and it has also been shown to play a positive role in cognition and emotions. In contrast, larger increases in cortisol have been shown to decrease performance by interfering with cognitive processes and also by lowering testosterone levels. Furthermore, chronic stress has been shown to have a significant negative effect on one's immune system.

Mazur's Biosocial Model of Status

Allan Mazur's biosocial model of status attempts to describe the hormonal changes that occur within one's body during face-to-face interaction. According to Mazur, status ranks are allocated among individuals or members of a group through face-to-face interactions, and this process is seen across the primate species. Mazur's model is based on the concept that primates, including humans, compete for status on a regular basis. During these "status" competitions, individuals attempt to "outstress" their competitor(s) through actions, nonverbal signs, or through verbal communication in humans. The winner(s) of the status contest assumes the higher or dominant rank, while the loser(s) assumes the lower rank. Studies have demonstrated that successful attempts to achieve or maintain status have led to increased levels of plasma or salivary testosterone levels. These studies suggest that rising or elevated testosterone levels are associated with assertive behavior, erect posture, strutting, and a general competitive nature. In contrast, diminished or depressed testosterone has been associated with submissive behavior, such as slumped posture and general acceptance of one's lower rank. In addition to

testosterone's role in preparing one for competition, Mazur's model also considers the relationship between competition and the stress experienced by individuals in response to or in anticipation of competition. Mazur's research shows that in most primate species, the lower-ranked members can be described as "nervous" or "insecure" during their interactions. These primates would be expected to display a greater degree of anxiety symptoms. On the contrary, higher-ranked primates appear to have a "relaxed" and "confident" demeanor, enabling them to cope more effectively with stressful situations. Therefore, Mazur's model suggests that winners would display the highest levels of testosterone and lowest levels of cortisol, while losers would tend to display lower levels of testosterone and higher levels of cortisol. This model lends support to the concept of a "winning streak" or a "losing streak." Winners of competitions seem to gather a sort of momentum after consecutive successful competitions, and this concept is very important in athletic competition as well as in the competitive business world.

Athletic Competition and Stress

As can be imagined, there are various forms of competition that can be observed, with a wide variation amongst the primate species. One form of competition that has been found to provide valuable feedback on hormonal activity during competition is athletic competition. This form of competition is a great environment in which to measure cortisol activity because there is a clear set of rules and regulations and also there is normally an unambiguous outcome leading to a winner and loser. Therefore, scientists seek to gain insight into the workings of hormones prior to, during, and after athletic competition. One of the questions that researchers seek to answer is whether there is an anticipatory stress response to the upcoming athletic competition. Most of the research on this topic has found that there is indeed an anticipatory rise in salivary cortisol and testosterone prior to competition. Suay et al. studied judo fighters in an attempt to demonstrate the anticipatory rise in hormones. Comparing precompetition saliva samples to samples obtained on 8 resting days, Suay et al. did indeed find an anticipatory rise in both cortisol and testosterone. Furthermore, in a study investigating hormonal responses to competition among a group of university tennis players, Booth et al. found a rise in testosterone and cortisol just prior to the competitive event. These studies suggest that anticipatory rises in cortisol and testosterone serve to ready the individual for the forthcoming competition.

Another area of interest is whether winning or losing has an effect on salivary cortisol and testosterone levels. In a study on human competition, Gladue et al. did report a significant increase in testosterone levels of winners as compared to losers. However, their results did not produce any significant differences in cortisol levels between winners and losers. In contrast to Mazur's prediction of stress as proposed in his biosocial model of status, and perhaps counterintuitive, were the results from the studies of Elias and Suay et al. These studies both found significantly higher levels of salivary cortisol among the winners. This finding demonstrated that winners experienced significantly higher levels of stress than did the losers in the postcompetition phase.

Finally, important to the understanding of human competition is whether physical activity is the underlying cause of hormonal variation. Thus, can variations in salivary cortisol and testosterone be attributed to physical activity alone? Or is there a set of psychological variables that play an important role in the body's physiological response to competition? To study this question, researchers can study or evaluate their participants in noncompetitive settings that require intense physical activity and in settings that are considered competitive and also require intense physical activity. Suay et al. found similar rises in cortisol and testosterone in both competitive and noncompetitive physical activity settings. These results lend support to the idea that physical activity in both competitive and noncompetitive situations can significantly increase hormonal activity. Despite this evidence, other research has demonstrated that psychological variables have an important influence on the hormonal responses to competition. In a study investigating hormonal differences among NCAA hockey players, Putnam and Carré found no significant differences in salivary cortisol levels during a noncompetitive practice session. Although significant differences were not observed in this noncompetitive setting, the researchers did find statistically significant pre- to postgame rises in cortisol levels throughout the hockey season. This finding suggests that there is more than just physical activity that plays a role in the activation of the HPA axis, and there may

be numerous psychological variables that can affect one's physiological responses to athletic competition.

Stress and Disease

Although physiological responses to stress can be useful for short-term survival, excessive activation of the HPA axis can lead to disease and illness. For instance, high levels of cortisol can lead to a thinning of the lining of the stomach, which can lead to gastric ulcers. Furthermore, too much cortisol can also lead to thinning of one's bones, which can increase the likelihood of osteoporosis and also bone fractures. Studies with monkeys have found a strong correlation between stress and heart disease. These studies have shown that monkeys undergoing chronic social stress related to changes in their hierarchies found a strong relationship between stress and cardiovascular disease. Chronic stress can also have a profound effect on one's psychological well-being. It has been shown that excessive stress can lead to serious bouts of depression as well as anxiety disorders such as post-traumatic stress disorder. These disorders certainly have a psychological component; however, increases in HPA axis activation certainly contribute to the subjective experiences of the disorders. Furthermore, researchers have found that certain therapies geared toward reducing stress have had a positive impact on those treated. For instance, there have been numerous studies that have cited patients with compromised immune systems responding well to psychological intervention. These studies indicate that being able to cope with stress can have a profound effect on one's immune system and his or her ability to fight off infection.

Research on the physiological and psychological effects of stress have enabled researchers to have a better understanding of how the body responds to stress. Furthermore, research on athletic competition and hormone responses to stress has led to mixed results. These results suggest that there is a multitude of psychological factors that play a central role in the activation of the HPA axis. Therefore, more research into psychological factors, such as self-esteem, self-confidence, mood, and personality may provide additional clues to the overall process of stress and competition.

— *Justin M. J. Carré*

See also **Brain, Human; Psychology and Genetics**

Further Readings

Booth, A., Shelley, G., Mazur, A., Tharp, G., & Kittok, R. (1989). Testosterone and winning and losing in human competition. *Hormones and Behavior, 23,* 556–571.

Bremmer, D. (2002). *Does stress damage the brain? Understanding trauma-related disorders from a mind-body perspective.* New York: Norton.

Martens, R., Vealey, R., & Barton, D. (1990). *Competitive anxiety in sport.* Champaign, IL: Human Kinetics.

Mazur, A. (1985). A biosocial model of status in face-to-face primate groups. *Social Forces, 64,* 377–402.

Putnam, S., & Carré, J. (2005). *Hormonal responses to competition in NCAA male hockey players.* Manuscript in preparation.

Salvador, A. (2005). Coping with competitive situations in humans. *Neuroscience and Biobehavioral Reviews, 29,* 195–205.

Suay, F., Salvador, A., Gonzalez-Bono, E., Sanchis, C., Martinez, M., Simon, V. M., et al. (1999). *Psychoneuroendocrinology, 24,* 551–566.

Human Dignity

Human dignity is of central importance today, particularly in the fields of medical ethics and bioethics, as it represents a fundamental constituent of many contemporary constitutions, the most global being the Charter of the United Nations. It is, however, far from clear what the term *human dignity* means. The expression itself may be inappropriate, as it focuses solely on human beings. Perhaps we should use *the dignity of human beings* instead of *human dignity*, as the latter implies that human beings have dignity, whereas the dignity of human beings implies that dignity has a foundation and that it applies to human beings but can also apply to other creatures. The foundation of dignity, according to Kant, is the actual ability for autonomy. He stressed that human beings have that ability but that it is also possible for other creatures.

We distinguish between two types of dignity. One implies equality and one implies a certain hierarchy. The type of dignity relevant for our constitutions and ethical debates is that which implies equality among the bearers of that dignity. The first philosopher who

mentioned that type of dignity was Cicero in his *De Officiis.*

The other type of dignity, hierarchial, is older and is linked to abilities. If someone has X, then that person has dignity. The more X people have, the more dignity they have. X can be power, strength, beauty, reputation, or many other things.

Dignity that implies equality can have necessary or contingent foundations. If we decide that the basis of our governing constitution is dignity of this sort but we don't hold that this dignity is a natural constituent of human beings, then the dignity has a *contingent foundation.* If we hold dignity as being a natural constituent, then the dignity has a *necessary foundation.* The trouble with contingent foundations is that we cannot claim ethical superiority relative to other governments that do not place the dignity of human beings as the basis of their constitution, but hold, for example, the concept of human slavery as right and proper.

If we wish to claim ethical superiority, then we have to hold that dignity is a natural constituent of human beings or that it has a necessary foundation. The problem here is with the enormity of the claim that we have grasped the nature of human beings and that part of that nature is a dignity that all human beings share in the same manner. Most philosophers during the last century have abandoned making claims about the essence of the world.

What are the necessary foundations? In the history of ethics, the three most popular foundations are

- reason
- freedom
- likeness to God's image

We can find each of these in most foundations of dignity, although one aspect may be emphazised over the others.

If we believe that reason is the foundation, we must clarify what type of reason. Reason can be the means to live a good life (good for ourselves) or to live a moral life (impartially right). We can distinguish between the potential ability of reason, the actual ability of reason without necessarily acting on it, and actual ability of reason as the necessary basis of our actions. Kant suggested that the actual ability for autonomy is the foundation of human dignity, but he linked reason to each of the other foundations of dignity as well.

In the context of being a foundation of dignity, freedom usually refers to metaphysical autonomy and connects with an eternal soul without beginning or end or a soul that we create ourselves before time and space. On the basis of the preferences of our souls, we freely decide our acts. Pico della Mirandola regards freedom as the foundation of our dignity.

Our likeness to God's image is the third of the most popular foundations of dignity. Our similarity can be represented in reason, having an immaterial soul, or being free. It becomes clear, then, that freedom, God's image, soul, and reason are closely connected. If we hold that our dignity is based on our being created in God's image, as Thomas Aquinas or Manetti do, we can still wonder from which moment to which other moment do we have dignity. Of course, this is from the moment when body and soul are united to the moment when they are separated again, but when are these moments? Some believe that we are brought to life from the moment of the fusion of sperm and egg. Thomas Aquinas, on the other hand, held that it takes place 40 days after conception for boys and 80 to 90 days after conception for girls.

If we have dignity, what does this imply? Possible implications come in the form of rights and duties.

Rights can follow necessarily or contingently. There are positive rights (for example, to receive something) and negative rights (such as the right to take action). A positive right implies that others ought to support us concerning X. A negative right implies that we ought not to be obstructed in doing X. The positive right to live can mean that others have the duty to support you if you fail to survive by yourself or if someone tries to take your life. So we still must distinguish between the positive right to have something and the positive right to keep what we have.

Duties can also follow necessarily or contingently from dignity. As with rights, duties may be positive (such as the duty to take action) and negative (for example, to refrain from something). We must also differentiate between our duties and the duties of others.

We can further define rights and duties by dividing them into ethical, moral, or legal categories. Ethical rights or duties are always those that are good for ourselves. Moral ones are those rights or duties that are impartially right. Legal rights or duties correspond to the law.

In the history of philosophy, we have given Cicero, Manetti, Pico della Mirandola, and Kant the most

importance in their views of the foundations of dignity. In the contemporary debate, the positions of Margalit, Gewirth, and Habermas are particularly noteworthy. The most vehement, explicit, and pointed critique of dignity was made by Nietzsche.

— *Stefan Lorenz Sorgner*

See also **Ethics and Anthropology; Kant, Immanuel**

Further Readings

Kant, I. (1999). *Practical philosophy* (M. J. Gregor, Ed.). Cambridge: Cambridge University Press.

Mirandola, G. P. D. (1965). *On the dignity of man: On being and the one: Heptaplus* (C. G. Wallis, P. J. W. Miller, & D. Carmichael, Trans.). Indianapolis: Bobbs-Merrill.

Human Excellence

As a term indicating well-developed skills pertaining to performing various tasks for personal gain and group benefit, *human excellence* may be found in all cultures. As a perfected ability in carrying out assigned work for survival, whether in hunting, war, or other activities, such as ritual dancing, excellence has been valued and recognized as well as rewarded, especially when exhibited in defending a group, tribal property, or, as often is the case, expanding territorial limits to obtain better living conditions. In general, the concept of excellence sets the boundaries for all efforts of continuous improvement.

The term has also been used to refer to bodily skills in competitive situations, such as games and exhibitions, taking on the meaning of "best" as in the case of individuals who have earned the reputation of being "the best" by having supremely trained skills worthy of imitation by and transmission to other members of the tribal group. Excellence thus takes its place among desirable social traits, urging the continuation of an established value. In Homer's *Iliad,* a father advises his son who is leaving for battle, "Always excel and remain better than others."

The list of bodily skills eventually was expanded in certain cultures to include personality traits covering activities related to powers of the "soul." In the history of the development of the concept of excellence, the Ancient Greeks made the first successful attempt to define the meaning of excellence within an enlarged scope of human activities to refer to all pursuits, beyond the needed training steps for the acquisition of military skills. They introduced theoretical considerations that facilitated the understanding of the conditions indispensable for securing the educational process, which leads from having an initial ability to perfecting it. Criteria for evaluating such attainable perfection became an object of inquiry, debate, and critical discussion.

Recommending and praising excellence was central to the life of Greece as well as a dominant feature in the arts, from poetry to architecture. As a concept, it permeated all walks of life and was adopted for all models of performance. To put it somewhat differently, excellence applied to both artist and artistic work. The Greek word *aretē,* usually translated as "virtue," and the related cognates of *aristeia* and *agathon,* including their derivatives, were used in a great variety of contexts referring to private and public activities, from shipmaking and legislating to public speaking and athletics. Eventually, with the maturing of philosophy, excellence became an indispensable trait of all ways of rational thought. Thus, a person was expected to exhibit his or her best in action as well as in thought, expecting in turn to be evaluated on the basis of explicit criteria known in advance and established as tradition. Such, then, was the rise and consolidation of a practical and reflective framework that led to the formulation of a philosophical treatment of excellence. It came to refer to a highly valued type of conduct that is usually translated in contemporary parlance as "moral virtue."

It should be noted that the concept itself, at least as it occurs in Greek culture, had a considerably wider meaning, exceeding that of commendable "moral" properties. In classical philosophy, excellence was treated in depth and used to cover ethical and political skills (i.e., "practical") as well as skills appropriate to acquiring knowledge (i.e., "theoretical"). The Greeks also spoke of ethical persons possessing excellence of character in the same way they referred to "right" or well-governed *poleis,* what we now call "city-states." In this refined sense of excellence, whereby "good" is taken to mean perfected and working traits, it came to apply to anything that possessed the characteristic features of a well-finished product or work as the outcome of *technē* (poetics). In this

Martial artists focus their mental and physical energies.

Source: © Jenn Reese.

widened context, a city having the right laws constituted the proper environment to breed excellent citizens. Inquiry, on the other hand, into the conditions and the criteria of excellence as *aretē* and their justification became a fundamental concern not only of poets but more so of philosophers, as we witness when reading the works of Plato and Aristotle. What had started earlier, as found in the surviving fragments of the pre-Socratics, became the subject of extensive treatment of excellence, thus contributing largely to the understanding as well as the promotion of this comprehensive use of *aretē* as a political, ethical, artistic, scientific, or religious value expected to accompany all institutionalized forms of conducts. It was recognized as an ideal that defined the meaning of praiseworthy "cultural conduct."

Seen as commendable ideals, the types of excellence the Greeks sought to clarify and establish as central to their culture became models of reference that were passed on to other cultures. In fact, they found a place in the institutions and patterns of values in the cultures of a variety of people that came in contact with the Greeks. This is true of the Romans as well as others who responded to the need to articulate their own conceptions of excellence and place them within a theoretical framework. It was in this connection that the idea of excellence was accepted and reformulated in the ways demanded of religious conduct as, for instance, in the case of Christian ethics. Its spokesmen in the course of time came up with a set of virtues appropriate to and supportive of its religious way of life. Although they made the Greek conception of virtues peripheral to theirs, the Christian theologians adopted the Greek reflective approach to excellence mainly to deepen, defend, and explain their own salvation moral stance.

The diverse antagonisms between different sets of virtues in the history of cultural outlooks, whether of the Western or other type, are characteristic of cultural disagreements and their continuous confrontations, often leading to serious conflicts and destructive wars. Be that as it may, the copresence of conflicting sets of virtues within the same culture, such as the Western type contains, renders inevitable all sorts of clashes between differing groups even within a given institution (for example, religion or art, even scientific organizations and philosophical schools). Many reform movements in political life that have sought to reconcile conflicting values actually concern incompatible conceptions of excellence, nurtured and sustained within the same culture. While they last, such differences affect in varying degrees and with anomalous results the institutions and their modes of interaction.

Revisions of conceptions of excellence have been a much-heralded concern of leaders in politics, religious life, as well as education. The purpose in so doing has often been more than seeking to supply justification for the priority and supremacy of a favored position regarding excellence. What seems to affect the foreground of conflicting values and their continuous presence in various cultures is mainly the

unacknowledged force of different conceptions of human nature operating in the background. Usually such different views, fundamental as they are to the selection and promotion of a pattern of excellence, are rarely sorted out and systematically subjected to the tests of scientific investigation. Even science itself, with all its merits of being open to public inspection and its reliability as a shared method of inquiry, is not readily acceptable as the reasonable arbiter to weigh the impact of conflicting elements and effect their removal from the body of cultural beliefs. This is especially applicable to the case of differing conceptions of human nature. Finding common grounds for accepting rationally formulated criteria regarding the soundness of operating views of human nature has proved to be a most disagreeable enterprise.

To conclude, the concept of excellence, as it developed from an element of conviction regarding the valued skills that ensure survival, to perfected abilities and praiseworthy behavior in public and private conduct, manifests itself as a basic cultural component in every cultural institution. It is interesting to note that the Greek philosophers were the first to offer a solution to the vexing problem of establishing coherence in a set of excellences fundamental to their culture. The coherent pattern is known as the "doctrine of the unity of virtues." The quest for excellence has never ceased to function as the source of an attitude that supports cherished aspirations, just as it continues to instigate violent disagreements in environments where different cultural perspectives enter in a confluent course, often generating unresolved conflicts and destructive actions. As a concept, it remains indispensable to guiding human conduct, but as an objective pursued in different and conflicting outlooks within the same culture, it often generates discordant forces, giving rise to serious political and educational discrepancies that make cultural cohesion almost impossible.

— *John P. Anton*

See also **Aristotle**

Further Readings

Anton, J. (1969). Human excellence. In P. Kurtz (Ed.), *Moral problems in contemporary society* (pp. 116–34). Englewood Cliffs, NJ: Prentice Hall.

Aristotle. (1962). *Nicomachean ethics* (M. Ostwald, Trans.). Indianapolis and New York: Bobbs-Merrill.

Gouinlock, J. S. (2004). *Eros and the good.* Amherst, NY: Prometheus Books.

MacIntyre, A. (1981). *After virtue.* Notre Dame, IN: University of Notre Dame.

Murphy, G. (1958). *Human potentialities.* New York: Basic Books.

Plato. (1971). *The collected dialogues of Plato.* (E. Hamilton & H. Cairns, Eds.). Princeton, NJ: Princeton University Press.

Human Genome Project

The Human Genome Project (HGP) is an international project that was coordinated by the U.S. Department of Energy and the National Institutes of Health. Other major partners and additional contributions came from the United Kingdom, France, Germany, Japan, and China. This project was formally initiated in October 1990 and finally completed in 2003. However, analyses of these data will continue for many years to follow.

The goals of HGP were to identify all the genes in human DNA (which is approximately 20,000 to 25,000), determine all of the sequences of the chemical base pairs (about 3 billion) that make up human DNA, store this information and make it available in databases, make improvements on tools used for data analysis, eventually transfer related technologies to the private biotechnology sectors, and address the legal, social, and ethical issues that will ultimately arise as a result of the completion of this project.

Many benefits have been projected as a result of HGP. The benefits from genomic research have potential applications in areas of molecular medicine, energy sources and environmental applications, risk assessment, bioarchaeology, anthropology, evolution, human migration, DNA forensics (identification), agriculture, livestock breeding, and bioprocessing. In addition, commercial development of genomics research will provide U.S. industry with several lucrative opportunities from the sales of DNA-based products and technologies. Overall profits in biotechnology industry are projected to exceed $45 billion by 2009.

In regard to molecular medicine (a branch of medicine that deals with the influence of gene expression on disease processes and with genetically based treatments, such as gene therapy), HGP has provided

technology and resources that have already had a widespread impact on biomedical research and clinical medicine. This is being made possible by increasingly detailed genome maps, which have assisted medical researchers in identifying genes associated with several genetic conditions. Clinical improvements will also be seen with more accurate diagnosis of disease, earlier detection of genetic predispositions to disease, rational drug design, gene therapy and control systems for drugs, and pharmacogenomics (the application of a genomic approach to the identification of biological drug targets and interactions). In short, molecular medicine will be defined less by treating symptoms of a disease and more by addressing the fundamental (or genetic) causes of a disease and its pathology.

HGP will also have applications in energy and the environment. Technology initiated in HGP can be utilized in the Microbial Genome Program, which is aimed to sequence the genomes of bacteria useful in energy production, environmental remediation, toxic waste reduction, and industrial processing. Microbial genomics research can be used to create new energy sources (called "biofuels"), to develop environmental monitoring techniques to detect pollutants, to develop safe and efficient environmental remediation, and to develop research for carbon sequestration. In addition, microbial genomics will help researchers to better understand how pathogenic microbes cause disease. Furthermore, research on microbial communities can provide models for understanding biological interactions and evolutionary history.

Understanding the human genome will have a significant impact on scientists' ability to assess health risks posed to individuals exposed to toxic agents; this is known as "risk assessment." This will be possible by examining the genome to identifying gene(s) that will increase the likelihood of potential harm. Therefore, HGP can improve the assessment of health damage and risks caused by radiation exposure, inducing low-dose exposures, exposure to mutagenic chemicals, cancer-causing toxins, and reducing the likelihood of heritable mutations.

Our understanding of human evolution and the common biology that humankind shares with all life will be improved by understanding genomics. Therefore, HGP will enhance our ability to more effectively study evolution through germ line mutation in lineages, study migration patterns of different types of populations based on female genetic inheritance, study mutations on the Y chromosome to trace lineage and migration of males, and to compare breakpoints in the evolution of mutations with ages of populations and historical events. Comparative genomics between humans and mice have already showed similarities in genes associated with disease and traits, which is useful in developing research models. The function of thousands of other genes with unknown functions can be determined by additional comparative studies. In addition, the comparison of DNA sequences of the genomes of different microbes can provide new insight in regard to the kingdoms of life: eukaryotes, prokaryotes, and archaebacteria (which is considered and presently classified an ancient life form that preceded and evolved separately from later bacteria and blue-green algae).

In DNA forensics, data from HGP will improve our ability to identify potential suspects whose DNA may match evidence left at a crime scene; exonerate individuals wrongly accused of a crime; identify crime and catastrophe victims; establish paternity and other family relationships; identify endangered and protected species (could be used to prosecute poachers); detect bacteria and other organisms that may pollute air, water, food, and soil; match organ donors with recipients; and determine pedigree for seed or livestock breeds. This will be made possible because any type of organism can be identified by the examination of a DNA sequence, which is unique to that species. To identify individuals, forensic scientists will scan about 10 DNA regions that vary from person to person and use this information to create a DNA profile of that individual (called a "DNA fingerprint").

In agriculture, the understanding of plant and animal genomes will allow the development of genetic modifications to yield crops that are disease-, insect-, and drought-resistant as well as healthier, more productive, and disease-resistant livestock. An example of the benefits gained would be that disease-resistant crops would require little or no pesticides. This would be beneficial because pesticides can be hazardous to humans, and pesticides are expensive, which adds to the cost of production. Therefore, safer and less expensive food can be grown. In addition, larger and more nutritious fruits and vegetables can be grown. It is also conceivable that edible vaccinations can be incorporated into new food products.

A very complicated science is behind the completion of HGP. In a basic sense, DNA from every organism possesses the same chemical components (i.e., a 5-carbon sugar group, a phosphate group, and a nitrogenous base). An organism's complete set of DNA is known as a *genome.* DNA is typically arranged into a distinct unit called a "chromosome." Each chromosome contains specific regions called *genes,* which are the basic physical functional units of heredity. Genes contain instructions that encode how to make proteins, which ultimately perform most biological functions. The total arrangement of a cell's protein is referred to as its *proteome.*

Each protein has a specific chemical composition and biological function, which are provided by instructions from a particular gene. Many genetic diseases are attributed to an irregularity in the structure and/or function of a protein, which is directly connected to an error in the base pairs of that specific gene. Consequently, a gene with a mistake in its base pairing will yield an abnormal protein, which is manifested by an abnormal physiology. Examples of this would include an abnormal structure in one of the proteins of a red blood cell, resulting in its inability to properly carry oxygen molecules (seen in anemia) or an abnormal protein structure of a sodium channel, which results in the inability of a cell to function properly, causing gastrointestinal and respiratory problems (seen in cystic fibrosis). Research that is geared toward protein structure and function is now becoming the main focus in order to provide insight into the molecular basis of medical health. This area of study is known as *proteomics.*

How is sequencing of the genome done? In the initial "subcloning step," the chromosomes are chemically broken down into smaller pieces, which are easier to work with. Next, each piece is used as a template (the *template preparation step*), which is, in turn, used to generate sets of fragments (the *sequencing reaction step*) that differ in length by one base pair. The newly sequenced fragments are then separated by a biochemical technique known as *gel electrophoresis;* this process is the *separation step.* The final step (the *base-calling step*) recreates the original sequence of each short piece generated in the subcloning step; this is analyzed by automated sequencers and read by computers (known as *bioinformatics*), which assemble the small sequences into a long, continuous strand that is examined for errors. The completed sequence is sent to a major public sequence database and made available to everyone around the world.

In the future, technology and genetic bioengineering may merge together and combine with information from the HGP to make it possible to "enhance" the human genome of an individual, thus potentially enriching the gene pool. Of course, this is very controversial and arouses many ethical and religious concerns. This technology is seen in a new area of medicine called "gene therapy," which is the treatment of genetic disorders, anomalies, or deficiencies by introducing specific engineered genes into a patient's cells. Presently, this is being introduced as a treatment option for diseases like prostate cancer.

Up until now, a tremendous amount of benefits has been enumerated and discussed, and consequently a typhoon of excitement has been created about a new era to come. However, there are many ethical, legal, and social implications that will need to be addressed in the new "postgenomic" era.

Much concern has been raised as to the fairness in the use of personal genetic information. It will need to be determined who should have access to personal genetic information and how to use it ethically and legally. This will need to be established so that insurance agencies, employers, courts, and schools do not use this information unfairly or discriminate against individuals based on their genomes. In addition, it will be important to decide who will legally own and control this information and what type of privacy and confidentiality will be ensured.

There are also concerns regarding genetically modified foods, as to whether they are safe for human consumption and to the environment or if they will have adverse effects on people's health. Research will have to be conducted to determine any detrimental effects or health risks associated with consuming genetically modified products.

Many clinical issues will also need to be resolved. For example, how are genetic tests evaluated or regulated for accuracy and reliability? Presently, there is little or no federal regulation in regard to genetic tests in the clinic. Other clinical issues will need to be addressed, such as whether we are prepared for the changes that will take place. It also needs to be assessed as to whether or not health care professionals are prepared to deal with the new genetics in a clinical setting. Ultimately, this may lead to changes in a clinician's education and certification standards. Also, it needs to be determined whether the public is being

prepared to make an educated and informed choice regarding genetic testing and the possible advent of gene therapy.

The new age of gene therapy also conjures up concerns in regard to what will be defined as required medical treatment and what is classified as genetic enhancement. Ethically, should people be allowed to enhance their genomes when it is not medically necessary? And what type of regulations will be set in place? In addition, it is conceivable that only the wealthy may be able to afford genetic enhancement. It may be also conceivable that this could give rise to a superior genetically enhanced upper class and a reciprocally inferior genetically unenhanced lower class. Or will it be possible for genetic enhancement to be equally available? This may create a "separation of class based on the availability of genetic enhancement." It is also conceivable that this could provide the next step in human evolution, leading to a new form of our species.

Philosophical beliefs will also be challenged as a result of the completion of HGP in regard to ideas such as free will. For example, if an individual's genome and genetic makeup are determined and mapped, will we arrive at the conclusion that an individual's genetic makeup dictates individual behavior and choice? If a genome can be altered or genetically enhanced, then there is the possibility that an individual's behavior may be controllable, negating the tender notion of free will and individuality.

In the future, due to the tremendous benefits that will be provided as a result of HGP, progress should be allowed to continue. However, guildelines need to be provided by educated, informed, and just individuals to ensure that new technology is not used to discriminate against individuals unjustly. Long-term goals should include the development of technology to protect all individuals' "genetic privacy," as well as addressing ethical and philosophical concerns. In short, the benefits should outweigh any short-term setbacks.

— John K. Grandy

See also **DNA Testing; Genetics, Human**

Further Readings

Benfey, P. (2004). *Genomics.* New York: Prentice Hall.

Macer, D. (2004). *The Human Genome Project* (Vol. 1). New York: Jai Press.

Palladino, M. (2005). *Understanding the Human Genome Project* (2nd ed.). New York: Benjamin Cummings.

Reardon, J. (2004). *Race to the finish: Identity and governance in an age of genomic.* New York: Princeton University Press.

Human Paleontology

Paleontology is the study of fossil animals and plants. Human paleontology focuses exclusively on fossils related to the human lineage. Human paleontology is highly interdisciplinary; to recover, describe, and interpret human fossil remains, its researchers need knowledge of cultural anthropology, archaeology, biology, paleontology, and geology.

Paleontology and Human Paleontology

Fossils, the remains or imprints of dead organisms, are the only physical evidence humans possess of ancient life. While fossils are generally formed from bone, shell, or wood, under very specific conditions, fossils may be formed from soft tissue, animal tracks, skin impressions, and feces. Sometimes, bones are disturbed by scavengers or water movement prior to fossilization; the study of what happens to a bone from the time of the organism's death to its discovery is called *taphonomy.*

Research in paleontology focuses on reconstructing the history of life on Earth. Fossils provide important clues about past environments, ecosystems, and evolution. Paleontology incorporates knowledge from many fields to understand the processes of evolution and to reconstruct ancient life. Most fossils studied by paleontologists are anywhere from thousands to several millions of years old. Human paleontology focuses on fossils of the human lineage, thought to begin between 5 and 8 million years ago.

Like paleontology, human paleontology utilizes evolutionary theory and the scientific method to test hypotheses about past lifeways and relationships. Ecological niche theory and estimates of inter- and intraspecific competition levels also help reconstruct behaviors and evolutionary pressures. Morphometric and cladistic methodologies help researchers define

fossil species and reconstruct relationships between fossil species and between fossil and living species.

However, human paleontology differs from paleontology in that it studies human origins. This self-reflexive process, humans studying humans, is subject to bias not seen in studying, say, the evolution of birds. Most animals transmit information from generation to generation primarily through genetics (the purview of biological evolution). However, humans have a well-developed ability to pass information along through culture: teaching and learning. While culture is by no means exclusive to humans, humans utilize it so very heavily that it has arguably interfered with evolutionary pressures normally experienced by other animals.

Because of the heavy influence of culture on human adaptation, the application of some paleontological methods can be problematic. While early fossil humans, like other animals, had to adapt biologically and behaviorally to specific environments or ecological niches via natural selection, this is less true for later fossil humans. When fossil humans began to rely on cultural adaptations, such as fire and toolmaking, to assist them in survival, these adaptations created a cultural buffer between them and their environment. If humans can warm themselves through the controlled use of fire, winters are no longer as dangerous as they once were. Communication/language skills and technological sophistication have played large roles in shaping human adaptation to the environment. It is difficult to know how to interpret to what extent the forces of natural selection affected the survival of a species that relies so heavily on technology.

The terms human *paleontology* and *paleoanthropology* are often used interchangeably, although the former is primarily focused on the study of human fossils and the latter is a broader multidisciplinary activity. Paleontology does not usually deal with artifacts made by humans, but due to the uniqueness of the human biocultural adaptation, human paleontologists do look at artifacts as well as modern human and primate behavior to better understand the fossil record and humans' place in nature.

Areas of Research Within Human Paleontology

The human fossil record, like all fossil records, is incomplete. Fossil skeletons are rarely complete. Only a very small percentage of the original members of any species experienced the accident of preservation as fossils. The challenge for human paleontologists is to reconstruct anatomy, behavior, and ecology from these specimens.

Osteology is the study of the structure and function of bones. The structure of bones is genetically based, but bones also respond to developmental events, stresses, and injuries to the body. Human paleontologists have to become very familiar with variation (between sexes, within any population, and between populations) exhibited by the modern human species. Some of this variation is genetic, but variation is also caused by unique life events experienced by the individual. The definition of fossil species rests on understanding of how much variation existed in the past, a difficult question, indeed. Familiarity with the principles of biomechanics (the study of the forces exerted by muscles and gravity on the skeleton) and the skeletons of primates and other animals help human paleontologists reconstruct the movement and behavior of fossil humans.

Dental anthropology, or the study of the dental evolution, variation, and morphology of modern and ancient human populations, is also a vital area of inquiry. Since teeth are composed of enamel, the hardest substance in the body, they are more likely to survive in the fossil record. Teeth are an important source of data in the reconstruction of fossil human diet, behavior, and species variation. Through the study of anatomy, human paleontologists can describe a species' size, diet, locomotor style, ecology, and even shed light on behavioral issues such as group size and social organization.

Human paleontologists use genetics to help answer questions about recent common ancestry and past population movements. They can measure how closely two species are related by comparing their DNA. Species that are similar genetically share an ancestor in the not-too-distant past. When geneticists compare human and chimpanzee DNA sequences, less than 2% of the sequences are different, meaning that these two species have a very recent common ancestor. Human paleontologists can estimate how long ago two species shared a common ancestor by using a "molecular clock," which calibrates an estimated mutation rate against time of divergence of different lineages. Scientists also use the concept of a molecular clock, but use mitochondrial DNA (or mtDNA) to track past population movements and to determine when and where the earliest modern human ancestor lived.

Finally, human paleontologists must look to behavioral models seen in modern humans and living primates to interpret fossil human behavior. Primate and human ecological models inform research on dietary adaptations and food-getting strategies, activity patterns, ranging behavior, and male/female reproductive strategies and social hierarchies.

A holistic anatomical study, including paleobotanic, paleontological, and paleoenvironmental associations, combined with molecular genetics and studies of behavioral models help human paleontologists understand the broader picture of human evolution.

— *Cathy Willermet*

See also **Eve, Mitochondrial; Osteology, Human; Paleoanthropology; Paleontology**

Further Readings

Aiello, L., & Dean, C. (1990). *An introduction to human evolutionary anatomy.* San Diego: Academic Press.

Boyd, R., & Silk, J. B. (2003). *How humans evolved* (3rd ed.). New York: Norton.

Johanson, D., & Edgar, B. (1996). *From Lucy to language.* New York: Simon & Schuster.

Human Rights and Anthropology

The term *human rights* refers to a set of legal and normative standards according to which all humans are ordained with certain rights irrespective of the cultural or social circumstances of their lives. Although the concept has considerable historical antecedents, modern human rights can be said to have been inaugurated with the establishment of the United Nations (UN) after World War II and that organization's adoption of the Universal Declaration of Human Rights. Since then, the number of organizations, treaties, and resolutions dedicated to human rights has multiplied dramatically.

The intersections between anthropology and human rights are numerous due to the increasingly vast range of issues covered under the rubric of human rights and the variety of topics addressed by anthropologists. The relationship between human rights and anthropology is made even more complex by the coexistence of a strong undercurrent of a commitment to social justice and skepticism of human rights' emphasis on universalism in anthropology. Indeed, much of anthropology's early engagement with human rights specifically targeted the issue of relativism and the cultural specificity of ideas of human rights. Although most anthropological work prior to the 1990s did not explicitly examine human rights, anthropology has given rise to a rich body of work addressing pressing social problems, such as the impact of poverty and violence on the communities in which anthropologists do research. This body of work has given us a detailed record of the psychological effects of collective trauma, the use of cultural creativity as a coping mechanism, and the search for dignity in the midst of abject poverty. A recent offshoot of the anthropology of war and violence examines peace processes and attendant mechanisms such as postconflict tribunals and truth and reconciliation processes and their role in nation building. The idea of human rights is not merely a subject of study for anthropologists, however, but an increasingly significant influence on anthropological practice and how anthropologists interact with a range of interest groups. The emergence of claims to tangible and intangible cultural property rights and their subsidiary issues, such as that of the repatriation of material culture or skeletal remains to cultures or nations claiming those artifacts as part of their identity, has underlined the obligations of anthropologists to the communities in which they conduct research.

The History of Human Rights and Cultural Relativism

The foundational document of contemporary discussions of human rights is the Universal Declaration of Human Rights, a statement of aspirations and principles adopted by the UN General Assembly in 1948 as an expression of a commitment to a just world order, in which the horrors of World War II and the Holocaust would not be repeated. While the Universal Declaration drew upon a rich history of political thought and struggles against injustices, including the French and American Revolutions and the abolitionist struggle against the Atlantic slave trade, it signaled the hitherto most extensive commitment by many countries to a range of rights, including political, social, economic, and cultural ones. The Universal Declaration has been expanded upon,

further specified, and sometimes made legally binding through numerous subsequent conventions and resolutions. These include the International Covenant on Civil and Political Rights, the International Covenant on Economic, Social, and Cultural Rights, and conventions on the rights of women, slavery, and children's rights, among other issues. Important human rights work is also carried out by specialized UN agencies, such as the International Labor Organization (ILO), which has played a leading role in defining labor rights and the rights of indigenous peoples, and the United Nations Educational, Scientific, and Cultural Organization (UNESCO), which has played a leading role in defining rights to education and cultural rights. The three regional human rights systems in Africa (the African Commission on Human and People's Rights), Europe (the European Court of Human Rights), and the Americas (the Inter-American Court of Human Rights) add another layer of institutions dedicated to the protection and promotion of human rights. Finally, numerous nongovernmental organizations and research centers contribute to the global propagation and strengthening of human rights. International humanitarian law (the set of laws that governs the conduct of conflicts, including the Geneva conventions), while historically and conceptually distinct from human rights, increasingly overlaps with human rights law and is often included in discussions of human rights. Consequently, human rights do not constitute a coherent whole, but are an amalgamation of standards, norms, and principles that are not always wholly compatible and are not easily slotted into a hierarchy of importance. Indeed, many human rights controversies, including particularly contentious matters, such as female genital mutilation, are made more complex by conflicts between different rights, such as between the right to practice one's beliefs as one sees fit and the rights of women. In addition, human rights are often not justiciable; that is, there is often not a clear legal recourse available to groups or individuals who believe their rights have been violated. Where such a resource exists, it is often subjected to significant restrictions. Nonetheless, the importance of human rights as a global normative discourse is difficult to overstate, as it animates and legitimates a wide range of political and legal claims.

The American Anthropological Association was among the organizations consulted by UNESCO at the time of the drafting of the Universal Declaration of Human Rights. The response was submitted to UNESCO in 1947, but there is no evidence that it was passed on to the drafters of the Universal Declaration. It was drafted by Melville J. Herskovits, a prominent anthropologist and a proponent of the idea of cultural relativism that had in some form dominated American anthropology since the work of Herksovits's teacher, Franz Boas. Cultural relativism was intended as a methodological or heuristic principle that held that a given practice can be understood only in the context of its culture. Informed by cultural relativism, the statement was a strongly worded argument for the tolerance of diversity and the biological unity of the human species, as well as a critique of racism and colonialism. It also suggested that values vary across cultures and any declaration of rights purporting to be universal must take that variation into account or simply be the expression of a particular culture's (or group of cultures') values. The worry, not unique to anthropologists, was that a list of rights and freedoms grounded in Western political thought and experience would be imposed on other cultures. Set against the background of European imperialism and the rhetoric of a civilizing mission justifying the colonization of most of Africa, South Asia, and other parts of the world, this admonition was wholly consistent with the anticolonial stance of the statement.

Cultural relativism has since then been largely misconstrued in many human rights debates into a version of moral relativism, suggesting that a cultural practice cannot be judged as right or wrong as long as it makes cultural sense. Cultural and moral relativism are not mutually exclusive, but the former does not necessarily lead to the latter. Despite occasional attempts by anthropologists to alter the terms of the debate, cultural relativism and universalism have remained the two poles around which much of the discussion has taken place. The proposition that human rights are a Western construct imposed in an imperialist fashion on peoples and cultures in the third world had considerable traction during the Cold War, during which the United States and its allies and the Soviet Union and its allies were proponents for different sets of rights (civil and political rights and socioeconomic rights, respectively). Proponents of "Asian values" similarly asserted that economic development should be prioritized over political freedoms and that many human rights, such as freedom of speech or assembly, reflect a Western individualistic culture and not the communitarian ethos attributed

to Asian cultures. Anthropologists have addressed these and other deployments of a crude cultural relativism for political purposes by noting the discrepancy between claims to cultural difference made by political leaders and the lived reality of their subjects, and by searching for cross-cultural equivalencies of human rights.

With the notable exception of the rights of indigenous peoples, anthropology was largely insignificant in substantive human rights debates beyond the issue of cultural relativism until the 1990s. Concern over discriminatory laws and policies, violence against indigenous peoples with the acquiescence of state authorities, the exploitation of indigenous people's territories by industrial operations, the harmful effects of environmental spoliation and degradation, and vulnerability to disease and substance abuse have prompted anthropologists to act as spokespersons for indigenous groups on every continent. Often working with indigenous scholars and activists, anthropologists have worked to rescue the history of indigenous peoples from the grand narrative of colonial expansion and to highlight the continued discrimination against and repression of indigenous peoples. Anthropologists have frequently argued against portrayals of indigenous groups as primitive remnants of an earlier age and advocated for the appropriateness and vitality of indigenous practices often overlooked by development and funding agencies in the management of natural resources. Anthropological research on the cultural traditions of indigenous groups has also been used by nationalist and indigenous movements to bolster claims to indigenity. Anthropologists have, finally, also been actively involved in international efforts to promote and protect the status of indigenous peoples, such as the UN Permanent Forum on Indigenous Issues or nongovernmental organizations like Cultural Survival.

The research and advocacy on behalf of the status of indigenous peoples is but one instance in anthropology's disciplinary history of addressing social injustices and being a voice for marginalized groups. An early example of this commitment is Franz Boas's struggle against bigotry and racism in the United States. In the 1960s and 1970s, many anthropologists, often influenced by Marxism or some version of dependency or world systems theory, sought to document the impact of global capitalism on local communities and the third-world laborers whose work sustains the wealth of the West and local elites. This work draws our attention to the fragmentation of social identities under global capitalism and the resultant vulnerability of communities, as well as the linkages between pauperization and economic exploitation on one hand and political and cultural marginalization on the other. Other work emphasizes the vitality of cultural traditions and the power of cultural practices and rituals to rearticulate impersonal corrosive global and regional forces into vernacular understandings of power and authority, hence making these forces approachable and ultimately contestable. More recently, other anthropologists have focused on the effect of structural violence on social problems, like famine or public health issues, such as the HIV/AIDS epidemic, arguing that these are often the result of, or exacerbated by, political decisions or willful ignorance. This work is, in turn, part of a long-standing interest in the social consequences of biomedical policies, particularly where they have consequences for human rights as in cases of forced sterilization.

Thus, since Boas, many anthropologists working under banners such as "action anthropology," "engaged anthropology," "public anthropology," and "public interest anthropology" have sought to address social injustices and promote social change. This scholarship, while for the most part not referencing human rights explicitly, nonetheless mirrors many of the concerns with the global human rights movement. Nonetheless, these partial exceptions aside, the scarcity of anthropological engagement with the growing international human rights regime is notable. Indeed, several anthropologists in the 1980s and early 1990s disapprovingly noted the paucity of anthropological studies of human rights and the institutions and individuals participating in their expansion.

The End of the Cold War and the Anthropology of Human Rights

The end of the Cold War in the early 1990s saw a resurgence of human rights and much talk of the victory of a Western liberal conception of human rights and the free market. The seemingly universal acceptance of human rights did little to stem the continued violent excesses and "dirty wars" of authoritarian governments, stop the outbreak of war and genocide (most notably the nearly simultaneous genocides in the former Yugoslavia and Rwanda and the Somalia crisis), or alleviate the crushing poverty of many third-world

countries exacerbated by an accelerating HIV/AIDS crisis. Within academia, cultural relativism lost some of its saliency, and the skepticism with which many scholars from across the social sciences and humanities had approached human rights receded by the first half of the 1990s. Anthropology itself underwent a dramatic period of self-scrutiny in the 1980s and paid a considerable amount of attention to the epistemological claims of anthropology, how these claims are constructed, and the relations of power and influence that enable those constructions in the first place.

A consequence of this period of theoretical upheaval was the transformation of the culture concept. The idea of a world of discreet cultures with their own conceptions of rights became increasingly untenable given the view of culture as a practice and something contested and negotiated. With the focus on power relations and the social maintenance of cultural boundaries, itself a mainstay of anthropology since the early work on ethnicity in the 1960s, statements of what a culture really is are increasingly difficult to make. Processes of globalization have further destabilized notions of culture to a point where the movement of goods, images, and ideas, including human rights, between culturally diverse contexts is part of the anthropological study, rather than a distraction. This confluence of factors has helped to propel human rights to the forefront of the anthropological imagination. As an institutional expression of this shift, the American Anthropological Association issued a new Declaration on Anthropology and Human Rights in 1999, which explicitly referenced the Universal Declaration of Human Rights and associated legal instruments as the baseline for anthropology's social commitment.

The reorientation of the relationship between anthropology and human rights away from previous discussions of relativity and cultural specificity to one where human rights themselves are considered cultural practices with particular social trajectories is an additional outcome of these shifting emphases within anthropology. From this vantage point, the question of whether particular human rights originate in a particular culture or have their equivalency in some other culture becomes less urgent. Instead, it becomes more important for anthropologists to study and describe how human rights are produced, by whom, in what contexts, and for what purposes. These human rights are disseminated through channels of communication and interaction that are empirically traceable by anthropologists, and received and elaborated on by actors for specific strategic interests. Working in this mold, anthropologists have produced studies of the "arrival" of human rights in different countries that detail how local grievances are translated into human rights concerns and thus tap into a globally legitimate political idiom and transnational networks of organizations, knowledge, and resources. A subset of this body of work focuses squarely on the legal and political institutions and meetings that produce human rights laws and standards, examining the cultural and social precepts and expectations brought to bear on the drafting processes themselves. These institutions, it is often argued, form a technocratic, legalistic, "culture of rights" that is roughly analogous to ethnic cultures in that they are premised on shared understandings, maintenance of social boundaries through educational and professional requirements, and frequent interaction.

In conjunction with a focus on the social processes of human rights, anthropologists have built up an extensive corpus exploring the effects of political and structural violence and war on groups and individuals. An important part of the anthropological study of violence in conflict is to understand the cultural and social logic that shapes how violence is enacted. Research conducted on the conflicts in Rwanda and Sierra Leone, for instance, have demonstrated that violence is often not random or gratuitously grotesque, but follows a particular rationality. These studies offer a counterpoint to popular representations of non-Western conflicts as particularly nasty or barbaric by foregrounding how violence is expressed in a culturally and socially relevant manner and thus follows an instrumental logic, however unpleasant the result may be. Anthropologists have generally argued against totalizing interpretative models, suggesting that all conflicts are ethnic or between competing religions, and advocated paying attention to the multitude of cross-cutting social relationships of kinship, ethnicity, religion, nationality, and class that may be factors in the emergence of armed conflicts.

Other studies have emphasized the international dimension of ostensibly domestic conflicts, demonstrating how such conflicts are often embedded in global capitalist processes, fueled by the international trade in arms, drugs, and commodities, and exacerbated by corruption and the grinding economic inequalities between regions, countries, and groups. Other anthropologists have focused on the effects of

fear and violence on communities, foregrounding the effects of trauma and impunity on social attachments and civil trust and how cultural identities are shaped by the militarization of everyday life. Drawing on work in Guatemala and Northern Ireland and other countries and territories, anthropologists have approached political violence as one of the ways through which a government or alternate authority structure creates and maintains a particular order and may suppress some voices while legitimizing others.

The resolution of conflicts, peace processes, and the aftermath and remembrance of war have attracted considerable anthropological attention as well. Anthropologists have brought a range of perspectives to bear on these matters, ranging from the study of the juridical processes intended to punish perpetrators of war crimes and crimes against humanity (such as the international criminal tribunals for Rwanda and former Yugoslavia) to the commemoration of the victims of war and genocide. Truth and reconciliation processes, most notably the South African transition from apartheid, have generated a significant body of work in which anthropologists have scrutinized their underlying assumptions, most notably the assumption that societies are analogous to individuals and that speaking out would work as a therapy for the nation. A few studies have also examined how some grievances are made part of the official version of the peace processes and others shunted to the side.

War and violence are not always easily amenable to ethnographic analysis, however. The methodological challenges are numerous and include the difficulty of tracing processes spanning multiple locales and the difficulty of securing reliable information. Some anthropologists have also voiced concern about the ethical responsibilities of anthropologists in situations of conflict, noting that there is a shortage of anthropological studies of the perpetrators of human rights abuses but cautioning against seeming to morally justify these abuses. The paramount concern, however, is the personal safety of the anthropologist as well as the individuals or groups he or she studies and for whom he or she may be an advocate. The murder of Myrna Mack, a Guatemalan anthropologist who had advocated for the rights of rural indigenous communities, is a well-known example of the risks anthropologists may take when speaking up for a marginalized group in a context of violence.

Rights, Cultural Property, and Anthropological Research

Human rights are not just a subject of anthropological research, but as a body of norms and laws, a factor impacting the conduct of anthropological research itself. This impact ranges from general provisions applicable to everyone (freedom of movement, for instance) to sets of rights specifically concerning areas of traditional anthropological expertise, such as cultural rights and the rights of indigenous peoples and minorities. Both of these areas of rights have seen a dramatic expansion of late as the UN and the regional human rights systems are increasingly seeking to frame the rights of indigenous and minority groups not just as protection from discrimination, but as a right to have their cultural heritage protected and promoted. Cultural rights refer to an amorphous set of rights to both cultural identity in the sense of a way of life, ethos, or worldview and the material expression thereof, and the right to create and enjoy particular genres of what is often referred to as "high" culture, such as art or music. Cultural rights consequently butt up against a range of other rights, including the right to freedom of expression, rights to education, and intellectual property rights. This distinction is muddied, however, by the increasingly common adoption of a model of property rights to matters of the cultural heritage of indigenous and minority groups.

As the obligations of states to protect and promote aspects of minorities' and indigenous people's cultures are strengthened, anthropologists may find themselves caught between the requirements of research and their human rights obligations toward the people they study. There is an emerging global consensus that material culture or biological remains linked to a culture or nation should not be removed from that culture or nation except in particular authorized circumstances (such as on loan for a museum exhibit) or that where such items have already been removed (be it due to war, colonial conquest, or theft), they should be repatriated. Well-publicized disputes such as that over the Elgin Marbles (a series of reliefs removed from the Parthenon by an English nobleman, Lord Elgin, sold to the British government in 1816, and now on display in the British Museum) have generated an extensive debate as to what the grounds for repatriation should be: whether the return of a few archaeological items would set a precedent that would force many major museums to give up significant parts of their collections

and whether the retention of an artifact might be permissible if its return to the culture or nation would endanger it due to limited resources for its conservation or its potential to be resold on international art markets.

As a response to these concerns, many countries have enacted legislation intended to protect the rights of indigenous and other cultural groups to their patrimony. The Native American Graves Protection and Repatriation Act (NAGPRA) was passed by the U.S. Senate in 1990 and established requirements for the repatriation of Native American and indigenous Hawaiian items to their descendants and culturally affiliated groups, as well as a process for the claiming of Native American cultural items. While the anthropological community's reaction to NAGPRA and similar initiatives in other countries has been overwhelmingly positive, the resultant tension between the requirements of scientific research and the right to cultural patrimony has occasioned several disputes, such as that of the "Kennewick Man." The Kennewick Man is a skeleton found in the state of Washington, in 1996, with the potential to complicate our present understanding of prehistoric America. The discovery and efforts to identify the origin of the skeleton pitted Native American groups against anthropologists and other researchers (the very name Kennewick Man is itself contested). The former group argued that the skeleton was Native American and thus had to be repatriated to them as required by NAGPRA, and the latter group argued that the association between the skeleton and the Native American groups is not easily scientifically demonstrable and that the scientific right to study the skeletal remains for the benefit of the broader community cannot be limited by NAGPRA. The debate also implied an argument, ultimately won by the anthropologists, over whether or not oral traditions were equal to written sources of history and scientific findings in terms of their validity and reliability.

The protection of intangible cultural heritage raises similar questions of ownership and cultural property. Efforts by UNESCO and other groups to codify standards and obligations for the protection of cultural practices such as music and folklore (most recently, the 2003 Convention on the Safeguarding of the Intangible Cultural Heritage) seek to establish lists of cultural practices under threat and recommend measures to be taken by governments to prevent their disappearances. Anthropologists have noted, however, that by seeking to preserve particular instances of cultural expression, one essentially makes that instance the paramount expression, contrary to our contemporary understanding of culture as fluid and negotiated. The process for deciding what practices will be singled out for protection by government is not always transparent and might conceivably be abused by special interests. The call for the safeguarding of intangible culture, moreover, entails a judgment of what culture change is desirable and what is not without providing any clear guidelines for making that determination. Finally, some anthropologists have expressed dismay over efforts to transform cultural practices into property that can be legally protected and exchanged as commodities (for example, the treatment of indigenous pharmacological knowledge as an intellectual property).

These concerns are weighed against the ethnographic reality of culture loss, where communities feel that their cultures are under siege from external pressures. Anthropologists and activists have also expressed concern over the phenomenon of "language death," or the decrease in the speakers of a language to a point where it is no longer used. Many of these worries are not new to anthropology, however. Early anthropology under Franz Boas and his students contained an exhortation to "salvage ethnography," or the recording of cultural and linguistic data for posterity, premised on the assumption that if linguistic and cultural diversity are diminished, humanity at large is poorer. More recently, the responsibilities of the anthropologist with regard to ethnographic data have become of increasing concern. The aforementioned epistemologically reflexive turn of the 1980s, mindful of anthropology's reputation and sometime collaboration with colonialism, was particularly concerned with how ethnographic authority is established, the collaborative nature of field research, and the ownership of ephemeral cultural data recorded by the anthropologist. While it widely held that anthropologists are obliged to share the results of their research with the communities they study, the allocation of responsibility for data past that point is uncertain. The ownership of a recording of a performance, for instance, may be said to belong to the anthropologist who did the recording or to the informant who performed. Whether or not these kinds of cultural artifacts can or should be repatriated remains unclear.

Irrespective of the legal or scientific merits of these and similar discussions, some anthropologists have

expressed dismay over the adoption of a model based on ownership and property for the protection of groups' cultural heritage, as the presuppositions of that model are not necessarily appropriate for matters of cultural identity. These concerns include whether one can stipulate that a given artifact or practice is somehow necessary or important to the survival of a particular cultural practice and the underlying reification of a cultural group as an entity whose integrity is measured by the retention of material objects. Other anthropologists question whether an approach based on rights is efficacious and whether it may trap negotiations of culture in a legal framework and thereby distort them. These misgivings notwithstanding, most anthropological researchers are broadly sympathetic to the aims of NAGPRA and similar national and international efforts.

In addition to these cultural rights, anthropologists follow the same guidelines for research on human subjects used by other social and natural scientists. These guidelines overlap with well-entrenched human rights norms, like prohibitions on forced labor and the right not to participate in a scientific experiment without informed consent. These normative standards are given formal expression in national laws, university regulations, and professional codes of ethics and conduct. Accusations of violations of these and similar rights by anthropologists are rare, but a notable exception is the debate surrounding anthropological research conducted among the Yanomami (an indigenous group in Brazil and Venezuela). The controversy was sparked by a book by an investigative journalist alleging that the researchers, including several anthropologists as well as medical and biological scientists, had purposely started an epidemic as a scientific experiment. An inquiry into these charges would eventually conclude that they were unfounded, but the controversy nonetheless foregrounded the ethical responsibilities of anthropologists.

Episodes like that of the Yanomami are exceptions to the fertile interaction between anthropology and human rights and the numerous contributions made by anthropologists to alleviate specific human rights problems. Anthropological expertise has also been marshaled in support of forensic investigations into genocide and ethnic cleansing. The often rare cultural and area expertise of anthropologists is often called upon for political and legal proceedings such as asylum cases. Anthropology remains central to the effort to protect against the involuntary fading away of linguistic and cultural practices, whether tangible or intangible. Finally, anthropologists often effectively speak out against abuse and injustice, drawing upon a rich legacy of commitment to tolerance and human rights.

— *I. Niklas Hultin*

See also **Ethics and Anthropology**

Further Readings

Borofsky, R. (2004). *Yanomami: The fierce controversy and what we can learn from it.* Berkeley: University of California Press.

Brown, M. F. (2003). *Who owns native culture?* Cambridge, MA: Harvard University Press.

Cowan, J. K., Dembour, M. B., & Wilson, R. A. (Eds.). (2001). *Culture and rights: Anthropological perspectives.* New York: Cambridge University Press.

Dean, B., & Levi, J. M. (Ed.). (2003). *At the risk of being heard: Identity, indigenous rights, and postcolonial states.* Ann Arbor: University of Michigan Press.

Farmer, P. (2003). *Pathologies of power: Health, human rights, and the new war on the poor.* Berkeley: University of California Press.

Hinton, A. L. (Ed.). (2000). *Annihilating difference: The anthropology of genocide.* Berkeley: University of California Press.

Sluka, J. A. (Ed.). (1998). *Death squad: The anthropology of state terror.* Philadelphia: University of Pennsylvania Press.

Wilson, R. A., & Mitchell, J. P. (Eds.). (2003). *Human rights in global perspective: Anthropological studies of rights, claims and entitlements.* New York: Routledge.

Human Rights in the Global Society

You gain strength, courage and confidence by every experience in which you really stop to look fear in the face.

— Eleanor Roosevelt

Every day, year after year, women grotesquely disfigured by fire are taken to Victoria Hospital's burn ward

here in India's fastest growing city. They are in rows, wrapped like mummies in white bandages, their moans quieted by the pain-obliterating drip of morphine. Typically, these women, and thousands like them, have been depicted as victims of disputes over the ancient social custom of dowry and as symbols of the otherness of India, a place where lovely young brides are doused with kerosene and set ablaze for failing to satisfy the demands of their husband's families for gold, cash, and consumer goods that come as part of the marriage arrangement.

As European countries batten down the hatches against immigration, seen as a burden on welfare and a threat to national identities already blurred by globalization, illegal immigration is soaring.

"Welcome to Europe" says a sign on the western side of the bridge over the Bosporus in Istanbul, Turkey, but the Europe of high incomes and generous welfare benefits that immigrants dream about is hundreds of miles west of here. For many, the road to it runs through the seething Istanbul quarter of Laleli.

Here, the seedy hotels are full of Russian prostitutes known locally as "Natashas," and the traffic in false passports that might afford entry to the European Union is brisk. Almost every day, newspapers are filled with accounts of discrimination, massacres, torture, or forced disappearances of political opponents. Horrors and tyranny are certainly not new in human history. The difference is that today there is a new parameter for assessing them: breach of this or that human right. This is an indubitable advance. Since 1948—that is, after the adoption of the Universal Declaration of Human Rights—all countries in the world, including those that had not gone through the long historical process of formation of the modern liberal-democratic state, have at their disposal an *international code* to decide how to conduct themselves and how to judge others. This is a code that not only has the virtue of *universal application* but also includes valuable principles in areas previously neglected by the constitutions of Western states. Previously, a state was accused of massacring an entire population; today, international norms talk of genocide, using this term with full awareness of its scope. Previously, it could be said that a state was torturing citizens; today, in addition to torture, international norms forbid any "inhuman or degrading treatment, or punishment." Previously, all one could do was denounce certain governments for neglecting the interests of their population; today, they can be accused of breaking the international rules providing for the right to food, the right to decent housing, the right to a healthy environment, and so on. Looked at properly, this does not mean merely that new definitions and a new "labeling" system are available to states and individuals; the international rules on human rights impose modes of behavior by requiring governments to act in a certain way and at the same time legitimize the complaints of individuals if those rights and freedoms are not respected.

The areas of human rights protected at world level has become quite broad. First, it includes *civil liberties.* These consist primarily of the "free space" that every government must guarantee the individual by not interfering in a certain private sphere: the right to life and security, to privacy, to "family life," to private property; the possibility of expressing one's opinion freely, of practicing a religion or not, and of peaceful assembly. Civil liberties also cover the state's obligation to articulate its structures in such a way as to guarantee a minimum of respect for the human person, as well as full justice in cases of abuse: the right not to be subjected to arbitrary rights to a fair trial. The international community further enforces *political rights* (the possibility for the individual to contribute, alone or in association with others, to the life and action of government: the right to associate, to form political parties, to take part in elections, to be elected to the various state offices, and so on). Also recognized at international level are *economic and social rights.* These are entitlements that the individual has vis-à-vis the state, in order to obviate social inequalities and economic imbalances, and to limit disadvantages caused by nature, age, and so on. By contrast to the other rights, the state is not bound to meet these entitlements all at once, but may see to them gradually, taking account of the economic and structural problems it has to face. In addition to the rights belonging to individuals, international norms also cover those of *minorities* and of *peoples.* Peoples in particular have, on certain conditions, the fundamental right to self-determination, that is, the right both freely to choose their own international statutes and to adopt the type of government most suited to popular aspirations.

If, then, every day some state is denouncing violations committed by other countries, if the media lend their support to this denunciation (or more often draw attention to facts and events that have frequently taken place in silence), all this is due *also* to

the existence of this broad set of international principles, which function like a kind of decalogue—to be observed and reinforced. All the inhabitants of the world benefit from the same principles and can voice their protest when they seem them violated. Human rights are an ideological and normative "galaxy" in rapid expansion, with a specific goal to increase safeguards for the dignity of the person.

The Emergence of Human Rights on the World Stage

The traditional pattern of the nation-state begins with the Peace of Westphalia (1648), and its evolution continues to this very day. It was after World War II that the notion of *peoples and individuals do not count* came to an end. Prior to World War II, individuals did not exist, being absorbed and overshadowed by the sovereigns and the sovereign states. Frequently, they pass from one sovereign to various rulers. Individuals are less overshadowed, but only insofar as they constitute emanations of their sovereigns. The citizens of a state who travel abroad to settle, trade, set up industries, or simply visit the country remain under the protection and aegis of the nation-state; to it the state of residence has to account if its authorities infringe the foreigners' rights, take away their goods, or treat them in an arbitrary fashion. Individuals thus become beneficiaries of a series of international legal standards—those on protection of foreigners—which of course regulate only relationships among sovereign entities but end up safeguarding interests and the property of citizens of each one of them. These individuals, however, remain mere beneficiaries of those standards, as is shown by the fact that if their rights and interests are injured by a foreign state and their own state decides not to intervene through diplomatic channels or not to start legal proceedings before international arbitrators (set up before the controversy), they can do nothing against their authorities' failure to act. In this case too they remain pawns in the game among the powers, advanced or sacrificed according to momentary whims or, at any rate, the political inclinations of the various sovereigns. After World War II, another great phenomenon took place in the international community: the launching of *a natural-law doctrine of human rights,* directly impinging upon the relationships between each state and its citizens.

Human Rights

Distinctions among various categories of human rights, civil, political, economic, social, cultural, individual, collective, positive, negative, first, second, or third generation, and so on are often misleading and rarely result in greater protection for individuals or groups. Indeed, the most common purpose for identifying such categories is to deny the status of *right* to one or more of them, rather than to expand international or domestic protections.

Conflict and tension are inherent in society; so are differences in individuals and cultures. One goal of the state, under the most fundamental of international human rights' norms, is to eliminate discrimination, not to destroy all differences. Recognition of the right to personal autonomy and group identity is essential to ensure that the principles of self-determination, participation, and tolerance are allowed to flourish. How is the United Nations situated in order to better help women whose rights were and are being violated?

In relation to the world's women and equal opportunities and pay for public sector employment, unequal opportunities in public education and discrimination by private bodies abound. Should not all countries, regardless of resources or religious/cultural and other beliefs, be required to address assaults on women's rights, such as harassment of women in detention, failure to enforce laws prohibiting bride burning, and other forms of domestic violence, toleration of female circumcision and other mutilations, and maintenance of inequitable laws regarding marriage and succession rights? Meaningful progress in promoting women's rights required emphatic and authoritative responses to those and other questions. In developing responses, the committee on the elimination of discrimination against women helped make a convention on the same a fact, and entered the convention into force in September 1981. As of March 1988, 94 states had ratified it. *Discrimination* is defined as "any distinction, exclusion or restriction made on the basis of sex, which has the effect or purpose of impairing or nullifying the recognition, enjoyment or exercise by women, of human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field" (Article 1).

The Commission on the Status of Women has begun to grapple with allegations of consistent patterns of discriminatory practices. It has yet to undertake a study on the relation between convention rights and Islamic

Law, despite the obvious importance of the issues to its monitoring work.

The East Asian discourse on human rights has been growing since the 1993 Bangkok Declaration on Human Rights, when parallel regional networks of governments and nongovernmental organizations (NGOs) first appeared. It has been spurred by a combination of factors. First, political opening allows for the growth of civil society as educated citizens confront economic development in an era of intense global competition. Next, East Asians are seeking out local attachments to recover a sense of belonging and trying to come to grips with the postcolonial identity, while at the same time identifying with larger, international human rights movements. Third, new social, political, and economic tensions come with greater income stratification and the breakdown of the community and the safety net it provided. Finally, networks of people throughout the region with shared human rights concerns are continually expanding. The new human rights discourse is also a reaction to the increasing pressure on East Asian governments that comply with international human rights norms. The pressure comes from an international community that has heightened expectations for a part of the world that has become irrevocably integrated into global markets. When Asian officials and their supporters want to challenge Western-style civil and political freedoms, they use the term *Asian values*.

The citizenship rights of women in a modern Islamic state in East Asia have to be explored in the context of Islam, particularly present-day Malaysia and Indonesia. Internationally, as far as human rights issues are concerned, Islam frequently gets very bad press, sometimes unfairly, but all too often deservedly. Yet actions taken in the name of Islam are often not based on true Islamic principles. Islam has the capacity to yield a notion of universal human rights, the idea that, by virtue of their intrinsic humanity, transcending all cultural and historically conditioned differences, people share certain essential entitlements. In the West, the development of the modern nation-state is generally equated with secularization. But in East Asia, the development of the modern nation-state over the past 30 years has demonstrated that often the influence of religion has grown as the consolidation of the nation-state takes place. A striking example of this is Islamic resurgence. The postcolonial development of most Muslim countries saw increasing tension between the adopted social and political order and the renewed efforts of many of their citizens to define and strengthen their Islamic identity.

The confrontation has accelerated various forms of "Islamic" discourse about human rights. Contemporary Muslims, like followers of the other two great Abrahamic religious traditions, Christians and Jews, have shown a notable concern for human rights that is not grounded in any borrowed "Western model." Instead, they have attempted to demonstrate that a human rights culture comes from the Qur'an and the teaching of the prophet Muhammad. This drive to reclaim for Islam a vision of human beings and a practice of law and politics that sustains an Islamic version of human rights has resulted in extensive writings by contemporary Muslims on the relationship of Islam and human rights. Yet the vast social changes that span the time between the establishment of the first Islamic community and the emergence of the contemporary world order require a creative and historically sensitive interpretation of that model that is not often reflected in the literature. Most Islamic writings are dominated by two problematic positions, which are in fact not so far apart in terms of their implications for contemporary human rights principles.

On one side are Muslims who maintain that Islam embraces human rights standards similar to Western-derived international human rights standards. They advocate integrating Islamic rules and concepts with internationally recognized rights to bring them into conformity with Islamic standards—the rules of Shari'a's. However, close scrutiny of this approach reveals various levels of ambivalence about the concept of rights. It is fraught with reservations and restrictions on a range of rights and freedoms, especially as they pertain to women and non-Muslims. At the other extreme are those Muslims who claim outright that current human rights concepts and standards (especially those incorporated within prevailing international human rights documents) are completely alien to Islam and incompatible with Islamic law as they interpret it. Between these poles lies a precarious middle ground—a space within which some of the most creative and inclusive Islamic sociolegal thought is now being created. However, like courageous and innovative thinking elsewhere, such sociolegal modernism is far from dominant within the Islamic world, especially in its Middle Eastern heartlands. It is a discourse propagated in the

main by Muslim intellectuals, many of whom are now forced to live in exile in the West for advocating their ideas. Although their positions may vary to some extent, the common thread among these intellectuals is that they advocate a critical reexamination of exegetical and jurisprudential texts as well as, whenever possible or pertinent, a reinterpretation of Islam's foundational religious texts.

Muslims advocating equal rights for women have emphasized in their discussion the problematics of interpretation of texts and, from those interpretations, of the contemporary codification of Muslim laws on the rights of women. The call for a review of the long-accepted juridical opinions and interpretations established during the classical age of Islam also characterizes many contemporary movements promoting the rights of women and of non-Muslims coexisting in a predominantly Muslim country.

Human Rights as a Universal Concept in Islam

Two main issues confront modern Muslims considering how to apply their own distinctive perspective to existing international human rights. The first is the prevailing Shari'a's definitions of human and citizenship rights. They must consider the position of any special category or subset of acceptance of the rights of humans simply by being humans. This awareness is by no means alien to Islam. It is grounded in the Qur'anic notion of a common human ontology (*fitna*) and couched in an Islamic idiom of moral universalism that predates much of the Western discourses about human rights. It is thus doctrinally a part of the Qur'anic worldview itself.

The challenge to contemporary Islam and to Muslims, especially the new traditionalist ideologues, is to revive and embrace that which is their own. It is nothing more than a challenge to begin to see humans, all humans, in the way that their faith insists that God/Allah sees them.

Second, Muslims contribute their own modern and Islamically appropriate conceptions of equal social relations between men and women to the human rights discourse. Here again, Qur'anic conceptions of the rights and duties of men and women in the family—to own and manage property, and to participate in public life and hold public office, for example—provide the basis for a far more enlightened and egalitarian view of gender relations than the regressive ideas that are currently offered, misleadingly, in the name of Islam by fundamentalist Islamists the world over.

Until these two main issues are clearly defined, human rights instruments and their moral foundations, derivatively Western in their origins and history, can be neither embraced wholesale nor summarily rejected by modern Muslims. Only after a critical reevaluation of their Islamic heritage and the acceptance of an underlying common humanity can progressive Muslims decide in what ways and to what extent they should accept, reject, modify, or renegotiate the stock of concepts and ideas that are now offered as the basis for a universal concept of human rights.

Citizenship Rights and the Position of Muslim Women

With respect to the states of Muslim women, although it is true that they have full legal capacity under Shari'a in relation to civil law and commercial law matters, in the sense that they have the requisite legal personality to hold and dispose of property and otherwise acquire or lose civil liabilities in their own independent right, Muslim women do not enjoy human rights on an equal footing with Muslim men under Shari'a.

According to An-Na'im, most of the published expositions of human rights in Islam by contemporary Muslim scholars are not helpful because they overlook the problems of slavery and discrimination against women and non-Muslims. Muslim women scholars, on the other hand, have mainly highlighted those verses of the Qur'an that are consistent with human rights standards. But a major problem still remains: Some crucial verses exist that are inconsistent with or even contradictory to universal human rights conceptions. An-Na'im has suggested that the only effective way to achieve sufficient reform of Shari'a in relation to universal human rights is "to cite sources in the *Qur'an* and *Sunna* which are inconsistent with universal human rights and explain them in historical context, while citing those sources which are supportive of human rights as the basis of the legally applicable principles and rules of Islamic law today." A major, often ignored, problem with respect to rights is that the "Shari'a-minded" "traditionalist," or "fundamentalist" recodification of modern state laws redefining people's rights, especially women's rights, affects democratic participation and citizenship rights as well as personal rights. Yet this proposed

Shari'a-based recodification is promoted by and also borrowed and imitated from countries, especially in the Middle East, that typically lack any articulated notion of citizenship rights. They are states with regimes but without citizens or "civil society." They invoke and uphold the adequacy of conventional Islamic views of the purely personal status rights of women and non-Muslims. By this maneuver, intentionally or by oversight, they set aside or rule out any consideration of the broader social, civic, and political rights and full legal rights of women and non-Muslims as equal citizens of the state.

No wonder that the Islamist ideologues promoting this Shari'a-based recodification can blithely dismiss the disquiet voiced by modernist Muslim critics with empty assurances that "all will be well" under the new Islamist ideologues because they have no modern experience of citizenship. Such moral and intellectual foundations are well beyond the reach of the ideologues' sociolegal consciousness. This draws into question how appropriate their ideas and agenda are, arising from their own limiting circumstances, as a basis for modern social policy and legal reform under different, less restricted conditions. Why should countries like Malaysia, which are already launched on a trajectory toward modernity, with modern notions of the nation as a community of people sharing citizenship rights, accept the elaboration of modern notions of citizens' rights from religious ideologues and developmentally deadlocked nations that lack any modern understanding of citizenship?

That such "Islamic" ideas, with their yearning for an unrealized utopian ideal, should be able to exert a powerful appeal among social groups that see themselves as excluded from or victims of development is not surprising. But it remains troubling to modern Muslims sensitive to the centrality and resonance of the issue of rights in both Western and Islamic historical consciousness and civilization. What especially concerns modernist Malaysians is the apparent readiness of some of their national leaders, who at the overtly political level directly oppose the "Islamist" agenda and the parties advocating it, to accommodate these tendencies and capitulate piecemeal to demands in such areas as the recodification of modern state law, especially in areas most affecting women.

In many Islamic societies today, there is a tendency to define the rights and obligations of citizens on the basis of gender and faith. This mind-set reflects the popular view that the typical citizen is a Muslim male. What is missing from this view is a recognition of the rights of human beings simply as human beings, which, as stated earlier, is a Qur'anic notion. This gap between the ethical principles of the Qur'an concerning gender equality and the kinds of retrogressive and male-centered interpretations that have been codified into Shari'a law provides a challenge for modern Muslim women's pursuit of equality and respect for their rights.

The Concept of Change in Islamic Society

As today's Muslim nations modernize, the socioeconomic circumstances of the majority of Muslim women will inevitably change. Many Muslim scholars assert that the way to move forward is for Muslims to develop (or recover) the imaginative ability to grasp such fundamental change. I say "recover" because from the inception of the history of Islam, Muslims have always held, at least theoretically, that change (change in people and in society) is possible, part of the human condition itself. But while the Muslim worldview has encompassed this possibility as a matter of principle, most Muslims themselves have lost the practical ability to face, understand, and master change.

There are many examples of a Qur'anic foundation of the concept of change; the Qur'an, in taking humankind beyond the age of ignorance (*jahiliyya*), oriented human thinking toward the possibility of change. Early Islam also incorporates the idea of change through migration or *hijra,* a movement not simply from one place to another (Mecca to Medina, in the paradigmatic instance) but from one social and moral plane to a higher one. Muslims have evolved from being one community, a part of the city-state Media, to become part of an empire, a political identity that extended well beyond a state by the time of the Abassid Empire. From a state with a central authority in Damascus or Baghdad emerged a polity with many autonomous governments and distinct political entities. In other words, change has been a constant of Muslim existence.

Islamic law itself has evolved along with changing circumstances, in part through the operation of *ijtihad,* or informed critical reason, which applies Islam's broad legal principles to emerging social and historical realities. Yet despite these possibilities for flexibility and dynamism, Islam has become stagnant. Many Muslims in Malaysia and elsewhere are always ready

to blame colonialism for this cultural stagnation. Whether it is colonialism itself that is at fault or, as Malek Bennabi suggests, the readiness to accept colonialism (or its twin phenomenon *colonisibilite,* the domination of the mind by alien ideas and a habituation to passivity toward alien cultural domination) is another debate. In any case, Muslims are not heirs to a history of stagnation that must be overcome, and Muslims need to regain a belief in change and in the ability to manage it intelligently, to pursue independent agendas rather than to capitulate to those of others. In this context, modern Muslims, especially in countries such as Malaysia that lie outside the culturally Arabic heartlands of Islam, need to be wary of acquiescence to a new colonization, one carried out by traditionalistic Islam misunderstood as the transhistorically essential Islam. What is required is a calm and reasonable debate on the issue of historicity and change in the Islamic heritage of contemporary Muslims. This in turn requires modern Muslims to act upon a basis that is historically informed and feasible, not historically and religiously confused.

A necessary part of this discussion turns upon understanding what is divine in the Shari'a and what, in the scholarly tradition interpreting it, is of human origin. What is divine is the *nass* of the Qur'an or the "word of Allah," the text and all its intentions and purposes. The act of interpreting the text and deriving its meaning and intended purposes is human, especially the methodology of interpretation devised by the experts of interpretive legal reasoning, the *fuqahas.* This means that various methods of interpreting the text through the use of critical reason (*itjahad*), analogy (*qiyas),* and consensus (*ijma*) can be reassessed and reevaluated. Modern Muslims are entitled to further develop those corpora of interpreted material. The choice is between futility and creativity, between attempting to impose archaic and limited legal understanding upon the present and seeking to understand the history of Islamic civilization in its entirety so that modern believers, members of an interdependent humankind, may act authentically as well as realistically and effectively as Muslims upon the stage of global history.

Gender Equality and Qur'anic Islam

The Muslim traditionalist position on women's rights rests heavily on the argument that Islam recognized no notion of gender equality. This assertion is based on two theological claims: first, that because at the time of creation the female was created from a man's rib, she is therefore in her origins derivative, and thus men are inherently superior to women, who exist for men's use. The second claim is that men are *qawwammun* ("have responsibility") over women, a claim based on the traditionalists' preferred interpretation of a key Qur'anic verse. Thus it is the woman's role to provide for the man's needs and continued reproduction through loyal service in the domestic realm. This claim finds its expression in the interpretation and emphasis given by traditionalists to the Qur'anic injunctions that "your woman are a tilth for you to cultivate, so go to your tilth as you will."

The theological foundations for this imposition of female subordination have been critically and effectively challenged in recent years. For example, Fatima Mernissi of Morocco and other Muslim scholars from Egypt, India, Pakistan, and the Sudan have provided cogent arguments that in principle and intention, Islam actually promotes gender equality. The common assertion of Muslim modernist scholars is that Islam is a liberating religion that uplifted the status of women and gave them rights considered revolutionary 1,400 years ago. Their arguments rest on the shared assertion that none of the Qur'anic verses that speak of human creation make any mention of women as an inferior or derivative being. "There is absolutely no difference in the value given to the creation of woman and the creation of man. Biological differences do not mean that women and men are not of equal value." Riffat Hassan, for example, has shown that "the story of the rib" was derived from the Old Testament, which was later absorbed in *hadithi* literature.

The economic responsibility for women that is mandated here must be related to "the occasion of revelation" of that verse, the need to secure the economic welfare of women. This included especially widows and divorced women of the clan-based patriarchal society of the prophet Muhammad's time, when women lacked full autonomous economic participation and enjoyed only half of the inheritance rights of men. But this verse, the modernists argue, cannot be understood as instituting a general subordination of women, because the Qur'an and Sunna at the same time recognized women's equal capacity to fulfill other roles—social, intellectual, and spiritual.

A common feature of the counterarguments provided by these critical scholars is their persistent questioning of the historical bases of the standard

male-supremacist and orthodox interpretations. They demonstrate that what was generally enshrined within and elaborated through the evolving Islamic legal culture failed to distinguish clearly between conservative Islamic social tradition and the normative Islamic legal principles expressed in the foundational texts.

Reconciling Local Culture and the International Human Rights Regime

Acceptance of the International Convention for the Elimination of All Forms of Discrimination Against Women—the United Nations organization's women's convention (CEDAW)—has been problematic in countries in which Muslim law is applied. Certain influential Muslims resist CEDAW purportedly on Shari'a grounds, and their critique must be addressed at a fundamental level.

There are simply no shortcuts around these obstacles. In the long run, before instruments such as CEDAW (or even recent domestic laws that provide for rights of women) can have a positive impact in these societies, women and women's movements will have to ensure, first of all, that the sources of all the various forms of subordination that arise from cultural and religious traditions are identified. Only then can they be differentiated from what Islam enjoins and be exposed to thoroughgoing criticism, leading to their rejection and abolition, precisely on the grounds of what Islam enjoins.

The Qur'an and the Universal Rights of Humankind

This underlying notion of rights and freedom open to all faithful believers, and to all who may yet come to recognize the supremacy of Allah (that is, all of humankind), is not dissimilar to modern notions. According to the Qur'an, a Muslim person who suffers oppression and does not do anything about it is a sinner. Such a person is encouraged to migrate elsewhere if he or she is unable to fight against an oppressive system. The Qur'anic term *ibn alsahil* refers to someone who is forced to move from place to place in order to seek a more peaceful life free from oppression. That is, to endure oppression involves a double violation of divinely ordained human nature and autonomy: by the oppressor and by the victim. Implied in this is a profound affirmation of human freedom, dignity, and autonomy—and of the human as a rights-bearing being.

Apart from the concept of *fitna,* which refers to humankind as an undifferentiated whole, the Qur'an also speaks of human dignity. The Qur'anic term "descendants of Adam" does not just refer to Muslims, or to a particular group of people, but to all humankind. "We have conferred dignity on the descendants of Adam" (*Al-Isna* 17:70). There is also the notion of diversity in the one humankind. On the basis of their differences, humans are to come together not just in a superficial way but in profound human and cultural contact. This notion of *umma* refers to humankind in its entirety and diversity, and human beings are given the right of religious conscience, an entitlement to their respective religious views and commitments. This is the capacity for spirituality that all humans share. It is not a Muslim monopoly but is immanent in every human heart and mind according to the Qur'an. As humans we not only enjoy a generic equality but also an ontological common ground.

The struggle for human rights, especially women's rights, in Muslim countries is complex. It involves the validity and hegemony of certain religious interpretations over others, gender bias, patriarchy, and the politics of identity. The often heard criticism that Western conceptions of women's rights and gender equality contradict Islamic principles of gender relations can no longer be accepted at face value.

Yet because of the pervasive influence of the literalist Islamic resurgent movements in many Muslim countries, women and women's groups struggling for recognition of their rights, both personal and public, have to make common cause with whatever modernist religious impulses are to be found in their own societies. By doing so they not only enhance the Islamic legitimacy of their cause, but they also thereby ensure that their endeavors are recognized as an integral part of the overriding question facing contemporary Islam: the attainment, based on the cultural and ethical foundations of Islam, of modernity. Negotiating space for public debate of the many issues relating to women's rights and freedom is a task that Muslim women can most readily achieve not through a solitary, separatist struggle but in concert with other Islamic modernists and human rights activists who recognize their cause as an inescapably public concern for 21st-century Islam.

The view of some human rights activists that women's rights movements are better served by utilizing the "secular" approach—one that bases its

arguments in the supposedly universal rule of law and democratization—is not at all pragmatic nor as easily implemented as its proponents claim. The experience of many women's groups operating in Muslim countries these past two decades demonstrates that in their daily battles a great deal more progress is achieved by working within their religious and cultural paradigm. This gives Muslim women's movements a distinctive character when compared to Western women's movements. Muslim women's rights activists have to employ a wide variety of approaches in their project to advance the status and rights of Muslim women. Their ideas, conceptions, and recommendations for rights and social emancipation must be religiously and culturally informed as they confront the challenge from their own religious, political, and community leaders, male or female. A common thread between Western and non-Western women's movements is found only within a social fabric or against the background of persistent gender bias in the assertion of modern-day patriarchal ideologies.

The path for human rights does not run smoothly or straight; every day we stumble against the irrational, and reason is pushed to one side and rights are trodden underfoot. Many of the forces that oppose human rights irrespective of gender are authoritarian regimes, theologically based regimes, heavy-handed and all-inclusive government structures as well as private groups (think of the Taliban) that treat defenseless and innocent people with ruthless violence. All those who belong to such authoritarian structures or violent private groups of whatever ideology refuse to allow anyone to question or threaten their aggressive impulses and lust for power. The faint voice of human rights can hardly be heard over their clamor.

What, then, can be done? As we all know, Rome was not built in one day, and it will take more than a day or a year to ensure respect for human rights; the time required is long. The United Nations's protection of human rights resembles such natural phenomena as earthquakes, glaciations, climatic changes, all of which happen beyond a single life span and can be measured only in terms of generations. As the third millennium has begun, the United Nations's human rights agenda has picked up speed through the making, among other international venues, of the International Court for Crimes Against Humanity.

It is hardly surprising that human rights should take so long to become established. Though not a religion, human rights do possess many of the characteristics of the main religious faiths. Centuries elapsed before the great religions began to expand; they were beset by obstacles, persecution, and a categorical refusal to accept their tenets. Yet, in time, they came to dominate the minds of men and women and to condition the behavior of people and states, generation after generation. The essential precepts of these religions were trampled underfoot by opponents and followers alike. Day by day the most sacred principles were violated; nevertheless, they continued to expand. All this is true of human rights, which many states habitually regard; yet they stand out as one of the great forces of natural law. To open people's minds, to illuminate the straight and narrow paths that lead in the right direction, it is important to ensure that the wells of public opinion are not poisoned by people becoming inured to authoritarianism and bullying.

— John A. Xanthropoulos

Further Readings

Bauer, J., & Bell, D. (Eds.). (1999). *The East Asian challenge for human rights.* Cambridge, UK: Cambridge University Press.

Birx, H. J. (1991). *Interpreting evolution: Darwin & Teilhard De Chardin.* Amherst, NY: Prometheus Books.

Dwyer, K. (1991). *Arab voices.* Berkeley: University of California Press.

Engineer, A. A. (1992). *The rights of women in Islam.* London: Hurst.

Karim, W. J. (1992). *Women and culture: Between Malay Adat and Islam.* Boulder, CO: Westview Press.

Mernissi, F. (1991). *Women and Islam: An historical and theological enquiry.* Oxford, UK: Blackwell Press.

Osman, F. (1992). *Jihad: A legitimate struggle for human rights; The Muslim world: Issues and challenges.* Los Angeles: Multimedia Vera International.

Osman, F. (1994). *Shari'a in contemporary society: The dynamics of change in Islamic law.* Los Angeles: Multimedia Vera International.

Othman, N. (1999). Grounding human rights arguments in non-Western culture: Shari'a and the citizenship rights of women in a modern Islamic state. In Joanne R. Bauer & Daniel A. Bell, *The East Asian challenge for human rights.* Cambridge, UK: Cambridge University Press.

Rahman, F. (1982). *Islam and modernity.* Chicago: University of Chicago Press.

SIS Forum. (1991). *Are women and men equal before Allah?* [booklet series]. Kuala Lumpur, Malaysia: Author.

Steiner, H. J., & Alston, P. (2000). *International human rights in context.* (2nd ed.). Oxford, UK: Oxford University Press.

Stowasser, B. E. (1992). *Women in the Qur'an: Traditions and interpretation.* New York: Oxford University Press.

The Koran (*c.* 632). In Micheline R. Ishay (Ed.), *The human rights reader* (pp. 41–42). New York: Routledge.

Human Variation

Human variation, historically a topic of much opinion, debate, and fallacy, is ruled today by deoxyribonucleic acid (DNA) technology that was absent from early classification systems. Before the onset of European exploration in the late 15th century, it was believed that humans were descended from a single pair and should not be placed into different categories as other animals were. However, the discovery of diverse cultures on different continents prompted scientists such as Linneaus, Buffon, Blumenbach, and Cuvier to distinguish *Homo sapiens* by physical and cultural characteristics. Carolus Linneaus, the first of these scholars, added temper, behavior, and dress to the already traditional division of skin color. Comte de Buffon, the next scientist to describe the human "race," did so by categorizing different peoples by their geographic location. However, Buffon did not separate people into different species as Linneaus did. In 1781, Johann Friedrich Blumenbach moved away from cultural traits altogether in his classification system and the limited set of physical characteristics he described were assumed to be finite for five varieties of people. Baron Georges Cuvier condensed these groups even further into basic "white," "yellow," and "black." As one of the last classification scholars, Cuvier moved to eradicate the "Great Chain of Being," which placed humans (unsurprisingly, Europeans) at the top of the animal hierarchy.

In the mid-19th century, scientists and anthropologists began to use a different approach to the question of human variation by quantifying observed physical characteristics. This was done through anthropometry, the measuring of the body and body parts, particularly skulls, and noting variation between supposed ethnic groups. Samuel Morton measured skulls, and his conclusions are now believed to reflect his own stereotypes about certain groups of people. The cephalic index, a construct of Anders Retzius, was also used to compare different groups of people by cranial measures, which placed them into two categories: dolichocephalic and brachycephalic. However, one of the problems with craniometric analyses is that people from extremely different geographic locales may show similarities, giving questionable basis for division.

The number of "types" of people, however, lingers in a state of disagreement over characteristics that define a "race." Thus, there have been many different definitions of the race concept. One of the broadest and currently accepted of these definitions was suggested by Huxley and Haddon in the 1930s and is the replacement of the word *race* with the term *ethnic groups*. The most conclusive definitions emphasize that the human species is polytypic, with different features loosely corresponding to certain geographic areas. There are three main ways that these differences come about: environmental adaptations, population genetics, and migration.

First, there are adaptive environmental traits unique to certain locales. Perhaps the best documented of these is sickle-cell anemia, an inherited disease in which red blood cells that are normally disk shaped are crescent shaped. The sickle-cell gene is common in Africa because it serves a distinct selective purpose. Those who carry one copy of the gene are resistant to malaria, a mosquito-borne illness. Those who carry two copies of the gene, however, have sickle-cell disease (SCD) and rarely live to reproductive age. Because of the pressures malaria places on those who live in high-risk areas such as Africa, populations in those environments have adapted and now possess a genetic trait indicative of their ancestry.

Sickle-cell anemia is an environmental adaptation that cannot be observed externally. The largely misinterpreted concept of skin color, however, can be. The rate in which melanin (a skin pigment) is produced varies with different skin types. Melanin levels are higher in darker-skinned people and lower in fairer-skinned people, and this variation is found latitudinally. Those living in lower latitudes have darker skin, where the abundance of melanin helps block harmful ultraviolet radiation. The lighter skinned are found in higher latitudes, where a lack of melanin allows more sunlight

Source: Photo provided by www.downtheroad.org, The Ongoing Global Bicycle Adventure.

to be absorbed. More sunlight means greater processing of vitamin D, a vitamin necessary for strong bones.

Along with environmental adaptations, population genetics is another way to explain human variation. In all organisms, the foremost means of achieving variation is through genetic mutation, specifically point mutation. Point mutations occur when a single nucleotide base is added, deleted, or replaced. If the mutation is advantageous to the organism, it will be passed on via natural selection. The aforementioned example of sickle-cell anemia is one such instance. It is probable that a human cell thousands of years ago underwent a mutation that produced the sickle-cell gene, consequently providing malarial immunity. Those individuals without a copy of the sickle-cell gene may have contracted malaria and died without producing their full potential of offspring at a higher rate than those that did have a copy of the gene. In contrast, people with one copy of the sickle-cell gene did not die of malaria and probably still retained full reproductive abilities, thus passing the gene on to offspring. Over thousands of generations (and malaria outbreaks), the frequency of the sickle-cell gene increased.

Finally, the third means of producing variation in humans is through migration and genetic drift. Over time, humans have always traveled, taking their varied gene pools with them. This means that people mated with people from other populations with different sets of genes, increasing genetic variation. The opposite, genetic isolation, can occur as well. A product of catastrophe or new habitation, isolation produces less variability within, but more variation between, populations.

Therefore, although there are several mechanisms in which human variation occurs, overall they are insignificant. During the recent mapping of the human genome, it was found that the DNA between any two individuals is about 99.9 percent identical. Hence, the concept of "race" based on individual physical variation has been rendered inaccurate, and scientists have in essence given up on a once popular notion.

— Lisa M. Paciulli and Sara R. Hegge

See also **Adaptation, Biological; Genetics, Population; Linneaus, Carolus; Melanin; Mutations; Sickle-Cell Anemia**

Further Readings

Gould, S. J. (1981). *The mismeasure of man.* New York: Norton Press.

Harrison, G. A., Tanner, J. M., Pilbeam, D. R., & Baker, P. T. (1988). *Human biology: An introduction to human evolution, variation, growth, and adaptability.* Oxford: Oxford University Press.

Marks, J. (1995). *Human biodiversity: Genes, race, and history.* New York: Aldine de Gruyter Press.

Molnar, S. (2002). *Human variation: Races, types, and ethnic groups.* New Jersey: Pearson Education.

Moran, E. F. (2000). *Human adaptability.* Boulder, CO: Westview Press.

Scupin, R. (2002). *Race and ethnicity: An anthropological focus on the United States and the world.* Upper Saddle River, NJ: Prentice Hall.

Humanism, Evolutionary

Evolutionary humanism is a philosophical point of view centered on human interests and values in the context of natural selection and additional forces of evolution. Evolutionary humanists have called attention to the unity of the body and the mind, human continuity across populations and with other life forms, and natural instead of supernatural explanations. Evolutionary humanists often have human welfare and social reform in mind as an ultimate benefit of their scholarship, following philosophical traditions of humanism.

Humanism, in philosophy, is an attitude that emphasizes individual dignity, value, and self-realization through reason. Evolutionary humanism similarly appreciates individual differences and the implication of heritable variation across generations. Evolutionary humanists look at cooperative strategies in terms of individual and inclusive fitness benefits and are generally critical of unilineal social evolutionary arguments. Evolutionary humanists are concerned with the development of idea and moral systems through time and the relationship between art and the evolutionary process.

A basic premise of humanism is that people are rational beings who possess within themselves the capacity for truth and goodness. Evolutionary humanism also assumes rationality in selection of adaptive traits and behaviors. Cost-benefit analyses are often made by evolutionary humanists in order to test hypotheses about factors involved in the evolution of traits. Truth and goodness are but one possible outcome, however. Evolutionary humanism must also include under study the development of malevolent human behaviors, such as ethnocentrism and warfare, and apparently maladaptive traits, such as drug abuse and celibacy.

Julian Huxley (1887–1975), grandson of Thomas Henry Huxley (Darwin's "Bulldog"), was an innovative thinker in early evolutionary humanism. Huxley explored the relationship of human culture and its relationship to genetical evolution. For Huxley, evolution was directional in the sense that greater variety, complexity, and specificity of organization occur, albeit amidst evolutionary dead-ends. He applied this to analysis of idea systems and found that some idea systems might be potent and perpetuate even if inaccurate, giving examples such as the predictions of Marxist-Leninist theory regarding the state and the alleged supernatural benefits of human sacrifice by the Aztecs and resulting failure of their socioreligious strategy. Some of Huxley's ideas related to culture as an instrument of human evolution have been modeled in contemporary dual transmission theory. Idea systems may change to an extent that they do not fit the developing conditions of human life (for example, frequency dependent and runaway directional selection). Huxley suggested that the scientific investigation of the human "psychosocial sphere," considering observable historical and biological processes, would lead to the construction of a new, open-ended framework of comprehension. Huxley's emphasis on the unity of the mind and body, such as his discussion of the function of emotions, is a precursor of evolutionary psychology.

A recent application of evolutionary humanism in anthropology is *Biopoetics: Evolutionary Exploration in the Arts* (1999). In this volume dealing with literary and visual culture, the authors explore inherited influences on aesthetic preferences, from body decoration to ecstatic states and science fiction. One revelation of this collection of evolutionarily minded analyses of literature and art is the surprising degree to which ancient and classic art reflect humanity's evolved tendencies, predispositions, and concerns.

— *John P. Ziker*

See also **Art, Universals in; Evolutionary Epistemology; Universals in Culture**

Further Readings

Cook, B., & Turner, F. (1999). *Biopoetics: Evolutionary explorations in the arts.* Lexington: Paragon Books.

Huxley J. (1992). *Evolutionary humanism.* Buffalo, NY: Prometheus Books.

Wilson, E. O. (1998). *Consilience: The unity of knowledge.* New York: Vintage Books.

Humanism, Religious

Within the discipline of anthropology, the subfield of humanism focuses on reason, logic, and scientific explanations for human existence, being skeptical of purely religious interpretation. Proponents of this approach, such as T. Willliam Hall, in the text *Religion,* state, "This interpretation of human existence dispenses with belief in the supernatural, considers the good of humanity on earth the supreme ethical goal, and applies the methods of reason and science to solve human problems." Following this same logic, Miles Richardson, in the *Encyclopedia of Cultural Anthropology,* adds that humanism "emphasiz(es) scholarly reading, as opposed to divine revelation, as the path to knowledge." Religion is then a construct of the human mind, not an unknowable fact.

It is a construct capable of scientific exploration, hypothesis testing, and theory verification.

Anthropologists who study religion from a humanistic perspective would include such notables as Raymond Firth, Edmund Leach, Joseph Needham, Mary Douglas, Clifford Geertz, and Ernest Gillner. They apply a rationalist approach to the study of religious values, actions, and beliefs. Their approach to religion is as a cultural system that exists and can be rationally explored and understood. Religious systems are a part of a society's total tapestry, a social reality that is constructed and explained, using the same methods and theories as the culturally constructed systems of politics, economic, kinship, subsistence, and art. When anthropologist Clifford Geertz writes in *The Interpretation of Cultures* that "religion is humanity," this statement can also be stated in the reverse: "Humanity is religion."

A religious humanistic approach to anthropological cross-cultural research can be described as being anthropocentric (human as center of existence). Existence external to the individual or group is viewed as not being constructed and maintained according to a divine supernatural plan, with rewards and punishments for various thoughts and deeds, coupled with the perpetuation or violation of specific culturally predetermined, etiquette-established guidelines. Religion, as a necessary human cultural construct, is open to logical realistic explanation, using guidelines that judiciously explain fundamental shared human dilemmas, associated with basic everyday existence. Searching for answers to what cannot be explained by contemporary science in times of fright or confusion reinforces the need for religious beliefs. Religious explanations are provided to offer answers to the basic questions of life that science currently cannot. What is existence? Why do I exist? What is the universe? Why do things beyond our control happen? Why do we have to suffer? Why death? What is the relationship of humans to other species? The humanists would acknowledge that these cannot be answered but that the search for concrete rational explanations is a more worthwhile and potentially gratifying endeavor than the passive acceptance of religious dogma. They believe that it is possible to eventually discover reasonable and logical explanations for phenomena or at the very least believe that exploration remains open-ended and tentative to allow for additions of new factual conceptualizations. Religious practices and scientific explorations are believed to be complementary.

Religion from a culturally based, humanistic perspective has a strong cultural relativist approach. Each society constructs its own unique approach to religion, depending on its own unique and dynamic physical and social environment. There is a continuing desire to maintain existing functional cultural order and also to attempt to restore equilibrium in the inevitable times of chaos. Anthropologists search for the unique social qualities and attempt simultaneously to tease out the individual social threads from the larger tapestry of life. Each thread represents a different but complementary component of religious life: belief systems, functions and structures of myths and legends, use of symbolic objects and language, rituals including offerings, prayers, sacrifice, feasts, and causes and motivations for change. The expectation would be that morally based religious factors would necessarily vary across time and space in a dynamic world and that solid, well-guided research

could uncover motivations and explanations for community-specific similarities and variations in religious practices.

When studying religious beliefs, the focus is on configurations relating to the form of the belief and the content of the beliefs. Research that concentrates on the outward manifestations of beliefs, as well as on the linguistic and other symbolic forms of expression, is conducive to productive analysis in the social sciences. Raymond Firth maintains that beliefs not only are always culturally defined, but also have a core or nucleus that could be discernable in written and/or spoken creeds and dogmas.

Study of the concept of faith, according to Firth, involves a two-way process, with one path extending from the human to the supernatural and a second from the supernatural back to the individual. A reciprocal relationship is required for the continuation of a faith. In Catholicism, the believer offers prayers and sacrifices to a specific Saint, with the expectation of a return of some kind. The prayer, ritual, or sacrifice is provided with the expectation that an answer in some form will be forthcoming. If not, why perform the ritual? Why have faith that an answer will be forthcoming? There is an expectation of unification, a possibility of a connection between the giving and the expectation of a return.

What is also implicit in the act of exchange or sacrifice, according to Firth, is an "asymmetrical status relationship," whereby the person making the offering is assigned an inferior position, while the recipient occupies a superior position. A hierarchy is in existence. A religious humanist researcher would question why a religious exchange is deemed necessary, contrasting and comparing various explanations for the participants. The focus is on what has occurred before the act, what is expected to happen during the act, and what the perceived outcome will be. The religious humanist believes that there is a discernable human logic underlying the values, beliefs, and behavior involved. A community ritual performance can be rationally interpreted as being performed because it allows for group social cohesiveness, providing a sense of belonging and reinforcement of specific moral values. The congregation provides unification of thoughts and actions for those with similar beliefs to coalesce and strengthen group unity, and it becomes a place for the individual to freely choose to belong and participate or to be coerced into choosing to belong and participate. The individual may belong because of political and/or economic costs or benefits or for fear of punishment via gossip networks and the potential for exclusion from the community.

Rituals, performance, prayer, dance, and music are possible paths for communication with the supernatural. Public over private rituals demonstrate community acceptance of specific patterns of behavior, and as demonstrated by acceptable community standards serve the function of showing support for group unification. Roy Rappaport demonstrates in *Pigs for the Ancestors* how participation in a religious ritual dance among the Tsembaga Maring of New Guinea also affirms the dancers' commitment to being part of the group in the event of war.

Secular humanism provides an alternative to metaphysical practices. The Council for Secular Humanism's Web site states, "Secular humanists accept a worldview or philosophy called naturalism, in which the physical laws of the universe are not superseded by non-material or supernatural entities such as demons, gods, or other 'spiritual' beings outside the realm of the natural universe." The website provides a list of guiding principles for participants. The first principle states, "A conviction of dogmas, ideologies and traditions, whether religious, political or social, must be weighed and tested by each individual and not simply accepted on faith." This would tend to reinforce the interpretation that religion, like other social systems, should be open to empirical scrutiny, methodology, and, when deemed appropriate, capable of change.

— *Beverly J. Fogelson*

See also **Cultural Relativism; Firth, Raymond; Geertz, Clifford R.; Humanism, Secular**

Further Readings

Firth, R. (1996). *Religion: A humanist interpretation.* London: Routledge.

Hall, T. W., & Pilgrim, R. (Eds.). (1985). *Religion.* San Francisco: Harper & Row.

Levinson, D., & Melvin, E. (Eds.). (1996). *Encyclopedia of cultural anthropology.* New York: Henry Holt.

Wilk, S. (1991). *Humanistic anthropology.* Knoxville: University of Tennessee Press.

Humanism, Secular

While the word *humanism* is recent, the idea of humanism is one of the oldest and most transnational worldviews in human history. Most worldviews are defined in terms of the distinctive beliefs they hold, but the principal feature of humanism is not so much its core articles of belief, but the method by which inquiry into the world is undertaken.

The American philosopher Paul Kurtz has provided the best understanding of humanism when he defined it in terms of its four constituent features. First and foremost, humanism is a method of inquiry; second, it presents a cosmic worldview; third, it offers a set of ethical recommendations for the individual's life stance; and, fourth, humanism expresses a number of social and political ideals. It is important to note the order in which these characteristics have been listed. Number 4 is the least important of them, not because social and political ideals are unimportant, but because the nature of those ideals has changed most over time and between continents. Numbers 2 and 3 are more important because the details of the worldview and the ethical recommendations have greater commonality between the various humanist civilizations of the world.

But the most important, because the most constant, is feature Number 1: Humanism is best understood as a method of inquiry. From the Carvakas and Ajivikas in India, from Kongfuzi and Wang Chong in China, from Thales and the Greek thinkers, through the Renaissance to the Enlightenment, to the 21st century, humanism is best understood as a method of inquiry. The *conclusions* of that inquiry—Numbers 2, 3, and 4 in Kurtz's definition—change between cultures and between centuries, but the *method* of inquiry has remained essentially the same.

Symptomatic of the uniqueness of humanism is that for most of its existence, it has functioned very well without the word. Humanism as a *concept* has its origins in ancient India, China, and Greece, each one arising independently, but the actual word was not coined until 1808, in Germany. To make things more complicated, *humanist* existed as a word long before *humanism,* originating in the Renaissance. But as humanism is defined principally by its method rather than by its conclusions, the lack of a word to act as a catchall for those conclusions is a trivial issue.

Another account of humanism, by the philosopher Mario Bunge, seems at first sight to come from a different perspective. In fact, Bunge's approach ends up saying things similar to Kurtz's shorter outline. Bunge speaks of humanism as involving concern for the lot of humanity. This concern he spells out in what he calls the seven theses of humanism, in this order: *cosmological thesis:* whatever exists is either natural or man-made; *anthropological thesis:* the common features of humanity are more significant than the differences; *axiological thesis:* there are some basic human values, like well-being, honesty, loyalty, solidarity, fairness, security, peace, and knowledge, and these are worth working, even fighting, for; *epistemological thesis:* it is possible to find out the truth about the world and ourselves with the help of experience, reason, imagination, and criticism; *moral thesis:* we should seek salvation in this life through work and thought; *social thesis:* liberty, equality, solidarity, and expertise in the management of the commonwealth; *political thesis:* while allowing freedom of and from religious worship, we should work toward the attainment or maintenance of a secular state.

Bunge is an advocate of what he calls "systemism," which postulates that every thing and every idea is a system or a component of another system. In this way, the first thesis covers the broadest territory and provides the foundation for the other theses. Looking at it another way, the theses run from the hard sciences through to the social sciences. Interestingly, in the first thesis, which addresses the individual human being, Bunge says what Kurtz also says, namely, the importance of the method of inquiry.

Humanism in the Ancient World

Humanism is the oldest and most transnational worldview on Earth, beginning quite independently in India, China, and Greece. The Carvakas were the materialist school of thought *(darshana)* in India, being traceable to the 6th century BCE. Carvaka philosophy regards the universe as interdependent and subject to perpetual evolution. Other important beliefs include the following: Sacred literature should be regarded as false; there is no deity, immortal soul, or afterlife; karma is inoperative and illusory; matter is the fundamental element; only direct perception, and not religious injunctions, can give us true knowledge. The aim in life is to get the maximum amount of pleasure from it. This had various interpretations,

from unalloyed hedonism, on one hand, to an altruistic service of others on the principle that this will maximize one's own happiness as well as that of others, on the other.

Other Indian movements of a broadly humanist orientation in India include the Ajivikas and the Sumaniya, about whom little is now known. The Ajivikas flourished between the 3rd and 6th centuries BCE, and their influence can be traced for more than 1,500 years. Like some early Jains and Buddhists, the Ajivikas went about naked, to indicate their contempt for worldly goods. In the main, they upheld a principle of nonaction, denying that merit accrued from virtuous activity or that demerit from wicked activity. Coupled with this was a thoroughgoing determinism and skepticism regarding karma and any sort of afterlife.

In contrast to India, the humanist strand in China became the principal strand of thought. This is largely, though by no means exclusively, due to the influence of Kongfuzi (479–551 BCE), who is known in West by his latinized name, Confucius. Confucius's genius involved transforming the naturalism and humanism latent in Chinese thinking into the strongest forces in Chinese thought, down to this day. He said that maintaining a distance from spiritual beings was a sign of wisdom; he expressed no opinion on the fate of souls and never encouraged prayer.

Confucius realigned the concept of *chun-tzu,* which had traditionally meant "son of the ruler," into "superior man," with the effect that nobility was no longer a matter of blood or birth, but of character. This was a very radical departure from customary Chinese thinking preceding him. Along with this, he radically transformed the notion of *jen* from meaning "kindliness" to the more general "man of the golden rule," or perfect chun-tzu. *Jen* was expressed in terms of *chung* and *shu,* or "conscientiousness" and "altruism."

In Greece, humanism can be traced back to the philosophers known as the pre-Socratics, that is, philosophers active before Socrates. The first of them was Thales (ca. 548–624 BCE), the man credited as being the "father of philosophy." Thales's claim to fame rests on being the first person to try to explain the world not in terms of myths, but by observation of the world as he actually saw it. Where Homer attributed the origin of all things to the God Oceanus, Thales taught that water was the prime element in all things.

The other thinkers who succeeded Thales took his thoughts in different directions, but their emphasis on studying the natural world and humanity's place in it remained the same. The humanist spirit was given its best voice by Socrates, who, during the trial for his life, declared that the unexamined life is not worth living.

The humanist tradition of Greek thought received a check in the philosophy of Plato and never fully recovered. Several Hellenistic movements, in particular Epicureanism and Stoicism, reflected important elements of humanist thought, but all had been effectively countered or crushed by Platonism and then by Christianity.

Renaissance Humanism

The collapse of the Roman Empire was followed by what can still justifiably be called the "Dark Ages." In these long centuries of faith and ignorance, the spirit of inquiry was almost lost in the West. It revived only with the Renaissance. In its broader sense, the Renaissance began with the life of Petrarch (1304–1374) and ended with the death at the stake of Giordano Bruno in 1600, with the most productive years of the Renaissance being the century before the sack of Rome in 1527.

Medieval thinking had been dominated by cultural pessimism: a weariness with this world and a suspicion, derived mainly from St. Augustine, that human affairs are inevitably tainted with corruption and selfishness. Renaissance thinking, by contrast, was positive and optimistic. While Renaissance humanism differed on many points, it was pretty unanimous in its condemnation of the monastic life, with all its implications of defeatism and withdrawing from one's civic duties. The very idea of Renaissance came from the idea that this age was the first to rediscover and appreciate fully the cultural grandeur of the ancient world. The thinkers of the Renaissance saw themselves as the scourge of medieval dogma and pioneers of a new cultural and intellectual orientation centering on the majesty of the ancient world. The new style of thinking was stimulated by the rediscovery of ancient thinkers, in particular Lucretius, Cicero, and Plato. The Renaissance humanists were optimistic about the power of culture to effect positive social change. Only after the sack of Rome in 1527 did this optimism decline and a return to contemplation and an escape from the world once more became a discernable trend in Renaissance thought.

Very few Renaissance thinkers were atheists: Almost all were theists, and the majority of them remained Christians, though of heterodox sympathies. But the understanding of God changed. God was something that could be understood by our learning and study. Indeed, learning and study was a deeply pious activity, in that learning about nature meant, ipso facto, learning about God. The Renaissance was a period of significant historical and scriptural research. For instance, Lorenzo Valla (1405–1457) was responsible for exposing the fraud known as the "Donation of Constantine," upon which the papal claims to own its large territories in Italy was based. Valla also wrote *Dialogue on Freewill*, a frankly skeptical work, and a very sympathetic account of Epicurus. Valla was influential in teaching people the need to read scriptures with a skeptical frame of mind. This religious scholarship of Renaissance scholars was usually undertaken with a mind to reform religion and purge it of its recent and harmful additions. This drive led directly to developing some of the first ideas since the ancient world of religious toleration. This trend came to an end only when the religious reformer Savonarola was burned at the stake in 1498.

Contemporary Secular Humanism

The humanism of the ancient world and the Renaissance were both stifled by religious reaction. The dramatic growth in humanism in the modern world is due to the declining power of religion to coerce belief and also the growing power of science to give strong support to Bunge's cosmological thesis. The revolution in thinking brought on by the Copernican revolution has been profound. No longer can humans credibly consider themselves the center of the universe. Concurrent discoveries of other civilizations by European explorers also showed that people could live quite happily without Christianity. The Enlightenment in Europe (roughly, the years between the 1680s to the 1780s) was characterized in part by the taking to heart of this realization.

If the Copernican revolution greatly demoted humanity's place in the cosmos, the onset of the Darwinian revolution in the 19th and 20th centuries meant an end to the conceit of seeing humanity as the pinnacle of creation, below only God, in whose image we are made. The current developments in genetics and brain science are certain to challenge those essentialist theories of humanity, which still linger on. So the story of contemporary humanism is the story of the progressive appreciation of humanity's part in an interdependent system. It is with this insight in mind that Bunge's seven theses of humanism have their value.

Contemporary secular humanism has been able to organize in a self-conscious way that was not possible for its ancient or Renaissance predecessors. There are now humanist organizations in most countries of the world. This change has been made possible by the coming together of the concept of humanism from the ancient world, the adjective *humanist* from the Renaissance, and the noun *humanism* from the 19th century.

Returning to Paul Kurtz's outline of humanism, we can trace the changes in two of the points and the continuities in the other two. Item 2, the cosmic worldview, has become more modest and less geocentric, as required by developments in astronomy and cosmology. Item 4, the political ideals, has become inclusive of more groups than earlier humanisms would have endorsed. Toleration of slavery in ancient Greece and the widespread misogyny found in Confucianism and Greek thinking no longer play a part in secular humanist thinking.

In contrast to these changes, Item 3, the ethical ideals, have remained fundamentally the same. The values identified by Solon, Pericles, Confucius, the Carvakas, and the Epicureans still resonate today. Enjoying the moment, resisting the transcendental temptation, love of nature, impatience with display, imperviousness to materialism, civic values, and family responsibility all were recommended by the ancient humanists, and all find enthusiastic support among their contemporary successors.

But it is the first item of Kurtz's outline that has remained the most constant. The endorsements of skeptical, open-minded inquiry given by Socrates, Wang Chong, and the Ajivika thinker Upaka find direct parallels in the work of Bertrand Russell, Albert Einstein, and all the other humanist philosophers and scientists who have shaped the modern world. Humanism is first and foremost a method of inquiry, and it is the conclusions of that inquiry that furnish us with our ideas and beliefs. Humanists have always rejected static formulas of thought, bowing to arguments from authority or accepting command moralities. In contrast to systems that are founded on acceptance of bodies of thought, humanism assumes

that as knowledge comes from humans, it is bound to include some element of error, and it therefore will be in need of revision as our learning grows. In this way, contemporary humanism can reject the anthropocentric conceit of the Renaissance humanists, the hedonism of the Carvakas, the humorlessness of the Stoics, and still honor their role in the long stream of humanist thought. And as our scientific and philosophic knowledge grows, doubtless some important features of 21st-century humanism will be replaced. But the primacy of humanism as a method of inquiry will remain.

— *Bill Cooke*

See also **Confucianism; Humanism, Evolutionary**

Further Readings

Bullock, A. (1985). *The humanist tradition in the West.* London & New York: Thames & Hudson.

Bunge, M. (2001). *Philosophy in crisis.* Amherst, NY: Prometheus Books.

Fowler, J. (1999). *Humanism: Beliefs and practices.* Brighton, UK: Sussex Academic Press.

Goicoechea, D., Luik, J., & Madigan, T. (Eds.). (1991). *The question of humanism: Challenges and possibilities.* Amherst, NY: Prometheus Books.

Gottlieb, A. (2000). *The dream of reason.* London: Viking.

Hiorth, F. (1996). *Introduction to humanism.* Pune, India: Indian Secular Society.

Kurtz, P. (1986). *The transcendental temptation: A critique of religion and the paranormal.* Amherst, NY: Prometheus Books.

Kurtz, P. (1989). *Eupraxophy: Living without religion.* Amherst, NY: Prometheus Books.

Walter, N. (1997). *Humanism: What's in the word.* London: RPA.

SECULARIZATION

Secularization is the process related to modernization and industrialization through which religious institutions, rituals, and beliefs lose their importance in societies. Several theories of secularization are influenced by evolutionist anthropology, which assumed that human societies evolve through different stages, becoming increasingly complex and sophisticated in their social organization. Theorists of secularization conceived the advent of modernity as the progressive marginalization of premodern forms of knowledge, including religion, by science.

Building on Max Weber's "disenchantment of the world," they argued that the development of rational forms of social organization and rational modes of thought would liberate humankind from the irrationalities of myth and religion. Some theorists also thought that the contact among different religious groups in contemporary cosmopolitan societies diminished each individual's sense of belonging to the best religion. Governments and other institutions can also play an important part in the process of secularization by reducing social inequalities among people, thus handling peoples' problems in place of religious groups.

In a secular society, all the superhuman and supernatural forces that populated the universe of pre-industrial cultures, and were responsible for the phenomena of the natural and social worlds, are replaced by modern scientific interpretations. As explained by Weber, only the laws and regularities discovered by the scientific method are validated as explanations of phenomena. Secularization is not the result of the increased capacity of humans to think rationally, but the emergence of a form of knowledge whose claims are demonstrably true and applicable. The process of secularization first became observable during the 17th century in Europe and gained prominence with Protestantism. Since then, it has spread through colonialism to other non-European countries.

Secularization is an undeniable tendency of contemporary societies. Yet, its legacy is an ambiguous one. On the one hand, traditional religious rituals are losing their centrality in social life and are becoming almost leisure-time activities. States such as France are equipping themselves with laws to protect their secularism, prohibiting the exhibition of religious symbols in public spaces such as schools. On the other hand, the complexity of modern societies is proving frustrating for many people and the responses of central secular governments to peoples' problems have failed to construct inclusive communities. In European

nations such as Italy, the Catholic Church can still play an influential role in both the social and political life.

The chaos of the contemporary world has also prompted people to look for reassuring responses and for a sense of community in nontraditional religious groups such as cults and sects. In the United States, Canada, and Western European states, religious revivals have taken place thanks to the ability of cults to recruit their members on a wide social spectrum. One of the most challenging debates of the coming years will be whether sects will rekindle religious sentiment in our societies or whether the process of secularization will prevail over sectarianism.

— **Luca Prono**

Humankind, Psychic Unity of

Anthropology, the study of human beings in their bedazzling variety, eternally provokes questions about what human beings share, about their similarity, unity, or identity. The doctrine of the psychic unity of humankind is an answer to that question. Humans, it claims, are characterized by something more than merely biological unity. Equally, they are characterized by something less than spiritual unity, at least insofar as we fail to semantically disentangle "spirit" from a parochial Christian ontology and theology.

The psychic unity of humankind (or mankind) enters the anthropological lexicon in the work of Adolf Bastian (1826–1905). The idea itself, however, is too large to belong to any single person. An intimation that there is a "humanity" and that it is "one," regardless of differences of caste, age, sex, or nation, is ethnographically rare but not unique. The historian of ideas, Eric Voegelin (1901–1985), suggests that the roots of this notion go back to the era of the ancient Mesopotamian city-states and the conviction they subsequently furnished that, standing as we do beneath the same sun, we are all equal.

Other sources for the idea have been essayed by the anthropologist Klaus-Peter Koepping. Particularly significant was the Stoics' challenge to the distinction between Greek and barbarian; Cicero's (106 BC–43 BC) coining of the term *humanitas;* the Renaissance ideal of the virtuous human as a cosmopolitan "universal human"; and the Enlightenment's championing of the "brotherhood of mankind." Nor should we neglect the transformation of the Jewish image of the one God into a universal God for all peoples in Pauline Christianity, along with the radicalization of this idea in numerous peasant revolts and ecclesiastical reform movements, right up to the utopian socialism of the early 19th century and beyond.

Popular within anthropology from its mid-19th- to early 20th-century beginnings, the psychic unity of humankind was a scientific postulate that fed from all these general influences. Today the phrase mostly surfaces in anthropological writings as a throwaway citation. Occasionally, as Melville Herskovits already noted in 1959, it is referred to approvingly but usually on the understanding that it no longer has any substantive theoretical role to play.

Nonetheless, the idea arguably remains at the very heart of the anthropological enterprise, though less as a still center of intellectual gravity than as a magnet possessing both attractive and repulsive poles. This curious centrality can be conveniently discussed by distinguishing between the *synthetic,* the *programmatic,* and the *normative* dimensions of the idea.

Inductive Synthesis

An indefatigable traveler and collector of ethnographic data, Bastian was also an ambitious conceptual synthesizer. He recognized that all ethnic groups generated their own collective representations; that across this variety of characteristic representations it was possible to discern certain elementary ideas; and that the presence of these elementary ideas counted as compelling evidence for the psychic unity of all peoples.

The doctrine was soon put to use in a number of early anthropological disputes. Can we account for cultural similarities between different peoples by recourse to the diffusion of ideas from a common source or in the course of historical contacts? The doctrine suggested we could not. In many cases, common origins are too ancient and/or there is no credible evidence of contact; so it must rather be the case that the human mind is such as to independently generate similar ideas when faced by similar problems and circumstances. Moreover, contact without psychic unity is insufficient on its own to explain the diffusion of ideas.

Is humanity one (the monogenetic claim) or several (the polygenetic claim)? The doctrine of psychic unity suggested that humankind was one race. Is history a story of degeneration from noble beginnings with no possibility for "primitives" to become "civilized"? Coupled to an evolutionary story that took note of cultural elements surviving from earlier phases even in the most civilized societies, the doctrine of psychic unity suggested rather that primitive peoples could make advances.

Popularized by Edward Burnett Tylor (1832–1917), this latter argument firmly linked the psychic unity of humankind to progressivist and evolutionary theories in anthropology. World War I dealt harshly with all varieties of progressivist optimism. The hugely influential cultural particularism of Franz Boas (1858–1942) dealt equally harshly with evolutionism in anthropology. Boas himself endorsed the idea of psychic unity, arguing persuasively that all peoples had essentially equal intellectual capacities and moral faculties. Nonetheless, with everything distinctively human elucidated by reference to discrete cultures, psychic unity became an explanatory empty set.

The fact that an emphasis on cultural particulars has made many anthropologists suspicious of human universals provides one reason for the eclipse of Bastian's doctrine. A further reason is that when 20th-century anthropologists did swim against the Boasian tide to seek generalizations applicable to all cultures, they more commonly swam "downstream" in search of social, economic, ecological, and biological regularities than "upstream" to the psyche.

Research Program

Countercurrents, to be sure, have not been absent. Among his elementary ideas, Bastian counted space, time, numbers, and the cross. Subsequent investigations, whether conducted to establish evidence for psychic unity or for cultural diffusion, have by now confirmed a large inventory of images and symbols occurring in the most far-flung cultures. The snake or the serpent, often eating its own tail (the uroborus) or in the beak of an eagle; the dragon; the swastika; the tree of life; the omphalos (navel of the world); the association of the left hand with disorder or cunning and the right hand with what is "right": These and other primary images or symbols are so widespread as to make fair bid to be called universal.

An exhaustive itemization and analysis of these and countless images of a more idiosyncratic nature was undertaken by Gilbert Durand. Interest in their archetypal significance has been strongest among ethnographically informed Jungian thinkers such as Eric Neumann (1905–1960) and Mircea Eliade (1907–1986). The Freudian approach is well represented by the pioneering psychoanalytic anthropologists Géza Róheim (1891–1953) and George Devereux (1908–1985), who used parallels and divergences between field data and material emerging from psychoanalytic case studies to illuminate each other. The cognitive anthropologist James Silverberg stressed the fact that rapport between observer and observed in the field would be impossible in the absence of psychic unity, and suggested that the empirical investigation of logical and inference-making universals was best pitched at the level of discourse. Lévi-Strauss, most ambitious of all, sought to properly locate sociocultural phenomena by identifying isomorphic processes and structures at work in physical, biological, linguistic, and psychological phenomena.

These are some of the signal resources currently available for thinking about the substantial content of the human psyche and its dynamic entwinement in varied sociocultural formations. They are not, however, resources that the discipline in general has taken up. It might seem that for anthropology as a whole, the psychic unity idea has been reduced to little more than an uninformative consensus that humanity is all one. But this is a false impression.

Virtually any line traced through the intellectual history of anthropology reveals itself as a tacit tacking back and forth across the wind of Bastian's fundamental concept. This is true whether the issue is cultural relativism, gender, number, the body, color discrimination, culture and personality, human evolution, the psyche itself, or native responses to Captain Cook.

Lewis Henry Morgan (1818–1881), for example, held to a monogenetic view, arguing that the brain of the "savage" and the brain of the "civilized person" were the "same brain." Judged from the perspective of polygenesis, Morgan's work supported the doctrine of psychic unity. And yet Morgan supposed in a Lamarckian vein that with the progress of social and technological evolution, morality and intelligence developed further, were subject to inheritance, and were stored in an increasingly larger brain.

For Bronislaw Malinovsky (1884–1942) this evolutionary schema shortchanged primitive peoples. They

needed to be understood in their own terms and in any case had desires comparable to the rest of us. What were those common desires? Well, they did not have the character supposed by many in bourgeois Europe. By demonstrating that the significance of wealth among the Trobrianders derived from the social importance attached to *giving,* Malinovsky undermined the utilitarian view that every person everywhere was a self-maximizing *H. economicus.*

And yet according to Marcel Mauss (1872–1950), Malinovsky had not gone far enough. He failed to really part company with utilitarianism, for he thought it possible to assess the individual motivations of Trobrianders by putting their separate exchanges on a continuum from pure gift giving to bargaining for gain. It therefore fell to Mauss to argue that the very contrast between disinterested giving and self-maximization was out of place. Giving and receiving in clan societies was religious, economic, aesthetic, legal, and so on, all at once. There was no separate economy, and no separable economically motivated actor, to be found in such societies.

The key question here is whether such debates are in any way cumulative. To the extent that they are, their virtue does *not* lie simply in taking this or that widespread assumption about what is common to the human mind and using ethnographic data to expose the assumption as a false universal. It lies rather in forcing the universal to become more concrete, that is, more ethnographically informed and therefore more genuinely universal. The "psychic unity of humankind" in this sense is not merely some outdated 19th-century doctrine, but an unstated research program, the name of a sprawling conceptual terrain that anthropologists are collectively mapping out.

Normative Horizons

Expressing the foregoing somewhat enigmatically, we might say that even if anthropology has forgotten the psychic unity of humankind, the psychic unity of humankind has not forgotten anthropology. This is most apparent when we turn to the normative dimension of the concept.

To speak of the psychic unity of humankind as having a programmatic value for anthropology is to indicate that it is more than a curiosity-driven search for human universals. Ineluctably, the idea has ethical significance. For attempting to inform humans about what they are and what they have in common is not a neutral act. By contributing its share, anthropology becomes part of the world-historical process by which human unity comes to exist in a new sense in virtue of being *known* to exist.

Without a doubt, anthropology's flagship achievement in this area is the blow dealt to racism. Handed an ethnographic mirror in which to see itself anew, humanity, and most particularly European humanity, had a better chance to recognize why racism was blinkered and wrong.

What is equally interesting is that the psychic unity of humankind also has a reverse ethical significance. It is a telling fact that on first acquaintance the phrase may sound *dystopian,* a perfect doctrine for a Kentucky Fried world striving all too successfully to become one unified place.

The psychic unity of humans, in fact, is a doctrine that straddles what may be *the* antinomy of anthropological thought in the ethicopolitical realm: the imperative, on the one side, to stand up for the rights of all people to a fair share of the possibilities the modern world makes available, and the imperative, on the other side, to stand opposed to the hydrochloric acid of the Western cultural stomach and its insatiable will to digest and assimilate all otherness into itself.

On the surface it appears that even if anthropology has come up with no way of reconciling the imperative of global equality with the imperative of global diversity, at least it is an intellectual arena in which the competing claims of each may be faced and argued over. But in fact more might be asserted than this. For considered in a historical sense, what else is the gifting to the world of a more culturally differentiated universal, a more concrete and accurate sense of humanity's psychic unity, than a labor on behalf of a humanity that must draw together without squandering its priceless diversity? Anthropology at its best, and that includes a figure like Bastian, has always seen itself as helping to bring about a "world culture" of a different order than the one presently doing the rounds.

— *Sebastian Job*

Further Readings

Durand, G. (1999). *The anthropological structures of the imaginary.* Brisbane, Australia: Boombana.

Eliade, M. (1979). *Patterns in comparative religion.* London: Sheed & Ward.

Herskovits, M. J. (1959). Past developments and present currents in ethnology. *American Anthropologist 61*, 389–398.
Koepping, K.-P. (1983). *Adolf Bastian and the psychic unity of mankind: The foundations of anthropology in nineteenth century Germany.* St. Lucia, Australia: University of Queensland Press.
Lévi-Strauss, C. (1977). *Structural anthropology.* Harmondsworth, UK: Penguin.
Lévy-Bruhl, L. (1966). *The "soul" of the primitive.* Chicago: Henry Regnery.
Lloyd, B., and Gay, J. (Eds.). (1981). *Universals of human thought: Some African evidence.* Cambridge, UK: Cambridge University Press.
Neumann, E. (1954). *The origins and history of consciousness.* Bollingen Series XLII. New York: Pantheon Books.
Róheim, G. (1974). *The riddle of the Sphinx: Or, human origins.* New York: Harper & Row.
Rousseau, J.-J. (1979). Discourse on the origin and foundation of the inequality among men. In J. H. Mason (Ed.), *The indispensable Rousseau.* London: Quartet Books.

UNITY OF HUMANKIND

First theorized by ethnologist Adolf Bastian (1826–1905), the psychic unity of humankind postulates that there are certain elementary ideas and concepts that are common to all people. Bastian proposed that cultural features, folklore, myths, and values of various ethnic groups originate within each group according to laws of cultural evolution and are essentially the same. The only differences that are detectable are formal and are due to the geographic environment. Bastian's unity of humankind theory has influenced a number of prominent anthropologists, including Bronislaw Malinowski and Franz Boas, as well as Carl Gustav Jung's psychoanalytic theory of the collective unconscious. The unity of humankind concept has become anthropology's oldest and most problematic question.

Studying shamanism, Bastian described it as a configuration that covered much of the globe. The shamanic phenomenon was considered by Bastian as a widespread elementary idea *(Elementargedanken),* whose individual embodiments *(Volkergedanken)* appeared in many different cultures under a variety of names. Shamanism, with its strong links to a hunting way of life, arose independently in places as diverse as the Arctic tundra and tropical forests. The distribution of shamanism on all six inhabited continents, like the occurrence of the nuclear family, the mother-son incest taboo, and the notion of property, is a function of the evolution of the human brain and not the result of historical phenomena, such as migrations, or of biological variations.

The belief in the unity of humankind engineered by cultural evolution led 19th-century anthropologists such as E. B. Taylor (1832–1917) and Lewis H. Morgan (1818–81) to detect several stages in the cultural development of humanity. As Morgan put it in *Ancient Society* (1877), "Since mankind were one in origin, their career has been essentially one, running in different but uniform channels upon all continents, and very similarly in all the tribes and nations of mankind down to the same status of advancement." Yet the theory of the stages was challenged at the turn of the 20th century, when anthropologists, such as Boas, Margaret Mead, and Ruth Benedict, argued that the discipline should move away from generalizations to focus instead on fieldwork on single cultures.

The unity of humankind theory has proved a theoretical challenge to the other important tenet of cultural anthropology: the notion of human cultural difference. The faith in a single human nature is difficult to reconcile with the defense of cultural relativism. Contemporary American anthropologists such as Leslie A. White, Julian H. Steward, Marshall D. Sahlins, and Elman R. Service have tried to address this apparent contradiction. They have claimed that although there is not a single process of evolution valid for all peoples, it is true that humankind generally evolves and progresses. Specific peoples supply innovations that make all humankind more dominant over the environment and more complex both socially and culturally.

— Luca Prono

Humans and Dinosaurs

Dinosaurs were a diverse and successful group of animals whose remains have fascinated us and inspired myths that persist into modern times. Although the last dinosaur died 63 million years before the first human, some stories infer contemporaneous existence or defy the fact of their demise. Behind these narrative relationships may lie an innate interest in what ended the reign of such successful creatures, as realization grows that humans are not exempt from similar factors causing their own fate.

Dinosaurs beheld the world long before humans. They evolved 230 million years ago on the single continent that was then the land surface of the earth. As the pieces of Pangaea separated and slowly drifted apart, their descendants were carried across the surface of the globe to become a hugely diverse and successful force of terrestrial ecology. They left traces of their existence on every continent, fossilized as tracks or bones preserved by geological accident. After a 165-million-year reign on earth, they suffered an abrupt demise, leaving their feathered descendants to fly over a world that was now safe for mammals. It would be another 58 million years until the first hominids appeared in present-day Africa, and a further 6 million years before our genus *Homo* could gaze upon the fossilized traces, and wonder . . .

Dinosaurs have long held deep fascination for humans. Their large and strange bones, continuously being exposed naturally by erosion, were encountered with amazement by ancient peoples. With no concept that animals once alive may have become extinct, speculation on the obviously dangerous creature that must visit from somewhere over the horizon inspired imagination and fear, and thus were born mythological creatures such as dragons, griffins, and winged serpents. Noting the similarity of sharp teeth and long tails of some dinosaur skeletons to familiar animals, depictions of dragons carried heads like a lion and bodies of snakelike form. Commonly, these reconstructions had wings, a not-too-inaccurate reconstruction of some dinosaurs that share close ancestry with birds. The additional inference of flight explained how the mythological creature could travel between its unseen lair and the local environment where its mortal remains lay.

These mythological explanations were later supplanted by formal religious beliefs, as in the Genesis account of the creation. Rational thought on how organisms can develop, change, and end would precipitate only in the last three centuries of human evolution. Yet stories and myth about humans and dinosaurs coexisting persist in some countries.

In central Africa and South America, legends tell of "Mokele-mbembe," alluding to a still-living sauropod dinosaur, while in Europe, local myths infer other creatures left over from the Mesozoic age of dinosaurs are still rearing their heads. The purveyors of these stories do not seem to consider that animals cannot live forever as individuals; a herd of dinosaurs large enough to form a sustainable breeding population this last 65 million years would be hard to miss even in the jungles of Congo, never mind around the tourist-tramped shores of Scottish Loch Ness.

In North America, supposedly human footprint traces are claimed to occur with those of dinosaurs at a small number of dinosaur track sites. Studies have revealed that the claimed human prints are in fact misidentified dinosaur tracks, natural erosions, or carvings by hoaxers and others with vested interests in myth. In some locales, there have arisen small industries to perpetuate and trade on such stories, sustaining fundraising from tourism and religious cultures.

In thousands of excavations around the world, on every continent, while recovering fossils and traces of tens of thousands of species of flora and fauna, no dinosaur and human remains have ever been found together to suggest any contemporaneous existence. The gap in time between the last dinosaurs to the earliest human being is approximately 30 times that of the entire existence of humans on the planet: The earliest *Homo* remains date to about 2 million years ago, and you have to travel 30 times that number further back in time to the last of the dinosaurs. This gap of 63 million years dwarfs the short history of human evolution and is a vast ocean across which no contemporaneous existence can cross. Even human myth must at some stage be diluted by the fact that the dinosaurs are gone forever.

After 165 million years of terrestrial domination, the dinosaurs became extinct at the end of the Cretaceous period during the most notorious of five mass extinction events in life's history. They were a major group but only one of a large percentage of the world's flora and fauna that became extinct in a profound turnover of the earth's biota at that time. And

what unfortunate series of events conspired to overcome the hitherto successful dinosaurs? Arguments continue to rage. There was massive volcanism and widespread marine regression toward the end of the Cretaceous, but the rate and scale of change these would have imposed on climate and environment is unclear. The evidence for the publicly popular theory of meteorite impact is well supported, with the necessary-size crater and over 110 sites documented with evidence of impact fallout such as Iridium and shocked quartz, yet the size and tempo of stresses this would induce upon life are hard to model.

Each hypothesis has its own complex mechanisms and interactions to explain the results seen in the fossil record. The anomalies in the patterns of surviving taxa are difficult to explain by a single theory, such as why birds survived while pterosaurs did not; so arguments as to the type and tempo of causes and mechanisms continue. There may be growing consensus that the patterns of extinction and survival indicate a more complex scenario than a single event might suggest, such as a combination of events causing a stressful rate of environmental change, with the meteorite impact being the coup de grace upon an already worsening fitness landscape. Although an exact and complete answer to the question of dinosaur extinction is yet to be ascertained, the discovery of the complexity of mechanisms involved has led to growing realizations about extinction processes and what they may look like in the modern world.

Underlying our continued fascination with dinosaurs as excitingly different creatures is a more fundamental and serious need. For humans may be naturally curious, as befits our mammalian development, but we also have a primal drive for answers to potentially fatal questions. What dangers can we expect to find in our own fitness landscapes, and what will they look like at an early stage? Are we adapting to evolutionary pressures successfully, and if not, what will signs of our own demise look like?

Dinosaurs, as robust fossils of great diversity over a long period of time, provide a useful record of life history with which to compare our own progress. There is increased awareness that humans too have to navigate the same evolutionary pressures that descended upon the dinosaurs and caused the demise of their once mighty branch of life. In this way, dinosaurs provide us with more than myth and movies, and are also illuminating the potential paths of development that humans must travel to become exempt from the same evolutionary fate.

— *Mark James Thompson*

See also **Extinction; Fossil Record**

Further Readings

Dawkins, R. (2004). *The ancestors' tale: A pilgrimage to the dawn of life.* London: Weidenfeld & Nicolson.

McGowan, C. (2001). *The dragon seekers: How an extraordinary circle of fossilists discovered the dinosaurs and paved the way for Darwin.* Cambridge, MA: Perseus.

Spalding, D. (1993). *Dinosaur hunters: 150 years of extraordinary discoveries.* Toronto, Canada: Key Porter Books.

Weishampel, D., Dodson, P., & Osmólska, H. (Eds.). (2004). *The dinosaurian* (2nd ed.). Berkeley: University of California Press.

VON HUMBOLDT, FRIEDRICH WILHELM HEINRICH ALEXANDER (1769–1859)

Alexander von Humboldt felicitously combined acute observation and scientific method with indefatigable energy levels and enormous curiosity. The Age of Humboldt, as some called it, was an age in which scientific method first conquered speculation and the world became a single world where the same processes, physical and human, could be thought to apply everywhere. Born September 14, 1769 in Berlin, the son of a Prussian officer and a Huguenot mother (whose family left France in 1685), Humboldt studied at various universities (Frankfurt, Berlin, and Göttingen), where he became interested in geology and botany. In 1790, he enrolled in the Mining School in Freiberg and then took a job in the Prussian government's department of mines (1792). In 1796, his mother died and he came into an inheritance worth about £17,000, which provided an annual income of about £700—vastly higher than his income as a government functionary of £80 per year. This inheritance helped subvention his travels and publications until it was finally exhausted around 1827. Humboldt lived in Paris during many of his most productive years where

he had a close friendship with physicist François Arago, but he also often resided in Berlin, where he died on May 6, 1859.

Humboldt traveled widely in Europe as well as the Americas (Central and South: 1799–1804) and Central Asia (1827). He was able to both write prodigiously about what he saw and to formulate fruitful generalizations that became the starting points for later disciplines, including physical geography, landscape ecology, climatology, and even vulcanology. He was the first to establish the difference between sedimentary and igneous rocks and to suggest that volcanoes were linked to fault lines. He devoted hours taking measurements, which he assiduously turned into statistics that he related to botanical and geological observations. Humboldt had a genius for graphical representation and was the first to introduce the depiction of isoclines and similar graphics using his many individual data points for magnetic readings, temperature, or barometric pressure.

Humboldt's observations tended to be acute: The Peru Current was originally named the Humboldt Current since he was the first to record its consistently colder temperatures. His observations that the limestone in Jura (Italy) obviously represented a distinct geological period led him to coin the term "jurassic," and his claim that South American savannas had a climatic origin is still a matter of theoretical interest. While authorities recognize some examples of anthropogenic influence, they tend to view Humboldt as correct in many other cases. His careful observations of traditional American peoples and civilizations even led him to hypothesize and provide substantial evidence for an origin across the Bering Strait from Siberia (1810) in contrast to the many speculative theories that then prevailed. Nevertheless, while he strongly promoted the career of Louis Agassiz, he still found it difficult to believe Agassiz's theories of earlier ice ages, and his spotty education prevented him from fully understanding the mathematics behind Gauss's model of earth's magnetism.

Humboldt was perhaps most unique in his energetic devotion to a scientific methodology in which hypotheses were assiduously exposed to all supporting and countervailing evidence and plausible conclusions reached only after evaluation of both. His enormous influence in his time was equally due to his prolific travel, acute observation, insightful generalization, and his ability to network with other scholars and governments. Humboldt was generous with his time and money, and though he died quite poor, his personal correspondence always involved a vast international network of scholars.

— Thomas K. Park

Further Readings

Kellner, L. (1963). *Alexander von Humboldt.* London: Oxford University Press.

von Humboldt, A. (1810). *Vues des Cordilleres et monuments des peuples indigènes de l'amérique.* Paris: F. Schoell.

von Humboldt, A. (1850–1859). *Cosmos: A sketch of a physical description of the universe.* New York: Harper & Brothers.

von Humboldt, A. (1988). *Political essay on the kingdom of New Spain.* Norman: University of Oklahoma Press. (Original work published 1811)

von Humboldt, A. (1971). *Researches concerning the institutions and monuments of the ancient inhabitants of America.* New York: Da Capo Press. (Original work published 1814)

von Humboldt, A., & Bonpland, A. (1818–1829). *Personal narrative of travels to the equinoctial regions of America, during the years 1799–1804* (Vols. 1-7). London: Longman, Hurst.

Hume, David (1711–1776)

Contrary to the traditional conception of human beings as essentially purely rational, David Hume, Scottish philosopher, historian, and essayist, argued that both reason and passion are essential parts of human nature. On the basis of his view of human nature, he hoped to radically reconstruct the moral discourse of his time. This led to his condemnation as an atheist and skeptic. Charles Darwin counted Hume as a central influence, as did Thomas Henry Huxley.

Life and Works

David Hume was born in 1711 near Edinburgh. He studied science and read widely in history, literature, and philosophy. In his mid-20s, he wrote his first, greatest, and most influential philosophical work, his three-volume *Treatise of Human Nature,* a difficult and provocative book. To Hume's disappointment, the book failed to gain attention. Therefore, in 1741

and 1742, he published his *Essays, Moral and Political* to get his ideas across to a general public. With their popular style, the essays were more successful than the *Treatise.* But being condemned as an atheist and skeptic—he despised the "monkish virtues" of humility and self-denial—Hume never obtained an academic post. Popular revisions of his *Treatise* (*Enquiry Concerning Human Understanding* and *Enquiry Concerning The Principles of Morals*) were published in 1748 and 1751. In 1751, Hume also published his *Political Discourses,* which drew immediate praise. But his most successful book was his six-volume *History of England,* published from 1754 to 1762. This work made Hume quite wealthy. After having held diverse professional positions and having spent several years of his life abroad (in France, Austria, and Italy), Hume could spend his last years in Edinburgh quietly and comfortably, dining and conversing with friends in Edinburgh's intellectual circles.

Empiricism

Following the newly developed natural sciences of the 17th century, Hume wanted to establish a science of human nature that would be free of false and misleading metaphysics or superstition. His aim was to find the explanatory principles that produce order in diverse phenomena of human nature. In general, he thought that a study of history and an examination of all known societies suggested that these principles of human nature are as universal and immutable as those governing the rest of the natural world.

Impressions, Ideas, and Personal Identity

Hume criticized the traditional conception of human nature, which identified the capacity for reasoning as the true human nature. In his account, the passions are likewise potentially positive and beneficent parts of human nature. The materials of thinking (perceptions) are divided into ideas (thoughts) and impressions (sensations, such as colors and sounds, and passions, such as being happy or afraid). He argued that all ideas are ultimately derived from impressions, a thesis usually called the *copy principle.* But ideas are also regularly connected. It is the faculty of imagination that combines simpler ideas into new structures. The imagination flows from one idea to another via three principles of association: resemblance, contiguity in time or place, and cause and effect.

Source: Courtesy, Wikipedia.

On this account, Hume was skeptical about personal identity. He claimed that we have no experience of a simple, individual impression that we can call "the self." He diagnosed that we naturally (mis)take a highly constant and coherent series of momentary perceptions for a continuous mental substance (the self). Because of the associative principles, the resemblance or causal connection within the chain of our perceptions gives rise to an idea of oneself, and memory extends this idea past our immediate perceptions.

Passions, Motivation, and Freedom of the Will

Passions like pride and humility, love and hatred play a prominent role in human life and for this reason attracted Hume's attention. Because Hume takes human nature as universal and unchanging, both over time and across cultural divides, he takes, for example, the mechanism behind the causes of the passions of pride as natural, that is, independent of convention. Pride is evoked by some intrinsically pleasurable factor when seen as relating to oneself. The particular things that cause pride, however, may change over time or culture. In contrast to pride and humility, which are self-directed states, love and

hatred are caused by reflecting on someone else. Love naturally leads to benevolence, whereas hatred is constantly conjoined with anger. Some passions are influenced by the opinions and sentiments of others. The capacity to simulate what others are experiencing when we see or think of them is sympathy. Hume also argued that human actions must be prompted by passion and never can be motivated by reason alone. Thus, Hume concluded that "reason is, and ought only to be, the slave of the passions."

On the issue of freedom of the will, Hume reconciled necessity with liberty. Although human behavior is just as predictable and explicable as any other natural phenomenon, necessity does not eliminate moral choice, because we rely on necessity to link a person's actions with his motives and thus pass moral judgment on the person's actions. Hume regarded an action as free when it systematically emerged from settled character traits.

Morality and the Seduction to Virtue

In his moral theory, Hume tried to reduce the phenomena of moral judgment, virtues, and vices to as few principles as possible. The starting point is an observation of the kinds of acts that elicit moral approval and the character traits constantly conjoined with them (i.e., virtues). This investigation reveals in Hume's account four primary sources of moral virtue: (1) qualities useful to others (beneficence, justice, and veracity); (2) qualities useful to oneself (prudence, perseverance, and patience); (3) qualities immediately agreeable to those who encounter or consider them (wit, eloquence, and cleanliness); and (4) qualities immediately agreeable to oneself (good humor, self-esteem, and pride).

Making a moral judgment, people approve or disapprove of certain qualities. Moral distinctions do not derive solely from reason but are passions that come from a general and stable viewpoint. In *Enquiry Concerning the Principles of Morals,* Hume names the central moral passion the "extended or extensive sentiment of humanity," which is a disinterested desire for the benefit of any person purely on account of shared humanity. Hume was very optimistic about human nature and morality: The sentiment of humanity could be found in everyone. No transcendental moral law has to be imposed upon people, because moral requirements are requirements of human nature itself. Hume's work on morality was motivated by the conviction that outlining and communicating this truth to people would seduce them to be virtuous.

— *Anne Siegetsleitner*

See also **Darwin, Charles**

Further Readings

Baillie, J. (2000). *Hume on morality.* London/New York: Routledge.

Hume, D. (2003). *A treatise of human nature* (D. F. Norton & M. J. Norton, Eds.). Oxford: Oxford University Press.

Norton, D. F. (Ed.). (1993). *The Cambridge companion to Hume.* Cambridge: Cambridge University Press.

Huntington, Samuel P. (1927–)

Samuel P. Huntington is one of the most talked-about and controversial political scientists in the world today. Huntington asks the question, "Who are we?" of Americans, contrasting many different cultures to our own. Instead of a unipolar world in which America is the lone superpower, he sees humanity instead more accurately organized into nine major cultures: Hindu, Orthodox (Russian, Slavic), Latin American, Western, Islam, Confucian, African, Buddhist, and Japanese. He also investigates in his writings how these cultures will compete for preeminence in the world in the 21st century.

Born in New York City in 1927, Huntington has worked in government at the highest level. He earned his bachelor's degree at Yale University in 1946, his master's degree at the University of Chicago in 1948, and his PhD at Harvard University in 1951. He founded and coedited the magazine *Foreign Policy* (1970–1977) and was a member of the National Security Council from 1977 to 1978, where he served as Coordinator of Security Planning in the Carter Administration. Huntington is currently professor of political science and director of the John M. Olin Institute for Strategic Studies at Harvard University.

One of Huntington's main theses is that the West (comprising the U.S., Canada, and Western Europe) is facing the decline of its power relative to other

cultures such as Islamic and Confucian (or Chinese) culture. The end of the Cold War has seen the attempted imposition of Western values on the rest of the world. This effort has been rejected by most of the Muslim world and others, including Cuba, China, and parts of Latin America. "Winning" the Cold War, however, does not translate to the creation of a democratic world in which Western values are substituted for all others.

Huntington sees the main threats to Western culture as coming from Islam and China. Economically, China continues to grow at a higher rate than the West. This is balanced by the West's continued technological superiority. Huntington sees this state of affairs as temporary, however. Over the next decade, China will achieve near military parity with the United States. In Asia, China is the main trading partner of most of the countries in the region. The smaller nations of South Asia may look to China for leadership in economic and political affairs, while China simultaneously makes an effort to increase its influence among the region.

Concerning the Islamic world, according to Huntington, the West is at a disadvantage due to a simultaneous slow (nearly zero) birth rate in the West and an exploding birth rate for Muslims. Anti-Americanism in these countries continues to be politically supported by large segments of Muslims. Arms sales from China to Syria, Iran, Libya, and other Muslim nations are warning signs that should be heeded by Western political leaders. However, since Islam has no "core country" as the West does (the U.S.), this inhibits the culture's dominance and its spread to non-Islamic countries.

Huntington's most recent book, *Who Are We? The Challenges to America's National Identity,* focuses on immigration into the United States, particularly Mexican and Hispanic immigration over the last 20 years. Huntington fears the loss of a unique American identity. He forecasts the wave of Hispanic/Mexican immigration to be an acute source of future cultural and political conflict. Huntington envisions a situation similar to Canada, in which French-speaking citizens of one or two provinces desire political autonomy or outright secession. He writes of the "American Creed," which values the English language, legal systems based on British law, our own traditions of democracy and individual liberty, and equality for women. Historically, immigrants have gradually assimilated into American society, combining these values with their own. As Huntington sees it, the last two decades of Mexican immigration have not witnessed the same type of "melting pot"—the newcomers instead simply move their cultures with them and have no intention of learning English or being assimilated into American culture. Another cause for alarm, according to Huntington, is that unlike other immigrations in U.S. history, Mexicans are closer in proximity to their home country, they can hold dual citizenship, they are much more numerous than other immigrants, and they possess a possible desire to redraw the map of the southwestern United States to reclaim lost territory from the mid-1800s.

At the same time, Huntington sees an internal enemy, the liberal elites who favor a "world community" model of nations. These are the influential politicians and policymakers who defer to the United Nations, international agreements such as the Kyoto Protocol on the environment, and the World Court. American sovereignty is to these people a thing of the past, having little if any relevance in the age of transnational corporations and worldwide communications technology. Huntington believes that American values are superior to all others and to act in concert with other nations can compromise our national interests.

Huntington's fault lines are sometimes inaccurate. Mexican immigrants, especially second- and third-generation Hispanics, *do* speak English, and the third generation will speak *only* English. Those granted U.S. citizenship are proud to be Americans. Instead of a unified Islamic civilization, the United Nations' response after Saddam Hussein invaded Kuwait shows how states act according to national interest, not along supposed culturally divided lines. A military coalition of the West, other Arab states, and Japan fought against the Arab Iraqis to preserve the political status quo in the Middle East. Huntington cites arms sales from China to Syria and Iran as proof of a Sino-Islamic alliance against the West, when it is probably a result of the black market in weapons not transferred by normally peaceful countries.

Latin America, according to Huntington, is a separate "civilization" from the West, even though immigrants from Portugal, Spain, and other Western European states founded those nations. Roman Catholicism is the main religion throughout Latin America and large sections of the United States, yet Huntington does not explain why this isn't a unifying force instead of a dividing one. Also, while India is

nonaligned with the West, that society continues to modernize, and the leaders there do not desire to isolate themselves from the world economy. If anything, trends in technology will improve conditions for India's middle class, further democratizing and opening up Indian society to Western investment. The same can be said for conditions in China and Latin America. Orthodox (Russian) culture is similar to Western society, at least since the late 19th century regarding the military alliances between France, England, and Russia. Economic associations such as the G8 cross these "civilizational" lines between the West, Orthodox, and even Japan. African culture too can only benefit from an influx of Western capital as the nations of the former third world gradually modernize. It is difficult to see how leaders of "African civilization" could see any benefit in estranging themselves from the West. Cooperation and interdependence would seem to be the more logical impulse for all nations, regardless of cultural, linguistic, or religious differences.

Huntington strives to define the new order of human civilization. He has defended this model of major cultural civilizations by asking, "If not this paradigm, how else can we describe the new world order?" As of this date, however, people throughout the world have much more in common than they have differences between them. It is in each nation's economic and national interest to increase its involvement in the global economy, as opposed to increasing barriers to international cooperation. Furthermore, it must be pointed out that nations and governments control cultures, but the reverse is not true. Huntington is accurate when he says that Islamic and Chinese cultures are gaining prominence relative to American or Western culture. Core values of those other cultures, such as the importance of religion and family customs, certainly differ from those of the West; however, any predictions of a new "cultural cold war" must be seen as alarmist and premature.

— *Thomas M. Prince*

See also **Cultural Conservation; Globalization**

Further Readings

Huntington, S. P. (1981). *American politics: The promise of disharmony.* Cambridge and London: Belknap Press/Harvard University Press.

Huntington, S. P. (1991). *The third wave: Democratization in the late twentieth century.* Norman: University of Oklahoma Press.

Huntington, S. P. (1996). *The clash of civilizations and the remaking of world order.* New York: Simon & Schuster.

HYLOBATES

Hylobates is the sole genus of primates in the family Hylobatidae. The family, whose members are known as lesser apes, includes the gibbons *(Hylobates spp.)* and siamangs *(H. syndactylus). Hylobates* are called "lesser apes" due to their stature (5–12 kg) and height (about 3 feet), which are smaller than the great apes (orangutans, gorillas, chimpanzees, and bonobos: 31–175 kg). *Hylobates* species are divided into four subgenera, which are grouped together based on chromosomal numbers and coloration.

The first subgenus uses the same name as its genus, *Hylobates,* and is also referred to as the "lar group." Lar gibbons include the silvery Javan gibbon *(H. moloch),* white-handed gibbon *(H. lar),* and Kloss's gibbon *(H. klossii),* all found on various islands in Indonesia. The dark-handed or agile gibbon *(H. agilis)* occurs on Sumatra, Borneo, and the Malay Peninsula. The gray gibbon *(H. muelleri)* can be found on Borneo, while the pileated gibbon *(H. pileatus)* lives in Thailand and Cambodia. Lar gibbons have 44 chromosomes.

Bunopithecus, the second subgenus, comprises the hoolock or white-browed gibbon *(H. hoolock),* found in India, Burma, and China. Hoolock gibbons are sexually dichromatic; the males are black, and the females are tan. Females of this subgenus have whitish hairs around their entire face, while males have only white eyebrows. White-browed gibbons have 38 chromosomes.

Living members of the third subgenus, *Nomascus,* are the black gibbon *(H. concolor)* of China, Viet Nam, and Laos; the golden-cheeked gibbon *(H. gabriellae)* of Cambodia, Viet Nam, and Laos; and the Chinese white-cheeked gibbon *(H. leucogenys)* of China and Viet Nam. Members of the concolor group have 52 chromosomes.

The last subgenus, *Symphalangus,* also has 52 chromosomes. It is comprised of one species, the siamang *(H. syndactylus),* found in west Malaysia and Sumatra. Siamangs are distinguished from the other lesser apes by their larger body size (10.7–11.9 kg), throat sac, and webbing between their second and third toes.

Hylobates spp. are the acrobats of the forest, using their long arms and long, slender, and curved fingers to brachiate (swing) through the canopy. Gibbons are frugivorous, with most of their diet consisting of ripe fruit. They also eat young leaves and flowers. The diet of siamangs, however, consists of more leaves. Insects and arachnids may also comprise a small percentage of the lesser-ape diet.

Life expectancy for lesser apes is 10 to 20 years in the wild. They live in small, monogamous groups and mate year-round. Often when offspring reach adulthood (about 6–7 years), they are driven out of the group by the same-sex parent. Many usurp a small part of their parents' home range and eventually begin their own social group. The vocalizations of hylobatids are well-known and can be heard up to 1 kilometer away. The calls are used for territorial defense, among other things.

Human activities such as deforestation and poaching have caused decreases in lesser-ape populations. All species of Hylobatidae are considered endangered, and the silvery Javan gibbon is critically endangered.

—Lisa M. Paciulli and Adam M. Isaak

See also **Apes, Greater; Apes, Lesser; Primate Taxonomy**

Further Readings

Chivers, D. J. (1974). *The siamang in Malaya: A field study of a primate in tropical rain forest.* Basel, Switzerland: S. Karger.

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego, CA: Academic Press.

Palombit, R. A. (1992). *Pair bonds and monogamy in wild siamang (Hylobates syndactylus) and white-handed gibbon* (Hylobates lar) in *northern Sumatra.* Davis: University of California Press.

Preuschoft, H. (1985). *The lesser apes: Evolutionary and behavioral biology.* Edinburgh, Scotland: Edinburgh University Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Rumbaugh, D. M. (1974). *Gibbon and siamang: Natural history, social behavior, reproduction vocalizations, prehension (Progress in biochemical pharmacology).* Basel, Switzerland: S. Karger.

Teleki, G. (1979). *Aerial apes: Gibbons of Asia.* Coward, UK: McCann & Geoghegan.

I

ICEMAN

On September 9, 1991, a German couple from Nuremberg, Helmut and Erika Simon, were hiking the trails along the Niederjochferner Glacier, at about 3,200 meters in the Otzal Alps, which lie east of the Inn River along the border of Italy and Austria, when they discovered a corpse, the upper part of which protruded from the ice. In the days that followed, some damage to the body occurred from removal attempts by local authorities. But by September 23, the exposed body was wrapped, placed in a coffin, and, together with a bag full of material that had been collected at the site, ultimately delivered for study at the University of Innsbruck, Austria. It was declared a prehistoric find and represented one of the oldest and best-preserved human mummies by freezing ever found. Named "Otzi the Iceman," after the Otzal Alps where he was found, he immediately became the object of border dispute between Italy and Austria as to his ownership. This was resolved when authorities confirmed that the spot he had been found was located in Italy. After years of study at the University of Innsbruck, Otzi was finally removed to a specially built exhibit in the new Museo Archeologic dell'Alato Adige, in Bolzano, Italy. His body was placed in a special chamber, which can be viewed through a small porthole kept at a constant 6°C and a humidity rate of 99%.

After many revisions of data and rejections of initial hypotheses, current findings concerning the Iceman's body and possessions are emerging. Articles found on or near the body included a longbow, a quiver containing the makings of arrows, an axe, knife, a wooden-framed backpack, two bark containers, and a belt pouch.

The smooth and weathered handle of the axe was made of yew, with a metal blade inserted into the notch of the handle and tied with a strip of leather. Analysis of the axe blade revealed that it was not bronze, as had been hypothesized, but almost pure copper, with traces of arsenic and silver. According to radiocarbon dating, the Iceman died around 3300 BCE, in the New Stone Age or Neolithic period. It rendered inaccurate much of what archaeologists previously thought they knew about the people and culture of this region and gave greater insight into the Stone Age. The axe was an advanced design that was thought to be in use around 2000 BCE, when the people of the southern Alps still relied on stone for most of their tools. Revisions now needed to be made concerning the advanced stage of Stone Age man and the date of the Copper Age.

The remnants of a quiver, now recognized as the oldest-surviving one in the world, have been described as made of "bald skin," but possibly had originally been made of fur, as there were some hairs wedged in a side seam. A wooden rod stitched onto the side of the quiver with a piece of leather gave shape to it. The top flap of the quiver had been ripped off, exposing the ends of 14 unfinished arrow shafts, 2 of which had feathers attached, together with 2 attached flint arrowheads. Also inside were wrapped four pieces of stag antler, probably destined to be fashioned into arrowheads. The bow was fractured, and the carrying strap for the quiver missing, as was the hood closure; three arrow shafts were broken, and one arrowhead was broken—all yet to be explained as to their condition. Before this discovery, scientists had not known with certainty that people had used quivers at this time.

At his discovery, it was observed that the Iceman had a primitive boot on the right foot, and grass was

Source: © CORBIS SYGMA.

noted sticking out of the tip of the boot and bound around the foot by some shredded string and some worn leather. The remains of a second shoe were also found nearby. Upon examination, it was noted that the boot consisted of three main parts: the grass insulation, a net that held the grass around the foot, and bearskin soles with red-deerskin insteps and uppers. The bottom edge of the net had loops that attached a piece of leather woven around the soles. Across the bottom of the sole was a strip of leather, probably designed to reduce slippage. With the fur side of the skin inside the sole, several holes around the insteps served as eyelets to bind the grass and uppers tightly.

Into these boots were tucked leggings made from scraps of fur sewn together that reached nearly to the groin. A fur tab found inside the boot and a second one sewn onto the edge of one of the other garments indicated that these were not real pants, but suggested that the mechanism for attachment was analogous to garterlike straps and stockings. The Iceman would slip his feet through the tubular "leggings" and cinch it around his thighs with a leather strap through openings along the tip of the legging. A strap extended from the front of each legging up to his waist, where it was attached to a belt that secured his loincloth. The whole outfit was so unusual that no prehistorian had ever seen or predicted these leggings and attachments.

Another garment had to have covered the torso, and remnants of it suggest that the article was likely a huge fur coat or cape of some kind, but with no evidence of sleeves or collar remaining; this interpretation remains open.

Topping all of these clothes was a long cape of plaited grass ending past the knees. It was made of long bundles of grass arranged vertically parallel to one another and bound together at short intervals by two twisted grasses plaited horizontally. The lower part of the cape was not plaited, allowing the grass to hang freely in a long fringe. A bearskin hat completed the outfit.

A knife had an approximately 7.5 cm blade made of gray flexed flint common in Europe. The actual length is unknown because the tip had been broken off. The edge of the blade was serrated, resulting from retouching, a kind of sharpening in which small pieces are broken off using a bone or antler as a tool. It also had a polish on the edge of the blade from cutting grass. Among the other artifacts were a finely woven grass sheath nearly matching that of the knife blade. A grass string coming off the handle may have aided the Iceman in carrying it.

A leather pouch attached to a long leather belt worn around the waist and under the coat was in a position like none other ever seen from prehistory. The contents could be accessed through an 8 cm gap along the top seam or laced shut. The pouch contained three flint blades of different types, a piece of hollow goat or sheep bone, and the rest of the small space filled with a wad of tinder bracket, *Fomes fomentarius,* a few hairs, and traces of pyrite. By keeping the pouch inside his coat and next to the skin, Otzi had found an effective way to keep his kindling dry.

Other artifacts of interest included a leather tassel threaded through a white marble disc, a wooden object from which protruded an antler bone, and two pieces of fungus punched and threaded onto strips of leather. Both pieces of fungus were identified as *Piptoporus betulinus,* a birch polypore, a common type of mushroom that grew on birch trees. These fungi were speculated to possibly have some

medicinal value, while the antler bone was thought to be a retoucher.

Remains of 17 types of trees and shrubs have been identified so far among Otzi's belongings. The bark used to make his containers was composed of white birch, the longbow and axe handle of yew, and his knife handle of ash. The arrow shafts were fashioned from viburum and cornus. The backpack frame was of larch and hazel. Leaves of Norway maple and juniper were used as the insulating material for the charcoal embers carried in one of the containers, while the fuel was composed of a mixture of willow, alder, spruce, pine, and elm. All of these, together with his layers of skins and grass revealed the uses of the natural environment some 5,300 years ago.

Otzi's body has undergone extensive and intensive study. Originally thought to be a person who had recently died in a mountain climbing or hiking accident, the corpse was subjected to rough treatment trying to free it from the ice. When using a nearby stick (his bow) failed, a jackhammer and ice pick were used, damaging the clothing and drilling a hole in his hip. Compounding the problem, his left arm was broken trying to force the body into a coffin. Upon verification that this was an archaeological find and with the stabilization of the climatic conditions in the laboratory, a series of tests were initiated that could possibly reveal injuries, disease, and any physiological abnormalities. X-rays and CT-scans that produced cross-sectional images, each millimeter wide, confirmed the damage to the left hip, buttock, and thigh area that had been obliterated by the rough removal attempts. The heart, lungs, stomach, intestines, liver, and kidneys were dissected and shrunken to almost nothing, with the brain reduced to the size of a fist. The CT-scans also revealed that the abdominal and carotid arteries were heavily calcified, denoting arteriosclerosis; rather surprising, since Otzi, at his death, was determined to have been in his 40s.

The organs were so dissected that a standard autopsy was ruled out, and samples of tissues were the only means of investigation. Microscopic analysis of a small sample of semidigested food was removed from the transverse colon. The position and progress of the food indicated that the Iceman's last meal had been eaten about 8 hours before he died. It consisted of a mass of material made up of einkorn whet, one of the few domesticated grains grown in this part of the world during the Iceman's life span. Its presence indicated contact with an agricultural community common in the Neolithic period of prehistory, in which people lived in semipermanent settlements, raising animals and engaging agriculture. The preponderance of bran, the outer skin of the wheat grain, suggested that the wheat had been finely ground and made into a flatbread. In contrast with modern breadmaking using yeast, which requires a high level of gluten in order to rise, einkorn wheat contains low levels of gluten, so the bread was unleavened, tough, and hard. If the einkorn had been eaten whole or boiled, then whole or larger pieces of the grain would have been evident. In addition, small particles of charcoal, which came from the wood of conifers, were found attached to the bran, indicating some sort of baking process. Examination under the electron microscope revealed tiny muscle fibers and a burned bit of bone and suggested that the Iceman had also eaten meat, together with some plant material. Other contents of the sample included the eggs of the parasitic human whipworm, *Tirchuris trichiura,* which produce symptoms of stomachache and diarrhea after infestation. These could be ingested via plant material or the intake of water.

Many different varieties of pollen were detected on the clothing and in the colon sample. These durable grains contain a record of the Iceman's surroundings at the time before his death. When studying pollen samples, the pollen grains generally are examined as to their method of transmission, type, and range, and then compared to various locations in the proximity of the site. In this sample, the preponderance of pollen was that of the hope hornbeam. The remarkable preservation of the pollen gametophytes indicated that the pollen must have been released from the trees concomitant with ingestion, because if they had remained longer in Otzi's colon, then they would have decayed. This observation, together with the fact that the pollen was of the spring blossoming varieties, meant the downfall of one of the hypotheses surrounding of his death—that he had succumbed after being caught in some early blizzard in the fall, as no autumn blossoming varieties were present in the colon.

Corroborating evidence came from a sample organic material that had been excavated near the site. A wad of 14 maple leaves, one wrapped inside another, revealed tiny chunks of charcoal, together with some spruce and juniper needles and birch bark pieces. The maple leaves were missing the stems and, when tested, still had chlorophyll in them, indicating

that they were removed from the tree sometime in the spring of the year. If they had been picked in the fall, either from the ground or the trees, the stems would be present and the chlorophyll missing. Further investigation implied that the leaves had been stripped from the tree in the spring in one swift fashion, leaving the stems on the tree.

Fourteen sets of bluish-black marks on the Iceman's back run parallel to the spine in four groups of vertical stripes varying in length from 2.8 to 3 cm and in width from 2 to 3 mm. Further down the body, on the inside of the Iceman's right knee in the shape of a cross, was another tattoo, repeated on the lower-left ankle.

Although Otzi's body was discovered in 1991, it was not until 2001 that new X-rays were taken, studied, and subsequently revealed that a flint arrowhead had hit the Iceman in the back, moved upward, shattering the shoulder blade, and was embedded on the left side of his chest within a few centimeters of the left lung and about 10 cm from his heart. The wooden arrow shaft was missing, but probing confirmed the presence of an entry wound that had not had time to heal.

Computerized tomography (CT) has further revealed the damage done to nerves and major blood vessels, paralyzing his left arm and causing major internal bleeding, contributed to his death. He had also received cuts on the hands, wrists, and rib cage. Many theories abound concerning the actual scenario surrounding his demise.

DNA tests have resulted in further complications and new speculations about the Iceman's final days. Samples of blood taken from the antler-skinning tool, arrows, axe handle, and coat revealed they were from four different DNA sequences: one on the knife blade, two different ones on one arrow, and a fourth on the coat.

Samples of the Iceman's tooth enamel, bones, and minerals, which came from the food via soil and water, have helped establish a probable location of Otzi's childhood. Similar analyses were made from the minerals in his adult bones and compared with a wide area of the Tyrolean Alps. Together with botanical evidence, it appears that the Iceman's early home was to the south of the find but most of his adult life was spent somewhat more in the northern valleys.

Speculation and research continue to change the interpretation of all aspects of Otzi's life, health, use of his environment, and the circumstances of his death. His contributions to the understanding of early man and his place in nature have been far-reaching and significant. Science, as the best-tested information that is presently known, is continuing to be validated, and with further study and increased technologies made available, a more refined picture will result.

— *Paul A. Young*

Further Readings

Cullen, R. (2003, February). Testimony from the Iceman. *Smithsonian,* pp. 42–50.

Fowler, B. (2001). *Iceman.* Chicago: University of Chicago Press.

Holden, C. (2003). Isotopic data pinpoint Iceman's origin. *Science, 302,* 759–761.

Müller, H. F., Hallidan, A. N., McCulloch, M. T., & Wartho, J. A. (2003). Origin and migration of the alpine Iceman. *Science, 302,* 862–865.

IDEOLOGY

The term *ideology* is etymologically divergent. A derivation from the rarely transmitted Greek *ideología* (opinion, discourse) must be denied due to the extremely differing meanings of the term today. *Ideology* rather derives from a combination of the Greek nouns *eídos* (appearance, form, term, imagination, idea, archetype) or *eídōlon* (picture, illusion, idol) and *lógos* (speech, doctrine, reason) and hence represents a scientifically sound examination of human ideas, which are naturally imperfect. Francis Bacon's "theory of the idols" is founded in the human mind, with its idols (pictures, imaginations) that are innate or input, although it has not much in common with the modern term ideology. With ideology in the broadest sense, we mean system of conceptions or ideas that are not based on revelation, but made by man. Therefore, ideology can in that sense mean a "system of ideas or history of ideas."

Terry Eagleton characterizes ideology in general as

> (a) the process of production of meanings, signs and values in social life; (b) a body of ideas characteristic of a particular social group or class; (c) ideas which help to legitimate a dominant political power;

(d) false ideas which help to legitimate a dominant political power; (e) systematically distorted communication; (f) that which offers a position for a subject; (g) forms of thought motivated by social interests; (h) identity thinking; (i) socially necessary illusion; (j) the conjuncture of discourse and power; (k) the medium in which conscious social actors make sense of their world; (l) action-oriented sets of beliefs; (m) the confusion of linguistic and phenomenal reality; (n) semiotic closure; (o) the indispensable medium in which individuals live out their relations to a social structure; (p) the process whereby social life is converted to a natural reality.

Ideology does not necessarily signify "the dominant forms of thought in a society," but it is the fundament of thinking and therefore constitutional for "a particular social group or class." Consequently, Eagleton centers in his definition of the term its power to integrate, which in most cases aims at political rule or social dominance.

Ideology therefore pursues worldly aims mostly on a political or economical level. In that, it demands ideological neutrality and represents itself as objective theory; it does not actually want to be ideological. Ideology does predominantly serve a certain *weltanschauung* (worldview), though. This can be seen quite clearly in the modern development of the term ideology since the French Revolution and the times of Napoleon I: With Antoine L. C. Destutt de Tracy in 1801, it meant a certain philosophical or political doctrine for the very first time. Ideology often connects secular interests with religious language and symbols, in order to strengthen its own position and to have an effect on people without losing the secular context completely. The unlimited realization of its purposes, while not thinking about the moral value of its methods, is the aim of ideology. It strives for a realization of salvation, in order to win people's favor with their doctrine.

Time and world and man are to be changed by ideology and to be seen in a different light. In that, a field of tension between present and future becomes discernible, which releases powerful, sometimes even revolutionary energies. Ideologies often have totalitarian features, as no totalitarian regime can live without ideology or without ideologization of its political ideas. The expectation of salvation and the benefactor in such systems prove to be a political messianism that gives people the strength to believe in the ideology of these political systems. With this kind of devoutness to ideologies, many people are monopolized, won totally, whereby such political systems develop totalitarian effects and become totalitarianisms.

It is an important task for ideologies to find new myths, especially myths about the origin of a nation or people, and consequently implant the newly created tradition of the ideological weltanschauung. Based on such new myths and fake traditions, a specific newly created culture can develop, as we can see in the images. These images integrate ideology in everyday life of people. Therefore, they even build an individual form of cults and feasts. In this fake-liturgical and ritual style of celebrations, National Socialism celebrated the sacrifice as self-sacrifice. Ideology is therefore mostly based on a constructed myth and artificial traditions. It gives a utopian aim to its followers that proposes salvation. The totalitarian system with its leader at the top, whose requests the crowd has to follow, whatever they express, leads to the beneficial intention. Without the crowd following their leader's requests, the beneficial destination would be endangered.

Paradoxically, ideologies do definitely not want to be regarded as religions, and in consequence, present themselves accordingly. The strengthening of the religion, though, can preserve from seductions of worldly ideologies. The totalitarian regimes let lose their forces in creating a short-lasting connection between the overcoming of this life and the salvation of mankind. Here, the power of utopia plays a big role, as it is important for the realization of inhuman ideologies because of the alleged paradisial final condition. Every ideology needs a specific utopia. Religion is regarded as an obstacle and is consequently monopolized, removed, or simply pushed aside, as it competes with the totalitarian ideology and has the same universal claim. The totalitarian ideologies are mostly atheistic and materialistically orientated. They are the base for objectification and dehumanization of the enemy, the *Volksschädling* (parasite), which is only mass and matter and can be eliminated industrially and with machine, for welfare's sake.

Ideology follows the compulsory maxim this way and not any other and is based on only one (political) truth. Both are very important for the totalitarian thinking. This criterion of truth is totally subject to the ideological propaganda. At the same time, political ideology is normally proclaimed as a salutary

political doctrine that can solve the actual critical state of affairs. This political ideology is represented by one party, which very often is personified by one person only. Ideology and utopia too serve as a motor for totalitarianism and support its enforcement. Hannah Arendt sees in political ideology that is being spread and popularized by propaganda one of the most important features of a totalitarian system. In Carl Joachim Friedrich's and Zbigniew Brzezinski's theory of totalitarianism, ideology is also put at a structurally important place. Hannah Arendt emphasizes not only ideology, but terror as supporting pillar of totalitarian tyranny, like Eugen Kogon before her. A totalitarian ideology, as Marxism or Fascist and National Socialist ideologies, for example, never ceases to announce the desired final state in a prophetical way. To get over the current state of affairs, it uses all forms of power and violence. Historical and religious facts are connected and are used for secular prophecies, as one can see in Hegel's philosophy and in its completion by Marx and later, in a different form, with Max Weber. Jacob Taubes is right in connecting Joachim da Fiore with Hegel, whereby the tension between religious and secular aspects in history are recognized quite well. This field of tension influences in a special way the intellectual milieu in Europe at the beginning of the 20th century, which in one way or another smoothed the way for both world wars.

Ernst Bloch makes out *The Spirit of Utopia* (1918) in the ideologically tense time and political situation at the end of World War I, leading into the first half of the 20th century. The utopia presents the positive aim that makes the realization of totalitarian ideologies bearable and permissible. So ideology gets the opportunity to countermand the critical awareness of the people in some way. In that, it shows a big resistance and permanence; one could say ideology sticks like pitch, it is very long lasting. Without the power of utopia, the totalitarian ideology would not be able to display its effects, because nobody would be ready to carry out its cruel sanctions and to put into practice the mass destruction in factories of death. Only with utopia do ideologies have the power to drive their men, despising aims and their inhumanity, because the goal of a harmonic ideal state that one has never seen is proposed. With the help of utopia, totalitarian ideology creates a new image of man that does not accept any universal humanity and so denies the nature of mankind. To be human cannot, as a matter of course, be awarded to everyone. So the human is being defined and judged in a new way.

Norman Cohn sees the driving power of medieval mass movements more in common need and common fate, like poverty or epidemics for example, than in a worldly ideology. Secular ideologies were too weak in medieval Europe to be accepted against the predominant doctrine of the church. Cohn's and also Talmon's works show that the research of militaristic and messianistic movements in the 1940s and 1950s were very important, because of the disastrous, fresh impressions of World War II. Very often one misses that the church did not by any means forbid a reasonably processing research. She only fought against the self-idolizing attitude of man, who saw himself, following the *homo-mensura* sentence of Protagoras, as the center and measure of all things: Man is the measure of all things: for the being that they are; for the not-being that they are not.

The biased ideology, which is oriented to certain interests of power, follows the truth neither of revelation nor secular reason and so draws a distorted image of reality. A world that closes itself more and more in itself holds necessarily the dangers of ideologization, as Romano Guardini in the 1920s and 1930s, being in Berlin, was aware of. Ideology supports, with its wrong understanding of world and reality, a wrong weltanschauung. The center of all knowledge, of all wisdom and of the truth cannot be grasped by humans alone; it is and will always be never ending and divine. Guardini said in his inaugural lecture in Berlin, 1923, that the church did by no means forbid the discovering in whatever part it may be, not even in the center of everything. The church allowed it and was happy that man wanted to do so, but drew people's attention to the point, however, that this center may not necessarily be reached in this life. Ideology did, in contrast to that, not in any way limit the cognition of man. Nothing in the world or in man was, according to the ideologies, undiscoverable.

By denying the belief in Trinity, ideologies destroy the center of Christian religion. That means ideology shows in its naturalistic features a seeming omniscience, but it adopts no kind of transcendent model. The model of an ideology, be it nature, history, or a certain race, is a worldly quantity that has been lifted to a *Realissimum,* in which man is reflected. That leads to self-idolizing of man in ideology. Gnostic sect movements of Late Antiquity, the Manichaeism for example, and Christian sects of the Middle Ages, the

Waldensians and the Cathari, supported with their views the ideologies of modern age, which are characterized by their belief in sciences and a strict dualism between the kingdom of good and the kingdom of evil. In this context, it is interesting to see that Raymond Aron especially points out the Manichaeistic, strictly dualistic character of modern ideologies when describing political/secular religions, as they see everything that is good in their own teachings and the evil in everything that does not support their views. Harald Strohm also refers in his portrayal of National Socialism as gnosis to its Manichaeic features. He further deals with the *gnostic mythology* of National Socialists and analyzes Hitler's psyche, which can be compared, according to Strohm, to that of a gnostic leader, that of Mani, for example. One can also see these gnostic features in the secular doctrines of salvation of the totalitarian ideologies whose logical consequences were the extermination of dissidents and the cancellation of mental freedom. Hans Blumenberg looks at the unvanquished gnosis from a contemporary point of view in a quite similar way as Voegelin. Alan Besançon arrives at this conclusion as well. He claims that ideology that was in terms of content a *perversa imitatio* of science, was in terms of form a *perversa imitatio* of religion. And as its fundament stained by gnosis and idolizing stood in contrast to Christianity, ideology did constitute itself as counterchurch with its countercouncils, counterpopes, and so on.

Besançon does not go as far as to regard ideology as political or secular religion. The reason for it is that persons who follow an ideology can feel the religious character and consequently show an attitude toward ideology as a religion. Ideology is thus no secular religion, as it is not recognized as one by its followers. Furthermore, ideologies are in nearly all cases antireligious or atheistic. For this reason, people in countries with ideologized regimes, and after their decline, need an inward reform to reshape their lives and to resist the dangers of relativism, as the development of Eastern Europe showed after the decline of the communist system. In that way, they do not have to flee in the cul-de-sac of an ideology, but can live a self-responsible life. In this case, religion can work as an effective shield against the secular ideology, which wants to monopolize them totally and makes it impossible to confess one's religion in freedom.

This is why, for many Christians, the way into resistance was the only answer to totalitarian heresies, called ideologies. In that way, the untruth of ideologies that pervert the truth and constitute themselves as doctrine of salvation becomes clear. Raymond Aron analyzes this religious dimension of 20th century political ideologies in his concept of a political/secular religion.

Aron predominantly examines the phenomena of totalitarian tyrannies in their religious quantity, especially in their self-redeeming character. The political/secular religion represents its ideological content as doctrine of salvation. The concept of political religion clearly shows that ideologies of totalitarian regimes are founded on secular ground. Ideology, however, as originally political doctrine becomes related with religious features, as the religious interest of man nearly imperceptibly leads toward these ideologies. At the same time, church and religion are weakened and marginalized, sometimes even persecuted. The people's interest in salvation is focused on genuine political theories, which means that ideologies are distorted images of religion, that is, a negative reflection of religion, which is a *religio falsa,* in the Augustine sense of the word, or "a *perversa imitatio* of religion," as it is called by Alain Besançon. At the same time, the development of ideologies out of the mainstream of political ideas shows religious features. Ideologies often develop like Christian heresies of the Middle Ages did. They found a way to stand out of the mainstream of Christian doctrine: to absolute a part of the total doctrine, which led to a schism from the original theory.

In this way, it is completely appropriate to define the totalitarian ideology as *political heresy,* as it separates itself from the mainstream of political ideas. Ideology generally already shows in its development features of a religion, and it behaves like heresy in politics. Eric Voegelin confirmed this statement in his work *The People of God* (about 1940). He arrived at the conclusion that the church was, approximately since the year 1300, no longer able to integrate eschatological and gnostic splinter groups, which is important for the preservation of its authority. In consequence, revolutionary movements developed, which led via the Protestant reformation to further schisms. This development finally revealed its secularistic, anti-Christian character and culminated in political mass movements of the 20th-century totalitarianisms. According to Voegelin, totalitarian systems and their ideologies show features of political heresies.

Karl-Dietrich Bracher is of the opinion that the breeding ground for ideologies of the 20th century was built at the beginning of the century. New political-religious tendencies developed in relationship to racial conflict and class conflict movements toward a nationalistic ideology that finally led to totalitarianism. It was during this period of time, as well, that political religions emerged, which, according to Bracher, were established artificially: were *created.* Political religions are pseudoreligious ideologies, demanding a scientific validity as well as a religious absoluteness. They promised to unite what was separated through modern science and secularization and to harmonize them with culture and technology, with politics and culture. In doing so, they tried to promise everybody everything, to be collective movement and collective faith and at the same time, to be in strong confrontation with an absolute ideological enemy: an ideology of integration and hostility in one.

Claus-Ekkehard Bärsch makes it clear that National Socialism used in its ideology the power of religion to guide people's actions to lead the broad mass of people into the direction of its doctrines. According to Bärsch, imagination, faith, wrong consciousness, lies, nonsense, and mania became the realities that influenced the way people acted. The terms *people, nation, race, Third Reich,* and *anti-Semitism* have religious implications. They are based on a feeling of being chosen, on an honor and a priority of the Germans, in contrast to other peoples or persons who have to be exterminated as they stand in contrast to the chosen, and as such are regarded as evil.

Bärsch already recognizes in this fact an important feature of a political religion. He points out that if you assumed an extraordinary relationship with God which can only be the own collective in the qualification of the own collective, the fixation of the own identity in contrast to other people, the New Socialism-ideology would correspond to the content of a political religion. Different from an ideology in form of a political religion or a political messianism, the relationship between religion and politics, channeled in civil religion, does originally not portray an ideology, as it is stated by Jean-Jacques Rousseau in the first version of *Contrat social* (1760): You have to think like me to be saved. This is the terrible dogma, that destroys the earth. You have done nothing for public peace, if you do not expel that diabolic dogma from the republic. Whoever does not think of it as disgusting, can neither be a Christian nor a civilian nor a human being: he is a monster, who must be sacrificed for peace of mankind's sake" This form of criticism of the ideological thinking and the consequence, not to allow such ways of thinking in a free system, can especially remind us of terrifying omissions in free European states of totalitarian ideologies in the second half of the 20th century. So, the criticism of ideologies, which has, according to Hans-Georg Gadamer, its base in the hermeneutics as well, is an important task for the philosophy. Many supporters of the Frankfurt School have vouched for criticism of ideology as well: Theodor W. Adorno, Max Horkheimer, Herbert Marcuse, and, last but not least, Jürgen Habermas. Karl Jaspers regards ideology as a kind of *modern sophistic,* which manipulates people not least by language. So do, in a similar way, Victor Klemperer in 1947 with his book *Lingua Tertii Imperii* (Language of the Third Reich); George Orwell with "Newspeak" in his novel *Nineteen Eighty-Four* (1949); and Josef Pieper and Alain Besançon with the ruin of the language by ideology, which has its own manner of speaking. An influential literary review of ideology and propaganda of the totalitarianism and of the events of World War II follows in the collection of essays *The Captive Mind,* by Czesław Miłosz, published in Paris in 1953, in which he sharply attacks the Polish communist regime. The concept of political religion takes on an especially important role with regard to the people's growing sensitivity toward totalitarian ideologies, as it does reveal symptoms of totalitarian ideologies. In this point it is also possible to strengthen the circumspection of people toward dangerous ideological *weltanschauungs.* It will never be possible to prevent the influence of ideologies completely, as their attracting power, by which many people will always be confused, remains virulent.

Man is *homo religiosus.* His nature is deeply shaped by the pursuit for the absolute and transcendent. This religious pursuit needs necessary satisfaction, be it in a traditional, historically grown religion or in a secular ideology that leads to terror and destruction. Man always stays unready in the search for happiness and salvation on earth, as, according to St. Augustine *(Confessiones),* true salvation that will not be given by any worldly movement; it can only be found in God: "Restless is our heart until it rests in Thee [my God]."

— *Hans Otto Seitschek*

See also **Aquinas, Thomas; Marx, Karl**

Further Readings

Arendt, H. (1976). *The origins of totalitarianism.* San Diego, CA: Harcourt Brace Jovanovich. (Original work published 1951)

Baradat, L. P. (2002). *Political ideologies: Their origins and impact* (8th ed.). Englewood Cliffs, NJ: Prentice Hall.

Bell, D. (2000). *The end of ideology: On the exhaustion of political ideas in the fifties* (rev. ed.). Cambridge, MA: Harvard University Press. (Original work published 1960)

Eagleton, T. (1991). *Ideology: An introduction.* London, New York: Verso.

Friedrich, C. J., & Brzezinski, Z. K. (1965). *Totalitarian dictatorship and autocracy* (2nd ed.). Cambridge, MA: Harvard University Press.

Hirst, P. Q. (1979). *On law and ideology.* Atlantic Highlands, NJ: Humanities Press.

Lane, R. E. (1962). *Political ideology: Why the American common man believes what he does.* New York: Free Press of Glencoe.

Larraín, J. (1979). *The concept of ideology.* London: Hutchinson.

Ricoeur, P. (1986). *Lectures on ideology and utopia* (G. H. Taylor, Ed.). New York: Columbia University Press.

Talmon, J. L. (1967). *Ideology and power in modern times.* New York: Judaica Press.

Ik

The Ik are a hunter-gatherer and agricultural group who live in the Morungole mountains, around the Kidepo Valley, in northeastern Uganda. They are few, numbering several thousand, but are famous within anthropology because of Colin Turnbull's extraordinary book *The Mountain People,* for which he was roundly criticized within anthropology. Turnbull is perhaps the only anthropologist to conclude his study with a recommendation that the group he studied be destroyed by being forcibly resettled into small units throughout the country.

Turnbull worked with the Ik in the mid-1960s. While he was there, a severe drought struck, making living conditions difficult. Moreover, the Ik's livelihood had been adversely affected by their recent eviction from the Kidepo National Park. Turnbull's book is a devastating and horrific account of a society that is both falling apart and willfully destroying itself. He describes scenes in which handicapped children have their food stolen from them by their peers and are eventually locked up in their home and left to die by their parents; where elders fall into gulleys and are laughed at and mocked by their fellows; where family members fight to strip the ornaments from their dead relatives; and where sisters steal tea from their brothers as they lie dying of gunshot wounds inflicted by cattle raiders.

The book was poorly received. There was a general feeling that the Ik were being badly represented by an anthropologist who had come to hate them. Perhaps the kindest comment was that this was an account that could best be understood as describing the consequences of the drought on the anthropologist, not the Ik. Turnbull was later criticized by Heine, who found many faults with his understanding of the language and his interpretation of events. Heine suggested that the disturbing events Turnbull saw were really the product of his own malevolent attitude.

Turnbull's account lives on, however, in literature about the consequences of protected areas on rural groups. It is taken as an early case of a detailed description of what can happen to people when they are denied access to rural resources by conservation. This literature is marked by its uncritical use of Turnbull's work, ignoring both the critiques of his findings, Turnbull's own conclusions, and the complex idealism that defined Turnbull's work.

— Dan Brockington

See also **Ethics and Anthropology**

Further Readings

Grinker, R. R. (2000). *In the arms of Africa: The life of Colin M. Turnbull.* Chicago: University of Chicago Press.

Heine, B. (1985). The mountain people. Some notes on the Ik of northern Uganda. *Africa, 55,* 3–16.

Turnbull, C. (1973). *The mountain people.* London: Jonathon Cape.

Incest Taboo

The incest taboo, considered a universal taboo, forbids marriage or sexual relations with a close relative.

However, there are problems with any definition of the incest taboo because the definition of "close relative" varies tremendously among different cultures, the taboo is universal only with very inconsistent applications, some writers restrict the definition to opposite-gender relations, and there are major violations, whatever the definition. Behavior that is strongly, perhaps even fanatically, forbidden in one culture might be accepted, encouraged, or even expected in another culture. Where the taboo is enforced, punishments have ranged from social ostracism to banishment, imprisonment, or death.

There are four inconsistent theories that attempt to explain the taboo's existence. Claude Lévi-Strauss and others have suggested that the taboo exists to encourage people to marry into other groups (exogamy), in order to build social, economic, or political alliances with other groups and thereby increase the group's ability to survive and expand. This theory applies particularly to ancient societies when most people lived in small, often isolated and vulnerable groups.

Lewis H. Morgan and others have suggested that sexuality with close genetic relatives can increase genetic diseases or other problems. In actuality, historically, people usually did not understand how genetics affected reproduction. Among modern Western cultures, this explanation is still strongly believed, although modern genetic research does not always support this belief. Genetic problems are more likely to occur in a closed group that inbreeds for several generations than in a onetime, close-cousin reproduction. Moreover, about half of the prohibited incestuous unions in the world have been with genetically unrelated people (e.g., an in-law of some type).

Bronislaw Malinowski and others have said that the incest taboo exists to prevent social role confusion or conflicts within a family, particularly regarding parent–child and sibling roles. Edward Westermarck and others have said that close family members have an instinctual repulsion toward incest, but other theorists suggest that an instinct of such strength would not need a strong cultural taboo. Other researchers point to the frequency of incest despite the cultural taboo or argue that living closely together as in a family leads to the opposite of incestuous desire (referred to as a "habit of avoidance").

Parent–child and brother–sister incest is the most strongly prohibited, partly because of the assumption of unequal power relationships. In the United States, beginning in the 1970s, largely as a result of encouragement from feminist theorists and conservative voters, this has been a major area of concern, with fervent encouragement of very severe punishments.

There have been several royal families (Egypt, when part of the Roman Empire, the Inca empire, and precolonial Hawaii) that required brother–sister marriages, primarily to maintain the family's unique sense of divinity. Also, in Egypt, brother–sister marriages were practiced by 15% to 20% of the farming class. First-cousin marriages are legally forbidden in some states in the United States, but practiced in others, and in some Middle Eastern and North African cultures, first-cousin marriages are common. Some preindustrial societies encourage first-cousin marriages for cross-cousins, but not for parallel cousins. Some groups (e.g., Sephardic Jews), have encouraged first-cousin (and uncle–niece) marriages at critical points in their histories. The reasons for the incest taboo have long been, and continue to be, a major debate within anthropology.

— *Abraham D. Lavender*

See also **Cultural Constraints; Norms; Taboos**

Further Readings

Arens, W. (1986). *The Original Sin: Incest and its meaning.* New York: Oxford University Press.

Bell, V. (1993). *Interrogating incest: Feminism, Foucault, and the law.* New York: Routledge.

Miletski, H. M. (1999). *Mother-son incest: The unthinkable broken taboo.* Brandon, VT: Safer Society Press.

India and Evolution

The term *evolution* comes from the Latin word *evolvere,* which means *to develop* or *to unfold.* It is equivalent to the Sanskrit word *vikas,* which means more than growth. It describes a series of related changes in a system of some kind. It is a process in which hidden or latent characteristics of a thing reveal themselves. It is an order of change, which unfolds the variety of aspects belonging to the nature of the changing objects. Out of various theories of origin of society—like divine origin theory, the force theory, the social contract theory, the patriarchal and matriarchal

theories—the evolution theory offers what we think a generally correct explanation. According to it, the society is the result of a gradual evolution, in that it is a continuous development from unorganized to organized, from simple to complex. Various factors helped in this process. For example, kinship and family were the earliest bonds uniting man with man.

It is generally assumed that the ancient Hindus in India lost themselves so much in speculating over the abstract metaphysical problems of the ultimate nature of worldly things that they never exerted any serious thinking in connection with the more practical and worldly problems, like those of social organization and evolution of society. In fact, they had given serious attention to the problems connected with social organizations, and a system or scheme of social relations has evolved for securing the best possible organization of human life and conduct that they could think of.

A society with all forms of social organization and institutions emerges out of human needs. The human needs define human interests, purposes, and aspirations; and the actual planning or devising different forms of social organization takes place in adjustments of human behavior, individual and social, with these purposes and aspirations. The Indian conception of life and its conduct is also organized in view of these considerations. The fundamental meaning of life and existence as understood by the Hindus permeates through all the forms of social organization, which are intended to regulate and direct the conduct of individual's life. Therefore, our first task will be to narrate and understand Hindu's fundamental conceptions regarding human existence as a whole, its purposes, its aspirations, and its mission.

According to the Hindu, this life alone would have no meaning; it has meaning only as a link—even if the last—in a chain of births in the past and in the future; it is a stage of transition from past births toward future birth(s), unless *Moksha,* or final liberation, is obtained within the span of this life. The soul of a man is, for the Hindu, immortal; the bodies in which he lives during the stages of transition may change. This fundamental idea persists through the whole of the Hindu life from earliest written literature Vedas to today. Indian social thought is shaped in the system-forming endeavor to metaphysics of transcendence since the Vedas more than 40 centuries ago. Whatever might have been the specific socioeconomic conditions in which the creative genius of the Vedic period flourished, approximately 3000 BC to 5000 BC, its influence on the evolution of the Indian society has never waned. In the Vedic literature, including the Upanishads, spontaneity, poetic imagination, and sense of gravity of the fact of existence surpassed intellectualism. Perhaps that is why India, not withstanding her sociopolitical-economic changes, retains its weary mood eternally, a mood running more after the other-worldly and inane than after the empirical and the concrete.

There are two ideological concepts in Hinduism that reveal two aspects of life: the goal of life and the means to achieve that goal. The Hindu view of life can be best brought out by a theory of fourfold objects of life (*Purushartha* theory). According to this theory, there are four *Purusharthas* or aims of life: *Dharma, Artha, Kama,* and *Moksha.* Moksha represents the end of life, the realization of an inner spirituality in men. It means that the true nature of man is spiritual and the mission of life is to unfold it and derive thereby the meaning and joy of it. *Artha* refers to the acquisitive instinct in men and signifies his acquisitions, enjoyment of wealth, and all that it connotes. By according *artha,* a place in the scheme of life, Hindu thinkers applauded the pursuit of wealth as a legitimate human aspiration. *Kama,* the satisfaction of the instinctive life, is recognized as one of the aims of marriage, along with dharma and procreation. Hindu thinkers tried to assign a place of sex in the life of men. But *kama* does not mean only an instinctive life; it means emotional and aesthetic life as well. Dharma provides a link between the two, the animal and the god in men. Dharma is knowing that *kama* and *artha* are means and not ends to Moksha. A life that is dedicated to the unrestrained satisfaction of these urges is undesirable and even dangerous. It is consequently necessary that it should be regulated by the ideal of spiritual realization, dharma.

The theory of *Purushardha* is given concrete expression in the Hinduism's scheme of *Ashramas.* According to this scheme, life is divided into four stages: *Brahmacharya, Gruhastha, Vanaprastha, and Sanyasa,* with every stage having its own duties and functions. An individual enters to the stage of life, *Brahmacharya,* by the performance of initiation rights. This ceremony initiates man into disciplined life. The initiation rights mark the beginning of schooling, where study is an important duty in a person's life. Besides intellectual equipment and disciplined life, the training in character and ethical life

are necessary. A student should learn to restrain his senses. In this control of senses, the control of the sex instinct is prominently stressed, and every individual going through this stage is expected to observe complete celibacy. Men thus learn his proper dharma in the first stage. The second stage of life, *Gruhastha,* is the life of a married man. The aim of marriage, according to Hindu philosophy, was dharma, progeny, and sex. Personal gratification is one of the ends of marriage, but a last place assigned to it clearly indicated that it should not me the guiding rule of life. Marriage is more a social obligation, as its main purpose is the performance of dharma and the perpetuation of family, as well as the continuation of the group through progeny. On entering the third stage of life, *Vanaprastha,* men continue to perform all the duties of the second stage. But the achievement of this stage lies in the discipline that prepares a man finally for the renunciation of familial ties and social relations. All the bodily comforts have to be gradually dispensed. This austerity is eminent to cultivate in man indifference to his own body. The last stage of life, *Sanyasa,* is the life of an ascetic. The Hindu ideal of life is Moksha, and that can be achieved, according to the Geetha, by cultivating detachedness to worldly things. The duties of this stage are mainly defined with the purpose of attaining this state of detachment.

In this ideological scheme of *Purusharthas* and *Ashramas,* the evolution of life is approached from the point of view of training or nurture of the individual through specifically provided environments at different stages of life; while on a structural scheme of *Varna-Caste-Organization,* the evolution of life is considered from the point of view of the larger group, and the individual's position is defined in the group with reference to his innate nature, his tendencies, and disposition.

Hindu society evolved in highly structured caste system. There are many studies about the origins of caste system. One racial theory of the origins of caste talks about the unadulterated and pure blood of *Aryan* race. However, other explanations endorse the view that caste is mainly occupational in origin. Occupations, which were organized into guilds, became exclusive and stratified into castes. The word *Varna* is practically all the pure-blood race theorists have in support of their position. They conclude that the difference in color is one of the causes that lay at the foundation of the caste, for the caste originated from *Varna* (color) organization. As a matter of fact, however, in Sanskrit, the word *Varna* means appearance, exterior, color, kind, species, caste; and Manu has used *Varna* synonymously with *Jati,* which means birth, the form of existence determined by birth, position, rank, family, descent, kind, and species. The theory of the origin of *Varna* from the various parts of the creator's body also finds a place in the early scripture of the Indian social thought.

For the historical treatment of *Varna-Caste* system, the history of India could be divided into four periods: first, the *Vedic* period, ending about 600 BC and comprising the literary data of the *Vedic Samhitas* and *Brahmanas;* second, the post-*Vedic* period, extending to about the 3rd century of the Christian era; third, the period of the *Dharma Shastras,* which ended during the 11th century AD. Manu, Yajnavalkya, and Vishnu are the chief exponents of the social ideals of this period. The fourth, modern period began during the beginning of the 19th century. The customs and beliefs of the contemporary Indian society were mostly fixed and classified by the thinkers of this period. During this period, the present-day vernaculars of India were evolving.

In the *Rigveda,* the earliest literature of the first period, three classes of the society are frequently mentioned, *Brahma, Kshatra,* and *Vis.* The origin of four classes (i.e., the addition of *Sudra* to these three) is repeated in most of the later works of this period. These four classes are described as being of divine origin, and these classes or orders are regularly referred to as *Varnas.* The literature of the post-*Vedic* period, while reiterating that there are only four *Varnas,* mentions certain mixed castes and also a group of outcaste class. The importance of sacrifices and ritualism had been growing, as well as the prestige of the priest, and the creator is said to have apportioned the duties and function of the four castes according to the inherent qualities and capacities of individuals. This period testifies to the rigid stratification and internal solidarity of the four *Varnas,* and the rules and regulations governing social life and individual conduct differed according to the *Varnas* to which they belong in the society. The third period of Indian history is marked by two developments in ideals of the Hinduism: first, the glorification of the gifts to *Brahmins* and, second, schematic growth of imaginary hells as punishment for certain offenders and the progressive application of the doctrine of rebirth. The solidarity of a caste as a unit of social organization was more and more acknowledged.

Gradually, then, the caste system became ordered and stabilized, with priests giving religious interpretation of all questions of the moment.

From this system of *Varna* organization, new castes came to be formed: (a) by groups separating from the present body and migrating to areas out of the range of normal communication; (b) by occupational changes within the caste; (c) by religious schisms; (d) by fragments from other caste grouping about some common objective; (e) by the offspring of crossings between two or more castes or by sex. When a new caste is formed and established, it will originally claim specialty in some vocation, and it will claim distinction on the basis of some fictitious or real cultural heritage, which it will always try to guard. Thus, caste has been a potent factor in stabilizing the cultural pattern of India. Village life was so coordinated that every caste has its proper place and duties. The joint family system is another potent factor in the continuance of cultural traditions. The traditional authority of the head over the junior members of the family was so awe inspiring that the juniors never thought of expressing their differences, whatever their convictions might be. The subordination and superordination designed to regulate the lives of different members in the hierarchy of the joint household, recognition of the family as a unit for all social relationships, and the place assigned to the family as a judicial unit in family quarrels all tended to give the family such enormous influence that the individual lost his identity in it. The social environment made the individual feel that he had no interest apart from those of the family.

India occupies a center stage in human evolution. It has served as a major corridor for the dispersal of modern humans, which started from Africa about 100,000 years ago. The date of entry of modern humans into India remains uncertain. However, modern human remains dating back to the late Pleistocene (55,000–25,000 years before present) have been found, and by the middle Paleolithic period (50,000–20,000 years before present), humans appear to have spread to many parts of India. A recent anthropological discovery provided molecular genetic evidence that a major population expansion of modern humans took place within India.

India is a land of enormous genetic, cultural, and linguistic diversity. With the exception of Africa, India harbors more genetic diversity than comparable global regions. It is generally accepted that the tribal people, who contribute 8.08% of the total population, are the original inhabitants of India. There are an estimated 461 tribal communities in India, who speak about 750 dialects. Contemporary nontribal populations of India tend to belong to overall Hindu religious fold and/or are hierarchically arranged in *Varna-Caste* organizations. The nontribals predominantly speak languages that belong to the Indo-Aryan or Dravidian families. These two linguistic groups have been the major contributors to the development of Indian culture and society. The extensive sharing of

one or two Haplotypes across population groups within India, irrespective of their geographical location, linguistic affinity, or social proximity, reveals a fundamental unity of mitochondrial DNA (mtDNA) lineages in India, despite the extensive cultural and linguistic diversity. Since mtDNA is maternally inherited, it is believed that there was a relatively small number of female lineages in India.

Evolution implies change along a definite line, and also a certain continuity throughout the change. Evolution of society and its cultural ideology and traditions requires profound social, economical, and ideological changes. As a matter of fact, a transformation of the cultural pattern in India became inevitable by virtue of the new economic organization, ideology, and administrative system the British introduced. Capitalism in the economic field, liberalism in ideological domain, and the principle of equality in the social and political systems helped change Indian society. Education, particularly education for women, brought a tremendous change in Hindu marriage and in family ideals and practices. The Industrial Revolution, which had begun before the arrival of British in India but was accelerated by them, brought industrial cities into existence and encouraged the flow of the rural population to these cities. Slowly, city life contributed to the evolution of new mode of family life, which was found to be inconsistent with the old Hindu cultural patterns.

Social changes in Indian society have also been brought on by the processes of Sanskritization and Westernization. The term *Sanskritization,* as first used by M. N. Srinivas, describes the process of cultural and social mobility in the traditional social structure of India—that is, during the periods of relative closure of the Hindu social system. It is an endogamous source of social change. Evolution in Indian society has also happened due to *Westernization,* which can be defined as the changes brought about in Indian society and culture as a result of about 200 years of British rule, the term subsuming the changes occurring at different levels—technology, institutions, ideology, and values. Emphasis on humanitarianism and rationalism is a part of Westernization, which led to a series of institutional and social reforms in India.

— Komanduri S. Murty and Ashwin G. Vyas

See also **Darwin and India; Gandhi, Mahatma; Hinduism**

Further Readings

Gupta, S. (1974). *A simple study of sociology.* Delhi: Ajanta Prakashan.

Kapadia, K. M.(1958). *Marriage and family in India* (2nd ed.). Bombay: Oxford University Press.

Singh, Y. H. (1973). *Modernization of Indian tradition: A systematic study of social change.* Delhi: Thomson Press.

Smith, H. (1991). *The world's religions.* New York: Harper Collins.

Vyas, A. (1991). *Social stratification and third world countries.* Berkeley, CA: Folklore Institute.

Weber, M. (1958). *The religion of India.* New York: Free Press.

India, Philosophies of

The content of Indian philosophy signifies the unbroken philosophical lineage beginning with the Rig Veda (ca. 2000 BCE), flagging one of the oldest continuing philosophical traditions in the history of global culture. This entry summarizes the basic orientations of some of the textual and conceptual regions selected from this vast philosophical history, paying special attention, whenever appropriate, to the anthropological trope of the human person.

The Vedas

The four Vedas, composed by anonymous poets (*rishis,* or seers) in the context of an oral tradition in the classical Indic language of Sanskrit, collectively constitute the *ur* texts of Indian civilization in general and Indian philosophical and religious traditions in *particular.* The four Vedas are called the Rig Veda, the Atharva Veda, the Sāma Veda, and the Yajur Veda. The Rig Veda is relatively more important for the later development of the Indian philosophical traditions. The Rig Vedic text, expressed in the form of hymns to the gods, largely voices a polytheistic tradition, where the gods signify the deification of natural elements. Within this universe of hymnal offerings, attesting to the multiple conceptual weavings implicit in the text, a significant philosophical shift can be located between the two sorts of theism: polytheism and kathanotheism, where the former assumes ontological equality between the various gods, whereas the latter, working

within a general polytheism, attributes ontological superiority to the particular god to whom a given hymn is being devoted. Going beyond the theistic framework altogether, nested in a famous series of questions, the famous *Nāsadīya* hymn (Hymn to Creation), made the startling claim that the Gods came after the creation of the world, thus robbing theism of its ontological status. Instead of giving a response to the question of how creation arose, the hymn offers a series of questions, professing ignorance regarding the question of cosmic origin. Even the gods do not have an answer to the ultimate ontological question because they themselves were born after creation. In this way, in the narrative of this pivotal hymn, the gods lose their earlier metaphysical status. It is clear that this particular hymn is keen on dismantling Vedic polytheism, making possible for the philosophical redescription of Ultimate Reality. The nontheistic and theistic articulations of ultimate metaphysical reality by the *Upanishads* and the *Bhagavad Gita*, respectively, provided such redescriptions.

The Upanishads

The Upanishads proposed a nontheistic formulation of the nature of the metaphysical substratum of reality. In the Upanishadic posture, the metaphysical structures of the human person along with the nature of objective world reality were fundamentally thematized. This formulation proceeded to provide one of the most important hermeneutic arcs under which much of the later developments in Indian philosophy would unfold. The Upanishads, collectively naming multiple texts, had as one of its central aim the postulation and elaboration of the concepts of *Brahman* and *Ātman.* The former points to an underlying metaphysical substance that, unpresentable to everyday cognition, provides the foundation of world presentation to experience. The latter is the underlying reality that allows for the ontological constitution of the empirical self. In other words, in the Upanishadic worldview, an underlying metaphysical substance anchors both the subjective and the objective orders of phenomenal experience. These notions, though transcendent to phenomenally conceived subject and object, categorically do not have any theistic resonance and thus cannot be conflated with the idea of a personal theistic God sustaining the empirical order. Indeed, for the *Upanishads, Brahman,* the underlying metaphysical substance of the world, is nongendered and cannot be conceived as being invested with a personality. Furthermore, in defining *Brahman* and Atman negatively as *Neti Neti* (not this, not that), the Upanishads summon the notion of ineffability by positing that Ultimate Reality escapes the significations of language. The *Upanishads* also consider the relationship that can possibly obtain between Ultimate Reality construed objectively *(Brahman)* and subjectively *(Ātman).* In the famous formulation "*tattvamasi*" ("thou art that"), the nondualist thesis is suggested whereby in the final analysis, the distinction between the subject and the object dissolves at the transempirical, metaphysical level. The issue concerning the relation between these two orders of reality attains central significance in the later philosophical developments of *Vedanta,* one of the schools of classical Indian philosophy.

The ideas of the *Upanishads* service a philosophical anthropology that structures the human person in a counter-Cartesian fashion. In a positive characterization of *Brahman,* the Upanishads claim that Ultimate Reality is *saccidanada,* meaning *sat+cit+ananda:* truth, consciousness, joy. However, given that Brahman makes possible the world cognition, and further given that *I am Brahman (Aham Brahmāsmi)* in the final description of reality, *cit* (consciousness) in the transcendental context cannot be understood as my psychoempirical self named by my name. Thus, the human person, for the *Upanishads,* is not only the Cartesian amalgam of mind and body but includes an underlying reservoir of consciousness, *cit,* captured in the notion of *Ātman.* In other words, I am my body *(sarira),* my empirical self *(manas),* and the impersonal sustainer of my empirical being: *Âtman,* which is not implicated by my (proper) name, but makes it possible nonetheless. In the context of contemporary philosophy of mind, the *Upanishads* is perhaps suggesting that a nonmaterial conception of consciousness *(Ātman)* remains even if a reduction of mental states to brain states is effected on the argumentative grounds of materialism.

Bhagavad Gītā

The *Gītā* articulates Ultimate Reality in theistic terms. The text of this classic philosophical/religious text comprises a small portion of the massive epic of Sanskrit literature, the *Mahābhārata.* Within the narrative structure of the epic, the *Gītā* records a conversation between Arjuna, who is about to fight a war against the army of his cousins, and Krishna, his

charioteer. In the course of this conversation, Krishna reveals himself as an incarnation of the absolute theistic reality, Vishnu. Krishna, then, is the name of God packed within a theology of incarnation. Thus, the *Gītā,* through the figure of Krishna, by providing a theistic ontology, gives a counter-Upanishadic account of the absence marked out by the *Nasādīya* hymn of the Rig Veda.

The quick review of the three early textual horizons allows one to see that from the very beginning, Indian civilization in general and philosophical thinking in particular exhibited a remarkable flexibility couched in a welcoming attitude toward plurality. The accent can be placed on this trope of plurality precisely because the early religious thrust of philosophical thought did not reduce Ultimate Reality to a singularity, attesting to a deeply motivated internal differentiation to the philosophical-religious tradition of India. It may be suggested that this valorization of plurality is based on an anthropological insight concerning the structure of the human person. The classical tradition provides a psychology of religious motivation that can be seen in the famous doctrine of the four yogas: *karma yoga, jnāna yoga, bhakti yoga,* and *raja yoga.* This doctrine recognizes that a given human being is a token of a certain psychological type. Thus, the doctrine of the yogas maintains that there are different ways in which one can achieve religious fulfillment. *Bhakti* yoga is the way of devotion, which requires a metaphysic of theism because prayer cannot be directed toward an impersonal absolute *(Brahman).* Alternatively, the *Upanishads,* eschewing a theistic orientation, finds its psychological counterpart in the way of knowledge *(jnāna)* that ultimately values the direct experience of *Brahman.* Ranging over all its dimensions, concern for plurality shapes much of the philosophical traditions of Indian civilization.

Source: © iStockphoto/Heidi Priesnitz.

While the *Vedas,* the *Upanishads,* and the *Gītā* provide the hermeneutic horizon for classical Indian philosophy, argumentative thinking is organized via the category of philosophical schools textured by their own histories and critical encounters. These schools are usually divided into two groups: the orthodox and the heterodox. The schools of the former type develop their views against the hermeneutic background of the *Vedic-Upanishadic* tradition, whereas the schools of the latter type begin only upon the critical rejection of the same textual history. The orthodox schools are Nyāya, Vaiúeshika, Sāmkhya, Yoga, Pūrva Mīmāmsā, and Vedānta. The unorthodox schools are Cārvāka, Jainism, and Buddhism. These schools together traverse an astonishingly wide range of metaphysical and epistemological issues, such as causality, inference, perception, cognition, and truth, constituting a rich and powerful philosophical history. It is beyond the scope of this article to treat all these schools in detail. Accordingly, I will provide accounts of the schools of Vedānta, Jainism, and Buddhism as representatives of the classical tradition.

Vedānta

Vedānta ranges over three related schools: *Advaita Vedānta* (nondualist Vedānta), *Viúistādvaita Vedānta* (qualified nondualist Vedānta), and *Dvaita Vedānta* (dualist Vedānta), each giving a different formulation of the relation between *Brahman* and *Ātman,* the key *Upanishadic* concepts. We shall discuss each in turn.

Advaita

The most influential thinker in the Advaita tradition was Sankara, who lived in the 8th century CE.

In discussing *Advaita,* we will exclusively summon the philosophy of Sankara because in him, the presentation of *Vedāntic* nondualism reached the highest level of philosophical sophistication.

Sankara adopts a philosophical methodology that uses a phenomenological strategy to establish ontological claims. He argues that the intentional content of consciousness continually undergoes corrections as it confronts newer experience. The content of the corrected experience has a higher ontological value. With this preliminary suggestion, Sankara proceeds to claim that consciousness is capable of types of experience that hook up to types of objects. Thus, the object of a nonveridical experience of, say, a mirage is corrected by the veridical experience of sand, leading to the conclusion that the objects of veridical experience has a higher ontological value than the objects of nonveridical experience. Similarly, the theoretical experience informed by subatomic physics that the table in front of me is mostly empty defeats the perceptual experience of the table as solid, leading to the point that theoretical objects have higher ontological value than perceptual objects. Through this phenomenological method, Sankara establishes an ontological hierarchy connecting types of experience with types of objects proceeding to the summit, which signifies the uncorrectable ground of all corrections. For Sankara, this realm of consciousness is nondual precisely because any type of consciousness that in principle is correctible must admit duality between subject and object and the plurality of objects. In *Upanishadic* language, this horizon of experience can be described in terms of the identity between *Brahman* and *Ātman.* In such a metaphysical scheme, the phenomenal world *(Māyā),* in which our phenomenal selves with their psychological states are embedded, is not unreal, but becomes so from the perspective of a higher-order experience, just as the table as solid becomes problematized only when a theoretical description of the table is admitted. For Sankara, then, reminiscent of Kant, the human person has an empirical and a transcendental dimension; but in the *Advaita* worldview, pace Kant, the transcendental self can be experienced in a transformative and liberating experience, couched in an eternal monistic identity that ultimately corrects the world-cognition. Sankara's philosophy also captures the "negative metaphysics" implied by the *Upanishads,* because his account entails that Brahman is devoid of properties and is thus beyond linguistic description; such a view pushes the concept of Ultimate Reality into the region of absolute ineffability, experienceable but not describable.

Viúistadvaitā

The most significant thinker in the *Viúistādvaita* tradition is Ramanuja, who lived in the 11th century CE. Ramanuja provided an alternative account of the Brahman-Atman relation by arguing for a position that embraced a qualified view of the absolute but on nondualist grounds. Indeed, the name *Viúistādvaita (viúista+advaita)* means qualified nondualism. Ramanuja, appealing to a theory of meaning, endorsed the metaphysical thesis that properties attaching to a substance leads to an indefinite regression, because the substance in turn can become a property of another substance. To take an example: Consider the phrase "the strongly built athlete." Here, "strongly" qualifies the nature of a physique, and in turn "strongly built" qualifies an athlete, which, in turn refers to a person, and so on. Ramanuja's point is that given that properties have to inhere in a substance, all qualifications ultimately refer to an ultimate substance, which in *Upanishadic* terminology is *Brahman.* For Ramanuja, the system of difference that is the world is a real qualification of *Brahman.* While Sankara rejects the ultimate significance of the correctible realm of difference, Ramanuja endorses the position that *Brahman,* by including difference as its qualities, allows the objects of world cognition to be ontologically final. Such a position remains nondual precisely because the property is metaphysically linked to the substance. Ramanuja's position, contra Sankara, may be aligned to theism, because bearing qualities, *Brahman* appears as an object of devotion and worship. Thus, Ramanuja develops a nondual but theistic hermeneutic of the *Upanishads,* which is perhaps nearer to the metaphysical spirit of the *Gītā.* For Ramanuja, a nondual experience would be phenomenologically unintelligible; the liberating experience *(moksha)* for him is equally transformative, but duality is preserved: Brahman appears in the ultimate cognition as an intentional object of consciousness.

Dvaita

The most important *Dvaita* (dualist) philosopher is Madhva, who lived in the 13th century CE. Madhva adopts a position that conceives of Brahman as the monotheistic God creating a world, which is a system of differences. As part of his thesis concerning duality

and difference, Madhva proposes five types of fundamental differences: difference between *Brahman* and matter, *Brahman* and *Atman, Atman* and matter, one *Atman* from another, and one material thing from another. To know something is to recognize it as being different from something else; knowing implies the disclosure of difference in reality. Furthermore, Atman and material things depend on Brahman, the sole independent substance. Conceptual patterns in Madhva's dualist philosophy are perfectly consonant with the classical monotheistic conception of Ultimate Reality.

Buddhism

Buddhism is a religious and philosophical system founded in India by Siddhartha (called Buddha after Enlightenment), who was born in 560 BCE. The Buddhist philosophical tradition, rejecting the hermeneutic arc of the *Vedic* tradition, is an unorthodox system in the taxonomy of classical Indian philosophy. The fundamental tenor of Buddhism derives from the first sermon of the Buddha that enunciated the Four Noble Truths: suffering *(dukkha)* is the universal condition of existence; suffering originates in desire; cessation of suffering results from the overcoming of desire; to overcome suffering, one must follow the eightfold path: right understanding, right thoughts, right speech, right action, right livelihood, right effort, right mindfulness, and right concentration. The qualifier "right" in each instance, reminiscent of Aristotle, points to a middle path driven between two extremes. The teaching of the Buddha privileged the human dimension of suffering and was less concerned with developing absolute metaphysical claims as per the *Upanishadic* horizon, which is a tendency that informs the tradition's agnosticism. Indeed, the antiabsolutist stance can be found in two cardinal doctrines of Buddhism: the doctrine of change and the doctrine of *no self.* Echoing the contesting positions of Parmenides and Heraclitus from the pre-Socratic Greek tradition, the former rejects the substance metaphysics of the *Upanishads* and claims that the fundamental aspect of reality is flux; the latter extends the doctrine to an account of the self by proposing, like Hume, that the concept of an abiding self is a fiction, thus rejecting the *Upanishad's* substance-based view of *Ātman.*

The rejection of metaphysical absolutism was given a grand philosophical defense by the Indian Buddhist philosopher, Nagarjuna (2nd century CE), arguably the most influential Buddhist philosopher in history and the main spokesman for the *Mādhyamika* system. Despite the Buddha's reticence toward metaphysics, speculative philosophy indeed developed with great power in early Buddhism in a genre of philosophical literature called *Abhidharma.* Targeting particular extant positions including positions plotted out in the *Abhidharmic* literature, Nagarjuna aimed to show that in the final analysis, all metaphysical postures are unstable. Using a brilliantly conceived dialectical strategy, he used philosophy against itself to reach the metaphilosophical position that philosophical rationality cannot yield absolute and independent positions. He shows, for instance, that the notion of causation understood in terms of the cause–effect relation of identity, difference, both, or neither all lead to contradiction when each is considered exclusively. This does not mean that causation is denied, but rather the point is that it, like all other categories, originates through a pattern of ontological dependencies. Such a thesis fiercely rejects substantialist thinking that ontologically privileges an independent ground of existence such as *Vedāntic Brahman* or the Cartesian God. This nonabsolute and interdependent nature of phenomena is termed *úûnyatā,* or emptiness, in the *Mādhyamika* tradition. Chandrakîrti nicely summarizes the doctrine in his commentary on Arya Deva's *Catuhśatakam,* when he states that dependently originating entities cannot have independent ontological status, and since all entities arise dependently, selfhood cannot have independent existence. The nonabsolute nature of things is their *úûnyatā.* Nagarjuna's main book, *Mūlamadhyamakakārikā,* contains apart from causality, similar dialectical analysis of a parcel of key philosophical concepts, such as time, becoming, action, and self. The text also brings under dialectical scrutiny specifically Buddhist notions such as nirvana, the Four Noble Truths, and suffering. Nagarjuna's philosophy can be seen as a vast hermeneutic gesture toward an understanding of Buddha's silence directed at metaphysics. Such a gesture was influential in the development of other philosophical traditions in Buddhism that privileged practice over theory, such as *Ch'an* in China and Zen in Japan.

Jainism

Like Buddhism, Jainism is a religious and philosophical tradition belonging to the class of unorthodox philosophical systems. As a religion, Jainism rejects

the idea that a single person founded it, because the teachings are considered to be eternal; rather, the ideas of the religion are traced to a series of *thirthankaras* who are repositories and transmitters of religious truths. Mahavira, being the latest in the series, is usually considered to be the founder of the religion.

Two doctrines of Jainism may be considered here: the doctrine of epistemic perspectivism and the doctrine of nonviolence *(ahimsā)*. The notion of epistemic perspectivism is a purely philosophical doctrine but interestingly enough emerges in the context of a religious account of the human condition. Jainism, a religion that rejects the theistic conception of God, teaches that the highest salvific state yields omniscience. Motivated by this view of salvation, Jainism develops its account of epistemic perspectivism to theorize the scope and limits of human knowledge. The account is motivated by the observation that an object can present itself to consciousness in a countless number of ways. Thus, the perspective that conditions the appearance of the object to consciousness colors any judgment we make about an object. Similarly, the truth of views, theoretical or otherwise, for the Jains, is relative to conceptual frameworks and cannot achieve absolute epistemic privilege. The Jains argue that this position has a normative resonance in its implication that divergent views should be tolerated because no single theoretical position can achieve totality.

The ethical doctrine of nonviolence, though originating earlier, is given a central role in the Jain system. Making a distinction between living substance *(jiva)* and nonliving matter *(ajiva)*, the Jains argue that all forms of *jiva* have moral standing. Living beings are classified in a hierarchical order ranging from the human person to microbial forms, inclusive of plant life. Every effort ought to be made in Jain ethics to avoid harming living creatures. The recent efforts in arguing for the moral standing of nonhuman animals and the environment were anticipated by the Jain teachings. The notion of *Ahimsā* influenced the political philosophy and activism of Mohandas Gandhi and through him had a bearing on many nonviolent political and civic agendas across the world.

Some Modern Considerations

A distinctive social and political turn in Indian philosophical thinking can be detected during the 19th and early 20th century. Postindependent Indian philosophy (contemporary) connects with the classical tradition in interesting ways. We examine each in turn.

The Decolonizing Period

The great thinkers of the decolonizing period were not philosophers in the narrow academic sense, but they developed political and social positions that have great philosophical resonance. This period roughly stretches from Rammohan Ray (1772–1833) to Mahatma Gandhi (1869–1948) and includes, among others, seminal figures such as Ramakrishna (1836–1886), Swami Vivekananda (1863–1902), Rabindranath Tagore (1861–1941), and Sri Aurobindo (1872–1950). These figures were responsible for theorizing a nationalism that did not descend into a narrow chauvinism. Indeed, a strand of thinking, inaugurated by Rammohan Ray, argued that decolonizing nationalism can pay heed to the normative tropes of cultural tolerance and pluralism. The charting of a nationalism that is rendered consistent with a globally scoped pluralism and replete with cosmopolitan sympathies stands in marked contrast with other forms of reductive nationalisms extant at the time and compellingly enunciates a distinctive modernity. Tagore succinctly articulated the cosmopolitan investments of Rammohan Ray, remarkable as they were for its time, when he wrote in an article titled "Way to Unity" that Ray's great contribution lay in forcefully arguing that truth can never be foreign. Material production can be limited to the producing country but not knowledge, or ideas, or immortal forms of art. Indeed, a scholar with a great global range including the Sanskritic, Islamic, and the Western civilizational traditions, Ray was one of the earliest cosmopolitan thinkers of the modern world.

Tagore, whose grandfather Dwarkanath Tagore was a close friend of Ray and whose father Debendranath Tagore was one of Ray's followers, was the great inheritor of Rammohan's pluralist sensibilities. Indeed, in Tagore, a deep internationalist in the words of Isaiah Berlin, the cosmopolitan sympathies textured every nook of his social thinking, ranging from politics to education. In Santiniketan, Tagore founded a university, Visva-Bharati, founded on two cardinal principles: a child's education must be able to disclose the continuity between the human and the environmental; and education must range over the cultures of the world. For Tagore, only such a holistic and plural educational experience can actualize the full

potential of the human person and in the final analysis create persons with global sympathies required for cultural empathy. For Tagore, the global is not reduced to a facile recognition of alterity, but is organically linked to cultural inheritance. Tagore's sustained presentation of the idea that the cosmopolitan and the plural need not reduce to incommensurate fragments shorn of tradition makes him, as Martha Nussbaum has noted, particularly relevant to the discourse of cosmopolitanism. We can add further that such a discourse needs to be driven between nostalgic nationalisms that valorize the singular and postmodern fragmentation that can arrive at the plural only through an overdetermination of the fragment.

Sri Aurobindo is another nationalist philosopher from the decolonizing period who shaped the cosmopolitan virtues of Indian nationalism. He was also a metaphysician who gave an evolutionary account of the notion of Brahman. Aurobindo developed a speculative system in which matter is understood in terms of the "involution" of Brahman, which then proceeds through the evolutionary process to summon a state of divinized humanity. In his speculative thinking, Aurobindo attempted to synthesize evolutionary ideas with *Vedāntic* conception of the Absolute. As a political and social thinker, consistent with the evolutionary thrust of his metaphysics, Aurobindo attempted to theorize the future in terms of a cosmopolitan account of unity when he claimed that nationalism will yield to a global consciousness that will not be merely an outward gesture, but will have a deep and abiding spiritual dimension.

Significantly, the respect for the plural was championed in the context of religious multiplicity. Ramakrishna famously maintained that different religions are different paths to the same goal, and his disciple Vivekananda preached this philosophy of religious pluralism in international forums, most notably at the Parliament of Religions in Chicago (1893).

The respect for plurality animated the nationalism of Mahatma Gandhi. Indeed, the very concept of *ahimsa,* or nonviolence, on which Gandhi based his political movement is premised on such a respect. The ethical imperative of *ahimsa,* in the Gandhian scheme, commands that the same rule be applied to the wrongdoer who is an enemy as to the wrongdoer who is ones father or son. *Ahimsa* as politics when consistently applied translates into a nationalism that is respectful toward alterity and plurality. Gandhi extended this respect to the areas of feminism and animal rights.

In contemporary European philosophy, postmodern thinking critiques a posture of modernity originating in the Enlightenment that is taken to be hegemonic in its comportments because it rejects the plural. In the structures of the decolonizing nationalism of this period of Indian thought, we find an account of nationalism that by its cosmopolitan sympathies mounts an alternative to the European account of modernity.

The Postindependence Period

Contemporary philosophical thinking in India displays, among others, two general characteristics. First, attempts are made to provide interpretive frameworks for the classical tradition. In this sense, philosophy in India continues the tradition of philosophical creativity through the writings of commentary. Second, philosophers have concerned themselves with comparative philosophy where attempts are made to study identity and difference across philosophical traditions. Sarvepalli Radhakrishnan (1888–1975) is a founding figure of the postindependent philosophical period. Much influenced by Tagore, on whom he wrote one of his first books, Radhakrishnan learned much from the towering intellectual figures of the decolonizing period, and in turn, he influenced the development of academic philosophy in the university setting of postindependent India. Radhakrishnan also embodied the two characteristics mentioned earlier: In important works, especially in *Indian Philosophy* (2 vols.), he developed creative interpretations of the classical tradition; and in books such as *Eastern Religions and Western Thought,* he made pioneering contributions to the field that is nowadays called *comparative philosophy.* Another towering figure of this period is K. C. Bhattacharya (1875–1949), who produced a highly original philosophy weaving elements from *Vedānta* and Kant. A philosopher who has defended a radical thesis concerning the nature of the classical tradition is the still-active Daya Krishna, who famously argued that the three ideas about the classical tradition—that it is "spiritual," that it is classified by "schools," and that it (at least the orthodox schools) relies on the authority of the Vedas—are myths and should be jettisoned.

A very influential contemporary philosopher is J. N. Mohanty (1928–), who has made powerful contributions to our understanding of the classical tradition, especially in his book, *Reason and Tradition in Indian Thought.* Mohanty is also one of the great scholars of Husserlian phenomenology, which makes his comparative observations especially trenchant. The economist Amartya Sen (1933–) belongs to the community of important postindependent philosophers. Many elements of his social thinking are inspired by the cosmopolitan spirit of the decolonizing period. Other notable philosophers of this period include, among others, S. N. Dasgupta, Kalidas Bhattacharya, P. T. Raju, and T. R. V. Murti.

The Indian philosophical tradition has one of the longest-running histories in the context of global philosophy. It has generated discussion of great analytical felicity and rigor in almost all areas of philosophical discourse, ranging from metaphysics to logic. The future of the tradition is enured, as Indian philosophy continues to flourish in all its varieties. This entry has been able to offer only a small sampling of this immense tradition.

— *Saranindranath Tagore*

See also **Buddhism; Gandhi, Mahatma; Hinduism**

Further Readings

Bruce, C. R. (Ed.). (1999). *The essential writings of Raja Rammohan Ray.* New Delhi: Oxford University Press.

Daya, K. (1991). *Indian philosophy: A counter-perspective.* New Delhi: Oxford University Press.

Jonardon, G. (2001). *Philosophy in classical India.* London: Routledge.

King, R. (1999). *Indian philosophy: An introduction to Hindu and Buddhist thought.* Edinburgh, UK: Edinburgh University Press.

Mohanty, J. N. (2000). *Classical Indian philosophy.* Lanham, MD: Rowman & Littlefield.

Murti, T. R. V. (1998). *The central philosophy of Buddhism.* New Delhi: Harper/Collins.

Phillips, S. H. (1995). *Classical Indian metaphysics.* Chicago: Open Court.

Raghavan, I. (Ed.). (2003). *The essential writings of Mahatma Gandhi.* New Delhi: Oxford University Press.

India, Rituals of

Rituals are part of India's rich cultural heritage. Religion is one of the prime social areas in which rituals function. A *ritual* may be defined as a type of organized behavior. It acts as a conservative force, binding the members of community. Ritual is mainly of two types: one that is directly related with religious activities, the other being life stage rituals, which polish and refine the individual's attitude toward society. Here, the discussion centers round the first type, the rituals associated with major forms of worship in India.

In fact, due to a national transition and global communication and interaction, Indian society is now facing change, though there are limits to change. Certain expressions that are the products of age-old beliefs do not change, and these provide the distinctive cultural template for the people of India. These rituals act as mirrors, in which the behavior of the people is reflected.

Common Elements of Rituals Associated With Worship

There are certain elements of rituals that are common to all worship: *Mantras,* or sacred words; *Mudras,* or gesture; *Nyas,* or yogic exercise of breathing; and *Bhutsuddhi,* the purification of elements. These rituals are performed by the priest at the time of worship.

Mantra: It has been generally believed that mantra is *sakti,* sacred words that have the power to evoke deities for the welfare and protection of people. These sacred words, mostly in Sanskrit, in verse or in prose, are recited during the time of worship. They can be uttered or recited loudly or visualized mentally. These words vary according to the particular worship. They are central to the ritual traditions of India. The most sacred and common word that is uttered is "Om." It has been said that this word encapsulates the entire essence of the *Veda.*

Mudras: These are gestures that act in conjunction with the sacred words. There are varieties of gestures that the priest performs, like invocation or installation of a particular deity. In the invocation gesture, the two hands of the priest are cupped together, palms upward. The installation gesture is the reverse of the above and expresses the entry of a deity. The image of a deity, be it God or Goddess, is constructed by the

artisans of a specific caste who earn their livelihood by image making, but there is a particular ritual the Hindus believe converts the lifeless image into a powerful receptacle of divinity. This is known *as Pran Pratishtha:* The priest inducts the breadth of the deity into the image with the aid of sacred uttering. It is believed that the priest is endowed with divine power at the time of worship. In this ritual, the eyes of the deity play a very crucial and revealing role. In this consecrational ritual, the eyes are painted with a final flick of black ash. And then the image of the deity is ready for intense interactions with devotees.

Nyas: This particular action is not merely yogic excises of breathing; while performing this action, the priest meditates on the particular deity of worship.

Bhutsuddhi: This means purification of the elements of which the body is composed. There are five elements, with centers in the spinal column. The most notable is at the base of the spine, the seat of the power known as *Kundalini,* or coil in the body. In yoga, this power is roused with the utterance of the sacred word "Om."

Besides the above, there are certain common items used in most worship. These are oil lamps, incense, camphor, sandalwood, silk clothes, flowers, fruits, and food, raw and cooked. Not only is the deity prepared for the homage, but the worshippers too have a role to play. The concept of purification pervades in any worship. People bathe and fast and wear clean and sometimes new clothes. Here, the priest is the intermediary between the common people and the deity who can perform the full service of the deity. He is well aware of the rules of worship and offerings. But even the priest must go through a series of elaborate purifications in order to perform the worship. Besides the concept of purification, the concept of the *vow* also plays an important role in this ritualistic performance. This vow is mainly intended to gain divine blessings by observing an austere ritual, particularly observing fasts. It is usually performed for personal gain. This votive ritual may be described as a rite of thanks giving to a particular deity. When someone faces crisis period, such as serious illness or accident, the person or the relative makes a vow to a particular deity. After the concerned person recovers, a votary performs a particular ritual to pay thanks to the deity.

The Cult of the Goddess

The cult of the Goddess is one of the very powerful cults, whose roots can be traced back to the Harappan civilization. This goddess may take different forms, both benign and malevolent. As Saraswati, she is the symbol of learning and culture. As Lakshmi, the divine consort of Vishnu, she represents good fortune and wealth. As Durga or Kali, she is the highest manifestation of divine power. When she is depicted as Kali, she demands blood sacrifice to symbolize her strength as the powerful enemy of the demons. These deities are part of the world as people know it, but when the special festival of a deity is celebrated, the Goddess is treated as a guest coming from the distant land. It is generally believed that Gods and Goddesses live in the Himalayas and travel across the land through the rivers. The worship itself consists of many parts, each of which shows deep reverence toward the deity as guest.

Let us start with the rituals that are associated with Goddess Saraswati. She is the goddess of speech, to whom a great hymn of the *Rig Veda* is addressed. She is generally compared with the *logos* of the Greeks. A special ritual is observed during her worship. One who wises to acquire knowledge starts his or her lesson in front of her image. Children's education starts with her worship.

Goddess Lakshmi represents one of the most important manifestations of female power, who it is believed brings all the worldly riches to people who worship her. Indian philosophy provides explicit sanction for the pursuit of material gain, or wealth. And this material gain or the acquisition of wealth is one of the fundamental goals of life. In Bengal, the goddess Lakshmi is represented by a certain quantity of unhusked rice kept in a basket, and on the basket over a heap of rice, a wooden pot is placed. It is smeared with vermilion and is decorated by cowrie shells. Generally, on the full-moon day, the pot is installed on a platform decorated with flowers by the oldest lady of the house. The above ritual is performed by some communities in West Bengal four times in a year in connection with sowing and reaping of the paddy. In the production of rice, India's role is praiseworthy, and rice is one of the staples of Indian diet. Goddess Lakshmi is represented as "Corn Mother," who brings peace and prosperity in every home where she is worshipped daily.

Goddess Durga is worshipped normally once a year during autumn, in the months of September to October. There is a legend that explains the origin of Goddess Durga. It is said that she is the fearsome destroyer of evil and greater than all the male gods,

through the pooling of whose powers she came into being. The word *Durga* originates from the word *Durg*, meaning "inaccessible." This suggests that she has all the powers to fight against the evils of the world and in this way protects her devotes. The worship of Durga consists of the rituals of *Navapatrika,* or nine plants, which reveal her association with earth and the vegetative forces of nature. There, nine plants are tied together with the vines of a flower, named *aparajita,* meaning "undefeated." The nine plants are the following: banana plant, kacu (an edible root plant), turmeric root plant, Jayanti (a kind of tree plant), bael plant, pomegranate fruit, asoka plant (a kind of tree twig), arum plant, and paddy, the unhusked rice. In a way, these nine plants symbolize human life and represent items that are necessary for maintenance and happiness. These plants have great significance even separately, and they form the basic ingredients of cooking. All these plants are fit representations of the Goddess; it is through creation that divinity is comprehended.

Besides these nine plants, the other indispensable items of worship are water, flowers, and the *ghat,* a vessel that plays an important role The vessel is made of clay, and sometimes copper vessel is also used, as copper is regarded as pure. A diagram is drawn on the ground. Then, a swastika sign (symbolizing good fortune) is painted on the vessel using vermilion. After that, the vessel filled with water is placed on said diagram. The open mouth of the vessel is covered with a bunch of five mango leaves and a coconut smeared with vermilion, and a small towel is placed on it. The coconut must come with the stem, as it is regarded as a sign of fruition and creation, symbolic of the Goddess's function. Here, the vessel is sacred as it symbolizes the abode of Goddess. Then, with the chanting of "Om,"' the worship begins. This mystical syllable "Om" represents the essence of the cosmos. By repeating it at the beginning of worship, the devotee moves into a state of readiness for contact with the supernatural. In any worship, man and nature are identified. It is being upheld that the human body is made by five elements of earth, water, fire, wind, and sky. The skin is composed of earth; the tongue is made up of water; fire is represented in the eyes; wind is equivalent to the nose; and sky corresponds to the ears. As these elements are mixed together in symbolic rites, the priest is filled with divine power. Most of the rituals indicate the lifestyle of the local people and their ways of living. There is a custom of submerging the image of deities in water after the worship ceremony. This custom, which is part of the ritual process, is found throughout India. This ritual process has both a theoretical and practical aspect. The Indians, particularly the Hindus, believe that the invisible is reached through the visible; an image is only an instrument to reach the supreme. The immersion ceremony signifies the impermanence of the material things, and moreover, it has the practical effect of keeping artisans who build these images employed every year.

Though Goddess Durga is worshipped once in a year, Goddess Kali is normally worshipped only in permanent temples. In Bengal, the worship of Kali is a regular event. But Kali, like Durga, is also worshipped in Bengal once a year, in a clay image made for this occasion only. Her worship falls on the night of the new moon, following the worship of Durga. Kali is the "Dark Goddess," a term that originally derives from the word *Kala,* meaning time, and she has been always identified with death and is regarded as the destroyer of evils.

Part of the bas-relief "Arjuna's Penance" at Mahabilipuram, a World Heritage Site south of Chennai, India, on the Bay of Bengal. The rock carvings date back to the 7th century A.D. and are among the earliest known examples of Dravidian architecture.

Source: Photo courtesy of Mark Mathiasen.

Like the other festivals, this worship has its own ritualistic performances, which can be broadly divided into two categories, daily and occasional performances. Hibiscus flowers are offered to Goddess Kali. This flower is considered to be the favorite present to Kali because it is the color of blood. Besides flowers, there are rice offerings, *arati,* waving the oil lamps in a rhythmic fashion in front of the deity, and after an offering of a light meal, the sleeping ceremony follows at night. Among the occasional performances, the ritual of sacrifice is there. But this is not a necessary item, and it depends on the initiative of the pilgrims. The services to the Goddess are part of a reciprocal relationship between human and divine.

In other parts of India, this festival is known as Diwali or Depavali, the festival of lighting the lamps. The main ritual of this festival is to light candles or earthen oil lamps. Due to globalization, many things have changed. But the ritual to light earthen oil lamps with cotton wicks, particularly in front of the deity, still persists. Earthen oil lamps are considered as purest and best. From the sociological standpoint, at least once in a year, these earthen lamps are produced on a massive scale, by those who earn their livelihood as potter.

In India, Diwali has a special importance among the Jainas, the followers of Lord Mahavira. It has been a ritual among the Jainas to observe the lamp festival every year on the very day of Lord Mahavira's *nirvana,* his passing away from this worldly life. In fact, since the discovery of fire, its influence is keenly felt in all spheres of life, including the traditional rituals. The flame of lamp is considered in India as the symbol of rebirth, and this is the reason why its ritual use is found in everything connected with death. The mystery of plant life is inextricably associated with the primitive conception of rebirth, and as Dewali is a ritual of death and rebirth, it is likely that it would maintain a relation with plant life. In some parts of Bengal, there is still a ritual of eating 14 kinds of vegetables on the day before the commencement of the Diwali festival. And these vegetables symbolize the herald of new life that follows inevitably after any destruction.

The Cult of the God

Like the cult of the Goddess, there is also cult of the God, and God Shiva plays a very dominant role. Shiva is described as the lord of the universe, seated on the bull, the giver of boons, three-eyed, his body besmeared with ashes, a small drum and trident in his hands, the head marked by the moon, and a serpent on his neck. Besides this image, God Shiva has another form that is very popular throughout India. In the Shiva shrines, it can be observed as devotees carry pots of holy Ganges water, which they pour upon the phallic form of the God, with sandalwood paste, incense, and leaves of bael *(Aegle marmelos).* The bael leaf, with its trifolicate design suggestive of Shiva's trident, is considered to be an essential ritual for the worship of the God Shiva. Solitary solemn prayer is one of the important rituals of the whole process.

Besides Lord Shiva, Ganapati is an important deity, and his image is represented with a human body and an elephant's head. Ganapati is the God of Wisdom, the deity who can remove all obstacles and grant success in our endeavors. His name is invoked before beginning any new venture. Ganapati is very popular all over India, but a special public celebration occurs in the state of Mumbai in the month of August to September, after the end of monsoon. The rituals that are associated with this festival vary, but the general rituals are almost same everywhere and include prayers, lamplighting, offerings of jaggery (from palm sap), grated coconut, cardamom seeds, and dried fruits. There is a social significance behind this festival. During the festival days, people can mix together, forgetting their internal differences, and cultural awareness develops among the younger generations. After the festival, the immersion ceremony occurs, which is very colorful in Mumbai. On this day, the image is installed on a cart, and people in large numbers join the procession and follow along, going down the streets toward the seashore, striking cymbals and gongs, everyone shouting, "Father Ganapati, come again! Auspicious one, come again." Sometimes, the icon is carried in a palanquin. Chanting of hymns is one of the rituals, while people watching from the roadside shower colored powder on them.

This showering of colored powder resembles another major festival of India, which is known as *Holi.* Lord Krishna is the incarnation of Vishnu, the Vedic God, in a human form. Krishna as an incarnation is God himself, thus showing a close similarity to Jesus, of Christian theology. This festival is celebrated on the full-moon day of spring, while that of Diwali is on the new-moon night at the advent of winter. Winter and spring symbolize, respectively, the death and revival of the year, and the annual cycle of birth

and death in nature. The most remarkable ritual of the festival of Holi is the use of the red powder, smeared on the bodies of the friends and relatives. Other colors are also used. Even strangers are treated as friends on this day, and sweets are offered to all, irrespective of caste and creed. Sometimes, red powder is mixed in water, and then this water is sprinkled on people. It is a festival of enjoyment and fun. In the 21st century, when India is at the crossroads of technological revolution, this age-old ritual is still maintained in some form or other. The red powder that symbolizes the color of blood signifies also the life-giving power. In spring, the growth of new leaves on the trees signifies the revival of new lives in nature, and the spring festival celebrates this renewal.

Another rejuvenated ritual can be observed in the worship of Lord Jagannath, from whom the English word *juggernaut* originates. This famous chariot festival known locally as Ratha-Yatra, at Puri, in Orissa, a state of India, stands out amidst all the observance of ritualistic performances. From the image making to other associated rituals, this festival deserves special mention. The festival starts a fortnight before the procession of the chariots, on the full-moon day of the month of May to June with the bathing rituals. This ritual ceremony lasts only one day and is followed by the period of illness of the deities. And after that, the chariot journey begins, from the main temple toward another one named *Gundicha* temple. During the months of June and July, the chariot festival takes place. This is the time of rejuvenating the deities and thereby renewing the bonds between the people and the land. As it has been observed, the images of the deities are normally made of clay, but the deities of Jagannath temple are made of wood. And it is a custom to replace the old wooden images after every 12 years.

On the morning of the bathing festival, the ritual functionaries fetch water from the nearby storeroom of the temple. This water is placed 108 pots, and the ritual functionaries pour water on the wooden deities. After the bath, one temple servant who is the representative of the king performs a ritual called "sweeping." With a gold-handled broom, the whole area is swept, and then sandalwood powder is sprinkled. After that, huge elephant's head masks are fastened on the images. Then the deities are offered sixteenfold offerings. The temple cooks bring the food in earthen pots.

After the bathing day, the period of illness of the deities follows. During this "dark fortnight," there is no beating of gongs or conch shells, and the temple is silent and deserted. At that time, herbal medicine and raw food are offered to the deities. On the 13th day of the dark fortnight, the paintings begin on the images, which were faded due to bathing ritual. On the dawn of the 15th day, the new-moon day, the period of the illness is over, and the gate of the temple is opened for the public. A welcoming ritual is observed in their renewed state. In the second day of the "bright fortnight," the chariot festival begins. There are three chariots covered with bright colored cloths. The color of the cloths vary according to the deities. Lord Jagannath's chariot is covered with yellow and red; that of Balabhadra, his elder brother, with green and red; and Subhadra, their younger sister, with red and black. Besides these deities, brightly colored wooden sculptures of side deities are made for this occasion to adorn the chariots. The images are decorated with flowers and other accessories. Then, the deities are placed on the chariots.

Before the procession starts, an important ritual has to be performed by the king. Though the kingdom was gone, the ritual is still there, and it is observed every year by the king's descendents. The king used to sweep the main road from where the procession started with a gold-handled broom. This is symbolic, to show all are equal. After this ritual, a pair of wooden horses are attached to the front of each chariot. Then, the ropes are fastened, and after the signal, the crowd starts to pull the chariots toward the Gundicha temple, almost 2 miles away from the main temple. In that temple also, elaborate rituals follow including bathing. On the 10th day of the bright fortnight of this same month, the return journey of the deities occurs. The same rituals are repeated. After their return, the deities are placed in their old positions, and daily worship takes place as usual.

Here, in the observance of the above rituals, the deities are treated in an anthropomorphic fashion. The desires of the people are reflected in the decoration of the deities. People want to see the deities as almighty, having all the good qualities, and achieving perfection. As humans are treated with care, so the deities also receive special attention in the period of illness that happens after a long course of bathing. As in the case of humans, so in the case of deities, medicines are applied for cure. After recovering from sickness, the deities are ready to appear among the public with much rejuvenated vigor. The sweeping ritual by the king indicates that no work is inferior.

Cleaning and sweeping are parts of our lives, and as humans, we are all equal. This chariot festival brings the aristocrats and the common men together.

The Personification of River

The rivers, as well as the deities, are worshipped with elaborate rituals. In different states of India, particularly in Benaras and Hardwar, this tradition of worshipping the river is very prominent. The river is treated as a *Devi,* or Goddess. In Hardwar, a state of North India, located at the base of the Himalayan foothills, where the celestial river Ganges enters the plains, this ritual of worshipping deserves special mention. Amidst the hustle and bustle of daily living, this city witnesses every evening a fascinating event that differentiates the city from other parts of India. As the day wanes and slowly dusk approaches, a typical phenomenon happens near the famed bathing bank, which is locally known as *har-ki-pauri,* meaning "the Lord's Stairs." Innumerable lighted oil lamps can be seen in the hands of the priests coming out from the nearby temples toward the Lord's Stairs. While standing on the stairs at twilight, chanting prayers, the priests wave the lighted oil lamps in a rhythmic rotary motion known as *Ganga Arati,* an offering to Devi Ganga, the personification of the river. Thousands of people sit or stand near the stairs and watch this ritual, spellbound, as part of the whole ceremony. After this, there is a ritual of leaf cup offerings of flowers with burning oil wicks; people place them in the water, and they float downstream. This ritual is observed as part of wish fulfillment, as if the flowers are people's high hopes, sailing along the water. If the leaf cups of flowers with the twinkling oil wicks float straight downstream without sinking, then it is assumed that one's secret desire will be fulfilled. If they sink at the very start without moving a bit, then one takes it as a bad sign.

Rituals are cultural motifs that reflect the nature of a particular society and the relations among people. Like a compass, they help one chart a course through life. India, a multireligious country, has divergent codes for life. In any religion, rituals have been and continue to be important for establishing social identities that constitute the "maps" for regulating public relations.

— *Debika Saha*

See also **Religious Rituals**

Further Readings

Abbott, A. (2000). *Indian ritual and belief: The keys of power.* New Delhi: Manohar.

Bhattacharya, N. N. (1975). *Ancient Indian rituals and their social contents.* New Delhi: Manohar Book Service.

Bhattacharya, N. N. (1999). *The Indian mother goddess.* New Delhi: Manohar Book Service.

Das, V. (2000). *Structure and cognition: Aspects of Hindu caste and ritual.* New Delhi: Oxford University Press.

Das, V. (Ed.). (2003). *The Oxford India companion to sociology and social anthropology.* New Delhi: Oxford University Press.

Flood, G. (2004). *An introduction to Hinduism.* New Delhi: Cambridge University Press.

Madan, T. N. (Ed.). (2004). *Religion in India.* New Delhi: Oxford University Press.

INDONESIA

The Southeast Asian country of Indonesia is composed of 17,508 islands (6,000 inhabited) and straddles the equator from the Indian Ocean to the Pacific Ocean. In area, it is more than three times the size of Texas. Indonesia has a hot, humid, tropical climate that is more moderate in the volcanic highlands.

The earliest inhabitants came to the Indonesian island of Java about 2 million years ago. At that time, there was a single landmass from Southeast Asia to what is today Malaysia, Sumatra, Borneo (Kalimantan), and Java. This landmass is referred to as the *Sunda shelf.* About 2 million years ago, *Homo erectus* migrated through what is today Malaysia, then Sumatra, and finally Java.

A wave of farmers came to Indonesia from northern Southeast Asia beginning about 5,000 years ago and reached western Indonesia by 3,000 years ago. This migration initiated the extinction of the original anatomically modern inhabitants of the tropical forests of Indonesia, which are the Negrito hunting-and-gathering populations. These indigenous populations are still found in the remote islands of Eastern Indonesia.

The Dutch began to colonize the islands in the early 17th century, and they were later occupied by Japan from 1942 to 1945. Indonesia declared its

Source: © iStockphoto/Naomi Hasegawa.

independence after Japan's surrender at the end of World War II, but there were 4 years of widespread hostilities by the Dutch before the Netherlands agreed to relinquish its colony.

As of 2004, the population of Indonesia is estimated to be over 238 million people, with the bulk living on the island of Java. Indonesia has the fourth-largest population in the world. Approximately 88% of the population are Muslim, 5% Protestant, 3% Roman Catholic, 2% Hindu, and 2% Buddhist. Indonesia is composed four major ethnic groups. The Javanese compose about 45% of the population, while 14% are Sudanese, 7.5% Madres, 7.5% coastal Malays, and 26% other. Although several thousand languages are spoken, a modified form of Malay called "Bahasa Indonesia" is the official language. After Bahasa, Javanese is the most common language, followed by English and Dutch. At 87.9%, Indonesia has one of the highest literacy rates in the world.

Current issues of concern to Indonesians include alleviating widespread poverty, preventing terrorism, continuing the transition to popularly elected governments after four decades of authoritarianism, implementing reforms in the banking sector, addressing charges of cronyism and corruption, holding the military and police accountable for human rights violations, and resolving armed separatist movements in Acheh and Papua.

— Donald E. Tyler

See also **Homo Erectus; Java Man; Meganthropus**

Further Readings

Lewin, R. L., & Foley, R. A. (2004). *Principles of human evolution.* Victoria, Australia: Blackwell.

Shipman, P. (2001). *The man who found the missing link.* New York: Simon & Schuster.

Swisher, C., Curtis, G. H., & Lewin, R. (2000). *Java man: How two geologists' dramatic discoveries changed our understanding of the evolutionary path to modern humans.* Victoria, Australia: Scribner.

Indus Civilization

In the second half of the third millennium (2500–1900 BC), a civilization flourished in the northwestern sector of the Indian subcontinent. It extended from Afghanistan into portions of Baluchistan in Pakistan, to the Indus Valley and along the tributaries of the Indus River, eastward to the Himalayan foothills and Indo-Gangetic plain, and southward to the Indian states of Gujarat and western Madhya Pradesh. This cultural realm covered some 1 million square kilometers. At the time of the discovery of this advanced urban culture in the early 1920s, as revealed by surface finds of artifacts and ruins of building structures, it was labeled the "Indo-Sumarian civilization." But as explorations proceeded, it came to be known as the "lndus civilization" or "Indus Valley civilization." Some archaeologists refer to it as the "Harappan civilization," since the earliest archaeological excavations took place at the site of Harappa, on the banks of the Ravi River in 1921, under the supervision of Rai Bahadur Daya Sahni (1879–1939). Four years later, the site of Mohenjo-daro, on the Indus River, was excavated under the direction of the British archaeologist John Marshall (1876–1958). Although

Map sites of the Mature Indus Period

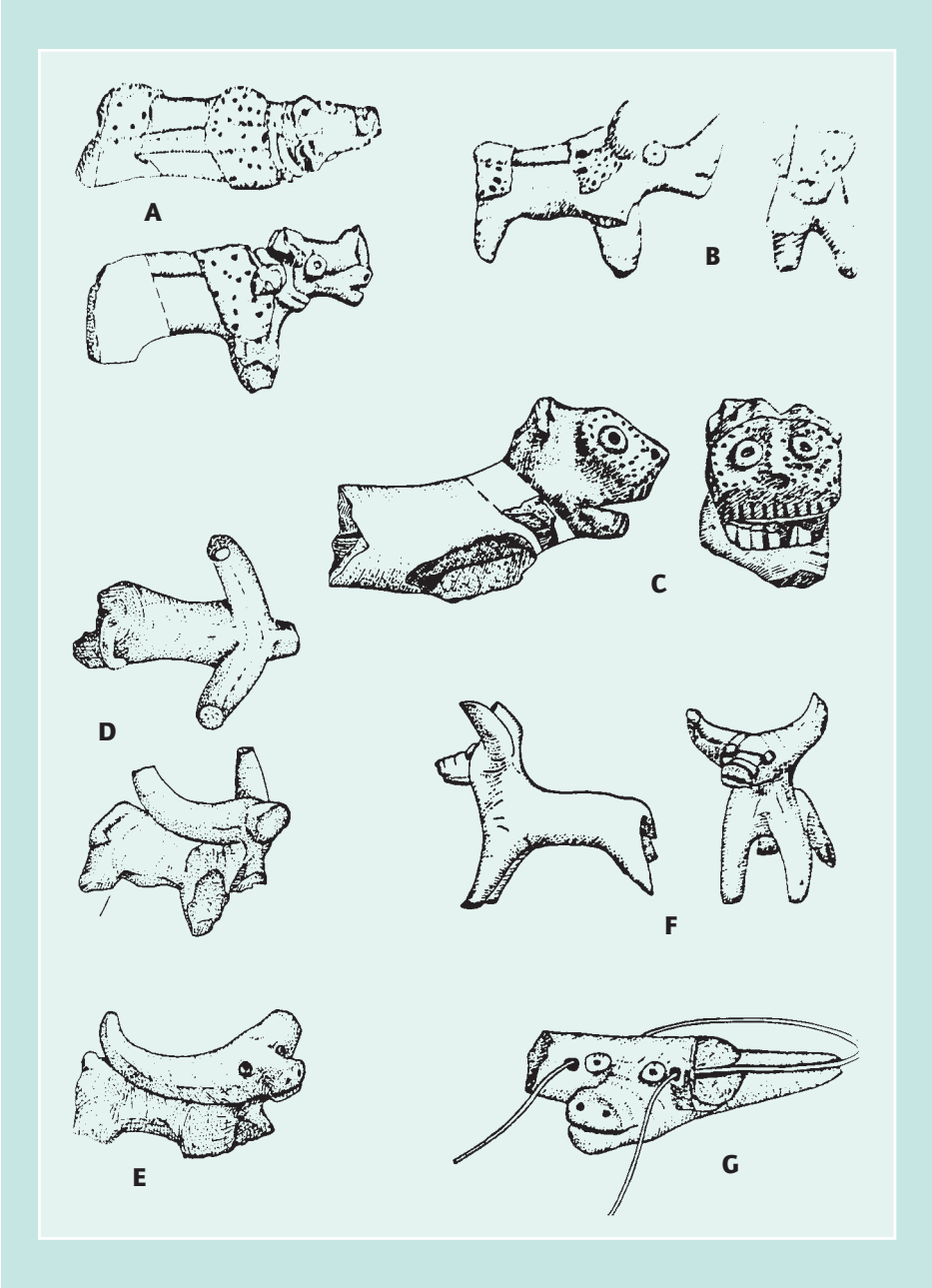
Source: Courtesy of J. Mark Kenoyer and Richard Meadow.

some 19th-century British explorers had collected surface artifacts at Mohenjo-daro, Harappa, and other sites, it was Marshall who recognized the unique characters of this hitherto unknown unique Bronze Age civilization of South Asia. He was aware that its cultural influence had diffused to Iran, Mesopotamia, and to the Arabian Gulf, as some Indus seals and pottery had been found in these regions, but there were only vague references to the Indus Civilization in Sumarian, Iranian, and Egyptian texts. It is possible that the Mesopotamian and Gulf localities of Dilmun, Magan, and Meluhha mentioned in and 2nd and 3rd millennium BC written records may have referred to important trade centers that Indus merchants reached by coastal sea routes.

As excavations progressed at Harappa and Mohenjo-daro, other Indus sites were discovered in Afghanistan, India, and the northwestern sector of the subcontinent, including the present nation of Pakistan, which gained independence from British colonial control in 1947. Over 1,000 sites dated to the mature Indus phase are known today. Some were towns such as Chanhu-daro, on the lower Indus River and Lothal in Gujarat, while other settlements were large urban centers such as Kalibangan, in Rajasthan, and Dholavira, on Kadir Island, in the Great Rann of Kutch. The socioeconomic basis for these centers included wheat and barley agriculture and pastoralism. Goats, sheep, and cattle were the predominant domesticated animals, but hunting continued to supplement food resources. Although there is regional diversity, the Indus Civilization is distinguished by a carefully regulated system of city planning. Streets are laid in a grid pattern and feature public structures and platforms, houses and courtyards, walls, and platform structures once considered by some archaeologists to be foundations for granaries. There were water-filled baths, tanks, wells, and bathing rooms within residential compounds. Working areas for firing pottery and threshing grain are present. The construction of drains running along the streets testify to the sophisticated level of hydraulic engineering for public sanitation. However, unlike the ancient cities of Egypt, Mesopotamia, and China, the Indus people did not erect monumental structures such as temples and palaces, although gateways and platforms approach grand architectural achievements. Mud and fired bricks were the principal building materials, all made to the same size, as were graduated series of standardized stone weights and measures.

Among other distinctive cultural features were wheel-made and well-fired ceramics, often with

characteristic floral and animal designs on urns, pots, dishes, and different types of household wares. Figurines were made of bronze, stone, and terra-cotta. Bronze was the material for short swords, knives, axes, and spearheads, as well as for utilitarian tools, such as chisels, saws, fishhooks, and sickles. Ornaments were of gold, silver, lapis lazuli, shell, and discoid beads, often shaped from stones imported as far away as the Bay of Cambay. The Indus script carved into steatite or formed as stamps of fired clay record an unknown language that has not been deciphered. It is likely that the script with their accompanying representations of plants and animals did not function as texts, but served as markers of ownership, contracts, and accounts.



Terra-cotta figurines of rhinoceros, lion, or tiger, cattle, goats, bird, and hippopotamus from the Mature Period of the Indus Civilization at the Harappa site

Source: Courtesy of J. Mark Kenoyer and Richard Meadow.

Because of the unexpected discovery of the existence of the Indus civilization, it was assumed by some early archaeologists that its origin was abrupt and without any antecedent cultural associations. But later investigations demonstrate that village farming communities and pastoral camps had been thriving in the northwestern sector of the Indian subcontinent as early as 7000 BC. Archaeological evidence of herding of sheep and goats dates to around 10,000 years ago in Afghanistan. Within and along the margins of the Indus realm were a number of cultures dating from 4500 BC to 2300 BC, which are identified by cultural locality names (e.g., Togau, Kechi Beg and Hakra, Amri, Nal, Kulli, and Kot Diji). Each is distinguished by its ceramic forms and paintings and other artifacts, including copper in some of these pre-Indus cultures, along with the implements of a village farming and pastoral way of life. The first stages or phases of the Indus civilization fall within a chronology of 2600 BC to 2500 BC. The mature phase continues for over 600 years (2500–1900 BC), to be followed by

posturban cultures identified as Jhukar, Early Pirak, Cemetery H, and other cultural entities that reveal the decline of the Indus civilization but a perpetuation of some of its material cultural elements in adjacent geographical regions.

Funerary customs of the mature Indus phase were of considerable diversity: earth burials in cemeteries with the skeletons in extended or flexed positions, secondary and fractional burials with partial skeletal remains deposited in pots and urns, cremation, and isolated interments of one or a few individuals. Preservation of skeletal and dental remains from the sites of Mohenjo-daro, Harappa, Kalibangan, Chanhudaro, Lothal, Rupar, and at some other Indus sites have allowed biological anthropologists to describe the physical features of the inhabitants of these localities and reconstruct demographic patterns of their populations. Furthermore, data concerning the health status of these earlier peoples can be ascertained by measurements and morphological observations of bones and teeth. Results of these studies by research teams from Pakistan and India and by foreign investigators (principally from the United Kingdom, United States, Germany, and Italy) show that there was a relative degree of genetic heterogeneity among the architects of the Indus civilization. Across the immense geographical regions of their cultural influence, populations had adapted to different environmental conditions as well as responded to various biological stresses imposed by local cultural traditions. In short, there is no "lndus race." Rather, the range of biological variability observed in skeletal and dental remains confirm that they are "typically" South Asian in their ancestry and not descendents of some exotic hordes of invaders from unknown places of origin elsewhere in Asia.

The question of the ancestral identity of the peoples of the Indus domain is relevant to questions concerning the decline of their mature phase circa 1900 BC. The British archaeologist Mortimer Wheeler (1890–1976) proposed that this civilization collapsed suddenly because of an invasion of Indo-European-speaking conquerors, the Aryans of the Vedic accounts of ancient India. Vedic India marks the period of a second rise of urbanization in the subcontinent almost 1,000 years after the decline of the mature Indus phase. Wheeler sought the evidence for this in the skeletons at Mohenjo-daro, which were not recovered from formal burials, but lay scattered over different parts of the site. Today, we know that the dating of such an invasion, if indeed one had ever occurred, was too late to coincide with the decline of the Indus civilization, and both the archaeological and biological anthropological evidence provide no support for this thesis. Better hypotheses are that there were gradual changes related to socioeconomic and ideological transformations in those cities and villages, which became less important as mercantile and manufacturing centers. It is unlikely that the Indus civilization had formed an empire or a national state, as the symbols of kingship are not present in the archaeological record. Within the broad spectrum of commercial interactions between the Indus Valley and the Mediterranean Sea and covering the lands between Central Asia and the Arabian Gulf were diverse human populations, ecological settings, and languages of which the Indus civilization was one center during the 3rd millennium BC.

New discoveries continue today with the finding of more sites and reanalyses of earlier hypotheses about the Indus peoples. American scholars active today in the archaeological sphere include Gregory L. Possehl of the University of Pennsylvania, Richard Meadow of Harvard University, Jonathan Mark Kenoyer of the University of Wisconsin, Louis Flam of Lehman College, and Rita Wright of New York University. The biological anthropology studies have been undertaken by John A. Lukacs of the University of Oregon, Nancy C. Lovell of the University of Alberta, Brian E. Hemphill of California State University at Bakersfield, and Kenneth A. A. Kennedy of Cornell University.

— Kenneth A. R. Kennedy

See also **Harappa**

Further Readings

Agrawal, D. P., & Kharalwal, J. S. (2003). *Bronze and Iron Ages in South Asia.* New Delhi: Aryan Books International.

Chakrabarti, D. K. (2004). *Indus civilization sites in India: New discoveries.* Bombay: Marg.

Kenoyer, J. M. (1998). *Ancient cities of the Indus Valley civilization.* Oxford: Oxford University Press.

Possehl, G. L. (2002). *The Indus civilization: A contemporary perspective.* Walnut Creek, CA: Alta Mira Press.

Informants

Native individuals who provide information to an ethnographer during fieldwork are referred to as *informants*. The term implies a procedure during ethnographic interviewing in which semistructured or informal in-depth questions are asked in a naturalistic setting, and informants answer. Recently, other terms such as *consultants* or *collaborators* have been preferred, indicating the greater participatory and equal role of these key individuals in the modern period. Since 1971, the American Anthropological Association has published guidelines that set out the ethical responsibilities anthropologists have to informants. These include avoiding harm or wrong, respecting informants' well-being, safety, dignity, and privacy, actively consulting in order to establish beneficial relationships, and protecting anonymity if that is desired. Increasingly, ethnographers submit proposals to institutional review boards, which examine research involving human subjects. Like other scientists, ethnographers then are required to obtain the informed consent of their subjects.

A trusting, reciprocal, and cooperative relationship between informants and ethnographers develops gradually throughout the fieldwork period. Since ethnographic interviewing often involves financial payments, informants benefit from their participation directly. Informants also may gain respect and prestige from working with anthropologists. They may expect friendship, favors, or gifts. As relationships change and deepen, ethnographers gain additional insight into the culture from the emic or native point of view. Eventually, informants provide cultural interpretation and analysis, not only cultural information.

Ethnographers select different kinds of informants depending on their research design and goals. If the ethnographer is seeking to write a general cultural description, a variety of informants, old and young, men and women, may be necessary. Each of these has ordinary knowledge that the ethnographer combines through a series of interviews, building them into the account of the culture. If the ethnographer is writing a description that requires expert knowledge, such as a study of shamanistic beliefs and practices, then perhaps only those who have this kind of knowledge become informants. Many ethnographers find that they develop special rapport with only one individual and that person becomes the key informant and often the focus of a person-centered ethnography. Research projects may interest certain people more than others, and some topics may be ignored or devalued. Thus, ethnographers interested in gender and women's experiences may be disregarded by the men of a particular culture. Such circumstances may enhance the relationship between women informants and women ethnographers.

Ensuring the accuracy and validity of informant provided data is an important methodological problem in ethnographic research. In contrast to survey-based inquiries, where replicability and comparison to outside data may be possible, informant-based data are critically assessed via a different process. Ideally, increasing rapport should produce increasing accuracy, but this is not always true. Informants may lie, avoid sensitive issues, or just not know. Ethnographic research offers the possibility of repeat interviews in which information can be checked or clarified. In addition, checking data via multiple informants may indicate whether the informant is "typical" or "idiosyncratic." Ethnographers also check informants' statements against their own observations. Informants' misrepresentations or avoidances provide cultural information just as their accurate statements do.

— *Audrey C. Shalinsky*

See also **Ethnographer; Participant Observation**

Further Readings

American Anthropological Association. (1998). *Code of Ethics of the American Anthropological Association.* Washington, DC: Author. http://aaanet.org/committees/ethics/ethcode.htm

Brettell, C. B. (Ed.). (1993). *When they read what we write.* Westport, CT: Bergin & Garvey.

Spradley, J. P. (1979). *The ethnographic interview.* Fort Worth, TX: Holt, Rinehart & Winston.

Inokun Village

The Ejagham civilization is one of the most ancient civilizations in the world. The Ejagham nation extends from Manyu Division in the southwest province of the Republic of Cameroon to the Cross River State in the Federal Republic of Nigeria. Long

years of contact with the outside world, especially European civilizations, have greatly tempered the Ejagham way of life. One region, however, has retained most of the ancient Ejagham cultures and traditions in nearly their pristine form. The lower Ekwe region has been described as the last true preserve of the Ejagham civilization.

"Lower Ekwe" is a term coined to describe a group of contiguous villages that have evolved into a peculiar subculture within the Ejagham nation, with a dialect *Ejagham Njemaya* (meaning "Ejagham from across the river") that easily distinguishes them from other speakers of the Ejagham language. The villages that make up lower Ekwe include Araru, Babong, Inokun, Mbenyan, Okurikang, and Onaku. The village of Inokun is the hub of this subculture. Its history, its politics, its art forms, its institutions, and its value systems best illustrate the accomplishments and the excesses of the Ejagham civilization.

Legend

Inokun is made up of two quarters, Ntasek and Ntota, descendants of two brothers. The two quarters are separated by a small stream *(Akem-ayeb),* which flows right through the center of the village and is commonly used for bathing and laundry. No one remembers exactly where the founding brothers came from or when they settled in present-day Inokun, but legend has it that through pure grit and servile labor, they subdued the land and built the most important commerce center of their times. A tradition of hard work was implanted. The first professionals, other than medicine men, who did not live off the land were the craftsmen. Inokun became famous for its highly skilled artisans (artifacts from the 18th century remain). Marketing of their work led to the establishment of a trade route linking the lower Ekwe area to the cosmopolitan port city of Calabar, Nigeria. Valuables like pottery, sculpture, animal skin, foodstuff, domestic utensils, household implements, and musical instruments were being exported, while manufactured goods such as lamps, hunting riffles, radios, loincloth, and sewing machines were being imported in ever-increasing proportions. By the turn of the 20th century, Inokun boasted of a culture of nouveaux riches. They were easily identified for smoking a pipe, sporting a top hat, while riding a bicycle (locally referred to as the "iron horse"). Ejagham architecture was the principal casualty of this new wealth. The Ejagham method of building consists of a framework of interwoven sticks padded with mud and roofed with thatches. Mud was being replaced by cement, and thatches were giving way to corrugated metal sheets locally referred to as "zinc." Zinc quickly became a status symbol to the extent that those who could not afford both had to choose between buying a bicycle and covering their homes with zinc. The use of mud and thatches, though common today, is easily associated with poverty.

Setback

Inokun has seen its importance diminish from the days when it was host to the only school and the only native authority court in the Ekwe area. The reasons for Inokun's dramatic reversal of fortune, from precursor of modernism to custodian of antiquated customs and traditions, cut across politics, geography, and unyielding pride. The story of Inokun, like that of most sub-Sahara people, is a story of bad government. Inokun lost much of its independence when it was incorporated into Eyumojock Subdivision, but never given access to Eyumojock, the administrative capital. The people of Inokun are required to trek for several miles through the forest to Eyumojock for basic health care needs, to register births, to attend secondary school, to make a police report, or even to buy stamps. There is a zero-police presence in Inokun, a void that is occasionally filled by vigilante justice. Women still give birth at home, attended by local midwives ill-equipped to handle certain complications. The result is a staggering loss of women during childbirth and a disconcerting ratio of stillbirths to live births. Inokun has no electricity, no pipe-borne water, no gas, no television signals, and no telephone. Houses have no plumbing, and the main source of cooking fuel is firewood.

Several efforts by the locals to create a motorable road network linking Inokun to other areas have been futile, mainly because the topography of the entire Ejagham land is very rugged. Traveling from Eyumojock to Inokun requires trekking through difficult terrain beset by a series of tortuous hills, culminating in a forbidding descent known as "Akat-egui." At the foot of Akat-egui flows the treacherous river Akarem. There is no bridge over Akarem. The navigable downstream of Akarem is no more than 30-feet wide and 4-feet deep in the dry season. But the riverbed quickly wells up in the rainy season, acquiring a

violent current that has washed away many a traveler, never to be seen again. Some natives consider this a perennial sacrifice necessary to propitiate the gods of Akarem.

Economy

The economy of Inokun today is much like it was a couple of centuries ago, except for the arts-and-crafts industry, which has all but disappeared. The only real change is the use of money to replace cowries as the medium of exchange. The people live off the land, growing their own food and hunting wild game. Food crop farming is the mainstay of the economy. Farming techniques are rudimentary, consisting mainly of a hoe and a machete. Consequently, farm holdings are very small. Bush burning is being discouraged, but the absence of an alternative time-saving method of preparing the farmland for tilling means bush burning will remain a common practice for the foreseeable future. Animal farming is very limited, consisting mainly of a few goats, pigs, and poultry usually left to roam about and fend for themselves. Because methods of food preservation are not very advanced (mainly smoking and drying), the people are still struggling with food self-sufficiency. Cash crop farming is the main source of income. Cocoa, coffee, bush mango *(ogbono)*, garri, and eru are the main exports.

The political system in Inokun is unique in its fusion of all powers—executive, legislative, as well as judicial—within the council of elders. Inokun is a monarchy. The chieftaincy is hereditary. The chief exercises power through his council of elders made up of wise men from each quarter. At the quarter level, every adult male is required to participate in the political process. The surest way to make one's opinion count is membership in the Ekpe society, the principal decision-making body. The Ekpe society is a sacred society open to all responsible adult males who can afford its initiation requirements and adhere to its policy of secretiveness. Membership in the Ekpe society is also considered the ultimate measure of manliness, and any adult male who is not a member is derided as a woman. The Ekpe society ensures discipline within its ranks through a system of hierarchy and through the imposition of stiff fines for unethical conduct by members or their dependents. However, the Ekpe society is usually regarded as a society of greed because fines are usually paid up in food and drink consumed exclusively by the members of the Ekpe society. The female equivalent for Ekpe is the Njom-Ekpa, also a sacred society empowered to handle exclusively female issues.

Legal System

The legal system in Inokun has persisted from the distant past. Although the chief of the village is an auxiliary of the central administration and is required to report all serious crimes to his superiors, the people of Inokun always try to resolve their legal problems within themselves. There is an unspoken code among the natives that bringing one's neighbor before the courts is an unpardonable breach of communion. Disputes that cannot be resolved within the family or at the level of the quarter are brought before the chief and his council. The chief's court hears cases ranging from simple disputes to murder, and it operates under a set of traditional legal principles, which accept witchcraft as evidence. Consider the case of two young men who went on a hunting expedition in the early 1980s; one returned the following day with a confession that he had shot and killed his partner. In his defense, he said his partner had transformed himself into a baboon to lure other baboons to come within fire range. Unfortunately, the one baboon he had shot and killed turned out to be his friend. Since there was no history of animosity between the two young men, the hapless hunter was summarily acquitted. He was asked to undergo major cleansing.

Kinship

Kinship patterns in Inokun can be as simple as they can be hard to decipher. The Ejagham culture encourages closeness among its people to the extent that any two persons connected by blood are considered siblings and are expected to treat each other as such. The Ejagham words for brother, *mone-nseh* (literally, "father's child"), and sister, *mone-nyen* ("mother's child"), are applied to cousins and even second cousins. However, when the words *mone-nseh* and *mone-nyen* are used in reference to persons other than direct siblings, they are usually followed by a qualifier. For example, I would introduce my cousin thus: "Anna is my sister. Her mother is my mother's sister." Similarly, the Ejagham language does not have a single word for nephew. To introduce a nephew, you could say, "Ashu is my brother's son" or "Ashu is my

son; his father and I are brothers." Keeping track of kinship is especially important in a culture where incest is at the top of its list of taboos. Cousins as well as second cousins cannot marry.

The extended family *(ndeb-nju)* is arguably the most important social structure within the Ejagham civilization. The extended family more than makes up for a nonexistent welfare system within the broader society. The extended family also eliminates the need for orphanages, adoption agencies, or homeless shelters. In a typical Ejagham society, there are no old-people's homes, and there are no homeless people. Marriage in Inokun following the proper traditional pattern is a protracted and arduous affair. The suitor makes his intent known by carrying drinks to his intended in-laws. If the initial drinks are accepted in good faith, courtship is officially on. Over the next few weeks, the suitor brings presents and more drinks. Then, he can start seeing his bride-to-be. In effect, he may have relations with her. She stays with her parents until she has her first child. Right after she has her first child, she is circumcised. Then, she is kept in a special room known as a "fattening room," away from the public. She is kept in the fattening room for 6 months, or in the case of well-to-do families, for a whole year. Here, she is not allowed to do any work, and her family is on hand to cater to her needs. At the end of her stay in the fattening room, she is given a complete makeover, and the public is allowed to see her for the first time. That same evening, a group of her husband's age mates come to escort her to her new home, bearing her high on their shoulders amidst singing and dancing. The number of traditional marriages has recently dropped, because since the 1990s, many feminist groups have been waging a sustained campaign against female genital mutilation. Some hidebound traditionalists are still unwilling to part with the practice.

Although Inokun has had contact with Christianity for almost a century, when many natives were baptized as a courtesy to the missionaries, the people of Inokun are essentially animists. The bulk of the population is nominally Christian, a great majority of whom are Catholic. A major breakthrough in the conversion of the natives was the translation of the Bible into Ejagham in the 1990s, but the impact was undermined by the fact that most of the natives are unable to read and write.

One of the enduring beliefs is that every descendant of Inokun has a double in the form of a mudfish, which inhabits a small pond called "Ayeb-Ikwi." Ayeb-Ikwi is also a major source of drinking water. Expectedly, no one fishes in Ayeb-Ikwi. When a child is born to an Inokun household, the event is replicated by the birth of a mudfish in Ayeb-Ikwi; and if by any chance. a mudfish is killed in Ayeb-Ikwi, its human double dies. There is a cloven of witches from all over the Ekwe area. which meets in Inokun after dark to decide on whose home to visit. The witches are known to fly at incredible speeds. They feed on flesh and blood and leave their victims with disease. Villagers mark themselves to render their flesh unsavory or hang fetishes on their doors to ward them off.

The people of Inokun have a genuine fear of ghosts. Ghosts are so pervasive that they control nightlife and influence burial patterns. It is generally believed that in a case of accidental or untimely death, the restive spirit of the dead will hover if it is not pacified prior to laying the body to rest. In a case where there is suspicion of murder, the spirit of the dead is encouraged to return and exact vengeance. In this case, it is commonplace for the dead to be buried with a concealed weapon. When a sorcerer dies, an undercurrent of panic can be felt in the community. Preventive methods range from having a reputable medicine man prepare the body for burial to outright cremation. The Ejagham people regard cremation as the ultimate dishonor to a man's memory.

Social life in Inokun is dominated by groups. The two main group types are peer groups and sacred cults. Peer groups constitute a support system outside the family. They are responsible for planning weddings, birth celebrations, and arranging funerals for their members. They also function as cooperatives and financial houses. Sacred cults are the principal custodians of traditions and the medium for communicating with the gods. Most prominent among these is the Obasinjom.

In Ejagham communities, both in Cameroon and Nigeria, Obasinjom (or Basinjom) represents the voice of unerring prophecy. Its pronouncements are made manifest through an individual who takes on its persona while cloaked in the guise of an otherworldly creature. This wild masquerade ensemble drapes the body in a flowing robe and is crowned by a crocodilian head, adorned with a tiara of plumage. Characterized as a "speaking mask," "the one who never tells lies," and "the one who tells and acts," Obasinjom unveils subterfuge and denounces wrongdoing. Such revelations form the core of Obasinjom's dramatic

visual spectacle and are of vital concern to the well-being of its audience.

— *Peter Ita Eta*

See also **African American Thought; Family, Extended**

Further Readings

Bacquart, J.-B. (2002). *The tribal arts of Africa.* New York: Thames & Hudson.

Onor, S. O. (1994). *The Ejagham nation in the Cross River Region of Nigeria.* Ibadan, Nigeria: Kraft Books.

Roschenthaler, U., & Chukwuezi, B. (1996). *Ejagham* (Heritage Library of African Peoples Central Africa). New York: Rosen.

Instincts

Instinct is the general term applied to unlearned behavior. Behavior is a result of neural wiring and the response of those circuits to sensory input, hormones, and internal feedback. In the early years of the 20th century, Ivan Pavlov studied conditioning of stimulus → response reactions to novel cues. His work led to J. B. Watson's formulation of "behaviorism." According to Watson, there were no instincts in animals; everything is learned—even respiration and the circulation of the blood. Behaviorism dominated psychology and the social sciences through at least 1970 and thus had a major impact on anthropological thinking.

The behavioristic formulation required viewing the inborn S → R units upon which conditioning operates as somehow not instinctive. Watson imagined that these building blocks were simple reflexes and arbitrarily excluded reflexes from innate behaviors; with reflexes gone, there was nothing instinctive left. More complex behavior was seen as a learned chaining of several S → R modules into a higher-level unit. Behaviorists thus became fixated on the study of learning.

Ethologists, the biologists who study animal behavior, found overwhelming evidence for complex innate behavior, and neurobiologists were later able to map the preexisting neural circuits that generate some of this activity, insect flight, for instance. Most animal learning is now seen as a way of calibrating or fine-tuning behavior.

Animals are born with behavioral circuits; often, however, the behavior appears spontaneously later at a species-specific time, a process called *maturation.* Innate behavior is triggered by some combination of simple cues *(sign stimuli);* the sensitivity of the animal to these cues is controlled by motivation or drive (which may be hormonal or neural, depending on the behavior), so that inappropriate behavior is blocked and creatures can direct their efforts to responses with the highest priority.

Learning, where it can occur at all, is usually specific to each behavioral context; that is, the cues that trigger it, the cues that can be learned, and the way they are organized in the brain for later use are species specific. Learning thus serves to make behavior less dependent on the simple cues that initially guide the response (and, in general, the learning of the new cues).

In short, natural selection has acted to focus learning; in some sense, most learning could be called innate. Reexamination of behavioristic studies of pigeons and rats reveals substantial species-specific and context-specific biases in their learning. More recently, both biologists and psychologists have become interested in self-directed learning, planning, and concept formation—activities formerly considered impossible in animals by both behaviorists and ethologists. *Cognitive ethology,* as it is called, has shown that many of the intellectual activities once thought uniquely human are in fact widely shared. Whether these behaviors actually require thinking (in either humans or other animals) is another question.

— *James L. Gould*

See also **Animals; Ethology; Ethology, Cognitive; Language, Animal**

Further Readings

Gould, J. L. (1982). *Ethology: The mechanisms and evolution of behavior.* New York: Norton.

Gould, J. G., & Marler, P. (1987). Learning by instinct. *Scientific American, 256*(1), 74–85.

Watson, J. B. (1924). Behaviorism. New York: People's Institute.

Integrity, Dynamic

In the 20th century, value inquiry had been greatly influenced by numerous impressive developments in biology, anthropology, and psychology, as well as evolutionary ethics in natural philosophy and new concepts in process theology. This progress in the special sciences includes fossil hominid discoveries, wild ape behavior studies, and genetic engineering research. The differences between the four pongids (orangutan, gorilla, chimpanzee, and bonobo) and the human species are narrowing in light of this new evidence, while recombinant DNA and the human genome project offer awesome possibilities for neolife forms and an indefinite life span for the human species. Moreover, neurological experiments are clarifying the direct relationship between the functioning material brain and all mental activity. The convergence of these remarkable advances in science and technology challenges entrenched beliefs and old values, resulting in the foundation for a new philosophical anthropology and a new conception of intellectual integrity.

Since the conceptual revolution of Darwinian evolution in the middle of the 19th century, the fixity of species and the traditional commitment to eternal truths have given way to a process view of life and the reevaluation of all values in light of empirical evidence, critical reflection, a cosmic perspective, and the evolutionary framework. Also, the new naturalist paradigm needs to take both cosmic entropy and species extinction seriously. No longer is earth or life on this planet or humankind itself viewed as the center of this universe. Furthermore, the scientific viewpoint critically evaluates all religious beliefs and theological concepts within the context of human sociocultural history. In brief, the human species must now be seen as a recent event within sidereal reality.

Grounded in organic evolution and human experience, value judgments hold both short-range and long-range consequences for the adaptation, survival, enrichment, and fulfillment of our own species. The conflict between facts and beliefs, as represented in the widening gap between scientific evolutionism and religious creationism, can only be resolved in terms of an open-minded acceptance of empirical evidence and rational deliberation. In fact, the value of dynamic integrity (as one shall see) becomes essential for the progressive development of evolving humankind.

Following the Age of Enlightenment, naturalists in the early decades of the 19th century began to take the scientific investigation of rocks, fossils, and artifacts seriously. Beyond denial, the empirical evidence argued for a conceptual view of earth history alarmingly different from a strict and literal interpretation of the biblical myth of Genesis. The result is a greater understanding of and deeper appreciation for time and change as a direct outgrowth of ongoing research in geopaleontology and bioanthropology. This paradigm shift, from fixity to evolution in natural history, has a devastating effect on all those cherished beliefs and traditional concepts that had given the human being its alleged unique place and special value in this universe.

Charles Darwin

As a young naturalist aboard the HMS *Beagle*, Charles Darwin (1809–1882) always remained open to a wide range of empirical evidence and personal experience during his 5-year voyage of discovery (1831–1836). Even though receiving a degree in theology, he was willing to doubt the story of Genesis while taking seriously both the new facts and the new concepts in several earth sciences, for example, historical geology, paleontology, biogeography, and comparative morphology. Likewise, his evolutionary interpretation of organic history in terms of "descent with modification" (from a common ancestor), through natural selection and sexual selection, incorporated the theoretical frameworks of Charles Lyell in historical geology and Thomas Malthus in population dynamics; their critical interpretations of rock strata and reproductive changes, respectively, had resulted in a scientific framework for uniting humankind with nature and history.

It is to Darwin's lasting credit that his analytic abilities were supplemented by a rational imagination. Through abduction, that is, the creative interrelationship of facts and concepts, he was able to elevate his own methodology above a strictly empiricist approach in order to correctly investigate the natural world in terms of time and change (geology and biology). This open orientation of synthesis allowed him to bring about a conceptual revolution in terms of the biological evolution of all life on this planet.

A comprehensive and intelligible interpretation of organic history was first presented in the pivotal writings of Darwin, especially in his major book, *On*

the Origin of Species (1859). Biological evolution replaced the eternal fixity of life forms. Yet in his epoch-making work, Darwin neither discussed human evolution nor considered the philosophical implications and theological ramifications surrounding the unshakable fact of organic evolution. Since our own species has emerged from an apelike form in the remote past, philosophers and theologians cannot ignore the reality that human beings themselves have created ethics, morals, and values within a natural environment and sociocultural milieu; one may speak of a human being as the evaluating animal, thereby distinguishing (but not separating) our own species from the apes and monkeys.

Clearly, scientific evolution both challenged and superseded the ideas and frameworks of Plato, Aristotle, Aquinas, Descartes, Kant, and Hegel (among many others). The certainty of previous values grounded in God-given laws or divine revelations could no longer be upheld by rigorous naturalists. As a result, the Darwinian conceptual revolution in modern science resulted in the emergence of both evolutionary ethics and pragmatic values in recent philosophy, as well as the emergence of sociobiology and evolutionary psychology in modern science.

Grappling with the implications of evolution, Thomas Huxley in England coined the word "agnostic" to express his own noncommittal position concerning the existence of God, while Ernst Haeckel in Germany advocated pantheism to express his dynamic worldview free from supernatural beliefs. In doing so, both evolutionists had acknowledged that the scientific fact of organic evolution has far-reaching consequences for those entrenched values of Western civilization that are grounded in traditional religion and theology. For over a decade, even Darwin himself had been reluctant to extend his theory of evolution to account for the origin and history of the human species (although Huxley and Haeckel did lecture on and write about human evolution during the 11 years following the publication of Darwin's *Origin* volume).

Finally, in *The Descent of Man* (1871), Darwin himself argued that our species is closest to the great apes and shares a common ancestor, with the chimpanzees and gorillas, that would be found in the fossil record of Africa. The evolutionist now held that the human animal differs merely in degree, rather than in kind, from these two great apes; the bonobos of Africa had not been discovered yet, and the Asian orangutans now live only on the islands of Borneo and Sumatra.

Furthermore, Darwin claimed that the naturalistic basis of human morality had had its origin in those social instincts and altruistic feelings that have enhanced the adaptation and reproduction of evolving fossil apes and later protohominids followed by bipedal hominids. These instincts and feelings are visible in the behavior patterns of living primates (particularly in the four pongids).

The traditional static views of nature, life, and humankind have been discredited by science, reason, and a dynamic interpretation of this universe. Since the conceptual revolution of Darwinian evolution, a naturalistic framework has replaced all fixed, safe, and secure worldviews with a process perspective of material reality. Within a cosmic framework and from an evolutionary viewpoint, the narrowly conceived views of geocentrism and zoocentrism and anthropocentrism offered by previous philosophies have now been rigorously reevaluated and are found to be erroneous. Nevertheless, value inquiry does require a human-centered view of this universe if values are to be relevant, meaningful, and true for the human species.

Of the countless millions of species that have inhabited this planet (most of them now extinct), only one life-form has been able to philosophize on both its own existence, the natural environment, and ongoing history; one may speak of *Homo sapiens sapiens* as this evolving universe conscious of itself. More and more, through science and technology, the human species is capable of directing its ongoing evolution, as well as determining the future destiny of plant and animal forms on the earth and elsewhere. Today, one witnesses emerging teleology as a result of human intervention. This incredible power of control over life dictates that human beings must make those value judgments that will enhance their adaptation, survival, enrichment, and fulfillment: the wisdom of evolution shows that, as a species-conscious and evolution-aware form of life, humankind needs other plants, animals, and a suitable environment for its ongoing existence. Moreover, the inevitability of extinction is a brute fact for all life on earth and elsewhere.

Clearly, Charles Darwin had both intellectual and personal integrity; he was willing to change his scientific interpretation of nature as the integration of empirical evidence and rational concepts dictated. Darwin is exemplary of an open-minded and courageous naturalist, whose steadfast commitment to the controversial fact of organic evolution challenged both the engrained Aristotelian philosophy of fixed

species and the dogmatic Thomistic theology of divine causality.

Ethics, Morals, and Values

Within the perspective of evolution, what about ethics and morals and values? Surely, the fact that our own species has evolved from a fossil pongidlike form of the remote past has something very significant to say about the human being as the bipedal, culture-bound, language-dependent, reflective ape (fifth pongid or third chimpanzee) and its social behavior patterns.

To decide what is right or wrong, philosophers offer ethical principles to guide human behavior, for example, Aristotle's "golden mean" and Kant's "categorical imperative" (the emphasis may be on individual fulfillment or social harmony). Within an ethical framework, human conduct is judged to be moral or immoral, that is, specific acts are held to be good or bad in terms of ethical judgments that consider the individual and/or social consequences of human behavior.

As a philosophical naturalist, the biology-oriented Aristotle (384–322 BC) appreciated the social value of friendship and recognized the relativity of excess and deficiency (from individual to individual) in a person's striving to achieve excellence. Briefly, virtue ethics stresses the rational value of character development within a human society.

In sharp contrast to Aristotle, Immanuel Kant (1724–1804) ignored both evidence and experience in his quest for moral certainty. He universalized an act to determine its ethical worth, for example, he claimed that it is always wrong to tell a lie (otherwise, lying would have to be a moral law). Ultimately, Kant's categorical imperative is grounded in cryptic theology; the ideas of God, free will, personal immortality, and a divine destiny for ethical persons are invoked to justify following the categorical imperative. For Kant, these ideas are grounded in an assumed, unknowable, noumenal world (a metaphysical assumption unnecessary for any rigorous scientist or thoroughgoing philosopher of evolution).

Of course, neither Aristotle nor Kant was an evolutionist. Today, for the pragmatic naturalist, both ethical principles and moral judgments are seen to be recent products of human biosocial evolution, and as such, the quest for certainty in human conduct becomes very problematic indeed (particularly if appeals to divine intervention and/or a transcendent world are rejected).

Friedrich Nietzsche

It was Darwin, the English scientist, who woke the German philosopher Friedrich Nietzsche (1844–1900) from his dogmatic slumber. Evolution offered a new framework within which Nietzsche could ruthlessly analyze the place of humankind in this universe. Having claimed that "God is dead!" is a truth about reality, he then called for a thoroughgoing reevaluation of all values. His analysis found the philosophical ideas and religious beliefs of European civilization to be false values that have resulted in the pervasive mediocrity of human culture (as he saw it). No doubt with Plato and Hegel in mind, Nietzsche wrote: "The will to a *system:* in a philosopher, morally speaking, a subtle corruption, a disease of the character. . . . I mistrust all systematizers and I avoid them. The will to a system is a lack of integrity." For Nietzsche, constructing metaphysical systems for the sake of morality, particularly at a time witnessing the beginning of modern science with its bold evolutionism, was tantamount to childish deception.

Surely, however, one can be systematic and have integrity. Otherwise, it is difficult to see how the human species will endure in its never-ending struggle within evolving nature.

Nietzsche was correct to criticize a blind adherence to any static metaphysical system or rigid theological framework. In fact, he himself desired to systematize his own iconoclastic and dynamic worldview. Taking a cosmological stance, Nietzsche argued that both space and energy are finite, but time is eternal. Therefore, for him, this universe is a cycle of evolution and devolution; this cosmic cycle has been and will be repeating itself in an absolutely identical way throughout all eternity. Of course, there is no progressive evolution from cycle to cycle, since each cosmic cycle is the same.

Concerning interpretations of dynamic reality, the arc of evolution spans from mechanistic materialism to spiritual mysticism. Nietzsche's own interpretation of evolution is grounded in creative vitalism. Furthermore, for Nietzsche, this universe is essentially the will to power and the human, all-too-human species is merely a temporary link between the past ape and the future overman (a superior being who will create new values beyond the traditional conceptions of good and evil).

Nietzsche said "Yes!" to the eternal recurrence of the same reality. Moreover, in this dynamic universe

of organic evolution, he stressed the essential value of human creativity and, as an atheist, challenged the human species to create new values that are free from religion and theology. Invoking his eternal recurrence perspective, Nietzsche taught that an individual must affirm life by willing to live it as if each choice one makes is a judgment for all eternity. Consequently, for him, each moment has eternal value.

Unfortunately, Nietzsche failed to clarify his own views on truth, science, and naturalism. Even so, this iconoclastic philosopher did have integrity, as is demonstrated in his scathing criticism of outmoded beliefs and in his desire to incorporate the findings of science and the use of reason in order to verify his awesome idea of the eternal recurrence of this same universe. It was Nietzsche's steadfast commitment to both overcoming mediocrity and the quest for wisdom that elevated his cosmic vision above the pervasive pettiness of human existence (as he interpreted it).

Naturalism and Pragmatism

Before the writings of John Dewey (1859–1952), the pragmatists Charles Sanders Peirce and William James had been influenced by the evolutionary movement in the special sciences. All three thinkers represented the crucial transition from religious idealism to philosophical naturalism in American thought.

For the modern pragmatist as evolutionary naturalist, science has epistemological priority, and matter (energy) is the ontological makeup of this dynamic universe. This practical philosophy does not dogmatically rule out theoretical constructs or rational speculations, but it does require factual evidence to justify objective truth-claims about our species, human society, and the natural world.

In step with the new logic of evolution, Dewey developed a pragmatic naturalism that stressed a need for philosophy to accept the advances in science. In particular, the discoveries of Galileo and Darwin had reshaped earlier interpretations of concrete nature. And for Dewey, philosophy has an obligation to incorporate these new scientific findings into its worldview.

In his insightful essay "The Influence of Darwin on Philosophy" (1910), Dewey pointed out the sharp contrast between change and fixity. He held that a modern thinker must acknowledge the superiority of the scientific method, as well as the flux of both human knowledge and nature itself. With sensitivity to the modern situation, Dewey wrote: "We live in the twilight of intellectual transition." Like Nietzsche, Dewey knew that the conceptual revolution of Darwinian evolution foreshadowed the transformation of false beliefs, old values, and static worldviews.

Ignoring science, many phenomenologists and existentialists had adopted a subjectivist stance in sharp contrast to the naturalist attitude, not to forget the antiscientific menace of fundamentalism and the intellectual nuisance of postmodernism. In the tradition of philosophical naturalism, Marvin Farber (1901–1980) taught that the human species is totally within nature; the fact of evolution had successfully shaken him free from a narrowly conceived phenomenology (which he eventually came to see as a limited methodology incapable of delivering a true ontology, sound epistemology, and humanist ethics).

Farber appreciated the obvious value of Darwinism for a sound naturalist philosophy. Reflecting on the liberating influence of evolutionism from spiritualism, he wrote: "Although philosophical criticism had long before anticipated this result, it was the large array of scientific evidence offered by Darwin which delivered the most distressing blow to the supernaturalist." Ultimately, the Farberian outlook is grounded in humanist values and pervasive materialism.

Despite their adherence to social change and organic evolution, John Dewey and Marvin Farber still clung to an outmoded idea. Although rejecting Hegel's idealism, Dewey retained an ambiguous conception of God inconsistent with a succinct naturalism; even so, he was not a practicing believer. Although rejecting Husserl's idealism, Farber remained sympathetic to Marxism even though it stifled intellectual creativity; moreover, he had never visited the Soviet Union. Nevertheless, by embracing science and reason, each philosopher did represent a significant degree of dynamic integrity.

Dynamic Integrity

An enlightened thinker is acutely aware of deep space, deep time, deep evolution, and deep psychology. Unfortunately, recent philosophy is usually detached from the incredible discoveries and awesome perspectives of modern science. This universe encompasses billions of galaxies; Earth is billions of years old; the process of organic evolution results from those random variations that occur in the biochemical complexity of the DNA molecule; and unconscious

activity motivates human behavior. Furthermore, beneath all the myriad evaluations of the human being lies a deep value: this is the virtue of integrity. But as a direct result of scientific cosmology and modern anthropology, no longer can the human species cling to a static worldview, that is, no longer can it be dogmatically committed to a myopic and closed philosophy, fixed moral maxim, or universal ethical principle (Aristotelian fixity and Kantian certainty have given way to evolutionary pragmatism).

It is now necessary for emerging humankind to recognize the quintessential need for a dynamic integrity that understands and appreciates the obvious fact of evolving nature while remaining in step with the advances of science and technology. Dedicated to a neo-Enlightenment and open inquiry, dynamic integrity integrates scientific findings, process cosmology, and evolutionary naturalism into a comprehensive and intelligible philosophical anthropology that encourages both creating and reassessing human values. Such an interdisciplinary attitude fosters a holistic character that is amenable to social change, critical dialogue, and pervasive investigation.

Yet, dynamic integrity must mean more than simply living an ethically integrated life or merely having a morally unified self. Instead, it entails an open-minded and open-ended commitment to science, reason, compassion, new perspectives, and the betterment of the human species. In principle, dynamic integrity is evolution based, for example, it acknowledges the unity of self, the unity of humankind, the unity of life, and the unity of this universe.

Dynamic integrity requires the creative union of thought and action. A person has dynamic integrity when his or her actions are not only based on empirical evidence and logical reflection but also when these actions contribute to the adaptation, survival, enrichment, and fulfillment of human beings. Consequently, in terms of ethics and morals, dynamic integrity is both deontological and teleological in nature: there is a duty to accepting scientific evidence, as well as an ongoing commitment to improving the human species by increasing knowledge, freedom, happiness, and longevity.

Briefly, dynamic integrity is both an attitude of mind and an approach to life that acknowledges the immensity of this universe, the brevity of human existence within it, and the ongoing need to enhance our species through scientific knowledge, critical thought, and resolute effort.

In evaluating their creative lives, both Darwin and Nietzsche represented a commitment to the essential value of dynamic integrity: Darwin revolutionized science through his giving attention to the facts of geobiology and their far-reaching implications for life in terms of evolution, while Nietzsche rejected the falsehoods and mediocrity of modern civilization and, subsequently, challenged the human species to create new values.

Pierre Teilhard de Chardin

The geopaleontologist and mystic Pierre Teilhard de Chardin (1881–1955) demonstrated dynamic integrity by embracing evolution, even though he was silenced by the Roman Catholic Church for his unorthodox ideas and perspectives. This courageous Jesuit priest had accepted and incorporated into his faith the facts from geology, paleontology, biology, and anthropology (even though this convergence of empirical evidence required a new interpretation of humankind within nature that challenged traditional beliefs and old values). In sharp contrast, many of today's creationists choose to reject or ignore any empirical evidence that may discredit their faith, theology, or perspective.

Unfortunately, the Harvard scientist Stephen Jay Gould lacked dynamic integrity when, without sufficient evidence, he implicated Teilhard in the infamous Piltdown hoax and thereby besmirched the Jesuit priest's reputation. Furthermore, Gould criticized Teilhard's theistic evolutionism. Ironically, this is despite the fact that Gould himself clung to an outmoded and unwarranted ontological dualism by advocating the existence of two separate realms of inquiry: the natural world of the scientist and the transcendent world of the theologian (at least Teilhard had attempted to bridge these two realms in terms of an evolving and converging spiritual panentheism). If one takes Gould seriously and assumes that these two different realms do exist, then how do they influence each other in any meaningful way? Under rigorous scrutiny, Gould's dualism quickly becomes completely superfluous for the evolving human species.

Regrettably, because of his dualistic approach to naturalistic neo-Darwinism, Gould is being used by biblical fundamentalists and religious creationists to discredit the fact of evolution. A rigorous evolutionist (with dynamic integrity) realizes that there is only this material universe, and that the emerging human

species is a product of, dependent upon, and totally within it.

The spread of fundamentalism and creationism in our modern world clearly illustrates a growing resistance to science and reason, not to mention a lack of vision for the future of humankind. Unfortunately, the gap between facts and beliefs continues to widen. In particular, the rejection of an evolutionary framework by some philosophers and many religionists clearly demonstrates that internal consistency alone in a worldview is not the road to truth and wisdom. In the ongoing quest for both truth and wisdom, dynamic integrity is always necessary.

And today, more and more, the potentially rational and sometimes compassionate human species needs to value those new ideas and collective actions that will contribute to its survival and fulfillment (in sharp contrast, by rejecting science and reason, all supernatural worldviews are bound to fail because their beliefs will be discredited by empirical evidence). Evolutionism forces one to look at this universe, life on earth, and the human species in a radically new way. Change is an invitation to improvement, and humankind must now choose evolution over stagnation. To save biodiversity and civilization, it is the deep value of dynamic integrity that becomes the axiological foundation for the emerging human species on earth, as well as its ongoing evolution elsewhere in this universe.

Pierre Teilhard de Chardin had called for an ultra-anthropology that views our species within an ever-widening comprehensive framework. In the future, scientists and philosophers will need to remain open to compelling evidence and progressive concepts if their thoughts and actions are to be relevant, meaningful, and true. For the evolutionary naturalist, philosophical inquiry must be in step with scientific discovery. In short, dynamic integrity underpins both pragmatism and materialism. As such, dynamic integrity is the essential value for wise social conduct and purposive creative intelligence throughout the centuries to come.

Quo Vadis

Our hominid species is the result of 7 million years of Darwinian evolution from fossil apelike forms to the human being of today. Only a complete disregard for modern geopaleontology and bioanthropology would prevent one from recognizing the established fact that the human being represents a recent species within primate evolution. For an evolutionist, our own species is the successful great ape that dominates this planet because of its sustained bipedality, social behavior, material culture, and symbolic language as articulate speech.

But the human species is not a fixed animal within organic history and sociocultural development. Furthermore, humankind is not nailed to the earth. Despite global convergence but with critical optimism, one may speak of the future divergence of our species beyond this planet as the human being becomes the cosmic ape among the stars.

As the human species continues to evolve on earth and elsewhere, space exploration along with nanotechnology and genetic engineering offer a Nietzschean vision: the emergence of godlike overbeings in the ages to come. No doubt, the human being has only glimpsed the awesome powers of science and technology in terms of both manipulating and directing the process of organic evolution. Our future generations will probably enjoy an indeterminate life span and see the artificial creation of neolife forms (i.e., new species of plants and animals), as well as the alteration of the human species for its adaptation to and survival in new environments, for example, living in outer space and on other worlds.

The planetary fallacy (as this author calls it) erroneously maintains that life, organic evolution, and intelligence are restricted only to the earth. Such a myopic viewpoint rejects the probability of both exobiology and exoevolution in this dynamic universe. Admittedly, the serious consequences of ongoing evolution challenge those values that many adhere to today, especially the claim that the human species is absolutely unique in reality. Overcoming the planetary fallacy, one should embrace a truly cosmic perspective in which humankind has the courage to explore outer space and to evolve into a superior form of life in terms of both intelligence and technology. As such, one may speak of the emerging cosmic ape as the brave and curious terrestrial human species ventures into sidereal space (a momentous transition for planetary life that has already begun). Of course, our cosmic destiny will require that humankind solve those future problems that are inherent in adaptation, survival, and evolution among the stars.

For the pragmatic naturalist, meaning and purpose in human life are derived from, and value judgments are made within, material existence. No doubt,

continued progress in science and technology, as well as an ever-widening perspective, will result in a reevaluation of our present values. Surely, many centuries from now, the old values of the Judeo-Christian-Islamic religions and Eastern philosophies will be replaced by new values (assuming that the human species survives on this planet and/or elsewhere). And there is always the crucial need for ongoing inquiry in order for humankind to overcome both intellectual stagnation and psychological boredom.

Likewise, a community of inquirers will be necessary for the continuing evolution of *Homo sapiens futurensis* as it engineers this solar system and others for its survival and fulfillment among the myriad of galaxies throughout this universe. For the success of this cosmic adventure, humankind must affirm both the joy of life and the value of existence.

Furthermore, the human species must overcome the omega illusion (as this author sees it). In the 20th century, Pierre Teilhard de Chardin offered a mystical vision of the final end-goal for human evolution on earth and then beyond it. His speculations appeal to the psychological needs and emotional desires of the human species (especially in light of the certainty of death). But the wish for personal immortality is no proof that such a status is true or even possible.

Without evolution, nothing makes sense. The pragmatic naturalist acknowledges the development of our modern worldview, from Julian Huxley's religion without revelation to Richard Dawkin's evolution without theology; one may speak of the development of values from the sacred to the secular. In this context, the backsliding from material evolution by some renowned thinkers is deeply regrettable and clearly demonstrates a failure of nerve. Of course, there is always the human need for love, compassion, and responsibility (aspects belonging to the naturalist outlook and dynamic integrity).

Finally, there is always the need to establish ethical guidelines for scientific research that must value nature, life-forms, humankind, and critical thought. Since the groundbreaking contributions of Charles Darwin and Friedrich Nietzsche, the brute fact of organic evolution and the empirical findings of the special sciences continue to reinforce a materialist framework that is paving the way for a cosmic neo-Enlightenment free from nonsense, ignorance, superstition, and obscurantism. With dynamic integrity as its essential guideline, the pragmatic human species will continue to make substantial progress in terms of both utilized scientific truth and shared philosophical wisdom.

— H. James Birx

Further Readings

Darwin, C. (2000). *The autobiography* (Introduction by H. James Birx). Amherst, NH: Prometheus Books.

Dewey, J. (1965). *The influence of Darwin on philosophy and other essays in contemporary thought.* Bloomington: Indiana University Press.

Farber, M. (1968). *Basic issues of philosophy: Experience, reality, and human values.* New York: Harper Torchbooks.

Gould, S. J. (1997). Nonoverlapping magisteria. *Natural History, 106*(2), 16–22.

Haeckel, E. (1992). *The riddle of the universe* (Introduction by H. James Birx). Amherst, NH: Prometheus Books.

Nietzsche, F. (1993). *Thus spake Zarathustra* (Introduction by H. James Birx). Amherst, NH: Prometheus Books.

Rachels, J. (1991). *Created from animals: The moral implications of Darwinism.* New York: Oxford University Press.

Teilhard de Chardin, P. (1975). *The phenomenon of man* (2nd ed.). New York: Harper Colophon.

INTELLIGENCE

Intelligence is a concept that is believed to be made up of a set of complex behaviors. It is described as the ability to problem solve, to perceive objects in one's environment, to understand spatial relationships, to remember, classify, calculate, and reason. It is analogous with *cognition,* a mental quality comprising one's ability to learn from experience, to adapt to new situations, acquire knowledge, and deal with abstract concepts. It has been found to be clearly associated with the integrity and functioning capacity of one's central nervous system functioning (the brain) and is made up of several anatomically related domains (e.g., arousal and alertness, visual spatial processing, attention, memory, executive functioning, etc.).

Raymond Cattell suggested that intelligence consists of two parts, "fluid" intelligence (one's innate basic reasoning that is supposedly independent of culture and educational background) and "crystallized" intelligence (the information and skills one learns through education, experience, and socialization).

Many scientists and educators believe that intelligent behavior is not restricted to human behavior; that is, it can be exhibited by other species. However, it is assumed to be limited by the absence of language. *Language* is defined as a culture's representation of ideas and objects in symbolic form that is used classify and store information in memory. Only the species of *Homo sapiens* has developed the ability to string together several sounds (phonemes) to produce new meanings. Language is considered a critical component of higher-order intelligence because without it, one could not measure and define the more complex aspects of intellectual behavior.

Integral to the current use of the term intelligence is the intelligence quotient (IQ). An individual's IQ is commonly measured and quantified by paper and pencil, individually administered IQ tests, as well as by the appraisal of adaptive behavior (based on how a person functions in an everyday setting).

Evolution of the Brain

In all species, the brain is the organ most associated with "intelligence." Much of the human brain's evolution has occurred within the past 5 million years, during which time it has increased 5 times from its original size. The modern human brain weighs between 1,000 and 2,000 g.

Current theorists believe that our earliest bipedal ancestor was the East African *Australopithecus.* Anthropological evidence indicates that its brain weighed about 400 g (the same size as a modern chimpanzee's). They evolved into the species *Homo habilis,* a toolmaking hominid characterized by dental patterns similar to modern humans'. *Homo habilis* developed a significantly larger brain than its predecessor's (believed to weigh one half the size of modern man's brain), which was thought to be directly related to their scavenger lifestyle. This type of lifestyle would have been more reliant on the organism's sensory, motor, and social skills than that of the *Australopithecus* lifestyle. It is thought that *Homo habilis* continued to develop its skill in designing and implementing tools until it changed from scavenger to hunter and migrated out of Africa.

These new behaviors were exhibited by *Homo erectus,* a species characterized by a larger brain and the behavior of traveling. Fossilized remains of *Homo erectus* have been found in Africa, Java, and Peking. As a hunter-gatherer living in a complex sociological society, survival of *Homo erectus* was strongly influenced by their ability to read another's behavior and adjust their own based on experiential and motivational factors.

The role of preadaption may explain the continued development of brain size in early man. Once certain intellectual behaviors (such as extended travel and toolmaking) had developed that could enable a species to take advantage of their environment, it opened the door for new cognitively superior developments to emerge. Dean Falk suggested that the development of the upright posture of *Australopithecus* contributed to the development of new changes in the venus blood flow of the brain. Until that point, apes had reached an upper limit to the growth of their brains due to the oxygen consumption and generation of heat in the brain. Exercise (like that involved in travel) put the species at risk for overheating the brain, until they developed a more widely dispersed venus blood flow system that served as a cooling system and allowed for the advent of extensive movement. Once upper limits of growth were selected out, other influences were free to contribute to brain growth (e.g., increased social development, climate adaptation, diet changes, increased skill in movement, larger bodies, mate selection).

Scientific discoveries of this type have contributed to the theory that the anatomical increase in brain size is responsible for producing more sophisticated behavioral abilities. It would stand to reason, then, that the more "sophisticated" the species, the more specialized central nervous system (CNS) functional domain areas. That is, as the human brain has evolved in size, it has actually developed more functions, which allows, in turn, more advanced skills to evolve.

Western Versus Eastern Views on Intelligence

The Western concept of intelligence can be traced back to ancient Greece, when Plato described three aspects of a human's soul as comprising intellect, emotion, and morality (later renamed as cognition, affect, and conation). Cicero appears to have coined the term "intelligentsia," and St. Augustine defined

intelligence as quickness of understanding and acuteness of discernment. Prior to the late 1800s, when Alfred Binet developed a paper-and-pencil test to measure it, intelligence was considered a philosophical concept and could not be easily quantified.

Early Eastern views of intelligence were also grounded in philosophy, although their understanding originally evolved from the Indian concepts of wisdom and prudence. Over time, this concept of intelligence (aka *buddhi*) was expanded to encompass human emotion, societal values, and interpersonal relationships.

History of Intelligence

Scientific research aimed at quantifying and identifying human intelligence began as early as 1869, when Francis Galton studied individual differences in the biological underlay of cognitive functioning by measuring reaction time and determined that all humans possessed a "general" intellectual ability.

This modern, Western concept of quantifiable intelligence scores was further developed and popularized during the 1910s by German psychologist Wilhelm Stern, and the continued work of Lewis Terman. They were responsible for expanding the intellectual concept of "mental age" into a quotient by computing a formula that divided mental age by chronological age and multiplying by 100.

The idea that a mathematical score could represent one's overall intellectual functioning was truly expanded by the infamous French psychologist Alfred Binet and his colleague Theodore Simon, with their development of an empirical measure of mental retardation (Binet-Simon Intelligence Scale, 1905). They were the first to use age standards in measuring intelligence, and their scale was designed to compare a mentally retarded individual's score with that of their normal, same-age peers.

Both Henry H. Goddard and Lewis M. Terman revised Binet's original intelligence scale and adapted it for use within the United States in 1916, with several revisions following in the years of 1937, 1960, 1972, and 1986. To date, it is still one of the most popular intelligence assessment measures used.

Meanwhile, as Binet and his predecessors continued to perfect their empirical measure of human intelligence, a Swiss biologist named Jean Piaget developed a theory that depicted intelligence not as a "general" ability, but rather as a continuum of human development and biological adaptation. He described the way a child typically perceives, understands, and operates in their environment as a cognitive process that progresses through time as a result of the reorganization of psychological brain structures. Piaget theorized that intellectual development occurred throughout four childhood stages, starting at birth, and each stage allowed for the construction of increasingly complex intellectual processes. Because he believed intellectual ability could be impacted by both biological and genetic factors, he thought it to be malleable.

It wasn't until the late 1930s that scientists began to describe intelligence as not just a single general ability, but as a cluster of cognitive processes (e.g., information processing, attention, planning, forming strategies, etc.) that, as Piaget had suggested, could grow and develop over time and were influenced by both cultural and social factors.

Louis L. Thurstone postulated that intelligence was actually made up of as few as seven independent mental abilities that operated independently, and in 1939, American psychologist David Wechsler developed the Wechsler-Bellevue Intelligence Scale test in an attempt to tease out and measure these different underlying mental abilities by providing distinct scores for each area of functioning.

In 1983, Howard Gardner added to this theory, claiming the concept of multiple intelligences could be further broken down into cognitive components that could describe specific behavior. However, when these distinct functions were taken in whole, they would better describe the overall cognitive performance of an individual. He added the specific concepts of musical, bodily kinesthetic (athletic ability, dancing), logical-mathematical (numerical ability), linguistic (verbal ability), spatial (orientation in space map reading, visual arts), interpersonal (understanding the behavior of others, empathy, sympathy) and intrapersonal (understanding oneself) functioning to the theory of intelligence.

Soon after, William Sternberg expanded the theory of intelligence to encompass the sociocultural context in which humans behave and interact. He redefined intelligence as a purposeful, goal-oriented behavior that could not be understood outside of an individual's environment, including a person's practical knowledge as measured by their success in the real world, not by a generic, quantifiable number.

Qualitative and Quantitative Intelligence Measurement

Intelligence is extremely difficult to identify and measure, as it is a complex process that involves many types of behavior. Intelligence tests were primarily designed to allow for an objective, systematic observation of an individual's intellectual performance in a controlled situation. However, it is obvious that no single IQ test or theory can fully identify the full spectrum of intelligence, particularly the individual's ability to use both environmental and personal resources to adapt to the world. Despite that, standardized intelligence scores are used in many industrialized societies as a basis for selection, placement, and decision making in educational and employment arenas across an individual's life span. They also play an enormous role in the decisions of allocation of the society's resources and opportunities. Although IQ tests cannot tap into every aspect of intellectual functioning, a good intelligence test should be both reliable and valid and ought to include both clear and ambiguous items that vary in difficulty. Commonly used measures of intelligence provide scientifically collected age- and/or education-adjusted comparative data that are normally distributed amongst the population. Currently, the average IQ as measured by the Wechsler Adult Intelligence Scale is a standard score of 100 (+15), where mentally retarded people score below 70, and gifted at or above 130.

— *Zoe Proctor-Weber*

See also **Brain, Human**

Further Readings

Calvin, W. H. (1994). The emergence of intelligence. *Scientific American, 271*(4), 100–107.

Hersen, M., et al. (Eds.). (2004). *Comprehensive handbook of psychological assessment: Vol. 1. Intellectual and neuropsychological assessment.* Hoboken, NJ: Wiley.

Kolb, B., & Whishaw, I. Q. (2000). *Human neuropsychology* (4th ed.). New York: Freeman/Worth.

Sternberg, R. J. (1997). The concept of intelligence and its role in lifelong learning and achievement. *American Psychologist, 52,* 1030–1037.

Weinberg, R. A. (1989). Intelligence and IQ landmark issues and great debates. *American Psychologist, 44,* 98–104.

White, S. H. (2000). Conceptual foundations of IQ testing. *Psychology, Public Policy, and Law, 6,* 33–43.

INTELLIGENCE AND GENETICS

Intelligence is the term used to measure the speed with which learning takes place, how well something is learned, how long it is remembered, and how well it is remembered. Intelligence also deals with much more than lessons learned in schools. Intelligence involves being able to remember things, ideas, or physical actions that have been learned. It also involves responses to challenges and to the need for innovative creativity.

Intelligence as a general cognitive ability is a universally recognized phenomenon, but there is not a universal definition to precisely explain it. It clearly involves in humans the ability to acquire language, to solve problems, to understand things and ideas.

Humans differ widely in their abilities to learn, remember, solve problems, or understand. The speed with which these tasks (and others) are performed is used to measure intelligence. Thus, people who can learn a language or solve mathematical problems more quickly than others are considered to be more intelligent.

IQ tests can measure the intelligence of a person in a particular culture. The tests can measure intelligence in terms of the speed of the mind's ability to solve problems.

However, IQ tests do not measure intelligence as a response to environmental challenges. People differ in their abilities to handle different situations. In the face of natural disasters, events filled with dangers, or stressful situations, individuals with school "smarts" may not have survivor "instincts."

Creativity is also a part of intelligence. Inventiveness and creativity are responses

sometimes to necessity. However, in the case of the performing arts, such as music and drama, creativity is an intelligent act that may be partially due to training.

Consequently, understanding intelligence involves both biology of the brain and the cultural experiences of people. This is often expressed as "nature versus nurture."

Intelligence is a factor of both genetic heredity and environment. Every human is born with mental capacities. These can be nourished or undernourished, both physically and culturally. If an infant or child is malnourished or neglected, abused, or discriminated against because of race, creed, nationality, or physical handicap, he or she is likely to underperform in mental capabilities. However, if a child is nourished physically and culturally stimulated, he or she is very likely to exhibit socially acceptable intelligent skills and behaviors.

Controversy rages over intelligence. Because humans differ in intelligence, this creates inequalities. The inequalities have been associated most often with social conditions or with race. Claims of racial inferiority due to genetics have been advanced in the past; however, studies of the genetic base of human intelligence are still in their infancy. Studies of twins have strongly indicated that all of intelligence is not due to personal biology, but to other factors as well.

— Andrew J. Waskey

IQ TESTS

"IQ" stands for "intelligence quotient." A person's IQ is a number used to indicate a person's "mental age" in comparison with others who have taken the same test. IQ is then used as an indicator of intelligence. An IQ for someone is calculated by dividing his or her mental age by chronological age. Therefore, if an 8-year-old has a mental age of 12, his or her IQ will be the mental age of 12, divided by 8 years of age, which equals 1.5. This number, after 1960, was multiplied by 100 to obtain a score, in this case an IQ of 150.

Since the 1960s, the number 100 has been set as marking average intelligence. Those with IQs below 100 are considered below-average intelligence and those above 100 are above-average intelligence. However, in recent decades, this has been replaced by a statistical "Z score."

IQ tests were first developed in France in 1904 by Alfred Binet. He invented the Binet Scale (Simon-Binet Scale) in order to have an objective method for distinguishing between normal children and those whose mental capacity was such that they could benefit from special education.

In 1916, Lewis M. Terman published a revision of Binet's work: the Stanford Revision of the Binet-Simon Scale of Intelligence, or Stanford-Binet, for short. It would be the primary intelligence test used in the United States for decades thereafter. However, problems arose. Terman believed that intelligence was fixed. Therefore, once a child had been tested, the child was labeled by the test results. For many critics, this stamped a child with a mark of inferiority (if applicable) for life.

Another issue is the meaning of intelligence that IQ tests are supposed to measure. "Intelligence" has never been precisely defined. This means that there is an open question as to what exactly an IQ test is measuring.

Other issues have arisen from the recognition that children who come from families that travel and provide rich learning environments score higher than children who come from impoverished homes. Enrichment programs such as Head Start have demonstrated significantly increased IQ scores when children from underprivileged homes are enriched by the program. Physical hunger due to poverty, fatigue, illness, or family stresses may also affect performance.

Cultural bias is also a controversy in IQ tests. Immigrant children taking a test in a new language and culture may encounter difficulties. Efforts to create culture-free tests have not been completely successful.

— Andrew J. Waskey

COGNITIVE SCIENCE

Biological anthropologists who study the field of cognitive science, which examines ways in which the human brain affects complex behaviors, have expressed interest in the work of psychologist Ellen Bialystok of Canada's York University and three coresearchers who concluded that being bilingual may prevent brain deterioration as individuals age. The three studies were designed to test the hypothesis that the same cognitive processes that control the ability to remain focused on one task while ignoring irrelevancies are those employed in using two languages. Building on previous research on children and young adults, the researchers were interested in discovering if the same findings held true for older adults as well as for younger individuals. Bialystok et al. found that individuals who knew and used more than one language scored higher on simple cognitive tests than those who knew and used only one language. The tests also revealed that advantages from bilingualism increased with age.

To control for other variables, the individuals involved in the studies all came from similar socioeconomic backgrounds and had been bilingual for most of their lives. One hundred and four respondents ranged in age from 30 to 59, while 50 others ranged from 60 to 88 years old. The researchers developed their tests of cognitive skills using the Simon Test, which operates on the principle that when a brain is faced with cognitive clashes, reaction time will slow down as the human brain processes information and determines proper responses.

The researchers developed cognitive tests employing a system of flashing red and blue squares that were placed on either the right or left of a computer screen. After identifying the squares, individuals were asked to respond by pressing the left shift key on the computer keyboard if the square was identified as blue or the right shift key if the square was perceived as red. Reaction time was delayed when respondents were forced to press a shift key on the opposite side of the keyboard from where the square appeared on the computer screen, as was true in approximately half of the required identifications.

The two-square test was followed by an additional test, in which respondents were asked to work with squares of four colors. In this case, the squares were located in the middle of the computer screen. As expected, bilingual respondents again received higher scores than other respondents. As the task was repeated a number of times and identification became routine, differences in the scores leveled off. The overall conclusion from the three studies was that bilingualism increases the ability to perform across a wide range of complex cognitive tasks, even as individuals age.

—Elizabeth Purdy

Intercultural Education

Intercultural education may be viewed as an application of cultural anthropology to the design and implementation of formal educational curricula, largely in prebaccalaureate programs. Its goal is to instill in students an appreciation of other cultures so as to offset a dogmatic and unproductive ethnocentric worldview. In an interconnected world where the capability to deal effectively with cultural differences is a necessary skill, this is an admirable educational program, but one beset with challenges.

The Related Approaches of Anthropology and Multicultural Education

Intercultural education is somewhat distinct from both the teaching of anthropology and multicultural education for elementary and secondary students. An anthropology course, while it may achieve the same goal as intercultural education, is designed to describe the ideas and methods of social science, based largely on what anthropology has learned about human cultural variation, the origins of humanity, and the rise of civilization. In this, it is broader in scope and less focused on transforming students' ethnocentric views. An anthropology

Source: © Photo provided by www.downtheroad.org,The Ongoing Global Bicycle Adventure.

course will spend most of its time describing the methods of anthropology, the fossil record and what inferences can be drawn from skeletal and artifact remains, and, more to the point of intercultural education, what anthropology has learned about cultural systems and the range of variation exhibited in these by societies around the world. A student may do well in such a course but not come to the transformational understanding required for intercultural education.

Intercultural education is not specifically tied to anthropology as a discipline, especially an anthropological approach that dispassionately presents a description of humanity. Rather, it seeks to persuade students that there is an inherent value in other cultures. In this regard, it may be imbedded in any course (e.g., English, language, social studies). The findings and conceptual approach of cultural anthropology may inform and guide it, in concert with allied fields such as sociology, speech communication, psychology, and world history, but may not be directly identified with it.

Intercultural education is also distinct from multicultural education, although it blends into and overlaps with it. Multicultural education focuses more on cultural pluralism within a nation and, in support of this, strives to present pedagogical materials from a variety of perspectives (by ethnicity, gender, social class, etc.). This is done in order to provide students of diverse backgrounds with materials that they can identify with and thereby gain some measure of ownership of their educational experience and close gaps in achievement.

Intercultural education is designed to create in students an improved worldview, one that includes an appreciation for the broad range of human cultural capability and expression. In other words, it is the educational application of the anthropological dictum that the members of all human groups possess an equivalent level of intellectual competence and a cultural system that is well formed and valid. This anthropological view of humanity is associated with two seminal orientations about how humans and human culture should be studied. These constitute the basis of an intercultural approach, as well as its challenges, in elementary and secondary education: a comparative approach to learning about humanity and the analytic skills to perceive practical and ideological value in other ways of life, or cultural relativism.

Comparative or Cross-Cultural Approach

Students may be told that humans are all equally capable, but an anthropological approach would hold that this conclusion must be supported by convincing accounts depicting humans of different cultures effectively dealing with appreciable challenges in their daily lives and environment. Selecting texts presents a challenge of combining the often mutually incompatible demands of interest (the materials should be written at an appropriate level and also be dramatically compelling to engage the willing involvement of the student) and validity (the materials must be reliable or realistic as to the relevant features of another culture). Anthropology carries the added burden in that much of what it describes about other cultures, such as forms of religion, marriage, and sexuality, may be considered unsuitable as instructional materials in elementary and secondary schools. For example, Margery Wolf's readable account of a Taiwanese

family *(The House of Lim)* necessarily includes accounts of prostitution, gambling, and arranged child marriage. The goal is to introduce students to other lifeways, yet some of these will be problematic to students, and probably more so to their parents/guardians. Educational curricula, especially in the United States, must meet community standards, and just as with the controversy over the teaching of evolution, pedagogical materials that present religious, marriage, and political systems of other cultures as explicitly valid (and, in effect, equivalent to corresponding local systems) may meet resistance.

Anthropology has long been familiar with case studies reasonably short ethnographies, used individually (e.g., the Holt, Rinehart & Winston series, *Case Studies in Anthropology*) or in readers (e.g., Service's *Profiles in Ethnology*). However, these were designed for college courses and thus were in the realm of adult literature and may be unsuitable for grades below the last years of high school. There has been a substantial growth in texts about other peoples in the world designed for elementary and beginning secondary students, but these have not always managed to merge interest and realism. There has also been a substantial growth in visual materials dealing with other cultures, especially in educational television. Many of these productions have focused on the life experiences of youth, with the expectation that this is what will interest, and will be appropriate for, an elementary and early-secondary-school audience. The irony of the success of these materials is that while they may very well be absorbing and valid in their representation of younger people in other cultures, it is really the world of adults whose valid worldview and cultural practices international education must present in a convincing light.

Another issue in the preparation and selection of cultural descriptions is that of standardization. If one goal is to present the idea that different religious systems can provide equally satisfying ways of community worship and integration, then there must be a number of written and audiovisual materials that present religious beliefs and rituals in comparable ways. Students who are examining, for example, how forms of worship may support forms of subsistence should have access to works that provide sufficiently comparable descriptions of these aspects.

It is necessary, from an anthropological standpoint, that the effort to make the rest of the world valued must be vested in valid and reliable knowledge of other ways of being human. Gaining an effective and lifelong appreciation of other cultures has to be based on the sometimes unpleasant reality of different customs and not simply presented as simply a good and enlightened perspective. An intercultural education informed by anthropology must continue to locate and develop pedagogical materials that meet the challenge of explicating different cultural worlds.

Cultural Relativism

The second anthropological contribution is cultural relativism. This is the analytic orientation that other, and especially quite different, cultural systems can be demonstrated as providing valid, productive, and satisfying ways of being human given the environmental and sociocultural situation of the society. An excellent set of comparative pedagogical materials by itself is not sufficient for the goals of intercultural education. A student may read or view a variety of ethnographic accounts and even enjoy and be stimulated by the experience, yet still be unconvinced that any of these represent valid human ways. It may even be the case that the degree of enjoyment at vicariously learning about "strange" ways is directly proportionate to the degree of certainty that these other practices are not only "strange" but abnormal.

Thus, the challenge is to place comparative materials in an instructional framework that provides students with the intellectual and affective ability to confront (not necessarily approve of and adopt) other cultural ways and then to understand that these may make sense. They have to be understood as possessing an appropriateness within a functioning cultural system that provides workable solutions for certain social and environmental problems and opportunities. This challenge may not be able to be overcome, at least within the confines of formal education. Achieving what has been referred to as "transspection," the ability to convincingly project oneself into very different ways of thinking and behaving, seems overly utopian. This cognitive condition, it should be emphasized, is not being done by an assimilating immigrant to whom its success or failure has serious real-world consequences, but rather as a class project or homework assignment. Furthermore, intercultural education is not well served by a negative approach that implies that other cultures are successful simply by critically detailing the purported flaws of the national culture. Nor is it achieved when

the world is depicted as made up of "good" societies (third-world or underdeveloped societies) or "bad" societies (industrialized first-world or powerful Western state systems). Rather, a convincing case must be presented that explains a rationale for another culture's practices and ideology. Anthropology has often achieved this by placing another culture in its social and physical environment. Providing accounts of breast-feeding until the fourth or fifth year due in part to a protein-poor tropical environment, of sororal polygyny due to the importance of the cowife bond and a cooperative women's work group, or of the prohibition on beef consumption in Hindu India due in part to the value of cattle dung have been staples of anthropological relativistic explanation. These and many others have to be presented effectively and convincingly in relation to the data that students obtain from their comparative materials in order for intercultural education to be successful.

Intercultural Education as a Luxury

Intercultural education may be viewed as luxury (even an irrelevance) compared to the acquisition of skills such as computation, literacy, citizenship, national culture, and subsistence/occupation technologies. It is important for the world's great powers to include international training in the education of their future citizens, since many of them will be involved in programs that will impact other cultures. Yet the advantage may not be valued by nations for whom education struggles to provide primary schooling for its youth. Those newer nations striving to inculcate their youth in a national culture may fail to appreciate the usefulness of spending time and money on other cultures, especially when they have inherited curricula oriented toward the values of other, specifically European, cultures. Finally, ethnically heterogeneous nations may well conclude that it is crucially important to emphasize interethnic education (i.e., multicultural education) rather than with the world as a whole.

Intercultural education is a valuable application of anthropology. Yet as with many other attempts to improve humanity's outlook on the human condition around the world, it faces many challenges.

— John D. Rhoades

See also **Cultural Relativism; Education and Anthropology; Ethnocentrism**

Further Readings

Fersh, S. (Ed.). (1974). *Learning about peoples and cultures.* Evanston, IL: McDougal, Littell.

Hoopes, D. S. (1980). *Intercultural education.* Bloomington, IN: Phi Delta Kappa Educational Foundation.

Lerner, E. (1994). *Cultural conflicts: Case studies in a world of change.* Portland, ME: J. Weston Walch.

Social Science Education Consortium. (1972). *A preliminary review of the intercultural dimension in international/intercultural education, Grade K–14* (Publication #156). Boulder, CO: Social Science Education Consortium.

International Organizations

When the United States decided to reverse the Iraqi invasion of Kuwait, it did not act unilaterally. It turned to the United Nations Security Council.

When the Security Council sought to learn the extent of chemical, biological, and nuclear arms in Iraq, it did not rely on U.S. forces. It dispatched inspectors from the International Atomic Energy Agency (IAEA).

When the international community sought to maintain the suspension of combat in Bosnia, it did not rely only on national efforts. It sent in peacekeeping units under the aegis of the U.N. and the North Atlantic Treaty Organization (NATO).

When states liberalized trade in services and strengthened intellectual property protection in the Uruguay Round, they were not content to draft rules. They created the World Trade Organization (WTO) and a highly institutionalized dispute settlement mechanism.

Formal international organizations (IOs) are prominent participants in many critical episodes in international politics. Examples in addition to those above include the following: Security Council sanctions on Libya, IAEA inspectors in North Korea, UN peacekeepers in the Middle East, and so forth. The U.N. secretary-general's 1992 Agenda for Peace sets out an even broader range of current and proposed U.N. functions in situations of international conflict: fact finding, early warning, and preventive deployment; mediation, adjudication, and other forms of dispute resolution; peacekeeping; sanctions and military force; impartial humanitarian assistance; and postconflict

rebuilding. But IO influence is not confined to dramatic interventions like these. On an ongoing basis, formal organizations help manage many significant areas of interstate relations, from global health policy (the WHO) to European security (OSCE and NATO) to international monetary policy (IMF). What is more, participation in such organizations appears to reduce the likelihood of violent conflict among member states.

International Nongovernmental Organizations

Much recent scholarship analyzes global structures and processes as a distinct level of social reality. The world is more than networks or systems of economic and political interaction and exchange; it has become a single international society, or world polity.

INGOs have proliferated spectacularly, from about 200 active organizations in 1900 to about 800 in 1930, to over 2,000 in 1960 and nearly 4,000 in 1980, but little systematic attention has been given to this domain of global organization. Unlike states, INGOs lack the rational-legal authority to make or enforce law. Unlike global corporations, they have few economic resources.

Since 1850 more than 35,000 private, not-for-profit organizations with an international focus have debuted on the world stage. Associations, societies, foundations, unions, committees, clubs, leagues, conferences, groups, federations, conventions—the range of designations is extraordinary. They include the Pan American Association of Ophthalmology, the International Exhibitions Bureau, the Commission for the Geological Map of the World, the International Catholic Child Bureau, the International Tin Council, and the International Tug of War International Federation. Most are highly specialized, drawing members worldwide from a particular occupation, technical field, branch of knowledge, industry, hobby, or sport, to promote and regulate their respective areas of concern. Only a few, such as the Scout movement, the International Olympic Committee, the International Red Cross, and the World Wildlife Fund, are widely known.

Universalism

Humans everywhere are seen as having similar needs and desires. They are capable of acting in accordance with common principles of authority and action, and they share common goals. In short, human nature, agency, and purpose are universal, and this universality underlies the many variations in actual social forms. Most INGOs are quite explicit about this: any interested person can become an active member, and everyone everywhere is a potential beneficiary of INGO activity.

Universalism is evident also in the breadth of INGOs' claims about what they do. Physics and pharmacology are presumed to be valid everywhere. Techniques for playing better chess are not country specific. Red Cross aid will alleviate suffering in Africa as well as Asia. Across every sector, the purposes and means of action promoted by INGOs are assumed to be useful and meaningful right around the world.

Most INGOs adopt a purer form of universalism that stresses the fundamental uniformity of all human actors. Scientific, technical, professional, medical, and business-related INGOs rarely allow much room for particularism, and they account for the great majority of all INGOs.

INGOs are embodiments of universalism, individualism, rational voluntaristic authority, progress, and world citizenship. Decentralized world authority among states both facilitates transnational organizing, because centralized barriers to rational voluntarism are weak and forces transnational organizations to focus their attention on states. In mobilizing around and elaborating world-culture principles, INGOs lobby and harangue states to act on those principles.

The Framework for Inquiry

Decision making in international organizations occurs within a context comprising the functions, the institutional framework and basic procedures, and the historical development of the agency.

Given the nature of the international system, the creation of an international organization requires concrete action by states. Usually, although not always, such actions are consecrated in a treaty. In any case, understanding must be achieved about what is to be done and how.

International organizations have been set up to perform a variety of tasks: keeping the peace, promoting economic development, allocating the radio frequency spectrum, reducing obstacles to trade, ensuring that technology is used only for peaceful

purposes, and facilitating the maintenance of stable exchange rates to name only a few.

In order to describe how decisions are usually arrived at in a particular international organization, it will be useful to classify the actors involved, to consider the ways in which they may exercise influence, and to list the modes of decision making that may be employed.

The actors in international organizations may be classified according to the following categories: representatives of national governments; representatives of and international private associations; the executive heads of organizations; high officials and other members of the bureaucracy of each organization; individuals who serve in their own capacity formally or informally as advisers; representatives of other international organizations, and employees of the mass media.

Of course, not all of these classes of actors will be active in all organizations. For each category of decisions, however, the actors will fall into one or more of these classes, and it is important to know which of these categories of actors typically have the most influence on the outcome.

Thinking About the Future of the International Organization System

In order to think about the United Nations, we must escape the narrow perspectives of daily press coverage as well as the mainstream of the scholarly agenda. Harlan Cleveland believes that the study and teaching about international relations is usually hung up on what's wrong with the picture: riots and their suppression, military takeovers, drug traffic, corporate raids, financial psychoses, arms races, wars, and rumors of wars. If you stand back and look at the whole scene, you see all kinds of international systems and arrangements that are working fairly well. For example: Weather forecasting: World Weather Watch (WMO); eradication of infectious diseases (WHO); international civil aviation (ICAO); allocation of the frequency spectrum (ITU); globalization of information flows; agricultural research for development; U.N. peacekeeping and peacemaking; ozone treaty; cooperation in outer space; law of the sea; the U.N. high commissioner for refugees; the Antarctic treaty.

The stage on which the drafters of the U.N. Charter performed was built during a long historical process, at least 500 years, through which human inquisitiveness, restlessness, and acquisitiveness produced ever-increasing contacts among human settlements, across even longer distances. The results of this historical process presented opportunities at San Francisco that had evolved out of a growing experience in peaceful cooperation among peoples. But there were also constraints produced by tendencies toward wars of increasing geographic scope with weapons of rapidly increasing destructive power.

If we look back in time from San Francisco, we readily see that the U.N. is a child of the League of Nations. It incorporates important institutional developments of the league, such as an international secretariat and the growth in importance of economic and social activities during the relatively brief history of the league. The U.N. Charter also reflects efforts to gain from the league's failures, as in procedures for deployment of military forces by the Security Council in response to aggression.

Nor was the league wholly a product of its founding conference, the Paris Peace Conference of 1919. The century bounded by the Congress of Vienna (1815) and the outbreak of World War I (1914) was the era of preparation for international organization. The league evolved out of the Concert of Europe created by the Congress of Vienna, convoked to create a new Europe out of the ruins of the Napoleonic Wars.

Humanity was placed on an irreversible path toward the league and the U.N. even earlier then 1815, in the late 15th century, when Europeans began a pattern of worldwide exploration that eventually led to extensive empires in Africa, Asia, and Latin America and to Western domination of the world. Europe-based empires eventually led to the creation of a worldwide system of states. In its early years, the U.N. was deeply involved in the creation of independent states out of former colonial empires.

In developing a historical perspective, it is worth remembering the depiction of the century between 1815 and 1914 as the era of preparation for international organization. How should we characterize the period between the founding of the League of Nations (1920) and today? Very apt would be the era of preparation for global governance. What have the pioneers in this first era of global organizations left as their heritage? They have achieved universality; they have created a network of global organizations responsive to a growing agenda of global problems; they have established a continuous, worldwide presence of this system of organizations, in at least 134 cities in all continents; they have made multilateral decision making commonplace and have developed new procedures for

achieving consensus; they have greatly increased the number of tools available for peace building; they have achieved and made substantial progress in multilateral definitions of a set of fundamental global values, such as peace, human rights, development, and ecological balance; they have made progress in breaking down barriers between the people of the world and global governmental organizations.

Overall we can conclude that there is much more potential for moving forward from this era of preparation for global governance than either the daily headlines or the mainstream of international relations research and teaching recognize. Supportive of possible greater employment of this potential are the vitality of INGO and NGO involvement in the U.N. system and the large number of creative proposals coming from outside the U.N. system. Employment of this potential could move more rapidly if governments of states were able to perceive more clearly the long-term interests and needs of their people. This, in turn, might be facilitated by broader media coverage of the U.N. system, as well as scholarship that offered more probing analysis for human betterment.

— John A. Xanthopoulos

Further Readings

Archibugi, D. (1993). The reform of the U.N. and cosmopolitan democracy: A critical review. *Journal for Peace Research, 3*(3).

Boutros-Ghali, B. (1992). *An agenda for peace: Preventive diplomacy and peace keeping.* New York: United Nations Press.

Chadwick, A. (1994). Citizens of the U.N. system in a changing world. In Yoshikazu Sakamoto (Ed.), *Global transformation: Challenges to the state system.* Tokyo: United Nations Press.

Cleveland, H. (1990). The management of peace. *GAO Journal, 11,* 11–13.

Foundation, S. (1994). *The U.N. system and NGOs: New relationships for a new era?* Twenty-fifth U.N. Issues Conference, Muscatine, Iowa.

Rochester, J. M. (1993). Waiting for the millennium: U.N. and the future of world order. Columbia: University of South Carolina Press.

United Nations Association of the U.S.A. (1992). *A U.N. revitalized.* New York: Author.

Wood, B. (1991). *Making the U.N. system work.* Paper presented at the International Studies Association Annual Conference.

Inuit

Inuit is the term used to identify the indigenous peoples of the Canadian Arctic. Inuit (singular, *Inuk*) means "people" in Inuktitut, Innuinaqtun, and Inuvialuktun, the three dialects of the Canadian High Arctic. The term has replaced "Eskimo" in most political discourse. Eskimo is an external label, long believed to have its origins as an Algonquian Indian word thought to mean "raw-meat eater."

Despite the narrow meaning of Inuit as a designate for Canadian Arctic indigenous peoples, the term has sometimes been more broadly applied to other Arctic peoples who share their origins with Canadian Inuit. These peoples all speak languages from the Eskimo branch of the Eskimo-Aleut family and include Kalaalit (in Greenland), Inuvialuit (Western Canada), Iñupiat (in Alaska), Central Yup'ik (Alaska), Siberian Yup'ik (Alaska and Russia), and Asiatic Eskimo (Russia). These are all peoples who, like Canadian Inuit, find "Eskimo" an unsatisfactory referent but also prefer to use their own self-designates instead of "Inuit."

Deciding on appropriate labels for particular groups can be somewhat hazardous, especially since categories and labels can change rapidly as indigenous peoples acquire greater self-determination and autonomy and develop regional, national, and international identities. Anthropologists are quite aware of these shifting sands but continue to use "Eskimo" as an appropriate referent in historical and comparative work.

Canadian Inuit, the subject of this entry, have been attractive subjects for southerners because of their ability to survive in an especially difficult and inhospitable environment, and to do so with a particular style and grace. Their ability to survive is based on a toolkit known for its technical complexity despite very limited materials for constructing that toolkit. The toggling harpoon head, for example, makes ideal use of scarce materials, conserves those materials for reuse, and also ensures the capture of marine mammals that might otherwise escape. As another example, Inuit clothing design and manufacture makes ideal use of furs and skins in a manner that conserves heat without restricting movement or blood flow.

Inuit technical sophistication has translated to the contemporary arena as well. Every anthropologist who has traveled with Inuit has firsthand knowledge

of the ability, honed by experience, experimentation, and necessity, to make equipment repairs with limited and seemingly unsuitable materials.

Inuit are also highly regarded by southerners for behavioral attributes. Equanimity and even cheerfulness in trying circumstances is highly prized by Inuit, and a particular point of emphasis in Inuit culture is the high value placed on helpfulness. Inuit gain greater prestige through giving gifts of food, sharing labor, and the exchange of knowledge than they ever could by being a great hunter or seamstress alone.

Because of the harsh environment in which Inuit live and the sophisticated technology they use to survive in that environment, they were natural subjects for anthropologists interested in understanding human–environment relationships. The Arctic during the 1950s and 1960s became one of the principal testing grounds for the cultural ecology approach developed by Julian Steward.

David Damas's *Environment, History, and Central Eskimo Society,* published in 1969, exemplifies this kind of work. Damas examined the three Central Eskimo groups, Copper, Netsilik, and Iglulik, paying particular attention to the relationships between ecological factors, subsistence patterns, and social features of each of these groups. Although they all shared a common and recent ancestry, some particular social formations, such as the large winter villages that typically contained up to 50 and occasionally up to 200 people, were present or absent in these groups due to ecological circumstances. The method of hunting ringed seals through the sea ice, most commonly found among Netsilik and Copper Eskimos but absent among Iglulik Eskimos, is most successfully accomplished by large groups of hunters working cooperatively. Damas did not discount other, purely social factors that could promote large seasonal aggregations, but most anthropologists assume that the need for food outweighs concerns about sociality.

Although Damas's work, like much of the scholarship of the period, generated a new understanding of Inuit culture, research was also speaking to an anthropological audience increasingly interested in cultural evolution. Inuit, whose subsistence mode is one of hunting and gathering, were at the time widely believed to be living fossils, representatives of how all humans lived during the Late Pleistocene. Based on this belief that Inuit were representatives of the natural human state, many anthropologists thought that Inuit were important subjects of study on these grounds alone. In addition, the intensification of contacts with the Canadian state raised concerns about the cultural survival of Inuit, providing further impetus for the conduct of anthropological research.

Eventually, scholars realized that Inuit, by virtue of the qualities that made them so attractive to researchers in the first place, were not living fossils, but were contemporary humans who happened to make their living as foragers. Concerns about vanishing hunter-gatherers, however, encouraged another research interest for anthropologists: principles of culture change, acculturation, and cultural survival in the face of colonization by and integration into more powerful societies.

Even as anthropologists were taking a keen interest in subsistence, ecology, and technology, it was apparent that Inuit culture was changing. Before 1950, Inuit relations with the Canadian state were accomplished through the trinity of the Hudson's Bay Company, Anglican missionaries, and the Royal Canadian Mounted Police. All of these groups echoed Canadian government policy and encouraged Inuit to pursue a seasonally nomadic lifestyle centered on subsistence hunting and trapping furs for trade. By the 1950s, however, many Inuit were expressing a preference for living in permanent communities and pursuing wage labor opportunities. The Canadian government, which began to take a more active role in Northern administration during this time, likewise began to encourage settlement.

Settlement was not without consequences. The wage labor opportunities available in new and expanding communities altered some Inuit cultural patterns. In Copper and Netsilik Eskimo communities, for example, the traditional, formal seal-sharing partnerships quickly vanished as hunters adopted new methods and strategies for hunting ringed seals. The introduction of formal day schooling in communities provided a vehicle for the transmission of southern cultural values, and these foreign values were, by 1970, being transmitted to many more Inuit children. The social safety net provided through settlement living resulted in a baby boom during the 1960s, generating a cohort of Inuit raised in the context of settlement life and socialized by a combination of schooling, their own age mates, and, by the early 1980s, television and southern mass media.

Some anthropologists have seen the constellation of changes surrounding settlement as the beginning of the end of Inuit culture, and not without reason. Inuit have experienced the Industrial Revolution in a span of three or fewer generations. Many researchers have documented the problems of alcohol consumption, interpersonal violence, underemployment, and young people's declining involvement in subsistence activities. These problems are commonly interpreted as both evidence of cultural decline and the result of a basic transformation of Inuit social life.

Other anthropologists have remained focused on subsistence, technology, and social organization, examining the changes wrought by settlement and new technological inputs through the lens of adaptation rather than acculturation. William Kemp, for example, working in Lake Harbour, on Baffin Island, during the late 1960s, examined the effects of imported technology on Inuit cultural patterns. Kemp noted that Inuit in Lake Harbour quickly adopted snowmobiles as the principal mode of travel, displacing dogs, despite the significant drawbacks associated with snowmobiles. Snowmobiles are loud, break down frequently under arctic traveling conditions, and require constant feeding with expensive gasoline and oil. Despite these problems, Lake Harbour Inuit felt that the advantages of living in a permanent settlement, which included access to wage labor and access to a larger number of kin, outweighed the disadvantages. Indeed, the snowmobile was what made living in the settlement possible, as it allowed for easier and quicker access to more distant hunting areas.

In this regard, then, the changes wrought by contact and settlement were not driven solely by changes introduced by the Canadian state. Inuit were making choices about settlement and subsistence strategy in reference to their own cultural preferences.

One consequence of greater integration into the Canadian state was the emergence of political movements that sought to protect native rights and formally define the relationships between native peoples and the state. These concerns emerged during the 1960s and early 1970s, as the pace of oil, gas, and mineral exploration in the North increased. These were serious issues. The political relationship between Canada and Inuit had never been resolved via treaty. Land claims movements sought to settle this issue, with the hoped-for result being greater political autonomy and improved social welfare for Inuit.

Beginning in 1975, with the signing of the James Bay and Northern Quebec Agreement, these relationships began to take shape. James Bay was followed by the Northeast Quebec Agreement, in 1978; the Inuvialuit Final Agreement, settling claims in the Western Arctic, in 1984; the Nunavut Land Claims Agreement, settling claims in the Eastern Arctic, in 1993; and the Labrador Inuit Land Claims Agreement, signed in 2003. All of these agreements settled land claims and specified economic, political, and social obligations between Inuit and the Canadian government.

A significant change in the nature of anthropological research paralleled the land claims process. Just as Inuit began taking an interest in their political and economic relationship with the federal government, so did anthropologists. Research on the politics of resource management led to new insights about Inuit resource use and ecological knowledge and led to recommendations about appropriate political arrangements for the comanagement of renewable resources. Investigations of Inuit subsistence practices began to focus on the continued economic importance of subsistence hunting to predominately Inuit communities, where wage labor jobs remain scarce and most Inuit are underemployed or cannot find work. Other examinations of Inuit cultural identity have yielded an improved understanding of Inuit identity formation and the ideology behind Inuit engagement in traditional activities despite external social and economic forces that seek to undermine the viability of those traditional practices.

The net result of this shift in focus has been an anthropology of the North that, as anthropologists such as Asen Balikci and George Wenzel, among others, have noted, is less engaged with theoretical trends in anthropology as a whole. Research in the North is, however, more engaged with Inuit social, economic, and political needs and goals than at any point in time. Research on contemporary Inuit subsistence practices may no longer be speaking directly to theoretical concerns in ecological anthropology, for example, but it is seeking to serve the practical needs of Inuit who continue to derive their continued well-being from hunting, trapping, and fishing.

— *Peter Collings*

See also **Aleuts; Arctic; Athabascan; Eskimo Acculturation; Steward, Julian H.**

Further Readings

Balikci, A. (1970). *The Netsilik Eskimo.* Garden City, NY: Natural History Press.

Briggs, J. (1970). *Never in anger: Portrait of an Eskimo family.* Cambridge, MA: Harvard University Press.

Damas, D. (2002). *Arctic immigrants, Arctic villagers: The transformation of Inuit settlement in the Central Arctic.* Montreal, Canada: McGill-Queen's University Press.

Wenzel, G. (1991). *Animal rights, human rights: Ecology, economy, and ideology in the Canadian Arctic.* Toronto, Canada: University of Toronto Press.

Iron Age

The Iron Age is the final period of European prehistory. The beginning of the European Iron Age is conventionally defined as the date when iron replaced bronze for the manufacture of weapons and tools in the early 1st millennium BCE. In many parts of Central and Western Europe, the Iron Age ends when these regions are incorporated into the Roman Empire in the 1st century BCE and the 1st century CE. In the regions that were never conquered by the Romans, such as Germany, Scandinavia, and Poland, the period from 1 CE through 400 CE is termed the "Roman Iron Age." In Scandinavia, the period from 400 to 800 CE is referred to as the "Germanic Iron Age," and the Iron Age ends with the beginning of the Viking period around 800 CE. For most of Central and Western Europe, however, the Iron Age begins around 800 BCE and ends around 1 BCE. Since the later 19th century, the European Iron Age has been divided into an early period known as the Hallstatt Period (ca. 800–480 BCE) and a later period known as the La Tène Period (ca. 480–1 BCE). The Iron Age is important archaeologically because it is the period in which the earliest towns and cities appear in Europe north of the Alps.

Iron Technology

While the copper and tin ores that were needed to produce bronze were derived from a small number of ore sources, iron ore was widespread throughout Europe. The ubiquity of iron ores may have encouraged the replacement of bronze with iron. Iron objects do not become common in Greece until about 1000 BCE. Iron objects appear throughout Central Europe at about 800 BCE. Although a small number of small iron objects appear in Late Bronze Age contexts in Central and Eastern Europe, these objects may have been produced as a by-product of bronze working. Iron objects appear at a somewhat later date in Northern and Western Europe. Iron working appears in Ireland around 700 BCE and in Scandinavia around 500 BCE. Since iron-making technology was widespread in the eastern Mediterranean by about 1200 BCE, it is likely that iron technology spread through Europe as a result of trade and technology transfer.

Archaeological evidence for iron production includes furnaces, forges, slag, iron-working tools, and finished objects. A small number of iron production sites have been excavated in Europe. These sites indicate that smelting, the separation of iron from its ores, and smithing took place in the same locations. Unlike bronze, which was worked by casting in antiquity, ancient iron was worked by forging. In the West, cast iron did not become widespread until the Industrial Revolution. To work the solid iron, the smith reheated it in a forge and then hammered it to remove any remaining slag and to shape the iron into its final form. The iron that was produced in this way was relatively pure and soft. The addition of organic carbon to produce a harder material was difficult to control. Too much carbon produces a brittle steel; not enough produces a soft iron that makes an inferior tool. Early European iron was produced on a relatively small scale and used primarily for weapons and funerary goods.

Iron production changed dramatically in the Late Iron Age. At about 200 BCE, large urban settlements known as *oppida* (see below) appeared in many parts of Europe. Many of these settlements appear to have been engaged in large-scale iron production. For example, the oppidum of Kelheim, in Bavaria, has produced evidence for the mining, smelting, and forging of iron on an industrial scale. Much of this iron may have been traded to the Roman Empire. By the Late Iron Age, iron was used for a wide variety of tools and weapons, including agricultural implements.

The Hallstatt Period

In temperate Europe (Europe north of the Alps), the early Iron Age is known as the Hallstatt period

(ca. 800–480 BCE). This period is named after a site in Austria that produced nearly 1,000 human burials. While iron replaced bronze for tool and weapon production during the early Iron Age, there are many continuities in settlement, subsistence, and technology between the Late Bronze Age and the Early Iron Age in Central Europe.

Substantial cultural changes appear in West Central Europe during the later part of the Hallstatt period. Around 600 BCE, Greeks from what today is Anatolia established trading colonies in the Western Mediterranean. The best known of these colonies was Massalia (modern Marseilles). At about the same time, towns, such as the Heuneberg, in southern Germany, make their first appearance in temperate Europe. Mediterranean luxury items, including Greek pottery, wine, and Etruscan bronze vessels appear at these towns, indicating substantial trade and cultural contact between West Central Europe and the Greek colonies in the West. At the Heuneberg itself, the city walls were rebuilt in a Mediterranean style. The traditional timber-and-earth fortifications were replaced with a wall built of clay bricks set on a stone foundation. The dimensions of the clay bricks match those used in contemporary Greek buildings. Rich burial mounds, known as *fürstengraber,* or "princes' graves," also appear at this time. These burials usually include a four-wheeled wagon, as well as Mediterranean luxury items. The largest bronze vessel known from antiquity, the Vix krater, weighing about 208 kg, was recovered from a rich late Hallstatt burial from eastern France. At about 450 BCE, Greek trade patterns changed, and trading towns such as the Heuneberg went out of existence.

The La Tène Period

Around 480 BCE, a new style of artwork appeared in temperate Europe. The art included decorative elements derived from Greek and Etruscan art, such as the Greek palmette, but these elements were highly stylized. The art is also characterized by stylized plant and animal figures and curvilinear ornaments that were designed using a compass. This style of art is known as La Tène, after the type site in Switzerland where a number of richly decorated iron swords and scabbards were discovered in 1854. By the late 19th century, archaeologists recognized that the La Tène style of metalwork was associated with people the ancient Greek and Roman writers described as "Celts."

Celts were people who lived in many parts of Central and Western Europe during the first millennium BCE. Most spoke Celtic languages, a family of Indo-European languages that include modern Irish, Scots Gaelic, and Breton, as well as many ancient languages. Although the term Celt was widely used by Greek and Roman authors, there is no evidence to suggest that the Celts ever identified themselves as members of a single ethnic group.

Historical sources, including Julius Caesar's account of the Roman conquest of Gaul, can provide some important information on Celtic social and political organization. The Greek and Roman sources indicate that Celtic societies were highly stratified, including a warrior elite, specialized priests known as *druids,* craft workers, and a large pool of agricultural laborers. Many of the poor farmers were clients of the elite classes. The nobles offered protection and support to the agricultural laborers in return for loyalty, especially in times of war.

While historical sources can provide some insights into late Iron Age social life, archaeology has revealed important information on La Tène settlement patterns, subsistence practices, and technological practices. In particular, archaeological research has revealed an important change in settlement patterns beginning around 200 BCE. At that time, a number of large fortified urban settlements appear across a broad swath of Central Europe, from western France to the Hungarian Plain. These settlements, which cover an area of at least 25 to 30 ha, are known as *oppida.* The oppida are urban enters that seem to have served a number of functions, including centers of long-distance and regional trade, political capitals for individual Celtic tribes, and places of refuge in times of war. Evidence from Colchester in England suggests that some of these sites may also have served as residences for members of the landed nobility. The excavations conducted at several of the major oppida have revealed important details about the ways the oppida were organized.

Kelheim is located in Bavaria, Germany, at the confluence of the Danube and the Altmühl Rivers, a location that is ideal for trade and commerce. The oppidum at Kelheim, which was occupied from the middle of the 2nd to the middle of the 1st century BCE, covered an area of 600 ha, making it one of the largest oppida in Iron Age Europe. Excavations at Kelheim, including those directed by Peter Wells in the late 1980s and early 1990s, have produced enormous

quantities of smelting and forging debris, including slag, as well as the bases of furnaces that were used in iron smelting. The archaeological evidence from Kelheim clearly indicates that the site's inhabitants were engaged in large-scale iron production. Much of this iron may have been exported to the Roman Empire.

Large-scale excavations have also been carried out at the oppidum of Manching, in Bavaria. Manching is located on the Paar River, and the swampy area near the Paar formed part of the site's defenses. The site was surrounded by a wall 7 km in length, which enclosed an area of about 300 ha. Part of the site was destroyed in the 1930s, when a military airfield was constructed at Manching. A series of excavation campaigns since the 1950s has uncovered about 3% of the Iron Age settlement. The site served as a major center for trade and exchange, and crafts produced at Manching included glass, iron, bronze, and pottery. The center part of the site appears to have been densely occupied; shops, homes, and warehouses lined the streets. The area near the walls was less intensively settled. Many of the oppida east of the Rhine, including Manching and Kelheim, were abandoned in the middle of the 1st century BCE. The reasons for this are not entirely clear, but they remain a focus of research. Regardless of the reasons for their abandonment, the oppida represent the first cities of temperate Europe.

— Pam J. Crabtree

See also **Celtic Europe**

Further Readings

Collis, J. (1997). *The European Iron Age.* London and New York: Routledge.

Cunliffe, B. W. (1991). *Iron Age communities in Britain: An account of England, Scotland, and Wales from the seventh century B.C. until the Roman conquest* (3rd ed.). London: Routledge.

Geselowitz, M. N. (2004). Origins of Iron production. In P. Bogucki & P. J. Crabtree, *Ancient Europe 8000 B.C.-A.D. 1000: Encyclopedia of the barbarian world* (Vol. 2, pp. 164–167). New York: Scribner.

Wells, P. S. (Ed.). (1993). *Settlement, economy, and cultural change at the end of the European Iron Age: Excavations at Kelheim in Bavaria, 1987–1991.* Ann Arbor, MI: International Monographs in Prehistory.

Iroquoian Nations, Northern

The Iroquoians are a group of linguistically related Native American nations that occupied portions of eastern North America for over a century before contact with Europeans. In addition to their language similarities, Iroquoians in the northeast region of the continent utilized similar technologies and followed similar settlement patterns and subsistence strategies, particularly prior to first contact with Europeans circa AD 1600. The Northern Iroquoian peoples include the Huron and Petun, who at the time of first contact with Europeans occupied portions of present-day Ontario; the Erie, Wenro, and Neutral, who occupied the Niagara Frontier; the Seneca, Cayuga, Onondaga, Oneida, and Mohawk (the members of the Haudenosaunee Confederacy), who occupied much of present-day New York State; and the Susquehannock, who occupied areas in what today is Pennsylvania and southern New York State. Other Iroquoian nations, including the Tuscarora, occupied areas in present-day North and South Carolina. The Tuscarora migrated north during the early 18th century and lived among the Oneida until they were adopted by the Haudenosaunee Confederacy.

Origins

Differences between Iroquoian artifact assemblages and those of the earlier Owasco cultures of the Northeast led archaeologists to initially hypothesize that Iroquoians migrated into the regions they held at the time of contact. This long-held position was called into question during the mid-20th century after the analysis of multiple archaeological collections. Focusing the attributes of ceramics recovered from Iroquoian sites, archaeologists identified stylistic similarities between Iroquoian and earlier vessels. This led researchers to suggest that the Iroquoian culture developed in the northeast over several centuries.

Social Structure

Prior to and for a time after contact with European missionaries and explorers, Northern Iroquoian peoples lived in villages composed of multiple longhouses, which were often surrounded by palisades. Each longhouse in a village housed a different clan segment. As a matrilineal and matrilocal society,

Iroquoians traced their kinship through and lived with their mother's family. When an Iroquoian woman married, her husband moved into her family's longhouse. The couple's children would bear the identity of their mother's clan and reside in the longhouse for life unless a male child eventually married. In the event a couple divorced, the husband would leave his wife's familial dwelling and return to his mother's clan's longhouse along with his personal belongings, while his children would remain with their mother's clan.

The division of labor within an Iroquoian village was primarily based on the sex of an individual. Women oversaw the activities within the household, preparing meals and monitoring children. Iroquoian women also managed the fields of a village, from the planting of seeds to the collection of the harvest, made clothing and utilitarian objects such as pots and baskets for their household, and collected wild edible plants in order to supplement the villages' food stores. Iroquoian men were responsible for hunting for or trapping food, traveling to neighboring villages to trade or to negotiate alliances, defending the village against invaders, and invading neighboring villages themselves. Men were also responsible for clearing fields prior to the planting of crops and for building longhouses.

Technology

Iroquoians mastered the art of working with stone, clay, bone, wood, and shell long before European missionaries, traders, and explorers exchanged metal weapons and tools with their Native American allies and contacts. Stone, for instance, provided a strong, durable, and plentiful resource for crafting tools for everyday tasks. Chert and flint variants served as a dependable and durable material from which to make knives, projectile points, hide scrappers, drills, and other general purpose cutting implements. Harder stones were also ground down to make adzes, celts, and axes for woodworking and digging, while softer stone materials such as soapstone were used by Iroquoians to create pipes, containers, and ornamentation such as beads.

Bone was an equally versatile material for Iroquoian craftspeople. From a utilitarian standpoint, bone could be worked into a number of everyday household items that made work easier. Needles for sewing, awls for puncturing hide, and even fishhooks were created from bone material. Additional items created by Iroquoians using bone as the base material included whistles, beads, combs, and soft hammers for creating edges on stone objects such as projectile points or knives.

Ceramic technology, originally developed over a thousand years before the development of Iroquoian cultures, provided Iroquoians with another large resource for tool creation and self-expression. At a basic level, an Iroquoian potter could create a variety of cooking and storage containers that varied in size from vessels only inches high and wide to larger pots that were over a foot in diameter. Other items, including both utilitarian and ceremonial objects, were also crafted from clay, including beads and pipes. Stone beads and pipes, while intricate in design, were difficult to create given the density of the base material. Clay, on the other hand, provided an Iroquoian with a material that was easier to shape and decorate.

Vegetation also provided Iroquoians a vast amount of resources from which to craft tools and personal items. A tree alone provided several materials useful to Iroquoian societies, with saplings providing supports for houses and palisades and bark utilized for creating containers. Other objects created by Iroquoians from wood include baskets, spoons, instruments such as flutes, rattles and drums, large mortars and pestles, clubs, snowshoes, spear and arrow shafts, and last, bows. Other vegetation was utilized as well, including corn husks, which were used to make containers and clothing, and gourds, which served as containers and rattles.

After first contact with European explorers and missionaries, Iroquoians gained access to new technologies and materials that often offered a better resource than their traditional technologies did. Metal objects in particular offered an advantage to Iroquoians in that the blades of axes were sharper than those of stone celts, axes, or adzes. Metal pots, while relatively brittle, were still stronger and lighter than their clay predecessors. Furthermore, when a metal object did break, Iroquoians were provided with metal material from which they could fashion their own metal tools and paraphernalia. Shards of a broken metal pot, for example, could be reshaped into items such as knives, spear or arrow points, beads, or other forms of adornment.

Glass beads, one of the more critical trade goods for Europeans, were highly prized by Iroquoians. Having long utilized beads in the creation of ornamentation,

glass beads, created in an array of colors, provided a beautiful and versatile bead that Iroquoians continue to use in the creation of clothing and personal items. However, the wampum that the Haudenosaunee used for ceremonial belts continued to be used even after the introduction of trade beads.

Firearms, one of the most sought-after European objects by Iroquoians and other Native American nations, were also an incredible technology that Iroquoians received from explorers. As with other European goods, the firearms given to the Iroquoians were poorly constructed and constantly needed repair. Initially, Europeans were reluctant to even give Native Americans firearms at all. Inevitably, firearms filtered into Native American societies, replacing the bow in relatively little time.

Trade with Europeans began a decline in the use of traditional Iroquoian technologies, and Iroquoians, like other Native American nations, soon became dependent on European trade goods as fewer Iroquoians were skilled in creating pottery or stone tools. While Iroquoians added their own touches to these newer technologies in time, the traditional technologies that were utilized for centuries were forgotten. Today, Iroquoian men and women have begun relearning traditional technologies and instructing others in ceramic and lithic tool production, providing a reemergence of these long lost skills.

Settlement Patterns

Prior to first contact with Europeans, Northern Iroquoian peoples lived in villages that followed a similar layout. Villages were often located on low lying knolls or hills that provided a measure of protection from invaders. In addition, villages were erected near creeks and rivers so that the populations would have access to fresh water and a supply of fish. Within close range to the village were the fields that the Iroquoians used for growing their crops, the most vital of which were beans, squash, and corn.

The villages themselves were often surrounded by large fences or palisades constructed of saplings gathered from nearby woods, which also provided wood for fires and other structures such as the longhouses that Iroquoians are noted for constructing. As for Iroquoian longhouses, the design and layout of these structures was quite standardized. Constructed by the men of a village, the structures, which were framed with young trees and covered with bark, were built approximately 20- to 25-feet wide and upwards of a hundred feet in length (longhouses measuring several hundred feet in length were discovered during the excavation of Haudenosaunee sites). A significant amount of partitioning was created within each longhouse in order to provide room for the storage of food and equipment, for the preparation and cooking of meals, and for families to rest and receive protection from either inclement weather or invaders.

For storage purposes, areas were secured at each end of a longhouse. Specific items secured in these areas included weapons, utilitarian objects, crops, and clothing. Fire pits were placed along the central area of a longhouse. In addition to providing heat for the structure and its inhabitants, the fires and the surrounding area provided a space to prepare and cook meals. For the occupants of the longhouse, benches were erected along each wall that served as sleeping platforms and storage areas. Additional posts were placed along the benches demarcating areas approximately 15 feet in width. Each of these areas served as the living quarters of one nuclear family. A couple and their children wood eat their meals, sleep within this area, and share a centrally placed fire with a nuclear family on the opposite side of the longhouse. While each nuclear family could utilize the storage areas at each end of the longhouse, families would also dig out storage pits within their area of the longhouse or store personal items on or under the benches.

The length of time a village would have been occupied for was dependent upon a number of factors, most of which were connected to the resources surrounding the village. Often utilizing slash-and-burn agricultural techniques, Iroquoians endeavored to increase the productivity of the soil, but eventually the nutrients would be depleted from the soil, decreasing the yield to the extent that the village could not be sufficiently provided for. This fact alone could force a village to move on. In addition, villages utilized a significant amount of wood for the erection of longhouses, the building of palisades, and the fueling of fires for cooking meals and heating longhouses. Once an Iroquoian village had used up a majority of the trees from nearby forests, they would have been better served by relocating to a new area.

Horticulture

While fish and game meat provided an important source of sustenance for Iroquoian peoples, it was

their crops that formed the basis of their diet. In particular, beans, squash, and corn, referred to as the "Three Sisters" by the Haudenosaunee peoples, provided a major supply of food that allowed Iroquoian societies to live in a village year round. Corn, the most critical of these crops, was used to make soups, stews, and bread, a considerable portion of an Iroquoian's yearly diet, to which was often added meat and other vegetables. As for the planting and harvesting of crops, Iroquoians worked through a rigorous process to obtain their food staples. Men worked to clear fields for their respective families. After following slash-and-burn techniques, women planted seeds and monitored the fields daily. As the respective plants ripened, women gathered the crops and stored them in areas set aside for food in their longhouse. Meals were then prepared by women for their families and clans.

Political Structure

Northern Iroquoian nations were politically structured around chiefs, each of whom represented a different clan within a village. When chiefs came together to discuss issues such as land use, resource allocation, and conflict, they would all participate in deciding what course a village (or entire confederacy) should take. However, each of the chiefs was present to voice the views of their entire clan, not solely their own individual beliefs. Given the matrilineal structure of Iroquoian societies, chiefs were often installed by the elder mothers of each clan. Failure to follow the directives of the clan, or particularly the clan mother, could result in the removal of the chief, whose title was not hereditary.

Conflict

The presence of palisades and the location of prehistoric villages on elevated parcels of land suggest that Iroquoians lived in a conflict-rich environment, a point reiterated by the history of the Haudenosaunee Confederacy's creation. According to that history, the Iroquoian nations throughout the Northeast were continually fighting one another. Hiawatha, an Iroquoian man who had lost his family to the long-running hostilities, helped convince the Seneca, Cayuga, Onondaga, Oneida, and Mohawk nations to stop all fighting and become part of a confederacy that would protect and serve them all. Other Iroquoian groups were offered a chance to join, but they refused that offer. While conflicts did continue to arise among the members of the Haudenosaunee Confederacy, the confederacy did help its member nations to avoid any large-scale outbreaks of war. However, confederacies of Iroquoians existed outside the Haudenosaunee, and there appeared to be a constant amount of discord between these different Iroquoian groups. With the arrival of Europeans during the 17th century, this discord was exacerbated as many Native American nations vied for access to European goods and for control of the resources Europeans wanted.

At the time, beaver felt clothing was extremely popular in Europe, and European explorers were intent upon obtaining as many beaver pelts as possible. To enlist the aid of Native Americans in this endeavor, Europeans provided villages with firearms, glass beads, and metal tools. Iroquoians and other Native American peoples attempted to obtain as much of the European trade goods as possible. Realizing that Europeans could go to any of a number of nearby villages, Iroquoians became embroiled in a large-scale war as the Haudenosaunee peoples in particular began infiltrating the territories of their neighbors to obtain beaver pelts and secure trade relations with the Europeans.

By the mid-17th century, many Iroquoian nations had been eradicated or dispersed by the Haudenosaunee Confederacy, which outlasted its neighbors. Throughout the course of this warfare, many members of the other Iroquoian nations were actually assimilated into different Haudenosaunee nations and adopted by different clans. Other members of the Northern Iroquoian nations fled to non-Iroquoian territories and began residing with native peoples there, where they retained a varying degree of their long-held traditions.

The end of this war opened up vast territories for the Haudenosaunee confederacy and gave them a prominent role in trade with Europeans. However, the Haudenosaunee members soon became entrenched in other large-scale conflicts that threatened the existence of the confederacy itself as its individual members took different sides in the American Revolution.

The Iroquoians had previously become involved in a struggle between European powers during the French and Indian War. During that event, the Haudenosaunee Confederacy, allied with the British, fought against other native peoples and allowed that conflict to decimate entire villages and nations. The

Haudenosaunee peoples appeared steadfast in not letting that happen once again. When the British and United States of America began fighting, the Haudenosaunee nations held a council and decided that the confederacy's members would not become involved in the revolution. However, individuals from each nation of the Haudenosaunee decided to take action, leading many other Haudenosaunee to takes sides. Inevitably, all the nations became involved. The Seneca, Cayuga, Onondaga, and Mohawk nations allied themselves once more with the British, whom they felt had been very supportive of the Haudenosaunee in the past. The Oneida nation and the relative newcomer to the confederacy, the Tuscarora nation, sided with the United States, with whom the Oneida and Tuscarora had established a cooperative coexistence.

Throughout the war, the Haudenosaunee often proved to be a considerable force to be reckoned with, regardless of which Haudenosaunee nation it was. Whenever an engagement occurred with Haudenosaunee fighters on both sides, however, the Haudenosaunee fighters would not participate. During the course of the revolution, retaliatory strikes from both the United States and Britain destroyed many of the Haudenosaunee villages scattered throughout the Northeast, leaving hundreds of Native Americans without food or shelter. At the end of the revolution, the nations that sided with Britain were forced to reside on land set aside by the United States in the present-day region of Buffalo, New York, and other western and northern New York localities. The Oneida and Tuscarora peoples, however, were allowed to retain their long-held territories. Eventually, even they were forced west as more Euro-Americans began to settle in central New York state.

The Haudenosaunee peoples, being the only substantial Northern Iroquoian confederacy remaining by the end of the American Revolution, became entangled in other conflicts as time wore on. Much of the conflict entailed military action as members of the Haudenosaunee supported the United States in the War of 1812, the American Civil War, World War I, World War II, the Korean War, and the Vietnam War. In each instance, Iroquoians served with distinction and reflected a tradition of bravery and self-sacrifice. However, other conflicts, void of intense military action, confronted the Iroquoians who remained.

After the American Revolution, the Iroquoian peoples still in the New York region were forced onto small tracts of land that became increasingly smaller as American citizens and local governments purchased acres of reservation territory through questionable land sales that left the Iroquoians little land on which to survive as they had prior to contact with Europeans. Their struggle to survive was arduous as Iroquoian women and men found new areas of employment that would enable them to provide food, clothing, and shelter for their families. Many Iroquoians eventually left the shrinking reservations to pursue opportunities in cities and towns across the United States. For those who remained in western New York, opportunities opened as a tourist environment developed around Niagara Falls, where Iroquoian women created and sold bead-decorated moccasins, purses, wallets, and hats. Other Iroquoians looked for work as servants or general laborers. By the early 20th century, Iroquoians, particularly Mohawk Iroquoians living in Canada and the United States, worked as construction workers and were critical to the erection of early skyscrapers that still dominate the skyline of major urban centers throughout northeastern North America. All the while, many of the surviving Iroquoians continued to maintain traditional beliefs when possible. The efforts of Iroquoians to combat time and outside influence on traditional beliefs have been successful in that many Iroquoians today remain aware of their heritage and actively reach out to teach other Iroquoians and non-Iroquoians. Members of the Haudenosaunee Confederacy in particular continue to fight for their lands and rights, only they do so in courts and capitol chambers throughout the world as opposed to battlefields. Speaking out for human and the rights of indigenous peoples on a world stage, they continue to prove their resolve and determination.

History

While multiple Iroquoian nations existed at the time of contact with Europeans, few survived as distinct nations after the warfare that ensued as Native American peoples throughout the continent competed for access to European trade goods, the most sought after being firearms, metal tools, trade beads, and alcohol. European diseases introduced through missionaries and explorers had an equally devastating effect on the indigenous populations of North America, including the Iroquoians. Consequently, few records of some Northern Iroquoian peoples exist

to inform us about their unique histories, even as other Iroquoian peoples left an extensive impression in the annals of history.

Haudenosaunee Confederacy

The Haudenosaunee Confederacy has long held a prominent position among Native American entities. The Seneca, Cayuga, Onondaga, Oneida, Mohawk, and Tuscarora long occupied many regions of present-day New York state. Before the arrival of Europeans, the people of the Haudenosaunee Confederacy, commonly referred to as the "Iroquois," maintained a strong regional presence that protected its members from both internal and external interference. As Europeans began entering North America and introducing their wares to various trade routes, the Haudenosaunee maneuvered to control access to the European goods and the beaver pelts and other resources that Europeans were most interested in. Inevitably, the Haudenosaunee were successful in defeating and dispersing neighboring Northern Iroquoian peoples. As mentioned earlier, the Haudenosaunee maintained a strong presence in the Northeast and a strong relationship with the British. After the American Revolution, the Haudenosaunee were forced from their traditional homeland to the western portions of New York state as well as a few areas in central and northern New York state. British officers, in recognition of the service the Senecas, Cayugas, Onondagas, and Mohawks had given, secured lands along the Grand River for the Haudenosaunee, which became the Six Nations Reservation.

Over the next 50 years, the Haudenosaunee lost hundreds of acres of land to questionable land deals. Faced with little land to farm and a loss of important hunting grounds, the members of the Haudenosaunee were forced to search for alternative ways of securing food and supplies. This need led many to work off of reservations in jobs that included service in the United States military, as maids or housekeepers, or as general laborers.

Throughout the 19th and 20th centuries, the Haudenosaunee were confronted with obstacles that tore away at the fabric of their traditions. Haudenosaunee children were placed in schools that strove to purge students of their native language and traditions, the United States seized thousands of acres of Seneca and Tuscarora land in order to build the Kinzua Dam in Pennsylvania and a reservoir in Niagara Falls, and more and more of the Haudenosaunee left the reservations in search of employment and opportunity. Through it all, individuals among the Haudenosaunee nations have endeavored to reinforce the traditional teachings and beliefs of the confederacy. Members of the Haudenosaunee also started to seek protection for indigenous peoples through the establishment of organizations such as the Indian Defense League of America. During the latter half of the 20th century and into the 21st, the Haudenosaunee revisited treaties their ancestors made with the United States, and they are reclaiming some of the land and resources they lost long ago.

Huron Confederacy

The Huron, a confederacy of Iroquoian nations that occupied regions of present-day Ontario, were an adversary of the Haudenosaunee. The Huron allied themselves with the French after contact and had established a significant trade network. Positioned near multiple sources of trade and fur, the Huron became a target of increasing Haudenosaunee attacks during the mid-17th century. The nations of the Huron confederacy, crippled by European diseases and constant conflict with the Hodenosaunee nations, were dispersed, with many individuals being adopted into other Iroquoian nations, including those of the Haudenosaunee confederacy. Huron peoples continue to live in Canada today on land set aside by the Canadian government.

Erie, Wenro, and Neutral Confederacies

The Erie-, Wenro-, and Neutral-occupied areas of the Niagara frontier, including much of the present-day Buffalo metropolitan region. Each was a confederacy of nations that spoke an Iroquoian language and were either dispersed, adopted, or destroyed by Haudenosaunee during campaigns during the mid-17th century. The Wenro, closest in location to the Seneca nation, were the first of the three to react to growing hostilities. After moving north to Huron territories, the Wenro were dispersed when the Huron villages were attacked. The Neutral, who were named so for long maintaining good relations with both the Huron and Haudenosaunee, eventually became the target of the Haudenosaunee and were dispersed. The Erie likewise found themselves the enemy of the Haudenosaunee and were dispersed during the 1650s. While many of each group perished during their respective conflicts,

more were assimilated into Haudenosaunee nations or into other native nations as well.

— Neil P. O'Donnell

Further Readings

Engelbrecht, W. E. (2003). *Iroquoia: The development of a native world.* Syracuse, NY: Syracuse University Press.

Graymont, B. (1988). *The Iroquois.* New York: Chelsea House.

Hauptman, L. M. (1986). *The Iroquois struggle for survival: World War II to red power.* Syracuse, NY: Syracuse University Press.

Heidenreich, C. A. (1978). Huron. In B. Trigger (Ed.), *Handbook of North American Indians: Vol. 15. Northeast.* Washington, DC: Smithsonian Institution.

Morgan, L. H. (1901). *League of the Ho-de-no-sau-nee or Iroquois* (Vols. 1–2) (Herbert M. Lloyd, ed. & annotator). New York: Dodd, Mead. (Original work published 1851)

Morissonneau, C. (1978). Huron of Lorette. In B. Trigger (Ed.), *Handbook of North American Indians: Vol. 15. Northeast.* Washington, DC: Smithsonian Institution.

Richter, D. K. (1992). *The ordeal of the longhouse: The peoples of the Iroquois League in the era of European colonization.* Chapel Hill: University of North Carolina Press.

Tooker, E. (1978). The league of the Iroquois: Its history, politics, and ritual. In B. Trigger (Ed.), *Handbook of North American Indians: Vol. 15. Northeast.* Washington, DC: Smithsonian Institution.

Tuck, J. A. (1978). Northern Iroquoian prehistory. In B. Trigger (Ed.), *Handbook of North American Indians: Vol. 15. Northeast.* Washington, DC: Smithsonian Institution.

Iroquois

The Iroquois, or *Houdounausee* (People of the Longhouse), are an important nation of Native Americans who made significant contributions in molding North America. Their social and political systems as well as their way of life strongly influenced the way North Americans live today. They have been characterized as relentless warriors in addition to possibly being the true founders of North American democracy. They developed a code of honor and established a social and political system, which proved to strengthen their forces and connect their nations. Iroquois women elected chiefs, who played key roles in war, economy, and culture.

The Iroquois inhabited the areas now known as New York State, southern Ontario, and the St. Lawrence region. They were first comprised of five nations that came together to form a union. These nations include the Mohawks, Oneidas, Onondagas, Cayugas, and Senecas. Between the 14th and 16th centuries, these tribes formed the Iroquois League of Five Nations, founded by Tadodaho and Hiawatha, although Iroquois themselves say the league is 1,000 years old. The purpose of the league was to establish peace among the tribes and to provide protection and a strong defense from attack by others. Around 1815, the Five Nations later adopted another nation, the Tuscarora, forming the complete Iroquois Six Nations Confederacy.

The Mohawk Nations found in New York are located on the Akwesasne Reservation, Ganiengeh, and Kanatsiohareke. In Canada, Mohawk Nations are found in Kahnawake, Kanesatake (Oka), Akwesasne, Tyendinaga, and Gibson. Oneidas Nations are found in Oneida, New York, and Oneida, Ontario. Onondagas Nations are found in Onondagas, New York. The Seneca-Cayuga Nation is found in Oklahoma. Seneca Nations in New York are located in Tonawanda, Allegany, and Cattaraugus. All six nations are found on the Six Nation Reserve in Ontario.

Spirituality and Healing

The Creator is known as the Great Spirit who created the physical world and rules celestial and human beings. Traditional teachings of how the world was created center around the Skywoman, named Aientsik, a descendent from the heavens, who was the first to walk on the earth. Aientsik gave birth to a daughter named Tekawerahkwa. Tekawerahkwa gave birth to twins, Tawiskaron and Okwiraseh. Tawiskaron was a jealous sibling who could not live up to the magnificence of his brother. He created elements within the natural world, including raging rivers, rapids, and vicious animals. His brother Okwiraseh created all that is pure and beautiful. The legend continues to explain that when the two met in battle, Okwiraseh defeated his brother Tawiskaron. As a result of his

defeat, Tawiskaron was confined to the dark areas of the world and governs the night, including all of the destructive creatures.

Messengers from the spirit world explained and demonstrated techniques in which the Iroquois people were able to properly honor and give thanks to the Creator. They shared moral teachings and specific rituals that formed the basis of religious practices and beliefs. Music and dance were included in ceremonies and were believed to be a means of preserving the human–earth relationship. As time went by, the teachings faded, and the Iroquois became a fearful and violent people. When suffering and hopelessness were felt by most Iroquois people, a prophet was sent from the Creator. His name was Skennenrahawi, also known as "the Peacemaker." The purpose of the Peacemaker was to restore hope, heart, and happiness among the Iroquois. He was to create peace among the Iroquois tribes and reform their way of life by creating a League of Iroquois nations, which would be strengthened by their unity. As the Peacemaker traveled from village to village, he brought with him a set of rules known as the "Great Laws of Peace," which were meant to be guidelines for all Iroquois. Skennenrahawi met a woman named Jikonsasay, who helped spread his teachings. Because Jikonsasay played a vital role in reaching a number of Iroquois, Skennenrahawi decided that women should be involved in the social and political decisions within the clans. Therefore, it was decided that not only would women openly participate socially and politically within their communities, but they would also choose which male leaders would be appropriate as clan leaders. Another individual often referred to as one of the Peacemaker's second disciples was a man named Aiionwatha, also known as Hiawatha. Aiionwatha was skilled in articulating the Peacemaker's messages by creating powerful prayers. He also found productive ways in which to physically express the messages to the Iroquois nations. The Peacemaker, along with his two main disciples, Jikonasasay and Aiionwatha, created peace among five Iroquois Nations, known today as the Grand Council and the Haudenosaunee Confederacy.

A second influential Iroquoian spiritual guide and prophet was identified as a Seneca *sachem* (chief) named Handsome Lake, also known as Ganeodiyo. He was born approximately in 1735, during the most tumultuous days of the Iroquois. The Iroquois were located on small reservations, and their culture was under tremendous stress. Handsome Lake instructed his people on many teachings given to him by the Creator. He expressed his appreciation of children and their needs as growing individuals. He taught parents that listening was one of the most important skills in child rearing. His purpose was to reform his people into sober, life-appreciating, peaceful, and moral people. He traveled village to village preaching a new way of life, a new doctrine. He had a life-altering near death experience that would continue to shape his existence. Celestial and physical beings were frequently sent by the Great Spirit to give Handsome Lake messages, which he would continue to share with the League. They warned of the evils of temptations to be aware of, which were present in the world and lingering among their communities. He also explained how the world operated in terms of equilibrium. Each member in society possessed a specific talent or characteristic which, when all put together, would create a unified and functioning unit. Many communities embraced the teachings that Handsome Lake spread. He was successful in teaching the means of achieving peaceful and moral communities. Handsome Lake's teachings across the League's communities have often been referred to as the movement to a "Temperance Society" or the "New Religion." He is claimed to have created the Handsome Lake Code, which contains a set of ethics describing the ways in which to live life to the fullest, while respecting family, members of the community, strangers, and the environment. He wished for the survival and harmony for his people and their culture.

There are many forms of healing among Iroquois nations, one of which includes the False Face Society. The False Face Society use a variety of wooden masks, carved from live trees, which have the power to frighten evil spirits that cause illness. With crooked facial features, the masks are often painted red, black, white, or a combination of these colors. The faces represent grandfathers of the Iroquois. The masks aid in reconnecting humans and nature, creating an equilibrium that cures illness.

Other forms of healing involve the use of natural remedies. Some native medicines include quinine, chamomile, and ipecac, in addition to a variety of energy-rich foods. The Iroquois were taught that the Creator gave the inhabitants of the earth all elements needed within the natural world to cure illnesses. They had developed a form of penicillin used to cure inflections, which was administered through a syringe. Many medicines and remedies used today

originated from techniques and remedies used by the Iroquois as well as other Native Americans. Dream interpretation was used to as a means of treatment therapy. Finding hidden clues within dreams was a technique used in unraveling causes of illness. Similar to a modern-day psychologist, the dream interpreter would analyze the dreams and determine the appropriate methods to cure the illness. Cleansing the body was a principal component in maintaining good health. Purges, fasts, and specific baths were employed. Cleansing the body was seen as a process in which to detoxify not only the physical body but also the mental and spiritual aspects of the being.

Family

The Iroquois believed that all human beings were created equal and each individual possessed a special gift, talent, or ability. Children were regarded as ultimate blessings and gifts from the Creator. Therefore, children were treated with much respect and taught by all members of the family. Infants were seen as being part of the spirit and the physical world. Children spent a great amount of time with grandparents and elders, learning about the culture, customs, beliefs, and history. The importance of this reflected in a strong sense of attachment to the family and community. Learning through experience was strongly recommended. Many outside observers confused this idea of growth through personal experience and freedom of decision making with a lack of discipline.

Women played an important role within the family and nations. Traditional teachings say women were given the ability to create. Every female birth was a blessing the Creator had given the nation. The lineage would be able to continue to grow and multiply through the birth of each female. From birth, female members were encouraged to take on leadership roles within their families and to freely express themselves. Young girls were trained in planting techniques, food preparation, and preserving. Women's occupations consisted of tilling the fields, dressing the meats and skins obtained by the males within the community, and gathering the fuel needed for the winter's fire.

Male children were taught at a young age the techniques used to protect and provide for the family and clan. Boys were taught specific characteristics and uses of a variety of foods. They were also taught which herbs and plants were used in tradition medicines and cures to illnesses. Survival skills were taught, including how to use the natural environment to shelter and create warmth and how to read weather patterns to determine what to expect. Hunting, fishing, trapping, and tracking skills were learned. During puberty, a young boy would participate in a vision quest, which would require the boy to survive on his own in Mother Earth, fasting and praying without distraction. He could be visited by an animal, which would represent his spiritual guide. When the boy returned, he would be seen as a young adult.

A *clan* is defined as a group of families who share a common female ancestry. They are named after animals that have a special significance and importance to the tribe. These include the turtle, bear, and wolf among all Iroquois tribes, while the Seneca, Cayuga, and Onondaga have an additional six, which include the crane (heron), snipe, hawk, beaver, eel, and deer. Marriage within the same clan is forbidden. Clan members are referred to as "sisters" and "brothers," and blood relations are not accepted within a marriage. Marriage between a man and a woman represents not only the union of a couple but also a merger between families and clans. The mothers of the couple are asked for permission to marry. Once the marriage is complete, the woman has control over the property. If for some reason, the couple were to separate, the woman would have custody over children and the man would have to leave with only his bare possessions. Iroquois are matrilineal, and children inherit the clan of the mother.

Social and Political Organization

Most Iroquois lived in longhouses, which were constructed by poles and elm bark. Measuring approximately 15 to 30 meters long, the longhouse was divided into separate sections, which would house the extended family. These houses were large enough to accommodate up to 120 people. This family residence was an important element in the survival and strength of the family and culture. All members living in the longhouse contributed to child rearing. Villages were generally permanent, but they moved once the soil had become exhausted, which would take approximately 20 years. Today, most Iroquois live on reservations and no longer reside in the traditional longhouses. Reservations commonly include elements seen in small towns and villages, but Iroquois communities are rich in Iroquois symbols, traditional cornfields, arts-and-crafts stores, and cultural centers.

It was believed that since women were more sensitive to the rhythms of the Mother Earth, they controlled the land in which they lived. Women were in control of all aspects and issues involved within a community. Iroquois social and political systems were controlled and monitored by women. Women were in charge of maintaining and taking care of the crops and seeds of the "three sisters" crop—corn, beans, and squash—well as other crops and medicines.

Males within the community were in charge of clearing the fields, building homes, and providing security and safety. They left in the fall to hunt and spent the spring fishing. Men spent a considerable time preparing and engaging in battle. Most conflicts arose from property and territory disputes. Males, more specifically, fathers and husbands were responsible for maintaining the well-being of their families. They were the protectors within the village and used whatever means possible to uphold their defense.

The League of the Five Iroquois Nations—the Mohawk, Oneida Onondaga, Cayuga, and Seneca—is believed by some to have been formed around the 15th to 16th century, but Iroquois believe it is older, formed around 1,000 years ago. A sixth member, the Tuscarora, joined at the beginning of the 18th century. The political system within the League included 50 sachems from a variety of clans. There was a set representation of sachems among the different Iroquois tribes. These included 9 from the Mohawk, 9 from the Oneida, 14 from the Onondaga, 10 from the Cayuga, and 8 from the Seneca. Although women were not able to become a sachem, they had the power to choose which male would represent their clan as a sachem. Women also had the right to remove any sachem they felt was not fulfilling his role. Sachems would meet and discuss issues pertaining to the maintenance and development of the Iroquois people. They would debate in a systematic manner, where every sachem would have the opportunity to express their opinion. A consensus between all sachem would render the decision to the issue at hand. During debates, the order in which a sachem voiced his opinion resulted from the tribe he was from. Earlier members of the League, such as the Mohawk, Onondaga, and Seneca, were referred to as "elder brothers" or "uncles" and therefore spoke first during meetings and discussions. The Oneida, Cayuga, and Tuscarora were referred to as "younger brothers" or "nephews." The League is described as one of the most effective political and social systems known to North America. Although the Iroquois have been described as a "primitive" group of nations, the organization of the League proves this wrong. The League devised a valuable and systematic set of values and laws that maintained a great amount of order and regulation among the nations. The League was quite successful up until the American Revolution, when a collapse occurred, which devastated the League. The organization of the League and its confederacy is a reflection of current North American democracy and government.

Today, traditional governments continue as they did in the past in Tonawanda, Tuscarora, and Onondaga. Akwesasne and Oneida function with a traditional council of chiefs as well as an elected tribal council. Although each community now has its own separate government, chiefs carry on the tradition of the confederacy, meeting independently from American and Canadian control.

Over the centuries, the Iroquois adapted and changed, through the adoption of agricultural practices, receiving the message of the Peacemaker, and the Handsome Lake cultural revitalization. The Iroquois today believe they are undergoing another cultural revitalization, caused by pressures of globalization and changes in their economy. Iroquois are revitalizing their language and culture through art, dance, literature, and education. They are actively discussing new forms of government, to find balance between elected councils and traditional governments. Iroquois have been international leaders and outspoken activists to protect Mother Earth and promote sustainability through traditional teachings "making decisions for the Seventh Generation."

— *Simon Brascoupé and Jenny Etmanskie*

See also **Native Peoples of the United States; Native Studies**

Further Readings

George-Kaneentiio, D. (2000). Iroquois culture & commentary. Sante Fe, NM: Clear Light.

Jennings, F. (1984). *The ambiguous Iroquois empire.* New York: Norton.

Johnson, E. (1978). *Legends, traditions, and laws of the Iroquois, or Six Nations and history of the Tuscarora Indians.* Lockport, NY: Union Printing.

Lyons, O., Mohawk, J. C., et al. (1992). *Exiled in the land of the free: Democracy, Indian nations, and the U.S. Constitution.* Sante Fe, NM: Clear Light.
Snow, D. R. (1994). *The Iroquois.* Cambridge, MA: Blackwell.

Irrigation

Rain-fed agriculture, the converse of irrigated agriculture, has traditionally meant cultivation of plants without adding additional water beyond that which falls naturally on them from the sky or flows to them as surface water. Obviously, there is a spectrum of human intervention between minor flood control management and massive irrigation works, as well as a spectrum in scale between typical surface flows and the traditional floods of major river systems. A third spectrum relevant to understanding the role of water in agriculture involves the energy needed for supplying the water to the fields, which ranges from low in some gravity-fed systems to high in systems requiring additional energy inputs for raising water to the level of fields well above the water table.

It is possible that the first crops cultivated by irrigation were small flood control systems on alluvial fans in arid regions, such as Jericho, circa 9000 BC, but it is just as likely that small flood control management works were built along river systems having a natural flood, and it is unlikely we will ever know when or where the earliest such systems were built, since alluvial soils in flood plains are rearranged annually and the likelihood of the earliest such works leaving a trace down to the present are slim. Significant irrigation works in the Middle East date at least to 5000 BC in the Nile, and an early major irrigation project was completed there around 3100 BC during the 1st dynasty.

Source: © iStockphoto/David Freund.

If we leave unsolved the question of who was first to irrigate, we can concentrate on the broader ramifications of irrigation technology. Modern measuring systems tempt researchers to believe that irrigation is required where less than a particular amount (e.g., 250 mm) of rainfall occurs. Premodern measuring systems were generally more sophisticated and allowed for temperature, orientation to the sun, soil characteristics, temporal distribution of rainfall, and evapo-transpiration by evaluating rain-fed fields not in terms of area and precipitation, but in more direct terms of the optimal amount of seed they would support. Even small gravity-fed watershed-harnessing systems can concentrate rainfall from a larger area onto a smaller one, and nature does a fair job of this in many circumstances. Thus, precipitation requirements for annuals like grains (trees can survive on the water table if it is high enough) make sense only as

guidelines, and the ethnographic literature is full of the expected exceptions (e.g., the Hunza, in Northern Pakistan, who require only 180 mm for rain-fed agriculture).

Karl Wittfogel developed the idea that irrigation works were both the products of centralized states and, via the control possible by monopolizing the water supply, the basis for the development of a particular (oriental) version of state despotism. This theory was taken up by many scholars but is now not seen as fitting well many of the very areas it was thought to explain best, such as Bali, where a strong case has been made that vast irrigation systems were constructed and regulated without any significant role for the state. If it does not have the broad relevance claimed for it by Wittfogel, some scholars, such as Sidky, claim it has explanatory value for 18th-century irrigation among the Hunza. Stanish suggests that part of the argument may be valid if reworked in terms of linking political complexity to labor intensification and declining returns to labor in areas largely under local control.

Because many early civilizations developed in riverain areas and also developed irrigation systems, archaeologists have focused a lot of attention on irrigation. In a classic work, Butzer attributes the repeated elaborations of the irrigation infrastructure in the Nile during dynastic times to local communities rather than to centralized state initiatives but notes the extensive efforts under state control to develop the Faiyum during the Hellenistic period. It may be that this model of early local development usurped only in much later times by a central state will fit far more premodern situations.

Irrigation systems, whose infrastructure is durable, both significantly improve the efficiency of human labor, through the multiplier impact of the infrastructure, and enable more labor to be used effectively in a given unit of area. At some level of effort (the margin in terms of labor efficiency), there begins to be a general trade-off, under ceteris paribus conditions, with intensification leading to higher returns per unit area and declining returns per unit of labor. Many irrigated systems pass beyond an optimal point where both returns to labor and to unit area increase and sacrifice the former for the latter. They often operate in this suboptimal area, from the perspective of returns to labor, because the sociopolitical system has prioritized returns to unit of area or water or even some combined unit of land and water. It is normal in many irrigation-based societies for the labor of many to be constrained in some measure by the will of the few. Varied explanations for how this comes about have been proffered. Inefficient uses of human labor, which are inevitable where the other factors of production (land, water, and capital, understood broadly) are unevenly distributed, may well have reached an early nadir in large-scale irrigation contexts.

The modern era of high-tech dams and irrigation projects has brought to the fore issues of environmental damage; displacement of peoples by new lakes, with a host of associated social and health issues; a regular prioritization of the energetic needs of urban areas over the needs of farmers; and a plethora of opportunities for corruption by elites, companies, and international organizations. Large-scale irrigation projects promise more predictable yields, greater independence from world market fluctuations in crop prices, and local sources of energy. Only in rare cases where the climate and ecology are already optimal for the crops in question do such projects provide crops at competitive world market prices if all costs are considered. Despite typical international advice to the contrary, modern decisions to undertake large-scale irrigation stand or fall on political and social considerations, not economic efficiencies, and would do well to be so understood.

— *Thomas K. Park*

See also **Agricultural Revolution; Horticulture; Political Economy**

Further Readings

Butzer, K. W. (1976). *Early hydraulic civilization in Egypt: A study in cultural ecology.* Chicago: University of Chicago Press.

Caufield, C. (1996). *Masters of illusions: The World Bank and the poverty of nations.* New York: Henry Holt.

Hammoudi, A. (1985). Substance and relation: Water rights and water distribution in the Drâ Valley. In A. E. Mayer (Ed.), *Property, social structure, and law in the modern Middle East.* Albany: State University of New York Press.

Lansing, S. (1991). *Priests and programmers: Technologies of power in the engineered landscape of Bali.* Princeton, NJ: Princeton University Press.

Park, T. K. (1992, March). Early trends toward class stratification: Chaos, common property, and flood

recession agriculture. *American Anthropologist,* pp. 90–117.
Sidky, H. (1997). Irrigation and the rise of the state in Hunza: A case for the hydraulic hypothesis. *Modern Asian Studies, 31,* 995–1017.
Stanish, C. (1994). The hydraulic hypothesis revisited: Lake Titicaca basin raised fields in theoretical perspective. *Latin American Antiquity, 5,* 312–332.
Wittfogel, K. A. (1957). *Oriental despotism: A comparative study of total power.* New Haven, CT: Yale University Press.

Islam

One of the world's major and fastest-growing religions, Islam is practiced by about 1.3 billion adherents throughout the world, about one fifth of the world's population. A monotheistic faith, *Islam* literally means "submission to the will" of God in Arabic, the language of its origin and of its sacred text, the Koran. Islam was founded by Muhammad, a man of 6th-century Arabia, who is considered the "seal" (or last) of the prophets by the community of believers.

Islam was studied by European scholars, including some considered to be among the founders of the discipline of anthropology, as Europe expanded its political and cultural domination of Asia and Africa in the 19th century. Recently, detailed ethnographic studies of the localized practice of Islam have become the main focus of anthropological inquiry.

Basic Practices and Beliefs

Islam is based upon five religious duties, often called the "Five Pillars." The first pillar is the profession or declaration of faith: There is no god but God, and Muhammad is the messenger of God. Recitation of this sentence makes a person a Muslim, one who submits to God. The second duty is prayer five times a day: dawn, noon, midafternoon, sunset, and nightfall. Each prayer is said facing Mecca, in a state of ritual purity, and is composed of a number of bows or prostrations to God. People may pray anywhere, although many congregate at mosques, Muslim houses of worship, especially for the Friday noon prayer.

Almsgiving is the third pillar or religious duty. Generally, most almsgiving is personal and direct from donor to recipient. Historically, in some countries, it has been an obligatory tax on those who were able to pay. The fourth pillar is fasting during the month of repentance and purification, Ramadan. Eating, drinking, smoking, and sexual relations are prohibited between dawn and sunset. At night, communal feasts for family and friends are common. The last pillar is the pilgrimage to Mecca, which must be made at least once in a lifetime if possible. Over a million people annually make the pilgrimage during the month of Dhul-Hijja. Among the many ritual acts the pilgrims complete are seven circumambulations of the Kaaba, a sacred shrine originally consecrated to God by Abraham. Those who make the pilgrimage to Mecca are called *hajji*s and are much respected when they return to their local communities.

A foundational belief in Islam is that God has a unitary nature. God is referred to as omniscient, merciful, compassionate, generous, everlasting, the most high, and the judge. These and other characteristics of God are often part of men's names; for example, *Abdul Rahman,* or "slave of the compassionate," indicates a man's submission to God in his personal name.

The Koran, Islam's holy book, contains 114 chapters, arranged longer to shorter, and contains legal, judicial, and ethical norms. The Koran is considered the last, final, and perfect revelation from God to humankind. It refers many times to the Day of Judgment, when God will judge people and the good will go to paradise and the evil to hell.

Other customs associated with Islam are prohibitions against the use of pork, alcohol, and representations of animate objects. The enforcement of these prohibitions has varied historically and regionally. Although the veiling of women is often linked to Islam, the Koran specifies modest dress, not the complete veil or the seclusion of women.

Historical Development of Islam

Muhammad was born in Mecca, a prosperous town and center of a pagan cult in the Arabian Peninsula, in AD 570. His tribe, the Quraysh, was powerful and wealthy; his family lineage was Hashim, a minor although respected group. His father died before his birth and his mother when he was only 6. At age 40, while meditating in a cave near Mecca, Muhammad received revelations from God via the Angel Gabriel

and began reciting these to the people of Mecca. The Koran, literally "the reciting," is the collection of these revelations and thus is God's direct word, according to Muslims. Not only did Muhammad attract followers from among the poor of Mecca, he also threatened the prosperity of the wealthy who gained economically from pilgrims visiting the city's pagan shrine. Some Meccans began to persecute Muhammad and his followers.

Source: © iStockphoto/Yusuf Demierelli.

Yathrib, a city north of Mecca later renamed Medina, was in the midst of a series of disputes that Muhammad was asked to arbitrate. Muhammad and his followers migrated to Medina, where they formed a community and state based on ties of faith rather than blood. This event, the Hijra or Emigration in 622, marks the year 1 in the lunar Islamic calendar. After a series of battles with the Meccans, Muhammad and his followers returned to Mecca in triumph. The Kaaba, a large black stone and the shrine, which previously housed idols, was purified and dedicated as the place where Abraham and his son Ishmael worshipped God.

Muhammad died in AD 632, leaving no male heir or successor. However, his daughter Fatima was married to Ali, one of Muhammad's earliest followers, cousin, and adopted son. Some, known as the Shia (from *shiat Ali,* or the "party of Ali"), thought Ali was Muhammad's true successor, but a group of Muhammad's counselors selected Abu Bakr, whom the majority accepted. The dispute about leadership continued through two additional successors, or caliphs. Although Ali finally was selected the fourth successor after Muhammad, he was never universally accepted. After Ali's assassination, the Shia looked to his eldest son Hasan, but the powerful governor of Syria, Muawiya, threatened his position. Hasan retired, and the Shia looked to Ali's second son, Husayn, for leadership. The forces of Husayn and Muawiya's son, Yazid, battled near Karbala, Iraq, on the 10th of Muharram, the first month of the Islamic calendar, in AD 680. Husayn and many of his family and followers were killed. The Shia commemorate the event each year on the 10th of Muharram in a reenactment of Husayn's martyrdom.

The orthodox majority of Muslims, 90% of the total, are known as "Sunnis" from the word, *sunna,* Arabic for customary conduct, referring to Muhammad's own practices. The Shia remain a minority of about 10% or 15%; however, they control the state in Iran and are the majority in Iraq. Shiism has been divided into numerous sects since the 8th century. Most are known as *Imamis*, or "Twelvers," because they accept 12 *imams,* or leaders, from the first, Ali, to the 12th, who is believed to have hidden himself away only to return later to restore justice before the end of the world. Others include the *Ismailis,* "Seveners,"

who accept a different 7th imam than the Twelvers, the Zaydis who accept a different 5th imam, and many more.

The victory of Yazid over Husayn consolidated the dynasty of caliphs known as the Umayyads (AD 661–750). Islam continued to expand across North Africa and up through Spain as well as through Central Asia, which had been Buddhist, to India and the frontiers of China. Many non-Arab peoples, including Berbers, Turks, and Persians, converted to Islam. The growth of non-Arab peoples within the Muslim community created difficulties in governance, leading to a series of revolts and a new ruling dynasty, the Abbasids, with capitals at Baghdad (AD 750–1258) and Cairo (AD 1261–1517).

In the 12th and 13th centuries, a major shift in popular religious expression took place in the Islamic world with the development of *sufism,* frequently defined as "Islamic mysticism." The word is derived from the Arabic word for "wool," *suf,* thus denoting a person wearing a wool robe. Taking different regional and historical forms, sufism emphasizes an individual's communion with the divine, the veneration of saints, and participation in religious brotherhoods. Each brotherhood has a teacher or master who initiates disciples into a particular set of rituals for reaching God.

Anthropology and Islam

In the 19th century, European expansion impacted the Muslim world, including forms of colonization and political domination. European historians and scholars of religion studied Arabic and other Semitic languages, primarily to understand the Bible's ancient roots in the Middle East. Using a theoretical paradigm now called *evolutionism,* these scholars thought that societies such as the Bedouin, pastoral nomads in the Arabian Peninsula, represented a past way of life that was comparable to that of Abraham or Jesus. One such scholar, William Robertson Smith (1846–1894), may be considered a founder of the anthropology of religion as well as kinship studies. Though Smith's evolutionist approach is no longer used in anthropology, he provided an early systematic description of the kinship and political organization of the Bedouin using ethnographic data. In writing about Islam, his main concern was in linking stages of religious development such as totemism, animal sacrifice, and the development of monotheism. In his time, Robertson Smith's ideas about religion were influential, and other scholars, such as Sigmund Freud in *Totem and Taboo,* borrowed much from him. Writing about Western scholarship on Islam, the late Columbia University Professor Edward Said and other critics of "orientalism" accuse 19th-century European scholars of overgeneralization, lack of historicity, and denigration of non-Europeans.

In the first half of the 20th century, forms of functionalism became dominant paradigms in British social anthropology and also were influential in the United States. Functionalism emphasizes the operation and interactions of social institutions as they maintain society. Anthropological studies during this period emphasized the study of small-scale societies and tended to ignore complex literate societies, where much historical work was necessary for cultural interpretation. In order to revive studies of complex societies in the 1940s, anthropologists labeled religious practices associated with standardized religious texts and authority "the Great Tradition," while they labeled popular understanding and practice of religion "the Little Tradition." Sufism, for example, was placed in the Little Tradition, ignoring the interpenetration of authoritative and popular understandings of Islam. E. E. Evans-Pritchard's work on the Sanusi, a religious order among the Bedouin of Libya, is one of few monographs on the Islamic world written by an anthropologist during the functionalist period.

The situation changed dramatically in the second half of the 20th century, when significant theoretical and ethnographic works were written by anthropologists on Islamic subjects. Much of the work highlights the historically complex variability within different parts of the Islamic world through detailed case studies. Clifford Geertz, one of the most influential anthropologists of the period, has compared Moroccan and Indonesian variants of Islam. Michael M. J. Fischer focused on the Iranian revolution and role of Shiism in a major work that appeared soon after that event. Fischer conducted fieldwork in Qum, the center of Iranian Shiism's religious establishment.

— Audrey C. Shalinsky

See also **Evans-Pritchard, Edward; Muslims; Religion and Anthropology; Smith, William**

Further Readings

Eickelman, D. F. (2001). *The Middle East and Central Asia: An anthropological approach* (4th ed.). Englewood Cliffs, NJ: Prentice Hall.

Evans-Pritchard, E. E. (1949). *The Sanusi of Cyrenaica.* Oxford: Clarendon Press.

Fischer, M. M. J. (1980). *Iran: From religious dispute to revolution.* Cambridge, MA: Harvard University Press.

Geertz, C. (1968). *Islam observed.* New Haven, CT: Yale University Press.

Said, E. (1978). *Orientalism.* New York: Random House.

Israel

On May 14, 1948, the State of Israel declared its independence. Located in the Middle East, it is bordered by Lebanon, Syria, Jordan, Egypt, and the Mediterranean Sea. Although only about 290 miles long and 85 miles wide, Israel has a varied topography, including desert, fertile valleys, forests, and a coastal plain. It also contains the Dead Sea, the lowest point on Earth. Primarily a country of immigrants, Israel's population numbers approximately 6.5 million, about three quarters of which are Jews. Most Israelis live in urban centers, including the capital city of Jerusalem, Tel Aviv, Haifa, and Be'er Sheva, although 2% to 3% live in rural communities known as *kibbutzim.* The Israeli government is a parliamentary democracy comprising legislative (called the Knesset), executive, and judicial branches. Although Israel is most immediately understood as a geographically situated nation-state, it also refers to a concept of peoplehood shared by many Jews, for whom the notion of the "land of Israel" is indistinguishable from the "people of Israel." Both the geopolitical limits of the state of Israel and the cultural contents of the people of Israel are subject of much debate and contestation.

The political history of Israel can be understood as on ongoing engagement with the domestic and international challenges occasioned by war and peace. Some 24 hours after declaring independence, the armed forces of several neighboring countries, including Syria, Jordan, Egypt, and Lebanon, invaded Israel. This conflict, known in Israel as the War of Independence, lasted approximately 15 months and concluded with armistice agreements negotiated under United Nations auspices. Under these agreements, Jordan took control of the West Bank, and the Gaza Strip came under the administration of the Egyptian government. Jerusalem was divided, with the eastern portion, including the Old City, going to Jordan and the western portion to Israel. However, Israel regained control of these territories after the Six-Day War of 1967, which also resulted in the Golan Heights moving from Syrian to Israeli control. In October 1973, the nations that had lost land in 1967 regained significant portions of what they had lost as a result of the Yom Kippur War (so-named in Israel because it coincided with the Jewish High Holy Day of Yom Kippur). While Israel and its neighbors have continued to do battle in the ensuing years (e.g., Lebanon in the early 1980s and Iraq in the 1990s), the greatest challenge to peace in Israel at the turn of the 21st century is that of Palestinian self-determination. In 1993, following several years of Palestinian insurrection known as the *Intifada,* Israel granted limited autonomy to the Palestine National Authority, led by former leader of the Palestinian Liberation Organization. On September 28, 2000, tensions between Israelis and Palestinians once again reached a flashpoint when Israeli leader Ariel Sharon visited the Temple Mount, Judaism's holiest place. Muslims refer to this site as *Haram al-Sharif* and regard it as one of Islam's holiest places. Since that time, Palestinians have continued to challenge Israeli authority, using both political channels and violence in an effort to obtain sovereignty.

In many ways, the ongoing disputes about the geographical borders of Israel the nation-state are directly tied to the notion of Israel as a people. While the term *Zionism* is usually construed to refer to the movement to establish a Jewish state, it has multiple connotations. Formally organized by Theodore Herzl in 1897, Zionism arose in the late 19th century in response to growing anti-Semitism in Europe and sought to reestablish a Jewish homeland in Palestine. Today, Zionism focuses on supporting and developing the state of Israel. However, the goal of establishing and maintaining a Jewish sovereign state necessitates a view of Jews as a people. In this view, Zionism positions Jewish history as central to the notion of Israel. Since so much of Jewish history has been characterized by persecution based on religious "otherness," there are also Zionists who emphasize the centrality of shared religious experience to the notion of Israel. However, traditional/Orthodox Jews view the geography of the

Source: FreeStockPhotos.com.

state of Israel as immutable. In the Torah, Judaism's holiest text, *Eretz Israel* ("the geography") is the Promised Land, given to Israel (the people) by God. The belief in Israel as a people undergirds the state of Israel's "Law of Return," under which Jews from any nation can claim and qualify for Israeli citizenship. Under the Law of Return, large numbers of Soviet Jews immigrated to Israel in the 1970s and 1980s, as did many Ethiopian Jews in the late 1980s and early 1990s. The latter of these, in particular, have had difficulty assimilating into Israeli culture, provoking many questions domestically about the limits of Israel as a people.

The limits and challenges to defining Israel as a people are also reflected in the conflicts between religious and secular Jews in Israel. In the eyes of some scholars, the divide between religious and secular Jews in Israel is even deeper than the divide between Israeli Jews and Arabs. According to Sandler, the divide can be defined in "the postmodern language of the politics of identity," with each side looking at the other side and defining itself as the other's opposite. The challenge presented by the secular-religious divide is not merely symbolic, however. This conflict in the definition of Israel as a people also has implications for Israel as a nation-state. The question of Palestinian sovereignty, for example, is inextricably connected, since the notion of Eretz Israel is biblically revealed, and therefore not negotiable, to those on the religious side of the divide. There is a reciprocal relationship between Israel as a geopolitical phenomenon and Israel as a group identity, and the challenges faced in one sphere also inform the course taken in the other.

— *Marianne Cutler*

See also **Buber, Martin; Jews**

Further Readings

Bright, J. (1981). *A history of Israel.* Philadelphia: Westminster Press.

Goldscheider, C. (2001). *Israel's changing society: Population, ethnicity, & development.* Boulder, CO: Westview.

Isaac, R. J. (1976). *Israel divided: Ideological politics in the Jewish State.* Baltimore: Johns Hopkins University Press.

Karsh, E., & Mahler, G. (1994). *Israel at the crossroads: The challenge of peace.* London: British Academic Press.

Sandler, S., Freedman, R. O., & Telhami, S. (1999). The religious-secular divide in Israeli politics. *Mideast Policy Council Journal, 6*(4).

Jarmo

Jarmo (Qal'at Jarmo), located in modern northern Iraq, is one of the oldest Neolithic agricultural settlements in the Middle East. Excavations here yielded much information on human society's transition to sedentary agricultural practices. University of Chicago archaeologist Robert Braidwood spent several seasons between 1948 and 1955 excavating the village that dated between 9,250 and 7,750 years ago (7250 and 5750 BCE). The introduction of ceramic vessel technology in Jarmo's later levels suggests the site spanned two time periods that are known as the Pre-pottery and Pottery Neolithic.

The village of Jarmo consisted of mud brick, rectilinear houses whose inhabitants subsisted on a diet of domesticated and wild plants, and animals. Domesticated plants included emmer and einkorn wheat, two-row barley, and lentils, while wild specimens included undomesticated wheat and barley, acorns and pistachio nuts. The villagers depended on domesticated sheep and goats for meat and dairy products as well as dogs to protect their herds. Villagers also hunted wild animals for resources and as protection; excavations revealed the remains of cattle, fox, lions, and leopards. Villagers depended primarily on flint, obsidian, bone, and eventually ceramic to make the everyday tools for food preparation, house construction, and hunting.

At the time of its discovery, Jarmo greatly expanded anthropology's limited understanding of early food-producing villages. In periods prior to the founding of agricultural villages, human societies practiced hunter-gathering subsistence in relatively small nomadic bands. As they became increasingly sedentary, human societies developed strategies to manage the wild crops and animals more efficiently. With increased investment in sedentary agriculture, settlement became permanent and villages saw an increase in population, disease, and political complexity. Braidwood's careful excavations at Jarmo revealed that this Neolithic "Agricultural Revolution," as it has been popularly coined, took several thousand years to complete, a fact made obvious by the presence of both domestic and wild plant and animal species in the village. Agricultural villages like Jarmo were the economic and political predecessors of the first Mesopotamian cities that would arise in the region beginning in the fourth millennium BCE.

Braidwood's excavations at Jarmo represented a watershed event in archaeological research as it was the first time an archaeologist had employed an interdisciplinary research project designed to understand the origins of food production. In addition to archaeologists, the Jarmo team consisted of specialists who studied the region's geology, the ancient climate, and plant and faunal remains. The innovative Jarmo project served as an example to both Old and New World archaeologists who were only beginning to pursue more sophisticated research on such important revolutions in human society as the origins of agriculture, urbanism, and craft production.

— *Benjamin W. Porter*

See also **Braidwood, Robert John**

Further Readings

Braidwood, L. S., et al. (Eds.). (1983). *Prehistoric archeology along the Zagros Flanks.* Chicago: Oriental Institute of the University of Chicago.

Braidwood, R. J., & Braidwood, L. (1950). Jarmo: A village of early farmers in Iraq. *Antiquity 24*, 189–195.

Braidwood, R. J., & Howe, B. (1960). Prehistoric investigations in Iraqi Kurdistan. *Studies in Ancient Oriental Civilizations (31)*. Chicago: University of Chicago Press.

Java Man

In 1887 a Dutch anatomist, Eugene Dubois, joined the Dutch army as a means to bring him to south Asia to hunt for the "missing link." His major interest was the theory of evolution proposed by Charles Darwin in 1854. Dubois received an assignment in the Dutch East Indies (now Indonesia) where he assumed humans had evolved. He arrived first in Sumatra where he was able to obtain financial support from the army and began excavating in a number of caves. Initial results, however, proved disappointing, since the soil deposits were too young to yield evidence of the earliest humans.

Dubois heard news of some exciting new finds of extinct mammals in eastern Java and moved his research to the Solo river valley in East Java. The Dutch army supported his excavations by providing him with two engineers and fifty indigenous forced laborers. In 1891 Dubois's workers found a skull cap (the majority of both parietals and the upper portion of the occipital bone) along the Solo River near the village of Trinil. A year later and approximately 50 feet from the skull cap, a femur (upper leg bone) was found. The find of the femur was proof to Dubois that what he had found was an "upright walking ape-man" which he named *Pithecanthropus erectus,* today known as *Homo erectus.* In 1894 Dubois published an article stating that *Pithecanthropus erectus* was a distant ancestor of modern man and had lived almost a million years ago. At the time authorities were of divided opinions; they regarded the find as either from a man, an ape, or an ape-man. The criticism from the scientific and religious communities caused Dubois to hide his discoveries under his house for 30 years.

In 1888 and 1890 two human skulls were recovered at Wadjak, about 65 miles from Trinil. Wadjak I was found by a Dutch mining engineer while prospecting for marble. Wadjak II was found by Dubois at the same site. The Wadjak skulls are modern *Homo sapiens* and less than 20,000 years old. These finds were reported only in the quarterly and annual reports to the Dutch East Indies government but not to the scientific community. Dubois withheld these specimens for fear that they would be associated with the Trinil finds. In 1920 Dubois publicly announced the skulls when another researcher claimed to have discovered the first *proto-Australian.*

In 1907–08 an expedition conducted by Selenka, another Dutch scientist, excavated 10,000 cubic meters down to 40 feet below the surface at the same location as the original Trinil site without finding any more remains of *Homo erectus.* The skeletal remains of hundreds of species of extinct animals were found and returned to the Netherlands.

In 1991, exactly one hundred years after Eugene Dubois's workers discovered *Homo erectus* (*Pithecanthropus erectus*), a museum opened at the site of Trinil. The museum displays the bones of mammals found at Trinil, such as mammoth and an extinct form of bison. It also displays some of Dubois's original documents and photographs, as well as replicas of the original skull, molar, and femur of *Homo erectus.*

The original fossil specimens of Dubois's excavations can be found in the natural history museum at Leiden University in the Netherlands. One of Dubois's most important contributions to understanding the natural history of *Homo erectus* is overlooked by most researchers: Dubois's Indonesian workers collected and preserved hundreds of species of extinct animals and plants that can be studied at Leiden University.

— *Donald E. Tyler*

See also **Homo Erectus; Indonesia; Modjokerto; Ngandong; Sangiran**

Further Readings

Larick, R., Ciochon, R. L., & Zaim., Y. (1999). Fossil farming in Java. *Natural History, 108*, 54–57.

Lewin, R., & Foley, R. A. (2004). *Principles of human evolution.* Victoria, Australia: Blackwell.

Shipman, P. (2001). *The man who found the missing link.* New York: Simon and Schuster.

Swisher, C., Curtis, G. H., & Lewin, R. (2000). *Java man: How two geologists' dramatic discoveries changed our understanding of the evolutionary path to modern humans.* New York: Scribner.

Wolfpoff, M. H. (1999). *Paleoanthropology.* New York: McGraw-Hill.

Jewelry

Jewelry consists of any ornament that is placed on the body for any symbolic reason. Ornaments can be made of metals, shells, beads, textiles, clay, gems, stone, glass, or any components extracted from animals or plants.

Sometimes worn as talismans, jewelry is found among every culture and society in forms rangings from rings, armlets, bracelets, necklaces, and ornamental piercing to broaches, headdresses, and hair clips.

Jewelry plays many roles within cultures. It may be used to adorn the body, to express wealth, as a method of payment or trade, to convey social or spiritual messages or as a tool of creativity. It is possibly one of the earliest forms of art.

Early Evidence of the Presence of Jewelry Among Cultures

The first indication that jewelry was an important element in human society is traced back 100,000 years ago during the Ice Age, when human bodies were buried with funeral gifts including jewelry. Archaeologists have found the remains of inorganic materials such as stones, fossils, and clay that were used in the making of jewelry during the Paleolithic Age dating between 50000 and 10000 BC. Other materials suspected to be used during this time to make jewelry include bones, horns, shells, and amber. The jewelry created was in the forms of necklaces, amulets, bracelets, earrings, and headdresses made from carved ivory, seashells, and antlers, as well as animal and fish teeth and bones. Linear and stipple designs and carvings replicating animals forms suggest special attention to the detailing of jewelry. In Europe, rock paintings left by hunters and gatherers during the Ice Age consist of drawings and images of human forms decorated with numerous colorful and creative ornaments on the heads, necks, arms, and legs. Facial ornaments such as earrings, lip, and nose ornaments were also depicted on these individuals. These findings suggest that jewelry creation and application were quite significant during this time.

The Neolithic Age was an evolutionary period in the production of jewelry. Materials used in making ornaments became increasingly available with the rise of horticulture, and improvements in living conditions led to population growth. Advancement in toolmaking enabled artisans to create more complex pieces of jewelry as well as increase production. Materials such as spondylus (mollusk) shells, amber, marble, copper, and gold were used in the exchange of goods. With these changes in effect, other materials and procedures were used to create jewelry. Pearls, precious metals, and stones were carefully cut, shaped and polished into works of art and forms of wealth. In comparison to earlier periods, more time was spent creating pieces of jewelry which reflected craftsmanship and artistic ability. The advancement of jewelry making also introduced the use of chains and the heating, hammering, and molding of metals into specific forms and designs. Widespread trade played a significant role in the development of jewelry making. The style and materials used in construction were representations and indicators of regions and areas in which jewelry originated. During this period, jewelry specific to particular regions is found over extensive distances. An example of this distribution involves the discovery of spondylus shells, copper and gold jewelry originally from the Mediterranean, but found in Central and northern Europe.

The Bronze Age generated specialized fields such as metal work and other technical processes including heating and lighting. Knowledge and experience were key elements in the growing social divisions of labor. It is suggested that this is the period in which primitive societies began to dissipate. Two Bronze Age cultures stood out in comparison to others in association with jewelry production. The first, the Aunjetity Culture, created simple forms of jewelry comparable to jewelry made in the Neolithic Age. In the earlier stage of the Bronze Age, popular forms of gold rings were produced by the twining or twisting of wire. Some archaeologists suggest that some form of social stratification existed as evidenced by discoveries of "princess graves" in which individuals were buried with numerous pieces of jewelry made of gold. The second, the Tumulus Culture, formed at the peak of the Bronze Age, left evidence of similar burial customs as well as other material items. The techniques and artistic quality, in contrast to the Aunjetity Culture, employed bronze casting and the work of the bronze smith. These techniques were improved and the processes advanced with the manipulation of the metals.

Jewelry in Contemporary Times

During the 18th century, jewelry was produced mainly by craftsmen and small manufacturers. England advanced economically compared to other countries, producing jewelry of better quality in the early 19th century. Machines and factories began to replace hand craftsmanship and small manufacturing, a trend that spread to other parts of Europe, Japan, and North America. Advances in stonecutting techniques began in the 18th century and continued

to the mid-19th century. The Bourgeois Revolution brought with it the evolution of peasant jewelry. Imitation jewelry and cost-effective jewelry began being produced and worn by lower social classes, thus overcoming the obstacles that allowed only high-class individuals to wear jewelry. Jewelry began to take on additional purposes and representations, becoming viewed as a statement of personality and independence. The use of silver was a common feature among peasant jewelry. Gold was used sparingly. Gold-plated silver, silver-plated copper, and brass alloys were used among the poorer peasants. Colored gems, stones, and glass were used to brighten up ornaments.

The evolution of jewelry-making continued, from mass production and replication processes to the colors and designs used to create pieces of jewelry. Today jewelry is affordable to most economic classes through mass production of imitation jewelry. Although association of jewelry with the higher classes has decreased, it is still present. Only a small amount of the world's population can afford to adorn itself with various precious gems and stones. The difference between past and present persists by virtue of the significance attributed to names of designers, companies, and quality of materials. Public attitude and the significance of jewelry still varies from culture to culture depending on social, economic, and cultural situations.

The Role of Jewelry in Society

Within a social context, jewelry plays numerous roles. It has been used as a teaching tool to communicate knowledge, to explain and recall histories and events; for example, in hunting tribes amulets were given to poets or singers to wear during a performance in order to transfer knowledge. Jewelry is also commonly used in identifying individuals. Soldiers often wore bracelets and necklaces as identification which was sent back to home to family or next of kin upon the soldier's death. In Africa, jewelry expresses information about an individual. For example, Tuareg women wear bracelets, rings, and silver beaded necklaces given by the husband at marriage. Jewelry is used to signify whether a woman is married, divorced, or widowed.

Jewelry signifies traditional and religious beliefs. For example, the Tuareg people of Africa regard the use of a triangle as a symbol of protection; thus, the triangle is a popular jewelry form and is worn frequently in order to protect against evil forces. Other benefits are associated with the wearing of particular materials. Silver is believed to bring happiness, agates are believed to be healing stones, and specific shells are used as fertility charms. Gold was once believed to attract misfortune, but is now frequently worn, denoting cultural adaptation. Silver is still considered to be a classic form of jewelry but gold has become more accessible and affordable than in the past, which has resulted in its increased use.

South American jade in the form of a frog or a bird was thought to bring the wearer the gift of life. Ancient Greeks and Romans wore images of Medusa to destroy evil forces, and dog's teeth to ward off illness. Members of many religious groups wear pendants, medallions, amulets and mandalas to identify themselves with a particular religion or sect, as a means of protection, or to show loyalty.

Jewelry has been used frequently in trade and as a sign of wealth. In Egypt, artifacts suggest that the role of jewelry played an important role for both the living and non-living. Pharaohs and the upper class accumulated large amounts of jewelry; however, not all jewelry was worn. It seems that jewelry played an even more important role in the burial rites of an individual. High-status individuals such as pharaohs and kings were often buried with an enormous amount of jewelry consisting of colorful objects, lapis lazuli, or glass with gold, mostly in the form of a scarab. The scarab was the classic universal charm or amulet and a principal theme in Egyptian ornamentation. The scarab was associated with the sun god Ra and therefore acquired magical significance. In Egyptian society, most artisans were exiled from the Valley of the Living, forced to live and work in the Valley of the Dead, creating masterpieces for the afterlife.

Unlike the Egyptians who strongly associated jewelry with the divinity, the Ptolemaic Romans strongly associated jewelry with the living. Jewelry was used as a tool by which to express or signify the owner's wealth. To make no mistake of ownership, the names of the owners were engraved into the pieces of jewelry.

It has been suggested that Roman women were the first women to wear jewelry freely, due to their social and economic status. Jewelry worn during this time consisted of necklaces, bracelets, rings, earrings, broaches, crowns, and anklets. Romans took comfort in their status and expressed their economic wealth by wearing jewelry to communicate their socioeconomic status. Gold was a predominant material used in Rome. Roman jewelry patterns and

forms were straightforward and bold in design. Greater emphasis was placed upon size and weight than on intricate design.

Beads are the materials most commonly found in the Indus Valley, but cave paintings dating back to the 8th century AD depict Buddhist women wearing gold crowns and numerous necklaces. Other sculptures from the 12th century include ornaments such as dangling pearl earrings and gems deeply cut in black stone. In India, jewelry symbolized the ruling class's power; an immense amount of power was expressed through a large quantity of jewelry. Materials associated with the history of Indian jewelry include pearls, diamonds, rubies, emeralds, lignum, aloes, and coral. Indian princesses were believed to have worn lengthy necklaces made of a variety of jewels such as pearls and gold, gem-set ornaments. An abundance of rings, bracelets, armlets, earrings, and waistbands were covered with magnificent jewels.

North American Indians originally used shell, turquoise, feathers, bearclaw, ivory, bone, and copper as the essential materials in creating jewelry. Exotic materials used were jade, freshwater pearls, particles of mica, and pieces of meteorite. Today, contemporary Native American jewelers use gold, platinum, diamonds, emeralds, opals, rubies, natural turquoise, coral, sugilite, chrysocolla, lapis lazuli, spiny oyster, and hardwoods. Much of the jewelry worn by Native Americans was, and still is, associated with the spiritual world and relationship of humans to Mother Earth in a celebration of all living things.

Although most jewelry produced today is mass-produced, there remains an art to jewelry making. Craftsmen, artisans, and artists continue to be inspired by old styles and designs. Individuals and families have maintained traditional procedures, techniques, and knowledge to be passed on to future generations. Jewelry is a key to cultural continuity and to rediscovering and reinterpreting culture over the generations.

— *Karen Hodge Russell and Jenny Etmanskie*

Further Readings

Halper, V. (2004). Trinket to talisman: Contemporary charms. *Metalsmith 24*(5), 32–39.

Hughes, G. (1984). *The art of jewelry*. New York: W. H. Smith.

Kuntzsch, I. (1981). *A history of jewels and jewelry*. New York: St Martin's Press.

Loughran, K. (2003). Jewelry, fashion, and identity: The Tuareg example. *African Arts, 36*(1), 52–65.

Schaaf, G. (2004). Precious: Native jewelry by 20 living masters. *Native Peoples, 17*(6), 48–54.

Jews

The title *Jews* has multiple variations in meaning. Jew is a term that can refer both to adherents of the religion Judaism and to members of an ethnicity (those who are Jewish). In the religious sense, Jews are followers of Judaism, whether or not they are ethnically Jewish. In the ethnic sense, Jews are those whose familial identification links them to the "peoplehood" of Jews. Ethnic Jews include both religiously observant Jews and those who, while not practicing Judaism as a religion, identify themselves as Jews culturally or through their ancestry. In Jewish law, or halakhah, there are two criteria for defining someone as a Jew, either one of which is sufficient. If one is the child of a Jewish mother, or if one converts to Judaism in accordance with Jewish law, then one is halakhically recognized as a Jew. This standard is mandated by the Talmud, the record of Oral Law that elaborates the Torah (also known as the Hebrew Bible, the Five Books of Moses, the Pentateuch, or, in Christian texts, the first five books of the Old Testament). However, in the second half of the 20th century, two theologically liberal branches of Judaism, Reform and Reconstructionist, have shifted position on the matter of Jewish identity. They now recognize as Jews those who call themselves Jews, although they meet neither halakhic criterion. Based largely in the United States, these two denominations no longer require one to have a Jewish mother if one's father is a Jew, nor do they require converts to follow traditional/Orthodox conversion procedures. This shift has produced a significant rift among various groups of Jews debating the question, "Who is a Jew?" Such Reform and Reconstructionist Jews, as well as secular/ethnic Jews, consider themselves Jews, but are not necessarily viewed as such by Orthodox and Conservative Jews. In addition, many Reform Jews outside the United States maintain traditional definitions of Jewish identity, rejecting American Reform Judaism's adaptations.

Given these complexities of identity, one must think broadly when defining "the Jews."

Despite these divisions, there are four generally recognized denominations (also called movements) within religious Judaism: Orthodox, Conservative, Reform, and Reconstructionist. Orthodox Jewish movements are those that emerged as a response to the cultural and religious changes prompted by the European Enlightenment, which included the political and social emancipation of Jews. The term encompasses traditionalist movements that sought to resist the influences of modernity and religious reform that characterized this era. The term is not typically used to denote Jewish traditionalism prior to the modern era, nor is it used in the context of Jewish communities unaffected by the emergence of Reform Judaism (for example, Jewish communities in North Africa). Orthodox Judaism is viewed by its adherents as the "true" or "authentic" Judaism since it follows the provisions of halakhah codified in the Torah and Talmud. While maintaining broad similarities in ritual and theology, Orthodox Judaism is comprised of many groups with both intersecting and diverging beliefs and practices. For example, ultra-Orthodox Jewish movements such as Haredim and Chasidim differ from Modern Orthodox movements in the extent to which they make allowances for living in the modern world. In addition, there are differences in beliefs in many areas, including the role of women in Judaism, the significance of the State of Israel, and relations with non-Orthodox Jews.

In contrast to Orthodoxy, Reform Judaism embraced the changes brought about by the European Enlightenment and Jewish emancipation. There are many varieties of Reform Judaism, but all assert the legitimacy of change in Judaism. As such, Reform Judaism has continually undergone revisions in practice and theology, since there is no irrefutable and absolute codification of Jewish law in Reform doctrine. The American Reform acceptance of patrilineal descent, which rejects the halakhic criterion of matrilineal descent in determining Jewish identity, illustrates the sharply contrasting positions held by Reform and Orthodox Judaism regarding strict interpretation of traditional Jewish sources of authority. While some Reform religious leaders promote adherence to select components of halakhah and traditional Jewish theology, others consider such practices to be inconsistent with Reform principles. Given Reform Judaism's emphasis on personal autonomy in matters of faith, both of these positions are considered acceptable.

Conservative Judaism occupies some of the vast middle ground between Orthodox and Reform Judaism. It, too, emerged as a reaction to the changes precipitated by the European Enlightenment and Jewish emancipation. In Europe, this movement was originally called Positive-Historical Judaism, and is still known as the Historical movement. In the United States it became known as Conservative Judaism. In Israel and England, it is referred to as Masorti Judaism. Conservative Judaism embraces a strong commitment to traditional elements of Jewish observance, while simultaneously accepting the potential usefulness of contemporary critical (i.e., secular) scholarship on Judaism's sacred texts. As such, Conservative Judaism maintains a commitment to halakhah, but sees halakhic authority as continuing to evolve in the modern era.

Reconstructionist Judaism, which emphasizes Judaism as a religious civilization, was developed by Mordecai Kaplan, an American rabbi trained in the Conservative tradition, during the 1930s. It formally assumed the status of separate denomination when the first Reconstructionist Seminary was founded in 1968. Like Reform Judaism, Reconstructionism privileges personal autonomy in matters of faith over traditional understandings of Jewish law and theology. However, this movement also promotes a number of traditional practices, including the observance of holidays, the use of Hebrew prayer services, and the wearing of yarmulkes (i.e., skullcaps). In Reconstructionism, individual congregations are free to accept or reject these practices, based on the wishes of their congregants. There are some significant theological differences between Reconstructionist Judaism and the other three major movements. For example, Reconstructionism rejects the idea that the Torah was delivered by God; rather, the Torah is considered a product of the social and historical development of the Jewish civilization.

Although there are religious Jews of many ethnicities and nationalities, there are two generally recognized ethnicities that are distinctly Jewish: Ashkenazim and Sephardim. Ashkenazim are descended from Jews in Eastern Europe, as well as Germany and Austria, while Sephardim trace their ancestry to the Mediterranean region, including Spain, Portugal, and North Africa. The traditional language of Ashkenazic Jews is Yiddish, while Ladino is that of Sephardic Jews. Neither of these languages is spoken widely today, and Ladino has all but disappeared from use. While

there are many points of overlap in customs between the two groups, there are also many points of divergence. For example, it is customary among both groups to eat foods fried in oil during the festival of Chanukah, but the holiday's signature food differs: for Ashkenazim, it is the potato pancake (called a *latke*), while Sephardim indulge in fried donuts known as *sufganyot*.

Source: © iStockphoto/Israel Talby.

In the west, many secular Jews base their Jewish identities on shared history, a sense of peoplehood, and an investment in cultural Judaism. Some elements of cultural Judaism include specific foods (many of which have been incorporated into the non-Jewish mainstream, such as bagels), distinctive folk music called *klezmer*, and a particular style of Jewish humor (for example, Woody Allen). For many secular Jews, pride in the survival of the Jews as a people, through many historical episodes of persecution, expulsion, and attempts at annihilation, serves as the foundation of their sense of Jewishness. Some of the most notorious examples of such threats to Jewish survival include the Spanish Inquisition, Russian pogroms, and the Nazi Holocaust. In general, ethnic Jews reject the notion of "racial" Judaism, given the history of this concept's relationship to anti-Semitism.

Among the consequences of the resolution of the Second World War was the establishment of the State of Israel as a Jewish homeland. After over two thousand years spent largely in Diaspora, Jews established their own nation, one in which all Jews are guaranteed citizenship irrespective of their nation of birth. However, Israel's Law of Return (the statute granting citizenship to all Jews) requires some level of agreement about the answer to the question, "Who is a Jew?" Given the significant rifts that exist between religious Jews and ethnic Jews (as well as those among the various denominations of religious Judaism), the answer to this contentious question has taken on political as well as cultural dimensions. In Israel, where most Jews are either Reform or secular/ethnic, the halakhic criteria for determining Jewish identity (supported by the Orthodox movement) serve also as the political criteria for determining immigration eligibility under the Law of Return.

Some observers worry about the long-term impact of the rifts among Jews on Jewish unity and the survival of Jewish "peoplehood." Is there still a central link connecting all who claim to be part of "the Jews"? If so, can the center hold, given the varying definitions pulling from the periphery? Since the establishment of the State of Israel, some view Judaism as a matter of nationality. However, Jews can be (and are) citizens of many nations, and non-Jews can be (and are) citizens of Israel. Others view Judaism as a matter of culture, since many consider themselves Jewish without being religious. For those religious Jews who are faithful to halakhic law and traditional Jewish theology, even those raised in a culturally Jewish environment, they are Jewish only if born to Jewish mothers or converted through an halakhically approved process. The contemporary situation of the Jews is best defined as one in flux, with the outcome of the identity challenges still to be determined.

— *Marianne Cutler*

See also **Anthropology of Religion; Cosmology and Sacred Landscapes; Ethnocentrism**

Further Readings

Cheyette, B., & Marcus, L. (1998). *Modernity, culture, and "the Jew."* Cambridge, UK: Polity Press.

Fishman, S. B. (2000). *Jewish life and American culture.* Albany: State University of New York Press.

Freedman, S. G. (2000). *Jew vs. Jew: The struggle for the soul of American Jewry.* New York: Simon & Schuster.

Hertzberg, A., & Hirt-Manheimer, A. (1998). *Jews: The essence and character of a people.* San Francisco: HarperCollins.

Margolis, M. L., & Marx, A. (1977). *A history of the Jewish people.* New York: Atheneum.

Prager, D., & Telushkin, J. (1981). *The nine questions people ask about Judaism.* New York: Simon & Schuster.

Stratton, J. (2000). *Coming out Jewish: Constructing ambivalent identities.* London: Routledge.

Telushkin, J. (1991). *Jewish literacy: The most important things to know about the Jewish religion, its people, and its history.* New York: William Morrow.

Jews and Pseudo-Anthropology

When anthropology emerged as a science in the mid- to late 1800s, it was almost immediately corrupted by the biases of some of the individuals who pioneered it. The politics in Europe at the time had shifted heavily toward anti-Semitism. Because anthropology was a fledgling science, it was easy for these prejudices to infiltrate because there were no scientific precedents to refute them. Initial scientific classifications of the human species were ridden with racism as well as social and religious biases. Presented as scientific fact, these prejudices became established in the ideology of European society.

While there were anthropologists trying desperately to refute these racist notions, they found themselves deprived of support and funding because they did not share the views of those in power. Although many scientists in the field of anthropology were of Jewish decent, few of them spoke out for fear of being further repressed. Many of the dissenters were innovators in anthropology who emphasized the role of cultural and social environments over biology and inheritance. Scientists such as Franz Boas, Melville Herskovits, and Margaret Mead realized that racism was used as a political tool, distorting the scientific facts regarding the physical variations within our human species.

The new science of anthropology was used by some to justify already established prejudices against certain ethnic groups, in particular the Jews. Some claimed that the Jews were not only inferior but also not even a part of the species. These radical racial classifications made it easier to look at those that are physically different as being genuinely subhuman. Even Darwin's theory of evolution, with its explanatory phrase "survival of the fittest," was seen as a reason for the Jews to be eliminated in order for European culture and society to prosper. This context can in some way help to explain how so many sat by as an entire group of people were being systematically killed off.

At the beginning of the 20th century, it was argued that there were between three and five (or more) distinct races within Europe; this discrepancy in number indicates that the facts behind these claims were less than reliable. Textbooks published in the 1920s varied greatly, but contained similarities in the ways in which they presented characteristics of each race. Surprisingly, very specific details were often provided as to the physicality of a person in each of these classifications. These texts provided average heights, weights, and even cranial circumferences for entire groups of people. Such measurements could never have been taken using the appropriate scientific method to make such generalities, particularly within an evolutionary framework.

Five of the most common groups described were the Nordic, Mediterranean, Alpine, Dinaric, and East Baltic races. It is evident from reading such descriptions in early 20th-century literature that there were obvious biases. The Alpines and Baltics were often described as dull in appearance, the Dinaric race looked defiant, and the Nordics and Mediterraneans were characterized as sophisticated and elegant. Each description carries connotations that create a definite hierarchy with the Nordics and Mediterraneans on top and the Alpines and Baltics below.

This hierarchy was not restricted to the five European races. Jews were listed as a subdivision within each group. Jews were depicted as being shorter and narrow chested, with a diminished lung capacity. They were said to be brunettes with thick, hooked noses and bushy eyebrows. Their skin was often

described as swarthy and their chins were said to be pointy beneath a mouth filled with oddly shaped teeth. The general characteristics that describe those of Jewish decent were ridden with negative overtones that diminished the status of Jews within every society.

The intermixing between Jews and the rest of the European races is what angered some people the most; it is what the Nazi party used as propaganda in Germany to gain support for their anti-Semitic policies. Hitler himself stated that he felt Jews and humans shared a common evolutionary path. Yet, he believed that at some point that common path split, placing the humans and Jews on separate branches. By integrating scientific concepts, such radical statements can sound plausible to a naive society. Unfortunately, many physical anthropologists and biologists of this time period used their science to spread biases that were beneficial to the Nazi cause.

Other new fields of science, such as genetics, were emerging, and they would eventually provide information that would be used to dispute these racial classifications. The genetics revolution in racial theory shifted the focus from physical characteristics (phenotype) to the DNA molecule (genotype); however, with the onset of World War II, some people that were able to experiment in these fields were the Nazis themselves. It has been discovered since that their methods of experimentation were even more atrocious than the theories that fueled them. The horrors of the Holocaust motivated some in the scientific community who had previously refrained from voicing opposition to take serious action. Fortunately, the field of genetics continued to advance and began to amend the public's perception regarding race and racism.

Today, anthropology has a more comprehensive view of our human species. By incorporating the studies of the physical and cultural aspects of humanity, one is able to see that humankind as *Homo sapiens sapiens* is a unified species sharing the same genetic foundation, but manifesting major sociocultural differences. No longer can groups of people be placed into a hierarchy based on physicality. As anthropologist and philosopher H. James Birx states: "There is only one human race, or there are over 6.5 billion human races on earth."

— Derik Arthur Kane and Jessica M. Masciello

See also **Genocide**

Further Readings

Boas, F. (1940). *Race, language, and culture.* New York: Macmillan.

Gershenhorn, J. (2004). *Melville J. Herskovits and the racial politics of knowledge.* Lincoln: University of Nebraska Press.

Gunther, H.F.K. (1927). *The racial elements of European history.* London: Methuen.

Ripley, W. Z. (1919). *The races of Europe: A sociological study.* New York: D. Appleton.

Johanson, Donald C. (1943–)

American paleoanthropologist Donald Johanson is most notable for his discovery and interpretation of the fossil hominid *Australopithecus afarensis.*

Originally born in Chicago, Illinois, of Swedish immigrants, Johnson faced adversity early in life. After the death of his father when Johanson was 2, his mother moved him to Hartford, Connecticut. Johanson's interest in anthropology was stimulated early in life by Paul Leser, a neighbor who taught anthropology at the Hartford Seminary Foundation. Through exposure to various cultures, Johanson's interest in our species' past developed quickly. Although Johanson decided to become an anthropologist in high school, Leser discouraged his anthropological interest in favor of his aptitude in chemistry. Encouraged to pursue science, Johanson attended Illinois State University for chemistry; however, his interest in anthropology grew stronger, eventually leading him to switch majors from chemistry to anthropology, whereby he participated as an archaeologist in the Midwest. Not completely satisfied with the coursework at Illinois, Johanson eventually transferred to the University of Chicago, where he received all of his degrees (BA, MA, and PhD).

In addition to his scholastic endeavors, Johanson was named curator at the Cleveland Museum of Natural History in 1974 and subsequently developed its affiliated Laboratory of Physical Anthropology. Johanson later relocated to Berkeley, California where he founded the Institute of Human Origins. At this publication date, both Johanson and the Institute of Human Origin are at Arizona State University, Tempe, Arizona.

Source: © Morton Beebe/CORBIS.

represented at the Wenner-Gren conference, the prospect of new hominid began to stir interest. During Johanson's second expedition to Hadar, he found Lucy at Locality 162. Lucy was described as a three-and-a-half-foot-tall, bipedal hominid with a small brain. Unlike larger jaws found at the site, Lucy's jaw was V-shaped with one cusp premolar. This fact led Johanson to believe that Lucy was an early representative of australopithecines. This find would only be outdone by the discoveries that followed during the next season.

The third season would prove to be most successful. On a slope known as Site 333, Johanson and his team found bones of what appeared to be a band of hominids who met their demise, only to be uncovered by the eroding rains of Hadar. Although the site lacked animal remains, it yields enough evidence to suggest that these hominids were not related to Lucy, the hominid discovered the previous season. These hominids were considered primitive *Homo* and dubbed "the First Family." The fourth season at Hadar was used to recover the remaining fossils for interpretation. Besides the recovery of other fragments including an exquisite jaw, the recovery of stone tools was an additional triumph. Although tools of Oldowan and Acheulean were well known and dated, the tools at Hadar would prove to be nearly impossible to date, leaving much to interpretation in the following months.

Interpretation of Johanson's evidence created taxonomical issues for the various hominids discovered up to Johanson's find. Opinions on the placement of this hominid spans the spectrum, creating havoc with the established descent of our own species. The traditional family tree before Johanson's discovery was *A. africanus* leading to *H. habilis,* then *H. erectus,* ending with our own species *H. sapiens.* The *A. robustus* was seen as an extinct branch splitting around 1.5 million years ago; however, Johanson's discovery of *A. afarensis* changed that view. With the dating of *A. afarensis* going back 3.5 million years, the Johanson specimen would

Contributions and Perspectives

Johanson's most significant contribution was the discovery and interpretation of the fossil hominid, which he named *Australopithecus afarensis.* Although his first discovery was dubbed "Lucy" during the excavation, the Hadar collection AL 288–1 would prove to be a single specimen that challenges the traditional taxonomical sequence of the human evolutionary line.

Discovered during what could be considered the latter half of the great hominid discoveries, in the early 1970s, Johanson set out to search for fossil hominids in Hadar, Africa. The area of Hadar was perfect for recovering fossils. Hadar was once an ancient lake bed that is now rock, sand, and gravel. Due to the soil's inability to absorb rainfall, runoff tends to erode the soil, uncovering fossils that lie underneath. Johanson's first field season at Hadar yielded a proximal tibia, a condyle, and a distal femur. Johanson quickly realized the relationship among the three specimens; discounting human or monkey remains, the knee joint specimen had to be a fossil hominid. Confirmed by Mary and Richard Leakey, this knee joint was the first to be analyzed by anthropologists. An early estimated age of 3 to 4 million years gave Johanson proof of the oldest bipedal specifmen to date, causing debates and a reanalysis of hominid phylogeny.

Although the initial description of this small bipedal creature (for the analysis was far from complete) had yet to gain acceptance by the scientific community

be considered the oldest hominid to date. According to Johanson and White, *A. afarensis* is ancestral to all known hominids. Leading to our species, *A. afarensis* led to the *H. habilis, H. erectus,* and *H. sapiens* (all Homo species having association with tools). On the *Australopithecus* side, the extinct line leads from *A. afarensis* to *A. africanus,* to *A. robustus.* When considering the age, bipedality, and location, the logical placement of *A. afarensis* seems to support Johanson's conclusion. Although there have been more discoveries and phylogenic analysis in recent years, Johanson's discovery remains an important part of human evolution.

— *David Alexander Lukaszek*

See also **Australopithecines; Bipedal Locomotion; Leakey, Mary; Leakey, Richard E. F.; Lucy Reconstruction Models; Paleoanthropology**

Further Readings

Edey, M. A., & Johanson, D. C. (1992). *Blueprints: Solving the mystery of evolution.* New York: Little Brown.

Johanson, D. C., & Edey, M. A. (1981). *Lucy: The beginning of humankind.* New York: Simon & Schuster.

Johanson, D. C., & Edgar, B. (1996). *From Lucy to language.* New York: Simon & Schuster.

Johanson, D. C., & Shreeve, J. (2000). *Lucy's child: The discovery of a human ancestor.* New York: Avon.

McHenry, H. H. (1982). The pattern of human evolution: Studies on bipedalism, mastication, and encephalization. *Annual Review of Anthropology, 11*, 151–173.

Skelton, R. R., Mc Henry, H. M., & Drawhorn, G. M. (1986). Phylogenetic analysis of early hominids. *Current Anthropology, 27*(1), 21–43.

DONALD C. JOHANSON

Donald Carl Johanson, an American anthropologist, is also known as Benjamin Earl Johnson, and as Ayubu Johnson. His legacy includes important fossil discoveries that have expanded the scant knowledge previously available on human origins, adding new species to science and new proposals for arranging the human family tree.

In 1972, Johanson and Maurice Taieb, a French geologist, explored the Afar Triangle of Ethiopia for fossils. Their explorations revealed a fossil-rich area. In 1973, Johanson helped to organize the International Afar Research Expedition to explore a promising site in the Afar area. In October of that year, Johanson, leading the expedition, unearthed a fossilized knee joint that was dated as 3.5 million years old. The importance of the find lay in the proof it offered that human stature and bipedal locomotion dated from such early origins.

In 1974, Johanson returned to the Afar site. This time, he discovered a complete skeleton. The skeleton was the oldest known to anthropologists. He called the find "Lucy" after the hit Beatles' song "Lucy in the Sky with Diamonds." Analysis of Lucy showed that she was a biped that walked upright, and therefore she was not an ape, although she had an apelike brain. She was given the scientific name *Australopithecus afarensis* (that is, "Afar southern ape").

Johanson concluded that Lucy was the "missing link" to the common ancestor of humans and apes. Johanson's hypothesis, if sustained, would overturn the traditional theory espoused by the Leakeys that brain enlargement came before or at least with the development of bipedalism and tool making.

Johanson's interpretation of the theory of human evolution contradicts the theory espoused by the Leakeys. Specifically, Johanson rejected the theory of the Leakeys that humans descended from earlier members of the genus *homo.* He argued that humans descended from *australopithecines* of which Lucy is a representative.

In 1986, Johanson led an expedition to the Olduvai Gorge in Tanzania. That year he discovered a 1.8-million-year-old skeleton of the earliest of the direct ancestors of humans, *Homo habilis.*

— **Andrew J. Waskey**

JONES, WILLIAM (1746–1794)

Sir William Jones was a British polymath whose scholarly research and vision were critical to both modern linguistics and Indology. In his founding

of the Asiatic Society in Calcutta in 1784 and the journal *Asiatic Researches,* Jones set forth a broad, interdisciplinary program of research in Indian languages, religions, history, law, natural history, medicine, and botany that represent anthropology at its finest, and that deeply challenged colonial attitudes of the times.

Jones received a classical education in England, which he supplemented with studies of Arabic and Persian. In his early 20s, he became known for his translations from Persian poets and his grammar of Persian. He did not inherit wealth, so he supported himself as a tutor to the son of the Spencer family, and then studied law. His plan was to obtain a position as a judge in India where he could both conduct scholarly work and save enough money to support his later studies; however, Jones differed with the leadership in England on the American War—he was a friend of Benjamin Franklin—and so was relegated to work as a barrister riding legal circuits until the American War was over, when he finally received his appointment to the Supreme Court of Bengal, one of the three British-run provinces in India. He requested and obtained knighthood just before he left for India. His legal training and interest in comparative law were to affect his understanding of culture, presaging the importance of the comparative study of law for anthropology.

When his ship entered the Indian Ocean near the end of the 5-month voyage to India, Jones had a vision of the vastness of Asia, its sciences and arts, its great diversity and geniuses, all largely unexplored by Europeans. Jones arrived in India in 1783, and in early 1784 founded the Asiatic Society to begin to remedy this lack of knowledge through broad, interdisciplinary study. As Jones put it in his initial address to the Society, "Our objectives are Man and Nature: Whatever is performed by the one, or produced by the other." A more succinct focus for anthropology is hard to imagine.

Jones saw that instead of just taking from India, the British could also make contributions through scholarship. He recognized the need for interaction among scholars and for cooperation and learning from local scholars. In colonial times, the thought that Europe could learn from India, let alone Indian scholars, was radical. Jones studied with local scholars on a daily basis, worked to have their research read at Asiatic Society meetings, and established an award for their finest work—all to encourage cooperation and change in attitude among fellow Europeans.

It was Jones's legal work in India that led to his study of Sanskrit. He believed that the local Hindus and Muslims should be tried according to their own laws and customs. Jones's opinion lined up with the policy of the East India Company, which also understood non-interference in local ways to be in their best interest. But in carrying out local law, British justices were forced to depend on local pundits for understanding of Muslim and Hindu law, a practice which invited corruption. Jones's knowledge of Persian and Arabic provided a sound basis for his scholarship on Muslim law, but for Hindu law he needed Sanskrit. In his first year in India he began study of classical Indian music and Hindu deities and texts, translated through Persian. When he finally decided that he must study Sanskrit himself, it was not easy, for many Indians did not think it appropriate for a Westerner to study their sacred language.

Jones was already fluent in 13 languages and competent in 28 others, yet Sanskrit, the last language he would study, held a special place for him. In his studies, he became aware of the excellence of Sanskrit phonetic description, ascribed to the Sanskrit scholar Panini. Yet Jones's contribution would not be in descriptive linguistics, but rather in explaining the relation between many European languages, some Middle Eastern ones, and Sanskrit, a relation that was profoundly disturbing to ethnocentric Europeans of the time.

Jones noted the affinity of Sanskrit with the classical languages of Greek and Latin, and then explained this relationship as due to a common source that no longer exists. Earlier scholars had noted the similarities of Greek and Latin, as well as similarities of Germanic languages. Several scholars (Sasetti, 1585; Coerdoux, 1767) had also noted an affinity between Greek and Sanskrit, including Scottish Lord Monboddo (1774), an acquaintance of Jones. But it was Jones who first gave a clear explanation for the similarities, and who first described languages coming from a common source as a "language family." The postulate of a common source language that no longer exists became known as a *proto-language*; the language family to which Sanskrit, Greek, and Latin belonged became known as the Indo-European language family. At the Third Anniversary Address of the Asiatic Society in Calcutta in 1786, Jones first presented this

research within the context of addressing the origins of the five main Asiatic peoples.

> The Sanscrit language, whatever be its antiquity, is of a wonderful structure; more perfect than the Greek; more copious than the Latin, and more exquisitely refined than either, yet bearing to both of them a stronger affinity, both in the roots of verbs and in the forms of grammar, than could possibly have been produced by accident; so strong indeed, that no philologer could examine them all three, without believing them to have sprung from some common source, which, perhaps, no longer exists; there is a reason, though not quite so forcible, for supposing that both the Gothick and the Celtick, though blended with a very different idiom, had the same origin with the Sanscrit, and the old Persian might be added to the same family.

Jones's genetic model of language owes inspiration to the taxonomic work of Linnaeus, which Jones deeply admired. By the same token, Charles Darwin would later draw inspiration from Jones's explanation of the relationships of languages, and their implied mutability, in his theory of evolution and the relationships of forms of life. In the analogy between language and biology, language families are similar to genera, languages to species, dialects to varieties, and idiolects (the language form of an individual) to individual animals or plants.

A less well-known influence on Jones's analytical work in relating languages was his experience with evidence in the courtroom. This was a time when many still explained the multitude of languages in the world as a result of the Tower of Babel. Those not confined to literal interpretation of this Biblical story often confused *borrowings* with *cognates*. It is common for languages to borrow words from other languages in which they are in contact. But cognates show that the languages are indeed related. Notice the multiple types of evidence—"in the roots of verbs and the forms of grammar"—not just in separate words, in Jones's famous explanation from the Third Anniversary Address of the Asiatic Society. This careful use of evidence is the basis for all sound scholarship, and it informed Jones's work from translations to botany.

Overall, Jones's explanation of the relation of languages led to modern linguistics, specifically to what became known as historical or comparative linguistics, that flowered in the 19th century as scholars put forward "laws" of phonological change in languages and classified other language families. Jones's design of broad, interdisciplinary research for the Asiatic Society of Bengal served as the prototype for systematic field research. And Jones's work as the first Westerner to write on classical Indian music, the first person to put forward a classification of Indian plants and animals, and his emphasis on the importance of study of Hinduism and Sanskrit, initiated the field that became known as Indology. His work in compendia of Muslim and Hindu law is important in the legal systems of South Asia to this day. For anthropology, Sir William Jones's work is a testament to the profound importance of the study of language in research.

— *Frances Trix*

See also **India, Philosophies of; Language, Classification of; Linguistics, Historical**

Further Readings

Cannon, G. (1990). *The life and mind of Oriental Jones.* New York: Cambridge University Press.

Chaudhuri, S. (Ed.). (1980). *Proceedings of the Asiatic Society: 1784–1800, 1.* Calcutta: Asiatic Society.

Justice and Anthropology

Justice refers to the constant and perpetual disposition of legal matters or disputes to render every person his or her due. The concept of justice traces its origin to the Greek language. The Greek work "dike" corresponds to the idea of staying in one's assigned place or role. The Greek philosophers Plato and Aristotle developed definitions of justice. Plato believed that justice means maintaining society's order with each person performing his natural role. Aristotle described justice in terms of proportion and equality. Aristotle believed that justice means treating individuals with fairness, and it is a matter of distributing goods in their right proportion.

Although law and justice are related concepts, they have distinct definitions. Law, in its generic sense, is a

body of rules or action or conduct prescribed by a controlling authority and having binding legal force. Justice, on the other hand, emphasizes fairness and rights. It implies the moral and impartial treatment of all persons, especially by the legal system of a society. However, conceptions of justice may come into conflict with the legal system of a society. For example, legal scholars as well as social scientists now consider laws that supported slavery as unjust laws. Anthropologists and legal scholars also debate justice from the points of view of moral relativism and moral objectivism. Moral relativists argue that justice has different meanings in different societies and that what one society considers unjust may not have that meaning in another society. Therefore, the anthropologist must seek to understand the meaning of justice in a particular society. Moral objectivists argue that there are standards of justice that can be used to judge the treatment of persons in every society. While the traditional training of anthropologists criticized value-based anthropological research, more recently the field of anthropology encompasses many anthropologists who espouse a moral objectivist position and who criticize the treatment of persons in the society they are studying from a perspective of social justice.

Scholars also distinguish three major types of justice: *distributive*, *commutative*, and *corrective*. Distributive justice is concerned with analysis of the distribution of the benefits and burdens of society. Most discussions of distributive justice concern the measurements that societies use to allocate society's resources, such as need, rank, agreements, or merit. Commutative justice deals with how to achieve a fair resolution between individuals when people believe they have been wronged. The purpose of commutative justice is to render to a person what belongs to that person in such a way that no one gains by another's losses. Corrective justice is concerned with how people should be punished for wrongdoing. It seeks to define what is considered fair punishment and what is considered a fair process for determining guilt before imposing punishment.

Anthropologists typically examine justice from one of three paradigms: functionalism, conflict, or pluralism. The functionalist paradigm characterizes society as a community consisting of like-minded individuals. Functionalists view law as a unifying force in society because it is a tool for resolving disputes and achieving justice. The conflict perspective relies on a Marxist conception of power, characterizing law as a tool of the powerful in society who want to maintain the status quo. Conflict theorists argue that the powerful write laws for their own benefit, resulting in the existing system of social inequality containing many laws that are unjust because they oppress the poor and other marginalized groups. The pluralistic paradigm seeks to provide a more complex understanding of justice issues in a society. Pluralists emphasize that justice is defined by interest groups in society, but these interest groups can change over time. This perspective also argues that interest groups may hold diverse ideas of justice that may be contradictory to one another.

Early anthropological studies of justice were largely conducted in non-Western societies and emphasized discovering the rules used to solve disputes. For example, Bronislaw Malinowski (1884–1942), studied the Trobriand Islands of Melanesia where he applied and discovered the importance of reciprocity, an exchange system based on mutual services between individuals and groups, as the basis for law, and consequently for social order. Malinowski posited that the obligations associated with reciprocity have the social function of safeguarding the continuity and adequacy of mutual services. He concluded that the obligations associated with reciprocity are the primary social bonds in Trobriand society.

In the 1970s, in addition to examining the rules used to resolve disputes, anthropologists also studied the processes by which disputes are resolved within the sociocultural context of a community. Through such observations, anthropologists learned that people often managed their legal disputes and arrived at a just outcome through a system of informal, negotiated settlements among parties rather than court-centered approaches. For example, Laura Nader used the concept "harmony ideology" to interpret her work on dispute resolution in a Mexican-Zapote mountain village. Nader argued that the reason people presented themselves as resolving all disputes harmoniously was part of a political strategy to keep colonial authorities from meddling in village affairs.

In the 1980s, anthropologists continued to study justice from the perspective of dispute resolution; however, this research began to emphasize a concern with issues of stratification and power. Anthropologists also expanded their scope of inquiry to

include such concerns as the field of human rights, prisoners, migrants, refugees, and other issues. As they expanded their scope of inquiry, anthropologists examined how law as a system of meaning presents a social construction of the world as just; that is, law, as an ideology, is embedded in the cultural meanings of a society. More recently, this approach frequently examines justice issues within the context of globalization. For example, some anthropologists report persecutions and other atrocities of peoples. This includes analyzing the tension between local formulation of human rights and its global counterpart; i.e. the ideology of international human rights. In addition, some anthropologists will endorse a particular definition of human rights and they may identify the kind of political systems that can provide these rights. These anthropologists hope to contribute to the social construction of a just world.

— *Patricia E. Erickson*

See also **Human Rights and Anthropology; Jones, William; Law and Society; Malinowski, Bronislaw; United Nations and Anthropology; Values and Anthropology**

Further Readings

Bohannan, P. (1957). *Justice and law among the Tiv.* London: Oxford University Press.

Conley, J. M., & O'Barr, W. M. (1998). *Just words: Law language and power.* Chicago: University of Chicago Press.

Likosky, M. (Ed.). (2002). *Transnational legal processes: Globalization and power disparities.* New York: Butterworth.

Malinowski, B. (1976). *Crime and custom in savage society.* Totowa, NJ: Littlefield, Adams & Co.

Moore, S. F. (1978). *Law as process: An anthropological approach.* London: Routledge & Kegan Paul.

Nader, L. (1990). *Harmony ideology: Justice and control in a Zapotec mountain village.* Stanford, CA: Stanford University Press.

Rosen, L. (1989). *The anthropology of justice: Law as culture in Islamic society.* Cambridge, MA: Cambridge University Press.

Sack, P., & Aleck, J. (Eds.). (1992). *Law and anthropology.* New York: New York University Press.

Starr, J., & Collier, J. F. (Eds.). (1989). *History and power in the study of law: New directions in legal anthropology.* Ithaca, NY: Cornell University Press.

K

Kant, Immanuel

Immanuel Kant was born on the 22nd of April, 1724, in Koenigsberg, Prussia (now Kaliningrad) and he died in the same city on the 12th of February, 1804. He was the fourth of nine children of his parents, Anna Regina, neé Reuter, and Johann Georg Kant, who both belonged to a Pietist branch of the Lutheran Church. When Immanuel Kant was eight, he entered the Piestist school, Friedrichskollegium, and remained there until 1740. As his parents were rather poor, he was dependent on financial support from Franz Albert Schultz (1692–1763), who had realized Kant's immense talent, and who was headmaster of Kant's school, professor of theology, and pupil of the famous German thinker of the Enlightenment, Christian Wolff (1697–1754).

Kant's mother died in 1737 while he was still at school. From 1740 to 1746, the year his father died, Kant attended the University of Koenigsberg, studying philosophy, mathematics, natural sciences, and theology. After university, Kant earned his income as a private tutor for three families in the area of Koenigsberg. In 1755, he completed both his doctoral degree (*Meditationum quarundam de igne succinta delineatio*), as well as his habilitation (postdoctoral qualification) thesis (*Principiorum primorum cognitionis metaphysicae nova dilucidatio*).

In autumn 1755, he started to lecture at the University of Koenigsberg, and he had to finance himself from the fees he received from his students. The first time Kant had a salaried post was in 1766 as a librarian. Later, he was offered various professorships (e.g., Erlangen, Jena), which he turned down. He had to wait until 1770, when he was already forty-six, to become Professor of Logic and Metaphysics at the University of Koenigsberg. Eleven years later, Kant's groundbreaking work, *Kritik der reinen Vernunft* (*Critique of Pure Reason,* 1781) was released. Schopenhauer named it the most important book ever written in Europe; however, initial response was not so favorable. As a consequence, he wrote the *Prolegomena zu einer jeden künftigen Metaphysik* which was published in 1783, the same year Kant bought himself a house. In 1785 Kant published the *Grundlegung zur Metaphysik der Sitten;* in 1787 the second edition of the *Kritik der reinen Vernunft;* in 1788, the *Kritik der praktischen Vernunft;* and in 1790, the *Kritik der Urteilskraft.* In 1793, Kant published *Die Religion innerhalb der Grenzen der bloßen Vernunft,* and it was this work that brought him into conflict with state authorities who wished to censor the work. A year later, he even wrote a second treatise on the philosophy of religion, *Das Ende aller Dinge.* As a consequence, he received an official letter accusing him of degrading Christianity and violating his duties as a teacher of youth. Even though he rejected the accusations, he agreed to refrain from writing further works about the philosophy of religion. *Zum ewigen Frieden* (1795), was Kant's first book after his conflict with the authorities, and *Die Metaphysik der Sitten* was released in 1797. In *Anthropologie in pragmatischer Hinsicht* (1798), Kant published further material on the philosophy of religion since Friedrich Wilhem II, who was mainly responsible for the intolerant political atmosphere, had died. In October 1803, Kant became seriously ill. He died on the 12th of February, 1804.

Reason

Reason is a faculty for gaining knowledge. Kant wrote critiques of aspects of reason in order to find out what can be known. In doing so, he did not condemn

Source: Courtesy of the Library of Congress.

reason, but rather determined its limits and sources. In the end, Kant rejected both empiricism and rationalism as appropriate theories of knowledge. There are purely rational ideas, but only as regulative principles, which means the ideas are connected to empirical data. Kant employed the following distinctions for his investigations: *a priori/a posteriori*; and *analytic/synthetic*. A priori judgments are judgments independent of empirical experiences. A posteriori judgments are judgments founded in empirical experiences. Analytic judgments are judgments in which the predicate is already contained in the subject. Synthetic judgments are judgments in which the predicate is not contained in the subject but provides further information about it.

According to Kant, reason has both a material and a formal aspect. The formal aspect of reason is concerned with laws of thinking irrespective of any object, or general logic. General logic does not have any material aspect, as it solely rests on the necessary laws of thinking, deals with analytic, a priori judgments and is constituted from two aspects: Analytics, by means of which one positively tries to describe what understanding is capable of; and dialectics, by means of which one tries to rule out what reason is not able to achieve. Reason, in its narrower sense, is the highest source of knowledge, and it brings together whatever has already been structured by means of our understanding to establish the highest unity of thinking. Understanding also belongs to the higher sources of knowledge, but has a common root with sensibility. In addition, it is capable of structuring and linking anything given to it, and of establishing laws.

The material aspect of reason, on the other hand, deals with objects and the laws by which they interact. These laws are either laws of nature or laws of freedom. The science that deals with the laws of nature is called physics, whereas the science which deals with the laws of freedom is referred to as ethics. Both physics and ethics have empirical as well as nonempirical aspects. Whatever is nonempirical is rational and valid a priori, and all areas with which rational investigation is concerned are called types of metaphysics. In contrast to general logic, which deals with analytic, a priori judgments, metaphysics is supposed to help promote knowledge; it deals with synthetic, a priori judgments. However, it is far from obvious whether such judgments are possible. Consequently, Kant asked in his *Kritik der reinen Vernunft,* how are synthetic judgments a priori possible?

In his transcendental *Elementarlehre* (teaching of the main elements) Kant answered his question. His *Elementarlehre* addresses transcendental aesthetics, the transcendental logic wherein one can distinguish the transcendental analytic, and the transcendental dialectic. Aesthetics encloses the realm of the senses; analytic, the realm of understanding; and dialectic, the realm of reason. Within his transcendental aesthetics, Kant articulated that all sense perceptions must be structured within space and time as pure forms of intuition. Within his transcendental analytic, he explained that all thinking must be based upon the categories of, for example, causation. These are two of Kant's most influential insights.

As both physics and ethics have rational aspects, there is a metaphysics of nature (physics deals with laws of nature) and a metaphysics of morals (the nonempirical aspect of ethics is referred to as moral philosophy). Theoretical reason deals with the metaphysics of nature. There is an analytics of pure theoretical reason which progresses from sensual experiences to notions and then to principles. Practical reason

deals with the metaphysics of morals. There is an analytics of practical reason which progresses from the possibility of practical principles a priori to the notion of the objects of practical reason to moral feelings. Analytics is always concerned with notions (both of nature and of freedom) and principles. As a side note, rational investigations concerning the existence of God, the soul, and free will are impossible, according to Kant, as these things are beyond sense perceptions, and if one applies human forms of sensual perception (time and space) and human forms of thinking (e.g., causation) to things which are beyond sensual experience, one is led into contradictions.

Areas of study concerned with the empirical aspect of physics are now referred to as natural sciences. The empirical aspect of ethics is called practical anthropology. In practice, practical anthropology is the empirical investigation into all ethical questions. One must not forget that all laws, finally, are one aspect of reason. The formal aspect of reason deals with the laws of logic, and the material aspect of reason with laws of ethics and physics. One of the early Platonists, Xenokrates was the first to distinguish philosophy into categories of logic, ethics, and physics. This distinction played a vital role for Platonists and Stoics. Kant's ethics owe a lot to Cicero's, who in his final phase held a traditional Stoic position.

Kant distinguished between empirical and rational ethics. Empirical ethics is mostly practical anthropology; rational ethics, or the metaphysics of morals, is a rational investigation of moral law. The central aspect of the moral law is the will, as the will is responsible for one's acts. The will constitutes character, which can be good, evil or holy. Ethics is concerned with the law of freedom, forwithout the realm of freedom, human choices would be determined solely by drives ornatural instincts as all animals are. Since human beings also belong to the realm of freedom or reason, reason decides when to act according to instinct and when to act according to reason. As humans belong to both realms, it is impossible not to be affected by one of them. All humans act sometimes according to reason, and sometimes according to instincts. Whether thewill can be referred to as good or evil depends on which aspect is dominant. If a person acts mainly according to reason, then the will is good, if not, then it is evil. The moral law or the law of freedom has to be a law of duty, as individuals always have the inclination to act according to instinct and must force themselves to act according to reason. Once the inclination to act according to instincts is absent, the will is holy.

An individual acting according to reason bases actions on moral law which can be determined by the categorical imperative whose general formulation is, "Act so that the maxim may be capable of becoming a universal law for all rational beings" (Note: A maxim is the determining motive of the will). Each act that, if taken as a general rule, leads, for example, to the extinction of humanity, or to self-contradiction, does not fulfill the demands of this imperative. It is an imperative, as individuals are not inclined by instinct to act in accord with it. It is categorical, because it is unconditionally valid. Kant also mentions the hypothetical imperative that refers to all conditional connection without the end being a necessary one. If one wishes x, one has to do y, without y being a necessary motive for all rational beings. The moral law encloses the categorical imperative only.

To be able to base one's actions on the moral law, or to be autonomous—which is the same—is the reason for a being to have dignity. All rational beings can base their acts on the moral law, and all human beings are rational. Therefore, all human beings have dignity. In the realm of purposes, every thing either has a price, or dignity. That which has a price does have something that is its equivalent: It can be exchanged for something else. That which has dignity, on the other hand, is beyond all price; therefore, Kantian ethics exclude the possibility of calculations which are basic for a utilitarian. In utilitarianism, it can be justifiable for one person to kill another in order to save the life of a hundred,but Kantian ethics hold the dignity of one person as beyond all price.

As all rational beings have such dignity, one might wonder from what point a human being is rational. Rationality is linked to the capacity for making abstractions, forming concepts, and having a language. One might be tempted to infer that human beings achieve rationality around the age of three; however, Kant asserted that rationality is part of the immortal soul of a human being. Therefore, human beings already are in the possession of rationality before their bodies are able to express that capacity. Around the age of three, the body is able to express that capacity, but human beings are already rational from the time their bodies and souls are united. All these discussions are particularly relevant for the current bioethical debates, as dignity is a fundamental

part of many current constitutions, and Kant's concept of dignity is the most popular one.

—*Stefan Lorenz Sorgner*

See also **Bioethics and Anthropology**

Further Readings

Guyer, P. (Ed.). (1992). *The Cambridge companion to Kant.* Cambridge, UK: Cambridge University Press.

Jacobs, B., & Kain, P. (2003). *Essays on Kant's anthropology.* Cambridge, UK: Cambridge University Press.

Kant, I. (1900ff). *Gesammelte schriften* (Koeniglich Preussischen Akademie der Wissenschaften, ed.) Berlin: Akademie-Ausgabe.

Kardiner, Abram (1891–1981)

Abram Kardiner was a psychiatrist and pioneering psychoanalyst who made major contributions to psychological and psychoanalytic anthropology as well as to his own professions. He was particularly interested in the psychological adaptation of the ego to war, society, oppression, and culture. Kardiner is best known in anthropology for his concepts of *basic personality structure* and *projective systems.*

Kardiner was born in 1891 in New York City. He received a BA from City College (New York) in 1912, then completed a year of medical school at Cornell University. He entered the PhD program in anthropology at Columbia University, studying under Franz Boas and Alexander Goldenweiser for a year before returning to finish his MD at Cornell in 1914. Kardiner completed his internship and residency in psychiatry in New York City and joined the New York Psychoanalytic Society. In 1921 he went to Vienna for a six-month training analysis with Sigmund Freud, and also took the opportunity to attend lectures by Geza Roheim on psychoanalysis and anthropology. On his return to New York, Kardiner worked for a veterans hospital in the Bronx from 1922–1925, studying victims of "war neuroses" from World War I. He published *The Traumatic Neuroses of War* in 1941 and an updated version, *War Stress and Neurotic Illness,* in 1947. Kardiner is now credited with defining posttraumatic stress disorder (PTSD).

Kardiner co-founded the New York Psychoanalytic Institute in 1931, the first such training institute in the U.S. In 1933, the director, Sandor Rado, asked Kardiner to develop a course on the application of psychoanalysis to the study of culture. The first session had only two students, but the seminar eventually grew to a hundred and included many distinguished anthropologists. The standard practice was for an anthropologist to describe a culture; Kardiner would then analyze it in terms of his neo-Freudian ego psychology.

Ralph Linton came to Columbia in 1937 to replace Boas as chair of the anthropology department. Linton was introduced to Kardiner by the psychologist Abraham Maslow, who was a participant in the seminar and a former student of Linton. Linton joined the seminar and presented his studies of the Marquesans of the South Pacific and the Tanala and Betsileo of Madagascar for Kardiner's analysis.

Kardiner published his major contribution to anthropology, *The Individual and His Society* in 1939, with Linton as a contributor. This comprehensive, causal theory of the relationship between culture and personality is regarded by some as the seminal work in the "culture and personality" movement that eventually gave rise to the field of psychological anthropology, providing the theoretical basis for much cross-cultural research in the postwar years, beginning with *Child Training and Personality* by Whiting & Child (1953).

Kardiner postulated the existence of a basic personality structure (BPS) personality traits shared by members of a society as a result of common early experiences. This BPS included unconscious conflicts and anxieties that motivated behavior. He divided culture into primary institutions, which generated the BPS, and secondary institutions, which were expressions of the BPS. The primary institutions included older, more stable elements of a culture such as technology, economics, family structure, and child-training practices, while the secondary institutions included religion, ritual, folklore, mythology, taboos, and art. Secondary institutions were based on the psychological process of projection and served to satisfy unmet needs symbolically. Basically, Kardiner posited a congruence between childhood experiences and expressive culture, mediated by the BPS, the same kind of congruity that Freud identified between parents and gods in *The Future of an Illusion.*

One problem Kardiner encountered was the availability of cultural, but not psychological data on the societies investigated. Cora DuBois was a postdoctoral student studying with Kardiner in 1936–1937. In 1938, DuBois went to the island of Alor in the Dutch East Indies to conduct ethnographic fieldwork, gathering dreams, autobiographies, word associations, children's drawings, and intelligence and projective tests. DuBois's fieldwork provided a model for culture and personality fieldwork for the next decade or more. Upon her return to New York, DuBois's data were analyzed by Kardiner as well as by two psychologists. Kardiner saw the results as confirmation of his theory of a shared personality. But in her classic ethnography, *The People of Alor* (1944), which included chapters and sections by Kardiner, DuBois replaced the concept of basic personality with *modal personality*, referring to central tendencies in the personalities of members of a society that are not necessarily shared by all.

Kardiner's work was not well received by his colleagues at the Psychoanalytic Institute, and in 1939 he brought the seminar to the Department of Anthropology at Columbia, where it was called "Psychological Analysis of Primitive Cultures." In 1944, Kardiner left the Institute to become a clinical professor of psychiatry at Columbia and the cofounder of what became the Center for Psychoanalytic Training and Research.

In 1945, Kardiner published *The Psychological Frontiers of Society,* a further explication of his BPS theory, with analyses of the Comanche (studied by Linton), the Alorese (studied by DuBois), and Plainville, a small town in the Missouri Ozarks (studied by James West, a pseudonym for Carl Withers).

During World War II, Margaret Mead, Ruth Benedict, and others turned their attention to the psychology of the British, the Japanese, and other modern peoples, beginning the study of "national character," which Kardiner found superficial. After the war, Linton left Columbia, and Kardiner moved his seminar to the sociology department.

Kardiner sought to demonstrate the applicability of his BPS theory to modern, complex American society with the publication in 1951 of *The Mark of Oppression: A Psychological Study of the American Negro,* written with Lionel Ovesey. This study involved four years of intensive research with 25 individuals, and it identified common personality dynamics that African Americans had developed, according to Kardiner, to cope with discrimination.

In 1954, inspired by the Kinsey Report, Kardiner wrote *Sex and Morality* with Edward Preble. He returned to the subject of anthropology in 1961 with *They Studied Man,* a study of the beginnings of cultural anthropology that focused on the lives of ten scholars and the ethos of the times. His last book was *My Analysis with Freud: Reminiscences,* in 1977. Kardiner died in 1981 at the age of 90.

— *William Wedenoja*

Further Readings

Kardiner, A., & Linton, R. (1939). *The individual and his society: The psychodynamics of primitive social organization.* New York: Columbia University Press.

Kardiner, A., Linton, R., DuBois, C., & West, J. (1945). *The psychological frontiers of society.* New York: Columbia University Press.

Manson, W. C. (1986). Abram Kardiner and the neo-Freudian alternative in culture and personality. In G. W. Stocking (Ed.), *Malinowski, Rivers, Benedict and others* (pp. 72–94). Madison: University of Wisconsin Press.

Manson, W. C. (1988). *The psychodynamics of culture: Abram Kardiner and neo-Freudian anthropology.* New York: Greenwood Press.

Keith, Sir Arthur (1866–1955)

During his era, Sir Arthur Keith was one of the world's most prominent anatomists and defenders of Darwinism. As Keith himself noted in his autobiography, he seemed fated to espouse causes and theories that fail to carry conviction, a notion that became even more accurate than he realized when he wrote it in 1947.

Arthur Keith was born on February 5, 1866, in Old Machar in Aberdeenshire, Scotland. His father was John Keith and his mother, Jessie, was from the Macpherson family, also from Aberdeenshire. The family was sufficiently prosperous for Arthur to receive a good education at Gordon's College and Marishal College at Aberdeen University, where he graduated with first-class honors in 1888. Keith did

postgraduate study at Leipzig before spending three years in Thailand, officially on business for a rubber company, but also to collect botanical specimens for Kew. While in Thailand, Keith studied the musculature of the native monkeys; his thoroughly documented work earned him a medical degree in Aberdeen, as well as the Struthers anatomy medal in 1894, and remained influential for decades to come. During this period, Keith also did groundbreaking research in malformations of the heart.

From 1895 until 1908 Keith taught anatomy at London Hospital Medical College. He was a popular and effective teacher, and he wrote what became the standard textbook for the subject, *Human Embryology and Morphology* (1898), released in six editions. In 1908 Keith moved on to the important post of Conservator of the Hunterian Museum of the Royal College of Surgeons, a position he held until he retired in 1933. At the Hunterian, he set himself the task of reviving the scientific element of the College's program, both by his own lecturing and publishing, and by his ability to attract respected colleagues to associate with the College. He also attracted some major anatomical collections.

During his tenure at the College, Keith turned his attention away from anatomy to broader issues surrounding human evolution, in particular the question of the origin of different races. Keith achieved international prominence through championing the greatest of his lost causes, Piltdown Man. While not in a position to have originated the hoax himself, Keith did become one of Piltdown Man's most important advocates. In *The Antiquity of Man,* published first in 1915 and followed by seven impressions (two of them revised editions) Keith argued the case for Piltdown Man. He recognized fully the problems raised by the human-like skull and the simian mandible, as well as the difficulty in finding credible material of that age at the Piltdown site. But each problem was confronted honestly, relevant evidence was brought to light, and solutions were found. Keith was convinced not only that Piltdown Man was genuine, but also that he represented a common ancestor to *Homo sapiens* and Neandertal, which could be traced to the Pliocene. The only question Keith did not ask was whether the Piltdown findings were a hoax. Keith knew all the main players in the Piltdown affair and respected the professional integrity of each of them, even if his relations with Grafton Elliot Smith were strained.

Keith's last major contribution to anatomy was his work during World War I on the treatment of soldiers' wounds. His work in this area was published in 1919 as *Memoirs of the Maimed,* and it was reprinted in 1952.

As Keith approached retirement, he masterminded his last major project. Working with influential friends, Keith oversaw the creation of the Buckston Browne Research Farm at Downe, the village in Kent where Charles Darwin spent the greater part of his life. Keith and Browne (1850–1945) were also instrumental in converting Darwin's house at Downe into a museum. When Keith retired from the Royal College of Surgeons in 1933, he and his wife moved to Downe, taking over management of the research farm and writing.

Much of Keith's writing during the second half of his life was concerned with popularizing evolution for nonspecialist readers. In this he had the enthusiastic support of his friend Charles Albert Watts (1858–1946), founder of Watts & Co. publishers and chairman of the Rationalist Press Association (RPA). Keith had been brought up a Christian, but his science training slowly eroded those beliefs. By 1925 when he first spoke publicly on religious issues, Keith was a naturalist and an agnostic. He became an Honorary Associate of the RPA in 1923 and was active in the organization for the rest of his life. When Watts & Co. decided to publish a series of works of popular science called the Forum Series in 1926, Keith supplied four titles, more than any other contributor: *Concerning Man's Origin* (1928), which included Keith's 1927 presidential address to the British Association; *Darwinism and What It Implies* (1928); *The Construction of Man's Family Tree* (1934); and *Darwinism and Its Critics* (1935).

Keith was a regular contributor to the *Literary Guide* (the RPA journal), and all of the books written during the last three decades of his life were published by Watts & Co. The major titles included *A New Theory of Human Evolution* (1948), *Autobiography* (1950), and *Darwin Revalued* (1955). *A New Theory of Human Evolution* featured another of Keith's lost causes: the so-called amity–enmity principle of race competition as a feature of human evolution. Not surprisingly, the *New Theory* was reviewed positively in South Africa, but the irony was that Keith was not a white supremacist. While stressing the differences of the races, he never spoke in terms of superiority or inferiority. Keith dismissed white supremacism as "self

flattery." The amity–enmity principle can be traced to his 1930 Rectoral Address at Aberdeen University when he spoke of war as nature's pruning hook. But once again, Keith was neither a Lamarckian, nor a Social Darwinist, at least not in the cruder sense of the term.

—*Bill Cooke*

See also **Hoaxes in Anthropology**

Further Readings

Cooke, B. (2004). *The gathering of infidels: A hundred years of the Rationalist Press Association*. Amherst, NY: Prometheus Books.

Haddon, A. C. (1934). *History of anthropology*. London: Watts & Co.

Keith, A. (1929 [1915]).*The antiquity of man*. London: Williams & Norgate.

Keith, A. (1948). *Autobiography*. London: Watts & Co.

Stocking, G. W. (1995). *After Tylor: British social anthropology, 1888–1951*. Madison: University of Wisconsin Press.

Kennewick Man

On July 28, 1996, the random discovery of a skull on the banks of the Columbia River near Kennewick, Washington changed the climate of archaeology. Discovered by two teenagers and initially examined by James Chatters, forensic anthropologist, this skull had many characteristics indicating its Caucasian origin. Characteristics of the skull's teeth, however, suggested an extremely old specimen (around 5,000 years). Finding bones with Caucasian characteristics is not an unusual occurrence; however, potential dating of the bones to precontact times is certainly uncommon in North America. This incongruity became more pronounced after the recovery and examination of the remaining skeletal elements.

The analysis of the almost-complete skeleton suggested that the bones belonged to a 40- to 50-year-old male with Caucasoid features who was approximately 5 feet, 9 inches tall and had sustained injuries throughout his life. In his right pelvis was embedded a projectile point resembling those manufactured and used by the people who inhabited the Columbia Plateau between 4,500 and 9,000 years ago. This puzzle became increasing difficult for Chatters to solve; as a result, he decided to send a small piece of bone for radiocarbon dating in order to get a better sense of the age of the skeleton. The results of the radiocarbon dating came as a shock, making "Kennewick Man" one of the oldest skeletons in North America and beginning a seemingly never-ending battle over the specimen.

Because Kennewick Man was discovered on a portion of the Columbia River that is federal land maintained by the United States Army Corps of Engineers, the Native American Graves Protection and Repatriation Act (NAGPRA) came into play. NAGPRA was signed into law in 1990; it essentially states that if human remains are found on federal lands and their cultural affiliation can be established, those remains and associated grave goods must be returned to the affiliated tribe. The same portion of the Columbia River is also considered to be part of traditional homeland by the Umatilla tribe, as well as several other tribes in the area. As a result, by September of 1996, five tribes (Umatilla, Yakama, Nez Perce, Colville, and Wanapum) had jointly made a formal claim to the Kennewick Man skeletal remains. At this point, scientific study of the skeleton was halted. The Army Corps of Engineers took possession of the skeleton and announced intended repatriation of the bones to the alliance of tribes.

In October of 1996, eight well-known scientists sued to gain access to the Kennewick Man remains. Citing civil rights violations, a lack of due process, and the lack of definitive affiliation with any single Native American tribe (especially given the presence of several traits more consistent with Europeans), these scientists argued the necessity of studying the skeleton in order to determine ancestry and to allow the entire American public access to knowledge about its past. For the Native American tribes, Kennewick Man represented an ancestor, whose bones are sacred and who deserved reburial; for archaeologists, the skeleton represented a piece of potentially significant information in ongoing research on the peopling of the North American continent.

Several theories exist regarding the peopling of the New World. Evidence places humans in the New World 12,000 years ago. One popular theory posits humans coming across the Bering Strait into Alaska and journeying south through an ice-free corridor into the Plains area of North America. Recently, sites

Source: © Tri-City Herald, photo by Andre Ranieri.

and artifacts dating to earlier than 12,000 years have been discovered in eastern North America and in South America. This new evidence suggests the possibility of several different migrations of humans into the New World, potentially from parts of the world other than northern Asia and possibly earlier than researchers have previously assumed. Skeletal remains from these very early periods are rare; the completeness and ancient date of the skeleton make Kennewick Man a potentially important clue to increasing our knowledge about the earlier inhabitants of the North American continent.

For almost eight years, the battle continued over Kennewick Man. Before any ruling was entertained, Justice John Jelderks, Justice Magistrate of the United States District Court in Portland, Oregon, ordered the study of the skeleton to determine cultural affiliation. In October of 1999, the cultural affiliation report indicated that Kennewick Man was not similar morphologically to modern Native Americans or as close to European Americans as was initially presumed; rather, Kennewick Man most closely resembled populations from southern Asia, specifically, groups of Polynesia and the Ainu of Japan.

Multiple reports assessing cultural affiliation, coupled with extensive testimony, led to a ruling in August, 2002, stating that scientists should be allowed access to the skeletal remains, and that the remains were not to be repatriated. Jelderks argued that in order for present-day tribes to claim skeletal remains or associated funerary objects, they must be able to establish a direct relationship with the skeletal remains. Jelderks argued that no such relationship was established for Kennewick Man and the tribes requesting repatriation of the remains. By the end of October, 2002, the tribes and the federal government had appealed the ruling of Justice Jelderks and, in the early part of the following year, the 9th U.S. Circuit Court of Appeals blocked the study of the skeletal remains pending their final decision.

In 2004, the battle seemingly came to an end when the 9th U.S. Circuit Court of Appeals upheld the decision made by Judge Jelderks in 2002. The ruling noted that a relationship between Kennewick Man and the tribes involved in the case was not adequately established. The ruling further indicated that the language of NAGPRA requires human skeletal remains to bear a relationship to a present-day tribe or culture; it also emphasized that the purpose of NAGPRA would not be served if the law ensured repatriation of remains to Native American groups without an established relationship to those remains. A proposed rehearing was rejected and the federal government declined to appeal the decision further.

While the Kennewick Man case appears to have been closed, it unearthed several deep-rooted issues. In *Skull Wars: Kennewick Man, Archaeology, and the Battle for Native American Identity*, David Thomas explains, "The multicultural tug-of-war over Kennewick Man raises deep questions about how we can make the past serve the diverse purposes of the present, Indians as well as white. It also challenges us to define when ancient bones stop being tribal and simply become human."

— *Caryn M. Berg*

Further Readings

Benedict, J. (2003). *No bone unturned: The adventures of a top Smithsonian forensic scientist and the legal battle for America's oldest skeletons.* New York: HarperCollins.

Chatters, J. C. (2000). The recovery and first analysis of an early Holocene human skeleton from Kennewick, Washington. *American Antiquity, 65*, 291–316.

Chatters, J. C. (2001). *Ancient encounters: Kennewick Man and the first Americans.* New York: Simon & Schuster.
Downey, R. (2000). *The riddle of the bones: Politics, science, and the story of Kennewick Man.* New York: Copernicus.
McManamon, F. P. (2004). Kennewick Man. Retrieved (month/day, 2005, from http://www.cr.nps.gov/aad/kennewick/
Thomas, D. H. (2000). *Skull wars: Kennewick Man, archaeology, and the battle for Native American identity.* New York: Basic Books.

Kenyanthropus Platyops

One of a rash of new extinct hominid genera discovered and described during the turn of the 21st century, *Kenyanthropus* immediately garnered substantial press coverage and an onslaught of criticism after its naming in 2001. Characterized by its describers as a distinct genus that suggested a more complex early evolutionary history of the human lineage, this taxon was later dismissed by other researchers as either belonging to *Australopithecus* or *Homo.* Regardless of their taxonomic placement, the specimens described as *Kenyanthropus* exhibit a mosaic of primitive and derived characters that may help elucidate the characteristics, habits, and environments of human ancestors.

Kenyanthropus was described in 2001 by Meave G. Leakey, Fred Spoor, Frank H. Brown, Patrick N. Gathogo, Christopher Kiarie, Louise N. Leakey, and Ian McDougall. Fossils belonging to the type species *Kenyanthropus platyops* were discovered at the Lomekwi Site in Kenya, on the western side of Lake Turkana, during a series of expeditions from 1998–1999. Over 30 hominid fossils were uncovered during the field sessions, two of which were described as *K. platyops.* These specimens were found in the Pliocene Nachukui Formation, indirectly radiometrically dated as 3.5 million years old. The holotype, discovered by Justus Erus in August 1999 and denoted as KNM-WT 40000, is a largely complete, yet heavily distorted cranium lacking most of the cranial base and the premolar and anterior tooth crowns. The paratype, KNM-WT 38350, is a partial left maxilla found by B. Onyango in August 1998.

Leakey and co-authors recognized that the overall size of the holotype fell within the size range of *Australopithecus afarensis* and *A. africanus,* but erected a new genus based on the cranium's mosaic of primitive and derived characters. These derived characters include a flat face, a condition known as orthognathy; a tall cheek region; and small molars. Of these characters, the orthognathic facial morphology of *Kenyanthropus* is most unique. While other extinct hominids, including *Paranthropus,* possess such a morphology, only in *Kenyanthropus* is an orthognathic face associated with small molars. In addition, *Kenyanthropus* shows the earliest evidence of orthognathy in the hominid fossil record. Despite these advanced features, *Kenyanthropus* also displays many primitive traits shared with australopithecines, including flat nasal margins and a small brain that compares in size with those of chimpanzees. Interestingly, *Kenyanthropus* shares many characters with *Homo rudolfensis,* including the lack of a depression behind the brow ridge and a flat plane beneath the nose bone. These characters may indicate that *Kenyanthropus* is a close relative, possibly an ancestor, of modern humans, and has led to the suggestion that *H. rudolfensis* be transferred to the genus *Kenyanthropus* (as *K. rudolfensis*).

Aside from providing important anatomical information, the discovery of *Kenyanthropus* added to the diversity of the eastern African hominid record of 3–4 million years ago, which had previously been represented solely by *A. afarensis* and *A. anamensis.* Additionally, the unique combination of derived and primitive characteristics indicated that *Kenyanthropus* had evolved a specific diet, and pointed to a diet-driven radiation early in the history of the human lineage. Based on this evidence, Leakey and her co-authors argued that human evolution didn't follow a well-defined path, with a continuum of species leading to *Homo sapiens,* but instead took the form of a "bush," with many unique species branching off at various points. Coupled with the discovery of other genera announced at roughly the same time, such as *Orrorin, Sahelanthropus,* and *Ardipithecus,* this interpretation of *Kenyanthropus* and its implications for human evolution diverged sharply from traditional views that advocated a "straight-line" path to modern humans.

However, other researchers have disagreed with the views of Leakey and her co-workers. Paleoanthropologist Tim White argued that the holotype cranium of

Kenyanthropus was too distorted to allow proper comparison to other hominid fossils. He noted that a geological process called Expanding Matrix Distortion (EMD) heavily damaged the cranium and resulted in its breaking into some 4,000 separate pieces. Since EMD doesn't enlarge or distort all dimensions equally, it commonly leads to an indecipherable complex of deformation that is often impossible to correct for, thus making precise identification tenuous. Since comparison to other fossils is made difficult by EMD, White argued that it is impossible to differentiate *Kenyanthropus* from the contemporaneous *A. afarensis* and *A. anamensis,* especially considering the known cranial variation in modern apes and humans. As a result, he opted for a conservative taxonomy that sunk *Kenyanthropus* into *Australopithecus.*

Camilo J. Cela-Conde and Francisco J. Ayala have suggested a different placement for *Kenyanthropus.* Unlike White, they recognized the distinct features of *Kenyanthropus* as real, and not a product of deformation. However, they contended that the similarities between *Kenyanthropus* and *Homo rudolfensis,* including smaller molars and thinner tooth enamel, were indicative of a close phylogenetic relationship. Therefore, they advocated that *Kenyanthropus* be included in the genus *Homo,* likely as its earliest known species. Their proposal placed the appearance of *Homo* at 3.5 million years ago.

Regardless of the uncertain taxonomic placement of *Kenyanthropus,* the discovery of the holotype and paratype, along with representatives of their associated flora and fauna, are revealing new insights regarding the environments and life strategies of human forebearers. Geological evidence preserved at the Lomekwi Site indicates that the area was wet and heavily vegetated during the time of *Kenyanthropus.* The discovery of certain bovid fossils suggests a mosaic of woodland and forest habitats, which argues against the common hypothesis that much of human evolution was driven by a sudden environmental shift between forests and savannas. Additionally, the paleoenvironment of the Lomekwi Site is similar to the few known hominid sites of similar age, including Laetoli in Tanzania, Hadar in Ethiopia, and Bahr el Ghazal in Chad.

While only a preliminary description of its bones has been published, *Kenyanthropus* is regarded as being among the most intriguing and informative of a handful of new hominid genera described during the close of the 20th century and the dawn of the 21st. Although some arguments remain over the validity of these new taxa, their discoveries are proof that much about human evolution remains to be discovered.

—*Stephen L. Brusatte*

See also **Leakey, Meave Epps**

Further Readings

Cela-Conde, C. J., & Ayala, F. J. (2003). Genera of the human lineage. *Proceedings of the National Academy of Sciences, 100*, 7684–7689.

Leakey, M. G., Spoor, F., Brown, F. H., Gathogo, P. N., Kiarie, C., Leakey, L. N., & McDougall, I. (2001). New *Hominin genus* from Eastern Africa shows diverse middle pliocene lineages. *Nature, 310*, 433–440.

White, T. (2003). Early hominids—diversity or distortion? *Science, 299*, 1994–1997.

Kenyapithecus Wickeri

Long recognized as an important genus for understanding the ancestry of great apes and humans, *Kenyapithecus* has been the subject of fierce taxonomic debate since its original discovery by noted paleoanthropologist Louis Leakey in 1961. Once seen as a direct ancestor of modern humans, *Kenyapithecus* is currently viewed as lying close to the origin of the great ape-human clade; however, controversy over the taxonomy and phylogeny of this genus continues, with researchers commonly arguing over the proper relationships of the two included species, *K. wickeri* and *K. africanus.*

Although fossils of *Kenyapithecus* are limited to isolated teeth, facial material, and other fragmentary bones, this primate is recognized as the most common large-sized hominoid known from the Middle Miocene of Eastern Africa. Louis Leakey discovered the first remains of this genus in 1961 when he excavated an upper jaw and isolated teeth from the 14-million-year-old sediments of Fort Ternan in western Kenya. One year later he described these specimens as *Kenyapithecus wickeri,* which he reconstructed as an early direct ancestor of man. In 1967 Leakey named a second species, *K. africanus,* which he based on fragmentary teeth and jaw material found at Maboko

Island in Lake Victoria, 100 kilometers from the Fort Ternan site.

The discovery and description of both *Kenyapithecus* species drew the attention of the paleoanthropological community, and several additional excavations were launched in western Kenya in hopes of finding new material. These excavations recovered numerous important new specimens, many of which proved controversial. In the years immediately following Leakey's early descriptions, it was commonly argued that *Kenyapithecus* was identical to *Ramapithecus.* While this view has fallen out of favor, few modern researchers support the validity of *K. africanus.* Based largely on the discovery of a nearly complete skeleton unearthed in the Tugen Hills in 1993, a team of scientists led by Steve Ward has advocated the transfer of *K. africanus* to its own genus, *Equatorius*; however, this proposal has also garnered debate, as other researchers have argued for a link between *K. africanus* and *Griphopithecus.* This taxonomic debate has yet to be settled, but regardless of the arguments, most researchers view *Kenyapithecus wickeri* as lying close to the origin of the great ape-human clade, and *Equatorius* (*K. africanus*) as a more primitive form.

Much of the aforementioned taxonomic debate can be blamed on the fragmentary nature of the known *Kenyapithecus* fossils, which are mostly limited to teeth and facial bones. Postcranial remains, which are often most phylogenetically informative, are poorly known; hence much about the anatomy and habits of *Kenyapithecus* are questionable. Based on the limited material, however, *Kenyapithecus* is known to have been a large, sexually dimorphic hominoid characterized by a robust lower jaw and thickly enameled teeth. These dental features have suggested to some researchers that *Kenyapithecus* fed on hard or abrasive foods such as nuts and coarse fruits.

Substantially more anatomical information is known for *Equatorius* (*K. africanus*). Based on the 1993 skeleton, which at the time of its discovery was the first Middle Miocene hominoid fossil preserved with associated teeth and postcranial remains, Ward and his coworkers have determined that *Equatorius* is more primitive than *K. wickeri.* Additionally, they have suggested that *Equatorius* was semiterrestrial, and thus the earliest known ape to occasionally leave the treetops for the ground. This transition, which was later paralleled in the immediate ancestors of humans, occurred about 15 million years ago when the rain forests of Africa were gradually replaced by open woodland. This environmental change may also explain the specialized diet of *K. wickeri,* which lived about one million years after *Equatorius.*

Fossils of *Kenyapithecus* and *Equatorius* have also been used as key evidence to support the controversial "Return from Eurasia" hypothesis which posits that hominoids went extinct in Africa during the Early-Middle Miocene while simultaneously diversifying in Eurasia. Later, during the Middle-Late Miocene, these Eurasian hominoids, which included the direct ancestors of the great ape-human clade, returned to Africa, where they subsequently evolved into modern great apes and humans. The ages of *Kenyapithecus* and *Equatorius,* along with their similarities to taxa known from Europe and Asia and the dearth of hominoids from the Middle-Late Miocene in Africa, have been used to support this hypothesis. Other researchers have argued that this scarcity of hominoid fossils is the result of an imperfect fossil record, and that the dating techniques used by the proponents of the reentry hypothesis are imprecise. Ward and his colleagues argue against this hypothesis, but do support a linkage between *K. wickeri* and a currently unnamed species known from the Middle Miocene site of Paşalar, Turkey. This connection, which is manifested by similarities in canine and incisor morphology, represents the earliest known link between African and Eurasian Miocene large hominoids; however, Ward and his colleagues view this linkage as indicative of an African–Eurasian migratory relationship, not a full-scale extinction and reentry event.

The fossil record of African Middle-Late Miocene hominoids has long been recognized as representing a transition from species retaining primitive characteristics to more derived forms, including several species close to the origin of the speciose great ape-human clade. Although it was originally described as a hominid closely related and perhaps directly ancestral to humans, *Kenyapithecus* is now viewed as either a primitive member of the great ape-human clade or a genus lying immediately outside it. Largely due to the dearth of fossil material, *Kenyapithecus* jumps around many modern cladograms, but paleoanthropologists recognize this controversial genus as important for understanding the early evolution of many human characteristics.

— *Stephen L. Brusatte*

Further Readings

Leakey, L. S. B. (1962). A new lower Pliocene fossil primate from Kenya. *Annals of the Magazine of Natural History (Series 13), 4*, 689–696.

Ward, S., Brown, B., Hill, A., Kelley, J., & Downs, W. (1999). Equatorius: A new hominoid genus from the Middle Miocene of Kenya. *Science, 285*, 1382–1386.

Ward, S. C., & Duren, D. L. (2002). Middle and Late Miocene African hominoids. In W. C. Hartwig (Ed.), *The primate fossil record* (pp. 385–397). Cambridge, UK: Cambridge University Press.

Kettlewell, H. B. D. (1907–1979)

Henry Bernard Davis Kettlewell, MD, an outstanding physician, lepidopterist and geneticist, is best known for his work on industrial melanism that so elegantly illustrates evolution in action it is now a feature of almost all basic biological texts. Kettlewell was also an energetic field researcher and co-founder of the significant Rothschild-Cockayne-Kettlewell Lepidoptera Collection in the British Museum.

Kettlewell was born on February 24, 1907 in Howden, Yorkshire, UK. He was a schoolboy at Charterhouse, trained in medicine and zoology at Gonville & Caius College, Cambridge, and then was a postgraduate clinical trainee at St. Bartholomew's Hospital, London. He later practiced general medicine as well as anesthesiology before service at Woking War Hospital. In 1949, he immigrated to the University of Cape Town, where he initiated research and from which he took expeditions to the Kalahari, Knysna Forest, Congo, and Mozambique. In 1952 he repatriated as a Nuffield Research Fellow in Genetics and Zoology at Oxford. In 1958 he led an expedition to Brazil marking the centennial of Darwin's *Origin of the Species*. From 1965 on, he was a Fellow of Iffley (now Wolfson) College, Oxford. Kettlewell died in 1979 of an accidental overdose.

In Britain prior to the industrial revolution, *Biston betularia* was a common moth of which a light-colored *typica* form predominated. A new, dark-colored phenotype—*Biston betularia carbonaria*—was first reported in 1848; remarkably, by 1895, this novel type comprised 98% of populations near Manchester. Such dramatic increase in *carbonaria* subspecies caused many to deduce that this was due to deposition of black coal soot throughout the landscape, notably on tree bark.

Manifestly, *carbonaria* is easiest to see against a light background but nigh invisible on a dark background; the reverse is true of *typica*. Indeed, *typica* was more commonly seen in the country, whereas *carbonaria* was more commonly seen in besooted urban areas. Moreover, with the advent of modern, antipollution practices, there has been a marked decline in environmental soot and, simultaneously, a sharply reduced frequency of *carbonaria*. In fact, some lepidopterists worry *carbonaria* will soon be extinct.

For decades it was widely assumed that the rise and decline of *carbonaria* evidenced evolution in action; however, Kettlewell, seeking empirical proof, embarked on his classic research in the 1950s. His results confirmed the hypothesis that camouflage congruent with the usual landscape surfaces on which the moths often alit was an essential driving force via natural selection. In 1998, geneticist Michael E. N. Majerus of the University of Cambridge reviewed the original studies of melanism by Kettlewell and others. Majerus endorsed Kettlewell's basic finding that phenotype color directly affected differential moth survival. Majerus also reported that many experiments–including some of Kettlewell's—were either not rigorous enough or not properly designed. For example, one main study compared predation of moths congruent and noncongruent with tree trunk bark coloration, but the moths do not often perch on tree trunks. Likewise, control for both the ultraviolet visual acuity of predator birds and the effects of migration was not adequate. Unfortunately, Majerus's review has been much misconstrued—sometimes rather polemically—by nonspecialists and creationists among others. Kettlewell's work remains a paragon of excellent field study.

— Daniel R. Wilson

See also **Melanin**

Further Readings

Kettlewell, H. B. D. (1952). Use of radioactive tracer in the study of insect populations (Lepidoptera). *Nature*, 170, 584–586.

Kettlewell, H. B. D. (1956). A résumé of investigations on the evolution of melanism in the Lepidoptera. *Proceedings. Royal Society of London.* (Series B). *Biological Sciences, 145*, 297–303.
Majerus, M. E. N. (1998). *Melanism: Evolution in action.* New York: Oxford University Press.

Kibbutz

Kibbutz (plural: kibbutzim) is the Hebrew word for communal settlement, and it refers to a particular type of rural community in Israel. The basic principles on which the kibbutz is based are joint ownership of property, social and economic collectivism, cooperation in production, direct democracy, egalitarianism in work, and voluntarism. While initially agriculturally based, most kibbutzim have expanded into small industries as well (e.g., metal work, plastics, processed foods). Some have also expanded into tourism and recreational facilities. Many kibbutzim run study courses for the integration of new immigrants to Israel, focusing on intensive Hebrew language instruction, lectures on Israeli culture, and tours of the country. Although each kibbutz is an independent entity, national federations have formed to coordinate activities and facilitate cooperation between kibbutzim.

The first kibbutz was founded at Deganya, Israel, in 1910, primarily by Russian immigrants. There are fewer than 300 kibbutzim, with most formed prior to Israeli statehood in 1948. Kibbutzim range in size from about 40 members to over 1,000; however, most have between 300 and 400 members. In total, the kibbutz population is approximately 130,000, about 2.5% of Israel's population. Although early kibbutz founders were largely secular, ideological supporters of socialism and Zionism, religious kibbutzim began to appear in the 1930s. Most kibbutzim belong to one of three major movements, each with a distinctive ideology, although these distinctions have become blurrier in recent decades. The United Kibbutz Movement, usually referred to by its Hebrew acronym TAKAM, comprises approximately 60% of the total kibbutz population. Kibbutz Artzi, which recently decided to merge with TAKAM, includes over 30% of the kibbutz membership. The third major movement, Kibbutz Dati, is composed primarily of religious kibbutzim.

Currently, the kibbutz movement is confronting what some observers characterize as a demographic crisis. Younger generations are leaving the kibbutzim, and the average age of the population is increasing. This demographic shift has prompted several adaptations in kibbutz living; for example, many kibbutzim are relying increasingly on paid workers for factories, agricultural tasks, and tourism services. Others are intensifying efforts to expand work exchange efforts, bringing in volunteers from within Israel and abroad. Despite the initial ideological commitments of the early kibbutzim to collective and egalitarian production, almost two thirds of the kibbutzim workforce is now comprised of hired workers. An additional strategy taken up by some kibbutzim as a way of coping with recent demographic shifts is the rental of housing to nonkibbutz members. Some kibbutzim have even built neighborhoods specifically for nonmembers. These shifts have contributed to the blurring of the line between the kibbutz as a social and economic entity and the kibbutz as a geographical/ municipal unit.

Kibbutz members also have more opportunity now for individual choices in higher education, the arts and literature, vacation time, and so on than was the case in the early days of the movement. This is possible in part because of shifts in the distribution of resources within the kibbutzim, in which more money is allocated to personal budgets than had been the case previously. Additionally, many kibbutzim now allow free choice of workplace, resulting in increasing numbers of kibbutz members working away from the kibbutz. These economic changes have resulted in increased hierarchy within the kibbutz, which is also reflected in shifts from political systems of direct democracy to representative democracy. These shifts have contributed to increased income inequality both within and between kibbutzim.

Changes in kibbutz life are also occurring in gender relations and the organization of family life. Ideologically, women are equal participants in the labor force, with all jobs open to them. In practice, most women work in education, health care, and other service positions, although in the earlier days of the movement women worked in agriculture. In contrast to early kibbutz practices that were designed to relieve women from domestic chores, today more women are seeking release time from communal kibbutz responsibilities in order to spend more time

at home raising their children. Although meals still tend to be eaten communally rather than in individual homes, the nuclear family structure has grown increasing prevalent in kibbutzim. In contrast to early collective kibbutz housing, which reflected the movement's ideological rejection of the "ownership" of children, private homes with children raised by their parents rather than in communal children's houses have grown increasingly common.

Various commentators have been ringing the death knell for the kibbutz movement almost since its inception; nevertheless, it has continued to survive. The major challenge facing the kibbutz movement today is how to maintain the ideals associated with its communitarian history while adapting to current demographic and economic challenges.

— *Marianne Cutler*

Further Readings

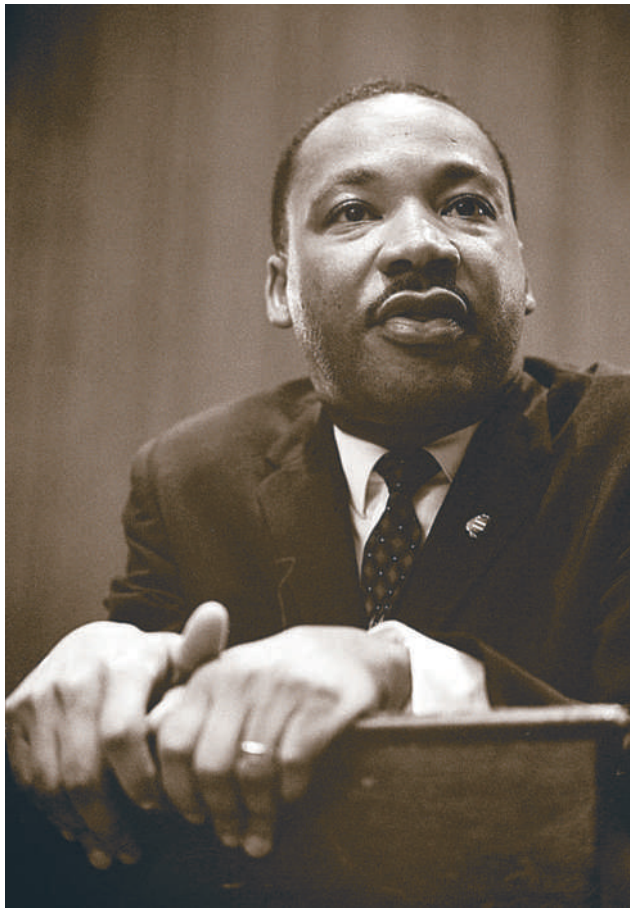
Ben Rafael, E. (1997). *Crisis and transformation: The kibbutz at century's end.* Albany: State University of New York Press.

Gavron, D. (2000). *The kibbutz: Awakening from utopia.* Lanham, MD: Rowman & Littlefield.

Rosner, M., Ben David, I., Avnat, A., Cohen, N., & Leviatan, U. (1990). *The second generation: Continuity and change in the kibbutz.* Westport, CT: Greenwood.

King, Dr. Martin Luther, Jr. (1929–1968)

Dr. Martin Luther King, Jr. was born in Atlanta, Georgia, on January 15, 1929 in an area that, today, is a national historical site. His father was a minister and a prominent member of the community who served as a pastor at a nearby church. During King's early days as a child, his parents attempted to shield him from some of the racial segregation policies characteristic of the time; however, racism permeated the atmosphere of his environment. A segregated society was a way of life that was even legalized by the United States Supreme Court in the famous case of *Plessy v. Ferguson* (1896), which established the important segregationist doctrine of "separate but equal." Even after this doctrine was later repudiated by the



Source: Courtesy, Wikipedia.

Supreme Court in the momentous case of *Brown v. Board of Education* (1954), there was much to work for in terms of social justice.

In some ways King was fortunate. He came from a prominent family and had the opportunity to receive a fine education. In 1948, he received his bachelor's degree in sociology from Morehouse College, a prominent African-American institution located in Atlanta. Later he received his PhD from Boston University. King married Coretta Scott, and together they had four children. Coretta Scott King was to follow in King's footsteps, also making important contributions to the civil rights movement.

One of King's most notable influences was Mahatma Gandhi, a great political leader who helped India gain independence from Great Britain. From Gandhi, King learned the value of use of passive resistance to influence society and obtain a very important goal. King decided to advocate for passive resistance and to use it in his attempt to bring about justice and racial equality in the U. S.

King first received national attention (as well as threats and indignities) as a result of his participatory leadership in the famous Montgomery Bus Boycott that began in 1955. History has described his efforts in the boycott as a major success foreshadowing future gains in the civil rights movement.

In April of 1963 King authored his famous "Letter From Birmingham Jail," an excellent description and explanation of his philosophy to bring about social change in in the U. S. In August of 1963, King gave his famous "I Have a Dream" speech before thousands in Washington, DC, expressing his desire for a time when his children might be judged by the content of their character and not by the color of their skin. In 1964, King received the Nobel Peace Prize, heightening his growing prominence on the national and international level. King was a key participant in the famous Selma March that led to the passage of the Voting Rights Act of 1965. Later he brought his advocacy of civil rights and equal opportunity to Chicago where he attempted to improve the quality of life for African Americans. His assassination in 1968 shocked the nation, but reinforced recognition of his accomplishments. King is buried in Atlanta, Georgia, the home of his birth. His tombstone reads, "Free at last, free at last, thank God Almighty, I'm free at last."

King was not the only person to make substantial contributions to the civil rights movement in the U. S.; however, his legacies are enormous and important. King increased the political, economic, and social opportunities not only for African-Americans, but also for other minorities. He caused Americans and others to contemplate the effects of their behavior on the less fortunate in society. Finally, his efforts are a reminder that the price paid for equality is often going to be quite high; equal treatment is a public policy that does not come easily.

—*William E. Kelly*

See also **Civil Disobedience**

Further Readings

Cone, J. H. (1991). *Martin & Malcom & America: A dream or a nightmare.* New York: Orbis Books.

Lischer, R. (1997). *The preacher king: Martin Luther King, Jr. and the word that moved America.* New York: Oxford University Press.

McKnight, G. D. (1998). *The last crusade: Martin Luther King, Jr., the FBI, and the poor people's campaign.* Boulder, CO: Westview Press.

Pyatt, S. E. (1986). *Martin Luther King, Jr.: An annotated bibliography.* New York: Greenwood Press.

Ralph, J. R. (1993). *Northern protest: Martin Luther King, Jr., Chicago, and the civil rights movement.* Cambridge, MA: Harvard University Press.

Kinship and Descent

Kinship and *descent* are each notions that have been of particular preoccupation to social anthropologists, as much due to their importance as because of the difficulties they present. It is worthy to note their close link, stemming from a common social and biological character (only the former being necessary).

In particular, *kinship* refers to social relationships that usually coincide with biological ones. This is the case with the two forms of *real kinship: consanguinity* and *affinity. Pseudokinship* or *fictitious kinship* takes place when the social relationships simulate the ones arising through real kinship (consanguinity or affinity) but without any biological relationship. For example, in many societies, children who are breast-fed by the same mother are considered siblings. We can view *ritual kinship* as a special form of fictitious kinship, which necessitates a ritual for its creation, rituals such as godparenthood, adoption, or fraternization.

The term *descent* denotes the relationship that bonds the child to its mother or father, through which the elements that constitute the main characteristics of their *status* are transmitted. These include name, surname, heritage, and so on. Descent rules determine mainly membership to the parents' kinship groups; in other words, descent is more of a social convention than a biological relationship. Consanguinity may exist, but it is in no way a necessary requirement. For instance, we consider adopted individuals (fictitious or ritual kinship) to have the same descent as the members of the group that adopted them. Just as it applies to individuals, descent can pertain to groups when group members biologically descend from a common ancestor or when they declare this to be the case, as slaves did by assuming membership of their owner's kinship group.

Morgan and especially Pitt-Rivers and Radcliffe-Brown formulated a series of theories that reproduction by way of descent is the main principle of kinship. These theories are known as *descent theories.* A different view to these older theories is aired by Lévi-Strauss's *alliance theory,* which links the exchange of women and the interdiction of incest as the organizational principles of kinship.

In all societies, kinship and descent are two different notions: Kinship is a social relationship that may or may not coincide with a biological one; descent is a social convention that may require a biological relationship.

Descent Systems

Descent systems determine the parents who transmit the main characteristics of individuals' status. Parents also determine our membership in kinship groups: our mother's, our father's, or both.

We can define descent as *bilateral* or *cognatic* when the characteristics of our status are transmitted through both parents and we belong to both parents' kinship groups. Most Western societies fall into this category, with children usually bearing their father's surname. We define descent as *unilineal* or *unilateral* when the elements of an individual's status are transmitted through only one parent and the individual belongs to only one parent's kinship group.

When the elements of an individual's status are transmitted through men, in particular the father, the descent is termed *patrilineal* or *agnatic.* In these cases, individuals belong to the groups constituted by their fathers' kin without overlooking their consanguinity links with their mothers. The Nuer in Sudan, as well as the ancient Romans, have kinship groups of typical patrilineal or agnatic descent.

Correspondingly, when the elements of status have been transmitted by women, by mothers in particular, the descent is called *matrilineal* or *uterine.* This descent was common among the Iroquois Native Americans, and it still happens in the Hopi tribe. In many matrilineal or uterine descent societies, the mother's brother has the primary role in the kinship group, corresponding to the father's role in cases of patrilineal or agnatic descent. In the Trobriands in Melanesia, the son belongs to his mother's kinship group in which her brother is also included; following the son's marriage, the son and his wife live with the said brother.

Some societies have an even more complicated descent system, combining matrilineal and patrilineal descent but with only one of them being commonly accepted. This system is termed *double descent* or *bilineal descent,* not to be confused with bilateral or cognatic descent, where descent is equally determined by both parents' sides.

In the Ashanti in Ghana, children inherit their fathers' "spirit" as a characteristic of their status, but they belong to their mothers' kinship groups, with whom they cohabit. A man and a woman who are distant patrilateral relatives are allowed to marry when it becomes impossible for them to name their common patrilateral ancestor, usually after four or five generations. Marriage is, however, strictly forbidden for all matrilateral relatives belonging to the mother's wider kinship group. Conversely, in the Yako in Nigeria, children belong to and live with the patrilateral kinship group. This patrilateral group is strictly exogamic; their matrilateral group is much less so. Here we have two unilineal descents juxtaposed.

Descent Groups

Extending our discussion of kinship and descent, a kinship group (either *lineage* or *clan*) may be of matrilineal, patrilineal, or double descent. *Lineage* is the wider group of individuals beyond the family who are interconnected through consanguineal kinship and who acknowledge a common ancestor. C*lan* is the even wider social group in which members acknowledge a common ancestry and whose relationships are ruled by solidarity. Whether the group is of matrilineal, patrilineal, or double descent depends on whether its members claim a common ancestor (who may be an existing or mythical person) and whether their characteristics are determined through the mother, the father, or both. These kinship groups are respectively known as *matrilineal, patrilineal,* or *double descent groups.*

The term *descent groups* is thus limited to unilineal or double descent groups. In the case of cognatic descent, there is no proper descent group, as neither patrilateral nor matrilateral relatives constitute a descent group because they both simultaneously belong to two kinship groups. Descent groups usually appear organized in such a way that enables them to make political, religious, or social decisions affecting their members. We call these *corporate descent groups.*

Descent and Residence

Because descent systems determine the kinship group to which individuals belong and with whom they usually cohabit, descent also appears related to the location of residence of both individuals and groups. When descent and locality appear parallel, that is, when patrilineal descent goes together with *patrilocality* or *virilocality* (residence with patrilateral relatives) and matrilineal descent goes together with *matrilocality* or *uxorilocality* (residence with matrilateral relatives), the descent system is described as *harmonic.* For instance, the patrilineal Nuer are patrilocal and the matrilineal Hopi, matrilocal.

There are cases, however, where descent and locality are opposed, as system we then describe as *disharmonic.* More specifically, a disharmonic system can combine either patrilineal descent with matrilocality or matrilineal descent with patrilocality. In Congo, for example, the husband lives in the same village as his father and sons (patrilocal residence) but belongs and inherits goods from his matrilineal descent group (matrilineal descent).

— *Maria Velioti-Georgopoulos*

See also **Kinship Terminology**

Further Readings

Dumont, L. (1971). *Introduction à deux théories d'anthropologie sociale. Groupes de filiation et alliance de mariage.* Paris: Mouton.

Fox, R. (1984). *Kinship and marriage: An anthropological perspective.* Harmondsworth, UK: Penguin.

Goody, J. (1983). Kin groups: Clans, lineages and *lignages.* In J. Goody & L. Roper (Eds.), *The development of family and marriage in Europe* (pp. 222–239). Cambridge: Cambridge University Press.

Lévi-Strauss, C. (1949). Les structures élémentaires de la parenté. Paris: PUF.

Kinship Terminology

The *terminology of kinship,* that is, the terms we use to name our kin, is one of the most important areas of study in the social anthropology of kinship. Kinship terminology is a message carrier, concurrently reflecting and determining social behavior.

Kinship refers to social relationships that may or may not coincide with biological ones. The terms of kinship can, indeed, correspond to true kinship, with social relationships coinciding with the biological ones (*consanguinity* or *affinity*). When social relationships only simulate biological ones, the term we use is *pseudo-kinship* or *fictitious kinship.* The third type of kinship is a special form of fictitious kinship created through a ritual, such as godparenthood, adoption, or fraternization. The terms of pseudo-, fictitious, and ritual kinship are identical to the ones of real or true kinship.

Terms of Address and Terms of Reference

Independent of the category of kinship, we divide terms that describe related individuals into terms of address and terms of reference. Terms of address are the ones we use from birth (*Ego*) to address our kin, such as "Mum" or "Dad." Terms of reference are the ones we use to refer to our kin in the third party: "my mother," or "my father." As these examples demonstrate, terms of address and terms of reference may be identical. Our use of kinship terms depends on how familiar we are with the relatives involved and the ages and genders of these relatives. Both terms of address and terms of reference exist only with respect to one another: "father" or "mother" implies there is a "son" or "daughter" and vice versa.

Classificatory Terms—Kinship Systems

Based on earlier work by both L. H. Morgan and G. P. Murdock, we now use six categories to classify systems of kinship: Eskimo, Hawaiian, Iroquois, Sudan, Crow, and Omaha. The main criterion for classifying a system is how the Ego uses the same term for different relatives. For instance, the kinship system of Western societies belongs to the Eskimo group, where the brothers of the parents are "uncles" and their sisters, "aunts." In contrast, in societies belonging to the Hawaiian group of classification, the same people are "fathers" and "mothers," respectively. Using the same term for different relatives entails a significant similarity in the behavior of Ego toward them, for example, the possibility of marriage.

Descriptive Terms

Descriptive terms number but a few: father, mother, son, daughter, brother, sister, husband, wife. To eliminate any chance of confusion, we use each of these terms or a combination to describe only one relative. In the kinship systems of Western societies, individuals use descriptive terms wherever specific terms for each and every relative do not exist. For example, uncles from both the father's and the mother's side are not distinguished from the other; both are uncles. We can make the distinction because of descriptive terminology: father's brother and mother's brother.

In the Dinka and the Shilluk in Sudan, a special term-phrase exists for the relatives that Western societies call uncles and aunts: *brother/sister of mother/father*. Sudanese call every cousin *daughter/son of brother/sister of mother/father*.

Abbreviated Terms

Anthropologists invented abbreviated terms for methodological reasons, namely, simplicity and clarity. In both French and English, where fundamental terms of kinship are morphologically unlike each other, we can achieve what anthropologists envisioned. In English, the abbreviations of the terms of kinship consist of the first letter (or sometimes the first two letters) of the terms:

B: Brother

F: Father

M: Mother

So: Son

D: Daughter

H: Husband

Si: Sister

W: Wife

The abbreviated terms of kinship allow us to refer to relatives in ways that would be impossible using the particular terms of kinship in each society. For example, the abbreviation "MBD" refers to an individual's mother's brother's daughter, what the Ego would call "sister" in the Hawaiian system.

Fictitious, Ritual, and Pseudo-Kinship Terminology

We may use terms of real kinship in social relationships that result from fictitious or ritual kinship. For instance, children who have been breastfed by the same mother are *siblings* in many societies, but there is usually a more exact definition of this relationship: *foster siblings*. We may also use similar terms, such as *godfather-father* in English or *vëllam-vëlla* (blood brother-brother) in the archiac dialect of Albania called Arvanitika.

We may use terms of kinship metaphorically in cases where neither real, fictitious, nor ritual kinship is in place. For example, the inhabitants of the villages Didima, Karakassi, and Loukaïti (in Peloponnesus, Greece) address each other as *cousin*, referencing their reminiscence of a common ancestry, even when that relationship is distant.

Throughout Greece, the same term is used as a sign of familiarity between nonrelatives in a manner similar to the use of "friend" in English. The term *κουμπάρος* (pronounced koubáros) that denotes the person necessary to accomplish a marriage, as well as the godfather, is used much in the same way. As a sign of respect, younger people and especially children may address adults as *uncle* or *aunt* and address the elderly as *grandfather* or *grandmother*.

Monks and other believers in the Christian church address each other as *brothers* and *sisters*, a practice with roots in the belief that all Christians are children of a "parental" God. Members of various organized groups, including religious groups or guilds, have also adopted terms of kinship and may call themselves *brotherhoods*. Examples of these are the *Confréries* in France and Belgium, whose name comes from *con* + *frère*, which translates as *jointly* + *brother*, such as the *Confrérie des Brasseurs* as a brotherhood for the brewers.

Whenever we require mutual support, we might use terms of kinship. For instance, we might call a more experienced co-worker who guides and instructs a newcomer in the workplace a *godfather* or *godmother*. Likewise, student *families*, such as those found in the colleges of the University of Cambridge in the United Kingdom, are composed of freshmen *children* and their co-student *parents*, more senior students who assume a guiding role.

—Maria Velioti-Georgopoulos

See also **Kinship and Descent**

Further Readings

Augé, M. (Ed.). (1975). Initiation au vocabulaire de la parenté. *Les domaines de la parenté* (pp. 7–57). Paris: Maspero.

Fox, R. (1984). *Kinship and marriage: An anthropological perspective.* Harmondsworth, UK: Penguin.

Murdock, G. P. (1949). *Social structure.* New York: Macmillan.

Kluckhohn, Clyde K. M. (1905–1960)

Clyde Kay Maben Kluckhohn was an early American anthropologist who made significant contributions to all four of anthropology's subdisciplines. One of the last true generalists in the field, Kluckhohn communicated his ethnographic research in the American southwest, as well as his theories on culture and society, to the public in accessible volumes such as *Mirror for Man* (1949).

Kluckhohn was born in Iowa in 1905. After completing his undergraduate degree in classics at the University of Wisconsin, Kluckhohn studied abroad, first at the University of Vienna in 1931, and then at Oxford University as a Rhodes Scholar in 1932. He completed his PhD at Harvard University in 1936 and was appointed to the faculty soon after; he spent his entire academic career at Harvard, where he taught anthropology and organized several interdisciplinary programs. Kluckhohn died in 1960 from heart failure while at work in New Mexico.

Kluckhohn's ethnographic contributions extend from his research in the American southwest. He gained firsthand experience with the Navaho when, at age 17, he was sent to New Mexico to recover from an attack of rheumatic fever. Kluckhohn published widely on Navaho society, most notably *Navaho Witchcraft* (1944) and *The Navaho* (1946).

Kluckhohn brought his eclectic knowledge of biology, psychology, and history to bear on his other major contribution to the discipline: the idea of culture. As a scholar, Kluckhohn was dedicated to moving anthropology away from the cultural relativism of Franz Boas and toward the search for human universals, a move he believed would gain anthropology a place in the theoretical sciences. He pursued the search for universals in value theory, asserting that despite wide differences in customs, fundamental human values were shared across different societies. Kluckhohn communicated these ideas in works such as *Culture: A Critical Review of Concepts and Definitions* (with A. Kroeber, 1952).

Kluckhohn's interests ranged beyond the field of anthropology to include university administration and government service. At Harvard, Kluckhohn was Curator of Southwestern Ethnology at the Peabody Museum and a senior founding member of the Department of Social Relations. During World War II, he served as consultant for the Office of War Information where social science principals were used to analyze Japanese society. His early government service led to his appointment as the first director of the Russian Research Center. A product of the growing tension between the United States and the Soviet Union, the Center was dedicated to the investigation of Soviet society through the social sciences.

— *Benjamin W. Porter*

Further Readings

Kluckhohn, C. (1942). Navaho witchcraft. *Papers of the Peabody Museum of Archaeology and Ethnology, 22*(2). Cambridge, MA: Harvard University.

Kluckhohn, C. (1949). *Mirror for man: The relation of anthropology to modern life.* New York: McGraw Hill.

Kluckhohn, C. (1962). *Culture and behavior: The collected essays of Clyde Kluckhohn.* New York: Free Press.

Koba

Koba, located in the northeastern Yucatán peninsula in the modern Mexican state of Quintana Roo, functioned as a Classic Maya metropolis. The center was also occupied in the Preclassic and Postclassic periods. The site includes prominent archaeological features such as pyramids, tombs, vaulted structures on elevated platforms, staircases, altar stones, stone carved slabs (*stelae*), and a complex set of roads (*sacbeob*) that connect the core area to the peripheries of the site and distant centers such as Ixil (20 kilometers to the

southwest) and to Yaxuna (100 kilometer to the west). The core of the 63-square-kilometer site includes a 1.5-kilometer-square area built on an artificial elevated platform which was the focus of the royal court, with large pyramid structures, elite residences, reception areas, broad stairways, and alley-like passageways. Koba was dramatically successful in creating an expansive Classic Maya regional center with its spoke-like *sacbe* system binding peripheral noble houses to the core area and serving as the boundaries of the contiguous suburban zones. Longer roads, trading expeditions, and warfare defined the limits of this regional state. The population of Classic Koba, estimated as 55,000, resided adjacent to the civic-ceremonial core and included greater nobles, lesser nobles, attendants to these, artisans, and modest commoners.

The Iglesia pyramid and the Nohoch Mul (Ixmoja) pyramid, located in the core area, are surrounded by vaulted architecture on both high and low platforms. The vaulted structures range from lavishly complex, double-wide vaulted structures to smaller, single-vaulted rooms. The functions of the central court area and its associated architectural forms are revealed through ethnography, ethnohistory, art history, and epigraphy. At Koba, this sector of the site is difficult but not impossible to interpret. The glyphic record at Koba is sadly eroded, the stone slab *stelae* inscriptions faded and in some cases broken; however, the ethnohistoric record provides some insight into the political importance of Koba. In addition, the ethnographic record of the Yucatec Maya lends some support to interpretation of the suburban zones, family structure, economic and political organization, and the religious symbolism and practice at the site.

One of the *stelae* at Koba illustrates connections between Koba and a woman from Naranjo, a Maya center located to the south. Through the tie to Naranjo, Koba was also bound to Tikal, but alienated from Calakmul and Caracol. Additional *stelae* at Koba mark the fortune and struggles of the center as part of the pre-Columbian Maya region.

Architecture and Construction

The central core zone and palace space at Koba is not like any other site: it is unique in its setting on the shore of Lake Koba and Lake Macanxoc, extending north to the Nohoch Mul group. Features include two ball courts, high platforms topped with double-vaulted structures, altars, stelae, enclosed private courtyards surrounded by substantial constructions with vaults, staircases, and tombs. Multiple entrances into restricted courtyards are seen in buildings adjacent to the Iglesia pyramid, at the south and terminal end of Sacbe 27, and in the large, but perhaps unfinished, enormous mound to the west of the Nohoch Mul pyramid. Small spaces open onto large plaza areas (such as the zone in front of the Iglesia pyramid, from adjacent plazuelas, and from the high mounds and vaulted structures in the Coba Group B). Another large plaza area is found in front of the Nohoch Mul pyramid and main staircase. Large courtyards and the open plaza areas were the location of public theater, ritual and secular activities. More intimate enclosures (such as the modest plazuela behind the Macanxoc group, perhaps the area around the Las Pinturas group, smaller courts such as those associated with vaulted structures found at the end of Sacbe 27, and plazuela groups dispersed throughout the suburban zones) also functioned as loci for ritual celebrations and secular activities. Elite constructions involved high-energy investments in collecting the stone, rubble fill (chich), and plaster for stuccoing the walls. The amount of stone collected and shaped to construct the pyramids and some of the complex elite residential structures was enormous. Small sascaberas (granular limestone mines) for collecting raw materials for stucco are found adjacent to the perimeter of the central core area, in the northern survey zone, and elsewhere. In the suburban zones, platforms, vaulted constructions, and the foundations of pole-and-thatch housing required the collection of stone. Granular limestone for stucco, support beams, wall poles, and roofing thatch were required for construction of vaulted and unvaulted structures that served as shrines, residences, kitchens, storage buildings, and foundation stones for small garden areas. While stucco murals and fragmentary stucco in walls can be seen in the core area, stucco was also applied to walls outside the central zone. To the south, stucco walls were found at Dzib Mul and fragments of stucco can be seen on the high vertical walls on the east side of the Kitamna mound.

Administration and Court Structure

Classic Koba also housed principal and secondary nobles who performed key administrative duties and whose residences were located adjacent to the core in

residential zones and at the ends of the many *sacbeob* (roads) for which Koba is deservedly famous. Important positions associated with the ruler include his Baah Ahaw ("Head Lord"), the Sajal and Ah K'uhuum, Yahaw K'ak, (the "Fire Lord"), Yahaw Te ("Tree Lord"), Ebet ("Messenger"), Ah Baak ("Captive Taber"), or Baah Pakal ("Head Shield"). These and their associates managed the operations of Classic Koba, inside and beyond the city limits.

The rulers pictured on *stelae* at Koba had female counterparts. Costumes worn by royalty are only visible in carved stone *stelae,* but these carvings show elaborate feathered headdresses, and details of dress, as well as scepters of power characteristic of Maya kings and queens elsewhere. It is highly probable that the elite men and women at Koba wielded both supernatural and earthly power as they did elsewhere in the Maya zone.

Ceramic art of the period indicates the presence of powerful women: royal wives who forged powerful alliances between Maya kingdoms. The significant relationship between rulers and powerful women is also manifest at Koba where a royal woman from Naranjo is portrayed on a *stela* at the second ball court constructed near the Nohoch Mul complex. The rulers and the queens were accorded elite burials; although to date no noble woman's tomb has yet been located, these high-status individuals would have carried symbolic codes in their dress, posture, and actions. The prime identifier for maize deities is the net overskirt of linked jade beads; both kings and queens are known to wear this garment, including the Koba queen from Naranja.

Documentation and Symbolism

The murals, glyphs and carved *stelae* found at Koba are badly eroded and faded but some records can be recovered. The *stelae* reflect important individuals involved in sacred and secular activities of import to the success of Koba as a central place. The decorated and elaborate figures mark dynastic histories, war triumphs and ritual common to Koba and other Maya centers.

Life at the Maya court is reflected in rulers standing on the backs of captives; seated on elevated platforms with cushions, pillows, and mats; in curtained rooms; in public spaces; dressed with care in elaborate costumes and headdresses. The *stelae* provide documentation of clothing; sandals; elaborate, feathered headdresses; jewelry (jade, shell, and bone); elevated platforms for positioning rulers; associated attendants to the court (small dwarf figures representing companions to the Ruler/Maize God, manifestations of the dwarf/stubby malformed maize ears that commonly form on the corn stalk); and symbolism that reflects maize, cacao, and the calabash tree. The ceramics at Koba date primarily to the Late Classic Period (600–800 AD), although the site was occupied in earlier and later periods. The Late Classic pottery is Tepeu I and Tepeu II styles, and fragmentary.

The *quincunx*, symbol of the Maya four directions and the center, appears as a decoration on the stairway to the north of the Iglesia patio and marks the entrance to the first ball court reconstructed at Koba. The staircase may have been designed to celebrate victory and bring the battle to the Maya court as ballplayers marched down the stairs into the playing field. Battles were played out on the ball courts that merge secular and sacred space. Who the Koba warriors were fighting and why remains unclear, but elaborate trade relations and tribute payments may have been cemented through military subjugation.

Maya warfare focused on the capture of enemies, and these conquests were incised on Koba *stelae* where captives, with their wrists and feet bound, are crouched beneath the feet of rulers.

Maize, Myth, and Sacrifice

The Classic Maya gave central importance to the life cycle of maize, including attention to the wet and dry seasons; crop planting; and its sprouting, ripening and harvesting, as well as activities associated with processing the kernels (removing them from the cob, grinding them, and the nixtamalization process). The tragic adventures of the Maize God in the Underworld, his death, and resurrection, and the adventures of the Twin Heros (Hunahpu and Xbalanque) represent a story of epic proportion retold in the Popol Vuh. This epic has deep roots that reach back into the Classic and perhaps Preclassic Maya Periods: A Maya lord seated on top of a mountain or stone was recognized as part of the story of the Maize God; the Maya ruler on an elevated platform was identified with the Maize God; the Maya lords living on top of high, elevated platforms in cavelike, vaulted, stone buildings impersonated the Maize God. The site of Koba is riddled with metates in the core area and in the suburban zones. Noble residences

Nohoch Mul Koba

Source: Photograph by Ellen R. Kintz.

with domestic structures and associated metates document significant processing of maize on the household level and in the central zone. In addition, Koba also has round altars that may have been used as sacrificial stones, with the victim's body recognized as the symbolic center for the sprouting of maize (as illustrated by Maya artists at Piedras Negras, Peten, Guatemala, in the Codex Dresden and Codex Tro-Cortesianus, and in the Temple of the Warriors and Temple of the Jaguars at Chichen Itza).

Offerings excavated at the La Iglesia pyramid beneath a reset *stela* revealed shell, cinnabar, jade, and pearls as symbolic reflections of the Maize God, blood, death, and resurrection. A second offering in front of the first included seashell, jade, shell beads, and unworked hematite, replicating the first offering and reinforcing the symbolic associations of maize, death and rebirth. A third offering associated with La Iglesia revealed a censer, a monochrome plate, and miniature mano and metate, also representing association with the Maize God and suggesting rituals performed by the ruler as the Maize God impersonator. A skeleton buried in La Iglesia, with jade beads in each hand, illustrates the Maize God interred in the Iglesia mountain underworld.

To the north of the pyramid structure, the first ball court reflects the struggles of the Maize God and his brother, as well as the activities of the Hero Twins in the Popol Vuh epic. The second ball court at Koba has a ceramic skull located in the center of the playing field. The courts represent "places of sacrifice" associated with elements (such as the calabash tree, jaguars, sacrificial knives, mosquitoes, coatimundi, squash, ants, vampire bats, blowguns, comal griddles, masa corn meal), as well as with cunning, wit, and transformation. The ball courts at Koba reflect Maya symbolism, sacrifice, and resurrection as is recorded in the Popol Vuh epic as well as the importance of maize, other plants, and animals in the Maya world. While burials and offerings at Koba that include jade (acquired by long-distance trade) represent the Maize God's costume minimally in comparison to the royal jade masks found with kings interred at Palenque and Calakmul, the symbolism is present and clear.

One significant obsession of Maya royalty was the emulation of the life of the underworld deity known as God L, the wealthy god of trade and tobacco, whose palace was richly furnished with objects desired by Maya kings. God L, old and toothless, with jaguar attributes, exhibited richly brocaded capes and extravagant feathered hats; frequently, his attendant owl was perched on his head. Beautiful women attended to his needs, and he received the frothy chocolate, a beverage preferred by the Maya nobility. God L was associated with the Rabbit scribe and the Moon Goddess, and because of this he is of particular interest in a discussion on Koba. The La Iglesia group at Koba is a place associated with reverence to the Moon Goddess, Chibirias (or Ix Chebel Yax) in contemporary local mythology. The Moon Goddess is known to be associated with abundant rebirth and regeneration in maize mythology and,

according to Redfield and Villa Rojas, *campesinos* (farmers) in Chan Kom have reported that maize is grown following the lunar calendar. Local hunters continue to burn candles and incense before they enter the forest at night. The hunters seek deer, an animal associated with Blood Woman (mother of the Hero Twins). God L, the Rabbit scribe, the Moon Goddess, and the Maize God perform their parts in the Maya epic story, played out in ball courts and adjacent zones at Koba. God L, as trader (clearly manifested in the murals at the site of Cacaxtla), was tied not only to maize but also to cacao. These two crops, central to the Maya economy, can be seen on ceramic vessels documenting the connection between cacao and maize, as well as the economic and symbolic significance of these crops. While maize is known to have grown successfully in the relatively moist climate zone around Koba, it has been suggested that Ixil served as a "bread basket" zone to the southwest of Koba, connected by a substantial *sacbe* (roadway). The moister climate may also have allowed the growth of cacao at Koba (which was also grown to the south in Honduras). Deep cenotes around Koba could have served as microclimates for cacao cultivation; there is evidence that a large cacao tree was known to thrive in a cenote in the southern zone at Koba until a decade ago. The ability to grow even a few cacao trees in a cenote would have heightened the political and economic power of the Koba rulers. As documented on ceramic iconography; the Maize God is linked to the cacao tree. Cultivation of fruit, fiber, bark, and resin was important in the Maya garden city and reflected social organization.

Another possible transformation of the Maize God appears in the calabash tree. One Hunahpu (the father of the Hero Twins and representative of the Maize God), appears as a head in the calabash tree. Maize, cacao, and the calabash tree were all prominent features in the environs of Classic Koba; their high productivity would be associated with royal, economic, and political clout. The Koba ball courts and caches of jade, cinnabar, pearl, and shell document royal concerns for these trade and prestige products.

The Hero Twin Hunahpu loses his head to the gods of the Underworld, and may be represented by the skull in the second ball court at Koba. His skull is only a temporary loss, replaced by squash and then reattached; however, he later sacrifices himself with his twin brother by leaping into the fire. Their bones are ground down to *masa* (corn powder), thrown into water, and reconstituted as fish, fish-men, and the Tricksters who defeat the Lords of the Underworld to emerge as the Sun, Moon, and Venus. The three celestial images were probably observed and plotted from the Cono or Xaibe observatory at Koba. The structure has been reconstructed; alignment with the adjacent pyramid/mountain, the Nohoch Mul, and other structures reflects the astronomical prowess of the Maya residing at Classic Koba.

Myth as Urban Organization

Koba, in line with findings and interpretations elsewhere in the Maya region, depicts the contrasts between agricultural wealth based on maize, and commercial wealth based on cacao. The *stelae*, murals, vaults on platforms, and pyramids attest to the complex nature of Maya urban organization at Koba, and to the struggles and strength of the social groups residing in the city and beyond. The clearest portrait of Maya social dynamics was played out in the ball court where king and queen, father and son, agriculture, trade, politics, and religion are patterned as epic myth and social realities.

Human remains have been excavated at Koba, including an adult interred in a filled chamber associated with the La Iglesia pyramid. A reburied skeleton of an adolescent has been excavated in a small stone crypt. Burials outside the core have not been located but single structure units may have served as barrio shrines, perhaps associated with burials, as noted elsewhere in the Maya zone. What made Koba able to rise to its social, political and economic heights, and what caused the center to falter and collapse? What allowed the nobles of Koba to connect to the southern Peten zone? What permitted the center to gain access to pearls, shell, cinnabar, jade, and obsidian among other exotic and valued goods? Who were the rulers that guided the city? Who were the warriors and traders that protected and provided the goods that enabled the city to thrive? An understanding of these issues is yet to be achieved; however, it is clear that the center rose to great heights and accomplished massive tasks in building pyramids, palaces, and vast numbers of house compounds (both large and complex, as well as modest and simple structures). One clue to the builders' intent might be the blue-green color seen on fragments of stucco and in faded murals at Koba; blue-green represents the fifth

direction, the center: the union of celestial, terrestrial, and underworld levels of the cosmos.

Beyond the stark realities of politics and economic life, the people of Koba clearly designed the center to merge secular, sacred, and mythic in a rich pattern that characterized Classic Maya culture and was to endure in contemporary Maya culture, albeit, in an innovative pattern.

— *Ellen R. Kintz*

See also **Mayas**

Further Readings

Folan, W. J. (1978). Coba, Quintana Roo, Mexico: An analysis of a prehispanic and contemporary source of *sascab. American Antiquity, 43*, 79–85.

Folan, W. J., Fletcher, L. A., & Kintz, E. R. (1979). Fruit, fiber, bark and resin. The social organization of a Maya urban center: Coba, Quintana Roo, Mexico. *Science, 204*, 697–701.

Folan, W. J., Kintz, E. R., & Fletcher, L. A. (1983). *Coba. A classic Maya metropolis.* New York: Academic Press.

Kintz, E. R. (1990). *Life under the tropical canopy: Tradition and change among the Yucatec Maya.* Fort Worth, TX: Holt, Rinehart & Winston.

Miller, M. E., & Martin, S. (2004). *Courtly art of the ancient Maya.* New York: Thames & Hudson.

Tedlock, D. (Trans.). (1985). *Popol vuh: The definitive edition of the Mayan book of the dawn of life and the glories of gods and kings.* New York: Simon & Schuster.

Thompson, J.E.S., Pollock, H. E. D., & Charlot, J. (1932). A preliminary study of the ruins of Coba, Quintana Roo, Mexico. *Publication 424, Carnegie Institution of Washington.*

Köhler, Wolfgang (1887–1967)

Wolfgang Köhler was born on January 21, 1887, in Rivel, Estonia. He was educated at the Universities of Tübingen and Bonn, and at the University of Berlin where he received his PhD in 1909. His doctoral dissertation was on psychoacoustics. Köhler is best known for his research in comparative psychology on the intellectual and problem-solving abilities of chimpanzees (*Pan troglodytes*), and for his involvement with Gestalt psychology.

From 1913–1920, Köhler was the director of the Anthropoid Research Station on Tenerife, Canary Islands. The research station was established by the Prussian Academy of Sciences to study the behavior of various primate species in hope of ascertaining where they fell along the evolutionary continuum, especially in comparison to humans. Köhler's observations and studies of the nine chimpanzees housed on Tenerife were summarized in *The Mentality of Apes* (1925).

Köhler recognized that chimpanzees are intelligent creatures, and that their behavior in natural settings resembles that of humans. On Tenerife, he observed chimpanzees interacting with one another during contrived problem-solving tasks. Some tasks involved using items such as sticks, boxes, and ropes to access food that was out of reach. The chimps attempted to obtain the food in various ways, using mostly trial-and-error methodology. Köhler noted that the chimpanzees appeared to survey the scene, think of a possible solution to the problem, and then act upon it. It seemed to Köhler that the chimpanzees suddenly came upon solutions, evidence for the chimpanzees doing the trial-and-error learning in their minds rather than outwardly, which Köhler believed was suggestive of insight learning.

Köhler and colleagues believed that the mind perceives things in the most organized and simplistic way possible. Along with fellow theorists such as Kurt Koffka and Max Wertheimer, Köhler believed that the whole of a system could be greater than the sum of its parts. With this theory, they created a new branch of psychology known as Gestalt psychology. Although Max Wertheimer is usually attributed with being the founder of Gestalt psychology, some people also credit Köhler; however, the theory itself dates back to Christian von Ehrenfels' *Über Gestaltqualitäten* (1890). The word *Gestalt* is of German origin and literally means pattern or organized whole.

After leaving Tenerife in 1920, Köhler became director of the Institute of Psychology at the University of Berlin. He was a visiting professor at Clark University (1925–1926), a William James lecturer at Harvard University (1934–1935), and a visiting professor at the University of Chicago (1935). By 1935, there was mounting pressure and social change from the Nazi regime that eventually affected the University of Berlin. Köhler publicly criticized Nazism, and

his clinic was raided twice by Nazi supporters; as a result, Köhler decided to accept a research professorship at Swarthmore College in Pennsylvania, where he stayed until 1958. Köhler remained an active researcher and lecturer for the remainder of his life. On June 11, 1976, at the age of 80, Köhler passed away at his home in Enfield, New Hampshire.

— Lisa M. Paciulli and Emma L. Hettrich

See also **Chimpanzees**

Further Readings

Ash, M. G. (1995). *Gestalt psychology in German culture, 1890–1967.* New York: Cambridge University Press.

Ellis, W. D. (1974). *A source book of Gestalt psychology.* London: Routledge & Kegan Paul.

Henle, M. (1971). *The selected papers of Wolfgang Köhler* . New York: Liveright Publishing.

Köhler, W. (1925). *The mentality of apes.* Trowbridge, UK: Redwood Press.

Köhler, W. (1969). *The task of Gestalt psychology.* Princeton, NJ: Princeton University Press.

Köhler, W. (1992). *Gestalt psychology: An introduction to new concepts in modern psychology.* New York: Liveright Publishing.

Murray, D. J. (1995). *Gestalt psychology and the cognitive revolution.* New York: Wheatsheaf Books.

Koko (lowland gorilla)

Koko is a 180-pound, lowland gorilla who has been taught American Sign Language by developmental psychologist Francine "Penny" Patterson since July, 1972. Born on the fourth of July, 1971 at the San Francisco Zoo, the gorilla was named Hanabi-ko (Japanese for "fireworks child"), but she is best known by her nickname, Koko. With the possible exception of King Kong, Koko is perhaps the world's most famous Great Ape. She has appeared hundreds of times on national television and the covers of magazines such as *National Geographic.* As Koko is purported to have a vocabulary of more than a thousand signs, anthropologists and linguists have been intrigued by her apparent capacity for complex, human-like language. Children and her other fans, however, are simply fascinated by her charm: Koko loves to look at pictures in books and magazines; she paints, and she has raised several kittens.

While not every researcher agrees with Penny Patterson that "she's just as much a person as we are," Koko is an ambassador and "spokesperson" for wildlife conservation, endangered species, and refuge projects for primates. Koko's Gorilla Foundation—with its website, newsletters, and other promotions—have kept ape-language research in the public consciousness, even though it has lost much of its earlier momentum in the scholarly community. While Koko's website says she wants to have a baby and that she will teach her child to talk, her past romantic encounters (such as with her first boyfriend, of sorts, Michael) have not been encouraging. As Koko progresses through her mid-30s (which is long-lived for gorillas in the wild), the possibility of pregnancy is decreasing yearly.

In the 1970s, interest in communicating with primates using sign language, computers, or other artificial devices not only captured the public's imagination to be able to "talk to the animals," but also seemed to be a very promising line of scholarly research. Psychologists, biological anthropologists, and those who studied language acquisition believed that these ape sign-language experiments could offer much insight into human evolutionary cognitive and linguistic development. Of all the apes studied, Koko appeared to be the most facile, and even some introductory anthropology textbooks were saying that she knew some 2,000 English words. If this were true, it would put Koko on par linguistically with a 5- or 6-year-old human child.

Patterson now gives a more modest figure for Koko's accomplishments: a working vocabulary of 500 signs with approximately another 500 signs she has said herself on one or more occasions. Yet, more important than the mere number of different vocabulary items attributed to Koko are the quality and kinds of language she uses. For example, one of the characteristics that is often said to separate human from nonhuman language is productivity: the ability to coin new words for new phenomena. Koko apparently does this quite often, such as making the sign combination *eye hat* for "mask," *elephant baby* for a Pinocchio doll, or *white tiger* for a toy zebra. While other primates have used signs productively (such as the chimpanzee Washoe's famous *water bird* for

"duck") Koko's neologisms seem more abstract, as the component parts of her new signs are not actually physically present when she creates them. She also has a very colorful and creative vernacular vocabulary of expletives. When Penny playfully put a salt shaker on her head, Koko called her *head stupid*. When asked what she thinks of her gorilla friend Michael, she has replied, depending on her mood, *think stupid devil, rotten devil*, or *toilet*.

Another characteristic of human language is that of displacement: the ability to talk about something beyond the immediate present or geographic locale. Below is an often-quoted discussion with Koko about death. Koko was asked to pick out the gorilla skeleton among four types of animal skeletons. After she picked the gorilla skeleton, the trainer asked her if this was an alive or dead gorilla. (It should be noted that the sign for *drapes* is polysemous for Koko, referring to security, providing security, or being afraid.) Her answer:

Koko: *dead drapes*

Trainer: Let's make sure, is this gorilla alive or dead?

Koko: *dead good bye*

Trainer: How do gorillas feel when they die—happy, sad, afraid?

Koko: *asleep*

Trainer: Where do gorillas go when they die?

Koko: *comfortable hole sleep*

Trainer: When do gorillas die?

Koko: *trouble old*

By the 1980s, enthusiasm for the ape-language had drastically waned. This was partly due to dismissals by theoretical autonomous linguists of the Chomksy school (e.g., Joel Wallman, Lyle Jenkins) and many cognitive scientists (e.g., Steven Pinker). Also, increasing funding for AIDS research caused a chimpanzee shortage at animal laboratories, and some universities and primate centers found they could no longer afford to operate as their funds were cut or transferred to medical research. Patterson left Stanford University and established the private nonprofit Gorilla Foundation whose primary purpose was to continue the language project, increase public awareness of gorillas as a threatened species, and provide a home for Koko.

Some of the criticisms leveled against all ape-language experiments can be seen in the following excerpt from a national AOL Live Internet Chat held in 1998 between Koko and Penny Patterson at the Gorilla Foundation, and a moderator and various questioners:

Moderator: Welcome Dr. Patterson and Koko, we're so happy you're here.

Patterson: You're welcome.

Moderator: Is Koko aware that she is chatting with thousands of people now?

Koko: *good here*

Patterson: Koko is aware.

Questioner 1: Koko, are you going to have a baby in the future?

Koko: *listen Koko loves eat*

Moderator: Me too.

Patterson: What about a baby? She's thinking. . .

Koko: unattention

Patterson: She's covered her face with her hands. . .which means it's not happening, basically, or it hasn't happened yet.

Koko: *I don't see it.*

Moderator: That's sad.

Here we see prompting by Patterson when Koko is silent, an interpretation provided when Koko's response is inappropriate, and a filling in of details not actually spoken by Koko.

Patterson has made surprising claims about Koko, even claiming that she has an IQ of 80.3 on standardized human intelligence tests. Perhaps because of their popularity in the mass media, Patterson and Koko are more harshly criticized than other ape-language researchers.

But these critics are perhaps being narrow minded. One reason Patterson and Koko's conversations are so interpretive may be due to the fact that they have never been apart since their language research started. As the science writer Eugene Linden noted, "Their relationship has all the overlays of love, bickering, and resentment. . .between a mother and a daughter who have spent their lives closeted together. . . . Were Koko human, their life together might have been a fitting subject for treatment by Tennessee Williams. Koko and Penny know each other so well that merely to read a transcript of their signing conversations is to glimpse only a very small portion of the interplay between them."

— *James Stanlaw*

Further Readings

Jenkins, L. (2000). *Biolinguistics: Exploring the biology of language.* Cambridge, UK: Cambridge University Press.

Linden, E. (1986). *Silent partners: The legacy of the ape language experiments.* New York: Times Books.

Patterson, F., & Gordon, W. (1993). The case for the personhood of gorillas. In P. Cavalieri & P. Singer (Eds.), *The great ape project: Equality beyond humanity* (pp. 58–77). New York: St. Martin's.

Patterson, F., & Linden, E. (1981). *The education of Koko.* New York: Holt, Rinehart, & Winston.

Peterson, D. (1989). *The deluge and the ark: A journey into primate worlds.* New York: Avon Books.

Pinker, S. (1994). *The language instinct: How the mind creates language.* New York: William Morrow.

Savage-Rumbaugh, E. S. (1986). *Ape language: From conditioned response to symbol.* New York: Columbia University Press.

Wallman, J. (1992). *Aping language.* Cambridge, UK: Cambridge University Press.

Kovalevskii, Aleksandr O. (1840–1901)

Russian biologist Aleksandr Kovalevskii (Kowalevsky) is notable for his foundational contributions to modern comparative embryology. Raised in a secular society with his brother Vladimir, Kovalevskii received his master's degree from St. Petersburg University for his studies of *Amphioxus lanceolatus.* The results from his research gained him admittance into the Russian Academy of Sciences, the Paris Academy of Sciences, and the Royal Society of London. Although Kovalevskii had won acclaim and prestige for his research, civil and academic political restraints prevented him from teaching at the leading academic centers of St. Petersburg and Moscow. Resigned to less-equipped provincial universities, he spent the rest of his academic career in Kazan, Kiev, and Odessa. In honor of Kovalevskii's achievements, the St. Petersburg Society of Naturalists created an international award, The Kovalevskii Medal, for advancing accomplishments in comparative embryology and zoology within an evolutionary framework. Applied to the study of phylogenetic relationships, Kovalevskii's contributions are foundational to Russian Darwinism.

Contributions and Perspectives

Influenced by Charles Darwin's theory of organic evolution, Kovalevskii's research into evolutionary embryology yielded insights into the relationships among species within a taxonomical framework. In his inquiry into the vertebrate *Amphioxus lanceolatus,* Kovalevskii suggested that this species could represent a transitional phase between vertebrates and invertebrates. Upon his initial research, he found that the embryonic development depicted two distinct developmental phases; the first phase resembles invertebrates, and the second phase resembles vertebrates. During this process, appearance of both egg and blastula is later followed by an embryo with both internal and external germ layer found in vertebrates. It was shown that within embryonic development, both vertebrates and invertebrates are similar; consequently, this discovery resulted in the reclassification of the lancet from vertebrate to invertebrate. Furthermore, Kovalevskii's inquiry into ascidians provided evidence that the developmental growth of these sea organisms closely parallels vertebrate development. Inquiry into embryonic development of other invertebrates exhibits similar development. Similar to Darwin's experiences that led to his discovery of organic evolution, Kovalevskii's study of marine life led to the finding of related species among the waters of both the Red and Mediterranean Seas. His findings provided further support for Darwin's scientific determination and opinion regarding embryonic development as possible terms in taxonomical evaluations.

Although Darwin's theory of organic evolution was not without its critics in Russia, most notably Karl von Baer (1792–1876), the mainstream of anti-Darwinian thought consisted of objections to transitional forms of species. Insufficient comprehension of heredity (genes and mutations) and the nature of adaptation allowed for the resurging fundamental principles of Aristotle (348–322 BCE) and Carol Linnaeus (1707–1778). Steeped in teleology and a designed ontology, the ensuing political climate (academic and social) differed slightly from today. In spite of this climate, Kovalevskii contributed evidence to the validity of Darwin's theory of evolution with the mechanism of natural selection within the biological sphere of marine life. Kovalevskii corresponded with Darwin, informing Darwin as to advancements in his own research and assisting with the translation of Darwin's publications that influenced embryology in both Russia and Western Europe.

— David Alexander Lukaszek

See also **Darwin, Charles; Kovalevskii, Vladimir O.**

Further Readings

Gould, S. J. (2002). *The structures of evolutionary theory.* Cambridge, MA: Harvard University Press.

Vucinich, A. (1988). *Darwin in Russian thought.* Los Angeles: University of California Press.

Kovalevskii, Vladimir O. (1842–1883)

Russian paleontologist Vladimir O. Kovalevskii was noted for his contribution to the development of phylogenic sequences or stages of evolution in species with an adaptive perspective. Brother to biologist Aleksandr, Vladimir is perhaps best known for his depiction of the transitional sequence involving the species Equus. Although educated in law as an undergraduate, he paid a heavy price for the transition to paleontology, first failing his examination at Odessa University and then failing to find suitable employment. Encountering opposition at every level, Vladimir was eventually appointed to Moscow University, a career cut short by his suicide in 1883.

Contributions and Perspectives

Influenced by the works and personal correspondence of Charles Darwin, Vladimir disseminated evolutionary theory by translating Darwin's works and supported his own research by publishing several monographs (one of which, *Anthracotherium*, he dedicated to Darwin). In addition, by translating other significant scientific and philosophical works, for example, Charles Lyell's *Antiquity of Man*, Kovaleskii typified and implemented the historical approach to the evolutionary perspective. This perspective was critical for the development of paleontology within Russian academia, through which Kovalevskii stressed the importance of fossils, biology, and ecology of species within an evolutionary and historical framework.

Kovalevskii's greatest contribution was reconstructing the evolution of the common horse, Equus. Using what we consider functional morphology, he studied the range of hooves or ungulates and arranged them into morphological variants (adaptations) and geological time. When viewed in this perspective, the lineage depicted several morphological changes: increase in size, modification of digits, and differences in dentition or the character of the teeth. When we interpret these changes through historical and geological time, it becomes apparent that the physical adaptations were a result of a changing ecology, thus supporting the Darwinian idea of natural selection.

Kovalevskii's research supported Darwin's theory of organic evolution and the mechanism of natural selection, implemented an active approach to phylogenic reconstruction, and established a comprehensive view of what would later develop into anthropology. Fighting against the political and academic restraints of the time, the very restraints that would contribute to his death, Kovalevskii tied Russian thought and science to Western Europe. This affiliation with the West and Kovaleskii's overall contribution to scientific thought advanced unity in Russians' view of life. Kovalevskii had provided the physical evidence to support not only his own personal perspective but also to reaffirm the materialistic interpretation of Darwinian evolution.

—David Alexander Lukaszek

See also **Kovalevskii, Aleksandr O.; Selection, Natural**

Further Readings

Darwin, C. (1964). On the origin of species. Cambridge, MA: Harvard University Press.

Gould, S. J. (2002). The structures of evolutionary theory. Cambridge: Harvard University Press.

Vucinich, A. (1988). *Darwin in Russian thought.* Los Angeles: University of California Press.

Kroeber, Alfred Louis (1876–1960)

Alfred Lewis Kroeber was an early American anthropologist who made significant contributions to all four of anthropology's subdisciplines. Kroeber is significant for his research on North American indigenous populations, his dedication to characterization and classification methods in ethnographic research, and his advancement of a definition of culture as a superorganic phenomenon. He established one of the most important centers for anthropological research at the University of California, Berkeley, where he trained a generation of anthropologists such as Julian Steward and W. D. Strong.

Kroeber was born in New Jersey in 1876 and grew up in New York City. He earned his bachelor's (1896) and master's (1897) degrees in English; Kroeber eventually obtained his doctorate (1901) in anthropology at Columbia University under Franz Boas, the founder of American anthropology. Kroeber moved to California in 1900 where he spent the bulk of his life, first as curator at the California Academy of Sciences, and later as a founding member of Berkeley's Department of Anthropology. After a lifetime of research and teaching, Kroeber died of heart failure in 1960 while on holiday in Paris.

Kroeber asserted throughout his career that all societies were historically unique and should be observed holistically to appreciate all constituent aspects (e.g. kinship, religion, language). As a result, Kroeber developed methods to characterize and classify the cultural traits of a society. One such example included recording the elemental distribution of cultural traits across North America in order to trace their evolution and write the culture history of indigenous populations. This work greatly informed Kroeber's observation of culture as superorganic, a phenomenon that develops according to internal laws and is immune to human intervention. The idea of culture as a superorganic phenomenon dominated anthropology in the following decades.

Kroeber's contributions to anthropology's subfields of linguistics and archaeology were remarkable. Understanding language to be the ultimate cultural trait, he recorded several disappearing languages during his fieldwork among California's indigenous populations. In his work on kinship terms, Kroeber developed what would later be termed *componential analysis*, in which language, when broken down into constituent components, could be categorized according to designated criteria. Kroeber was drawn to archaeology due not only to his curatorial responsibilities, but also in his quest to reconstruct American Indian culture histories. In his excavation and research in the American Southwest, the Valley of Mexico, and Peru, Kroeber was most concerned with ceramic styles and sequences. As a result, he introduced seriation into archaeological research, by which material culture is arranged in the order that produces the most consistent patterning of their cultural traits.

— *Benjamin W. Porter*

See also **Anthropology, Cultural**

Further Readings

Kroeber, A. (1948). *Anthropology: Race, language, culture, psychology, prehistory* (2nd ed.). New York: Harcourt, Brace.

Kroeber, A. (1952). *The nature of culture.* Chicago: University of Chicago Press.

ALFRED LOUIS KROEBER

Cultural anthropologist Alfred Kroeber is best known for his work with indigenous peoples of North and South America. Following in the steps of his teacher and mentor Franz Boas (1858–1942), Kroeber and anthropologist Roland B. Dixon (1875–1934) devised new classifications for American Indian languages. While at the University

of California, Berkeley, Kroeber also became involved with examining the Peruvian pottery collection excavated by Max Uhle (1856–1964). In 1926, Kroeber and Donald Collier traveled to Nazca on the south central coast of Peru to excavate cemetery sites in order to learn more about pottery styles of ancient civilizations.

Kroeber's 1928 account of the expedition has become a classic work in anthropology, arousing interest in Peruvian archaeology and influencing the work of generations of anthropologists. Edited by Patrick H. Carmichael, Kroeber's *The Archaeology and Pottery of Nazca, Peru* was reprinted in 1998, further demonstrating that Kroeber's detailed documentation has continued to set high standards for the rapidly expanding field of Peruvian anthropology.

On the basis of new radiocarbon dating methods, archaeologists in Peru announced in 2001 that the site of Caral is now believed to be the oldest city located in the Americas. Caral, which is located some 125 miles north of Lima, is now thought to date to 4,090 years ago. Under the leadership of Winifred Creamer of Northern Illinois University and Jonathan Haas of the Chicago Field Museum, archaeologists uncovered a vast complex of ceremonial and administrative buildings.

Caral is one of the largest cities located in the Supe Valley, where a number of other ancient sites have also been discovered since excavations began in 1941. The Supe Valley extends some 90 kilometers from the Pacific coast to the Andes Mountains. Examination of the Caral site has revealed that its residents lived on vegetables and seafood rather than on various grains as was more common at the time. Evidence of irrigated farming has also survived. Archaeologists have identified sophisticated architecture that includes low platforms, hearths, terraces, enclosures, and a sunken, circular plaza. Archaeologists who examined a present-day canal believe that a prehistoric canal existed in the same location.

New discoveries continue in Peru; in February 2005, archaeologists announced the discovery of some 50 etched figures found on the hills of the south coastal area of Palpa that likely predate the earlier discovery at Nazca of similar figures. According to Johnny Islas of the Andean Institute of Archaeological Studies, the figures at Palpa (depicting human beings, birds, monkeys, and felines) are assumed to have been created by the Paracas between 500 and 100 B.C.E.

— Elizabeth Purdy

Kropotkin, Prince Peter A. (1842–1921)

Peter (Pytor) Alekeyevich Kropotkin was a revolutionary and a philosopher; he was known for his works in other fields such as zoology, anthropology, and sociology. Kropotkin was the son of Prince Aleksey Petrovich Kropotkin of the old Russian aristocracy. He was educated in the elite Corps of the Pages, a special military school for boys of noble birth. From 1862 to 1867, Kropotkin served in the Army as an officer in Siberia; while there, he carried out original studies on cartography and geomorphology. Kropotkin proved that eastern Siberia was acted upon by post-Pliocene, continental glaciations. He found similar evidence in Finland and Sweden, thus theorizing that glaciers had once covered the northern plains of Eurasia and North America. A prolific writer, he developed his theories of libertarian communism on the principle of mutual aid, while observing tribal communities and the social life of the wild animals in Siberia.

As a result of his studies of animal life, Kropotkin theorized that mutual aid was the key to understanding human evolution. Most animals live in societies; Kropotkin believed that the survival strategy of safety was a concept needing closer examination, not just as a struggle for existence, but as protection from all natural conditions any species may face. Each individual increases its chances for survival by being a member of a group. Mutual protection allows certain individuals to attain old age and experience. With humans, collective groups allowed for the evolution of culture.

In the earliest band societies, social institutions were highly developed. In the later evolution of clans and tribes, these institutions were expanded to include larger groups. Chiefdoms and state societies

carried this mutual identity to groups so large that an individual did not know all members. The idea of common defense of a territory and the shared character of nationalism appears in the growth of the group sharing a collective distinctiveness.

Kropotkin believed that science and morality needed to be united in the revolutionary project; education ought be global, humanistic, and empower everyone equally, and children should learn not only in the classroom, but also in nature and in living communities.

Mutual aid remains a necessary part of the life of any family, band, city, or nation. It becomes even more important for smaller groups in surviving the rule of an elite. Mutual aid becomes the foundation for our ethical systems; ethics is the basis of our biological evolution, and in this morality lies our collective material existence in nature. Kropotkin claims anarchism would extend mutual aid from family to include all of humanity. This idea of *universal ethics* is the origin of all universal religions and philosophies.

Kropotkin's economic analysis began not with production, but with consumption established upon human needs. Needs are the starting point of production decisions; needs should not be determined by the greed and avarice of the individual. Economies should guarantee that all peoples' needs are met with the least waste of energy. Hunger and want is the fault of an improper economic system, and not the fault of nature. Only an economy of mutual aid can meet all peoples' needs; these needs include not only biological needs, but also all creative and emotional needs to live for the purpose of living the most meaningful life possible. Artistic creativity and concern for the well-being of oneself and others is the foundation for social morality, artistic creation, and the will to work at jobs that benefit the community.

According to Kropotkin's theory, each community would produce as much of its local needs as possible, exchanging only what it can produce in surplus for what it cannot produce. Mutual aid and voluntary cooperation eliminate the need to motivate labor through greed, hunger, or coercion. Kropotkin stated that even those who do not work should be fed, as they are but the "ghosts of bourgeois society." He felt strongly that most people would contribute to the well-being of others as long as they freely chose to do so.

Kropotkin believed that people easily can have all they need to be truly happy and healthy, and to live a meaningful life. In labor, work and art must be united. Through the rotation of jobs, all people share in both the noxious and creative work. Joy and responsibility cannot be separated. The separation of mental and physical labor can be eliminated. Decentralization can help reduce the poverty of separation of humans from nature.

Source: Courtesy, Wikipedia

Kropotkin believed it is possible for people to create a society in which unbridled wealth as well as all poverty can be eliminated. With wages or property, people could live in luxury with every need being met. This society can be achieved, Kropotkin wrote, only through propaganda of the deed, and through direct action. This unites a collective insurrection with a collective construction of society.

A large portion of contemporary social and biological science follows in the footsteps of Kropotkin's academic work. Responding to the social Darwinism of his day, he wrote his primary scientific work, *Mutual Aid: A Factor of Evolution,* arguing that a major factor in the evolutionary success of humans

was a predisposition to cooperate and share without the need for institutions such as the market or the state.

Research in anthropology has provided substantial confirmation to supporting mutual aid in non-market economies. Karl Polanyi, among others, has shown that a moral economy can and does exist. Anthropologists continually show extensive decentralized cooperation based upon reciprocity and redistribution. Marshal Sahlins writes that, in many cultures, selfishness is not rewarded. Substantivist economists have shown that people often give away substantial amounts of wealth. In many cultures, people actively cooperate against their own narrow self-interest. This is not simply "enlightened self-interest," it is a genuine need for justice as it own justification. Biologists have acknowledged that competition among early human groups could have contributed to the evolution of cooperative behavior on the part of individuals. Both cooperation and competition has existed in the past.

In 1871, Kropotkin dedicated his life to social anarchism, mostly because of his observations of animal and human communities in Siberia during his military service. In 1874 he was imprisoned in Russia for his radical actions and beliefs. In 1876 he escaped and went into exile, fleeing first to Switzerland, then France, and finally settling in Britain in 1886. He supported the allies during World War I; because of this, he lost much of the respect he had held from his fellow anarchists. Because of the Russian Revolution, Kropotkin was allowed to return to Russia in June, 1917. Although Kropotkin was respected by both the Bolsheviks and the opposing forces, he was critical of both sides. After the Bolshevik Revolution succeeded in overthrowing the Revolutionary Provisional Government of Kerensky, Kropotkin strongly argued that a vanguard couldn't make a revolution; only the people can fight a revolution and establish freedom. The Bolsheviks did not listen; brokenhearted, Kropotkin died in his beloved Russia in 1921.

For anthropologists, Kropotkin's work on mutual aid is perhaps his most important contribution, not only in terms of his argument for the moral basis for communist anarchism, but also as the base for his theories of human evolution.

— *Michael Joseph Francisconi*

See also **Anthropology, Economic; Anthropology, Humanistic**

Further Readings

Carter, A. (2000). Analytical anarchism: Some conceptual foundations. *Political Theory, 28*(2), 230–253.

Kropotkin, P. (1967). *Memoirs of a revolutionist.* Gloucester, MA: Peter Smith.

Kropotkin, P. (1967). *Mutual aid.* Boston: Extending Horizons.

Kropotkin, P. (1970) *Revolutionary pamphlets.* New York: Dover.

Kropotkin, P. (1989). *The conquest of bread.* Montreal, Canada: Black Rose.

Woodcock, G. (1971). *Anarchism: A history of Libertarian ideas and movements.* New York: Meridian.

Woodcock, G. (1971). *The anarchist prince: Peter Kropotkin.* New York: Schocken.

Kula Ring

The term *Kula Ring* refers to the circulation of shell valuables between island communities in the Milne Bay Province of Papua New Guinea. Bronislaw Malinowski was the first anthropologist to document the exchange in a classic anthropological text, *Argonauts of the Western Pacific,* written in 1922. Anthropologists working in the latter half of the 20th century have clarified many of the local characteristics of the kula from different island perspectives.

Visualizing the exchange as operating within a ring is somewhat misleading, as not all island communities are involved, nor do all communities within islands participate in the exchange, although it could be argued that all people in the Milne Bay are affected to some extent by the exchange. The majority of shell valuables that circulate in the exchange are regularly diverted from the kula and put into other local exchanges to satisfy people's more immediate exchange obligations. Entrepreneurial skills are needed for the kula man (and sometimes woman) to find a replacement and reenter it into the kula; otherwise he will lose all standing as a reliable kula partner, thus affecting his career in the kula. Unmet kula obligations may also threaten his life.

There are two shell ornaments circulated against each other between kula partners. The armshell or *mwali* is made from shell belonging to the *Conidae*

family. Both ends are broken off and smoothed to leave a cylindrical armlet that is decorated with other shells, seeds, beads, and ornamental items. The armshells travel around the ring in a counterclockwise direction for the necklaces, or *soulava,* which travel in a clockwise direction. The necklace is made up of *Spondylus* and/or *Chama* shell roughly broken and then repeatedly smoothed between stone in a single, long strand of shells strung together to form the necklace. These, too, are highly decorated for aesthetic purposes. While armshells and necklaces are the primary objects exchanged in the kula, other valuables and locally produced resources (such as clay pots, greenstone, and ocher) are also exchanged as solicitory gifts.

Although there are local differences, as a general rule men only have kula partners on other islands. A man will have partners on one side of him from which he receives only armshells. He gives these to partners on the other side of him from whom he can expect to receive necklaces. This means that men have to cross the open seas to solicit and acquire their valuables. Kula protocol is all about attraction and persuasion. While Malinowski wrote that kula was a "very simple affair," anthropologists have since documented the dangerous business of conducting kula. Partnerships are unstable because others desire the shell valuables they might hold and may persuade the trader to give up the shell to someone other than the intended partner. The consequences of this action include suspension of one's kula career and even death threats. The most valuable shells invite jealousy and accusations of foul play in their acquisition, subjecting holders to attacks of sorcery. While participation in kula offers men status and prestige, it may also bring upon them disgrace and death.

Today kula continues to be a significant exchange between people in the Milne Bay. Indeed, people who now work and live outside of the province continue to conduct kula with others relocated in other towns, cities, and nations as well as with those within the Milne Bay. Instead of traversing the seas on specially constructed, decorated, and magically impregnated kula outrigger canoes, these partners travel by motored launches and airplanes.

—*Shirley F. Campbell*

See also **Malinowski, Bronislaw**

Further Readings

Campbell, S. F. (2002). *The art of kula.* Oxford: Berg.

Leach, J. W., & Leach, E. (1983). *The kula: New perspectives on massim exchange.* Cambridge, UK: Cambridge University Press.

Malinowski, B. (1922). *Argonauts of the western Pacific.* London: Routledge & Kegan Paul.

KULTURKREISE

Kulturkreise (*culture circle* or *culture center*) is an early 20th-century German diffusion theory based on the belief that a cultural trait evolved in a specific area and then grew to encompass additional societies. According to this theory, the areas in which cultural traits evolved can be identified and the diffusion of the traits can be mapped. The work of Friedrich Ratzel (1844–1904) served as a motivating force for kulturkreise. Leo Frobenius (1873–1938), a student of Ratzel, developed the culture circle theory, and Fritz Graebner (1877– 1934), a German ethnologist, utilized this theory in many of his studies on societies throughout the world.

Graebner's research and publications helped popularize this school of diffusionist thought. While working at the Berlin Ethnological Museum, Graebner wrote about culture circles in Oceania. Later, he used the kulturkreise theory in a study focusing on the entire world,. tracing the spread of an ancient culture's traditions throughout the rest of the world in his best-known work on kulturkreise, *Das Weltbild der Primitiven: Eine Untersuchung der Urformen Weltanschaulichen Denkens bei Naturvölkern* (*The World View of Primitive Peoples: An Investigation of Archetypal World Outlook Thinking of Aboriginal Peoples*). The methodology outlined by Graebner served as a stimulus for later field research and led to the development of the culture-historical school of ethnology in Europe.

The goal of kulturkreise was to trace cultural traits from their specific origin through their spread to other cultures. It was believed that all cultural traditions originated within a few cultural centers, then spread through increasingly large circles to encompass additional cultural areas. The original cultural centers

were thought to contain discrete characteristics referred to as a culture complex (*Kulturkomplex*). Once the culture complexes were identified, the spread of culture could be traced.

Kulturkreise contrasted with the British school of diffusion thought associated with G. Elliot Smith and William Perry. The British school believed that ancient Egypt was the site for the development of the primary characteristics of modern civilization, and that the modern cultures that retained the civilized traits of ancient Egypt were the most evolved.

German-born Franz Boas, the founder of American anthropology, brought ingredients of the kulturkreise theory to the United States; however, he and other American anthropologists recognized the failures of the kulturkreise theory as a whole and instead focused on the development and diffusion of cultural traits in their historical context to identify connections between different cultures and their traits.

Diffusionist theories gradually lost fashion in anthropology and were replaced by the development of functionalist and structuralist theories. These forms of diffusion are viewed as extreme and not used by scholars today; however, anthropologists do acknowledge diffusion as a source of culture change.

— *Kristine McKenzie Gentry*

See also **Boas, Franz; Diffusionism; Functionalism; Structuralism**

Further Readings

Graebner, F. (1924). *Das weltbild der primitiven: Eine untersuchung der urformen weltanschaulichen denkens bei.* Munich, Germany: E. Reinhardt.

Kluckhohn, C. (1936). Some reflections on the method and theory of the Kulturkreislehre. *American Anthropologist, 38*(2), 157–196.

Sieber, S. A., & Mueller, F. H. (1941). *The social life of primitive man.* St. Louis, MO: B. Herder.

!Kung Bushmen

Strictly speaking, the !Kung are members of a Khoisan language family occupying the Kalahari regions of part of Namibia, Botswana, Angola, and Zambia; however, the term has come to be used conventionally to refer to the forager peoples of the Western Kalahari surrounding the border between Namibia and Botswana. Specifically, the term is often applied to the Ju/'hoansi—a forager group belonging to the !Kung language family. The confusion over this set of nomenclature stems from changing trends in political preference both among !Kung-speaking peoples and anthropologists. For the sake of continuity, the term !Kung will be used here in its older, conventional sense.

For several reasons, research concerning the !Kung was extremely important within the ecological anthropology of the second half of the 20th century. First reason is the idea, which even extends as far back as early Enlightenment thought, that foragers are somehow closer to nature or to some original state of humankind. This idea was very important to foundational cultural ecologists such as Julian Steward, and also to contemporary anthropologists dealing with issues of human evolution. The second important reason was the understanding that humans had evolved as foragers and had lived with that economic lifeway for the vast majority of human history. For these reasons, there was a great deal of interest in the !Kung and other Kalahari foragers as possible evolutionary models.

Evolutionary Models Based on the !Kung

The earliest major anthropological research in the Kalahari was done by members of the Marshall family. Beginning her second career as an anthropologist in the 1950s, Lorna Marshall offered early descriptions of !Kung economic and social behavior. Most important among these were her early accounts of sharing and reciprocity networks, which became a key long-term research focus among the !Kung. Marshall depicted the !Kung as gentle and nonviolent people living in peace, with egalitarian social and economic practices and no differentiation in status between individuals. She saw a society in which all economic resources were shared, accumulation of resources was not tolerated, and status differences were quickly and forcefully diffused. Despite this somewhat utopian flavor, Marshall's ethnography was excellent in its detail and extremely influential in its effect on contemporary anthropologists dealing with foragers. In addition, her accounts influenced a great deal of the evolutionary thinking of the 1960s and

established food sharing as an important feature of early hominid evolution. Filmmaker John Marshall captured vivid images of the !Kung that became prominent features of anthropology classrooms around the world for decades, further securing the place of !Kung as evolutionary models even in the minds of lower-level students. John Marshall filmed his important images of the !Kung over a long span of time, documenting the changes in !Kung culture during this time. Thus the Marshalls established the persistent and popular image of the !Kung as isolated, autonomous, egalitarian foragers living in a manner very close to the earliest humans. Harvard physical anthropologist Sherwood Washburn, in the latter part of his career by the 1960s, was also important in promoting forager research in order to document analogues with which to understand the past and build evolutionary models.

Due to this early information, a generation of ecological and evolutionary anthropologists made their careers working with the !Kung in the Kalahari. Perhaps the most prominent of this generation was Richard Lee. Working under the direction of Washburn's student, Irven Devore, Lee went to the Kalahari to gather information concerning the economics and social organization of foragers to use a baseline in formulating a synthetic model. Lee elaborated on Marshall's description of the !Kung as having an egalitarian social and political structure, focusing on the strong sharing and leveling norms of the !Kung. He saw these features as ways of dealing with economic dynamics of the forager lifeway. Lee viewed sharing as a way of coping with resources, such as large animals that are cooperatively hunted and too large to be consumed by individuals of close kin units. During this time period, Lee saw this egalitarianism as a feature of all forager societies, a feature also evident in models of human evolution during the 1960s. These ethnographic feature of the !Kung continue to figure prominently in current discussion.

Lee's work in the Kalahari was the cornerstone of the important *Man the Hunter* conference convened in Chicago in 1966. Lee and Devore put together the *Man the Hunter* conference with the idea of establishing hunter-gatherers as a cultural type defined by a fixed set of cultural features. This conference brought together the elite scholars working with foragers either archaeologically or ethnographically, and has had a long-lasting impact on the field. Lee and Devore sought to establish the view of all hunter-gatherers as egalitarian, with strong sharing and leveling norms and extensive reciprocity networks—a view taken directly from ethnography of the !Kung. This kind of forager research (and particularly that among the !Kung in the Kalahari) came to constitute a paradigmatic industry within the anthropology of the 1960s and 1970s. The model that emerged stated that humans evolved from early australopithecines through the increased hunting of large animals, which stimulated social food sharing, more complex social organization, larger brains and other anatomical changes. This relationship between hunting, food sharing, and complex social organization stemmed directly from these early ethnographic accounts of the !Kung.

The central features of the !Kung economic and social systems that continued to be elaborated upon were the prominent egalitarian sharing and leveling mechanisms and food sharing practices. In particular, a great deal of attention was paid to the *xaro* reciprocity networks; this topic was addressed notably in the research of Polly Wiessner. Xaro networks were pathways along which prestige items (jewelry, arrows, etc.) were exchanged, denoting important relationships in terms of individual group membership, residency, and access to resources. Wiessner argued that these exchange pathways, sharing and leveling practices, and food sharing were ways of managing the risk inherent in the forager lifestyle. For example, foragers are susceptible to resource shortages, and hunting is a risky economic practice prone to frequent failure. In addition, successful hunts result in the acquisition of meat packages too large to be consumed by individuals or strictly kin units, and therefore can sensibly be shared. Finally, sharing is the logical outcome of corporate labor practices such as hunting. Shared labor investment results in sharing of the final product. With these explanations as central features, the egalitarian sharing practices and reciprocity networks of the !Kung became vital aspects of evolutionary theory.

Revision and the Kalahari Debate

The direct analogy of the modern, living !Kung with the earliest time periods of human evolution was not without its political problems. By the early 1980s, an important critique was emerging. Critics such as Carmel Schrire, John Denbow, and Ed Wilmsen suggested that !Kung were not isolated, but instead had

been incorporated in regional economic networks for thousands of years. In addition, the !Kung were not autonomous, but had actually been exploited by neighboring ethnic groups in varying degrees over the last several millennia. Finally, they suggested that the !Kung were not entirely foragers, but had lived with mixed economies in relationships with neighboring groups in the past. The critics argued that evolutionary models based on !Kung ethnography were problematic in the sense that they promoted an image of primitive backwardness, or "fossils" of Stone Age. In short, these critics suggested that much of what anthropologists like Lee were describing as innate features of forager peoples were, in fact, the result of historical relationships, and were actually symptoms of rural poverty.

The debate that ensued (often glossed as the "Kalahari debate") was acrimonious and divisive among anthropologists working with the !Kung. Lee and his followers continued to promote the !Kung as forager analogues appropriate for interpretation of the past. Wilmsen and his followers continued to reject this practice on both intellectual and political grounds. From this context, most recent studies have focused on variability and diversity among forager groups, particularly the !Kung. Prominent among this set of researchers was Susan Kent, who argued that using the !Kung as a kind of modal forager society denied the variability inherent among all foragers. Instead, she argued, it is more productive to document this variability, understand its causes, and use this knowledge to understand variability in the past. This approach is also advocated by Robert Kelly and Lewis Binford in their recent synthetic volumes concerning forager societies. The !Kung continue to be incorporated into evolutionary models, but not as direct analogues or fossils of the human evolutionary past.

Current Lifeways

Today the !Kung live mainly in Namibia and Botswana, incorporated into global economic networks. In Namibia, the !Kung participated as soldiers in the Namibian war for independence, drastically changing their economic systems and dramatically increasing the importance of cash economics. The !Kung fought mainly on the South African side of the conflict, and this provided a considerable amount of cash income to numerous !Kung men who chose to participate. Following the end of the war, despite the disappearance of the prominent military incomes, wage labor and cash continued to be primary economic pathways. Currently, tourism and government agencies provide the bulk of employment, and state-paid, old-age pensions inject a good deal of cash into the region. On the Botswana side, where military employment was never present, the !Kung continue to participate in patron–client employment relationships with local Tswana herders in the context of difficult and controversial relationships with the government. Nongovernmental organizations (NGOs) on both sides of the border provide important resources, and many anthropologists have important relationships with these NGOs. Finally, foraging continues to be an important practice for both economic and cosmological reasons despite the important role of cash economics. In many respects, future prospects look bleak as the !Kung are confronted by a lack of economic development and increasing dissolution of foraging opportunities in the context of Third World African poverty and global economic systems.

— Grant S. McCall

See also **Binford, Lewis Roberts; Steward, Julian H.; Washburn, Sherwood L.**

Further Readings

Kelly, R. L. (1995). The foraging spectrum: Diversity in hunter-gatherer lifeways. Washington, DC: Smithsonian Institution Press.

Marshall, L. (1961). Talking, sharing and giving: Relief of social tensions among the !Kung bushmen. *Africa, 31*, 231–249.

Marshall, L. (1976). The !Kung of Nyae Nyae. Cambridge, MA: Harvard University Press.

Lee, R. B. (1979). The !Kung San: Men, women and work in a foraging society. Cambridge, UK: Cambridge University Press.

Lee, R. B., & Devore, I. (Eds.). (1968). Man the hunter. Chicago: Aldine.

Schrire, C. (1980). An inquiry into the evolutionary status and apparent identity of San hunter-gatherers. *Human Ecology, 8*, 9–32.

Wiessner, P. (1982). Risk, reciprocity and social influences on !Kung San economics. In E. Leacock & R. Lee (Eds.), *Politics and history in band societies* (pp. 61–84). Cambridge, UK: Cambridge University Press.

Wilmsen, E. N. (1989). *Land filled with flies: A political economy of the Kalahari.* Chicago: University of Chicago Press.
Wilmsen, E. N., & Denbow, J. R. (1990). Paradigmatic history of the San-speaking peoples and current attempts at revision. *Current Anthropology, 31*, 489–524.

KWAKIUTLS

Kwakiutl is the name given to the people of one of the tribes of British Columbia who know themselves as the *Kwakwaka'wakw*, and have five dialects to their Kwak'wala language that stems from the Wakashan phyla. The Kwakiutl are concentrated on the northern end of Vancouver Island, and have constructed a communal lifestyle, for the most part, living on the fringes of the boreal forests. The Kwakiutl developed knowledge of the taking and use of salmon and cedar. From the plentiful cedar, the Kwakiutl made clothes, houses, ceremonial regalia, baskets, storage and serving utensils, canoes for transportation, and totem poles (some of the tallest in the world) carved to display family crests in demonstrations of lineage and status.

The Kwakiutl are best known for their Winter Ceremonials called *T'seka*, the potlatches where they competed with wealth, and the Hamat'sa, or Cannibal Dancer initiation rituals. When Europeans arrived in the northwest Americas, mercantilism was promoted and consequently affected every part of tribal lifestyle including clothing, food, transportation, hunting and cooking gear, and the symbols of value within the potlatch. As the ceremonial value or prestige of goods was transformed, the Kwakiutl became infamous for their potlatch wars and related activities. In 1884, the Canadian government enacted a law prohibiting the practice of the potlatch; in 1921, Indian agent William Halliday began arresting potlatch attendants, with sentences to prison for not less than two months. The potlatch artifacts that were confiscated were placed in museums and/or sold. In 1951 the law against the potlatch was removed.

The Kwakwaka'wakw Hamat'sa or Man-Eater dance

Source: Photograph by Eva Grainger, reprinted courtesy of U'mista Cultural Society, Alert Bay, British Columbia, Canada, www.umista.org

Canoes from Canada and Washington state waiting to be welcomed by the Port Gamble S'kallam Tribe in Washington.

Source: Photograph by Pamela Rae Huteson.

During the generations subjected to "civilization," some of the culture and the Kwak'wala language fell into disuse.

Lifestyle

Salmon was a food source that not only sustained the villagers through the winter, but also played a role in establishing social technologies that created a people who used salmon and other surplus foods like dried halibut in feasts, coupled with oratory edifying of the known cosmology, which assisted in forming a "moral universe" society. This philosophy both honored and demonstrated a kinship with all life, earthly and supernatural. Much like the Koyukon in Alaska, the Kwakiutl also follow the respectful etiquette of returning the bones of the salmon to the sea after eating, a procedure showing respect to the fish in order to seek favor and to ensure the perpetuation of abundant salmon runs and harvests. In addition to salmon, halibut, and other fish, Kwakiutl subsistence included a variety of berries and crustaceans, supplemented by hunting and digging edible roots. Dried salmon, halibut, and deer were stored in large amounts to ensure survival through the winter, with winter feasting in mind.

The cedar was of inestimable value to the Kwakiutl, as all parts were utilized: bark, roots, wood, and withes. Wood was the base element for shelter, transportation, totemic displays, and bentwood boxes that held valuables such as blankets, masks, and copper shields. Cedar products were made not only for survival, but also as prestige items used in feasts and potlatches. To obtain the tree that would be best for a long house or canoe required skill in detecting the soundness of a tree; but most important, it required the prayers and intuitiveness to be drawn to the right tree, as the Kwakiutl believed it is the tree that offers itself.

Similar to their northern neighbors, the Haidas and Tlingits, the Kwakiutl were a society of established rank of strict stratification, from the chief at the top, through various ranks from high, middle, and low caste, and then debtors and captured slaves. The complexities of Kwakiutl life included etiquette that was strictly followed, such as the correct procedure of placing food in one's mouth, how to chew, and other ways to avoid vulgarities. Name, rank, and property were claimed and given during potlatch times. Property consisted of dances, songs, and history of

origins; supernatural ancestors; and masks. Feasts could be held for weddings, memorials with a memorial pole, welcoming, naming of children, and for winter ceremonies. Formal invitations and strict protocols were observed at festivities, not the least of which involved refusing an invitation until the fourth time it was extended. In a competitive potlatch, canoes might be burned, copper shields broken or "drowned," blankets destroyed, and even slaves killed. In Kwakiutl antiquity there were few potlatches given, for these were costly affairs requiring several years to accumulate enough gifts for payments.

Repatriated masks from the Royal Ontario Museum

Source: Photograph by Vickie Jenson, reprinted courtesy of U'mista Cultural Society, Alert Bay, British Columbia, Canada, www.umista.org

European Contact

New prestige items produced through modern European technology made their way through the barter system into the villages, metamorphosing within the Kwakiutl's spiritual and daily activities. Before Hudson Bay blankets replaced fur pelts in the value system, only the elite could give pelts during a feast due to the special value of the pelt, which was not only the coat of an animal, but also had a spiritual significance representing the power and spirit of the animal. There were strong beliefs throughout the northwest coast tribes that animals also had villages, and without their coat of fur or feathers, they would appear as humans. Fur trade with the Europeans brought the much-coveted "modern" conveniences such as metal, pots and pans, china, clothing, fabric, as well as beads and blankets. Difficult questions had to be answered to adapt the conversion of pelts to the common Hudson Bay blanket, but by the time Boaz met the Kwakiutl in 1886, there was already an established value system surrounding exchange with these blankets of newly bestowed value.

Dancers at the 2003 Tulalip Canoe Quest celebration

Source: Photograph by Pamela Rae Huteson.

Potlatches captured the imagination of newcomers to the Kwakiutl area, and they became highly controversial among missionaries such as Thomas Crosby, who experienced culture shock in discovering the customs such as dancing. Crosby expressed the horror of witnessing a man cutting himself during a dance, but also explained how a chief felt that a "white man's dance" of holding another man's wife while dancing was worse. The barter marriage among the Kwakiutl brought the most criticism from outsiders. Although the marriages for young girls were a sham, existing only to build the status of the girl and ending

when the young lady reached her first menses, the practice prompted those such as Reverend Alfred James Hall and his wife to have Girl's Homes built, where girls could live until they were at least 16 years old. The media's interest in the potlatch and barter marriages bordered on sensationalism, which brought even more discontent among the settlers and citizens of Canada. Missionaries were given the task to "civilize" the Kwakiutl and other tribes of the northwest.

Ban of the Potlatch

A law prohibiting the potlatch finally passed in 1885, but alterations to this law were necessary for the courts to be able to act on it. Indian agent William Halliday aggressively sought to destroy the potlatch by the indictment and sentencing of its participants, as well as by the confiscation of any potlatch paraphernalia and statements from the accused that they would never potlatch again. In response, people concealed potlatch locations and camouflaged the distribution of gifts and property under the guise of Christmas or other types of gift-giving events, as well as separating the events of dancing and gift giving in order to stay within the law. In 1951, the Canadian Indian Act was revised (sans anti-potlatch laws).

Kwakiutls Today

The Kwakiutl have succeeded in gaining restoration of some of their confiscated treasures and have built two museums to house them: the Kwakiutl Museum and the U'mista Cultural Centre. Since English had become the dominant language, tribes like the Kwakiutl have been attempting to bring their language back.

Today the potlatches are not only reestablished, but are even increasing in popularity. New canoes are being carved, not just for artistic enjoyment, but also for use in canoe races at festivals and the new trend of canoe voyages. Today, Kwakiutl canoe teams can be seen training along the coastline, preparing for an annual event inclusive to all northwest coastal tribes that draws pullers (paddlers) from as far as the coast of British Columbia to Washington. Stops are made along the many villages up and down the northwest coast; a different final destination is set each year with a potlatch greeting the pullers when they arrive.

The Kwakiutl have been a historic presence along the northwest coast, with their world-famous potlatching and Hamat'sa secret societies. Today they are translating that traditional role into a positive, contemporary one by sharing their culture internationally through art, stories, language, and history; thereby instilling pride in their tribe and communities and giving them international prominence.

— *Pamela Rae Huteson*

See also **Boaz, Franz**

Further Readings

Anderson, M. & Halpin, M. (Eds.), (2000). *Potlatch at Gitsequkla: William Beynon's 1945 field notebooks,* Vancouver, BC: University of British Columbia Press.

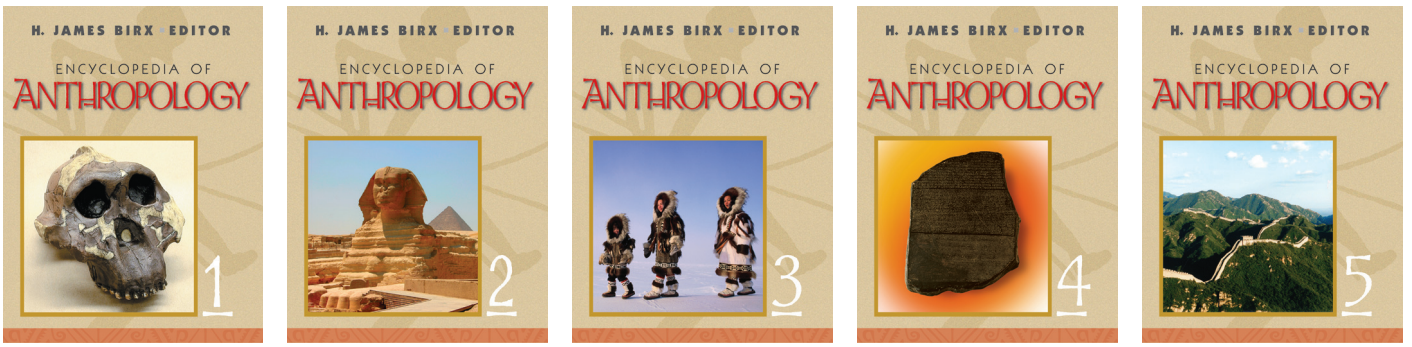
Boaz, F. (1975). *Kwakiutl culture as reflected in mythology.* Millwood, NY: Kraus Reprint.

Crosby, T. (1907). Among the An-Ko-Me-Nums. In C. Lillard (Ed.), *Warriors of the North Pacific* (pp. 63–124). Victoria, Canada: Sono Nis Press.

Dietler, M., & Hayden, B. (Eds.). (2001). *Feasts: Archaeological and ethnographic perspectives on food, politics, and power.* Washington, DC: Smithsonian Institution Press.

Jonaitis, A. (Ed.). (1991). *Chiefly feasts: The enduring Kwakiutl potlatch.* Seattle: University of Washington Press; New York: American Museum of Natural History.

McFeat, T. (Ed). (2002). *Indians of the North Pacific coast: Studies in selected topics.* Seattle: University of Washington Press.



ENCYCLOPEDIA OF ANTHROPOLOGY

H. JAMES BIRX ▪ EDITOR
Canisius College, SUNY Geneseo

4

A SAGE Reference Publication

SAGE Publications
Thousand Oaks ▪ London ▪ New Delhi

Copyright © 2006 by Sage Publications, Inc.

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

For information:

Sage Publications, Inc.
2455 Teller Road
Thousand Oaks, California 91320
E-mail: order@sagepub.com

Sage Publications Ltd.
1 Oliver's Yard
55 City Road
London EC1Y 1SP
United Kingdom

Sage Publications India Pvt. Ltd.
B-42, Panchsheel Enclave
Post Box 4109
New Delhi 110 017 India

Printed in China.

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Encyclopedia of anthropology / H. James Birx, editor.
p. cm.
Includes bibliographical references and index.
ISBN 0-7619-3029-9 (cloth)
1. Anthropology—Encyclopedias. I. Birx, H. James.

GN11.E63 2005
301′.030—dc22
2005013953

05 06 07 08 09 10 9 8 7 6 5 4 3 2 1

Sage Reference:	Rolf Janke, Sara Tauber
Production:	Claudia A. Hoffman
Permissions and Image Research:	Karen Wiley
Typesetting:	C&M Digitals (P) Ltd.
Indexing:	Will Ragsdale
Cover Designers:	Ravi Balasuriya and Michelle Lee Kenny

CONTENTS

List of Entries
ix

Reader's Guide
xvii

Editorial Board
xxix

Entries L–P
1395–1976

Index
I-1–I-96

4

La Barre, Weston (1911–1996)

Raoul Weston La Barre, an anthropologist of wide-ranging interests and great accomplishments, was born in Uniontown, Pennsylvania on December 13, 1911. By high school, he demonstrated the careful scholarship and versatility characteristics of his forthcoming career as a psychological anthropologist. He matriculated from Princeton (1933) and went on to Yale, earning his doctorate in 1937 with a study of the peyote religion. He was subsequently named Sterling Fellow at Yale and worked among the Aymara of Lace Titicaca Plateau and the Uru of the Rio Desaguadero. A Social Science Research Council Postdoctoral Fellowship allowed him to receive psychoanalytic training at the Menninger Clinic in Topeka, Kansas, where his friend and colleague, George Devereux also studied.

In 1939, La Barre married Maurine Boie, a social worker and editor of *Family*, a social work journal. She later taught at Duke University Medical Center until her retirement. World War II interrupted La Barre's teaching at his first post, Rutgers University. He joined the Navy as a parachutist trained for naval intelligence but spent two years in China (again, with George Devereux) and Kandy, Sri Lanka. After the war, La Barre, as a Guggenheim Fellow, studied the Japanese and the Chinese and joined the faculty at Duke University.

La Barre's fieldwork had begun in 1935 with the study of the Kiowa of the Plains. These works concerned peyote, on which he wrote *The Peyote Cult*, which has been reprinted and revised numerous times and remains a standard work on the subject.

La Barre's ethnobotanical interests continued in studies on Kiowa folk medicine, Aymara *materia medica*, and potato taxonomy. These developed into both descriptive and theoretical writings on Native American hallucinogens and the relation of these to ecstatic religious experience in both the Old and the New World. The works predated the interests of medical anthropology and cognitive anthropology by several decades.

A central perspective in La Barre's work beginning in the 1930s was the application of psychiatric—especially psychoanalytic—insights to ethnography. He wrote on the importance of socialization for the development of ethics and the elements of the same that we find in folktales and myths. Despite his orthodox analytic perspective, La Barre emphasized holism in anthropology, as indicated by his classic 1954 work, *The Human Animal*. Here, he showed how specific human traits such a language, family, and culture were reciprocally related to the specific biology and evolution of the human species. He later continued this theme and argued for the role of human biology in religion and even gender. In his 1970 classic, *The Ghost Dance*, he argued that religion's origins must be sought in its creators, human beings, and their experiences of socialization and society, a theme to which he returned in his last book, *Shadow of Childhood* (1991).

La Barre's view of humans was akin to Pareto's at the end of that theoretician's career; much that is human is irrational, especially the sacred. This view is exemplified through his 1962 work *They Shall Take Up Serpents*, which discerned psychopathic and sexual elements in a rural U.S. snake-handling religion.

La Barre's range of interests and expertise allowed him to write insightful articles on a wide range of subjects, such as social guides and the cultural bases of emotions and gestures, as well as ritual public confessions, nonverbal communication, the history and ethnography of marijuana, folktales, and the cultural

relativity of obscenity. He also published articles on family, children, and socialization.

He retired from Duke University in 1977 as the James B. Duke Professor of Anthropology. In the 1980s, La Barre remained active, publishing three books in five years. His final work, *Shadow of Childhood*, appeared in 1991, signaling a publishing career that spanned more than five decades. His publications now occupy more than 7 linear feet of shelf space in the National Anthropological Archives at the Smithsonian Institution. He was also, perhaps, anthropology's most precise English-language writer, with examples from his writings cited for correct usage 138 times in Webster's *Third International Unabridged Dictionary*. His life partner Maurine Boie predeceased him, and La Barre died in North Carolina in March, 1996.

—Atwood D. Gaines and Paul E. Farmer

See also **Peyote Rituals**

Further Readings

La Barre, W. (1938). *The peyote cult.* New Haven, CT: Yale University Press.

La Barre, W. (1962). *They shall take up serpents: Psychology of a southern snakehandling cult.* Minneapolis: University of Minnosota Press.

La Barre, W. (1970). *The ghost dance: Origins of religion.* New York: Doubleday.

La Barre, W. (1991). *Shadow of childhood: Neoteny and the biology of religion.* Norman: University of Oklahoma Press.

Labor

Labor involves purposive effort, mental or physical, toward a goal. In studying labor, we should be particularly careful not to import the biases of our own economic culture. Labor is not always clearly segmented from other activities in daily life, although the wage labor system favors such segmentation; this confusion obscures unpaid labor within capitalism as well as work in noncapitalist settings. Likewise, we need to be careful not to extend male gender biases to the study of labor; child care is as much labor as is cutting hay. Finally, we need to include multiple dimensions of labor, such as ideas and social organization, as well as physical effort, and we need to pay corresponding attention to nonstereotypical instances of work and workers, for example, bureaucrats as much as miners.

Labor is a central characteristic of human life; indeed, a number of scholars have proposed it as the defining characteristic, one that has shaped human evolution and history. David Ricardo and other early economists proposed a labor theory of value, and Karl Marx and Friedrich Engels made labor central to their theory of society as well as to their revolutionary politics. They viewed labor broadly, as active engagement with the natural and social world, and saw it as integral to human species. However, labor's products and value became separate from the humans who made them with the development of commodities, class society, and especially wage labor capitalism. The past results of labor, taken and used in the form of capital, then confront current labor as an alien and powerful force.

A number of anthropologists, such as Lewis Henry Morgan (who influenced Engels), similarly saw labor, or its close associate tool use and technology, as central to cultural evolution. Even as 19th-century evolutionary schemes faded, labor continued to be a central concern of anthropology. Many scholars saw tool use as central to the evolution of the brain. Julian Steward's combined approaches of cultural ecology and multilinear evolution focused on work, as Robert Murphy has noted. Steward's notion of the culture core was the social organization of labor in food production within a particular environment.

Important insights were achieved in grand theorizing about labor, but its importance was exaggerated. In hominid evolution, for example, bipedalism preceded well-formed tool manufacture, and social organization and language use must be accorded equal evolutionary importance to labor (although all are interrelated). Likewise, in the findings of cultural anthropology, expression and imagination balance purposive labor. The human condition combines work and release, discipline and antidiscipline, production, reproduction, and play, and no single view seems adequate.

Labor in small-scale societies is tightly integrated with the rest of daily life. Gathering, for example, takes place along with child care and socializing, and it produces an immediate product for consumption rather than a product to be stored and alienated from

the producers. The gender division of labor, along with age, largely organizes small-scale production, but as with so many human phenomena, flexibility and variability are the rule; most hunters are men, but there are female hunters, and gathering is done by males as well as by females (similar comments can be made about horticulturalists).

Time allocation studies have been particularly influential in the study of labor, and their striking result is that people in small-scale societies work significantly fewer hours than do people in industrial societies filled with "time-saving" devices. In fact, increased time spent in labor is a sensitive indicator of greater social inequality because labor goes to provide not only for the person and immediate dependents but also for a wider social structure of surplus takers and a vast apparatus of technology.

This is seen clearly as we move to unequal agrarian societies. In some ways, there is continuity with small-scale cultures, for example, in patterns of direct production for use. However, Eric Wolf used an analytical framework of peasant "funds" to identify the uses of labor's products—subsistence, replacement funds, and ceremonial funds directed to peasant needs and goals as well as funds transferred to others as "rent" (including taxes and unequal market relations as well as payment for land as such). The question of transfer of the product of labor becomes more central yet with wage labor capitalism. In this context, some labor (physical and mental) is segmented from the rest of life, used to create commodities for an employer, and then turned into money and, in turn, into other commodities made by yet other workers. In the process, direct production for use declines (but by no means disappears, as feminists have shown for housework), and the accumulated past product of labor—or capital—has power over current laborers.

Engaging this range of settings, a rich anthropology of work has emerged. There have been numerous ethnographies of industrial workers, with June Nash's study of Bolivian tin miners notable for showing connections between seemingly disparate preindustrial and industrial cultural frameworks. Sidney Mintz provided a superior life history of a Puerto Rican plantation worker and later explored, in the case of sugar, global connections between commodity production and commodity consumption. Ethnographers often reveal hidden, informal social organization and implicit knowledge among workers, exemplified by Herbert Applebaum's study of construction workers and Frederick Gamst's ethnography of locomotive engineers.

Recent work has examined light manufacturing of consumer goods for global export in Mexico (by María Patricia Fernández-Kelly), in Malaysia (by Aihwa Ong), and elsewhere. Carla Freeman explored the emerging global trade in white-collar services and, in so doing, highlighted the management of self required by such industries. The sociologist Arlie Hochschild opened up an important line of inquiry into caring work, including both paid and unpaid caring for children, the elderly, and the ill, raising important feminist questions about the cultural frameworks surrounding contemporary labor, and Josiah Heyman explored the labor of consumption (again with a gendered perspective) seen as the production of daily life within commoditized societies. Clearly, the list can go on because labor is indeed fundamental to human existence.

— Josiah McC. Heyman

Further Readings

Applebaum, H. A. (Ed.). (1984). *Work in market and industrial societies.* Albany: State University of New York Press.

Applebaum, H. A. (Ed.). (1984). *Work in non-market and transitional societies.* Albany: State University of New York Press.

Nash, J. C., & Fernández-Kelly, M. P. (Eds.). (1983). *Women, men, and the international division of labor.* Albany: State University of New York Press.

Labor, Division of

Anthropologists refer to the division of labor as the different tasks that people do to provide for their physical needs and to reproduce their culture. We base these tasks on such criteria as age, gender, and skill. How this division is manifested varies across cultures and according to societal type.

In the foraging, tribal, and peasant societies, labor tends to divide along gender lines. Among foragers, such as the !Kung, men hunt large game animals, while women collect wild edible plants and care for

children. Within tribal societies such as the Yanomami, women keep garden plots and care for children, while men engage in hunting and trade. Among peasants in Latin America and Asia, men tend to farm and women manage the household. In these societies, there is little specialization in that a man or a woman does just one job, although they learn most of the tasks that their respective gender does.

Among people living within state societies, in contrast to foragers, tribal people, and peasants, there is a high degree of job specialization. From farmers to craftspersons, government administrators to cooks and teachers, men and women dedicate their labor to one specific task. In industrialized societies, a person can specialize even further by making only a component of a product rather than the entire product. Service industries are similarly divided into multiple tasks. In these societies, members cannot learn all the jobs that are performed, but there are fewer gender- and age-based divisions of labor.

This deceptively simple definition belies both the complex classificatory practices used by earlier ethnographers as they described how people provide for their needs and wants and the diverse analytical practices used by contemporary ethnographers studying why people do the tasks they do. Anthropologists have long recognized that human beings divide their labor into distinct tasks according to age, gender, kinship, skill, and knowledge. Classic ethnographies by Bronislaw Malinowski, A. R. Radcliffe-Brown, and Margaret Mead contain obligatory chapters explaining the division of labor within a structural-functionalist framework. In such ethnographies, the ways in which labor is divided illustrates how labor functions to reproduce the members and culture of that society.

In more contemporary ethnographies, anthropologists have moved away from the mere classification of the division of labor and functionalist explanations. Instead, anthropologists study the division of labor by analyzing why people do the jobs they do. They aim to show how people work within their respective societies and across diverse cultures and to learn why the division of labor in society changes.

In part, this line of research grows out of Adam Smith's 1776 book, *An Inquiry into the Nature and Causes of the Wealth of Nations*. A proponent of industrialism, Smith argued that, not only does the division of labor increase productivity, the specialization of tasks into subtasks makes the workers more productive and allows them to increase their skills. By focusing on a particular subtask rather than the whole task, workers are more efficient and contribute to a superior product.

Early anthropologists such as Herbert Spencer in *Principles of Sociology* combined Smith's analysis with evolutionary perspectives of societal change to argue that, as individuals compete for jobs and compete to improve the products they make, societies would progress from simple to complex. Civilization, as conceived of by Americans and Europeans in the late 1800s, is the ideal. Along the way, a new, more efficient division of labor would replace the division of labor in less complex societies.

More contemporary anthropologists who study the division of labor may be influenced by the theoretical perspectives that Émile Durkheim presented in his 1983 book, *The Division of Labor in Society,* and those that Karl Marx and Friedrich Engels presented in works such as *Capital* and *The German Ideology*. Both Durkheim and Marx were concerned with how industrialization and increased commodification affected society. Although they shared Spencer's evolutionary theoretical orientation, they did not agree that industrialization would necessarily lead to utopia, but in a contrary direction.

Durkheim argued that society helps maintain order and keep individuals' self-interests and desires in control. In societies characterized by mechanical solidarity, such as the !Kung, members are integrated according to likeness: moral ideology, nonoccupational specialization, and kinship. In those characterized by organic solidarity, however, such as the industrialized United States, members are not well-integrated and differences and divisions are more common among individuals. The causes for this are a division of labor in which there is greater specialization. Unlike the division of labor within societies based on mechanical solidarity, those based on organic solidarity lose their moral bonds and sense of community.

Marx and Engels also believed in the destructive nature of industrialization. They focused on the material conditions of human labor to show how increased specialization and commodification contributed to the development of social classes and caused workers to develop poorer skills overall and to lose their pride in their work. In other words, these workers' labor is alienated from the item being made because they learn only some small part of the

process. Marx did regard the division of labor as a necessary form of cooperation, but it is within a commodity-driven society that the divisions of labor are deleterious to the well-being of individuals and ultimately to that society itself.

These theoretical perspectives have influenced a great number of anthropological studies that question the relationship between work and culture, the nature of social classes and class struggle, and the links between work and gender roles. In particular, the analysis of the division of labor according to gender has helped transform how we think about why women and men do the tasks that they do. In *Sex and Temperament in Three Societies,* Mead showed that the division of labor by gender varies from society to society, dispelling Western cultural biases about the supposedly natural jobs that men and women do to maintain their material bases and cultural practices. Later, feminists Louise Lamphere and Michelle Rosaldo used Engels's work, *Origins of the Family, Private Property, and the State,* to question the ways that capitalism and industrialization have changed the gendered division of labor. The biases they describe about what we consider woman's work and how labor benefits are culturally and materially allocated in favor of men are also discussed by Ruth Behar and Deborah Gordon in *Women Writing Culture.*

From early anthropological descriptions of the tasks that people do from society to society to maintain their culture, anthropological research on the division of labor has progressed to analyses that ask why people do the tasks they do, who does them, and how they are rewarded.

— Walter E. Little

Further Readings

Behar, R., & Gordon, D. (1996). *Women writing culture.* Berkeley: University of California Press.

Durkheim, E. (1983/1997). *The division of labor in society.* New York: Free Press.

Mead, M. (1935/2001). *Sex and temperament in three societies.* New York: HarperCollins.

Smith, A. (1776/1977). *An inquiry into the nature and causes of the wealth of nations.* Chicago: University of Chicago Press.

Spencer, H. (1876/2002). *Principles of sociology.* Piscataway, NJ: Transaction.

Lafitau, Joseph-François (1681–1746)

Joseph-François Lafitau was an important French Jesuit missionary scholar who closely observed the Mohawks and other Indians at the Jesuit mission of Sault-Saint-Louis opposite Montreal during the early 1700s. Social theorists describe him as a proto-anthropologist because he combined critical use of historic sources with careful (albeit not always accurate) use of the comparative method, with an insistence on the dignity of Native beliefs and the worthiness of their study. Lafitau's work remains a vital ethnographic source for anthropological study of Iroquois people and of the history and culture of the Jesuits and their missionary endeavors.

Born in Bordeaux, France, in 1681 to Jean Lafitau and Catherine Berchenbos, both Joseph-François and his brother Pierre-François became Jesuits, members of a religious order of men founded by Ignatius of Loyola in 1540 that quickly garnered a reputation for intellectual acumen as well as pedagogical prowess. Beginning Jesuit formation in 1696 at 15 years of age, Joseph-François completed his 2-year novitiate and then went on to studies in philosophy, rhetoric, humanities, and theology as well as assignments to teaching posts and engagement in other apostolic duties by 1711.

While his brother was eventually consecrated bishop and never left Europe, the newly ordained Joseph-François requested assignment in New France and took the rigorous ocean voyage in 1712. He did his tertianship (final year of formation) in New France and took final vows in Montreal in 1716.

Lafitau worked among the Mohawks for roughly 6 years (1712–1717), allowing him time to master the language adequately, to gain familiarity with the local people, and to hone his observational and interview skills. In all this, he anticipated anthropology's defining methodology of fieldwork using the local language. He studied the *Jesuit Relations,* a contemporary compendium of reports by Jesuit missionaries in New France that contained considerable ethnographic detail concerning Native peoples. He also learned from the veteran Jesuit missionaries in the field, especially Julien Garnier, who had labored 50 years with the Iroquois. His intensive Jesuit training in Christian and Hebrew Scriptures, Greek and Latin Classics, and

mission reports from throughout the world provided ample material for his comparativist project.

Lafitau's most important contributions, achieved through careful and prolonged observations, elucidate Iroquois architecture, matrilineal descent, classificatory kinship (later rediscovered by Lewis Henry Morgan, who was not familiar with Lafitau's work), clan exogamy, the relationship of age grades and social status, and the significant role of women in Iroquois political life. While not always giving a proportional treatment to topics in his *Customs of the American Indians,* he considered the origins of the Indians as well as their religion and mythology, politics, marriage, occupations of men and women, dress, war and weaponry, trade, hunting and fishing, games, illness, medicine, death and burials, and finally language.

Cognizant of the great changes in Iroquois culture with the arrival of Europeans, Lafitau engaged in what was later called memory ethnography to reconstruct precontact lifeways, a preoccupation of 19th- and early 20th-century salvage anthropology. Although Lafitau was certainly not the first to compare Native American cultures with those of classical Europe and the Middle East, he did refine the method by critical use of written sources and direct fieldwork.

Returning to France in 1717, Lafitau urged that the mission be relocated due to soil and natural resource depletion, and he advocated the abolition of the liquor trade. He became mission procurator 1722 and was charged with providing for the financial and physical needs of the missions of New France. He held that office for 19 years. Reconnected with the libraries of Europe, Lafitau also used this time to write. First, in 1718, came a treatise on ginseng, which he learned about from a female Mohawk herbalist near Montreal, also drawing on European published descriptions (thereby becoming an early ethnobotanist). Next, in 1724, he turned his attention to what became his most important work, *Customs of the American Indians,* and also published *Historie de Jean de Brienne, Roy de Jérusalem et Empereur de Constantinople* in 1727. He returned to Montreal between 1727 and 1729 to serve as mission superior. Returning to France, he published his final book, *Histoire des découvertes et conquests des Portugais dans le Nouveau Monde,* in 1733. Lafitau also revised his very large chapter on religion, although the revision was never published. He died in the city of his birth in 1746.

Outside Jesuit and Catholic intellectual circles of the time, Lafitau generally was unnoticed or even opposed. He came to prominence during the 20th century when his unique contributions to the history of anthropology were recognized in France by Arnold Van Gennep, in Germany by Wilhelm Schmidt, and in Anglophone England and the United States by luminaries such as Francis Parkman, John Cooper, Anthony Reginald Radcliffe-Brown, Margaret Hodgen, Sol Tax, Meyer Fortes, and Lafitau's most important biographer William Fenton. Although his theological premises, universal comparisons, and ethnocentric peculiarities are rejected by contemporary anthropological method, Lafitau remains an important early practitioner of the discipline of anthropology.

Father John M. Cooper, himself a priest and ethnographer of the Gros Ventre of Montana, in 1935 wrote the early short biography that brought Lafitau to the attention of contemporary English speakers. A deep appreciation for the historical and ethnographic importance of Lafitau's life and works prompted William Fenton (a scholar of Iroquois culture) and Elizabeth Moore to translate into English Lafitau's *Customs of the American Indians Compared With the Customs of Primitive Times* in 1974, adding an extensive introduction to Lafitau's life and his significance as a recorder of Iroquois culture and within the history of European intellectual development as well as illuminating footnotes. William Fenton also wrote two earlier biographies of Lafitau in 1969 and 1974. The Champlain Society recently issued a free electronic version of this work. In 1971, Margaret Hodgen wrote on Lafitau and other proto-anthropologists of his era and provided historical context for these seminal thinkers. The 2002 work of Jesuit Father Carl Starkloff, a theologian who also worked closely with Indian tribes in Wyoming, demonstrated the currency of Lafitau's thought for missiological and theological questions.

— *Raymond A. Bucko*

Further Readings

Cooper, J. M. (1935). Lafitau. In E. R. A. Seligman & A. S. Johnson (Eds.), *Encyclopedia of the social sciences* (Vol. 9, p. 12). New York: Macmillan.

Fenton, W. N. (1969). J. F. Lafitau (1681–1746): Precursor of scientific anthropology. *Southwestern Journal of Anthropology, 25*(2), 173–187.

Fenton, W. N. (1974). Joseph-François Lafitau, S. J. (1681–1746). In *Dictionary of Canadian biography* (Vol. 3, pp. 334–338). Toronto: University of Toronto Press.
Hodgen, M. T. (1971). *Early anthropology in the sixteenth and seventeenth centuries.* Philadelphia: University of Pennsylvania Press.
Lafitau, J.-F. (1974). *Customs of the American Indians compared with the customs of primitive times* (Vol. 48, W. N. Fenton & E. L. Moore, Trans.). Toronto: Champlain Society. Retrieved December 11, 2004, from www.champlainsociety.ca/cs_publications-printed.htm
Starkloff, C. F. (2002). *Common testimony: Ethnology and theology in the customs of Joseph Lafitau.* St. Louis, MO: Institute of Jesuit Sources.

Language

Language, like culture, is something that is easier to discuss than to define, and no unitary definition is offered here. Instead, what anthropologists and linguists mean by language is better understood by trying to be clear about what does and does not count as language. In some cases, this involves disentangling folk uses of the term *language* from scientific uses.

In its folk sense, language is often used to mean any communication system—the "dance" of honeybees, the significance of type and color of flowers given to someone, computer codes, the posture and gestures included in "body language," and so on. Although these are indeed communication systems, they are not examples of language because they lack specific properties of human language, including especially the following:

Discreteness or discrete infinity. The elements of language (phonemes, words, and phrases) are perceptually discrete and can be combined and recombined without limit.

Dual patterning. A relatively small number of phonemes (as few as 15 for Hawaiian and approximately 35 for English), which are without intrinsic meaning, are combined to form units that bear meaning (e.g., morphemes, words). In other animal systems, each call is a meaningful unit.

Hierarchical structure. Linguistic elements are nested within each other. For example, the noun phrase *the gray cat* contains the nested constituents *the* and *gray cat,* and *gray cat* in turn contains *gray* and *cat.*

Structure dependence. The rules that govern the formation of words, phrases, and sentences operate on structural categories such as nouns and verb phrases, not on individual words such as *cat* and *eat.*

Some features of human language that are hinted at in other animal communication systems include the following:

Displacement. Linguistic expressions can have referents that are not present in either space or time such as the moons of Saturn and Attila the Hun.

Prevarication. Linguistic expressions can have referents that exist only in the imagination such as Tolkien's hobbits and Darth Vader.

The displacement feature may be present in the communication of direction and distance to the source made by honeybees. In addition, many animals "lie" by disguising themselves as more dangerous animals. Some monkeys learn to give false warning calls to the troop when they are under threat from other monkeys, and some of the primates that have acquired elements of human sign language seem to be able to use it for both displacement and prevarication, although they appear to be proficient at about the level of a 2-year-old human.

For anthropologists and linguists, then, one sense of language is the species property, the apparently uniquely human and innate capacity to acquire and use the entities that we label with words such as *English, Tagalog,* and *American Sign Language.* Darwin called this our "instinctive tendency to acquire an art." This is not an entirely uncontested view, but most linguists agree that language is innate in humans, although all agree equally that the specific language variety that people acquire as children depends on the social context within which they are enculturated.

Studying Language

Scholars who study the structural aspects of language generally focus on one or more of the traditional core areas: phonetics, phonology, morphology, syntax,

Source: © iStockphoto/Lauri Dammert.

semantics, and pragmatics. These core areas represent most of what users of a language must know about their language:

Phonetics. Speakers must know how to articulate the sounds of their language. English speakers must know that the first sound of a word such as *top* is alveolar rather than dental as in Spanish.

Phonology. Speakers of a language must know what the distinctive sounds of their language are. English speakers must know that the sounds [p] and [b] contrast in words such as *pat* and *bat.*

Morphology. Speakers must know how to combine the sounds of their language into meaningful units—words, prefixes, suffixes, and so on. English speakers must know how to form the plural of words such as *cat, dog,* and *bush* by adding the appropriate suffix to form cat[s], dog[z], and bush[iz], respectively.

Syntax. Speakers must know how to combine their words into sentences that call attention to something and then provide information about it. Again using English as an example, English speakers must know how to form yes/no questions from statements such as "She is in the kitchen" ("Is she in the kitchen?") by the appropriate movement of *is.*

Semantics. Speakers must know the meanings of the words they use. Speakers of English must know that *foot* refers to a small part of the leg, whereas speakers of some forms of Creole English must know that *foot* refers to the entire leg and foot.

It is also possible to study how people use their language appropriately to accomplish what they want in a given social situation (pragmatics), how language shapes and is shaped by social context (sociolinguistics), the acquisition and mental processing of language (psycholinguistics), language variation across space or between social groups (dialectology), and language variation through time (historical linguistics).

The knowledge that native speakers have is mostly unconscious knowledge; they "know" how to use their language, but they (usually) cannot explain how or why they say what they say. The scientific description and explanation of this knowledge, as possessed by a language's native users, is known broadly as descriptive grammar. In its folk sense, however, grammar often refers to prescriptive rules of use that are, in fact, social rules rather than linguistic rules. One example is the rule against using double negatives in English. Like most such rules, this one wrongly took language to be a logical (rather than a patterned) system. Prescriptive rules sometimes try to make one language fit the patterns of another more prestigious language such as the Latin-inspired rule against ending English sentences with prepositions. Still other prescriptive rules attempt to impose social values on language such as the English rules promoting *man* and *he* as "generic" forms.

Language, Dialect, and Idiolect

In another folk sense, language refers to any of a number of entities with labels such as *English* and *Tagalog.* But these are really labels of convenience; what counts as English is contestable within a sociocultural context. The points at which language can be thought of as a natural object are (a) the linguistic knowledge possessed by individual persons (their idiolects) and (b) the property universal to the human species, namely human language. In between these

extremes, entities such as "English," "American English," and "African American Vernacular English" are fuzzy categories that are socially and culturally defined and whose membership may expand or contract, depending on social and cultural consensus. They are all "dialects" because, at different levels, they all represent forms of language acquired and used across speech communities.

Because all people speak dialects, the reasons why particular forms of language get labeled as languages and others get labeled as dialects must be sought in the context in which they are embedded. The people who wield political, economic, and social control speak the "language"; nonelites speak a "dialect" of the language. As the old linguistic saying suggests, "A language is a dialect with an army and a navy."

Language as Biology and Culture

It seems clear that language is a part of the human biological endowment. Perhaps the most compelling evidence for this can be found in the area of children's acquisition of language. All normal human children everywhere acquire the language of their social setting at about the same pace and in the same way. They do so without formal training, and they do so in social and cultural contexts that differ in terms of what kinds of linguistic interactions are supposed to be appropriate between parents/caregivers and infants. These differences do not seem to affect the rate or quality of children's acquisition of language; in a sense, children acquire language in much the same way as they acquire the skill of walking. However, children who for some reason are isolated from all forms of linguistic interaction do not acquire language, and if they reach puberty without exposure to language, they might never be able to acquire more than a very rudimentary linguistic ability.

By the time children are roughly 3 to 4 years of age, they have mastered some of the most complex and subtle rules of their language, rules that no teacher of language could ever teach them. Of course, they still have lots of vocabulary to learn as well as some of the pragmatic rules of language use in different social situations and the literacy practices of their culture.

Although the underlying shape of language is biological, any given language itself is a cultural artifact. The best way of illustrating this is to take the words for the domesticated animal that English speakers refer to as a *dog*. All languages have a word for this animal; no language has a word for "half a dog." This seems to result from a property of the human brain that guides our perception and representation of natural objects in the world, such as dogs, that come to us in whole "packages" (other candidates might be rocks, trees, birds, and so on). At the same time, the words we find in different languages are as different as *dog* (English), *perro* (Spanish), *anu* (Aymara), *kelb* (Arabic), and *sobáka* (Russian). None of these words has a privileged connection to the animal itself. Each is an arbitrary but conventional answer to the problem of naming this familiar domesticated animal.

Apes and Language

Investigators have made numerous attempts to teach our phylogenetically closest relatives, chimpanzees and gorillas, to use language. Early efforts to teach them oral language were unsuccessful due in part to the fact that their vocalization behavior is not under fully voluntary control. Beginning in the 1960s with the chimpanzee Washoe, some of these fellow hominids showed that they can acquire and use a limited subset of a signed language such as American Sign Language, and they have also demonstrated some proficiency with other symbolic systems using computerized images or plastic tokens. Their linguistic capacity seems to limit them to a "two-word" or "telegraphic" use of the signs or tokens, although at least one bonobo (*Pan paniscus*) seems to understand some complex spoken English sentences.

During the formative years of anthropology, the study of language was at the core of ethnology done by researchers such as Franz Boas and Alfred Kroeber. Notions about language developed alongside the broader precept of cultural relativism, under which it was believed that languages, like cultures, could vary infinitely. It was also assumed that language acquisition was primarily a product of external forces. Noam Chomsky's 1958 review of B. F. Skinner's *Verbal Behavior* challenged this view by amassing evidence that language acquisition is driven primarily by an innately provided universal grammar and that enculturation fills in the surface details, determining whether a person acquires "Japanese," "American Sign Language," or some other system. To account for the fact that human children can easily acquire, without formal teaching, whatever happens to be the language of their community, most of language must be innate and languages must be, at some level, far more alike

than different. Some anthropologists resisted this approach to language, preferring instead to continue focusing on the features that make languages different from each other, in keeping with the broader interest in cultural differences over cultural universals.

— *Ronald Kephart*

See also **Generative Grammar; Protolanguage**

Further Readings

Chomsky, N. (1986). *Knowledge of language.* New York: Praeger.

Chomsky, N. (2000). *New horizons in the study of language and mind.* New York: Cambridge University Press.

Crystal, D. (1987). *The Cambridge encyclopedia of language.* New York: Cambridge University Press.

Foley, W. A. (1997). *Anthropological linguistics: An introduction.* Oxford, UK: Blackwell.

Lieberman, P. (1984). *The biology and evolution of language.* Cambridge, MA: Harvard University Press.

Pinker, S. (1994). *The language instinct.* New York: William Morrow.

Sapir, E. (1921). *Language: An introduction to the study of speech.* New York: Harcourt Brace Jovanovich.

NOAM CHOMSKY

Anthropological linguists have closely followed the works of linguist, educator, and political activist Noam Chomsky since the 1957 publication of his *Syntactic Structures* transformed the study of linguistics and launched the "cognitive revolution." Understanding how children acquire language is an essential element in understanding linguistics. Chomsky contends that all children have the ability to learn language without being taught by those around them. He suggests that children learn the basic rules of grammar as they learn to talk without realizing that they are doing so. Unlike animals that are rewarded for language-related accomplishments, children, at least past the infant stage, are not rewarded for language acquisition, nor are they punished for not acquiring language skills.

Chomsky maintains that bilingual or multilingual children are able to pick up the correct rules of grammar as they learn a language. He also believes that there are universal characteristics in children's acquisition of language. Chomsky's theory was supported by a 2004 study at the National Institute of Child Health and Human Development where researchers studied language acquisition in 269 children from Argentina, Belgium, France, Israel, Italy, the Republic of Korea, and the United States. All children were 20 months old. The study revealed that nouns, verbs, and adjectives, in that order, make up toddlers' language regardless of the emphasis on a particular part of speech in the language as a whole. For instance, English emphasizes nouns, while Korean accentuates verbs. Researcher Marc Bornstein posited that the emphasis on nouns for all toddlers in the study was a response to the tactile nature of objects as opposed to abstract verbs and adjectives that toddlers might have trouble comprehending.

Source: © Nancy Kaszerman/ZUMA/CORBIS.

Although linguists have studied language acquisition since the discipline began, the exact meaning of sounds that preverbal babies make has remained a mystery. In early 2005, researchers at the Infant Language Lab of the James Whitcomb Riley Hospital for Children and the Indiana School of Medicine announced that they hoped to solve this mystery of language acquisition in order to

develop tools for teaching deaf infants, who have received cochlear implants, how to talk. Cochlear implants are small electronic devices that are used to magnify sound for individuals who are either deaf or severely hard of hearing. According to the National Institute on Deafness and Other Communication Disorders, approximately 10,000 children in the United States have received cochlear implants. The majority of these children received the implants between the ages of 2 and 6.

Researchers Derek M. Houston and Tonya R. Bergeson are developing methods to test comprehension levels of infants in order to discover how infants process language. This information will be used by speech therapists to work with deaf infants as they discover the world of sound. In the past, researchers have been unable to test the language perception of children less than 2 years of age. Possible ways of testing infant language perception include tracking eye movements, recording information on responses to stimuli, and noting the length of time an infant stares at objects. Infants in the study are placed in a darkened room with a parent, as an unobtrusive camera above their heads tracks their responses.

While the focus of the study is identifying the differences in the way that hearing and deaf children with cochlear implants respond to sound, in other related projects, researchers are gathering significant data in areas that will enhance the entire field of language acquisition. Researchers are also looking at the seemingly instinctive practice of mother's talking "baby talk" to their infants. Bergeson reports that mothers of deaf children with cochlear implants talk to their children in language appropriate for their hearing age, based on the length of time the cochlear implant has been in place, rather than the child's chronological age.

— Elizabeth Purdy

Language and Biology

Both the biologist and the linguist are interested in how language evolved in the natural history of the human species. This process was embedded in the evolution of life from the first self-replicating macromolecules to the wealth of species living today on Earth. The evolutionary thinker hits, therefore, on a more fundamental question: Is human language the most complex realization of abstract principles that govern the processing of every kind of biological information?

But let us start with the first question: How did language evolve in our natural history? There is not a single science that can answer this question; research on the natural history of language is an interdisciplinary project that must bring together linguists, neurobiologists, social anthropologists, and evolutionary theorists, among others.

If we want to find the evolutionary origin of language, we need foremost a theory of what language is so that we can describe the relation between the general language competence of humans and the specific use of all those languages that were, are, and will be spoken in different human populations. A first idea could be that a language is just the set of all sentences that were ever spoken in some population. But how can a sentence be defined without criteria for whether an utterance is a well-formed combination of words? So, we need to know a grammar, which is nothing more than a rule-governed set of such criteria.

The grammars of, for example, Japanese and English do not look at all alike. Has the biological evolution of the human species, therefore, nothing to tell us about today's linguistic variety given that it is a result solely of cultural history and nongenetic transmission? On the contrary, according to one of the most influential linguistic theories, Noam Chomsky's theory of universal grammar, every human inherits the same grammatical competence involving abstract principles of how to learn a language. These principles alone cannot determine the language a child will learn; they contain parameters, the values of which are set by the social environment of the child, so that the rich variety of languages is generated by different individual experiences.

What is innate, and what is acquired in the knowledge of grammar, can be decided only by empirical research, in which human biology and social anthropology must cooperate. Apart from other research on anatomical and physiological prerequisites for language use, the most important question for the biologist involves investigating the neural structures in the brain that implement the different parts of the linguistic competence—from the phonological

analysis of utterances, through the generation of syntactic patterns and the semantic understanding of words and sentences, to the pragmatic knowledge of what is expected from the hearer when he or she perceives a certain kind of sentence in a dialogue. The neurobiologist must come to an understanding of how the neural instantiations of partial linguistic competencies are ontogenetically formed, and the zoologist must compare them with homologous parts in the brain of kindred species.

Yet language is, even from a strictly biological point of view, a social phenomenon. No human would speak if there were not others with whom a coordination of behavior is necessary to achieve some individual aims by social action. Therefore, primatologists and anthropologists are asked to explain the coevolution of innate cognitive competencies and social contexts in which the biological evolution of language happened.

The last remark draws our attention to possible evolutionary reasons for the origin of language. It seems evident that language provided a selective advantage for the ancestors of the human species in their struggle for survival because it is superior to any other known system of animal communication. But was language directly selected? Or did there exist some other previously selected mental faculties on the base of which the linguistic competence came into being as a kind of cognitive by-product that was only indirectly selected? Although the second alternative is more complicated than the first alternative, which is the typical answer that would be expected from a Darwinian, the creative possibilities inherent in language speak in favor of the second alternative, which is also compatible with the theory of natural evolution by selection. In contrast to any other system of animal communication, each of the different grammatical systems of human language allows one to construct an endless number of well-formed combinations of words and to communicate the same vast number of thoughts. Because this faculty transcends any direct adaptation to immediate communicative needs, the computational power of human language seems to have its origin rather in a kind of interface between sensory–motor and conceptual–intentional systems that were directly functional as adaptations by natural selection.

To this point, our evolutionary considerations seem to conceive language as a general anthropological characteristic that discriminates humans from any other kind of organism, a point of view that would be in agreement with a long Western philosophical tradition since Aristotle. But although we adopt the thesis that there does indeed appear to be something new in human language in respect to its computational power, we need not deny a second thesis: Human language is the most complex realization of abstract principles that govern the processing of every kind of biological information.

To support this thesis, we must ask whether it is possible to interpret the evolution of life on Earth in general, from the origin of the genetic code through intercellular and neural codes to the evolution of animal communication and of human language, as a history of the discovery and establishment of forms of information processing, which are nothing more than different types of languages. If so, abstract principles governing human language should be found in a more primitive form even on the level of genetic information processing. Since the 1970s, scientists interested in the functional organization of biological information, such as Vadim A. Ratner, Manfred Eigen, and Bernd-Olaf Küppers, have systematically described the linguistic character of genetic information.

Modern genetics conceives heredity as a process of storing, transmitting, processing, and transforming genetic information. To do so, it uses the concept of code for the description of the structure of the material carrier of hereditary factors, the deoxyribonucleic acid (DNA). Let us describe some main features of the linguistic structure of DNA.

- DNA stores genetic information in the sequence of its four nucleotide building blocks that bear no genetic sense separately. Yet they are combined in linear sequences of three nucleotides (called "codons") that do have a genetic sense. Each codon encodes an amino acid building block of a protein, so that the syntax of codons encodes the linear sequence of amino acids in the polypeptide chain of a protein.

- But if the syntactic structure of DNA can instruct the biosynthesis of proteins, there must exist a set of rules—a code—that attaches an amino acid to each possible codon. Indeed, such a genetic code exists; it defines the semantics of genetic information.

- Like in human language, this genetic semantics is contingent. Although the genetic code is the same in all organisms, the semantic relations of codons to amino acids originated not only in biochemical

necessity but also in evolutionary accidents. To explain the origin of genetic semantics, we must discover the singular boundary conditions of its first use, that is, the primitive pragmatics of genetic information in self-replicating molecules.

Our short remarks show that we can describe a language of genes involving the syntactic, semantic, and pragmatic dimensions of genetic information. If we expand our horizon and analyze other kinds of biological information by linguistic means, we are making a further step toward the integration of human language into a general evolutionary perspective on natural and cultural history.

— *Stefan Artmann*

Further Readings

Hauser, M. D., Chomsky, N., & Tecumseh Fitch, W. (2002). The faculty of language: What is it, who has it, and how did it evolve? *Science, 298,* 1569–1579.

Jackendoff, R. (2002). *Foundations of language: Brain, meaning, grammar, evolution.* Oxford, UK: Oxford University Press.

Küppers, B.-O. (1990). *Information and the origin of life.* Cambridge, MA: MIT Press.

Language and Culture

Attempts by linguists and anthropologists to understand humankind have always focused on two areas: culture and society and language and communication. It is somewhat unnatural, however, to separate the study of language from the study of culture, as doing so can limit attempts to characterize the development of peoples and how they create communities and live in societies. Language and are intrinsically related or, as Agar says in *Language Shock:*

> Culture is a conceptual system whose surface appears in the words of people's language.

Culture

In *Language and Social Semiotic*, author Halliday calls culture a social reality that consists of many interrelated dimensions. A traditional view might characterize culture as a group of people who most likely use the same language, live in the same geographic region, have the same moral and religious value systems, and participate in similar activities. Most researchers would judge this traditional view of culture as incomplete. Just as society is, culture is a complex concept. Anthropologists, linguists, and others have attempted to define culture, but language and communication characteristics are critical to the definition. Individuals do not develop cultures in isolation nor apart from language. Belonging to a culture requires belonging to a group and establishing bonds with members in the group through communication and language interactions. Existing cultures provide the means for individuals to form their personal identities and to make decisions about living, roles, membership, and participation; language is a major player in the development or demise of a culture. It is important to consider the differences between cultures and language use by peoples of the past and cultures and language use that has survived or has developed within current human societies.

Language and its Relationship to Living in Society

Language is more than just a singular component of culture. It is a symbol system that acts as a glue to bind cultures together. Reference to language in relation to most human societies and cultures nearly always involves spoken communication and written language; one notable exception is the culture of deaf individuals, which relies on language that is signed rather than language that is spoken.

The relationship between language, communication, and culture is complex. While language is a powerful and necessary tool to unite individuals in particular cultures, it may act as a barrier or be used to exclude or separate people in a society and within cultures. The author Ben-Rafael, in discussing Zionist immigrants to Israel, explained that, even though these individuals belonged to a common culture, they had migrated from Russia, Poland, and other eastern European countries with varying competencies in languages. Identification with a culture becomes dependent upon prior social context, and the choices of language and language adjustment are not always simple matters.

Members of a Sephardic family who moved from Bulgaria to Israel could speak between two and four languages besides Hebrew, and each member,

Source: © iStockphoto/Israel Talby.

especially the grandfather, was determined to speak one of the alternative languages to Hebrew at home. We can assume that immersion into Israeli/Hebrew society affected family interactions as well as their perceptions about their language use in society. Ben-Rafael explained that the grandmother criticized her husband for using Bulgarian because it was a non-Jewish language. And the grandchildren preferred English to Hebrew because it would support their future university studies and help them converse with visitors and during travel abroad.

The Prominent Place of Language

Individuals may speak different languages and belong to the same culture, or individuals may speak the same language and belong to different cultures. Sometimes people may be involved in multiple language groups that influence their choices of cultural identity. The ability to speak a language is not the only determinant for belonging to a culture or participating in a society, but it is intrinsic to establishing social identities and cultural roles.

Different Languages, Same Culture

One population that may be characterized as having more than one language but belonging to a culture of a major society is the deaf community in the U.S. Although a vast number of adults use American Sign Language (ASL) as their mother tongue and choose to belong to a distinct, identifiable deaf community, they are citizens of the United States and belong to the broader hearing society that uses English as its primary language. Deaf individuals share economic responsibilities, occupations, healthcare, and leisure with the hearing American society and are immersed and involved in American culture at every level.

Over 90% of deaf individuals are born to hearing parents, and more than 83% of deaf children attend public and private schools with hearing children. Frequently, it is not until the deaf child becomes an adolescent that increased opportunities to know other deaf persons arise, as well as opportunities to learn ASL. A majority of deaf individuals are members first and continuously of one culture but are bilingual through ASL and English. Only in the past 30 years have deaf Americans vigorously established their identity as a deaf community. To characterize them as belonging to a major culture, that is, the American hearing society, is not as clear cut as it may appear.

Same Language, Different Cultures

There are many real-life examples of societies in which individuals may speak the same language but belong to different cultures. Although Brazilians speak Portuguese, they do not share the same culture as individuals living in Portugal. More than 35 million eastern coast and central Africans speak Swahili, but they belong to distinct nations and to tribes with distinct cultures. Even though Swahili may be the language of many people, residents of African nations speak other languages derived during European explorations, and many African languages intersect and cross nations.

Cultures are not limited to countries. In certain workplace cultures, such as those at the animation film company PIXAR or in regional and national orchestras, individuals may speak the language of that corporate culture. Members of legislative bodies try to speak the same language and interpret the language of their constituents to determine the passage of laws. In these instances, individuals belong to common workplace cultures but they may be separated from each other within their workplace by the cultures of families, friendship, or religions.

Language and Culture at the Lexical Level

We can learn much about the connection between language and culture by studying the availability and use of words in language communities. Edward Sapir comments that vocabulary is a very sensitive index of the culture of a people. Even at the lexical or vocabulary level, we can often get a sense of how individuals perceive themselves as members of society and members of specific cultures. The differences in word usage between languages can have serious implications for those who attempt to converse in a language not their own if they assume the same words in both languages carry equivalent meanings.

Freedom

In an analysis of the word *freedom* in five languages, Wierzbecka shows that, not only does this word mean something distinct in each of the four languages, in some of them, some usages are not permitted. For example, in English, we can use *freedom* in contexts such as freedom *from* (interruption), freedom *to* (leave), freedom *of* (choice). In Polish, we define the word *wolność* in moral and political terms, a word we associate with oppression and matters of life and death. It is inappropriate to use it in phrases as we might in English, such as *freedom of access* or *freedom of movement*, or in sentences such as *A dog should be given its freedom.* We can, however, use *wolność* as we do in English when we say *freedom of conscience.*

Words by themselves do not have meanings; words take on meaning from individual use and as a function of the language and of the culture in which the words occur.

Language and Power in Culture and Society

In studies of ethnicity and race, researchers have recorded numerous instances of families and cultures considered *language minorities* but who insist that they will maintain the characteristics that define their people while living in a country outside of their country of origin. Fearing assimilation and loss of ethnic identity, migrants as well as ethnic and racial groups that may have resided in a country for years or even centuries may attempt keep their original languages and their cultures alive by developing isolated styles of living within the larger society. At times, the choice to maintain cultural identity comes at the price of economic advancement, livelihood, and educational opportunity. Lambert and Taylor quote a Vietnamese adult living in Montreal: "I'm grateful to be here, but this is not my place of choice. I will not become less Vietnamese by living here."

In the United States, members of ethnic or racial communities who try to maintain their cultures and their native languages are sometimes able to resist assimilation. Although the distinct identities of many ethnic communities are dwindling, some, such as the Navajo nation, are growing—from 8,000 in the 1860s during the period of decimation by the U.S. government to more than 210,000 in the 21st century.

As we consider the power of language, we must recognize individuals' ability to adjust the use of language to more than one social context. Individuals who have few opportunities to interact outside of a small subgroup within a society can be victimized or placed in a role of subservience or isolation by those in the larger community who have a broader command of language. Conversely, because languages change as cultures develop, individuals with high degrees of competence in their mother tongues have the capability to support those who do not share that competence, expanding—as Lull terms it—the *dynamic ecology* of culture.

— *Patricia N. Chrosniak*

Further Readings

Agar, M. (1994). *Language shock: The culture of conversation.* New York: William Morrow.

Ben-Rafael, E. (1994). *Language, identity, and social division.* New York: Oxford University Press.

Gallaudet Research Institute. (2002–2003). *Regional and national Statistics.* Washington, DC: Gallaudet University Press.

Halliday, M.A.K. (1978). *Language and social semiotic.* Baltimore, MD: University Park Press.

Joseph, B. D., DeStephano, J., Jacobs, N. G., & Lehiste, I. (Eds.). (2003). *When languages collide: Perspectives on language conflict, language competition, and language coexistence.* Columbus: Ohio State University Press.

Lambert, W. E., & Taylor, D. M. (1987). Language minorities in the United States: Conflicts around assimilation and proposed modes of

accommodation. In W. A. van Horne (Ed.), *Ethnicity and language* (pp. 58–89). Madison: University of Wisconsin Press.

Lull, J. (2000). *Media, communication, and culture: A global approach,* 2nd Ed. New York: Columbia University Press.

The Navajo Nation. www.americanwest.com

Padden, C., & Humphries, T. (2005). *Inside deaf culture.* Cambridge, MA: Harvard University Press.

Sapir, E. (1949). *Language: An introduction to the study of speech.* New York: Harcourt, Brace.

Wierzbecka, A. (1997). *Understanding cultures through their key words: English, Russian, Polish, German, and Japanese.* New York: Oxford University Press.

GLOBAL LANGUAGE

When Marshall McLuhan wrote his *Understanding Media* in 1964, he laid the foundation for what would emerge as a true "global village." What McLuhan might not have perceived at the time is that the language of that global village would be his own—English. The Internet that would bind that global village became known as the World Wide Web, a silicon-based communications system that brought together people from all over the world through the small screens of their personal computers. The origin of the Web can be traced to the work begun by the U.S. Defense Advanced Research Projects Agency (DARPA) in 1958, when the administration of President Dwight D. Eisenhower (perhaps the most unsung of computer pioneers) sought to develop a method of keeping alive the nation's communications grid in the event of a Soviet thermonuclear attack. Indeed, an early name for the Internet was the DARPANET. Yet it was not until 1975, 11 years after McLuhan published *Understanding Media,* that the first true personal computer, as opposed to the computers used by the government, universities, and businesses, would appear. It was, as Ray Kurzweil wrote in *The Age of Spiritual Machines,* "the Altair 8800, which had 256 bytes of memory. A byte is a contraction for 'by eight.' A group of eight bits clustered together to store one unit of information on a computer. A byte may correspond, for example, to a letter of the English alphabet."

With the existence of the Internet and the beginning of the personal computer era that would make most homes and offices a part of it, there existed only the need for a communications medium to tie the two together. In 1990, Tim Berners-Lee at the CERN physics laboratory in Geneva, Switzerland, developed HyperText Markup Language (HTML). The development of HTML led to the conception of the World Wide Web. Before the Web, computer communications among individuals had been relegated basically to computer bulletin boards, a limited way of contacting others through the electronic ether. With the use of HTML, an explosion of computerized communication erupted with the full emergence of the Web in 1994.

From the onset, English appeared to be the language of choice on the new Internet. English already had a head start when, in 1994, America Online (AOL), the first Internet service provider, already boasted some 1 million paid members, who for a monthly fee could discuss everything from politics to their favorite sports teams or hobbies. Since then, English has preserved its dominance as the language of choice on the Internet. However, to make the Internet truly international, many Internet Web sites provide the ability for users to access the same pages in foreign languages as well. The most common languages after English are French, Spanish, Italian, and German, although there are sites in any language of the world as well. Some Web services also facilitate translations from English into other languages. Thus, by the 30th anniversary of the publication of *Understanding Media* in 1964, not only had McLuhan's global village come into being, but so had a common language to connect all its citizens—English.

— John F. Murphy, Jr.

VANISHING LANGUAGES

"A language is a flash of the human spirit," wrote anthropologist Wade Davis. Throughout history, perhaps 10,000 different languages have been spoken, but of the nearly 7,000 that still survive today, many are not being taught to children and fewer than half might continue to exist during this century. Some 450 tongues have only a few elderly speakers and are in immediate danger of extinction. Linguists estimate that one language dies every 2 weeks, taking with it unique ways of thinking, communicating, and living.

This linguistic impoverishment is considered a disaster that could threaten cultural diversity. As linguist Ken Hale argued, "Languages are more than grammar. They are cultures, ways of thinking about ourselves and our surroundings. When we lose one, it's like losing the Louvre." Linguists compare the disappearance of languages to the threat that the earth's biological diversity is facing from industrial pollution and population growth. This link is far from being simple rhetoric, and indigenous languages could play a role in environmental preservation because they often contain valuable ecological knowledge that enables speakers to preserve their habitats.

Among languages that have recently disappeared are Northern Pomo, a Californian Native American language; Sirenik Eskimo; Quinault, spoken by Native Americans in Washington State; Kasabe, spoken in the Adamawa province of Cameroon; and Ona, spoken in Tierra del Fuego in southern Argentina. Many languages have died out through human history, including those of major civilizations such as Sumerian, Assyrian, Babylonian, and Latin. Yet today's more technologically connected world is speeding up the process. English and a handful of other major languages that increasingly dominate the world are considered as linguistic passports to education and economic success. Spanish is killing native tongues in Latin America, and French is having a similar impact in its former African colonies. In southeastern Alaska, parents have stopped teaching native languages to their children.

The process of language vanishing has an economic base. When small linguistic communities become economically impractical, they break up and the language dies out as its speakers relinquish it for the language of the larger community. For example, after Russia drove the roughly 50,000 Ubykh speakers from their homes on the Black Sea into Turkey during the 1860s, the Ubykh speakers eventually decided that the dominant Turkish, Abkhaz, or Circassian languages would be more useful. Over time, they stopped teaching their children their extremely difficult tongue.

— **Luca Prono**

Language Use, Sociology of

Many disciplines in the social sciences and humanities systematically study language, each having its own theoretical foundations, goals, and research traditions. The resulting landscape is a maze of paths that start and then split off either to reemerge as hybrids combined with other specialties or to reach a dead end. For instance, psychology and anthropology joined with structural functional analysis to take a linguistic turn during the 1970s in the form of structuralism that, some believe, reached a dead end with poststructuralism. On the other hand, a team of 10 scholars (half linguists and half sociologists) spent 8 weeks of joint study at the 1964 Summer Linguistic Institute to purposefully give shape to a new field that was to be called sociolinguistics. Since that meeting, the number of publications, courses, and conferences that combine linguistic and sociological goals exploded and currently operates under the bifurcated categories of "sociolinguistics" and "sociology of language use."

Linguistic Universals Versus Variation

A major theoretical departure in the study of language pits linguistic universality against variation with its sociological counterpart found in theories of the relationship between influences of structure and agency. Within the former, the distinction can be traced to the work of Ferdinand de Saussure (1857–1913), a Swiss linguist whose main contributions were made through the published interpretations of former

students after his death. Saussure argued that languages are complete systems with two distinct layers: langue and parole. Langue is the consistent and complex template of a language that is possible due to the innate predisposition to knowledge of grammar that only humans possess. Langue is composed of systematic pairings of labels and their meanings called "signs." A sign is the association between a signifier (label) and a signified (object or concept), and meaning is found in the relationship of signs to each other. Once acquired, the association between signified and signifier is taken for granted as being natural and irreversible.

Parole, on the other hand, is the historically and culturally variable manifestation of langue. At the level of parole, signs are relative and arbitrary. The association between signifier and signified is relative in the sense that tree and *arbre* are culturally distinct labels used to represent a similar concept. For Saussure, the substance and form of signs are also arbitrary. In other words, reality is divided and categorized differently in different cultures, resulting in variable linguistic forms. For instance, the language system of Inuits has far more signs for snow than do languages in climates where the distinctions are less critical. Representations that address such a fine array of differentiation allow people to reflect on and communicate important facets of their culture. Conversely, a lack of representation precludes reflection or communication of concepts that have not been linguistically noted in a culture. For Saussure, by the time individuals reach maturity, a complete langue has been acquired and it becomes nearly impossible to separate the signifier from the signified (i.e., the label from the concept). Consequently, words and thoughts become one. Although originally created at the level of parole, once language is established, it becomes autonomous and the autonomy of the subject is undermined or lost entirely.

Noam Chomsky, a student of Saussure, reframed the langue/parole duality into that of competence and performance, placing priority on the universality of competence. Chomsky asserted that the human brain allows language, and he described how the brain is organized through the study of language structure. According to Chomsky, children are born with an innate mental propensity to understand grammar. Competence, referring to the unfolding of the innate knowledge of language structure, is the only way to account for children's ability to use the wide range of grammatical variables found in language without consciously being aware of the complicated rules and exceptions that govern its structure. Performance is learned through social action and is merely the surface structure of a particular linguistic code that is driven by the deeper structure that lies beneath all language systems. Although he later changed his focus, Chomsky believed that discoveries about linguistic universals, which he termed "generative" grammars, were more interesting and had more promising explanatory potential than did performance. The task of linguists was to reveal the underlying structures to be found in all languages by writing grammars that would develop an understanding of language as a system and, from that, provide insight into the human mind and social structure.

Claude Lévi-Strauss, a structural anthropologist who was influenced by Saussure and Sigmund Freud, stressed the invariance of human nature caused by a biochemistry of the brain linking the social activities of societies across cultures and history. He analyzed myths (i.e., the stories that people tell about themselves) in terms of the relationships between phrases to uncover the latent structure of society. This form of structuralism is based on the view that studying relationships among signs reveals more about the human condition than does analyzing the use of language. For structuralists, discoveries of universals can be drawn from observations of anyone and, therefore, no one in particular. They also must rely on observable, but superficial or secondary, occurrences to explain underlying and primary structures.

Poststructuralists reversed the structuralist pursuit of material structures through the study of language to an orientation toward the deconstruction of discourse to see how it operates below the level of intention and consciousness. There are several definitions associated with discourse analysis. For one, it refers to a type of analysis that highlights the rules and dynamics of speech and conversation in relation to the social situation. Discourse also refers to the production of ideology, in other words, the function of language to create a version of reality in favor of the ruling class. Finally, discourse also refers to a line of inquiry that assumes no objective reality outside that which is manipulated through language.

From an extreme development of logic found in poststructuralist discourse analysis, there is no external reality outside that created by language. Because language structures are universal rather than personal, human presence is uncovered only through

an examination of a subjectless text. Michel Foucault (1926–1984), perhaps the most notable poststructuralist, aimed at establishing the origins and changes in meaning structures over time. From both structuralist and poststructuralist points of view, social actors are "decentered" to a position of being mere products of discourse whether originating from innate structures or from historical developments in language. Critics such as Anthony Giddens have noted that the death of the subject and of objective reality brought about the death of this line of reasoning. However, other less extreme forms of discourse analysis remain legitimate lines of inquiry into language use.

Sociolinguistics and Structural Functional Variation

Both the linguists and the sociologists who met to combine their disciplines to shape sociolinguistics during the 1960s rejected approaches that lacked concern for correlations between social structures and the variability in the individual use of language. Although they share an interest in linguistic variation and its association with social reality, sociolinguistics from a linguistic approach attempts to discover linguistic structures within a social context, whereas sociolinguistics from a sociological approach attempts to discover social structures by studying actors using language. At its onset, however, sociolinguistics took on a predominantly structural functionalist point of view. This was the case for sociologists because Parsonian theory was at its pinnacle during this time, and it was the case for linguists because it was their tradition.

The structural functionalist approach to social structure is quite different from that of the structuralists. For the structuralists, structures are the underlying principles on which social patterns are built. On the other hand, structural functionalism refers to structure as the observable patterns of social practices such as roles, norms, and language that have been intentionally or unintentionally created or reproduced by social actors. Following this definition, sociolinguists view language as, first and foremost, a social and cultural product, and linguistic variation must be studied in social context. It emphasizes a social order that derives from normative consensus, with the individual operating in line with specific social constraints that derive from this social agreement. A central premise of sociolinguistics is that language is social in the sense that it is a mirror of society. Speakers use language varieties that reflect their differences in terms of regional, social, and ethnic statuses. Social variables such as style (degree of formality within a social context), social characteristics (class, race/ethnicity, gender, and age), social structure (norms and roles), and social status (ranking) are independent variables to the dependent linguistic variables. Therefore, sociolinguistics relies heavily on hypotheses that correlate social characteristics as independent variables with dependent linguistic variables.

Linguistic units that vary within differing social circumstances form a continuum composed of deviations from a standard or proper form and can be observed occurring more or less frequently. Inquiry focuses on the social determinants of the selection of linguistic variants in accent and dialect emphasizing phonemes, morphemes, phrases, and clauses that are considered to be variant, continuous, and quantitative. Much of this research prioritizes empirical matters over theoretical ones.

In 1958, a sociologist, John L. Fisher, was one of the first to conduct research that correlated social characteristics with linguistic variables. He found variations in the use of the suffix *-ing* (pronounced either [ing] or [in] such as in running or runnin') among the speech patterns of children in New England. He found that the less standard form [in] was used more frequently by boys than by girls, by working-class children than by middle-class children, and in a casual context than in a formal social context.

Studies by sociolinguists such as William Labov and Peter Trudgill provided seminal insight into how language represents social organization. The later work of the linguist Labov is usually regarded as the model for quantitative studies of variation. In early studies, he observed the social context in which the postvocalic *r* (i.e., *r* pronunciations after vowels) occurred in New York speech patterns. His independent variables were social class and style. He found that the postvocalic *r* was pronounced most often by upper middle-class speakers and was dropped most often by New Yorkers observed in casual social settings rather than formal ones. He also found that women of lower middle-class status used a greater range of variability than did working-class or upper middle-class women. In other words, lower middle-class women dropped the *r* much more often (in fact,

they practically never pronounced the postvocalic *r*) in casual conversation but did pronounce it significantly more often than upper middle-class and working-class women when speaking in more formal social circumstances. Labov hypothesized that lower middle-class women were more conscious of social mobility and, therefore, were more willing and able to change their language to adapt to social circumstances that required a more standard or prestigious variation. He called this process "hypercorrection."

In 1974, Trudgill explored sex and social class as determinants for using 16 phonological variables in a study conducted in Norwich, England. Extending Fisher's work with children, Trudgill found that working-class males used the less standard form of *-ing* (for example, singin') much more frequently than did working-class females. He concluded, and others since have consistently concluded, that women are more likely than men to use standard forms of language and also to have access to a greater repertoire of linguistic variations. A common explanation is that women are more status conscious and less secure than men and, therefore, use a more prestigious form of language. Another explanation is that women are more likely than men to use an interpersonal strategy called "face" to maintain self-esteem in social exchanges. A feminist critique is that these explanations conceptualize female linguistic strategies as deviant from the standardized or more normal male strategy.

A Sociological Approach

In 1992, Glyn Williams contended that sociolinguistics was far more influenced by linguistic goals than by sociological goals at its inception during the 1960s and remained that way. As evidence of this, many more linguistics departments include courses in sociolinguistics than do sociology departments. A main sociological critique of sociolinguistics is that its purpose is not to learn more about a particular society, or even to examine correlations between linguistic and social phenomena, but rather to learn more about language and to investigate linguistic change, variability, and the structure of languages. Also, its heavy reliance on consensus theory limits alternative theoretical perspectives and methods. Although sociolinguistics emphasizes empirical positivism and theory building, it is void in theoretical critique.

A subdiscipline within sociology that focuses on language must use an approach that relies on its disciplinary foundations. Critics deny the legitimacy of a specialty called the sociology of language use, suggesting that it still lacks a dominant or integrated theoretical basis that could progress to specific hypotheses and the collection of data that could be analyzed to test the originating theory. Nonetheless, the sociological interest in language expands the gamut of sociological thought. It includes analysis of the negotiation of meaning in conversation, of questions about the construction of reality, of its importance in the process of socialization and identity formation, and of the role of language in social inequality and oppression.

Although sociology at the macro level is often concerned with social systems that, as a whole, are greater than the sums of their parts, it is also the study of social life and behavior at the micro level along with the connection between the two. Like all fields in sociology, the sociology of language use must combine interest in social systems (how they work, evolve, and affect individual lives) and individual behavior (how individuals participate in creating, reproducing, and changing social systems).

An introduction of agency into explanations of society is found in the theory of Georg Simmel (1858–1918), a German sociologist who opposed a structuralist view of social behavior. He viewed society as "a collection of people connected by their interaction with one another." For Simmel, structure exists only through the constant achievement of individuals involved in interaction. Interactionist theories derived from Simmel view social systems largely as abstractions that have no existence independent of what individuals actually do in relation to one another.

Ethnomethodology is an approach within the framework of interaction theory that examines how human agency and the use of language affect perceptions of social reality. It emerged simultaneously with structuralism, but in direct opposition to it. Ethnomethodologists locate structure not in language systems but rather in the ways in which actors use language to create and maintain an ongoing sense of reality. As originated by Harold Garfinkel, it is the study of the methods that people use in everyday interactions, emphasizing the ability of individuals to create social situations. To gather data, ethnomethodologists use conversation analysis, where interactions in everyday natural settings are audio- or videotaped to systematically capture, code, and analyze the methods used by individuals to create social reality.

Critics point to the way in which ethnomethodology reduces social behavior to the rational behavior of social agents and how it cannot account for regularities other than those that arise unintentionally from purely individualized behavior.

Symbolic interactionism provides a theoretical foundation that brings more balance to the micro–macro paradox of causality. Individuals are seen as the core of social life, providing social systems with their fundamental form and creating reality through negotiated interaction. Symbolic interactionists study how symbols such as language are adopted and exchanged through mutual interpretation not merely to communicate but also to create and maintain a self-identity (internal) and impressions of ourselves (external) and to create and sustain our experience of particular social situations. Although shared meanings create a type of structure, structures are always emergent, fluid, and ambiguous. Language becomes the link between individual agency and social structure.

The anthropologist Edward Sapir (1884–1939) and his student, Benjamin Lee Whorf (1897–1941), developed a theory that has become known as the Sapir–Whorf Hypothesis and serves as the linguistic equivalent to this connection between structure and agency. It considers the bidirectional connection between linguistic variation and universality. The main tenet is that language not only expresses our ideas about social reality but also shapes these ideas. The theory has two parts: linguistic relativity and linguistic determinism. Linguistic relativity corresponds to Saussure's theory of the arbitrary nature of signs and infers no absolute or natural way to label objects, ideas, or experiences. Each culture divides up the world differently, and a particular perception of the world influences the language that is created; therefore, language represents perception. Linguistic determinism states that language is also the framework for our thoughts and perceptions. The most useful implication from the Sapir–Whorf hypothesis is that the reciprocal or nonrecursive relationship between social structure and agency avoids the extremes of both determinism and relativism. Language enables us to create reality by substituting words for direct experience. It is central to culture because it is through language that we are able to create and transmit culturally shared meanings of human experience, thought, feeling, and behavior. Sociologists, in particular, believe that variation in the ways in which language is created and used and the impact that variation has on differential perceptions of reality is at least as interesting as, and perhaps a more fruitful endeavor than, models limited by structural functional theory.

Basil Bernstein studied language as a bidirectional relationship between structure and agency through the process of socialization. Openly influenced by the Sapir–Whorf Hypothesis, Bernstein regarded language as something that both influences culture and is in turn influenced by it. He noted the distinctions in language use associated with socioeconomic standing, particularly the link between language acquisition and social reproduction. His interest in language extended to a general interest in how class systems are maintained by having control over knowledge and the language needed to access and use it in complex and creative ways. His basic premise was that social location has a linguistic environment that is learned through socialization from generation to generation and that, reciprocally, one's acquired language influences social standing. In his theory of speech codes, Bernstein argued that social class affects how students learn language in their family and school environments and that this, in turn, affects their achievement potential and social class possibilities.

Specifically, Bernstein found that people in the working class use a "restricted code," whereas those in the middle class have additional access to a more formal or "elaborated code." The elaborated code makes use of standard grammatical order and syntax and uses complex sentence structures that employ devices for conjunction and subordination clauses and prepositions to show relationships of both a temporal and logical nature. This variation also exhibits the frequent use of "I," a wide range of adjectives and adverbs, and qualifiers that he believed are conducive to expressing complex conceptions of experience. On the other hand, the restricted code employs short, grammatically simple, and often fragmented sentences of nonstandard form; uses few conjunctions or subordinate clauses; uses a limited variety of adjectives and adverbs; makes infrequent use of the pronoun "I"; and makes frequent use of idioms. According to Bernstein, everyone has access to this variety, which is used on occasions of familiarity. However, working-class families do not have access to the more formal and complex elaborated code due to their lack of experience in using it.

A controversial interpretation of Bernstein's theory is that socioeconomic groups that are limited to using

a restricted code are at an essential disadvantage, rather than a social disadvantage, when communicating in establishments such as educational systems and occupational organizations that favor an elaborated code. Although the codes have different characteristics and social consequences, Bernstein refuted that his theory implies differences in practical utility.

Pierre Bourdieu, on the other hand, made a utilitarian distinction in the acquisition of language. Bourdieu was a French sociologist whose general theory bridged the gap between individuals and social structures by examining the link between education and culture. He discussed language use in terms of the variation learned during an individual's early years as a form of cultural capital that acts as a condition for the reproduction of social order. For Bourdieu, language is part of a person's *habitus,* which is the totality of cultural aspects acquired during early stages of socialization. Cultural disadvantage is proportional to the distance between one's habitus and that of mainstream or dominant culture. A child who has acquired a vernacular that deviates far from the standard, such as in minority student populations, has less cultural capital to spend than does a child who has learned a more standard variety. The minority child will experience symbolic violence in social situations where standard language is used. For the minority child, academic goals are harder to reach because the ideas and concepts to be learned are delivered in an unfamiliar and, therefore, hard to understand linguistic variation.

Another major thread in sociology, originating with the work of Karl Marx and Frederick Engels and informing the study of language, exalts social theory critical of oppression and domination. An understanding of ideology as the meanings created by the dominant class to self-preserve their social status has been the center of most studies of language among contemporary Marxists, leading to what is referred to as critical sociolinguistics. French sociologists have been particularly prominent in the theoretical reevaluation of the role of language in ideology. Foremost among such critics is Foucault, whose basic argument is that language and knowledge form a basis for power in their roles in the social construction of reality. Content analysis of political and media rhetoric in the construction of ideology falls under this category of analysis. Language as a link between individuals and their social and cultural locations makes it a legitimate field that can address a wide range of sociological theory.

Sociolinguists often criticize the sociological study of language use, even including the work Bernstein to whom the origination of the sociology of language use is usually attributed, on the grounds that it has "no linguistic objective." Sociologists have a greater concern for the empirically rigorous but limited usefulness of sociolinguistics that emphasizes formal linguistic theory rather than social theory. More important, adherents to the sociology of language use wishing to advance the field must systematically address the difficulties inherent in applying empirical research designs to its rich theoretical heritage.

— Paula Burgio Moore

Further Readings

Bernstein, B. (1971). *Class, codes, and control: Theoretical studies towards a sociology of language.* New York: Schocken Books.

Bourdieu, P. (1977). *Reproduction in education, society, and culture.* London: Sage.

Chambers, J. K. (2003). *Sociolinguistic theory.* Oxford, UK: Blackwell.

Fishman, J. A. (Ed.). (1971). *Advances in the sociology of language use,* Vol. 1: *Basic concepts, theories, and problems: Alternative approaches.* The Hague, Netherlands: Mouton.

Kollock, P., Blumstein, P., & Schwartz, P. (1994). Sex and power in interaction: Conversational privileges and duties. In J. O'Brien & P. Kollock (Eds.), *The production of reality: Essays and readings on social interaction.* Thousand Oaks, CA: Pine Forge.

Lakoff, R. (1975). *Language and women's place.* New York: Harper & Row.

Wardhaugh, R. (2002). *An introduction to sociolinguistics.* Malden, MA: Blackwell.

Williams, G. (1992). *Sociolinguistics: A sociological critique.* New York: Routledge.

Language, Animal

Work in animal behavior, and in particular cognitive ethology, has shown that most of the differences in kind once thought to distinguish humans from other animals are actually differences in degree. The one behavior where a huge gap still seems to exist is language.

Language is best defined as a communication system that employs arbitrary signals to refer to things distant in time or space. It is not simply a way of advertising a creature's species and sex—the role of the vast majority of animal communication. Thus, the flashing of fireflies, olfactory signaling of moths, croaking of frogs, and mate attraction calls of birds are specific here-and-now signals; they are no more a matter of language than are body shapes or the movements involved in locomotion.

One scenario for the evolution of language is that it developed from preexisting systems of animal communication. This hypothesis suggests that the previous communication systems would have needed multiple signals to give evolution a start. In social animals, including animals that are social only during reproduction and the rearing of young, there are generally many innate calls or other signals that permit the necessary coordination of effort. Monogamous birds, for instance, have approximately two dozen unique calls used during pairing, incubation, and feeding of nestlings. Social primates have roughly the same number.

True language is found in two highly social species: honeybees and humans. In bees, the foragers communicate to potential recruits the direction, distance, and quality of a food source; the language is also used for pollen, water, and nesting sites. In two species, the dances occur on vertical surfaces in the darkness of the hive, out of sight of the food (up to several thousand meters away) and minutes or even hours after visiting the site.

The arbitrary conventions involve taking vertical in the hive to correspond to the direction of the sun and considering each "waggle" and sound burst in the dance to correspond to a specific distance flown. "Up" could just as easily have been referenced to the direction the hive faces or to the north; at least these directions do not change with time and would not have required the elaborate time compensation system by which the dance angle is changed to reflect the unseen motion of the sun outside. The arbitrariness of the distance convention is particularly clear; different subspecies of honeybees have different waggle-to-meters dialects.

Impressive as it is, the honeybee language is both wholly innate and closed; that is, no new arbitrary conventions (words or grammar) can be added to the system. At the same time, we now know that human language depends on enormous amounts of inborn help; consonants are innately recognized, vowel categories are innately sorted (although culturally defined), specific brain areas (generally on a particular side) are present from birth, a default word-order grammar is in place, a "deep structure" for encoding and decoding is built in, and strong drives exist to categorize, learn grammatical rules, and acquire a vocabulary.

Perhaps the wealth of innate circuitry should not have been a surprise. Language is, after all, a species-specific human behavior that develops in all normal children at a characteristic age independent of active teaching or error correction. On the other hand, the intellectually trivial skill of multiplication is never learned spontaneously and always requires error correction.

Comparing humans with primates, the obvious candidate for the initial components of language is the set of innate calls, which could correspond to consonants. In certain species such as vervet monkeys, some of these calls have highly specific meanings such as a predatory bird, snake, or leopard in ambush. Like most human language, these calls are "inflected"; that is, alteration of the beginning, duration, or ending add meaning to the signal. The right-angle bend from spine to head engendered by walking erect created the two separate chambers necessary to produce vowels and, thus, created a huge number of syllables when combined with approximately three dozen consonants. But how this potential was turned into the elaborate mix of innate and acquired features that is human language remains a mystery.

— James L. Gould

Further Readings

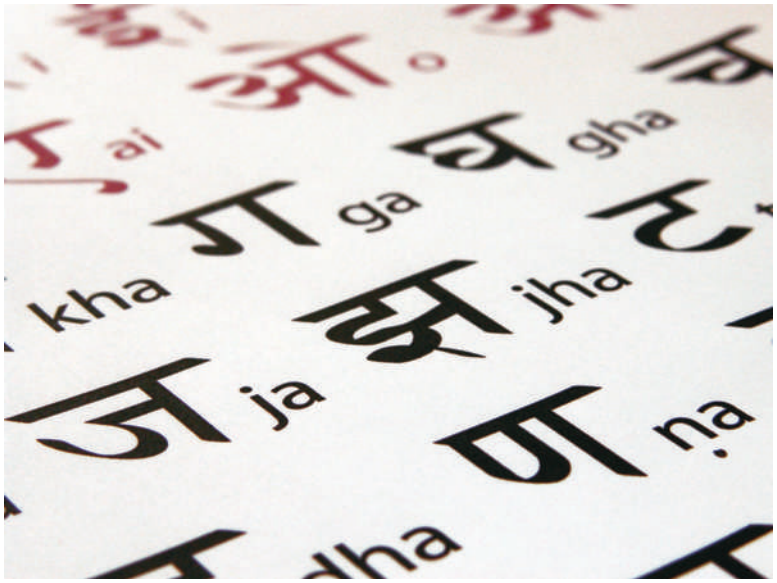
Gould, J. L. (1982). *Ethology: The mechanisms and evolution of behavior.* New York: Norton.

Gould, J. L., & Gould, C. G. (1995). *The honey bee* (2nd ed.). New York: Freeman.

Pinker, S. (1994). *The language instinct.* New York: William Morrow.

Language, Classification of

To classify the languages of the world, it is of foremost importance to first decide what constitutes a "language." Most classification schemata involve spoken



Source: © iStockphoto/Heidi Priesnitz.

languages—alive, endangered, and extinct. The estimated number of spoken languages varies from 3,000 to 10,000, and there are languages spoken by a few societies that are still unidentified. There are some languages that have different names in different cultures, and there are some that have no names. There are languages that are classified as "major" because they are used by numerically large populations of people (for example, English, Polish). There are languages that are used between and among many societies as contact languages besides their individual native or national languages. Sometimes a society will use the term *dialect* synonymously with *language,* and sometimes a name is used to refer to a language group as well as to a single language. If one takes into account that some languages have writing systems or can be identified only historically as written forms, and that some languages have sign forms or are strictly sign languages, the method of classification becomes even more complicated.

Families, Branches, and Languages

One systematic approach to language classification separates spoken languages into "families" by tracing each language to its possible origin or the geographic place(s) where it was historically documented to have branched off of a parent language. The family system of classification began with philologists theorizing and grouping languages first into the Indo-European family. It is believed that the languages in this group are derived from a parent language, "Proto-Indo-European," that may have been spoken before 3000 BCE. As indicated in the name, the languages in this family were generated throughout Europe and parts of southern Asia. The Indo-European language family branches off into superordinate categories (for example, Germanic), to subordinate categories (for example, East Germanic, West Germanic, North Germanic), and finally to languages (for example, English, Dutch).

In 1997, David Crystal listed 29 world language families in the *Cambridge Encyclopedia of Language* as well as languages that are termed "isolates" because linguistic analyses of these languages do not show features that are common in any specific schema of the existing families (for example, Basque, Australian Aboriginal).

Criteria for Language Classification

Early philologists and historical linguists of the 18th and 19th centuries explored the similarities and differences between specific target linguistic structures in particular spoken languages and subsequently tried to determine the possible ways in which the languages developed. These early researchers provided a basis for their successors to create language classification systems. The objects of special interest in comparative linguistics are phonology, morphology and words, and syntax.

Purposes for Classification

Scholars have attempted to classify languages with particular purposes in mind. The first purpose is to have a record of all the world's languages, but there are other reasons for classification. One of these purposes is for the demonstration of cultural and cross-cultural patterns given that native languages and commonly spoken languages have previously been classified linguistically.

In 1997, Philip Parker provided a detailed statistical analysis of more than 460 language groups in 234 countries to illustrate issues connecting linguistic cultures to nine areas of concern (such as economics, cultural resources, demography) with key variables for each area (railways, water, telecommunications). His analyses are especially valuable for the development of

nations, especially those designated as Third World countries.

Along a similar vein, scholars have attempted to classify languages according to their use between and among cultures and across nations. Such an endeavor is particularly challenging because there are historic dimensions as well as current cross-cultural variables that need to be characterized in the documentation.

Language Change and Extinction

Another reason for classifying languages is to understand language change, the extinction of languages, and the rebirth of languages. Stephen Wurm and Ian Heyward produced two successive editions of an atlas that identifies world languages that are endangered to greater and lesser degrees as well as those that are at the brink of extinction. At the beginning of the 21st century, researchers around the world consider the situation of language death to be an especially serious one. In Papua New Guinea, for example, there are approximately 820 local languages, and the national language is a Creole, Tok Pisin. Although the government has a positive attitude toward language diversity in New Guinea, by 2001 there were 75 languages in threatening circumstances and 16 extinct languages.

Reasons for concern regarding language extinction include the influence of dominating or dominant languages that cause adaptations to minority languages. In places where trade occurs with major nations of the world, native language speakers may adopt and adapt their own languages to accommodate communication. Currently around the world, there are Creole languages that have become the vernaculars of a number of language communities, and this has been at the expense of previously existing languages.

The Persistence of Spoken Languages

Although there is much concern regarding looking for trends in the endangerment and extinction of languages, there is a hopeful side to classification as well. Certainly, researchers must be pleased when they can take a language off the endangered list or when they can see language growth.

In Togo, a tonal language, Ewe, is one of two indigenous languages that are spoken by more than 4 million people there and in adjoining Ghana. It is a primary language for use in the government, in education, and in mass media. Ewe also has a written form, and there is a body of literature written in Ewe. Togo has a commission to devise Ewe words for technological terms. Felix Ameka recently explained that Ewe is very important for life in West Africa but that the population is in regular contact with English, French, and other indigenous languages in the region. Yet it appears that the people's efforts to stabilize the identity and use of Ewe are showing results.

— *Patricia N. Chrosniak*

Further Readings

Campbell, G. L. (2000). *Compendium of the world's languages* (2nd ed.). London: Routledge.

Comrie, B. (Ed.). (1990). *The world's major languages.* New York: Oxford University Press.

Crystal, D. (1997). *The Cambridge encyclopedia of language* (2nd ed.). New York: Cambridge University Press.

Davis, J. (1994). *Mother tongue: How humans create language.* Secaucus, NJ: Carol.

Garry, J., & Rubino, C. (Eds.). (2001). *Facts about the world's languages.* New York: H. W. Wilson.

Parker, P. M. (1997). *Linguistic cultures of the world: A statistical reference.* Westport, CT: Greenwood.

Wurm, S. A., & Heyward, I. (2001). *Atlas of the world's languages in danger of disappearing* (2nd ed.). Paris: UNESCO.

Language, Origin of

Language represents a fundamental character of modern humans, *Homo sapiens.* All animals engage in some form of communication. For example, single-cell organisms may relate to individuals around them via chemicals, whereas birds prefer more vocal communication. Researchers who study communication in nonhuman animals, such as Sue Savage-Rumbaugh (in bonobos) and Irene Pepperberg (in parrots), may argue that human communication skills are not very different from those of some animals. However, researchers continue to debate the question of whether any species other than humans are capable of language, although there does appear to be a significant difference between animal communication and human language. Human language evolved over the course of several million years through the modification

of the hands, larynx, and brain, arising as an elaborate form of gestural communication in the ancestor of apes and humans to become the vocal communication observed throughout cultures today.

What Is Language?

Communication, which all forms of life engage in at some level, can be thought of as a process in which information is exchanged between individuals through a system of symbols, signs, and/or behaviors. This could include the use of odors that can determine rank, sexual status, location, and a host of other information forms of which humans have little understanding. Nonhuman primates make use of odors to express and convey some information, and humans do this as well to a certain degree. Where primates differ dramatically from other animal groups is in the use of gestures for communication. Gestural communication includes everything from the obvious, such as a sweeping hand or body motion, to the subtle, such as a slightly raised eyebrow.

Excellent examples of communication abound in nonhuman primates. For example, gelada baboons (*Theropithecus gelada*) live in the mountainous region of Ethiopia. The uneven terrain of their habitat makes it impossible for individuals in separate groups to communicate with each other using the vocal calls familiar to other primates and especially birds. Geladas use primarily gestures to communicate to distant groups often positioned at varying elevations. When the male of a group wants to send a warning to a male in an adjacent group, the first signal that he may give is a wide yawn that exposes his large canines. This somewhat benign gesture indicates to the other male that he is a little too close for comfort. If the adversary does not respond appropriately, he may receive a brief look from the male in which the eyebrows are briefly raised to reveal a patch of white skin around the otherwise dark skin eyelids. This gesture makes the eyes appear larger than normal and makes the other male understand that he is being watched closely. The gelada may engage in a variety of long-distance gestures that culminate in an eyebrow raise with a lip-flip accompanied by a sharp thrust of the body and face in the direction of the antagonist. This lets his adversary know that the next gesture may be actual physical contact, the ultimate gesture that most organisms avoid if possible.

Geladas, however, do not focus all of their gestures on aggression. They also use them to communicate sexual status. Geladas spend more time sitting than do other baboons and, as such, do not communicate sexual status to each other in the same way as is seen in other nonhuman primates. In most species of primates, females develop obvious swellings of the external genitalia around the time of ovulation. These swellings are an indicator or form of communication to males that a mating at the time of maximal swelling has a better chance of being successful. Geladas, however, do not produce swellings that are as obvious as those of other baboons. Instead, geladas possess a hairless patch of skin on the chest that changes color and develops nodules as the female enters into estrous. Moreover, like other primates, the female will solicit the male around the time of estrous to indicate that she is willing to mate with him.

Geladas do not engage in the most elaborate forms of communication known in nonhuman primates, but they do provide an excellent example of how communication works in nonhuman primates. Most forms of nonhuman communication are restrictive and stereotypical. All male geladas use eyebrow raises, yawns, and lip-flips to communicate threats to other males, and the order in which the gestures appear is predictable. Vocal communication is no different. Primates and birds are capable of producing a vast number of sounds, yet they only use a limited range of vocal calls to communicate.

Based on the results of studies on nonhuman primate as well as those on other animals, it is obvious that communication and language are not the same. Language involves a systematic method of communicating that incorporates gestures, sounds, and signs that have understood meanings. In addition, language takes the elements of communication and places them into a system that allows the speaker to alter the way in which the elements are presented to convey a different thought by adhering to the rules of the language. Known as syntax, the rules of a language determine the order of words in a sentence, enabling the speaker to convey an infinite number of ideas so long as they are presented in the correct sequence. For example, the sentence "This is the house that Jack built" makes it known to the reader that Jack built the house the observer sees. However, the sentence "Jack is house this built that the" may have the same words as the preceding sentence but does not covey the same thought and is perceived to be nonsensical because

the presentation of the words does not adhere to the syntax of the language.

Language also differs from gestural communication in that it allows the speaker to express ideas that concern the past or future. In general, communication is literal and is concerned primarily with the present. Although a male baboon may be able to present a gesture that tells the receiver that he should move away from the group or else he may be attacked, the gesture does not indicate that the receiver should move away or else he will be attacked tomorrow. Indeed, even human gestures indicate nothing of future or past events unless they are presented in the context of a formalized language such as sign language (for example, American Sign Language) or gesturing while talking.

Although primates, especially chimpanzees and bonobos, are capable of incredible feats of communication, such as learning sign language or a set of symbols that carry meaning, they do not engage in language as defined in humans. Moreover, they do not develop languages on their own, a trait seen in humans. However, this does not imply that the apes are not unique among nonhuman primates for the elaborate nature of their communication. For example, Kanzi, a bonobo, understands more than 200 symbols and has developed the ability to string symbols together into phrases that enable him to convey a thought or understand a command. This does not indicate that chimpanzees possess a language or are capable of language given that Kanzi's ability for language is little better than that of a 2½-year-old human. Nevertheless, Kanzi's capacity to learn elements of language indicates that the seeds of language extend back beyond the evolution of modern humans.

The Requirements for Language and Speech Production

Language has evolved through the adaptation of three structures to accommodate the requirements of verbal and written language: the brain, larynx, and hand. Without changes in all three from the ape condition, it would not be possible to place words into a structured syntax. Moreover, it would not be possible to understand what the words on this page mean without changes in the brain other than those required to produce language.

The Hand

The hand is an often-overlooked aspect of language. The hands (as well as the whole body) are used for gesturing, which at its most basic level conveys a simple thought much as gestures in nonhuman primates work. However, hands also play an important part in language. During conversation, the hands as well as the body can be used to emphasize the point of a sentence or the action contained within it. The dexterity of the human hand allows people to produce an infinite variety of gestures that can be used to make language more efficient. For example, a person can efficiently explain how much smaller one object is than another object by using his or her hands while speaking rather than spending time using words to explain the difference.

The hand is also important to written language. Without the manual dexterity exhibited in the human hand, it would be impossible to manipulate the fine movements of a writing instrument on a page. This ability is the product of significant changes that occurred in the muscles of the thumb.

In chimpanzees and other primates, the muscle that flexes the tip of the thumb is the same as the muscle that flexes the tips of the other four digits, the flexor digitorum profundus. Although chimpanzees share the other muscles of the hand with humans, the lack of independent control of the tip of the thumb prevents nonhuman primates from manipulating objects in the same manner that is seen in humans. In humans, the thumb or pollex has a tendon with an independent muscle belly running to the tip of the thumb, the flexor pollicis longus. This muscle enables the thumb to strongly oppose the other digits. It gives humans the ability to hold a hammer firmly through what is called a power grip. It also lets humans hold a piece of paper firmly between two digits in what is referred to as a precision grip.

The origin of the flexor pollicis longus, and thus the power precision grip, occurred approximately 2.5 million years ago when tool use appeared, according to the human fossil record, with the first members of the genus *Homo*. Humans from before this period, like chimpanzees today, used tools, but these were relatively simple tools that required little modification such as digging sticks. Stone tools represent an essential shift away from the lifestyle of the first hominids and apes to one that resembles that of modern traditional cultures.

To manufacture a stone tool, one must have the ability to form a mental picture of the finished

product, which has no resemblance to the original stone. A stone tool is derived from a core stone. To form a tool, the core stone is hit with a hammer stone to remove flakes, which can then be modified to create the tool or be discarded if the core stone is to be modified into a tool. To remove flakes from the core stone, it is necessary to hit the core stone in the correct location. These precision blows arise from the power precision grip and eye–hand coordination.

Although tool use is not language, many researchers, such as Ralph Holloway and William Calvin, believe that the expansion and reorganization of the brain, and thus the rudiments of language and its evolution, may have begun with tool use. This is in part because once tool use develops, humans begin to move away from the social nuances of their ancestors and more toward groups involved with cooperative gathering and scavenging and later hunting. Such cooperative living would have encouraged the development of more complex forms of communication. Also, once languages developed, the dexterity of the hand allowed for the development of a written language. Although the first formal written languages are only a little more than 5,000 years old, it is possible that informal written languages date back beyond 30,000 years through the use of drawings and other ornamentation.

The Larynx

Speech is the most recognizable aspect of modern human language. Humans have an ability to produce an infinite variety of sounds that can be strung together to form words. Although the possibility of human-like communication skills in other species is debated, the uniqueness of human speech is not. Only birds have the ability to approximate human speech, yet no single species of bird is capable of producing the entire range of sounds in the human repertoire.

Human speech is the product of modification of airflow from the lungs by the larynx and the supralaryngeal airways (for example, pharynx, nasal cavity, oral cavity, mouth). Although none of the features is unique to humans, the arrangement of the structures permits a speaker to produce the subtle sounds associated with any language. Of these features, however, the larynx appears to have undergone the greatest change.

Study by researchers such as Edmund Crelin, Jeffrey Laitman, and Philip Lieberman on the hominid larynx has revealed that the position of the human larynx is most responsible for the range of sounds associated with human speech. All nonhuman primates have a larynx that is positioned high in the throat, a condition found in most mammals. The normal mammalian condition allows the larynx to overlap the soft palate. This gives mammals the ability to drink and breathe at the same time because the high position of the larynx lets liquids flow around it and into the esophagus without crossing the path that airflow follows. This condition likely evolved to let prey animals flee predators more effectively when drinking at exposed watering holes. The drawback to the normal mammalian condition is that nonhuman mammals lack the ability to produce the range of sounds of which humans are capable.

In modern humans, the larynx sits low in the throat. The low position of the larynx creates an additional space in the supralaryngeal airway called the oropharynx. This added space, in addition to the extra distance air travels before it reaches the lips, allows humans to produce additional sounds that other mammals cannot produce. Indeed, even birds lack the ability to produce the range of sounds that adult humans can produce. Much of the ability of birds such as parrots to form sounds that mimic those of human speech patterns are perceived rather than the result of true mimicry.

Not all modern humans, however, produce the same range of sounds. For example, an infant is incapable of producing little more than a few sounds that may carry meaning but are indecipherable to an adult. This is because the larynx at birth is in the normal mammalian position. It is not until the child is around a year old that the larynx begins to make its descent into the throat. This descent can be observed in any child as he or she progresses from making baby talk to producing sounds more consistent with human speech. By the time an individual reaches the final stages of puberty, the final changes in the larynx and related structures are complete.

The position of the larynx in the throat in primates appears to be related to the degree of basicranial flexion observed. In chimpanzees as with other mammals, the base of the skull is flat in profile, whereas that in adult modern humans is flexed toward the anterior side of the midline. The degree of flexion in the skull base relates to the degree of laryngeal descent. With a flat skull base, a chimpanzee has a larynx that sits high in the throat. Because of this position, chimpanzees are unable to produce a variety of vowels and consonants that adult humans use. When one looks at

the hominid fossil record, it is apparent that the descent of the larynx is a relatively recent phenomenon.

In early hominid fossils such as *Australopithecus afarensis* at 3.5 million years ago, and likely back to *Australopithecus anamensis* (4.2–3.9 million years ago) and even *Sahelanthropus tchadensis* (7.0–6.0 million years ago), the skull base resembles that of a modern chimpanzee. In fact, nearly the entire morphology of the face is more reminiscent of an African ape than of a modern human. This morphology indicates that the larynx would have resided high in the throat, meaning that early hominids would have been incapable of modern human speech. Instead, they would have been limited to the range of sounds seen in chimpanzees.

Later in hominid evolution, the cranium began to shift away from the ape condition of a prognathic or jutting face, small brain, and flat cranial base to a more vertical face, large brain, and flexed cranial base. Although the appearances of these features do not coincide with each other, the gradual shift toward the condition seen in modern humans implies that speech capabilities evolved gradually over time. The first indication of a possible change in the position of the larynx occurs in *Homo erectus* (also called *Homo ergaster* for early members of the species from Africa). The skull base of *H. erectus* (1.8–0.4 million years ago) is only slightly flexed over the condition seen in earlier hominids, but the slight flexion of the cranial base may indicate that *H. erectus* was capable of producing a greater range of sounds than *A. afarensis* would have been able to produce.

With the appearance of *Homo heidelbergensis* (400,000–150,000 years ago), the skull base becomes more flexed. Again as with *H. erectus, H. heidelbergensis* was likely incapable of producing the range of sounds seen in modern humans. Neandertals, once considered a subspecies of modern humans, have a skull base similar to that of *H. heidelbergensis.* Although they possessed cultural characters more similar to modern humans than did previous groups of hominids, it is likely that even Neandertals were limited in their speech capabilities.

It was not until the appearance of *H. sapiens* some 200,000 years ago that modern human speech capabilities arose. Modern humans are the only hominid group that possesses marked skull base flexion. Cranial base flexion allows the larynx to reside lower in the throat, adding to the distance a sound travels before it passes out of the mouth. With this morphology, humans have the ability to manipulate a puff of air coming from the lungs to form difficult sounds such as "b" and "p" in addition to the various forms of each consonant and vowel found in different languages.

The Brain

No other structure in human evolution receives more attention than the brain. The human brain is capable of things well beyond the abilities of any other creature. Arguably the most unique ability of the human brain is its capacity for language. With language, humans are able to communicate ideas beyond the simple emotions conveyed through the gestural–visual communication of the great apes. However, although the mental capabilities of modern humans are apparent and easy to assess, those of the fossil ancestors of humans are very difficult to define. Despite this shortcoming of the fossil record, it is possible to understand what is required for language in the brain and when those features may have developed in human evolution.

In 1861, the eminent French physician and anthropologist Paul Broca described what he called the "seat" of language in the brain. By studying a patient who had suffered damage to the left frontal region, Broca found that although the patient developed the ability to understand speech during the course of therapy, the patient lacked the ability to produce language except in limited capacity. Over time, the region associated with language production, which would come to be known as Broca's area, would be isolated to the inferior third convolution (gyrus) of the frontal lobe.

Broca's area represents the motor speech area of the brain. Located in the left inferior frontal lobe in most right-handed and some left-handed people, this region allows the intricate muscle movements of the lungs, larynx, and supralaryngeal airway needed for modern human speech production. Moreover, this area allows the fine movements of the hand required for writing. As Broca discovered, damage to this region of the brain may leave a person incapable of communicating with others.

In 1874, the German neurologist Carl Wernicke completed the language picture by identifying the area of the brain for language comprehension. Located posterior to Broca's area in a region called the parieto–temporal junction, Wernicke's area enables an individual to understand the words spoken by another individual or those that appear on this page.

Together, Wernicke's and Broca's areas, along with other regions of the brain involved in aspects of language, have allowed humans to create the approximately 6,000 languages that are spoken today.

Although there is a general understanding of the brain regions involved in modern human language, what is less clear is the evolution of these areas. When one looks at the fossil record, it is evident that the knowledge contained within it is limited. In general, only the most durable parts of an organism fossilize. These include calcified materials such as bones and teeth. Only under rare circumstances will soft tissue be preserved, and so far no brain of any extinct species has ever been discovered. As such, the ability to interpret brain evolution is limited. Those that study brain evolution using the fossil record, paleoneurologists, use the various clues available on fossils. An important piece of evidence is the endocast.

An endocast is a cast derived from the endocranium or inside the skull where the brain resides. Although the external surface of the brain is distanced from the endocranial table of bone by cerebrospinal fluid, the endocranial surface does approximate the overall shape of the brain and in certain regions picks up the specific shape of a structure (for example, the course of a sulcus, the protrusion of a gyrus). Because of this intimate relationship, a cast of the endocranium may contain a large amount of information about the brain.

In some cases, sediment seeps into the skull during decomposition and hardens during fossilization to form a natural endocast. If the sediment seeps in before other forces act on the skull to possibly change its shape, the endocast preserves a reliable replica of the endocranial surface. Alternatively, a cast of the endocranium can be made after the fossil has been excavated. In both cases, the endocast can be used to determine overall brain size as well as general, and occasionally specific, features of the brain.

During human evolution, the brain has increased significantly in size from the 400-ml capacity of a chimpanzee brain to the 1400-ml capacity of the human brain. During the early part of the 20th century, it was assumed that increased brain size was the first adaptation to appear in human evolution. This would have indicated that early hominids would have been capable of some form of speech. However, after the discovery of *Australopithecus africanus* by Raymond Dart in 1924 and the subsequent exposure of the Piltdown hoax, it was apparent that human brain evolution proceeded in a very different manner. Instead of the brain exploding in size early in hominid evolution, brain evolution proceeded in a much more gradual fashion, with brain size increasing only later.

Early hominids possessed brains that were little different in size from those of chimpanzees. Although this would indicate that early human brains functioned like those of their ape ancestors, this might not be the case. Endocasts from early hominids indicate that the brain underwent some form of reorganization once hominids were adapted to a bipedal posture. Although there is no indication that early reorganization included adaptations for language areas in the brain, it is possible that the changes that did occur laid the groundwork for later changes leading to the development of Broca's and Wernicke's areas.

Broca, and later the linguist Noam Chomsky, proposed that the human language areas represent an "organ" unique to humans. This philosophy of the uniqueness of human language and the structures responsible for it dominated much of linguistic and neurological study until the late 1980s, when it was discovered that there is no isolated language organ. Instead, it was found that there are language-related areas in many different parts of the brain that are connected to each other by vast neurological pathways. This alternate view of language and the brain meant that language might not have evolved de novo and at a single time in human evolution but that, instead, its history is much more complicated.

The German neurologist Korbinian Brodmann produced cytoarchitectural maps of the human brain during the early part of the 20th century. The area described as Broca's area was assigned to Brodmann's areas 44, 45, and 47. From his studies, it was possible to measure precisely the boundaries of this region and other regions for study in anthropology, medicine, and other fields. A few years later, Brodmann produced the same type of maps for the brains of great apes, identifying a region as area 44, implying that it possessed the same cytoarchitecture as that of modern humans. Brodmann did not think that chimpanzees having an area 44 in their brain meant that they possessed the same speech motor skills as did humans. Moreover, neither did his successors who found similar results. However, the presence of an area 44 in chimpanzees, an area clearly related to

Broca's area in humans, indicates that the precursors of brain language areas were present in the ape–human ancestor.

A second line of evidence indicates that some of the regions in the brain for language, and thus the rudiments of language, are ancient comes from a 1998 study by Patrick Gannon and colleagues that demonstrated the presence and asymmetry of a structure, the planum temporale, in the parieto–temporal region of the brain in chimpanzees. The planum temporale is within Wernicke's receptive language area in humans. Its presence in chimpanzees, as well as in gorillas and orangutans, indicates that some of the components for higher levels of communication are ancient. Moreover, the finding that the feature is asymmetric is also significant.

Because some features thought to be entirely unique to modern humans have been discovered in chimpanzees and other primates, it had been thought that one unassailable feature of the human brain is the asymmetry displayed between the left and right cerebral hemispheres. In general, chimpanzee brains, as well as those of other nonhuman primates, are symmetrical in appearance. In this case, the left and right sides of the cerebrum appear to be equal in size. In humans, however, the brain is asymmetrical, such that one portion of the brain is measurably larger than the other side of the brain. This asymmetry in humans is related to the division of cerebral functions between the left and right sides of the cerebrum. Thus, whereas speech production may occur in Broca's area on the left side of the brain, the right side may assume some other aspect of language. In this fashion, it is thought that the brain can process information efficiently by not first needing to integrate that information traveling to redundant areas. This is what makes speech fluid and abundant.

With the knowledge that chimpanzees possess brain areas resembling those found in humans for language and that these areas are often asymmetrical, it is possible to assume that language did not arise only within modern humans. Instead, as with other aspects of human evolution, language likely evolved over time, becoming more elaborate as structures in the brain and throat changed.

The first indication of modern-like human language areas in the fossil record may have been some 2.5 million years ago with *Homo habilis.* However, data from this time period are very incomplete, making any judgment of the neurological state of early *Homo* all but impossible. It appears likely, however, that there were few changes in the brain of *H. habilis,* indicating that the development of language areas did not appear until *H. erectus.* This is due in part to the relatively small increase in hominid brain size from 6.0 to 2.0 million years ago. In addition, the features that are discernible on endocasts for language lack the asymmetry seen in modern humans. For example, according to research performed by Ralph Holloway, Broca's cap, an endocast feature that corresponds to a portion of Broca's area in the brain, is symmetrical in chimpanzees and early hominids, whereas it is asymmetrical in modern humans. This does not appear to be a consistent asymmetrical feature in the fossil record until *H. erectus.*

The appearance of Broca's cap in the fossil record suggests that the neurological components necessary for modern human speech are very old, dating to some 500,000 years ago or possibly earlier. At this point, the brain is approximately 1,000 ml on average, indicating that an increase in brain size may also have been related to the advent of language. Later reorganization of the brain, along with further increases in the size of the brain, likely led to changes important to fully modern human language.

The early development of modern-like language areas, such as the planum temporale in the brain and Broca's cap in endocasts, indicates that the neurological aspect of language is ancient in origin. However, as stated earlier, modern human language is a product of neurological and anatomical components. For example, although some researchers support the view that *H. erectus* and Neandertals were capable of language, others argue that the speech capabilities of premodern hominids were severely limited even though the neurological components for language may have been present early on. Thus, although species such as *H. erectus* likely had language, they were incapable of producing the range of sounds found in modern human speech. This limitation may have hindered the development of complex speech and further adaptation of brain structures for speech until the larynx evolved into the form seen today.

By the close of the 20th century, anthropologists had made significant advances in understanding the origin of language not known of during the first 100 years of human evolutionary study. Some of these advances were due to the discovery of new fossils. Many, however, were made through improved

techniques of observation such as computed tomography (CT) and magnetic resonance imaging (MRI).

Today, much of the focus on the origin of language is in the study of great apes. Studies of chimpanzee communication skills by researchers such as Savage-Rumbaugh continue to provide important data on the mental abilities of the closest living relative of humans. Moreover, understanding the full capabilities of the chimpanzee mind provides the most important line of evidence as to the abilities of the ancestors of modern humans.

Additional lines of study include elucidation of the ape brain. As continuing research has shown, the brains of chimpanzees appear to share more with humans than they do with other primates. This indicates that much of what is thought to be unique about the human brain has instead been exapted from the ape brain. Much research is still needed in this area, however, before there is a full understanding of what any possible similarities might mean.

— Douglas C. Broadfield

See also **Brain, Evolution of Primate; Evolution, Human**

Further Readings

Botha, R. P. (2003). *Unravelling the evolution of language.* Oxford, UK: Elsevier.

Calvin, W. H. (1983). *The throwing Madonna: Essays on the brain.* New York: McGraw–Hill.

Corballis, M. C. (2002). *From hand to mouth: The origins of language.* Princeton, NJ: Princeton University Press.

Deacon, T. W. (1997). *The symbolic species.* New York: Norton.

Gannon, P. J., Holloway, R. L., Broadfield, D. C., & Braun, A. R. (1998). Asymmetry of chimpanzee planum temporale: Humanlike pattern of Wernicke's brain language area homolog. *Science, 279,* 220–222.

Holloway, R. L., Broadfield, D. C., & Yuan, M. S. (2004). *The human fossil record,* Vol. 3: *Brain endocasts.* New York: Wiley–Liss.

Lieberman, P. (2000). *Human language and our reptilian brain.* Cambridge, MA: Harvard University Press.

Wilson, F. R. (1998). *The hand: How its use shapes the brain, language, and human culture.* New York: Pantheon Books.

ORIGIN OF LANGUAGE

Most scientists agree that one of the main characteristics that separates humans from other species is humans' ability to use language, both spoken and written. Many theories have been advanced as to the origin of language. There is still no one theory to which all anthropologists subscribe.

Some believe that humans began talking early in the scheme of things. Creationists think that God created humans with a full-blown language ability. This would fit with the biblical accounts of Adam and Eve conversing in the Garden of Eden.

Many other scientists, however, subscribe to a theory that language was a later development in the evolution of humans. But they cannot agree on the way in which language originated. There are many theories that are divided into imitation hypotheses and necessity hypotheses. Imitation hypotheses state that language was acquired by humans imitating naturally occurring sounds. Necessity hypotheses hold that language originated as a response to an acute necessity in the community.

Some believe that language developed as humans named objects, actions, and phenomena after sounds they heard in real life. This would include words such as *crash* and *boom.* There are two problems with this hypothesis. First, words that imitate sounds (onomatopoeia) make up a very small part of the vocabulary of a language. Second, the words for these sounds differ in different languages.

Some think that the first words were involuntary exclamations of pain, hunger, pleasure, and dislike. This theory is subject to the same limitations as the first theory given that exclamations make up only a small part of any language and that the exclamations for the same things tend to vary from one culture to another.

According to a third theory, which was never widely accepted, vocabulary developed by humans imitating animal sounds. This theory has the same inherent problems as the first two theories. The last imitation hypothesis, put forth by Charles Darwin, states that speech may have developed when

humans tried to imitate with their organs of speech the gestures that they made. Darwin himself was skeptical about this theory. Also, human gestures differ greatly from culture to culture.

One of the necessity hypotheses states that language developed out of a need for warning signals. Words such as *help, look out,* and *run* might have developed early. Some scientists think that language was based on human cooperative efforts. Perhaps the earliest language was a chorus of chanting to stimulate collective efforts such as moving big stones and repeating war chants to bolster courage.

Another interesting hypothesis takes into account the fact that emotions can be communicated by gestures and facial expressions. When humans wanted to contradict this body language, they came up with language to deceive other humans.

None of these hypotheses explains how grammar developed in a specific pattern. This does not seem like a random development given that all languages have complex grammatical structures.

None of these theories can be either proved or disproved, so no definitive conclusion has been reached as to the origin of language.

— Pat McCarthy

Language, Types of

Language types and language typology refer to characterizing languages of the world by similarities and differences in their structural forms and in their functional uses. They also refer to characterizing them according to language families where there is evidence that the languages have common structural relationships that are consistent with some "parent" language (i.e., genetic classification). These two kinds of language typologies do not usually involve, to any great extent, focusing on social context or cultural variations of language use and language change that are typically studied by sociolinguists and anthropological linguists. Yet having knowledge of the characteristics and varieties of language (or languages) used in a society helps to inform the work of both groups of researchers as well as others that fall under the umbrella of applied linguistics.

Most of the work on language typology involves differentiating spoken languages, but there is a considerable focus on characterizing writing and signed languages as well. With William Stokoe's efforts during the mid-20th century to secure recognition for American Sign Language (ASL) as a true language, typology of sign languages around the world has been a particularly vigorous pursuit.

Types of written language are a special case because, unlike spoken language and signed language that are directly interactive, much writing is generated without actual "in time" interactions and is, as David Crystal pointed out, space-bound and static. Societies that speak different languages may use the same writing system. For example, Cyrillic script is used by several Slavic languages and some non-Slavic languages.

Identifying Types of Language

Although human languages are grouped as spoken or signed, there is a wide range of characteristics in the world's languages that make the task of subclassifying them into types within these categories quite difficult. Given that there are estimates of between 3,000 and 10,000 spoken languages, the development of language varieties and the change that can occur in languages over time add to the dilemma of approximating typologies. The same is true for signed languages in the world. Among the many systems that linguists have used to try to manage complex combinations of linguistic variables, there is a basic focus on how languages differ in their structures and in their formal use.

Crystal provided a detailed explanation regarding spoken language typology and distinguished between two major approaches to the task: differentiation and the search for language universals. The latter construct is especially associated with Noam Chomsky, who has explored language characteristics that could generate a set of rules universal to all languages. Rather than looking at the ways in which languages are different, Chomsky has been more concerned about those things that are in common in a generative grammar that helps to understand the human mind.

The second approach to language typology is differentiation, and it is this approach that is applied not only to characterize language structures but also to

indicate how languages are the expressions of societies and cultures. In other words, by differentiating languages, we can locate patterns of linguistic and societal development and we can formulate theories about societies living in specific geographical areas. Language and culture may be artificially separated for study, but they are actually inseparable for understanding the ways in which people create communities and live in them. Crystal cautioned, however, that there is no evidence that "languages of a particular type are inevitably associated with particular geographic areas or with people of a particular ethnic or cultural group."

Structures for Typology of Language

One way of designating language structures for differentiating languages consists of three divisions: grammar, semantics, and phonology. The category of grammar includes words (morphology and word classes), phrases, and sentences. Anatole Lyovin described another set of possible options in six categories of typology: phonological, morphological, syntactic, lexico–semantic, holistic, and sociolinguistic. These categories are derived from theories proposed to provide an adequate classification of the world's languages. All categories but the sociolinguistic category deal primarily with the implications of language universals. In the case of sociolinguistics, several frameworks have been proposed that really strive to differentiate languages where there is considerable variability in language use rather than looking at universals.

Kinds of Grammar Typology

A grammar can be viewed, in a very basic sense, as a framework for describing the ways in which the components of a language (words, phrases, sentences) are positioned and operate so as to achieve meaning. Crystal distinguished among six different types of grammar that address distinct purposes: descriptive, pedagogical, prescriptive, reference, theoretical, and traditional. For example, he described a prescriptive grammar as one that focuses on socially correct uses of language such as that of Henry Fowler's *A Dictionary of Modern English Usage.*

Noam Chomsky drew attention to issues of grammatical complexity that are not understood merely by thinking of grammatical representations as maps or guides to identify the appropriate forms of a language. He distinguished between the surface structure of a sentence and its deep structure. One classic English sentence pair that he used in a demonstration of these two structures is *I* "I persuaded John to leave" in contrast to "I expected John to leave." In this case, both sentences have the same surface structure but different deep structures. Noting distinctions such as this informs linguists in the discovery of rules to designate a set of language universals across languages.

Syntactic Typology and Grammar

Grammatical frameworks characterize the forms and kinds of words that exist in a language and the ways in which they are used and ordered in other structures of language, particularly in the sentence, which is a main form that dominates language typology. For example, languages such as English have a common pattern of subject–verb–object (SVO) in the ordering of words in sentences, although there are other ways permitted for ordering words into sentences, and English has particular word orders for phrases, as in positioning color words, (for example, *big yellow ball*). Other languages in the world follow one of five other identified word patterns, and sometimes they permit more than one pattern as part of common language ordering. It is estimated that more than 75% of the world's languages follow the SVO pattern.

Some languages are typified as agglutinating, whereas others are typified as inflecting, synthetic, or fusional. The grammars of these kinds of languages are characterized by the ways in which sentences and words occur as strings in which there might be markers for tense, gender, person, number, voice, and/or mood. For example, *amant* in Latin is translated as the third-person plural present tense for the word *amo,* meaning "to love" (i.e., "they love"). Words in Turkish, an agglutinating language, contain a root or stem and markers that account for characteristics such as plurals and possessive pronouns. The words also follow vowel harmony rules so that certain forms of pronouns, for example, may be spelled differently to be attached to the stem word and plural marker as in the following: my banana = *muzum* (muz + *um*), but my bananas = *muzlarim* (muz + ar + *im*).

Lexicosemantics and Semantics

A second characteristic that is applied to differentiate languages is semantics or the meaning of utterances

in languages. How words are used to specify particular meanings, and the availability or lack of availability of words in various languages, is part of the study of lexicosemantics. For example, studies regarding color words in languages where societies live in distinctively different geographic areas (for example, island societies and the color *blue,* Arabic nations and words for *camel*) might have consequences for the linguists to create accurate schemata to classify language types by understanding word use, semantic interpretation, and the availability of words.

Characterizing languages by their semantics has to do with the manner in which meaning is expressed. There are considerable data involving the study of words and their interpretations within grammars, even though a preferred approach for typology is to work on syntax. Languages can be differentiated semantically according to the ways in which words are used, the prosody that is used, and how the grammar is constructed as well as pragmatically. A statement in English such as "Let him have it" can be interpreted differently depending on the emphasis or the lack of emphasis (i.e., prosody) on the word *him.* An ambiguous sentence such as "Bill told John that he loved Mary" will be interpreted according to a grammatical principle in English that designates the function of the subject noun in each clause to be approached as an equivalent (i.e., parallel function). Sentences such as "Mary put the rug next to the chair and sat on it" will take on a preferred interpretation according to the "usual" way in which things work in the world (i.e., pragmatics).

Crystal pointed out that there is an uncertain boundary between syntax and semantics that poses a special problem in linguistics; thus, differentiating among language types more accurately can often be enhanced by studying the sociolinguistic or ethnographic dimensions of language use in particular contexts. This is something that was recognized by the anthropologist Dell Hymes, who proposed an ethnography of speaking as a construct for understanding societies and communities of speakers. Two types of language that would necessitate study in this way are pidgins and Creoles. These languages were formed through conditions requiring communication between groups of people who had very different languages, mostly for trade purposes (for example, French traders and the natives of New Caledonia in the Southwest Pacific).

Phonological Typology

An interesting category for language typology is that of phonological classification. Applying rules for speech sounds that can occur in human languages provides a special perspective on the differentiation among spoken languages. Chinese, for example, is a set of languages that are described as tonal. In Mainland China, there are hundreds of languages and dialects that are classified as "Chinese," and all of these share tonal characteristics. Some of the languages in Chinese have simple tonal patterns, and others are more complex. Every syllable has a tone that distinguishes the meanings of words, and these tones are affected by the chains of syllables in speech. Tonal variation is the main characteristic that differentiates among the dialects (languages) in spoken Chinese. It is a common writing system that helps the members of a great number of Chinese-language communities to understand one another.

Typology of Sign Languages

Much of the typology of sign languages has been derived from the structural characterization of ASL. Designations of grammar, semantics, and phonology have been applied and interpreted through formal linguistic analysis, and subsequently the classifications in ASL have been used to compare and type other sign languages in the world. This study has been a relatively new endeavor, beginning for the most part during the latter half of the 20th century.

Researchers approached the field through processes of differentiation as well as by looking for language universals. Because sign languages were not given equal status with spoken languages for a considerable part of history, it was important that the characterization of ASL account not only for the formal structures but also for language use and sociolinguistics. Anthropological linguists, such as James Woodward and William Washabaugh, explored relationships between ASL and other sign languages used by deaf persons in countries besides the United States. Their work, along with that of ethnographers such as Gerner di Garcia, has drawn attention to the sociolinguistic dimensions of language typology as seen through communities whose members use sign language.

— *Patricia N. Chrosniak*

Further Readings

Chomsky, N. (1965). *Aspects of the theory of syntax.* Cambridge, MA: MIT Press.

Comrie, B. (Ed.). (1990). *The world's major languages.* New York: Oxford University Press.

Crystal, D. (1997). *The Cambridge encyclopedia of language* (2nd ed.). New York: Cambridge University Press.

Daniels, P. T., & Bright, W. (Eds.). (1996). *The world's writing systems.* New York: Oxford University Press.

Lucas, C. (Ed.). (1990). *Sign language research: Theoretical issues.* Washington, DC: Gallaudet University Press.

Lyovin, A. V. (1997). *An introduction to the languages of the world.* New York: Oxford University Press.

Muller, S. H. (1964). *The world's living languages: Basic facts of their structure, kinship, location, and number of speakers.* New York: Frederick Ungar.

Uspensky, B. (1968). *Principles of structural typology.* The Hague, Netherlands: Mouton.

Lapps

The Lapps, or Sámi as they prefer to be called, reside in a vast area of land that is nearly 400,000 square kilometers and crosses the boundaries of four countries: Sweden, Norway, Finland, and Russia. They are the oldest known inhabitants of Finland. The Sámi are in the minority in each of these countries and are often faced with discrimination. Their territory once extended even farther to the south, but as the rest of the world's population grew and moved closer to the Sámi, they retreated farther north. To the Sámi, the name "Lapp" is derogatory.

It is difficult to determine the exact population size of the Sámi due to the differing methods of determining Sámi ethnicity. For instance, in Finland, language is the primary method used. Anyone who speaks Sámi, or whose parents or grandparents speak Sámi, is considered to be Sámi. However, in Norway and Sweden, reindeer herding is used to determine nationality because the Sámi are known for this mode of production.

Although the Sámi are generally known as reindeer herders, there is actually a great deal of variation within the Sámi population regarding their primary mode of production. The Sámi can be divided into five different groups based on their geographic locations as well as on their primary modes of subsistence. One group is the Coast Sámi, whose economy is based primarily on fishing and who reside in Norway. Another group is the Forest Sámi, whose economy is based on hunting and trapping, supplemented by fishing, and who live primarily in Sweden and Finland. Another group is the Mountain Sámi, whose economy is based on reindeer herding and who live in the central and northern areas of Norway and Sweden. Another group, the River or Fisher Sámi, are known for farming and cattle raising. They also fish and herd reindeer to supplement their incomes, and they live in Norway and northern Finland. The final group, the Skolt and Kola Sámi, live in the most eastern areas of Norway, Finland, and Russia that are inhabited by Sámi. Their economy is based on both forest and sea products. They have been the most influenced by missionaries, especially the Russian Orthodox Church.

The Sámi culture is believed by many to be in danger. The primary obstacle facing the Sámi with respect to maintaining their cultural identity is the fact that they live in four different countries, making it difficult for them to develop their own separate form of organization. Furthermore, they speak at least six different languages that are closely related to Finnish. In the past, the Sámi have had difficulty in maintaining their languages because they were not allowed to use their languages in formal schooling of their children or in official governing processes and procedures. Moreover, in some areas, the Sámi have been experiencing population decline.

However, as a result of organization by the Sámi, they are now able to use their languages in schooling under the Finnish Schools Act of 1985. Norway and Sweden also have laws to support the use of Sámi for education as well as for governance. Linguists have also been studying the languages of the Sámi, and books and movies have been produced in Sámi. This will likely help to preserve their culture. The Sámi Council now represents all Sámi and participates in the World Council of Indigenous Peoples.

— Kristine McKenzie Gentry

Source: © Dave G. Houser/CORBIS.

Further Readings

James, A. (1989). *Lapps: Reindeer herders of Lapland.* Vero Beach, FL: Rourke.

Ruong, I. (1967). *The Lapps in Sweden* (A. Blair, Trans.). Stockholm: Swedish Institute for Cultural Relations With Foreign Countries.

Siuruainen, E. (1977). *The Lapps in Finland: The population, their livelihood, and their culture.* Helsinki, Finland: Society for the Promotion of Lapp Culture.

Lascaux Cave

On September 12, 1940, in an oak forest just outside the small town of Montignac in southwestern France, four schoolboys crawled into a hole in the ground that had been exposed by the roots of a falling tree. Once inside, they crawled several dozen yards along a dark passage before finding themselves in a cavity across whose walls cascaded large and vibrant polychrome images of a variety of mammals, notably aurochs, the extinct ancestor of today's cattle. The boys had discovered the cave of Lascaux, now generally acknowledged to be the finest among several hundred decorated caves known from the last Ice Age of southern France and northern Spain.

Lascaux, a solution cavity in Cretaceous limestones, is decorated principally in three areas: the Hall of Bulls, into which the schoolboys stumbled; the narrow Axial Gallery beyond it; and the Lateral Gallery, which opens to its side. Paintings have been preserved mainly in parts of the cave where the walls are coated with a layer of "cauliflower calcite" that trapped the particles of mixed pigment daubed or blown onto them. In other areas, notably the Lateral Gallery, thousands of finely incised animal engravings are preserved, but only tiny traces of paint remain.

Source: © Kathleen Cohen.

The painted animal images are beautifully observed but are also rendered using a variety of sophisticated conventions found elsewhere, for example, leaving an unpainted space between the far-side legs and the body of an animal seen from the side to produce the effect of perspective. Also as elsewhere, the animal images are accompanied by a host of abstract signs whose significance has been variously interpreted. Most likely, they formed part of a larger symbolic system that equally embraced the animal images, which in this cave are predominantly of horses, although the total fauna represented is quite diverse.

Painting and engraving of animal and abstract images in caves (and the decoration of "portable" objects) started in the Franco–Cantabrian area at some time before 32,000 years ago and continued at least intermittently until the end of the last Ice Age (which witnessed a radical climate-mediated erosion of the artists' economic base) some 11,000 years ago. The artists themselves were Cro-Magnons, early European *Homo sapiens* who led a hunting-and-gathering lifestyle of remarkable technological and probably social sophistication and who left evidence of symbolic activities of many kinds, including notation and music as well as graphic art. Lascaux itself was evidently decorated by a team of specialists who rigged up scaffolding to undertake their work and who worked by the light of dozens of rudimentary fat-burning lamps that they left behind. Exactly what the art was created *for* is unknown.

Stylistic, technological, and pollen evidence, as well as some radiocarbon dates, suggests that Lascaux was decorated some 17,000 years ago, just after the peak of the last Ice Age but during a brief respite from the most severe climates of that period. Excessive visitation following its discovery led to deterioration of the cave's condition, and in 1963 it was closed to the general public. It is currently totally closed due to continuing conservation concerns.

— Ian Tattersall and Kenneth Mowbray

Further Readings

Bahn, P. G. (1998). *The Cambridge illustrated history of prehistoric art.* Cambridge, UK: Cambridge University Press.

Ruspoli, M. (1987). *The cave of Lascaux: The final photographs.* New York: Abrams.

White, R. (2003). *Prehistoric art: The symbolic journey of humankind.* New York: Abrams.

Law and Anthropology

Law and anthropology (or legal anthropology) examines the relationship among society, culture, and law in societies at various levels of political, economic, and social complexity. Legal anthropology is a subfield of the discipline of anthropology; however, its subject matter is also a focus of interdisciplinary analysis in fields such as criminal justice, law, philosophy, and sociology. These academic disciplines analyze the cultural context of laws and rules, the processes of their development, how different

societies structure competition and conflict, the manner in which legal institutions function to maintain social control, and the range of mechanisms used for settling disputes and maintaining social cohesion. In addition, applied legal anthropologists, such as forensic anthropologists, use anthropological information to provide direct assistance regarding legal issues.

Scholars credit Sir Henry Maine (1822–1888), an English comparative jurist and historian, as the founder of legal anthropology. In *Ancient Law,* Maine developed a theory positing that the development of legal systems was the key to social evolution. Maine argued that that as society progressed from custom to law, political organization evolved from one based on kinship to one based on territory. Accompanying such movement was the emergence of the "individual" as separate from the group and the replacement of "status" (family) with "contract" in the modern nation-state. Scholars criticized the evolutionary bias in Maine's model of law, challenging Maine's view that the modern nation-state is necessarily the most civilized stage of development. However, for decades *Ancient Law* remained the preeminent work on the nature of "primitive" legal institutions.

The Emergence of Modern Law and Anthropology

Modern legal anthropology developed during the 20th century with the publication of several significant anthropology books and monographs devoted to law. These studies examined the legal ideas and practices of non-Western peoples, especially their approach to the management of disputes in their societies. Research conducted by the anthropologists Bronislaw Malinowski (1884–1942), E. Adamson Hoebel (1906–1993), and Max Gluckman (1911–1975) were key to the development of legal anthropology.

Bronislaw Malinowski and Norms of Reciprocity

Malinowski was the founder of a theoretical perspective known as structural functionalism. The premise of structural functionalism, as articulated by Malinowski, is that every component of social structure, including law, functions for the good of the whole society and every component of social structure interconnects to form a well-balanced system. In *Crime and Custom in Savage Society,* one of several monographs written by Malinowski on the Trobriand Islands of Melanesia, Malinowski conducted systematic research on tribal law and applied a structural–functional analysis to the study of the various forces that make for order, uniformity, and cohesion in a "primitive society." He criticized earlier anthropological perspectives that assumed that the community completely dominates the individual in primitive societies, that is, that the individual is simply a passive obedient responder to the customs and commands of the community. Malinowski argued that a lack of fieldwork led anthropologists to these erroneous conclusions about law in these societies.

Using an ethnographic approach, Malinowski sought to understand what kind of law exists in Trobriand society and why members of the society follow that law. His observations led him to criticize the assumption made by many scholars that law in such societies consists primarily of strict prohibitions and harsh punishments resembling criminal law. Instead, Malinowski's research led him to recognize the importance of reciprocity, an exchange system based on mutual services between individuals and groups, as the basis for law and, consequently, social order. Malinowski posited that the obligations associated with reciprocity have the social function of safeguarding the continuity and adequacy of mutual services. He found that obligations associated with reciprocity are the primary social bonds in Trobriand society. Furthermore, the public and ceremonial nature of exchange, as well as the desire for individuals to achieve prestige, reinforces these bonds. Based on his observations, Malinowski called for a broader definition of law, one that recognized law as a body of binding obligations kept in force by the specific mechanism of reciprocity and publicity inherent in the structure of society. Given this broad conceptualization of law, Malinowski asserted that specific, formal legal institutions are not necessary in every society.

E. Adamson Hoebel and the Case Study Method

Hoebel was an ardent proponent of the collaboration between the two disciplines of anthropology and law. In *The Cheyenne Way,* Hoebel collaborated with a law professor, Karl Llewellyn (1893–1962), to examine the methods used by the Cheyenne for the legal resolution of intratribal conflicts. In studying the Cheyenne, Hoebel and Llewellyn developed a social science instrument for the recording and interpretation of dispute resolution among "primitive peoples" known as the case study method. This case study method consisted of examining in detail the

processes involved in settling "trouble cases." In a typical trouble case, this included investigating what happened, what each participant did in relation to the dispute, what steps were taken by other persons, the final outcome, the reasoning of the deciders, and the effects of the decision on the parties themselves, on future trouble cases, and on the general life of the group as a whole.

Hoebel and Llewellyn advocated for the case study method of investigation because they believed that the two other methods of investigation that were available to researchers had serious methodological weaknesses. The first, the ideological approach, emphasized concentration on norms or rules that express ideal patterns against which researchers can measure actual behavior. The emphasis of this approach is to investigate what people think are the rules of their society. Hoebel and Llewellyn pointed out that in some societies people do not think in terms of rules and, therefore, are unable to identify the rules of their society. Moreover, in societies that do think in terms of rules, a statement of the rules might not explain decision making adequately; that is, precise conformity to the norms is the exception rather than the rule. This divergence between norms and outcomes could result from normative ambiguity or normative conflict. Hoebel and Llewellyn also found the second approach, firsthand observations of actual behavior, to be seriously deficient in two respects. First, they believed that studies using this method contained descriptions of behavior that were overgeneralized and did not give a complete picture of how disputes were resolved. Second, these studies tended to concentrate on substantive law, or what the rules of the society are, instead of procedural law that examines the process for settling trouble cases. Hoebel and Llewellyn believed that the case study method overcame the limitations of these two approaches. They argued that by using the case method, researchers are able to identify the phenomenon of competing norms, overcome the inability of individuals to articulate norms, observe the divergence between stated norms and actual outcomes, and examine the actual process used in trouble cases. The study of actual legal cases as the unit of analysis for investigation also enables researchers to generalize from particular cases and, therefore, to understand the legal system of a society. It also enables researchers to understand legal change through studying comparative legal dynamics.

Max Gluckman and Legal Reasoning

Gluckman conducted extensive research among the tribes of Central and South Africa. In *The Judicial Process Among the Barotse,* Gluckman focused on the dispute settlement process of the Lozi, a society consisting of a number of interrelated ethnic groups located along the Zambeze River in Barotse Province in western Zambia. He systematically studied the Lozi court in action, listening to cases and the legal arguments presented as they unfolded. From an analysis of the cases and legal arguments, he sought to extract the way in which Lozi judges approached their task, how they assessed evidence, what sources they drew on in making their decisions, the logic of their arguments, and how they applied legal rules to social life. To achieve these objectives, Gluckman distinguished Lozi norms that were special to their society from the logical principles that judges used to decide what norms to apply in court and how and when to apply these norms. Gluckman believed that the results of his research demonstrated that the judicial process used in Lozi courts represented logical principles or modes of reasoning found wherever individuals apply norms to settle disputes, that is, that indigenous African legal systems and practices were as rational as those found in Western societies. Therefore, Gluckman argued that although the premises of the Lozi court were different from those of Western courts because the social context of the society was different, the logical principles used and the reasoning process were the same as in Western courts.

Critics challenged Gluckman's universalistic notions about logical principles and modes of legal reasoning. In particular, the anthropologist Paul Bohannan asserted the importance of cultural difference and uniqueness, even in the legal principles and process of legal reasoning used to settle disputes. Bohannan argued that law is an expression of unique cultural premises. He believed that anthropologists should not apply Anglo-American categories to the study of non-Western societies because using such categories prevents understanding another culture. Instead, he advocated the use of native legal terms that perhaps are not translatable into English but provide a nondistorted understanding of the judicial process of non-Western societies, including the legal reasoning used to arrive at decisions. The task for the anthropologist is to explain the meanings of native legal terms as part of the reported research. For critics such as Bohannan, comparative law was an opportunity to

examine cultural difference, and the analysis of cultural difference is a central purpose of anthropological research.

The Broadening of Law and Anthropology

Studies in non-Western societies continued during the 1960s and 1970s, with an increasing number of anthropologists advocating for studying the processes by which disputes are resolved. This approach often emphasized a choice-making (or rational) model of behavior in which people could use law in a variety of ways to represent their own interests. This approach also examined the process of dispute resolution within its sociocultural context, with anthropologists observing that people often managed their legal disputes through a system of informal negotiated settlements among parties rather than through court-centered approaches. The law as process model challenged the long-standing emphasis in legal anthropology on rules of adjudication as the primary focus of research. In response, some scholars attempted to synthesize the rule-centered approach with the law as process approach. An additional outcome of the process model of law was an emphasis on legal pluralism, that is, the recognition that many types of dispute processing could exist in the same society. Anthropologists began to understand that societies contained other sites where norms were generated and social control was exercised besides the state. In such a system, the social reality may consist of behaviors that are congruent with rules and other behaviors in other sites where people exercise choice to benefit their own self-interests.

The subfield of legal anthropology, however, has broadened its domain in several other, more fundamental and significant ways than simply an emphasis on legal process and pluralism. Most notably, legal anthropology now studies industrial countries and has expanded its scope of inquiry from local legal analysis to national and transnational legal matters. Legal anthropologists study areas such as the field of human rights, international treaties, and other issues that anthropologists did not address in earlier works grounded in a community-based conception of anthropology. Such research entails a greater concern with issues of stratification and power. It also means that anthropologists may openly question the legal rules set by the state when they view these rules as detrimental to the poor and the oppressed. These anthropologists report persecutions and other atrocities of peoples, and they take positions on the issues they address. Law as ideology becomes a way of contributing to the social construction of a just world. An example of such an approach is anthropologist Laura Nader's criticism of the addition of the informal alternative dispute resolution (ADR) in American courts as a response to the perceived needs of the poor and of those who had minor legal claims. Nader referred to ADR as a kind of coercive "harmony ideology" and argued that the poor should have access to the courts rather than being forced into a mediation setting because the legitimacy of a legal system depends on providing access to the courts for all. Furthermore, she asked what coercive harmony ideology signified about the inequalities of American society. Nader also applied the idea of harmony ideology to interpret her work on dispute resolution in a Mexican Zapote mountain village and argued that the reason why people presented themselves as resolving all disputes harmoniously was part of a political strategy to keep colonial authorities from meddling in village affairs. Thus, Nader was able to draw parallels between the power and stratification situation of colonial peoples and the poor in industrial countries.

As legal anthropologists began to study industrialized nations such as the United States, the theoretical orientations of other social sciences and law contributed to their perspective and understanding. Legal anthropologists saw the limitations of the structural–functional paradigm in a world where transnational processes exercise enormous power over people and nations. They also recognized the limitations of a dispute processing approach that does not take into account its wider social context. By collaborating with other disciplines, such as law and sociology, other paradigms provided alternative explanations of the role of law in culture and society. For example, in legal scholarship, critical legal studies examines the way in which law maintains power relationships by creating images of social relationships that appear to be fair due to the authority and legitimacy that the law gives them.

Finally, globalization has become an important theme within legal anthropology scholarship. Anthropologists consider the impact of globalization on social relations in several different kinds of context. For example, one context for examining globalization is that it is a form of postmodern colonialism, that is, a form of domination in which the worldwide production and consumption of cultural products is removed

from the contexts of their production. Another context is to examine justice issues within the context of globalization. This includes analyzing the tension between local formulation of human rights and its global counterpart, that is, the ideology of international human rights. It often also includes taking a position on the definition of human rights and what kinds of political system can provide these rights.

Law and anthropology examines the complex processes through which laws shape human life. Early studies by legal anthropologists reflected a community-based conception of anthropology. Today, law and anthropology has expanded its scope of inquiry to include national and transnational legal matters. The role of the anthropologist has also changed from one of simply being an observer and reporter of social relations to one of, at times, taking a position on justice issues.

— *Patricia E. Erickson*

See also **Functionalism; Globalization; Gluckman, Max; Hoebel, E. Adamson; Maine, Henry Sumner; Malinowski, Bronislaw**

Further Readings

Bohannan, P. (1957). *Justice and law among the Tiv.* London: Oxford University Press.

Gluckman, M. (1955). *The judicial process among the Barotse of northern Rhodesia.* Manchester, UK: University Press for the Rhodes–Livingston Institute.

Hoebel, A. E. (1954). *The laws of primitive man.* New York: Atheneum.

Likosky, M. (Ed.). (2002). *Transnational legal processes: Globalization and power disparities.* New York: Butterworth.

Llewellyn, K., & Hoebel, E. A. (1941). *The Cheyenne way.* Norman: University of Oklahoma Press.

Maine, Sir Henry. (1960). *Ancient law.* New York: Dutton.

Malinowski, B. (1976). *Crime and custom in savage society.* Totowa, NJ: Littlefield, Adams.

Nader, L. (1990). *Harmony ideology: Justice and control in a Zapotec mountain village.* Stanford, CA: Stanford University Press.

Sack, P., & Aleck, J. (Eds.). (1992). *Law and anthropology.* New York: New York University Press.

Starr, J., & Collier, J. F. (Eds.). (1989). *History and power in the study of law: New directions in legal anthropology.* Ithaca, NY: Cornell University Press.

RIGHTS OF INDIGENOUS PEOPLES TODAY

Securing rights for indigenous peoples around the world is an important issue today. Great strides have been made in this direction, but much work remains to be done.

According to the United Nations, human rights are those rights that are inherent to the human being. Every human should have these rights, without being discriminated against because of color, race, religions, gender, language, political opinions, national or social origin, property, birth, or other states. These rights are founded on respect for each person's worth and dignity. They should be applied to all people without discrimination. No one's rights should be taken away unless he or she is convicted of a crime by a court of law. The International Human Rights Law has been adopted by the United Nations. Many nations have also adopted laws that formally protect the basic rights of individuals.

Indigenous peoples still have concerns about their rights. Representatives from around the world voiced many of these concerns at the Permanent Forum on Indigenous Issues in May 2002. Representatives came from areas as diverse as Alaska, Columbia, Scandinavia, Siberia, Africa, Australia, and Indonesia. Reported abuses of the human rights of indigenous peoples included usurpation of land, genocide, and proscription of traditional languages. Groups of hunters, gatherers, and traditional farmers from Africa and the Amazon Basin charged that their lifestyles are being wiped out as the land is taken over for extraction of resources, grazing, and hydroelectric projects.

Several news releases in early 2005 addressed human rights for indigenous peoples in different areas. In *Nigeria World,* Samuel Bayo Arowolaju claimed that indigenous peoples are being denied political rights in Nigeria. He called for a national conference to discuss the problems. Irene Kahn's article in the *Toronto Star* addresses "Canada's shameful failure." She reported that indigenous women in Canada face a much higher rate of violence and discrimination than other women in the country.

The same week in March 2005, the European Parliament voiced concerns over persecution of the Mari people in Russia. Most of the indigenous Maris were opposed to the reelection of President Leonid Markelov in 2004. Since the election, Maris who spoke out against Markelov claim to have suffered illegal dismissals and violent beatings, some resulting in death.

Although many people in many places are working toward securing human rights for all indigenous people throughout the world, there is still much work to be done.

— Pat McCarthy

Law and Society

Law and society designates a three-way concern with the nature of law, society, and the relation between them. Two main approaches have been important: one ultimately rooted in the law and legal theory of the Roman Republic and the other ultimately rooted in the law and legal theory of the Roman Empire. This entry describes the bases of the tradition, its transformation into the 19th-century debates that framed the emergence of sociocultural anthropology, and its main representatives in anthropological theory.

Roman Law and Legal Theory

Roman law is a complex body of substantive laws, legal doctrine, and theory about law and society that began in the Roman Republic and has evolved continuously since. The general view of law in the ancient Mediterranean world was that it was the "will of the gods." It was, therefore, not something that mortals could create. It had to be something they found. Different societies used different theories of how this was to be done.

Rome was always a class-based society with two main classes. Patricians were a military aristocracy whose members held large estates that they farmed with unfree labor, slaves, and plebes. Plebes were not uniform, but their main interests were those of small-scale peasant farmers.

Republican legal theory was social constructionist with a presumption of individual freedom and rationality. A "republic" is *Res Publica* (a public thing). There were several key ideas. Officers were elected for fixed 1-year terms. At first, the chief officer was the praetor, who was chief magistrate and general of the army. His power to command was his *imperium*. Candidates for magisterial office described the laws they would enforce, so the vote was for both. The principle that connected the idea of law as the will of the gods to this system of election was *vox Populi vox Dei* (the voice of the people is the voice of the gods).

The popular voice was safeguarded by checks and balances. Soon after the republic was initiated, the office of consul was added above the praetor. The consul was always a divided office, that is, one office occupied by two people. To do anything, the two had to agree. Still later, the office of tribune was added in response to the demand of the plebes. The tribune was elected solely by the plebes and could block any action of a praetor or consul that was adverse to plebian interests.

Magistrates were balanced by the senate, consisting of men who had been through the elected offices and had not done anything to merit censure. Although the magistrates could initiate wars, only the senate could receive ambassadors and make peace.

Finally, the law authorities were separated from the law enforcers. The key text and symbol of the process was the XII Tables, attributed to a committee of 10 men representing patricians and plebes on display in the Forum Romanum. It was not a code but rather a set of key legal problems and solutions that implied what the basic legal principles were without stating them. For the rest of the law, a legal archive was maintained in the college of the Pontiffs, headed by the pontifex maximus.

The Roman Empire was constructed out of the offices of the republic by Augustus. Having been elected consul repeatedly, Augustus gave up that office to be appointed proconsul for life with an extended imperium. Proconsuls were appointed by the senate and did not have fixed terms. He then was elected tribune and finally also was appointed pontifex maximus. This obliterated the checks and balances and established the system known as the principate, which very quickly became the hereditary single office of imperator (emperor).

With elections ended, the constitutional principle could no longer be that the voice of the people was

the voice of the gods. It became instead "The emperor is the voice of the law."

Imperial legal theory developed around the idea of a conflict between state interests and individual interests. This was embodied in the sequence of efforts to establish uniform imperial codes, beginning mainly with Theodosius and culminating in the *Corpus Juris Civilis* ordered by Justinian. The organizing principle was hierarchy, that is, a hierarchy of civil laws that followed by logic from first principles in a state that was a hierarchy of obedience to the emperor. The compilers did not write new law but rather rearranged the law that already existed according to what they argued were universal logical principles. When the *Corpus* was completed in 534 CE, Justinian ordered all other law books destroyed.

Although the *Corpus* disappeared from European administrative life soon after it was promulgated, republican law lived on. It had always been fundamentally the law for a *civitas,* and it persisted in both the original Roman cities and the *colonias* that had been sent out to conquered areas. These were usually located in previous large settlements where the Roman colonists lived side by side with the original inhabitants and brought them under Roman protection. When the empire collapsed and the power relations reversed, the Romans were protected in turn. Eventually, the populations and legal systems merged to form the European nations that are recognized today.

Rebirth

The conflict between empire and *civitas* redeveloped in Europe in three main contexts. First, in the 11th century, universities began to be established and offered law as a subject of study based on textual analysis of *Corpus Juris Civilis,* which was copied, extensively annotated, and widely circulated as a general legal standard. The second context was the development of canon law by the Catholic Church on the same model. The third was the "reception" of the 15th century, a widespread movement in Germanic areas to introduce substantive codes along the same lines. Because the principles of imperial law could not be extracted from their texts without also exposing the underlying principles of republican law, by the Renaissance both theories were once again in full flower and known to all educated people.

Enlightenment

Political, social, and legal philosophy as now recognized crystallized in debates over the epistemological basis of law governmental legitimacy between the reception and the 19th century. In this, arguments on the republican side were closely aligned with arguments for experimental science and philosophical skepticism. Those on the imperial side were aligned with the idea of deductive systems based on a priori or self-evident knowledge. On the republican side, these culminated in the Enlightenment arguments of Montaigne, Montesquieu, Smith, Hume, Kant, and the authors of the American Revolution. On the imperial side, comparable figures included Hobbes, Locke, the Scottish Common Sense philosophers, and Hegel. Of these two traditions, the former was clearly ascendant by 1800.

The 19th-Century Republican Tradition

The most direct path to the 19th-century anthropological conceptions of law and society begins with the historical jurisprudence of Carl Friedrich von Savigny (1779–1861). His subject matter was Roman law between the collapse of the empire and the reception, and his focus was not on texts but rather on courts and legal ceremonies as represented by court documents.

It was Savigny who traced the continued development of Roman republican law in Europe after the empire collapsed. He saw this as demonstrating that "law grows out of the life of the people," at once an echo of Kant's conception of law embodying the progressive growth of freedom of a community and a reaffirmation of *vox Populi vox Dei.* His philosophical and political manifesto was titled *Of the Vocation of Our Age for Legislation and Jurisprudence* (1814) and opposed a project to write a legal code for Germany on the Napoleonic model. He contended that laws constructed in such a way could never have the subtlety, complexity, and efficacy of law that grew naturally, or "organically," from the perceptions and values of those to whom it applied—the spirit of the people, their *Volksgeist.*

For anthropology, the most immediate impact of Savigny was through the Grimm brothers, Wilhelm and Jacob. Both were his students. Jacob, the elder, began his studies in 1802 and was a research assistant for Savigny beginning in 1805. Since Savigny had

deciphered the history of Roman law in the German context, one obvious unknown concerned the German side of the relationship. One possibility was to use folkloristic materials collected from the less educated and presumably more conservative "folk" so as to find relics of an ancient *mythos* not originating in the Latinized culture of the upper or educated classes. To date this material, the Grimms adapted Savigny's comparative method to the language of the stories. This led to the discovery of the "sound law" in the sequence of languages that leads from ancient Greek, to Gothic, to the varieties of modern German. The general method is still the basis of historical linguistics. The Grimms' main work on law proper was Jacob's *Deutsche Rechtsaltertümer,* published in 1828.

Savigny's recognized successors in law included Theodor Mommsen (1817–1903), Frederick William Maitland (1850–1906), and Rudolph von Jhering (1818–1882). The first two revolutionized the history of law. Jhering revolutionized the analysis of law as such. Building on Smith and Kant, Jhering grounded his analysis directly in cognitive and social processes at the individual level. Two mutually complementary theses run through his work. The first is that law is created and maintained through self-interest. The second is that law grows out of the self-regulation of power.

Jhering argued that self-interest bids us to enter exchanges. Even exchanges are self-enforcing by mutual interest. But exchanges can become uneven. For example, suppose that I offer to pay you if you fix my plumbing. You fix it. Now I have fixed plumbing and what I offered to pay you. In this case, law is needed to provide an artificial interest in paying you to replace the natural interest that has been removed. This is what law is: a support to maintain required relations in other institutions, especially commerce, in those cases where they do not maintain themselves.

Jhering had two major successors of direct importance to anthropology: Eugen Ehrlich (1862–1922) and Hermann Kantorowicz (1877–1940). Ehrlich originated the term "sociology of law." His central concept was the notion of the "living law" as those rules we have that are so firmly enforced that we can hardly think of violating them and that rarely or never actually require judicial action, for example, the rules of most workplaces. Kantorowicz's perspective was very similar.

The Lawyer-Ethnologists

The more the sophistication of Roman Republican law became clear, the more important it seemed to be to ask where it originated. This was the question of the lawyer-ethnologists such as Adolphe Bachofen (1815–1887), Henry Maine (1822–1888), Lewis Henry Morgan (1818–1881), and John F. McLennan (1827–1881).

Bachofen had studied under Savigny at Berlin from 1835 to 1837; was appointed professor of Roman law at Basel in 1841; and served as a judge of the Basel criminal court from 1842 to 1866. He has come to be identified with the thesis that a matriarchal state of society preceded the current patriarchal one, but his deeper and more original concern was not with systems of rule but rather with the cultural worldviews that they reflected.

In the debates concerning the Swiss Civil Code, Bachofen opposed the blanket imposition of the Code Napoleon and supported the approach that eventually incorporated more recognition of local custom into the Swiss code than into any other contemporary European system.

Maine argued for two main theses: that law evolved from status law to contract law and that the first form of organized society was "patriarchal." As with Bachofen, Maine's legal and ethnological activities were inseparable. His first major work, *Ancient Law,* was published in 1861, the same year as Bachofen's *Mother-Right* was published. From 1863 to 1869 in India, Maine served as a legal member of the Council of India and as vice chancellor of the University of Calcutta.

Maine was the first British ethnologist to insist on the "comparative method" of historical investigation, although he did not make clear at first that he took it from Savigny. Contrary to Bachofen, Maine argued that the patriarchal system went back to the beginnings of the Indo-European language family. To specify it, he modified the Roman model only enough to incorporate points that he considered to be held in common with other ancient Indo-European legal systems, particularly Hindu law. The result was a social system in which the only organization was the household and literally all legal power resided in its eldest male. In this system, "law is the parent's word."

Eventually, in Maine's view, as allowances were made for those among the descendants who would succeed to the position of the father, status within the

family and the society became more differentiated, increasing by slow degrees the rights of others within the family to delineate a portion of the property and act on their own regarding it. This eventually led to a system based on the individual power of contract, supported by a government detached from the family system.

Maine was a major proponent of legal codification, and no matter how debatable his movement from status to contract may have been as an historical thesis, there is no doubt that it described the thrust of British law in India.

Morgan was a year younger than Bachofen. He practiced law from 1844 in Rochester, New York, and served in the state legislature from 1861 to 1869.

Morgan was interested in general rules of development that covered all societies. His main works were the *League of the Iroquois* in 1851, *Systems of Consanguinity and Affinity of the Human Family* in 1871, and *Ancient Society* in 1877. He approached the ethnographic materials directly through Roman legal vocabulary and constitutional analysis. This included the concepts of consanguinity and affinity themselves. The result was to show how terminologies for kinsmen articulate with different forms of family organization and to thereby create an enduring and central concern of social anthropology. Equally important, however, he did not see primitive society as monolithic; for example, he recognized that the family system was not necessarily the same as the clan system, if any, which in turn was not necessarily the same system of government.

McLennan brought the arguments on matriarchy versus patriarchy together with another line of argument focusing on "totemism." He was appointed parliamentary draftsman in 1871. His first major work was *Primitive Marriage,* published in 1865. He agreed with Morgan and Bachofen in holding that the first organized form of the family must have been based on the relation between mother and children, but he disagreed vigorously with most other aspects of their analyses. Basically, McLennan held that it was quite wrong to start with a small and sharply defined group such as the family in any form; what one had to imagine was the least fully conceptualized type of association. This was the undifferentiated territorial "horde." He then held that the first and most basic rule required for the constitution of such a group was the rule of exogamy, that is, the rule that one had to marry outside of one's own horde. He argued that because there were still no principles that could order relations among hordes, this naturally led to the practice of marriage by capture.

McLennan saw evidence of marriage by capture in the marriage ceremonies of an extremely wide range of linguistic communities. He held that such ceremonies were more appropriate and reliable sources of evidence on the most ancient uses than were formal laws, particularly written laws, which must have arisen more recently. Thus, the ceremonies were not considered "mere" rituals or expressions of religious ideas alone. They were read as Savigny had read judicial proceedings, that is, as enactments of general societal relationships.

By the early 20th century, the lawyer-ethnologists were of little interest for two main reasons. The first was that, with the exception of Morgan, their social mechanisms assumed a time span for human history that turned out to be far too short. The second was that they came to be identified with the neo-Hegelians.

19th-Century Authoritarian Theory

The main authoritarian reaction to the theories based on republican conceptions was in two ideologies with roots in Hegel and St. Simon's socialism: Auguste Comte's positivism and Karl Marx's communism. They agreed in seeing society as monolithic and hierarchical, rejecting pluralism as disorder and rejecting democracy as a delusion. Their main disagreement was over causality. Positivists argued that mind controlled matter, and Marxists argued that matter controlled mind. The legal positivism of John Austin (1790–1859) is parallel but separate, imperially grounded but not Hegelian.

The first anthropologist to espouse Comte's positivism was E. B. Tylor (1832–1897). In 1889, Tylor's *Primitive Culture* argued for "animism" as the first religion directly on the model of Comte's "fetishism" and for Comte's view of science as precluding recognition of human free will. The first legal scholars were the neo-Hegelians.

The Neo-Hegelians

The recognized founder of the neo-Hegelian school is Albert Herman Post (1839–1895). His publications, beginning in 1872, invoked Comte's arguments and methods to attempt to construct a universal history of law and society. Unlike the lawyer-ethnologists, Post argued that evolution had a

definite goal, which was none other than the creation of a totalitarian world system. Joseph Köhler (1849–1919) was Post's successor and shifted the imagery from Comte to Hegel.

Köhler was a prodigious writer. The editor of the English translation of his *Lehrbuch der Rechstphilosophy* (translated as *Philosophy of Law*) listed 48 major works up to 1903. The most important for anthropology is *Zur Urgeschichte der Ehe* [On the Prehistory of Marriage], published in 1897 and recently translated with a foreword by R. H. Barnes.

Köhler took totemism as the original and basic form of religion and social organization, citing James Frazer. This was considered to be a system of beliefs in which members of social groups, clans, or tribes are identified with distinct animal species or objects. Köhler argued that it followed that no one could belong to more than one clan because this "would result in a mixed animal." Given this, it further followed that the clan must always be based exclusively on either "mother-right" or "father-right."

Köhler argued the case with an analysis of kinship terminologies based on Morgan, noting that Morgan's glosses could be written out as equations. Thus, if the same term is applied to one's (ego's) father and father's brother, this is represented as Father = Father's Brother. Terminologies could then be compared as patterns of such equations.

Köhler interpreted all such equations as evidence of group marriage, meaning that all of the people from one clan married all of those from the other clan, even though Morgan had explicitly said otherwise. Nevertheless, Köhler concluded that it was irrefutable that "all peoples of the earth originally had group marriage" if we considered the derivation of group marriage from totemism andthat "totemism presents itself to us in nearly all human activities, institutions, legends, [and] idioms as an ancient and later abandoned system."

Köhler's *Philosophy of Law* began with an "excursus" that deduced Köhler's position from a general definition of law and argued that, for humans, natural law is the law of culture, which it is "man's task" to create and develop. This "ideal of cultural development," in his view, would be served "if all states would unite in one great whole" through the formation of a "supranational" law. But he saw little hope that such a "world empire" and law would emerge by rational action of sovereign nations because it would result in a reduction of their jealously guarded autonomy. therefore, Köhler held that war in pursuit of it was "valid."

French Sociology

Although Émile Durkheim (1858–1917) described himself as a republican, "republican" for Durkheim was not what it was for the Romans or Kant. Durkheim defined democracy only as a type of thought, not as any sort of organizational arrangement to ensure popular sovereignty. It was the widest extent of participation in "the governmental social consciousness," whereas "the role of the State . . . is not to express and sum up the unreflective thought of the mass of the people but [rather] to superimpose on this unreflective thought a more considered thought."

Durkheim's social analyses supported his politics. *On the Social Division of Labor,* his dissertation in philosophy, was intended to refute Adam Smith's description of orderly and efficient economic relations arising from the interactive exercise of personal judgment. Durkheim argued that the division of labor was social rather than individual. It was both mental and collective. Society was integrated by a principle of solidarity. The form of this solidarity evolved according to a necessary law of growth, drawn directly on the analogy of the biological evolution. It began with mechanical solidarity, where everyone literally looked, thought, and acted alike, and ran to organic solidarity, where people, behaviors, and roles were progressively differentiated and interlinked. People were drawn into these differentiated roles not by individual purpose or even the pressure of others but rather by an impulse for self-fulfillment because each alone was "incomplete."

Durkheim's interpretation of totemism drew on both Köhler and Tylor. Durkheim praised Köhler's analysis extensively in an important review published in *L'Année Sociologique* in 1897 and again in 1905. He then applied Köhler's argument nearly point for point, although without citing Köhler, to Baldwin Spencer and F. J. Gillen's representation of Australian totemism in *The Native Tribes of Central Australia* (1899). Spencer and Gillen, in turn, credited their theoretical perspective to Tylor. The result was *The Elementary Forms of the Religious Life,* first published in 1912 and then in English in 1915, widely considered one of the foundational works of modern sociology.

The argument began with the idea that categories of thought control our behavior. Durkheim then argued (paraphrasing Comte) that these categories,

being general and mental, cannot come from the individual but rather must come from society:

> Man is double. . . . There are two beings in him: an individual being which has its foundations in the organism and whose activities are therefore strictly limited, and a social being which represents the highest reality in the intellectual and more order that we can know by observation—I mean society.

Durkheim's explanation of how the two beings come together is that the subjective dominates the objective, the general dominates the particular, and the state dominates individual experience and Köhler's idea of totemism. Hence, the categories were "born in religion and of religion."

Durkheim concluded with Köhler's argument that unity of the group is the basis for the self-identity of the individual: "We have shown how the religious force which animates the clan particularizes itself in particular consciousness." He also argued, following both Hegel and Köhler, that only the group is active, not individuals:

> The collective consciousness is the highest form of the psychic life, since it is the consciousness of the consciousness. Being placed outside of and above individual and local contingencies, it sees things only in their permanent and essential aspects, which it crystallizes into communicable ideas.

The "two beings" argument was repeated in *Mental Functions in Inferior Societies* by Durkheim's colleague, Lucien Lévy-Bruhl, in 1910. Others proposed different ideas of the original form of society or its essential basis but kept the same basic idea that there was some such elemental form or essential basis and the same circular methods of arguing for it.

German Sociology

French sociology and the contemporaneous German sociology of Georg Simmel (1858–1918), Ferdinand Tönnies (1855–1936), and Max Weber (1864–1920) agreed that society was unitary and that human free will and choice were illusions. The differences were only in the ways in which they focused their arguments. They were less interested in primitive religion and early societies than in contemporary religion and modern society. Rural life was characterized as traditional and superstitious, emphasizing the group over the individual. Urban or civilized life and thought were rational, scientific, and individualistic. Simmel's sociology of religion was simply the claim that religion was society, that is, that social determinism was religious determinism. The most general difference between Tönnies's and Weber's arguments was that Weber's argument was built around the dichotomy between form and substance, whereas Tönnies's argument stressed the dichotomy between will and reason. Tönnies's *Gemeinschaft* and *Gesellschaft* were forms of collective will. Weber, like Comte, took thought as the basis of action and equated the evolution of society with the evolution of rationality.

Weber had studied law at Heidelberg, Berlin, and Göttingen and had written his dissertation on medieval commercial law in 1894. The connection between the economy and law was the central theme of his massive *Wirtschaft und Gesellschaft* (Economy and Society), published in 1922. This aimed directly at rejecting Smith's view that division of labor is the product of efficiency-seeking behavior at the individual level. Instead, Weber portrayed law as developing by an internal logic of increasing formality and rationality.

Weber's stages of legal development followed Comte's and similarly implied that legal values descend from and are consonant with religious values. First was primitive law with "magically conditioned formalism," evoking Comte's fetishism. This coalesced into Old Testament religion for Comte and Old Testament law for Weber, that is, charismatic revelation by law prophets. Next was "cautelary jurisprudence," which seemed to refer to the pragmatic law finding of the Roman Republic. "Imposition of law by secular and theocratic powers" was next and suggested the imperial and papal rationales, again agreeing with Comte, and "rational" law corresponded directly with Comte's positivistic science, being based on generalization by rational bureaucrats from specific cases to principles according to universal logical rules.

The problem is that modern European law has no more developed out of ancient Judaism than has modern science. Nor did Roman imperial law supersede Roman republican law, as Savigny showed. But succession was what Weber wanted because succession suggests hierarchy, and hierarchy was the unifying theme of his argument.

Pragmatism in Law

The American counterpart to European post-Kantian empiricism is pragmatism. Pragmatism grew out of the discussions of the "Metaphysical Club" that met in Cambridge, England, during the early 1870s. Especially important pragmatists at that time included Oliver Wendell Holmes, Jr., Charles Peirce, and William James and later included John Dewey, G. H. Mead, and W. I. Thomas. In pragmatic legal theory, "law" is firmly focused on courts and what they do.

Pragmatism uses an empirical theory of knowledge and meaning to bring together the entire panoply of post-Kantian empirical developments from physiological psychology, to developmental and social psychology, to a theory of social relations, and finally to an understanding of key institutions—most notably law, education, and economics. Pragmatic legal thought was continuous with the continental jurisprudence descending from Savigny.

Holmes's most important and expansive work was *The Common Law* (1881). The historical sweep covered the XII Tables, the law of the Germanic tribes, English common law, and modern American case law. It was not a codification but rather a delineation of basic legal concepts as illustrated by cases. The introduction focused on the general concept of liability, which became Holmes's touchstone for differentiating criminal law from torts and contracts. Holmes argued that for criminal law tort the idea of liability, based on an idea of revenge, is "of the first importance," although in contract law it is "hardly material" outside a limited number of cases. The concepts of liability differ, however, between criminal law and tort and are linked to differing interpretations of other concepts such as trespass, malice, reasonable, foreseeable, accident, intent, and responsible.

One of Holmes's most important underlying ideas was that in each of the major branches of law, the basic categories under which the cases and exegeses are grouped form, in themselves, an evolved philosophy of law, a repository of experience, ordered and retained in an evolved and evolving social system.

Benjamin Cardozo (1870–1938) demonstrated the agreement between Ehrlich and Holmes in a series of lectures delivered at Yale University and published in 1921 as *The Nature of the Judicial Process.* His focus, like Holmes's focus, was on how judges decide cases, particularly difficult cases. This, he argued, had led to increasing recognition of the necessity for the sociological method in Ehrlich's sense. A quotation Cordozo took from Dean Pound was particularly apt and indicated nicely the broad agreement among all four:

> It is true, I think, today in every department of the law that the social value of a rule has become a test of growing power and importance. This truth is powerfully driven home to the lawyers of this country in the writings of Dean Pound[:] "Perhaps the most significant advance in the modern science of law is the change from the analytical to the functional attitude." . . . "The emphasis has changed from the content of the precept and the existence of the remedy to the effect of the precept in action and the availability and efficiency of the remedy to attain the ends for which the precept was devised."

Pound's position in this stream is clear from the same quote. Law is a set of social tools that answer to diverse purposes in diverse ways. Conversely, social life itself defines diverse purposes for individuals to pursue.

Pragmatism in Anthropology to 1950

Although Franz Boas (1858–1942) and Bronislaw Malinowski (1884–1942) are equally identifiable with the intellectual traditions of pragmatism, Boas's interests did not lead him to encounter issues law.

Bronislaw Malinowski

Malinowski initially took his D.Sc. in physics at Kraków in 1908, but he decided to go into anthropology instead. His first step was to take courses from Wilhelm Wundt and Karl Bucher at Leipzig. Wundt was concerned with the relation of mind to action, and Bucher was concerned with the organization of work. In 1910, Malinowski became a postdoctoral student at the London School of Economics, planning to do research in the South Pacific. He studied mainly under Charles Seligman (1875–1940) but also associated with Edward Westermarck, Leonard Hobhouse, W. H. R. Rivers, and A. C. Haddon, among others. The theoretical assumptions and issues at the London school were essentially the same as at Leipzig. They shared a central concern with the emergence of human mentality and human culture out of a pan-human physiological substrate and the way in which human thought was shaped by culture, and

ethnological fieldwork was well established as an extension of laboratory methods in Wundt's sense.

Malinowski left for the Trobriand Islands in 1914 and remained there until 1918, formally interned as an enemy alien. He is recognized as having developed what is now called "participant observation" and also was the inventor of the ethnographic monograph as we now know it. This is not a reconstruction of a past condition or a pristine "precontact" society but rather a description of a community as it is observed with the investigator located within it.

Malinowski's Trobriand monographs were pluralistic and relativistic. Each took a group of theories reflecting one of our institutions and held it up against their uses. Thus, *Argonauts of the Western Pacific* in 1922 compared conventional economic concepts of rationality, markets, money, and value with the Trobriand system of overseas trade, called the *kula. Sex and Repression in Savage Society* in 1927 tested and rejected Freud's concept of the Oedipus complex. *Crime and Custom in Savage Society* in 1926 did the same for neo-Hegelian conceptions of law and custom and is Malinowski's main work on law.

Although Malinowski was absolute in his rejection of the neo-Hegelians, he did not discuss their opponents. Yet his conception of the sanctioned basis of custom was very similar to Ehrlich's conception of the living law, and his idea of when sanctioned intervention was required paralleled that of Ehrlich and Jhering, as was subsequently recognized by Cardozo and Pound.

Karl Llewellyn

Karl Llewellyn (1893–1962) is the legal scholar who most ethnologists are likely to have read. The specific work they are most likely to have read is *The Cheyenne Way,* written mainly by Llewellyn using fieldwork by E. A. Hoebel. This began with a discussion of the method according to which the cases were collected. They were texts rather than actual observed events, but they were of a specific sort calculated to illustrate basic principles of law; they were "trouble cases." Trouble cases are cases that present general problems for the group as a whole and that are remembered for those problems and their solutions. The book presented the cases under subject headings according to the types of problems and remedies they illustrate and concluded with three chapters on "law-jobs and juristic methods" that presented Llewellyn's theory of law. Although it clearly belongs to Savigny's tradition, it does not take any established analysis within that tradition as a starting point. It is of a piece—a simple, striking, and new view of the way in which law arises from the life of the people.

Positivism in Anthropology to the Present

The period between around 1930 and 1960 saw a major intellectual swing from pragmatism and empiricism to positivism. Roughly in chronological order, the main arguments fall into four main clusters: an initial isolated "theoretical" statement by A. R. Radcliffe-Brown (1881–1955), the "cultural" view of E. A. Hoebel (1925–1983), a long series of arguments aimed at treating law as "dispute settlement" that is shaped or controlled by the larger social structure, and a debate on the general definition of law. The end result was theoretical sterility and isolation.

A. R. Radcliffe-Brown

Radcliffe-Brown was a forceful proponent of the positivism of Henri Hubert and Durkheim, and he wrote the section on primitive law in the general article on law for the 1934 *Encyclopedia of the Social Sciences.* The article began by dismissing the entire line of scholarship from Savigny to Pound as irrelevant to the subject. The reason was that the jurisprudents defined law as involving "organized legal sanctions," and primitive societies did not have any; rather, they had sanctions imposed by society itself. Deeds that offended the "moral sense of the community" would be subject to three sanctions: a general diffuse sanction that subjects a person to general disapproval, a ritual sanction that puts a person in a condition of ritual uncleanliness, or a penal sanction "whereby the community through certain persons acting as its constituted judicial authorities inflicts punishment."

Although few subsequent writers have agreed that primitive society had no law, virtually all have recognized that the perspective of the great jurisprudents was incompatible with positivistic social determinism.

E. A. Hoebel

Hoebel was a student of Boas. Hoebel was interested in Commanche law but was having trouble conceptualizing it. Boas asked Llewellyn to meet with him. The two worked together on *The Cheyenne Way.* Hoebel then continued on his own, moving from Llewellyn's pragmatic conception of "law jobs" to his own conception of a jural code of postulates and corollaries.

For the Ifugao of the Philippines, Hoebel listed 6 postulates and 17 corollaries. The list included entirely unrelated ideas, most of which were in legal terms clearly not adjudicable or enforceable. The first, for example, was as follows: "The bilateral kinship group is the primary social and legal unit, consisting of the dead, the living, and the yet unborn." The second was as follows: "Supernatural forces control most activities, and the actions of human beings are either compatible or incompatible with the predilections of the supernaturals," a corollary of which was the necessity of headhunting.

Hoebel's claim was that all such beliefs form a unitary controlling whole, which he characterized as "superorganic." If it were true, the Ifugao would be a community of gullible rule followers with no sense of logical inconsistency or incoherence. In actuality, most of these ideas are not rules of behavior at all.

Dispute Settlement

The effort to treat law as socially structured dispute settlement runs from Max Gluckman, to Elizabeth Colson, to Laura Nader. The core ideas of the dispute are well represented in *The Disputing Process,* published by Nader and Harry Todd in 1978.

Gluckman is known mainly for his "structural–functional" explanation of conflict, but he was also very forceful in urging a complete theoretical separation of anthropological theory and jurisprudence. The argument equated the increasing power of a science with the development of specialized and distinct scientific vocabularies. Because anthropology was a new and separate discipline with its own purpose, anthropologists who used legal concepts had to give them new and separate meanings. The purpose of anthropological theory was to show that the ideas and behaviors of people were directly shaped by the organization of their society. However, although legal theory and anthropological theory were separate, anthropologists should borrow whatever descriptive insight they could.

In *The Judicial Process Among the Barotse of Northern Rhodesia* in 1955, Gluckman showed that Barotse judges arrived at their decisions using the same methods described for Western judges by Cardozo. Gluckman observed the way in which specific cases were handled and followed them from the point of view of their prejudicial status and origin, the way in which they were recast for adjudication, and the vocabulary of legal debate that was applied. He saw Barotse rules of law as clear counterparts of judicial conceptions of rational behavior in tort and civil law. But none of this descriptive apparatus, for Gluckman, was "theory." Rather, theory was a further idea he offered to explain it. This was the distinction between societies that are "multiplex" and those that are differentiated. Where relationships are multiplex, dispute settlement is readily available and produces solutions that are intended to maintain social ties. Where relationships are specialized and differentiated (not multiplex), dispute settlement is impersonal and often difficult to reach, and it aims at settlements based on individualistic ideas of justice or equity.

One problem with this is that it does not really explain what seems to need an explanation the most: why Cardozo's analysis actually fits. Another is that it sets up a contrast between types of "societies" that makes no sense. Is a village a society or a nation? Is a household a society? In American families, for example, one person deals with the same others on many bases. In American commerce, one person usually deals with others only in highly specialized roles. So, is American society multiplex or differentiated? "Multiplex" may be a reasonably clear idea, but "society" (among others) is not.

Colson and her students recognized the paradoxes and thought that Gluckman's characterization was too sharply polarized. They turned to what they considered a "processual" model of organization that, according to Nader and Todd, "focusses on people enmeshed in networks of social relations, on people making decisions that are based on a number of competing factors." This, however, was harder to reconcile with the idea of social unity and ultimately led to a still further retreat that focused only on disputes and put off the social theory for later.

In their preface to the 1978 book, Nader and Todd described the project as having begun with the program set out in her 1965 review of the anthropology of law, resting on four assumptions:

> (1) There is limited range of dispute within any particular society; (2) a limited number of formal public procedures are used by human societies in the prevention or handling of grievances . . . ; (3) the disputants have a choice in the number and modes of settlement . . . ; [and] (4) the range of manifest and latent functions of law vary cross-culturally. We were interested in understanding the conditions that defined the presence and use of specific

> dispute-resolving procedures. We would concentrate on one function of law—the management of disputes. Because the modes of settlement are limited in number, dispute processes would offer a good starting place for comparison.

There was no longer any claim about society in general or even law in general, only "comparison" as a distant goal for no clear purpose. The debate died out during the 1980s.

The Definition of Law

The debate over the definition of law was similar. Central figures were Gluckman, Paul Bohannan, and Leopold Pospisil. Bohannan, following Kantorowicz, argued that law could be defined in its own terms and understood in those terms. There was no need to impose anything on it from the outside. Pospisil and Gluckman disagreed, holding that law had to be defined anthropologically. They disagreed with each other, however, over how to do this. Gluckman argued for separating the anthropology of law from legal studies so as to combine it with social theory. Pospisil held that the purpose was to make cross-cultural comparisons of legal systems as such.

Pospisil's first major work, in 1958, was *Kapauku Papuans and Their Law.* Kapauku legal decisions were rendered mainly by "big men," that is, local informal leaders. Pospisil's analytic headings drew on Roman law, and the conclusion gave four general attributes of the legal process with evident Roman roots: authority, intention of universal application, *obligatio* (imposition of an authority external to the dispute itself), and sanction. In 1971, his *Anthropology of Law* began with a review of legal theory making it clear that his own theoretical touchstone was Ehrlich. But where Ehrlich insisted on framing legal theory within a general theory of social organization, Pospisil simply said that his concern was with legal decisions alone and offered the definition from his Kapauku analysis. The rest of the argument compared this definition with those of a series of other writers. This brought him to his disagreement with Bohannan.

Bohannan reflected the same jurisprudential tradition but accepted its pragmatic methodological assumptions. Pospisil focused on a distinction that Bohannan had used in 1957 in *Justice and Judgment Among the Tiv* between the folk system of law and the analyst's system imposed from without. Pospisil commended the distinction but criticized Bohannan for concentrating only on the folk system, saying that although Bohannan clearly presented a description of the Tiv conceptualizations, it lacked "broader theoretical considerations" that Pospisil equated with "analytical systems." From Bohannan's own perspective, however, the broader considerations arose from the description itself, and the analytic systems that Pospisil was demanding would only have obscured them.

In a 1994 review of legal anthropology in Britain, Chris Fuller cited this debate as a reason for a broad loss of interest among nonspecialists during the 1980s.

Return to Pragmatism

In 1974, the Association for Social Anthropology in Britain published the papers of a conference at Keele University that returned to the pragmatic perspective. Contributors were Lloyd Fallers, P. H. Gulliver, J. L. Comaroff and Simon Roberts, F. G. Snyder, Sally Falk Moore, and J. A. G. Perry. Only Fallers came close to offering a definition of law, but this was just as "our own" idea that could serve as a template. Gulliver described mediation in general terms, but again not with the aim of proposing a cross-cultural definition. The other papers were aimed still more directly at explaining forms of adjudication entirely in local terms while at least implying that external definitions of law or of the determinants of behavior are not required and do not help.

The concluding paper was by Moore, originally a student of Llewellyn and both a lawyer and an anthropologist. Moore argued that legal systems were ordered from within and could be seen from within. Interests affect outcomes, but interests cannot be determined in advance or by external criteria. They are themselves socially constituted, built up or altered even in the course of reaching the decisions they affect. They exist at many levels and are entangled with matters such as friendship and personal resentment, which they sometimes support and sometimes contradict. They are part of the fabric of life, but the way they are built up is recognizable with no need for prior "scientific" definitions.

During the past 10 years or so, approaches to law and society in anthropology have largely returned to the interest-oriented, constructivist, empirical, and bottom-up perspective of the republican tradition of legal scholarship represented by Moore for reasons that have little to with the previous 20 years of positivistic

argument and a great deal to do with changes in other fields and in the world at large.

Increasingly, social scientists and lawyers have come to work much more cooperatively with each other and in terms that spring from law as understood from the republican perspective. This has been especially visible in meetings and publications of the Law and Society Association (founded in 1964), which has provided an important common forum for sociologists, anthropologists, lawyers, and others interested in what has come to be called "sociolegal studies." In consequence, most younger sociologists have rejected the strident antilaw perspective and social determinism that was common in sociology during the 1960s and have moved much closer to the empirical, and mainly pragmatic, perspective that anthropologists have held to more or less consistency despite the positivist excursion. Virtually no sociologist or anthropologist interested in law now dismisses legal scholarship by lawyers as merely normative or takes as his or her mission to "explain" law in the sense of denying its independent reality or importance. As represented by one recent collection of readings by Moore in 2005 and another by the sociologist Alfonso Morales in 2003, what we now see are many more joint or cooperative projects on topics of mutual interest, from development and globalization to how to do ethnographic fieldwork. Social scientists do not yet quite recognize writers such as Holmes, Jhering, and Ehrlich as social theorists as well as legal theorists, but anthropologists, sociologists, and pragmatically oriented lawyers (who are the mainstream) increasingly have the same theoretical priorities and address common concerns in mutually intelligible ways.

— *Murray J. Leaf*

Further Readings

Bohannan, P. (1957). *Justice and judgment among the Tiv.* London: Oxford University Press.

Cardozo, B. N. (1949). *The nature of the judicial process.* New Haven, CT: Yale University Press.

Cohen, M. R. (1931). Justice Holmes and the nature of law. *Columbia Law Review, 31,* 352–367.

Hoebel, E. A. (1954). *The law of primitive man: A study in comparative legal dynamics.* Cambridge, MA: Harvard University Press.

Llewellyn, K., & Hoebel, E. A. (1941). *The Cheyenne way.* Norman: University of Oklahoma Press.

Malinowski, B. (1923). *Crime and custom in savage society.* Patterson, NJ: Littlefield, Adams.

Merryman, J. H. (1969). *The civil law tradition.* Stanford, CA: Stanford University Press.

Moore, S. F. (1978). *Law as process.* London: Routledge and Kegan Paul.

Moore, S. F. (Ed.). (2005). *Law and anthropology: A reader.* Malden, MA: Blackwell.

Morales, A. (Ed.). (2003). *Renascent pragmatism.* Aldershot, UK: Ashgate.

Nader, L., & Todd, H. F., Jr. (1978). *The disputing process: Law in ten societies.* New York: Columbia University Press.

Lazaret Cave

Lazaret Cave (*Grotte du Lazaret*) is a pre-Neandertal cave occupation site located on the French Mediterranean coast in Nice (Alpes-Maritimes) on the western slope of Mount Boron. This karstic cave is extremely large, measuring 40 meters long by 15 meters wide with a ceiling 15 meters high. Excavations conducted by François Octobon and Henry de Lumley have produced a rich archaeological assemblage as well as 10 fragmentary hominid specimens. The archaeological material derives from stratigraphic complex C and is subdivided into three main units, which are further subdivided into distinct archaeological stratigraphic units. Combined uranium/thorium (U/Th) and electron spin resonance (ESR) dating of faunal materials associated with the complex C layers indicate a late Riss occupation corresponding to Oxygen Isotope Stage 6 (OIS 6). The site is notable for its evidence for the existence of structures built inside the cave by its occupants.

The hominid material from the site is limited to very fragmentary remains and isolated teeth provisionally typed to pre-Neandertals by Marie-Antoinette de Lumley, a conclusion borne out by subsequent dating. The most significant hominid material from Lazaret is a complete parietal belonging to a juvenile who was approximately 9 years of age. This individual shows pathological development and vault thinning that were likely due to a bone infection, resulting in death; alternatively, the pathology has been described as the result of a tumor pushing the meninges into the parietal, resulting in bone resorption.

The archaeological and faunal material from the site reflects long-term occupation by pre-Neandertals. Units C1 and CII contain Acheulean lithic assemblages with a large makeup of bifaces. U/Th and ESR dates from red deer enamel indicate an age of approximately 170,000 (± 20,000) years for Unit CII. Unit CIII contains a Mousterian lithic assemblage derived from the Acheulean with many flake tools lacking bifaces, and U/Th and ESR dates from red deer enamel indicate an age of approximately 130,000 (± 15,000) years. These dates place Lazaret squarely in the pre-Würm OIS 6 stage. Taphonomic analysis of the faunal material recovered indicates alternating stages of habitation between humans and carnivores, primarily wolves (*Canis lupus*).

Prey species recovered from the site are predominantly goats (*Capra ibex*) and red deer (*Cervus elephus*), with limited equid and bovid material. The age/death profiles of the goats and deer are indicative of selective hunting, and bone modifications associated with all stages of carcass processing are present. The equid and bovid remains are represented by only some parts of the skeleton lacking any carnivore gnawing marks, supporting the contention of selective transport of specific parts of these larger animals, whereas the entire carcasses of smaller prey mammals were transported to the site. Although the presence of some gnawed bones and coprolites indicates carnivore occupation of the cave, the majority of the prey fauna collection and transportation can be confidently ascribed to the hominid occupants.

Perhaps the most interesting feature of the Lazaret site is the construction of a wall or hut within the cave, presumably used either to separate an intensely used portion from the rest of the large cave or to create shelter from weather. Features thought to be postholes surrounded by rock features are indicative of the construction of these huts or walls within the cave. On the basis of the distribution of archaeological material, de Lumley argued for the presence of entrances and internal compartments constructed via these walls. Tiny seashells that may have been brought into the site attached to seaweed, as well as mammalian foot bones (presumably attached to hides), are found within the smaller compartments surrounding a hearth, and de Lumley presented this material as evidence for bedding.

Although the most complex behaviors arguably present at the site are primarily speculative, the presence of some sort of structure within the cave is well established. The long-term occupation of the site and its use as a central place to process carcasses procured via selective hunting are also well established, marking Lazaret as an important site for understanding the lifeways of pre-Neandertals within the Middle Paleolithic.

— Christopher David Kreger

Further Readings

de Lumley, H. (1969). *Une Cabane Acheuléenne dans la Grotte du Lazaret* (Nice) [An Acheulean hut in Lazaret Cave]. *Mémoires de la Société Préhistorique Française, 7.*

de Lumley, H. (1976). Grotte du Lazaret. In *Sites paléolithiques de la région de Nice et grottes de Grimaldi* (9th UISPP meeting, pp. 53–75). Nice, France: Union Internationale des Sciences Pré et Protohistoriques.

Valensi, P. (2000). The archaeozoology of Lazaret Cave (Nice, France). *International Journal of Osteoarchaeology, 10,* 357–367.

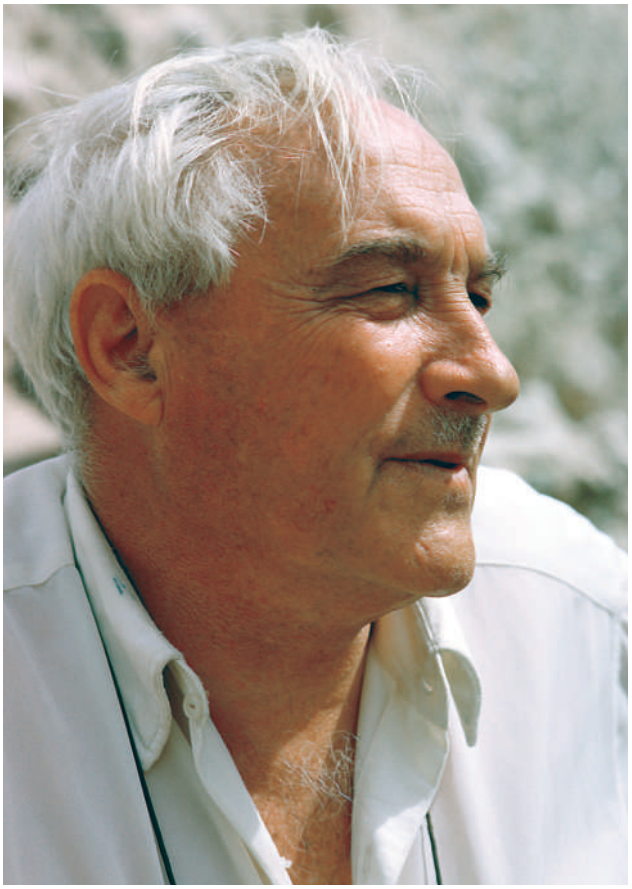
Leakey, Louis S. B. (1903–1972)

The English anthropologist Louis Leakey was known primarily for his discovery of *Proconsul africanus,* his interpretation of *Zinjanthropus,* his announcing the discovery of *Homo habilis,* and his great influence on primatology. Born in 1903 at Kabete Mission, Kenya, Leakey benefited from two distinct cultures: the English culture that was provided by his parents, Harry and Mary Leakey, and the Kikuyu tribe culture to which he was initiated at 13 years of age. Acculturated into tribal lore, Leakey acquired the ability to survive in the bush. Other than a brief time in England at Gorse Cliff school during 1912 and 1913, his formal education during the period from 1913 to 1919 was provided by tutors from England. Regarded by the tribe as more African than European, Leakey was known as the black man with the white face. During his youth, his interests in the past and the collection of artifacts began to develop. With the aid of the curator of the Kenyan Museum, valuable insights stimulated the young naturalist's mind. This influence continued until he returned to England after World War I.

After completing his formal education at Weymouth College, Leakey entered St. John's College in Cambridge in 1922. Interested in modern language, his term was suddenly interrupted by a rugby accident in 1923. This accident allowed him to have the invaluable experience of participating as a member of the British Museum East Africa Expedition in the Tanganyika Territory. Under the leadership of the Canadian paleontologist W. E. Cutler, Leakey learned the finer points concerning the handling of fossils and site managerial skills. After the year of expedition, Leakey returned to England to complete his language requirements and to take archaeology and anthropology in 1926. Besides multiple expeditions to East Africa, Leakey held a fellowship (1929–1934), was a Leverhulme Research Fellow (1933–1935), and was the Munro Lecturer at Edinburgh University (1936). Furthermore, he was the Herbert Spencer Lecturer at Oxford (1961), the Regent's Lecturer at the University of California, Berkeley (1963), and the Silliman Lecturer at Yale University (1963–1964). Leakey was awarded multiple honorary doctorates. He also holds an honorary doctorate of science from Oxford University and the University of East Africa and holds a doctorate of law from the University of California, Berkeley, and Guelph University.

Throughout his career, Leakey published many articles and books, most notably *Stone Age Africa* in 1936, *Adam's Ancestors* in 1960, and *Olduvia Gorge* in 1965. Concerned with both African life (he became a citizen of Kenya in 1963) and natural history, Leakey was a founder trustee of the Kenya National Parks and a trustee of the East African Wildlife Society. Furthermore, he was the honorary curator for the National Museums of Kenya, whereby he created and served on the Pan-African Congresses on Prehistory and Pleistocene Studies.

Leakey's contribution to anthropology is great; however, the basis for his success can be seen in the teamwork with his spouse. Although his first marriage to Henrietta Wilfrida Avern ended, his second marriage to Mary Douglas Nicol, an archaeologist, was a beneficial and integral part of this team's anthropological dynamics. Among his various academic and scholastic functions and duties, including parental duties, Leakey was interested in humans' closest living relatives—the primates. He influenced the area of primatology. He helped secure the future for Jane Goodall's work with the chimpanzees, Dian Fossey's study of the mountain gorillas, and Biruté Galdikas's work with the orangutans.



Source: © Jonathan Blair/CORBIS.

Although Leakey was viewed as always good-natured, the stress and workload began to undermine his health. After collapsing on four different occasions for four different reasons, Leakey died of a heart attack in London's St. Stephen's Hospital in 1972. Although some scientists considered some of his interpretations of the archaeological evidence as being hasty and erroneous, his dynamic personality and naturalistic inquiry benefited anthropology in the understanding of the deep history and descent of the human species. Supporting Charles Darwin's (1809–1882) belief that Africa was the cradle of human evolution, Leakey was concerned with the complete array of African history, from humans' remote hominid ancestors to modern-day life. Leakey's naturalism and life history illustrate the commitment to both science and humanity.

Contributions and Perspectives

Prior to the discoveries at Olduvia Gorge, questions pertaining to the origin of the human species were

surrounded by controversial speculation. Believing that Darwin was correct in his speculation that Africa, as opposed to Asia, was the cradle of humankind, Leakey's speculation was confirmed by a hominid find by Hans Reck in the area known as Olduvia Gorge. Beds that are exposed by the natural formation yielded many answers concerning both the geological and historical aspects of the natural evolution of the human species. It is this point, including the behavioral patterns of today's primates, that led Louis and Mary Leakey on the road to discovery.

Although Leakey previously discovered a skull he called *Proconsul africanus* (estimated at 20 million years old), the greater find that would be associated with the Leakeys came through the efforts of Mary Leakey. At Olduvia in 1959, she discovered a skull that differed from that of any known hominid. Exhibiting larger teeth and pronounced bone structure, Louis Leakey named this robust form *Zinjanthropus* (estimated at 1.75 million years old), and it is commonly known today as *Australopithecus boisei.* Although Mary Leakey made the first significant find, Louis Leakey would make the second discovery himself.

During an excavation in 1960, Leakey recovered a hand, clavicle, and foot that belonged to a new hominid form. Because of its means of locomotion and stone tools (Oldowan culture), Leakey named this new form *Homo habilis* (estimated at 2 million years old). According to the new discovery, including further discoveries not attributed to Leakey, *H. habilis* had the structure of the lower extremities that indicates bipedality, a rounded cranium with a cranial capacity ranging from 600 to 750 cubic centimeters, a decrease in dentition (molars and premolars), and an increase in stature. Similar discoveries with slight differing morphological features (for example, smaller occipitals, no brow ridges) are attributed to *H. habilis*'s contemporary, named *Homo rudolfensis.* Thus, the phylogeny of the human species became the following. *Australopithecus afarensis* shares a common ancestor. *A. afarensis* from Hadar and Laetoli leads to *H. habilis* on one side, and *A. afarensis* from Hadar leads to *A. africanus,* and then *A. Boisei,* on the other side.

Although Leakey was known for his controversial, and sometimes premature, explanations concerning the evidence, his dedication in search of human origins is unquestionable. Concerned with Africa's past and future, Leakey was able to further paleoanthropology and conservation for current wildlife. He believed that Darwin was correct that Africa was the cradle of human evolution. Consequently, the evidence recovered by Leakey (both his wife's discovery and his own) supports Darwin's speculation. Furthermore, the antiquity of the human species and its cultural influences could be reassessed due to Leakey's discoveries. Through fund-raising and organizational efforts, he increased awareness of human evolution and primate studies. Leakey's contributions, although not all scientific, greatly benefited the discipline of anthropology.

— David Alexander Lukaszek

Further Readings

Birx, H. J. (1988). *Human evolution.* Springfield, IL: Charles C Thomas.

Leakey, L. S. B. (1934). Some aspects of the Kikuyu tribe. *Man, 34,* 59.

Leakey, L. S. B. (1965a). A new species of genus *Homo* from Olduvai Gorge. *Current Anthropology, 6,* 424–427.

Leakey, L. S. B. (1965b). Recent discoveries of fossil hominids in Tanganyika: At Olduvai and near Lake Natron. *Current Anthropology, 6,* 422–424.

Lewin, R. (2002). The old man of Olduvai Gorge. *Smithsonian, 33,* 82–88.

Tobias, P. V. (1976a). African hominids: Dating and phylogeny. In G. Isaac & E. B. McCown (Eds.), *Human origins: Louis Leakey and the East African evidence.* Menlo Park, CA: W. A. Benjamin.

Tobias, P. V. (1976b). White African: An appreciation and some personal memories of Louis Leakey. In G. Isaac & E. B. McCown (Eds.), *Human origins: Louis Leakey and the East African evidence.* Menlo Park, CA: W. A. Benjamin.

LOUIS S. B. LEAKEY

Louis Leakey was born in Kenya on August 7, 1903, the son of British missionaries (Anglican Church) serving the Kikuyu tribe. Being the first white baby born among the Kikuyu, he was brought up in a bicultural experience that made him a member of the tribe and an expert on their language and

culture. While a child in Kenya, Leakey found fossils and arrowheads that stimulated his interest in paleontology.

In 1924, Leakey took a leave of absence from his studies at Cambridge University to heal from a rugby injury. He joined an archaeological expedition and then led four other archaeological expeditions for fossils in Africa over the next decade. In 1936, Leakey married Mary Nicol, who would become his partner on African fossil expeditions and who would make important scientific contributions herself. The couple had three children: Jonathan, Richard, and Philip.

In 1948, Leakey found the skull of a Miocene hominoid to which he gave the scientific name *Proconsul africanus.* After study, he concluded that the skull was from an ape-like creature that had lived between 23 and 14 million years ago and that it may have been a common ancestor to humans and apes. During the 1950s, Leakey dug for fossils in the Olduvai Gorge in Tanzania. He discovered what he identified as human remains and the bones of more than 100 different extinct animals. The first important discovery at Olduvai, which Louis named *Zinjanthropus boisei,* was uncovered by Mary Leakey on July 17, 1959. Now known as *Australopithecus boisei,* the find was a landmark in paleontology.

Leakey's legacy includes another find in 1960 that eventually led him and his team to announce the new species *Homo habilis* or "handy man." Leakey believed that this species was a direct human ancestor. The African fossils discovered by Leakey generated numerous questions. What was not questioned is that Leakey made significant contributions to knowledge about the origin of humans.

Leakey died in 1972. During his lifetime, Leakey made many important contributions to anthropology. He was influential in relocating the search for the origin of man from Asia to Africa. The Olduvai Gorge fossils added several branches to the human genealogical tree. He influenced and assisted researchers in many related fields. He inspired Jane Goodall, Dian Fossey, and Biruté Galdikas to do field studies of chimpanzees, mountain gorillas, and orangutans, respectively.

— Andrew J. Waskey

OLDUVAI GORGE

Olduvai Gorge, located in northern Tanzania, has revealed many secrets about early humans. The 30-mile-long ravine with its steep 295-foot-high sides contains layer after layer of fossils, built up over the last two million years. The lowest layers are about two million years old, making it possible to date the fossils discovered in each layer. Layers of fossils alternate with layers of volcanic ash, which has preserved plant and animal life.

Probably the world's best-known fossil site, Olduvai Gorge was first discovered in 1911 by German entomologist Professor Wilhelm Kattwinkel when he fell down a ravine while chasing a rare butterfly. He realized that the fossil beds surrounding him were a great anthropological find. Significant finds at the site include animal fossils, hominid specimens, and crude but functional stone tools. Nearby are the ruins of an ancient city.

Source: © Robert Jurmain.

Dr. Louis Leakey and his wife, Mary, did an extensive study of the site, beginning in 1931 and continuing for more than three decades. In 1959, Mary Leakey found a nearly complete human skull. Because of its heavy build and thick bones, it was determined that it represented a robust species to which scientists gave the name *Zinjanthropus boisei.* They soon began calling the man Zinj. He was also known as the Nutcracker Man because of his enormous back teeth. Zinj was one of the first hominids to undergo radiodating, which showed the skull to be 1.8 million years old.

In the 1960s, the Leakeys found the remains of a 1.4-million-year-old man known as *Homo habilis.* Unlike Zinj, *Homo habilis* had a lighter build. After

studying the bones from the hand of *Homo habilis,* scientists concluded that the opposable thumb would make him capable of carving the stone tools found at Olduvai Gorge.

In the 1970s and 1980s, Mary Leakey discovered footprints and fossils of 3.6-million-year-old hominids. The Leakey's son, Richard, was also involved, and he located another example of *Homo habilis.* The legacy of Olduvai Gorge lies in its variety and large number of finds, including fossils of 150 animals, bones of two different types of hominids, and hundreds of tools.

— Pat McCarthy

Leakey, Mary D. (1913–1996)

Some academicians may believe that only one who has had extensive formal training in a profession can make a substantial contribution to it. However, the numerous and important achievements of Mary D. Leakey invalidate this view because she never obtained a formal degree in her area of specialty, although she did receive a number of honorary degrees. Her work is primarily in the area of archaeology, but it is of obvious value to anthropologists.

Source: Courtesy of Harry Nelson.

Mary Leakey was born in England on February 6, 1913. Her father was a landscape artist who died early in her life. Yet Mary was able to spend much of her youth traveling in Europe. In fact, at 11 years of age, she had the opportunity to visit a famous cave in France, and it apparently increased her interest in anthropology. In 1930, she had some exposure to a university education by auditing courses in archeology and geology, but she left the university without receiving a degree.

Mary Leakey did, however, continue her interest in archaeology and apparently had an admirable ability to illustrate and record what was found in various excavating sites where she was a participant. She also developed an expertise concerning stone tools. In addition, Leakey is credited with a number of important discoveries that occurred in 1959 and 1975 and during the late 1970s. All of them constitute a

contribution, but the one made during the late 1970s related to footprints demonstrating that a human had been walking upright a very long time ago. This particular finding resulted in changes in theories concerning the evolution of the human species in terms of walking.

The discoveries of Mary Leakey during these years are especially important because they give us some idea as to what the past was like in terms of human evolution. Yet besides these valuable discoveries, she should also be recognized for calling our attention to the value of recording and describing the artifacts that we uncover from the earth. She also found time in 1984 to write an interesting biography titled *Disclosing the Past*. Leakey continued her professional interests in retirement but died in 1996 at 83 years of age.

— *William E. Kelly*

Further Readings

Leakey, M. D. (1979). *Olduvai Gorge: My search for early man.* London: Collins.

Leakey, M. (1983). *Africa's vanishing art: The rock paintings of Tanzania.* Garden City, NY: Doubleday.

Leakey, M. (1986). *Disclosing the past.* New York: McGraw–Hill.

Leakey, M. D., & Harris, J. M. (Eds.). (1987). *Laetoli: A Pliocene site in northern Tanzania.* Oxford, UK: Clarendon.

Morell, V. (1995). *Ancestral passions: The Leakey family and the quest for humankind's beginnings.* New York: Simon & Schuster.

MARY D. LEAKEY

Mary Douglas Leakey was a leading paleoanthropologist, anthropologist, scientist, and writer. She was born in London in 1913, the daughter of a popular landscape painter, Erskine Nicol, and Cecilia Frere. During her parents' frequent trips to France, she gained an interest in the art of the French caves of Font de Gaume and La Mouthe. She was also able to help with archaeological digs, where she found prehistoric stone tools.

After her father died in 1926, Mary returned to London with her mother. By the time Mary was 20 years of age, she had worked on archaeological digs in England as both an excavator and an artist who made drawings of the finds. Her artistic abilities captured the attention of Louis S. B. Leakey, then a Cambridge University professor. After working together with Mary on archaeological projects, Louis Leakey eventually divorced his wife in 1934 and married Mary in 1936.

In 1935, Mary and Louis Leakey visited the Olduvai Gorge in Tanzania, where in 1948 Mary discovered *Proconsul africanus.* In 1959, she discovered *Zinjanthropus boisei,* which is now called *Australopithecus boisei.* In 1960, she found *Homo habilis.*

Louis Leakey died in 1972, and after his death Mary carried on their work. She conducted lecture tours around the world and continued to make important fossil finds in the Olduvai Gorge. She often worked with the couple's son Richard Leakey, who made important advances in anthropology on his own.

In Laetoil, Tanzania, in 1979, Leakey discovered a series of 89 fossilized hominoid footprints estimated to be 3.5 million years old. It was a major fossil find.

Among Leakey's writings dealing with early human fossils was *Olduvai Gorge: My Search for Early Man* in 1979. She also contributed to the archaeology of the Stone Age with research on Tanzanian rock art (*Africa's Vanishing Art: The Rock Paintings of Tanzania*) in 1983. Her 1984 book, *Disclosing the Past: An Autobiography,* tells of her first visit to the Olduvai Gorge.

In 1983, Leakey retired from fieldwork. However, she continued to write scientific articles for years afterward. She died in 1996.

Leakey made many contributions to paleoanthropology. Probably her two most important contributions were the refocusing of attention on human origins from Asia to Africa (with Louis Leakey) and the great increase in sophistication she applied to the science through a multidisciplinary approach.

– Andrew J. Waskey

Leakey, Meave Epps (1942–)

Meave Leakey seems to have the philosophy that if we can understand our past, we should be in a better position to understand our future. Such a view might not be the only reason for looking backward for what we can find out about ourselves today, but most would agree that it is a good one. She has practiced her philosophy by becoming one of the most renowned paleoanthropologists of this day.

Leakey's professionalism should not be too much of a surprise considering her background. She comes from a family that has had a distinguished reputation for digging out the facts that help to explain human evolution. The efforts of her family paid off handsomely due to their numerous and important findings. She has followed in the family tradition with her own professional accomplishments, and evidence suggests that she could make additional ones in the future.

Leakey received her B.S. in zoology and her Ph.D. in zoology and marine zoology from the University of North Wales. In 1968, she worked with Richard Leakey when he was conducting his research near a lake in Kenya, and the experience provided her with the opportunity to engage in beneficial research activities. Certainly one of her most notable professional accomplishments occurred in 1999, when her research team found a skull and jaw suggesting that there had been a newly discovered branch of an early human family. It also suggested that there existed in the past a type of species of which present-day researchers were unaware. Her discovery also contradicted the current view at the time, namely that humans evolved from just one branch. This important finding understandably brought her national and international attention and contributed greatly to her high stature in the profession.

In addition to her impressive research accomplishments, Leakey has authored a number of professional scientific articles that should be of great help to those interested in her specialty. Likely because of her many contributions in her chosen area of inquiry, Leakey was named "explorer in residence" by the National Geographic Society. It seems likely that Leakey will continue to be fruitful in her research and other professional endeavors, thereby demonstrating her worthiness as a recipient of this distinguished award.

— *William E. Kelly*

Source: © Leakey Foundation.

Further Readings

Leakey, M. (1988). *Guide to Koobi Fora: The East Turkana fossil sites.* Nairobi: National Museums of Kenya.

Morell, V. (1995). *Ancestral passions: The Leakey family and the quest for humankind's beginnings.* New York: Simon & Schuster.

Poynter, M. (1997). *The Leakeys: Uncovering the origins of humankind.* Springfield, NJ: Enslow.

Willis, D. (1992). *The Leakey family: Leaders in the search for human origins.* New York: Facts on File.

MEAVE EPPS LEAKEY

Meave Epps was born in London in 1942. She earned a Ph.D. in zoology from the University of North Wales in 1968 before accepting Richard Leakey's invitation to work on the paleontological site at Koobi Fora on the eastern shore of Lake Turkana in Kenya in 1969. In 1970, she married Leakey, the son of famed paleoanthropologists Louis and Mary Leakey. Since 1969, Meave Leakey's career has been spent working for the National Museums of Kenya.

In 1982, she was made head of the Division of Paleontology of the National Museums of Kenya. In 1989, she began working as coordinator of the National Museums' field research in the Turkana Basin. She resigned from that position in 2001.

Leakey's fieldwork in East Africa has been focused on fossil hunting that uncovers the origins of the earliest human ancestors. Her search for fossil remains in the Turkana Basin has been fruitful, with her fossil finds adding to the understanding of early hominids. The sites excavated are believed to be between 4 million and 8 million years old. Excavations near Lake Kanapoi in 1994 led to the discovery of early hominids.

In 1999, a research team led by Leakey discovered the fossilized skull and partial jawbone of an individual they named *Kenyanthropus platyops* ("flat-faced man of Kenya"). The fossilized skull was estimated to be 3.5 million years old. This find and others during the 1990s required reorganizing the evolutionary timeline for hominids.

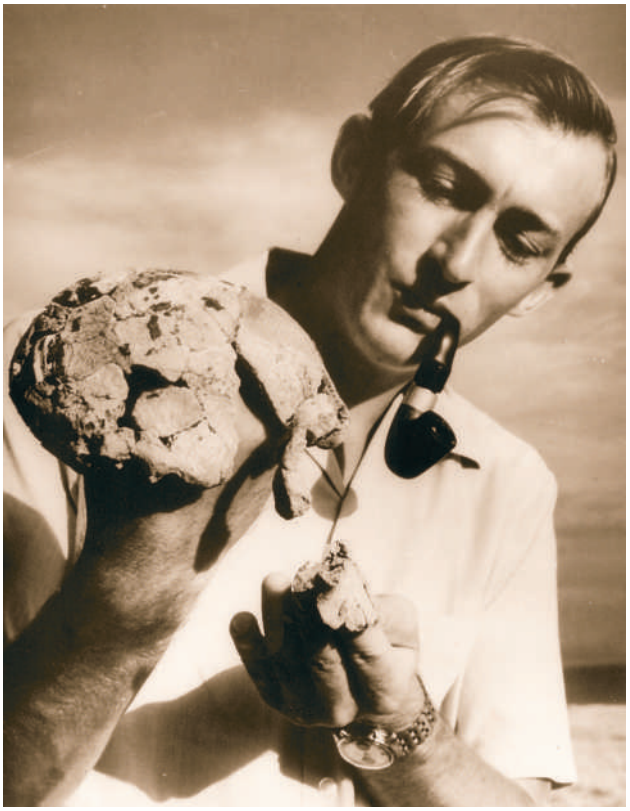
Leakey is the author of numerous books and scientific articles on paleontology. Some of her most important writings include *Lothagam: The Dawn of Humanity in Eastern Africa* in 2000, *Stratigraphy and Paleontology of Pliocene and Pleistocene Localities West of Lake Turkana, Kenya* in 1988 (with John Harris), and *The Fossil Hominids and an Introduction to Their Context, 1968–1974* in 1978.

Leakey is the leading member of the Leakey dynasty of paleontologists. Her daughter, Louise, is actively following in her footsteps. Together, they are digging into the origins of humans in East Africa. In 2005, Meave and Louise were working with the Leakey Foundation and the National Geographic Society to fund the 5-year Koobi Fora Research Initiative in the Turkana Basin. The initiative expands the seasonal fieldwork to a year-round search and addresses questions about the origins and spread of humans from Africa to other parts of the world.

— Andrew J. Waskey

LEAKEY, RICHARD E. F. (1944–)

The paleontologist Richard Leakey was born and raised in Kenya, son of the famous paleontologist team, Louis and Mary Leakey. Influenced by his dynamic parents, the value of a traditional English education waned in the face of both adventures of new hominid discoveries and the diversity of life found in the African environment. After successful completion of his primary school education, Leakey attempted to further his education by attending the Duke of York. Contrary to previous success, his scholastic term at Duke of York was less than illustrious. Similar to his father's plight, the free, warm, and sympathetic association with the native populations of Africa led to social conflict for the young Leakey, eventually leading him to become a social outcast. However, the prospects of an African adventure allured Leakey from the halls of academia to the rugged African landscape that was a form of personal comfort. For Richard Leakey, who skipped classes and was fiercely independent, both his rebellious nature and the issue of dropping out of school were divisive



Source: © Leakey Foundation.

factors in the crippling of the relationship with his father. However, the decision that led to Richard's financial independence (due to his father's ultimatum and generosity) would eventually shape his future endeavors.

With monies secured by his parents, Leakey's wildlife venture earned him the respect and financial independence that he sought. This success continued and was furthered by the formation of his safari company shortly before Kenya's independence in 1963. During an excursion to Olduvia, he became aware of the geological formations at Tanganyika's Lake. The ensuing expedition yielded an exciting discovery, for evidence of a new fossil hominid was recovered. Although Richard was initially absent during its discovery, the recovery, interpretation, and announcement of this new species, *Homo habilis,* was left to the patriarch of the Leakey clan, his father Louis. The second expedition might not have had the same importance as the first expedition, but the fossils recovered were just as impressive.

Leakey married Margaret Cooper in 1966 (divorced in 1969) and later married Meave Epps in 1970. Between the two marriages, he had three children. Leakey acquired additional professional responsibilities during this period. He served as director of the National Museums of Kenya (1968–1989) and director of the Kenya Wildlife Service (1989). His days in the field came to an end in 1993 when his plane crashed. Concerned with political corruption and environmental issues, Leakey's efforts for environmental protection and political reform had led to the creation of the political party Safina. Subjected to hostile intentions from political and criminal enterprises, Leakey continues to further his ideals through education and writings. His publications include *Origins* in 1977, *People of the Lake* in 1978, *The Making of Mankind* in 1981, and *The Origin of Humankind* in 1994.

Contributions and Perspectives

Similar to Charles Darwin (1809–1882) and Louis Leakey (1903–1972), Richard Leakey considered Africa as the evolutionary cradle of the human species. Although he was not a credited scholar, the influence of his parents and his naturalism led him to a historical approach within an anthropological framework. Within this historical approach, Leakey placed the evolution of the human species' history that can be traced back to the origin of bipedality in the African environment around 5 to 10 million years ago, although evidence of *Australopithecus afarensis* places the earliest known bipedal creature between 3 and 4 million years ago. From this point, both brain expansion (complexity is another issue) and stone tool use in Africa were seen between 2 and 3 million years ago. Major advancements in stone technology (for example, the Achulean) were seen between 1 and 2 million years ago, when the expansion of *Homo habilis* out of Africa coincided with an increase in meat consumption. With the first use of fire around 700,000 years ago, another major technological advancement (the Mousterian) led to the origins of modern humans in Africa around 200,000 years ago. However, the greatest advancements can be seen as stemming from the Agricultural Revolution around 10,000 years ago. From this point, divisions of labor and the creation of cities with larger populations made both the Industrial Revolution and the Technological Revolution possible. All this progress became possible through the refinement of hominid bipedality around 5 to 10 million years ago.

Although this post hoc analysis of human antiquity does possess an evaluative power, Leakey's analysis of hominid taxonomical structure becomes a point of interest. Unlike most taxonomical analysis that places the human species as sharing a common ancestor, *A. afarensis,* with other hominids, Leakey depicted our species as descending from an unknown hominid form. In this manner, a hominid taxonomical structure creates two parallel evolutionary branches: one consisting of the *Homo* line and the other for the *Australopithecines.* When placed in a hierarchy, an unknown species of *Homo* gave rise to *H. habilis,* and then *Homo erectus,* ending with the human species *Homo sapiens.* Parallel to the *Homo* line, *A. afarensis* gave rise to both *Australopithecus africanus* and *Australopithecus Boisei,* and *A. africanus* gave rise to *Australopithecus robustus.* Compared with the accepted phylogenetic analysis as performed by Randall Skelton and colleagues in 1986, *A. afarensis* gave rise to *A. africanus,* which then split into two branches: *H. habilis* and *A. robustus/boisei.* The interpretation of the evidence does become a point of inquiry. In the use of inference from molecular genetic evidence, as with Leakey's preference, it is important to implement extreme caution when classifying extinct hominid forms based solely on some unstandardized morphological characteristics.

Regardless of the interpretation of the evidence, Leakey's vitality and deep interest in our own humanity created an opportunity for open dialogue and research. Viewing the human species as a part of nature, it becomes clear that it is human's own responsibility to conserve their natural environment. With understanding and compassion, if not being subjected to utility, this process should be extended to all life, including the treatment of members of the human species. Perhaps stemming from his cultural environment, Leakey's political activity clearly depicts his concerns based on his earlier experiences. Although the plane crash ended his fieldwork, paleoanthropology will continue to benefit from the "Leakey luck" that has greatly enriched the field of anthropology. Work will continue by Richard's wife, Meave, and the couple's daughter, Louise. Richard Leakey, like his father Louis, will be remembered as one of the patriarchs of African paleoanthropology.

— *David Alexander Lukaszek*

Further Readings

Leakey, R. (1978). *People of the lake: Mankind and its beginnings.* New York: Anchor.

Leakey, R. (1981). *The making of mankind.* New York: Dutton.

Leakey, R. (1982). *Human origins.* New York: Lodestar.

Leakey, R. (1994). *The origin of humankind.* New York: Basic Books.

Meikle, W. E. (1994). *Naming our ancestors: An anthology of hominid taxonomy.* Prospect Heights, IL: Waveland.

Morell, V. (1995). *Ancestral passions: The Leakey family and the quest for humankind's beginnings.* New York: Simon & Schuster.

Skelton, R., McHenry, H. M., & Drawhorn, G. M. (1986). Phylogenetic analysis of early hominids. *Current Anthropology, 27,* 21–43.

LEGENDS

Legends are stories believed by the narrator to be true. Most stories, therefore, are based on actual experience or observations that have been cast into narrative form in accord with traditional models and established points of view. Legends need no datelines or the names of persons or places to authenticate them. They are over as events, but they live and survive in our memories due to their human interest. They are symbols of something of universal and perennial interest, ideal representations of human nature and the truth of life everywhere. Legends are the stories formed around the truth like crystal formed around a grain of sand. False addition or deductions from real facts may build them up by twisting the facts in the process of translating from primitive languages. As such, legends are unverified nonhistorical popular stories handed down by tradition from antiquity. Originally, they were limited to the lives of saints and gods or to collections of stories from particular religious and mythological backgrounds. There is a legend regarding the creation of the world in Middle America coming from ancient Aztec and Mayan people. Throughout the New World, there is a belief in multiple creations of which the present world is but one. In Middle American belief, there are normally four of these creations or, as

they are called, world ages. Movement through these ages is usually progressive, and the present age may acquire a special status as the fifth age, which is the sum of all other ages. The basis of this legend of five in four is expressed in the carving known as the Aztec Sun Stone, where the sign that names the present age movement is constituted by the signs that name the four previous ages: Water, Jaguar, Rain, and Wind. These signs are enclosed in the unending sign of the Twenty signs, running anticlockwise and enclosed by two year-snakes. The 16th-century Nahua manuscript known as the legend of the Suns tells us more about these world ages and their cataclysmic endings. During the first age (Water), humans were invented and molded from ash, and then everything was overtaken by water and people were transformed into fish. During the Jaguar age, the sun was eclipsed, and in darkness jaguars ate the people. Then came the Rain age, which ended in a rain of volcanic fire and ash. Then the Wind age, with its hurricane, came and men turned into apes. And the present age also is doomed to earthquake and famine. The same sequence of cataclysmic events—flood, eclipse, eruption, and hurricane—occurs in other legends as well. According to Indian legends, the universe is said to have come into being out of chaos when Indra, the kind of the gods and the god of rains, or Vishnu, a solar deity, separated heaven from the earth. Then the sun rose, and from that spot, the naval of the earth, a great pillar was erected to prop apart heaven and the earth. This pillar is the axis of the world. There were now three worlds: Heaven, Earth, and the intervening Air or Ether. Although there are some obscure hints of an underworld as well, little is said about it in *Rigveda,* the basis of this legend.

The word *legend* is derived from medieval Latin *legenda* ("things for reading") from the Latin *legendus* ("to collect, gather, or read"), meaning that the story or legend comes from some ancient book. As such, a legend is different from a myth or folklore because a myth in this particular context is a traditional story originating in a preliterate society and dealing with supernatural beings, ancestors, or heroes who serve as primordial types in a primitive view of the world, and folklore is the traditional orally transmitted beliefs, practices, and tales of people. A legend is an ancient traditional story, or a cluster of stories, about a particular person or place. Besides godmen and saints, legends include elements of mythology, supernatural beings, or explanations of natural phenomena. They are often regarded as historical, although the elements of truth in legends cannot be examined, verified, and proved.

Source: Courtesy, Wikipedia.

The legends denoting human relations with animals are also found in a number of ancient traditions, cultures, and literature. The heroes who

are responsible for the good and bad in the lives of people appear as animals and men on different occasions. The ancient gods of Egypt, Greece, and India bear testimony to this. It hardly makes any difference whether *Coyote* of the American Indian tribes was a man or an animal to those who tell stories about him. Similarly, *Hanuman,* one of the most popular Hindu deities, is depicted as an ape, Ganesh is depicted with an elephant head, and the reincarnations of Lord Vishnu all are animal figures such as *Varah* (pig), *Kachchap* (tortoise), *Matsya* (fish), and *Narsinh* (half man, half lion). Moreover, the animals (e.g., *Kamdhenu,* the holy cow) help humans to achieve their ultimate goals. They are also the vehicles of gods such as *Laxmi* (owl), *Saraswati* (swan), *Ganesh* (mouse), *Vishnu* (hundred-headed snake), *Shiva* (ox), and *Yama* (buffalo). Similarly, the legendary relations are established between gods and nature. *Indra* is identified with rain, *Varun* with air, and *Agni* with fire. *Ganga, Yamuna, Godavari,* and *Narbada* are not only holy rivers but also goddesses.

Besides having the divine and semidivine element, the legends are associated with historical figures as well. On the one hand, there is a tendency to confuse legend with history and to accord them unduly. On the other hand, the postmodern school of history is laying a great emphasis on accepting legends as an important source material for history. As for their credibility and acceptance the antistructuralists argue that the line between belief and unbelief is very vague and thin and that it varies from culture to culture and even from person to person. Here even in the educated, learned, and sophisticated societies, legends of strange things from the past or present continue to be told and are usually believed. Moreover, one may argue that legends are not history but must accept that history often becomes legends. The real historical figures turn into legends sometimes during their own lifetimes or after death. It is very common with the tribal leaders; many of the tribal leaders who fought against injustice and raised rebellions have been deified and given the status of demigods, thereby acquiring legendary characters—*Birsa Munda* of Chhota Nagpur, *"Rani" Gaidinliu* of Nagaland, and *Gundadhur* of Bastar, to name a few. The most outstanding national heroes, such as the great Ashok, Shivaji, Maharani Laxmi Bai, Bhagat Singh, and Mahatma Gandhi in India, Alexander and Napoleon in Europe, and George Washington and Abraham Lincoln in America, are legends of history. The social–cultural legends from living beings are scattered all over the world, be it Ludwig van Beethoven, Michelangelo, Leonardo da Vinci, Pandit Ravishankar, or Amitabh Bachchan.

The latest trend in legends is that of "urban legends" being used to denote something close to rumor and coming out of a mental state of anxiety that America is facing today after the terrorist attacks on the World Trade Center and Pentagon. The psychologist Chip Heath has explained that urban legends often evolve to include informational credentials that act as camouflage and make it harder for people to debunk them.

— Abha R. Pal

Further Readings

Augusta, K. (1984). *Legends and myths in spiritual India.* Delhi, India: Discovery Publishing House.

Cavadish, R. (Ed.). (1993). *Mythology: An illustrated encyclopedia.* Boston: Little, Brown.

Dange, S. A. D. (1967). *Legends in the Mahabharat with a brief survey of folk tales.* Delhi, India: Motilal Banagardi Dass.

Lemurs

Extant lemurs inhabit the island of Madagascar along with other prosimians, the indriids and the aye-aye. Among the former are the "mouse" lemurs (cheirogaleids); the "sportive" lemurs (genus *Lepilemur*); the "gentle," "wooly," and "bamboo" lemurs (genus *Hapalemur*); varecias (genus *Varecia*); the ring-tailed lemur (genus *Lemur*); and various other lemurs such as black, brown, collared, macaco, and mongoose lemurs (genus *Eulemur*). As prosimians, all lemurs possess a grooming claw on the second pedal digit, and their six lower anterior teeth (with the central four being more slender than the lateral pair) form a variably elongate and procumbent toothcomb. *Lepilemur* is unique among primates in that it does not replace its upper deciduous incisors; the anterior region of the palate bears a keratinized cud pad. Mouse lemurs have somewhat elongate ankle or tarsal bones (primarily the calcaneus) and locomote by

Source: Photograph courtesy of Gregory Scott Hamilton, Honolulu Zoo.

Source: Photograph courtesy of Gregory Scott Hamilton, Honolulu Zoo.

leaping between more or less vertical branches. The other lemurs are hindlimb-dominated quadrupedalists that are equally agile on the ground and in the trees.

Most lemurs are diurnal, but mouse lemurs and *Lepilemur* are nocturnal. Mouse lemurs are insectivorous and display a "noyen" type of social behavior (i.e., females share a nest and territory that is overlapped by the territories of single males); they enter a state of metabolic slowdown or torpor while asleep. Male and female *Lepilemur* urine and feces mark the boundaries of their overlapping territories. *Lepilemur* is the only prosimian whose diet consists solely of mature leaves and that reingests its feces (caecotrophy) as a way of further processing its food intake. Other lemurs aggregate in variably sized groups of males and females and, depending on the species, are folivorous (leaf eating) and frugivorous (fruit eating) to varying degrees. *Lemur* and *Eulemur* scent mark territory with urine, feces, and glands (variably located on the wrists, neck, and/or forehead). *Lemur* is distinguished from *Eulemur* species in that it spends more time on the ground and its social behavior is based on a hierarchical arrangement of female dominance. The activity pattern of at least some *Eulemur* is cathemeral (i.e., sporadic throughout a 24-hour period), rather than diurnal or crepuscular, although under certain circumstances the same group of *Eulemur* may temporarily become nocturnal (and change their diet to nectar and pollen). *Hapalemur*'s ability to digest toxic bamboo shoots has allowed it to spread its range as bamboo replaces areas of primary forest that were lost to deforestation.

The systematics, phylogenetic relationships, and biogeographic history of extant lemurs are not without debate. Although a simple hypothesis is that primate diversity on Madagascar emerged after the chance invasion of a single ancestor (a historically favored scenario, most recently embraced by molecular anthropologists), comparative morphological studies suggest that mouse lemurs may be more closely related to a loris–bushbaby group (for example, by virtue of a unique arterial pattern involving the carotid artery) than to any Malagasy group. In addition to alternative theories of indriid–adapid relationships, there is a case for multiple invasions of Madagascar. Among the nonmouse lemurs, *Lemur* has been united with

Source: Photograph courtesy of Gregory Scott Hamilton, Honolulu Zoo.

Hapalemur (due to the presence of wrist glands and the interpretations of some chromosomal studies), although detailed craniodental analyses indicate closer relationships between *Lemur* and *Eulemur* and between *Lepilemur* and *Hapalemur.*

— *Jeffrey H. Schwartz*

Further Readings

Delson, E., Tattersall, I., Van Couvering, J., & Brooks, A. S. (Eds.). (2000). *Encyclopedia of human evolution and prehistory* (2nd ed.). New York: Garland.

Fleagle, J. G. (1999). *Primate adaptation and evolution* (2nd ed.). San Diego: Academic Press.

Tattersall, I. (1982). *The primates of Madagascar.* New York: Columbia University Press.

Lenin, Vladimir I. U. (1870–1924)

Born in 1870, Vladimir Ilyich Ulyanov, who later changed his name to Vladimir Lenin, was the son of a civil service official in the Russian government. Lenin became interested in socialism and revolution when his brother Aleksander was executed in 1887 for being part of a group that attempted to execute Alexander III. Shortly thereafter, Lenin studied law but was banished from the university for his revolutionary interests. He completed his studies independently, even though he became a professional revolutionary and not a lawyer. Because of his revolutionary activities, Lenin was exiled to Siberia from 1895 to 1900. During his exile, he wrote *The Development of Capitalism in Russia.* With this publication, Lenin showed that Russia depended on a capitalist-based economy. Within Russia at this time, the peasants were divided between a developing peasant bourgeoisie (capitalist farmers) and a peasant proletariat (farm laborers). The peasants between these two economic classes were disappearing. Russian industry was divided among traditional handicrafts, backward manufacturing, and a modern machine industry, with a great deal of foreign capital invested only in the latter.

After returning from exile in Siberia, Ulyanov took the name Lenin and left Russia, joining with other Russian revolutionaries in Europe. In 1902, he wrote the pamphlet *What Is to Be Done,* maintaining that Social Democrats needed to be clear on the main principles of socialism: "Without revolutionary theory there can be no revolutionary movement." In his pamphlet, Lenin wrote that unions, standing by themselves, would only lead to struggles over wages and working conditions; a socialist consciousness needed to be introduced from outside the working class. Lenin believed that, for the workers to learn to stand together, they must struggle against their employers, class society, and the state. This organization would need to be disciplined, conspiratorial, and centralized. The "party of a new type" would become the vanguard of the working class and would lead, but remain separate from, the broader democratic workers movement.

In 1904, Lenin completed *One Step Forward, Two Steps Back.* The intelligentsias were fixated on individualism and anarchism, and they had revulsion for discipline. The workers, because of their work lives, were familiar with discipline and self-sacrifice. Lenin wrote that intellectuals were too indecisive to be serious socialists.

Source: Courtesy of the Library of Congress.

Materialism and Empiriocriticism was written in 1908 to destroy the influences of *Machism* in the Socialist party. Ernst Mach argued that science cannot discover a reality independent of one's experience of that reality; that is, science records only one's experience of reality and not reality itself.

In *Materialism and Empiriocriticism,* Lenin stated that logic in science is the observation of the material universe, existing independent of the observer. Physical sensations are the direct connection to the external world. Every ideology is conditioned by its historical setting. Science is no different, yet science is valid independent of the observer to the degree that it corresponds externally to tangible nature.

Also in 1908, Lenin wrote *The Agrarian Program of Social Democracy in the First Revolution.* In this book, he clarified the peasant situation in Russia at the time. Most peasants in Russia were reduced farm workers or tenant farmers. Few peasants had enough land to survive. A few were rapidly becoming like American capitalist farmers. The large feudal *latifundium* (large estates) remained. The latifundium were slowly developing into large farms modeled on the German Junker type. Lenin tried to prove that by breaking down feudalism, capitalism could develop. He explained that the demand for nationalization of the latifundium by the poor would not work at this early stage. The established market economy would simply make the state become the landowner, and rebellion would grow. Only by the expansion of capitalist relationships in the countryside would socialist consciousness grow among the poor peasants.

Lenin was in Switzerland when World War I broke out. He saw World War I as an imperialist war. He wrote in *Imperialism: The Highest Stage of Capitalism* that imperialism was "the final stage of capitalism" and that this war offered the prospect for a socialist revolution. Lenin recommended that the proletariat oppose the war and turn it into a civil war against the capitalist class.

Competitive capitalism of the early 19th century had become increasingly centralized (fewer competitive firms) and concentrated (larger firms). Monopoly capitalism was able to create larger surpluses by limiting competition. This meant that corporate capitalists were forced to export capital to ensure future profits. This became, for Lenin, a major distinction between the earlier competitive capitalism and its later descendant, monopoly capitalism. Competitive capitalism exported finished goods in exchange for raw materials produced in the poor areas of the world. Monopoly capitalism exported its capital to these areas. Capital was invested to create modern ways of extracting those same raw materials. Instead of the mines being owned by the local traditional elite, capitalists in the rich industrial nations owned them. This then increased overall capital on a world scale while arresting development in the main capitalist countries.

The principal feature of modern capitalism was the domination of monopolist consolidations by giant capitalist firms. The monopoly control was most firmly established when all sources of raw materials were controlled by a single joining of several large surviving firms. Monopoly capitalism, when a few highly centralized firms effectively dominated the economy, created imperialism out of its own needs. To find continued profits in an already overly developed economy at home, investments flowed to less developed areas of the world where the capitalist

economy had not reached a saturation point, thereby making profits much higher. Export of capital was the fundamental principle of imperialism. The export of capital greatly influenced and hastened the growth of capitalism in those countries to which it was exported.

In *The National Question,* Lenin recognized the right of national self-determination, although he was aware of the problem of national chauvinism. He believed that internationalism was central to any hope for socialism.

With the revolution of March 1917, the German government allowed Lenin to return to Russia, insisting that he go in a sealed railway car so that the followers of his revolutionary ideas would not know of his passing.

Lenin stated in his *April Thesis* that Russia was now ripe for a socialist revolution, arguing that the provisional government represented the bourgeoisie, whereas the Soviets represented a revolutionary democratic dictatorship of the proletariat and peasantry, with the proletariat leading the poor peasantry toward the full power of the Soviets of Workers' Deputies. In *State and Revolution,* Lenin claimed the workers could not simply take control of the existing state; they needed to smash it. He proposed that the new workers' state replace the police and military with armed workers' militias. Elected representatives accountable to the workers' councils and subject to popular recall would replace the bureaucracy. All officers would be paid workers' wages. In Lenin's proposal, when the return of bourgeoisie was overthrown, the state would wither away.

In November 1917, the Bolsheviks, led by Lenin (who had returned to Petrograd), overthrew Aleksander Kerensky's regime and established a Soviet government. Lenin became chairman of the Council of People's Commissars. A bitter civil war followed, and the Bolsheviks won. But because Western Europe failed to have a successful socialist revolution of its own, and because Russia was in economic ruin, Lenin was forced to delay establishing a socialist government immediately; instead, market reforms were put into place. In *Left Wing Communism: An Infantile Disorder,* Lenin criticized leftist elements in the West for neglecting parliamentary tactics and legal opportunities to create their own socialist revolution. He reiterated the importance of all communist parties to become centralized and disciplined and to follow the lead of the Russian party. Lenin died January 21, 1924. He did not live long enough to see a successful conclusion to his life's work or socialism in Russia. He is remembered most due to a legacy created by his followers in the new Soviet Union. In death, he became more important to the evolution of Marxist theory than he ever had been in life. For the remainder of the 20th century, the phrase *Marxism–Leninism* became the definition of orthodox Marxism.

— *Michael Joseph Francisconi*

Further Readings

Davis, H. B. (1978). *Toward a Marxist theory of nationalism.* New York: Monthly Review.

Lenin, V. I. (1939). *Imperialism: The highest stage of capitalism.* New York: International Publishers.

Lenin, V. I. (1947). *One step forward, two steps back.* Moscow: Progress Publishers.

Lenin, V. I. (1954a). *The agrarian program of social democracy in the First Revolution 1905–1907.* Moscow: Progress Publishers.

Lenin, V. I. (1954b). *Critical remarks on the national question: The right of nations to self-determination.* Moscow: Progress Publishers.

Lenin, V. I. (1956). *The development of capitalism in Russia.* Moscow: Progress Publishers.

Lenin, V. I. (1970a). *Left wing communism: An infantile disorder.* Peking, China: Foreign Language Press.

Lenin, V. I. (1970b). *Materialism and empiriocriticism.* Peking, China: Foreign Language Press.

Lenin, V. I. (1973). *What is to be done.* Peking, China: Foreign Language Press.

White, J. D. (2001). *Lenin: The practice and theory of revolution.* Houndmills, UK: Palgrave.

Leonardo da Vinci (1452–1519)

Leonardo da Vinci represented the transitional stage between the early period of the Renaissance, with its humanist links to Classical antiquity, and the later Renaissance, with its scientific and technological achievements that foreshadowed the modern Western world. In fact, he was one of the dominant artistic figures of this age. During his later years, da Vinci's great ambition was to discover the natural laws underlying the processes of nature and the flux of reality. He became more and more interested in

science, especially scientific illustration. The thoughts and creativities of his all-encompassing mind still remain an inspiration to the human species.

The Italian Renaissance (1401–1600) represented not only the rebirth of humankind out of the unenlightened years of medieval beliefs and superstitions but also a return to reason and empiricism; all aspects of society and culture were changing. It presented views of the human species and the universe that challenged the old, entrenched, and dogmatic Aristotelian, Ptolemaic, and Medieval conceptions of things. In fact, a new anthropology and the modern cosmology were emerging.

Wandering through the Alps and the mountains of Tuscany, da Vinci was fascinated by the beauty and detail of the geological and paleontological evidence about him and its far-reaching implications. His own magnificent landscapes attest to his love for physical nature, as is clearly seen in his painting *The Virgin of the Rocks.* To da Vinci, the rock strata with their fossils suggested a story considerably different from the interpretations given by most thinkers in antiquity. (Although he was the father of biology and made contributions to taxonomy and embryology, Aristotle himself had held to the eternal fixity of all terrestrial plant and animal forms—including that of the human species—within the hierarchical great chain of being. It was a safe and secure worldview.)

Because numerous marine fossils of various sizes and shapes were found in many different layers above the sea level, da Vinci knew that natural history had not been eternally fixed in space and time. Searching for a scientific and rational explanation, he rejected all religious interpretations of creation and destruction. To account for the marine objects at the tops of hills and mountains far removed from the sea, his mind leaped ahead of contemporary thought to embrace conceptions of both geological catastrophism and historical uniformitarianism (ideas that are hard for some thinkers to accept even today), and it may have even anticipated the scientific theory of biological evolution.

Da Vinci studied the fossil evidence in these layers of mountain stone: various crabs, sea snails, oysters, corals, scallops, cockles, marine shells, and cuttlefish as well as traces of worms and the bones and teeth of fishes. To explain rationally the geopaleontological nature of things, he took time and change seriously. Holding to the plasticity of the earth, da Vinci held that there had been periodic upheavals of mud layers from the ancient bottoms of the salt waters. Such mud layers formed hills and mountains, and erosion by rivers later uncovered the strata of marine fossils. In short, the bottoms of seas had become the mountain ridges of modern time.

Like Xenophanes, da Vinci recognized the biological and historical significance of the fossil shells and marine animals he found embedded in mountain rocks at high elevations. He rightly held them to be the remains of creatures that had once lived in the seas or on the beaches of the past and had been lifted up later. Da Vinci also ascribed to the earth an antiquity of more than 200,000 years. This was an incredible insight on his part given that most thinkers at the time held fast to the biblical account of a Creation that had taken place around 6,000 years ago or did not take history and change seriously. Da Vinci pushed back the horizon of time. He also recognized the similarities among humans, apes, and monkeys. He even speculated on the process of erosion, sedimentation, and fossilization or mineralization.

Reminding one of Plato, da Vinci had once written, "Let no one who is not a mathematician read my works." Yet during his later years, he changed his view of the universe from a mathematico–mechanistic model to an organismic interpretation of the cosmos. All nature is now vitalized in da Vinci's cosmology. As such, he viewed the earth itself as a living organism. He wrote that animals (including the human species) are the image of the world; a human is a microcosm, whereas the universe is the macrocosm, with the two being identical in their nature. Like Heraclitus, da Vinci held that everything in the world is in a state of flux; the basis of all phenomena is not mathematics but rather life, movement, and change.

In his cosmic vision, da Vinci rejected the earth-centered model of the universe. Although he held to a fixed but spherical earth and the fixed ceiling of stars, he did anticipate both the telescope and the universality of gravitation. Da Vinci's cosmology supported a plurality of worlds and both the eternality and infinity of the universe. He shed theology for a monistic and naturalistic philosophy supporting pervasive necessity and simplicity, continuous change, and areligious pantheism (recall the similar thoughts of Giordano Bruno).

Da Vinci saw time as the evil destroyer of all things. He was fascinated and obsessed with catastrophic destruction involving wind, water, and fire (his

sketches depict the destructive forces of the natural elements). Like the later Neptunists in geology, da Vinci held water to be the basic geological modifier of the surface of the earth. He even envisioned the natural end of the world as a result of the disappearance of all water into the interior of the earth, followed by fire destroying all terrestrial life, including the human species. This vision was a far cry from the Aristotelian view of an eternally fixed, safe, and secure world.

In 1516, after years of aimlessness and restlessness, da Vinci was invited by the French king to spend the remainder of his life in France. In May 1519, he died at Cloux and was buried in the cloister of the Collegiate Church of St. Florentin in Amboise. He had lived at the threshold of the modern world. He himself shook the foundations of art and science and envisioned the shape of things to come. Recognizing the ultimate unity of nature, his worldview foreshadowed the modern image of humankind within the universe and anticipated our scientific and technological world.

— H. James Birx

Further Readings

Kemp, M. (2004). *Leonardo.* Oxford, UK: Oxford University Press.

McCurdy, E. (2005). *The mind of Leonardo da Vinci.* New York: Dover.

Nicholl, C. (2004). *Leonardo da Vinci: Flights of the mind—A biography.* New York: Viking.

Zubov, V. P. (1996). *Leonardo da Vinci.* New York: Barnes & Noble.

Levalloisian Tradition

The Levalloisian tradition is a Lower and Middle Paleolithic method of stone tool production whereby stone flakes are removed from a carefully prepared stone core in such a way as to predict the size and shape of the flakes removed and to maximize the number of flakes produced per core. The evolution of the Levalloisian tradition is significant not only because it marks an important technological change from simple core tools to more complex flake tools but also because it reflects changes in hominid cognition in that the complexity of a stone tool tradition is taken by archaeologists to be an index of cognitive complexity.

The Levalloisian tradition gets its name from a quarry in the northern Paris suburb of Levallois–Perret. As an archaeological concept, it is less than 100 years old, and for much of that time it was viewed as a monolithic typological construct where the final products of the flaking process were of paramount concern. Although what exactly constitutes a final Levalloisian product is debated, it is generally agreed that there are three basic final products: flakes, blades, and points. Flakes vary in shape but are generally oval or rectangular in outline, blades are long and narrow and usually twice as long as they are wide, and points are triangular. Levalloisian stone cores are sometimes referred to as "tortoise-shaped" cores due to their distinctive dome-like appearance.

In contrast to earlier ideas, recent research has documented a wide range of morphological variability among Levalloisian cores and flakes in time and especially space. This tradition has now been identified in Europe, Africa, Asia, India, Australia, and most recently Japan. Archaeologists became concerned with Levallois variability after an analysis of classic Levalloisian end products from Levels 1 and 2 of the Boker Tachtit site in the Negev desert of Israel were discovered to have been produced from an atypical Levalloisian flaking and core preparation sequence. This realization led archaeologists to understand the Levalloisian tradition as a dynamic process that varied regionally, temporally, and perhaps culturally.

The Levalloisian tradition was first thought to have originated as a single invention at a single place in a single time and to have eventually spread throughout the Old World by diffusion. The continental geography of its invention is an issue of debate. Some monocentrists argue for European origins, where the evolution of the Levalloisian tradition is seen as an accidental development, whereas others look to Africa for its origins. Proponents of the African hypothesis argue that the Levalloisian tradition is a distinctly African phenomenon that spread to Europe and other parts of the Old World some 250,000 years before the present as anatomically modern humans migrated out of Africa. Still, the widespread geographic variability observed in Levalloisian assemblages throughout the Old World provides strong evidence for polycentric origins and suggests independent invention in multiple places and times. The ultimate cause of such widespread regional variability is currently unknown,

but archaeologists hypothesize that it may be the result of the combined effects of migration events, diffusion, stone raw material variability, and variations in use.

The archaeological concept of the Levalloisian tradition has been in a near constant state of transformation since its recognition nearly 100 years ago. Consequently, archaeologists are simply not sure how to interpret its temporal, spatial, and formal variability, let alone its origins. To combat this, archaeologists have outlined the major problems facing Levalloisian scholars in an effort to direct future research toward the resolution of these issues. The first problem questions the Levalloisian tradition itself as a unified analytical concept. That is, is Levalloisian technology only one of many technological solutions within a single flaking strategy, or is Levallois the only possible outcome? The second problem concerns the definition of intended Levalloisian end products in the sense that archaeologists must decide what constitutes an end product as well as the role of predetermination in its production. The third problem challenges archaeologists to deal with variability in the Levalloisian tradition, especially in terms of the role that individual cognition and standardization play in the flaking sequence. Finally, archaeologists must also deal with Levalloisian terminology; for example, is the Levalloisian tradition only a method of core preparation, or does it also refer to the specific organization of flake scars and ridges on the surface of the core? These questions, among others, will continue to drive the archaeological understanding of the Levalloisian tradition for the next 100 years.

— Phillip R. Hodge

Further Readings

Bordes, F. (1980). Levallois debitage and its variants. *Bulletin of the Society for Prehistoric France, 77,* 45–49.

Otte, M. (1995). The nature of Levallois. In H. L. Dibble & O. Bar-Yosef (Eds.), *The definition and interpretation of Levallois technology* (Monographs in World Prehistory, No. 23, pp. 117–124). Madison, WI: Prehistory Press.

Ranov, V. A. (1995). The Levallois paradox. In H. L. Dibble & O. Bar-Yosef (Eds.), *The definition and interpretation of Levallois technology* (Monographs in World Prehistory, No. 23, pp. 69–78). Madison, WI: Prehistory Press.

Rolland, N. (1995). Levallois emergence: Single or multiple? A review of the Euro-African record. In H. L. Dibble & O. Bar-Yosef (Eds.), *The definition and interpretation of Levallois technology* (Monographs in World Prehistory, No. 23, pp. 333–360). Madison, WI: Prehistory Press.

Van Peer, P. (1992). *The Levallois reduction strategy* (Monographs in World Prehistory, No. 13). Madison, WI: Prehistory Press.

Van Peer, P. (1995). Current issues in the Levallois problem. In H. L. Dibble & O. Bar-Yosef (Eds.), *The definition and interpretation of Levallois technology* (Monographs in World Prehistory, No. 23, pp. 1–10). Madison, WI: Prehistory Press.

White, M., & Ashton, N. (2003). Lower Paleolithic core technology and the origins of the Levallois method in North-Western Europe. *Current Anthropology, 44,* 599–609.

Levinas, Emmanuel (1906–1995)

Emmanuel Levinas was a major figure in postwar French philosophy, although he was born in Lithuania. Significantly, he was Jewish in origin; this was always important in his philosophy, which sometimes referred to his Jewish (although he seems to have been agnostic about the existence of God) and Zionist convictions. He studied with Martin Heidegger in Germany, and his work exhibits deep ambiguity about Heidegger, presumably at least partly due to Heidegger's support for the Nazis in 1933. There could be no Levinasian philosophy without Heidegger, but Heidegger is often the target of Levinas's philosophy, as are G. W. F. Hegel and Edmund Husserl. Levinas's emergence as a French philosopher belongs to the time when the "three H's" where at the center of academic philosophy. He suggested that they belonged to a Greek philosophical tradition in which ontology (the study of being and types of beings) is taken as the first philosophy. The Jewish tradition took ethics as the first philosophy, according to Levinas, and therefore offered a correction to the Greek tradition. Levinas did not, however, refer to Jewish philosophers; he meant that the Torah and the tradition of its interpretation assumed a position in which ethics was the first philosophy. Levinas himself taught Talmud classes for children. Nevertheless, his philosophy can

be understood only against the background of the European tradition since the Ancient Greeks. His work began with research on the phenomenology of Edmund Husserl and emerged in mature form decades later in *Totality and Infinity* (first published in 1961). In that book, he suggested that the ontological tradition of Greek philosophy was a philosophy of power, of the state, of the supremacy of the I, and of war. He opposed that with the Jewish ethical tradition in which the Other is supreme and the I, or the Same, can exist only in its responsibility to the Other. The Other appears phenomenologically in the face, with which the I cannot avoid an ethical relation. Even if the I murders the Other, the Other is still supreme for the I. The I cannot exist without recognizing the Other, without recognizing that the sameness of the self depends on alterity. The self can have a relation with the world, which is its only way of existing meaningfully, only if it recognizes that its own self belongs to what is outside the self. Levinas partly explained that in relation to notions of the Gift, of the relation of giving with no return, with clear echoes of the work of Marcel Mauss. Despite his reservations about the European philosophical tradition, Levinas defined his position though Plato, Descartes, and phenomenology. From Plato, he took the idea of the form of Good as the sovereign form before the form of Being. From Descartes, he took the idea that God (as a form of otherness) is an unavoidable assumption for me and exists in excess over, or transcendence of, my being. From phenomenology, he took the goal of describing the contents of consciousness, and their necessary structures, in a manner that pays particular attention to habitation, the body, the erotic, and language. His later work, particularly *Otherwise Than Being* (first published in 1974), also has traces of a critical dialogue with his friend Jacques Derrida in which he responded to Derrida's claims that his position was an act of metaphysical violence against the "ontological" tradition that replaced ontological metaphysics with his own metaphysics, in which abstract truth is said. Levinas's response was to emphasize the distinction between the act of saying as an ethical operation open to the other and the contents of what was said as more enclosed, along with a general attempt to write out any elements of the ontological tradition that might have appeared in his own work.

— *Barry Stocker*

Further Readings

Levinas, E. (1969). *Totality and infinity.* Pittsburgh, PA: Duquesne University Press.

Levinas, E. (1990). *Time and the Other.* Pittsburgh, PA: Duquesne University Press.

Levinas, E. (1998). *Otherwise than being.* Pittsburgh, PA: Duquesne University Press.

Lévy-Bruhl, Lucien (1857–1939)

The anthropologist, philosopher, and sociologist Lucien Lévy-Bruhl is known for his controversial understanding of the minds of indigenous people. His highly influential writings led to a new method of analyzing illogical thought patterns as well as new ideas regarding primitive religion and mythology.

Lévy-Bruhl's early work focused on French, German, Jacobean, and Comtean philosophy, whereas his later work shifted toward the mental functions and emotions of indigenous people. Lévy-Bruhl's theories were based on his own research as well as on accounts gathered by other ethnographers, missionaries, and travelers. He was concerned with what he called the study of "primitive mentality." This work was Lévy-Bruhl's reaction to Émile Durkheim's ideas, which were extremely popular in France at the time.

In Lévy-Bruhl's *Les Fonctions Mentale dans les Sociétés Inférieures* (How Natives Think), published in 1910, he stated that indigenous people's thought processes were different from those of modern humans. He believed that their way of thinking lacked logic because they were unable to think abstractly. Instead, Lévy-Bruhl argued, indigenous people's minds focused on the supernatural. Therefore, he believed that indigenous methods of thinking reflected their beliefs in magic instead of focusing on the reality of human relationships and experiences. Lévy-Bruhl continued to develop these theories in *La Mentalité Primitive* (Primitive Mentality), published in 1923, and *L'Âme Primitive* (The "Soul" of the Primitive), published in 1928. His later work, *Carnets* (Notebooks), published posthumously in 1949, suggested a shift away from his earlier statements that primitive people were illogical. In this book, Lévy-Bruhl wrote about two different thought processes: one based on the natural and the other based on the supernatural.

In 1978, Lévy-Bruhl earned his degree in philosophy from the Ecole Normale Supérieure. Before enrolling at the University of Paris to work on his Ph.D., Lévy-Bruhl taught philosophy at the University of Poitiers and the University of Amiens. He finished his doctorate in 1884 but continued teaching until he was hired as titular professor of the history of modern philosophy at the Sorbonne in 1899. In 1904, Lévy-Bruhl became the chair of the history of modern philosophy department. He also served as editor of the *Revue Philosophique de la France et de l'Etranger* (Philosophical Review of France and Abroad). He continued to work at the Sorbonne until 1927. In 1925, Lévy-Bruhl assisted Marcel Mauss and Paul Rivet in the founding of the Institute d'Etnologie at the University of Paris.

— *Kristine McKenzie Gentry*

Further Readings

Cazeneuve, J. (1972). *Lucien Lévy-Bruhl* (P. Rivière, Trans.). New York: Harper & Row.

Lévy-Bruhl, L. (1926). *How natives think.* London: George Allen & Unwin.

Lévy-Bruhl, L. (1931). *Primitive mentality.* Oxford, UK: Clarendon.

Libby, Willard (1908–1980)

Willard Frank Libby was an American chemist whose technique of carbon-14 (or radiocarbon) dating provided an extremely valuable tool for archaeologists, anthropologists, and earth scientists. For this development, he was honored with the Nobel Prize in Chemistry in 1960. Libby was born in Grand Valley, Colorado, on December 17, 1908, to Ora Edward Libby and his wife Eva May. He attended grammar and high schools near Sebastopol, California, between 1913 and 1926, moving to the University of California, Berkeley, in 1927. He received his B.S. in 1931 and his Ph.D. in 1933. After receiving his Ph.D., Libby spent the 1930s building sensitive Geiger counters to measure weak natural and artificial radioactivity. He worked for 2 years as the personal research assistant to G. N. Lewis on the Berkeley campus. In 1939, he became an instructor in the College of Chemistry at Berkeley, and he later became an assistant professor. In 1941, Libby was awarded a Guggenheim fellowship, for which he spent most of that year at Princeton University. With the start of U.S. involvement in World War II, he moved to New York and joined Columbia University's Division of War Research to work on the Manhattan Project with Harold Urey (Nobel Prize in Chemistry, 1934) alongside Glenn Seaborg (Nobel Prize in Chemistry, 1951). Libby was responsible for the gaseous diffusion separation and enrichment of uranium-235, which was used in the atomic bomb that was dropped on Hiroshima, Japan. Most separation was accomplished by gaseous diffusion of uranium hexafluoride (UF6), but other techniques were employed as well. The bulk of this separation work was done at Oak Ridge, Tennessee. Libby also showed that tritium is a product of cosmic radiation. In 1945, he became a professor at the University of Chicago in the Department of Chemistry and Institute for Nuclear Studies (now the Enrico Fermi Institute for Nuclear Studies). It was during this chapter in his life that he earned the international renown for which he is regarded today.

Libby had available to him two invaluable facts when he conceived of the carbon-14 dating method. First, he was intimately familiar with the 1932 discovery of the neutron by Sir James Chadwick (Nobel Prize in Physics, 1935), who was involved in the Manhattan Project. Second, he was familiar with the work of Martin Kamen and Samuel Ruben, who in 1940 used the cyclotron of E. O. Lawrence (Nobel Prize in Physics, 1939) at Berkeley to bombard graphite and discover radioactive carbon-14 (an isotope of carbon) and found that it had a half-life of approximately 5,700 years. In addition, other researchers during the 1940s had found that some of the nitrogen in the atmosphere was turned into carbon-14 when hit with cosmic rays. In 1947, Libby, who was then at the Institute for Nuclear Studies, figured that a plant would absorb some of this trace carbon-14 while it absorbed ordinary carbon dioxide in photosynthesis. Once the plant died, it could no longer absorb carbon, and the carbon-14 it contained would decay with a known half-life without being replaced. Therefore, if the concentration of carbon-14 with respect to the stable carbon-12 left in the remains of the plant could be calculated, the amount of time that had passed since the plant had died could be determined because the unstable radioactive carbon-14 isotope decays at a measurable rate on the

death of an organism. With postdoctorate James Arnold, graduate student Ernie Anderson, and a $5,000 grant, Libby led a team that developed carbon-14 dating using a highly sensitive Geiger counter, a logical development from his 1930s research. He tested his process on objects of known age, such as timbers from Egyptian tombs. The tests proved to be reliable, and it was assumed that this technique was accurate for organic objects that were tens of thousands of years old. For his work on carbon-14 dating, Libby received the Nobel Prize in Chemistry in 1960, joining fellow Alpha Chi Sigma fraternity members Seaborg and Linus Pauling (Nobel Prize in Chemistry, 1954). In 1954, while at Chicago, Libby became the first chemist ever appointed to the Atomic Energy Commission. In that capacity, he headed President Eisenhower's international "Atoms for Peace" project and studied the effects of radioactive fallout. In 1959, he became a professor of chemistry at the University of California, Berkeley, a position he held until his retirement in 1976. He taught honors freshman chemistry from 1959 to 1963 (it was a university tradition that senior faculty teach this class). He was also director of the University of California statewide Institute of Geophysics and Planetary Physics (IGPP), which was an exciting post during the time of lunar landings. He served in that capacity until his death. He also started the first environmental engineering program at the University of California, Los Angeles, in 1972. Throughout his long career, Libby wrote many articles and books, including *Radiocarbon Dating* (1955), which went through several editions. He was the recipient of several other awards, including the 1959 Albert Einstein award. Even brilliant men such as Libby could sometimes get things wrong. For example, Libby once suggested that the Tunguska event might have resulted from a small piece of antimatter from space. The actual cause is now thought to have been a comet. He died in 1980 in Los Angeles.

— *Larry A. Pavlish*

Further Readings

Arnold, J. R., & Libby, W. F. (1951). Radiocarbon dates. *Science, 113,* 111–120.

Libby, W. F. (1946). Atmos ^{3}He and radiocarbon from cosmic radiation. *Physical Review, 69,* 671–672.

Libby, W. F. (1951). Radiocarbon dates (part 2). *Science, 114,* 291–296.

Libby, W. F. (1955). *Radiocarbon dating.* Chicago: University of Chicago Press.

Libby, W. F. (1972). Radiocarbon dating, memories, and hopes. In *Proceedings of the 8th International Conference on Radiocarbon Dating* (pp. 27–43). Wellington: Royal Society of New Zealand.

Libby, W. F., Anderson, E. C., & Arnold, J. R. (1949). Age determination by radiocarbon content: World-wide assay of natural radiocarbon. *Science, 109,* 227–228.

Life Cycle, Human

Theorists who have written about the human life cycle include Sigmund Freud, Jean Piaget, Lawrence Kohlberg, Erik Erickson, and Daniel Levinson. They usually describe universal stages that people pass through during their lives and present the life cycle as one where people progress toward certain goals. Some theories, such as Freud's, were based mainly on speculation about what "must" occur in individuals in terms of oral, anal, and phallic stages of infancy and the later latency and genital stages. The oral stage (birth to 1 year) focuses on the conflict that the infant experiences between pleasure and pain from the mouth, the pleasure of food, and the pain of its denial. The anal stage (1–3 years) looks at the anus as a source of sexual pleasure and control, and the phallic stage (3–6 years) focuses on the genitals and a love/hate relationship with the parents. The latency stage (6 years to puberty) involves redirecting sexual energy to activities of the larger society. The genital stage (puberty to adulthood) involves becoming a mature adult in a heterosexual relationship. Others theories, such as Piaget's, were based on research on children. For example, Piaget did research on how children developed different ways of thinking. Today, the most influential of these theories is that of Erickson, who developed an eight-stage model of human development that modified Freud's theory to work better with non-Western cultures. Erickson looked at non-Western cultures, for example, how the Sioux, who freely breast-fed children up to 3 years of age and had a relaxed method of toilet training, produced generous adults, whereas the Yurok, who breast-fed children for 6 months and had strict rules

against urinating in the Klamath River, produced suspicious and miserly adults.

Although all of these theories have influenced particular anthropologists, many anthropologists have ignored them because they say such theories represent at best the Western life cycle and not the life cycles of even all members of Western society. Anthropologists who look at the life cycle are more likely to describe the four basic stages of the life cycle as birth, puberty, marriage, and death and to describe how people in different parts of the world think about these and the practices associated with them. The work of Arnold Van Gennep (1873–1957) has had a lot of influence in how anthropologists deal with the life course. In *The Rites of Passage,* Van Gennep described specific rituals that mark transitions in a person's social life in various societies in terms of the life cycle rituals related to pregnancy and childbirth, birth and childhood, initiation rites, betrothal and marriage, and funerals. These rituals move people from one social position to another. People often mark these changes in age-based identities with bodily mutilations such as scarification and circumcision.

Other anthropologists have looked at age grade and age sets, where males or females move into groups of approximately the same age, sometimes according to rites of passage and sometimes not. People in each age grade or age set take on specific roles. Thus, among the Tiriki of Kenya as described by Walter Sangree, adolescent boys undergo an initiation into an age grade at puberty. The Tiriki have seven named age groups, with each involving males who were initiated during the same 15-year period. Although it has changed over the years, it had the following form in 1939. Small boys entered the first age group, which consisted of boys up to 10 years of age. The next group consisted of 11- to 25-year-olds who in the past were divided into those who were initiated or uninitiated. The third consisted of men ages 26 to 40 years and was made up of warriors. The fourth group consisted of men ages 41 to 55 years and was made up of older warriors. The fifth group consisted of men ages 56 to 70 years and was made up of judicial elders. The sixth group consisted of men ages 71 to 90 years and was made up of ritual elders. The last group consisted of men ages 91 to 105 years and was made up deceased or senile elders. Many anthropologists have written about age sets and age groups as ways for people to find help outside of groups based on kinship or marriage.

Many anthropologists in the United States dealt with the life cycle in terms of the culture and personality approach. Ruth Benedict wrote that the Japanese learn from the early years to subordinate individual desires to the needs of the group, with an emphasis on shame. Margaret Mead's studies showed that child raising greatly influences gender roles in a society, and subsequent studies have confirmed this despite controversy about Mead's methodology and interpretation of data. Geoffrey Goffer developed the "swaddling hypothesis" that linked swaddling to the intense mood swings of Russians in that swaddling immobilized infants for periods of time and then freed them to have intense social interaction.

John Whiting began another approach to the life cycle when he wrote an early ethnography about a life cycle of Melanesian people titled *Becoming a Kwoma* in 1941. It described how their culture affected the Kwoma from childhood to adulthood. He and the psychologist Irving Child then used the Human Relations Area File (HRAF), which had data on hundreds of societies, to write *Child Training and Personality* in 1953. In this book, they looked at differences in child-training customs in different cultures using elements of Freudian and behavioral psychology. The most impressive statistical correlation they discovered in their data was that the age of weaning and the severity of weaning had a strong correlation with people's oral explanations of illness. However, the HRAF data often involve a judgment call, so much of Whiting and Child's statistical data are suspect. Whiting also introduced the idea that societies where boys had a strong identification with their mothers have severe initiation rites that represented symbolic castration. However, many doubt this as well because some evidence shows that boys who grow up without a strong male figure actually act in exaggerated male ways. Later, Beatrice Whiting (John's wife) and Child developed the contrast between dependence training and independence training. This theory states that some societies focus on training children in such a way that promotes group solidarity and working together, whereas other societies emphasize individualism and self-reliance. Positive stimulus to promote dependence training includes nursing children for an extended period of time, whereas negative stimulus includes punishing aggressive behavior toward others. Positive stimulus to promote independence includes giving children their own private space at an early age and showing

toleration of aggression and competition, whereas negative stimulus includes nursing children for a shorter period of time and giving less attention to young children. Whiting and Child said that dependence training produces children who work well in groups, whereas independence training produces children who focus on individual success.

A recent approach to the life cycle draws on ideas from the French sociologist Marcel Mauss (1872–1950). One of those to develop Mauss's ideas, Paul Bourdieu, looks at life in terms of different types of capital—economic, social, and cultural. He says that these different types of capital create different opportunities for people not only in different societies but also within the same society. Those who follow this approach say that mental life is not universal but rather is influenced by cultural traditions and practices involving issues such as gender and kinship organization. Those drawing on Mauss's writings on bodily techniques talk about how the body is a part of both nature and culture, so that culture determines how people do basic things such as sitting. They write about how birth is biological but changes people's social roles and relationships, so that bodily events are inseparable from social ones. One's bodily experiences within a particular culture determine one's possible life course; one's life cycle depends on one's unique lived situation. Similarly, the life events approach says that people's lives depend more on the events of their lives than on their age, whereas the life span approach emphasizes individual differences and how change can take place in many ways.

— Bruce R. Josephson

See also **Benedict, Ruth; Culture and Personality; Mead, Margaret**

Further Readings

Bock, P. (1999). *Rethinking psychological anthropology.* Prospect Heights, IL: Waveland.

Hockey, J., & James, A. (2003). *Social identities across the life course.* New York: Macmillan.

Mead, M. (1949). *Coming of age in Samoa.* New York: Mentor Books.

Stigler, J., Shweder, R., & Herdt, G. (Eds.). (1990). *Cultural psychology essays on comparative human development.* Cambridge, UK: Cambridge University Press.

Van Gennep, A. (1960). *The rites of passage.* Chicago: University of Chicago Press. (Original work published 1909)

Whiting, J., & Child, I. (1953). *Child training and personality: A cross-cultural study.* New Haven, CT: Yale University Press.

Life, Characteristics of

The concept of life belongs to the basic cognitive endowment of every human. This deep anchoring makes it difficult to define life. Everyone has an intuitive understanding of how a living object should look and how it should behave, but for scientific purposes it is necessary to make this implicit and vague knowledge explicit and clear. How else should we identify extraterrestrial life on other planets—or artificial life in the computer?

A classical strategy of defining life, which can be traced back to Aristotle, involves listing characteristics of living beings. A modern biologist would enumerate at least three essential properties: metabolism, self-reproduction, and mutability.

- *Organisms metabolize.* There is a permanent exchange of matter and energy going on between organisms and their physical environment to build and preserve their physical structure.
- *Organisms reproduce themselves.* Organisms transmit at least a part of their genetic information to their offspring. This information is necessary for the structural and functional development of an organism.
- *Organisms are mutable.* Their self-reproduction is not completely perfect, so it is probable that even offspring of asexually reproducing organisms show genetic variation if compared with their parents.

Like any list of characteristics of life, our proposal has two fundamental defects. First, there is at least one important borderline case that turns out to be very difficult to classify. Viruses have no metabolism of their own, so they need a host cell to be supplied with energy for their self-replication. Do they alternate between life and death—alive whenever they have invaded a host cell and dead whenever they are outside a host cell? Second, there is a class of nonliving

objects that possess all of the characteristics on our list. Crystals grow in saturated solutions by replicating their highly symmetrical spatial structure. This process is not perfectly exact, so variations can occur in the crystal structure. In addition, one can detect a bidirectional metabolism; the building blocks of crystal growth are molecules coming from the solution, and the growing crystal radiates heat into the solution.

Both examples indicate that our list of characteristics of life contains only necessary, but not sufficient, properties for the identification of living systems. This is no surprise if we adopt an evolutionary perspective, which explains organic life as a result of natural history on Earth.

Because evolutionary theory will also address the problem of the origin of life, it must construct models for the prebiotic chemical evolution of the first self-reproducing macromolecules. By so doing, evolutionary theory presupposes that there is not an ontological cut between living and nonliving natural objects; rather, there is a physicochemical continuum. Consequentially, the evolutionary biologist cannot draw a sharp conceptual distinction between living and nonliving systems. But a complete list of necessary and sufficient characteristics of life would assume the possibility of both a clear ontological cut and a conceptual cut between prebiotic and biotic natural objects.

Darwinian evolutionary theory proposes that organisms are objects that are shaped by natural selection. A way out of the difficulty of defining life, then, is to characterize it by the natural dynamics of its origin and evolution. To do so, we must state the laws structuring this dynamics and the boundary conditions under which these laws act.

Natural selection is a dynamic process in systems in which struggle for survival occurs. That happens whenever a population of varying elements (for example, macromolecules, organisms) self-reproduce under restrictions on growth (on primitive Earth, in the ecological environments of today). We thereby take up the characteristics of life listed earlier but now integrate them into an evolutionary perspective.

How complex the resulting elements of the systems should be to call them "living," then, is clearly a normative decision that cuts into a continuous natural history according to our respective research interests. So a list of characteristics of life is meaningful but in a specific research context. If we are, for example, interested in the origin of genetic information, the takeoff of life will be the appearance of self-replicating macromolecules.

A famous example of how to follow this strategy of embedding characteristics of life into an evolutionary perspective is Jacques Monod's *Chance and Necessity* (1970). This French molecular biologist defined two principal properties of living systems that he called "invariance" and "teleonomy" (from ancient Greek *telos* aim, and *nomos* law). Whereas invariance is the ability of a system to reproduce its structure correctly, teleonomy is the property of a system that is structured so as to realize a project by its behavior. Monod saw no dualism between invariance and teleonomy because the behavioral teleonomy of an organism involves, in the last analysis, transmitting the genetic information that is needed to reproduce its structure. Monod explained this functional dependence of teleonomy on invariance by assuming the temporal precedence of invariance over teleonomy both in the general evolution of life and in the specific development of individual organisms.

Modern biology has investigated both the material and functional aspects of this priority of invariance to teleonomy. The concept of biological information captures the functional dimension of this priority because it designates all processes in living systems in which a biochemical structure instructs the construction of another biochemical structure by means of a code. Taking the example of the gene, its functionality as hereditary information relies not only on its material stability in evolutionary processes but also, and above all, on the existence of a genetic code that relates the biochemical structure of a gene to the biochemical structure of a protein. Thus, the material structure of a gene is biologically relevant only insofar as it is, by its hereditary function, an information carrier between an organism and its offspring and, therefore, subjected to natural selection.

The concept of information is used here not in a metaphorical manner that would, if taken literally, impute an intention or even a consciousness to all living systems. Instead, information must be understood in a naturalistic way as a concept that can describe the functional architecture of the physicochemical structures that build up a living system. If Monod was right in giving self-reproduction priority over any other property of organisms, the concept of information is basic to every list of characteristics of life.

— *Stefan Artmann*

Further Readings

Küppers, B.-O. (1990). *Information and the origin of life.* Cambridge, MA: MIT Press.

Monod, J. (1970). *Chance and necessity: An essay on the natural philosophy of modern biology.* New York: Alfred A. Knopf.

Schrödinger, E. (1992). *What is life? The physical aspect of the living cell.* Cambridge, UK: Cambridge University Press.

ARTIFICIAL LIFE

Within the discipline of anthropology, a number of scholars have begun to examine the ever-expanding subfield of synthetic anthropology, which examines artificial beings, worlds, and languages as a means of reaching a more comprehensive understanding of human beings. Recent advances in robotics seem to have brought science fiction to life, intriguing the general population as well as anthropologists and other scholars. In February 2005, the U.S. government announced that it had accelerated its development and use of what has popularly become known as "robot soldiers." Far more than being entertaining, the use of artificial soldiers is predicted to have enormous impact on saving the lives of American soldiers engaged in reconnaissance missions as well as in actual combat. The army predicts that robot soldiers will be ready for the battlefield in less than a decade. Financing the robot soldiers will raise the cost of the Future Combat Systems (FCS) project to $127 billion, making it the most expensive military project on record.

The United States is already using unmanned aerial vehicles (UAVs), such as the Shadow, the Raven, and the Ignat, to expand military capabilities in Iraq. The military also plans to employ an Extended Range Multi-Purpose (ERMP) program that will expand the capabilities of UAV systems, which are projected to number 8,000 by 2010. These systems may be used for border patrol and homeland security as well as in combat situations.

Army robots are the result of ever-advancing technologies that have allowed the military to plan for a time when each human soldier will be able to tap into the resources of robotic trucks and planes with up-to-date knowledge of targets, reconnaissance, and communication. As a result, soldiers will be able to supplement human instinct with scientific knowledge when making tactical decisions. As the technology behind the robot soldiers advances, so will their abilities and uses. By the middle of the 21st century, robots are expected to become autonomous, rather than being controlled by soldiers using laptop computers. While some future robots will look like humans, others may be disguised as hummingbirds, tractors, tanks, cockroaches, or even dust.

Military visionaries began planning military uses for robots as early as the 1970s, and the new robot soldiers were preceded by less advanced models. In the spring of 2003, the army employed "Matilda" (Mesa Associates' Tactical Integrated Light-Force Deployment Assembly) in Afghanistan. About the size of a dog, Matilda has a retractable arm and claw. This robot was ideal for traversing mountainous regions, seeking out members of terrorists who might be using the mountains for cover. Equipped with a video camera and sensors designed to identify the presence of toxic gases or other potentially dangerous substances in the air, Matilda was also used in Afghanistan to test for the presence of possible booby traps and to precede soldiers into tunnels or other tight spots. Robots have been used in Iraq since the beginning of the war to detect mines and to serve as armed sentries at weapons depots. A robot capable of firing 1,000 rounds a minute was expected be deployed on the frontline in Iraq in the spring of 2005.

— **Elizabeth Purdy**

UNITY OF LIFE

The comparison between human genetic instructions (genomes) and those of other species has shown that our genetic code is similar to those of creatures such as worms, flies, weeds, and mice. This indicates that we are all descendants of a

single organism that emerged 4 billion years ago, supporting the evolutionary theories of Charles Darwin and the notion of evolutionary process as a constant reworking or random recombining of parts.

All living matter is made up of large molecules called proteins, which are mostly responsible for important functions absolved by cells, such as DNA processing, cell cycle regulations, and the production of auxiliary proteins that help proteins to take the correct shape, which is crucial for them to work properly. Proteins are constructed from 20 amino acids, and just as the letters of the alphabet can form words of various lengths and meanings, so different combinations of amino acids form specific proteins. Moreover, those parts of protein molecules concerned with carrying out similar functions in different organisms often have the same sequences of amino acids.

As far as cellular organization is concerned, the main chemical processes of all living matter (humans, animals, plants, fungi, or bacteria) are often identical. In 2001, the Celera Genomics team compared the human genetic code with that of organisms such as a fruit fly and a nematode worm. Its data suggest that humans and flies shared 2,758 genes, while there were 2,031 genes in common with the worm and 1,523 in common between all three. In addition 10% of the genes in humans were clearly shown to be related to particular genes in the fly and the worm. Comparing the human and the mouse genomes, the research concluded that only slightly more than 100 genes in the human genome do not seem to have a counterpart in the mouse genome.

The comparison of human and insect genomes points out, in the latter, the lack of genes associated with the immune system and of those associated with a circulatory system. The molecular machinery that manages programmed cell death appears to be much more complex in humans than in insects. The human genome also contains a marked increase in the number of members of protein families that are involved in nerve cell connections and development. Most significantly, humans have more genes associated with DNA and regulation. They come up to 12% of the human code, while they are only 8 percent of the insect code. Yet these differences are simply variations on common themes. Thus, scientists have argued that the principle of the unity of life should inspire a sense of humility and respect for nature in all humans and challenge their supposed uniqueness.

— **Luca Prono**

Life, Origin of

One of the questions that has troubled humankind ever since it began to think about its position in the universe concerns its own origin and the origin of life in general. There are two basic alternatives for answering this question. Either we believe that life has a supernatural origin (such as being created by a transcendental God), or we think that the origin of life can be explained in a scientific way. This means that we try to describe an empirical scenario in which life originated through the workings of natural mechanisms. Here we are interested in the second alternative, but we must also say some words about the first one because the origin of life still is a problem about which religious, metaphysical, and scientific positions quarrel with each other.

Regarding the first alternative, speculating on a supernatural origin of life can be traced back to prephilosophical thought that is handed down to us by many orally transmitted and ethnologically collected myths of origin. The history of religions and metaphysics prolongs this mythical quest for origins. For example, the biblical Genesis reports that the world, all living beings included, was created by a personal God who himself is not part of his creation. Because the existence of such a transcendental creator is not an empirical fact that could be verified or falsified by scientific methods, the adequate cognitive attitude toward reports of creation like the biblical one is to either believe it or reject it for subjective reasons.

Nearly the same is true for metaphysical accounts of the origin of life. Metaphysics is a functional substitute of religion. It is the attempt of the human mind to develop a complete conceptual picture of the world that is structured by logical reasoning. To be complete, any metaphysical system must answer our question about the origin of life. The

speculative assumptions with which a metaphysics starts its reasoning are not of an empirical nature and impregnate all other metaphysical propositions with irrefutability because ad hoc explanations that agree with some metaphysical principle can be found anyway. Therefore, one must either believe a metaphysical system or reject it for subjective reasons that must be expressed in a coherent way.

For want of an empirical procedure of deciding which metaphysics is false, any metaphysical account of the origin of life, be it based on concepts such as entelechy (the Aristotelian tradition) or vital élan (the Bergsonian tradition), is not up to elementary standards of modern science that must be met if we want to follow the second way of answering the question about the origin of life: to describe an empirical scenario in which life originated by the workings of natural mechanisms.

Since the times of Galileo Galilei and Isaac Newton, modern science has searched for an empirically based and mathematically expressible description of all natural phenomena, its living inhabitants included. The aim is to acquire intersubjectively checkable and systematic knowledge of mathematical relations between empirical phenomena. Modern science approaches its aim by making controlled and replicable experiments with isolated natural systems. Of course, it also relies on hypotheses that are not themselves empirically verifiable (such as the supposition that nature can be described mathematically). Yet this is no drawback because, altogether, those hypotheses demand that any specific scientific proposition must be falsifiable by empirical data.

Any attempt to blur the boundary between religious belief and scientific doubt must be criticized. The result of mixing them up could only be a way of thinking that would lead to a religious ideology and a pseudoscience at the same time. It would let religious people lose the only legitimate source of their belief out of sight, and it would hinder science to follow its own dynamics of proposing and criticizing theories without ideological restrictions.

This is especially true when it comes to the origin of life. The empirical science that must find this origin is biology. Its general framework consists of evolutionary theory, which states that life is not a static phenomenon but rather a dynamic process. Life has a natural history; existing species die out, and new species are born. In the history of biology, different evolutionary theories gave diverse answers to the question of how this process of speciation happens. Today, the evolutionary theory bearing the name of Charles Darwin is the theory that is accepted by nearly the totality of active biologists.

Since its second edition, Darwin's main work, *On the Origin of Species,* seems to give an answer to our question about the origin of life. This is no surprise because an evolutionary theory of life that takes into account the finite age of Earth must also explain the origin of life. But the famous last sentence of the book might be surprising because it states that the "several powers" of life have "been originally breathed by the Creator into a few forms or into one." Yet there is a plausible explanation for this religious stance. In the first edition, published in 1859, the prepositional phrase "by the Creator" was missing. Darwin added it to the second edition, published in 1860, because his secular account of the evolution of life suggested an equally secular explanation of the origin of life, but he did not want to bother his wife, Emma, who was a devoted Christian. Darwin himself was rather agnostically minded.

Scientific research on the origin of life tries to explain how the workings of physicochemical mechanisms led, in the boundary conditions of primitive Earth, to the development of material systems that possess necessary properties of life. Modern evolutionary theory assumes a natural continuity between the dynamics of prebiotic chemical systems and the evolution of the first living systems. It does invoke neither a supernatural principle nor some unknown natural force to explain the transition from the nonliving to the living. Older ideas of vitalism also proposed that the origin of life can be scientifically explained, but only if one also assumes the existence of some mysterious force that should be effective just in organisms. Because such a force was not found and even turned out to be unnecessary for explaining the structure and function of living systems, modern theories of the origin of life are reductionistic and mechanistic; they explain the origin of life exclusively by physical and chemical mechanisms giving rise to complex natural systems that we call "living."

One cannot get rid of our problem by proposing that life was imported onto Earth from some extraterrestrial origin, be it by chance (on an asteroid) or intentionally (by an intelligent extraterrestrial civilization). Wherever life appeared for the first time in the universe, its origin at that place must be explained. Although, according to the hypothesis of an outer

space origin of life (put forward by, for example, the English astronomer Fred Hoyle), life on Earth did fall from the heavens, the first of its extraterrestrial precursors could not do so. Thus, let us concentrate on the problem of how life originated on Earth without hoping that some extraterrestrial biologist will come to solve the problem for us.

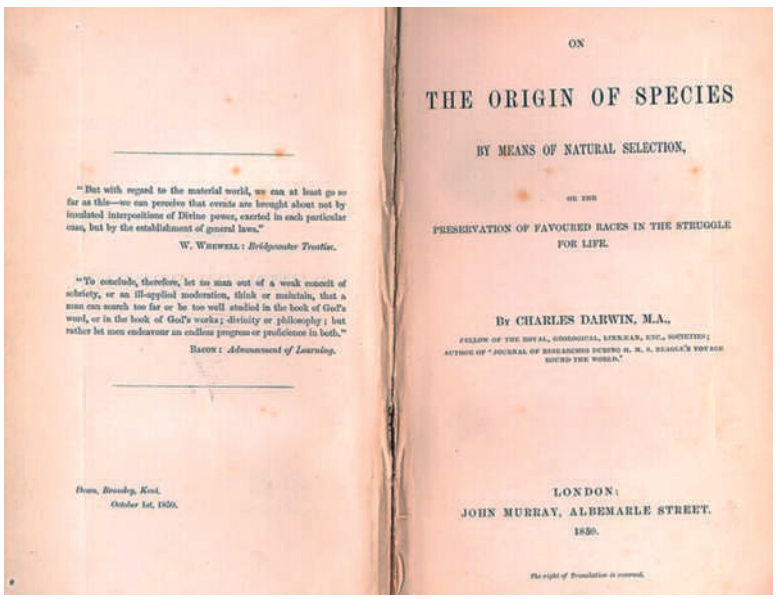
The main conceptual prerequisite for answering our question involves a clear definition of life. This is not an easy task. We must combine necessary characteristics of living organisms in an evolutionary perspective. A modern biologist will specify at least three such properties. First, an organism has a biochemical metabolism. Second, it reproduces itself by transmitting genetic information to its descendants. Third, these descendants may differ from their parent because mutations and recombinations can occur in the transmitted genetic information. From an evolutionary perspective, these properties must be interpreted as features of systems that live in ecologies where natural selection occurs. The selective struggle for existence between such systems arises whenever a population of varying natural systems such as macromolecules or organisms self-reproduces under restrictions on growth.

Therefore, do we need not a single origin of life but rather as many origins as there are necessary characteristics of life? In this way, the physicist Freeman Dyson proposed that we must accept two separated origins of life: the origin of metabolism and the origin of self-reproduction. Of course, one could add the origins of other defining characteristics of primitive organisms such as having some kind of membrane. The more we know about the necessary structural elements of early life forms, the more origins we get—until we have a sequence of many origins of life. But then we must ask what the first origin of life was. So we are back again at the very same point from which we started.

We do not need, however, to follow this line of thought. The previously mentioned characteristics of life are not standing separately next to each other. There is, for example, no simple dualism between information-based replication and biochemical metabolism. The behavior of an organism—made energetically possible by its metabolism—aims, after all, at transmitting the genetic information that is needed to construct the structural prerequisites for metabolism. Because of this causal and functional dependence of metabolism on genetic information, we must assume that the origin of genetic information is identical to the origin of life. The origin of life is nothing other than nature's first discovery of information processing via codes, that is, the evolutionary establishment of a primeval language. We are able to integrate mutability into this overall picture as well because the replication of genetic information in real chemical systems is often incorrect.

If the origin of life is identical to the origin of genetic information, can we infer that the origin of genetic information is the origin of deoxyribonucleic acid (DNA)? It seems so because molecular genetics describes inheritance as a complicated dynamics of storing, transmitting, processing, and transforming information where DNA acts as the material carrier of genetic information from parents to offspring. But the case is not so simple. According to current knowledge, there was a ribonucleic acid (RNA) world before the DNA world of today. Nowadays, the different types of RNA play important roles in the cell (such as transferring genetic information out of the nucleus in eukaryotic cells), but they do not act as the material carrier of the genetic information flow from parents to offspring.

The assumption that there was an RNA world solves an important evolutionary problem. To reproduce genetic information, proteins that act as catalytic enzymes in this process are needed. To produce such enzymes in a cell, their structure



"But with regard to the material world, we can at least go so far as this—we can perceive that events are brought about not by insulated interpositions of Divine power, exerted in each particular case, but by the establishment of general laws."

W. Whewell: *Bridgewater Treatise.*

"To conclude, therefore, let no man out of a weak conceit of sobriety, or an ill-applied moderation, think or maintain, that a man can search too far or be too well studied in the book of God's word, or in the book of God's works; divinity or philosophy; but rather let men endeavour an endless progress or proficience in both."

Bacon: *Advancement of Learning.*

Down, Bromley, Kent.
October 1st, 1859.

ON

THE ORIGIN OF SPECIES

BY MEANS OF NATURAL SELECTION,

OR THE

PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR LIFE.

By CHARLES DARWIN, M.A.,

FELLOW OF THE ROYAL, GEOLOGICAL, LINNEAN, ETC., SOCIETIES;
AUTHOR OF "JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE ROUND THE WORLD."

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1859.

The right of Translation is reserved.

Source: Courtesy of Wikipedia.

must be encoded in genetic information. To have this information in a cell, it must be copied before in the ancestor cell. To reproduce genetic information, those enzymes are needed and so on. RNA breaks out of this circle because RNA can store information in the sequence of its building blocks and catalyze its own replication enzymatically.

What is more, the biologist must also take into account the possibility that there was a precursor, or even a sequence of precursors, of RNA. The detailed chemical structure of such primeval information carriers is not known. Therefore, experimental research on the origin of life is of utmost importance. After a theoretical prelude during the 1920s (Alexander Oparin and J. B. S. Haldane), this kind of research started during the 1950s with the famous experiments of Stanley Miller and Harold Urey, who were able to synthesize, in a laboratory simulation of the atmosphere of primitive Earth, a multitude of organic compounds such as purines and pyrimidines (the bases that are components of the fundamental building blocks of RNA and DNA) and amino acids (the building blocks of proteins). Since Miller and Urey's experiments, great progress has been made in experimental research on the origin of life. One could especially note experiments with viral RNA, which self-replicates in a test tube without any surrounding cell so that one can start a selective evolution of information-bearing macromolecules in the laboratory (Sol Spiegelman).

In spite of this experimental progress, until now no biologist could experimentally reconstruct the historical origin of the first life form on Earth. It is even probable that we will never be able to simulate the real history of the transition from the nonliving to the living on primitive Earth. This impossibility can have two reasons.

First, one might suppose that the origin of life was a single event that happened against all odds. Because there are so many possibilities of how to combine all the compounds that are necessary for the spontaneous assembly of the first self-replicating macromolecule, it seems to be a priori very improbable that they all came together in the right concentration at the same place and at the same time (Jacques Monod). If life originated in such an extraordinary moment of absolute randomness, it is a realistic assessment that we cannot reproduce it in the laboratory because we would need to simulate successively an unforeseeable number of those possible chemical scenarios.

Yet the idea of a random origin of life underestimates the role of law-governed dynamic processes that can lead, from a diverse set of initial conditions, to the origin of life in many possible courses of natural history. But even according to this second conception, it is rather probable that the real primeval history of life will never be reconstructed in all details. We do not have enough information about the concrete circumstances of the transition from prebiotic to biotic evolution. So we can define only the class of possible histories that could have led to this transition. To do so, we must apply to the origin of life the very same theoretical idea that is used to explain the origin of species—natural selection.

How can we extend the Darwinian logic from biotic to prebiotic evolution? First, we must show how a set of chemical compounds can self-organize into a self-replicating system of macromolecules. For example, let there be three different kinds of macromolecules: A, B, and C. Now imagine that the rate of self-replication of B is proportionally dependent on the concentration of A, the rate of self-replication of C is dependent on the concentration of B, and the rate of self-replication of A is dependent on the concentration of C. So we get a closed cycle of macromolecules that depend on each other to maximize their rate of replication. As such, a cooperative structure, called "hypercycle," arises (Manfred Eigen and Peter Schuster).

Second, we must realize that such hypercycles are systems that self-reproduce (by reproducing their components cooperatively), have a metabolism (by importing the building blocks of their components and energy from their environment), and are mutable (by changing the structure of the components due to, as an example, the thermal movement of the involved molecules). In sum, hypercycles show all the phenomenological characteristics that are necessary for calling a system "living."

Third, we must see hypercycles as self-replicating and varying systems from a Darwinian perspective. In a common prebiotic ecology on primitive Earth, they would act as selective units that struggle against each other for chemical and energetic resources. As such, a process of natural selection among hypercycles would start, so that we are encouraged to call them "living" even from an evolutionary point of view.

Fourth, we must connect this rather formal model with our considerations on the first material carriers of genetic information. In a hypercycle, a nucleic

acid—be it RNA or some precursor—could reproduce autocatalytically. Of course, it would not store information about how to construct something other than its own structure. But if there arises some code by which the nucleic acid can control the synthesis of other macromolecules such as proteins and which helps to better replicate its chemical structure, our hypercycle would enter the next evolutionary phase of natural information processing. If this happens, our information-theoretical criterion of life would be fulfilled; it would identify the origin of life with the origin of genetic information, which is based on a code.

By elucidating even the origin of life, Darwinism shows its explanative power. Abstracted from the struggle for existence between macroscopic organisms and applied to the level of microscopic molecules, the Darwinian logic of variation, inheritance, and selection can explain the origin of prebiotic self-reproducing systems, which are the very first ancestors of what we are—macroscopic organisms.

If we accept Darwinism as an explanation of the past origin of life on Earth, we are urged to look into the future and to ask whether there could appear new forms of life—via new types of genetic information—by the same mechanism of Darwinian selection. This might occur not in the chemical ecology of our ancestors but rather in complex computer systems, where varying self-replicating programs could fight against each other for the resources of an electronic ecosystem without being controlled by some human programmer.

— *Stefan Artmann*

Further Readings

Dyson, F. (1999). *Origins of life* (rev. ed.). Cambridge, UK: Cambridge University Press.

Eigen, M., & Winkler-Oswatitsch, R. (1992). *Steps toward life: A perspective on evolution.* Oxford, UK: Oxford University Press.

Küppers, B.-O. (1990). *Information and the origin of life.* Cambridge, MA: MIT Press.

Maynard Smith, J., & Szathmáry, E. (1999). *The origins of life: From the birth of life to the origins of language.* Oxford, UK: Oxford University Press.

Popa, R. (2004). *Between necessity and probability: Searching for the definition and origin of life.* Berlin, Germany: Springer.

Lineage Systems, Segmentary

Segmentary lineage systems are a form of decentralized and egalitarian social organization consisting of nested groups vested with the responsibility for security, defense, and welfare. Lineage systems are characterized by groups defined by descent from a common ancestor. Small groups trace their descent to close ancestors, whereas large groups (encompassing many small groups) trace their descent to distant ancestors. For groups to be discrete and not overlapping, descent is traced unilineally—through one line, either male or female. Patrilineages trace through the male line and are dominated by male and female descendants of the common male ancestor; matrilineages trace through the female line and are dominated by male and female descendants of the common female ancestor. In patrilineal systems, only males pass on group membership to their children; women's children are members of their fathers' groups. Conversely, in matrilineal systems, only females pass on group membership to their children; men's children are members of their mothers' groups.

Lineage systems are segmentary in that each group takes the same form as every other group, whether large or small, with each segment being like every other. These segments are organized in relation to one another into a balanced opposition. This organization is based on the general principle that genealogically closer groups unite in opposition to more distant groups and on the contingent nature of these groups by which they are activated only in situations of opposition to groups of structural equivalence and equal size. For example, if two men who are members of minor lineages in the same tribal section fight, only the members of each minor lineage are involved, but if members of two different tribal sections fight, all members of each section, regardless of minor lineage membership, are involved and, if mobilized, are acting as section members.

Segmentary lineage systems are important because in many tribal societies lineage groups based on descent through the male line are vested with important economic and political responsibilities. In segmentary lineage systems, patrilineages commonly have collective ownership of, or particular claims on, important resources such as land and water sources. In general, lineages are responsible for security, providing the defense force and undertaking collective

responsibility for gaining restitution or taking vengeance for losses and injuries. The original and most famous description of these systems, *The Nuer,* described a pastoral tribal people living in the southern Sudan. Edward Evan Evans-Pritchard recounted the correspondence between the lineage system and the territorial system that made possible their functioning as a decentralized, egalitarian, and expansionist political system. These systems are widespread in Africa (Somali, Libyan Bedouin) and in the Middle East (Turkmen, Arabian Bedouin, Baluch).

Segmentary lineage systems are best understood as means of defense and social control. The balanced opposition serves as a deterrent to aggressive adventurism. Collective responsibility of group members for each other guarantees that no individual or small group is a free target. Loyalty to one's lineage is not so much a sentimental attachment to blood kin as it is a hardheaded recognition of who one can count on when one gets into trouble.

Segmentary lineage systems are found where tribal political organization is possible. These systems provide security for life and property where important property, such as livestock and wells, need constant protection. They are also found where nonterritorial means of relating people are useful such as among pastoral nomads, where people are frequently moving around and mixing. Under strong states, segmentary lineage systems are suppressed as competing powers.

— *Philip Carl Salzman*

Further Readings

Evans-Pritchard, E. E. (1940). *The Nuer: A description of the modes of livelihood and political institutions of a Nilotic people.* Oxford, UK: Clarendon.

Evans-Pritchard, E. E. (1949). *The Sanusi of Cyrenaica.* Oxford, UK: Clarendon.

Irons, W. (1975). *The Yomut Turkmen: A study of social organization among a Central Asian Turkic-speaking population* (Anthropology Paper No. 58). Ann Arbor: University Michigan, Museum of Anthropology.

Lancaster, W. (1997). *The Rwala Bedouin today* (2nd ed.). Prospect Heights, IL: Waveland.

Lewis, I. M. (1961). *A pastoral democracy: A study of pastoralism and politics among the Northern Somali of the Horn of Africa.* Oxford, UK: Oxford University Press.

Salzman, P. C. (2000). *Black tents of Baluchistan.* Washington, DC: Smithsonian Institution.

Salzman, P. C. (2004). *Pastoralists: Equality, hierarchy, and the state.* Boulder, CO: Westview.

Linguistic Reconstruction

One of the most important tasks of historical or comparative linguistics is to try to establish a relationship between or among two or more contemporary languages based on a supposed common ancestry. The tool most often used to do this is linguistic reconstruction.

In 1786, Sir William Jones, a British judge and swashbuckling scholar who some more recently have compared to his namesake Indiana (in the *Indiana Jones* films), made a startling discovery: "The Sanskrit language . . . is of wonderful structure; more perfect than Greek, more copious than Latin . . . yet, bearing to both of them a stronger affinity, both in the roots of verbs and forms of grammar, than could have possibly been produced by accident; . . . [they] sprung from a common source which, perhaps, no longer exists." What Jones was suggesting then was that Greek, Latin, and Sanskrit all shared a common ancestor in the distant past, just as three sisters might share a common grandfather. The reconstructed language is called a protolanguage, and reconstructed words or parts of words are called protoforms. (A protoform is usually preceded by an asterisk to distinguish it from actual speech.)

In doing a comparative reconstruction, word lists of the languages thought to be related are carefully compared to find cognates—words that share similar structures and meanings. For example, consider the following words for *sun* in four Native American languages: *hasi, hashi, haasi,* and *hasi* in Koasati, Choctaw, Hitchiti, and Creek, respectively. Ignoring the "long" *a* vowel in Hitchiti, what might the protoform for sun have been in the parent language? All of these words begin with the same sound, *h,* and use the low central vowel, *a,* so the word in the protolanguage probably contained these as well. But what about the *s* and *sh* sounds? By the "majority rules" strategy, we would argue that *s* was the original sound and that Choctaw underwent a change to *sh* for some reason. Thus, we would probably posit the protoform in this

protolanguage—actually called Muskogean by most Americanists—to be **hasi* rather than **hashi.*

But there is another reason why **hasi* is the more likely candidate. The "phonetic plausibility" strategy says that the sound changes we hypothesize must make sense phonologically based on our knowledge of how the speech organs operate. There is much worldwide linguistic evidence where an *s* sound becomes palatized (i.e., the tongue moves back toward the hard palate in the roof of the mouth) when it comes before a high vowel *ee* (the last vowel in all of the Muskogean words mentioned previously). There are few, if any, examples of the opposite; in other words is it more likely that an *s* becomes a *sh* than an *sh* becomes an *s* in this context. Thus, if a native English speaker is tired or drunk and wants to say the sentence "I didn't see she was home," the speaker would be more likely to slur it as "I didn't *she* she was home" than to slur it as "I didn't see *see* was home."

Although phonological reconstructions are the most publicized, reconstructions can also be made at the level of morphology (units of words) and syntax (grammar). In terms of linguistic reconstruction in general, the Indo-European language family probably has received the most attention. Besides shifts in sound changes due to formal regularities, more historical linguists are also investigating the sociolinguistic motivations behind them. Linguistic anthropologists, from the time of Edward Sapir onward, have used linguistic reconstructions to explain the movement, contact, and history of non-Western peoples and will no doubt continue to do so.

— *James Stanlaw*

Further Readings

Buck, C. D. (1988). *A dictionary of selected synonyms in the principal Indo-European languages.* Chicago: University of Chicago Press. (Original work published 1949)

Cannon, G. (1991). *The life and times of Oriental Jones: Sir William Jones, the father of modern linguistics.* Cambridge, UK: Cambridge University Press.

Hock, H. H. (1991). *Principles of historical linguistics* (2nd ed.). Berlin, Germany: Mouton de Gruyter.

Hoeningswald, H. (1960). *Language change and linguistic reconstruction.* Chicago: University of Chicago Press.

O'Grady, W., Dobrovolsky, M., & Aronoff, M. (1989). *Contemporary linguistics.* New York: St. Martin's.

Linguistics, Descriptive

Descriptive linguistics is a subfield of linguistics that studies and describes language in structural terms. In its investigation of linguistic structure, descriptive linguistics emphasizes the primacy of speech, the adoption of a synchronic approach, and the description of language and dialect systems as they are found to be spoken.

Descriptive Linguistics as a Scientific Pursuit

The rise of descriptive linguistics is generally attributed to the work of Ferdinand de Saussure (1857–1913), a Swiss linguist who is credited as being the father of modern linguistics. In the *Cours de linguistique générale,* a collation of his lecture notes published posthumously in 1916, Saussure laid out the general principles and methods of what has come to be known as descriptive linguistics.

The primacy of speech. Fundamental to Saussure's teachings was the dichotomy of *parole* (speech) and *langue* (language). Language is a system of rules and conventions shared by a community of speakers, whereas speech is individual and particular utterances. The descriptive linguist uses speech to construct the underlying common structure or system of a language. In the construction of the language system, speech is primary and writing is secondary. Not only is speech older, but all writing systems are based on units of speech, yet no writing system captures all of the information that is carried in speech by variations of pitch, stress, gesture, facial expressions, space manipulation, context, and so on. There is also an overwhelming majority of languages that do not have a writing system. The primacy of speech, however, does not negate the importance of writing where homophony makes speech ambiguous, writing is completely independent of speech (Latin), or speech and writing have diverged significantly (Cantonese, Mandarin).

Synchronic approach. Descriptive linguistics is also known as synchronic linguistics. The synchronic study of a language involves describing it at a particular point in time without recourse to historical information. In contrast, the diachronic study of a language involves describing its historical development

through time. Diachronic description is based on the knowledge of previous synchronic states through which languages have passed historically. By necessity, synchronic description (descriptive linguistics) is prior to diachronic description (historical linguistics). This primacy of synchronic description also implies that diachronic information is irrelevant to the investigation of a language in a temporal state. To illustrate this point, Saussure used a famous analogy that compared languages to games of chess. The pieces of a chess set may be made of wood, ivory, onyx, metal, or something else. A treatise on the origins of the chess pieces or on the history of materials used to make them may be interesting, but it has no bearing on the understanding of chess games. What is crucial for an understanding of chess games is to know the synchronic relations among chess pieces. Equipped with this knowledge, the state of the chessboard at any particular time can be described without recourse to the previous combination of moves that has brought the game to that point. Similarly, any language can be described without recourse to information about its previous states. Unlike historical linguistics, descriptive linguistics is interested in all languages, not just those languages whose historical changes are known.

Descriptivism versus prescriptivism. Descriptivism is the policy of describing a language as it is found to be spoken. Descriptive linguists write rules and grammars to capture the knowledge that speakers have of their language in producing speech. The end product is a descriptive grammar, a model about how people speak and what they know of their language unconsciously. For Saussure, the goal of linguistic analysis is to uncover out-of-awareness native knowledge, a *langue* as opposed to *parole.* Prescriptivism is the belief that people must conform to the rules laid down by prescriptive grammarians and that deviation is corruption. A prescriptive grammar dictates how people should speak. It is not unusual that prescriptivists condemn utterances that appear to be perfectly normal to the majority of speakers, for example, "It's me" instead of the prescribed form "It's I." Language change is the worst enemy of prescriptivism.

Structuralism. Saussure saw language as "a system of relations." To analyze the structural importance of relations, he developed a number of dichotomies, including the famous syntagmatic–paradigmatic dichotomy. Syntagmatic relations are contracted between units that can co-occur, whereas paradigmatic relations are contracted between units that may substitute for each other. The Saussurean point that linguistic units have no validity independent of their syntagmatic and paradigmatic relations with other units is well taken. With contributions like this, Saussure made the structuralist approach explicit for the study of language. It was Leonard Bloomfield (1887–1949) who propounded a general theory of language structure. Not only did his *Language* contain a thorough theoretical excursion, but the 1933 book also mapped out a detailed methodology for analyzing all levels of linguistic structure up to syntax. At the heart of Bloomfield's theory is the autonomy of language, a thesis stating that the patterns of language operate with regularity and constitute an object of scientific study in its own right. Edward Sapir (1884–1939) and Bloomfield were the first two leading linguists of American structuralism to emphasize the importance of a descriptive approach to the study of language. They developed a substantial agenda for the autonomous, synchronic, and structural description of languages.

Discovery Procedure

The goal of descriptive linguistics is to "discover" a grammar by performing a set of operations on a corpus of data. The levels of grammatical description are to be arrived at in the following order:

1. Phonetics (speech sounds)
2. Phonemics (phonemes and allophones)
3. Morphemics (morphemes and allomorphs)
4. Syntax (sentence construction)
5. Discourse (use of speech)

This discovery procedure typically leads to the generation of three descriptive studies: a grammar, a dictionary, and an edited volume of texts in the language.

Descriptive linguistics features a rigorous application of basic concepts and analytical procedures. The basic units of analysis (for example, phone, allophone, phoneme, morpheme, allomorph, immediate constituent) are carefully defined, and the analytical procedures or modi operandi are laid out. The resultant descriptions are characterized by a systematic

exposition of the phonemes of the language, their phonetic variants (allophones), and their realization in the morphemes (morphonemics). This is followed by a treatment of the morphology and syntax of the language that is no less rigorous and systematic. By focusing on the shared structural features cross-linguistically, descriptive linguistics enables the classification of the world's languages typologically.

There is also a procedural constraint against "mixing levels." As was shown earlier, in terms of analytical levels, phonemics precedes morphemics. Therefore, morphemes are to be discovered only after the phonemes of which they are composed are isolated from the data of speech. Moreover, morphemic or syntactic information must not enter a phonemic description. All of this is designed to ensure the scientific rigor of linguistic analysis against circularity. If two fairly bright graduate students who are trained in descriptive linguistics at two different institutions are sent out to describe an unanalyzed language at two different times and using two different informants, chances are that their analyses would be highly similar.

What has been presented is a "working up" model. It starts with the identification of speech sounds and phonemes and goes progressively up to examine how they are arranged into meaningful units (for example, morphemes, words, phrases) and what rules are used to combine these units into longer sentences and utterances. Conversely, the larger units of speech can be taken as the starting point as in the generative tradition. Sentences, for instance, are elicited directly and then broken down progressively. This "working down" model, however, is not what ethnographers usually follow in fieldwork. Because ethnographers must learn to speak the native language for participant observation, they tend to work up, beginning with the minutiae of the language, uncovering its structure bit by bit, and in the process managing to use its rule systems and everyday speech as a valuable source of insight into the culture of that speech community.

Descriptive Linguistics and Anthropology

Descriptive linguistics received its formative impact from anthropology as much as from linguistics. It was Franz Boas (1858–1942), the father of American anthropology, who set the stage for the development of a modern linguistic science in the United States. He developed a scheme for the systematic description of languages and outlined it in the introduction to the *Handbook of American Indian Languages* (1911–1922). The scope of description envisaged by Boas was to include the psychology of meaning expression in addition to linguistic structure. In 1917, he founded the *International Journal of American Linguistics,* which was devoted to the descriptive study of the American Indian languages.

The history of American linguistics since Boas's groundbreaking impact is the history of the influence of Sapir and Bloomfield. As a student of Boas at Columbia University, Sapir was trained in anthropology. Like Bloomfield, he switched to the study of synchronic linguistics after doing brilliant work in historical linguistics. Whereas Bloomfield focused on the Algonquian languages around the Great Lakes, Sapir's principal work was with the native languages of the western United States and Central America such as Kwakiutl, Chinoook, Yana, Wishram, Wasco, Ute, Nootka, Nahuatl, Chenyenne, Yurok, Comox, and Navajo. Sapir was perhaps the greatest fieldworker in the history of linguistics. The analyses of a number of American Indian languages that he presented have remained valid to this day. Especially noteworthy is his Takelma grammar of 1911 (published in 1922), in which he worked out the basic principles of structuralism before Saussure's *Cours* was published.

During the 1930s and 1940s, one of the primary concerns of descriptive linguistics was phonemics, which involves the classification of phonemes. Consider the *p*-like sounds in the words *pray* and *spray,* which are grouped under the same phoneme *p* in English. Acoustically, however, these *p*-like sounds are different, with one being aspirated and the other being unaspirated. Although this variation of aspiration is ignored phonemically in English, it is important in languages such as Sandhi because it gives rise to two different phonemes: an aspirated *ph* and an unaspirated *p* that differentiate meaning in words, as in $p^{TM}nu$ (snake food) and $p^{TM}nu$ (leaf). Conversely, where English speakers distinguish between the sounds *p* and *b,* as in *peach* and *beach,* speakers of Arabic do not and group *p* and *b* under the same phoneme. The list of examples can go on and on.

Difficulties arose when efforts to provide an object basis for defining the phonemes of an unknown language in face of their variation in sounds were attempted. A breakthrough came when Sapir proposed that the phoneme was a psychological unit under

which the native mind grouped a number of similar speech sounds (allophones). It was shown that the grouping of allophones into distinctive phonemes varied from language to language. Therefore, one could not impose the forms of one's own language on other tongues. Rather, each language had to be studied in its own terms and categories. Principles like these enabled the descriptive linguist to overcome the ethnocentrism to which Boas had objected.

Sapir also believed that linguistic structure had an underlying mental reality. To put it in Boas's words, language was the window of the mind. This belief was reinforced by the discovery that both the phoneme and morpheme were psychologically real and could not be explained away merely in behavioral terms. It led Sapir to assume that linguistic structure also played a role in shaping people's perception of reality, an idea that was mentalist and further developed by his student Benjamin Lee Whorf (1897–1941).

Bloomfield instead insisted on an empiricist orientation that allowed only statements based on direct observation or generalizations that were derived from observables. During his later years, Bloomfield was known for his stark refusal to consider semantics or mentalism as a part of linguistic science. It was his belief that neither could be studied scientifically. Under the predominant influence of Bloomfield's empiricism, descriptive linguistics came to focus on the internal structure of language without reference to meaning or psychology.

The descriptive linguist tends to rely on "direct elicitation" in data collection. To the extent that direct elicitation requires a native informant to reflect on language context free to a nonnative speaker (the field-worker or researcher), biases are inherent in the data collected. Some of the biases arise from decontextualized unnatural uses of language in elicitation sessions. Others are due to the fact that the informants may use simplified speech, such as "foreign talk," to cope with the abstract unnatural tasks imposed on them. Participant observation provides a remedy in that regard by helping the field-worker to observe native speech in context and to relate it to the meaning system and cognitive patterns of the native culture.

Descriptive linguistics has proved to be productive in the hands of linguistic and cultural anthropologists who retain the mentalist outlook of Sapir. Led by Morris Swadesh, Stanley Newman, Mary Haas, and C. F. Voegelin, they are responsible for the many careful descriptive studies of American Indian and other indigenous languages that have been published and continue to be published. It is important to include the study of linguistics in the basic training of anthropologists. The insight that structural linguistics provides into the rule and meaning systems of language is indispensable for anthropologists attempting to examine language in broad terms.

— Zhiming Zhao

Further Readings

Bloomfield, L. (1933). *Language.* New York: Henry Holt.

Carroll, J. B. (1955). *The study of language.* Cambridge, MA: Harvard University Press.

Dinneen, F. P. (1967). *An introduction to general linguistics.* New York: Holt, Rinehart & Winston.

Duranti, A. (1997). *Linguistic anthropology.* New York: Cambridge University Press.

Lehmann, W. P. (1972). *Descriptive linguistics: An introduction.* New York: Random House.

Lyons, J. (1968). *Introduction to theoretical linguistics.* New York: Cambridge University Press.

Newmeyer, F. J. (1986). *Linguistic theory in America.* San Diego: Academic Press.

Sapir, E. (1949). *Selected writings of Edward Sapir in language, culture, and personality* (G. Mandelbaum, Ed.). Berkeley: University of California Press.

Linguistics, Historical

Historical linguistics is a subfield of linguistics that studies language in its historical aspects. It investigates a language or languages at various points in time. The term "diachronic linguistics" is often used in place of historical linguistics and sets it apart from "synchronic linguistics," which studies language at a single point in time. The investigation of historical linguistics involves language change, reconstruction, and classification.

Linguistic Change

No language stands still so long as it is spoken, and every language is the product of change. Linguistic change is cumulative and, for the most part, gradual enough to escape our attention as it occurs. Typically,

the cumulative effect of linguistic changes makes itself felt after a span of centuries. The longer the span, the greater the changes that are accumulated.

External Change

One way in which languages change is through the influence of other languages or *external change.* Such influence is most obvious in the borrowing of words that may arise from contact brought about by navigation, trade, cultural exchange, political dominance, conquest, and so on. The study of linguistic borrowing is often called "areal linguistics."

The two principal strategies of lexical borrowing are loanwords and loan translations. A loanword is a word of foreign origin that is adapted at least partly in sound or grammar to the native ways of speaking. The English word *macaroni,* for instance, was borrowed from Italian (*maccheroni*). In loan translation, the parts of a foreign expression are translated, producing a new idiom in the native language, as in the French *gratte-ciel* and the Spanish *rascacielos.* Both are derived from the English word *skyscraper* and formed after the metaphor of "scraping the sky" to convey the idea of a very tall building. Such forms are a kind of calque in which the internal structure of a foreign expression is maintained but the morphemes are nativized.

Loanwords often have a life that cuts across the boundaries between languages. A case in point is the English word *chess,* which was borrowed from Old French during the 13th century. But the word originated in Persian and was adopted as a loanword by Arabic and then by Latin from Arabic. The Medieval Latin *scaccus,* in turn, gave the Old French *esches* (singular *eschec*). Thus, the etymology of *chess* reaches from Persian through Arabic, Latin, and Old French to English.

The distribution of loanwords is a subject of serious study because it bears on the nature of contact between two languages during a particular historical stage. Consider what happened after the Norman Conquest of 1066, which made French the language of the official class in England. It is small wonder that many English words having to do with government, administration, nobility, law, military and religious affairs, and so on are of French origin. But when the English cow, sheep, pig, and calf were served at the table, they became the French *beef, mutton, pork,* and *veal,* respectively. French names were also given to the culinary processes whereby the meats were prepared for Normans' consumption.

Phonological and syntactic borrowing occurs less freely than does lexical borrowing. This is because a phonological or syntactic system consists of an integrated sum of rules, and the modification of one rule may have serious consequences elsewhere in the system. But there are known examples of phonological and syntactic borrowing. Old English (450–1100), for instance, did not have phonemes such as /v/ (*v*ase), /z/ (*z*eal), and /ð/ (*th*ey). It was with the introduction of loanwords from French as well as Latin that these three sounds eventually achieved phonemic status during the Middle English period (1100–1450). A well-known case of syntactic borrowing is the restricted use of the infinitive by the languages of the Balkan Peninsula (Albania, Bulgarian, Greek, and Romania). This shared trait is attributable to mutual borrowing instead of genealogical relationship that is quite indirect among them.

When two languages come into contact, linguistic acculturation ensues, resulting in the adoption of linguistic traits from each other. If the speakers are equally powerful or prestigious, we have two adstratum languages. In an adstratal relationship, linguistic borrowing goes in both directions, with each language serving as donor and recipient. If the speakers are unequal in terms of power or prestige, the language of the dominant group is called the superstratum language and the language of the less dominant group is called the substratum language. In this case, borrowing is primarily unidirectional, with the superstratum language serving as the donor and accepting only a few loanwords from the substratum language.

Linguistic borrowing is subject to sociolinguistic and structural factors. Traditional wisdom is that the degree of typological and structural similarity is more significant in determining whether an indigenous language accepts loanwords. Recent studies, however, have shown that the opposite is more likely to be true. In the case of Native American languages, for instance, past bilingualism appears to have been a more prominent factor in influencing the borrowing of lexical items and grammatical features.

Internal Change

Internal change can occur on all levels of linguistic structure. The difficulties that Middle English (1100–1450) poses for the modern reader, for instance, are due partly to the strangeness of outdated spelling

conventions. This was about to change when Geoffrey Chaucer (ca. 1340–1400) condemned what he considered to be haphazard variations in English vowel pronunciation. In actuality, these seemingly random variations were part of an internal sound change (the Great Vowel Shift) that resulted in the transition of Middle English to Early Modern English (1450–1700). Consequently, the spelling conventions of Shakespeare's time were brought more in line with what we have today, but in an actual performance of a Shakespearean play the pronunciation of the actors is still not easy to follow.

Interestingly, internal sound change may be related to culture change. The distribution of *f* sounds in time and space, for instance, led Charles F. Hockett to propose in 1985 that as a relatively recent innovation attested by diachronic and synchronic evidence, the *f* sounds arose in association with agriculture. Not only is there a correlation between the development of *f* sounds in language and the practice of crop raising, but the use of cereal grains in the daily diet may have been responsible for inducing the changes in the dental configuration and jaw motion that made the articulation of labiodentals possible and easy.

Another form of internal change involves the loss and addition of lexical items. There used to be, for instance, an English verb *cennan,* meaning "give birth to," but it has completely disappeared from the language. The addition of new terms can be through coinage (for example, *Kodak, xerox*), derivation (use of prefixation, use of suffixation), compounding (*takeoff, headstrong*), abbreviation (*radar, ASAP*), clipping (*exam, dorm*), blending (*brunch, smog*), functional shift (*to bag, to milk*), semantic change, and so on.

On the syntactic level, internal change may occur in word order or the use of morphemes that indicate syntactic relations among words. During the early stages of English, for instance, a possessive pronoun tended to follow rather than precede the noun it modified. Therefore, the Lord's Prayer used to begin with *F¿der ûre* ("Father our") in the opposite order from what is said today. Even more dramatic is the amount of inflection shed by Modern English. Old English was a highly inflected language, employing an abundance of grammatical endings to distinguish case, number, gender, person, tense, and so on. In Modern English, however, there is relatively little left in the way of inflection. This revolutionary change was initiated by the lowly English peasants and shepherds, who adhered to their native tongue during the Norman Conquest and, in the process, introduced an overhaul of the structure of English in their speech.

Reconstruction

The emergence of modern linguistics is often traced back to 1786, when Sir William Jones (1746–1794) published an article describing the structural similarities that crystallized from a comparison of Sanskrit, Greek, and Latin and called for the *reconstruction* of their ancestor language. At its onset, modern linguistics exhibited a predominantly *comparative historical* orientation.

The Growth of Comparative Historical Linguistics

Following the lead of Jones, the 19th-century historical linguists made a concerted effort to study the relationship among languages, especially those that constituted the Indo-European family of languages. Among these linguists were Rasmas Rask (1787–1832), Jacob Grimm (1785–1863), Karl Verner (1846–1896), and August Schleicher (1821–1868).

In 1818, Rask, a Danish linguist, wrote the first comparative grammar of the Scandinavian languages. Through rigorous comparisons, he mapped out the sound correspondences among these languages, brought order into their historical relationship, and defined their place in the Germanic branch of the Indo-European language family. Grimm, a German linguist, had focused his attention on the Germanic languages in general and Gothic in particular. His work resulted in two important achievements in 1822. One was the regular correspondences of consonants that he found between the Germanic languages, on the one hand, and Classic Greek, Latin, and Sanskrit, on the other. The other achievement was the revelation of the systematic nature of sound change. His conclusions went down as Grimm's Law, a simplified summary of which is given as follows:

Indo-European				*Germanic*		
p	t	k	>	f	è	h
b	d	g	>	p	t	k
bh	dh	gh	>	b	d	g

However, there are exceptions to Grimm's Law. Verner found that the regularity of the correspondences

predicted by Grimm was undercut by the place of the Indo-European stress. To account for the exceptions resulting from it, he proposed an additional phonological rule in 1875 that is to be applied to the outcome of Grimm's Law. The rule is named Verner's Law in honor of this Danish linguist.

During the mid-19th century, the German linguist Schleicher applied himself to the task of reconstructing the protolanguage of the Indo-European family. A protolanguage is a hypothetical parent language reconstructed from a group of languages that appear to be related. Schleicher set the reconstruction process on a solid footing by synthesizing the work of his precursors and formulating the "family tree theory" in 1871. According to this theory, language changes in regular ways (the regularity hypothesis) and similarities among languages are the result of a genetic relationship among them (the relatedness hypothesis). To reconstruct the protolanguage, the comparative method is to be used.

The Comparative Method

The technique of comparing related languages to arrive at a reconstruction of the protolanguage is known as the *comparative method.* It is a technique for establishing the relatedness of several languages and for reconstructing the linguistic forms (such as sounds, morphemes, words) of their protolanguage. In both cases, the comparative method works primarily with cognates.

Cognates are words that belong in different languages but are descended from the same ancestral root. A cognate set is a group of words similar in form and meaning. The English word *three,* for instance, is a cognate of Sanskrit *tri,* Persian *thri,* Greek *treis,* Latin *trçs,* German *drei,* Dutch *drie,* Icelandic *thrir,* Welsh *tri,* and so on. The application of the comparative method to this cognate set yields **treyes* as the proto-Indo-European form, where the asterisk (*) denotes its hypothetical nature. The sound correspondences revealed in this case also operate with regularity in other sets of cognates from these languages.

There is no intrinsic tie between form and meaning. This led Shakespeare to remark, in *Romeo and Juliet,* "That which we call a rose, by any other name would smell as sweet." If names are arbitrary, then the probabilities that different languages randomly choose to call the same thing by similar names are statistically insignificant. When we do find similarities (cognates), they are taken to point to relatedness. However, this is on the condition that their resemblance is not due to chance or borrowing. For example, Modern Persian has a word that virtually sounds and means the same as the English word *bad,* but the Modern Persian sound correspondences (*b-b,* ®-®, *d-d*) do not recur in a large set of linguistic items. It is relatively easy to eliminate chance similarities of this sort. Eliminating similarities due to borrowing, however, is more difficult. A common strategy is to focus on basic vocabulary, an area where borrowing has the least effect.

Given a cognate set, the historical linguist is able to arrive at its protoform by means of comparative reconstruction. The process involves examining each sound correspondence and applying two principal strategies. One is to reconstruct the sound occurring in the greatest number of languages being compared (majority rules), and the other is to reconstruct the sound that would have undergone the most common sound change (the rule of realism). In case there are two alternative analyses, preference is given to the one that is more natural or more explanatory in the sense that it sits better with the overall linguistic structure. No reconstruction, however, should violate the maxim of "Occam's Razor," which favors the simplest possible analysis. Following the reconstruction of the protoform, the linguist goes on to specify the sound changes that applied to the daughter languages and to check whether these proposed changes operated regularly across the whole collection of cognate sets.

Linguistic paleontology or archaeology uses reconstructed lexical items to recover information pertaining to prehistoric culture, society, and geographical facts. In the case of proto-Indo-European, linguistic evidence suggests that its speakers were small farmers who worked their fields with plows, had a clear sense of family relationship, kept domesticated animals and fowls, used wheeled vehicles, could count, lived in small villages, and believed in multiple gods. The original home of the Indo-Europeans must have been in an area of Central and Western Europe, defined by the coexistence of beech and birch trees. Similarly, the proto-Athabascan kinship system seems to contain evidence that its culture featured bilateral cross-cousin marriage, de facto sister exchange, and sororal polygyny, among others.

Internal Reconstruction

The *internal reconstruction* technique is designed to reduce synchronic, language-internal variation to an

earlier stage of invariance. Except for majority rules, the strategies discussed in connection with comparative reconstruction are also applicable to internal reconstruction. In addition, the linguist is watchful for the effects of "conditioned" sound change in that they might cause morphological irregularities in inflectional and derivational paradigm. Consider the following data from Latin, where only item 1 contains irregularities:

	Singular Normative			*Singular Dative*		
(1)	ur*p*-s	ur*b*-is	"city"	rē*k*-s	rē*g*-is	"king"
(2)	wō*k*-s	wō*k*-is	"voice"	stir*p*-s	stir*p*-is	"root"

Internal reconstruction will yield the protoforms **urb-s/*urb-is* and **rēg-s/*rēg-is* for item 1. A conditioned sound change caused the devoicing of **b* and **g* before voiceless *s* in the protoforms **urb-s > urp-s* and **rēg-s > rēk-s,* hence the synchronic irregularities. This process is known as "voicing assimilation," but it had no effect on voiceless **k* and **p* in the protoforms of item 2: **wōk-s > wōk-s* and **stirp-s > stirp-s.* By recovering the protoforms and the conditioned sound change, internal reconstruction completes its reduction of synchronic variation to historical invariance. However, the application of internal reconstruction has limitations. After all, an earlier structural feature can be reconstructed only if evidence for positing it happens to have been retained.

Classification

The historical linguist seeks to classify the world's languages in terms of genetic relationship. Such relationships are couched in the idiom of kinship so that a protolanguage is a parent language, with the divergent languages as its daughters and as sister languages among themselves. A parent language and its daughters constitute a genetic group or language family.

The most popular mechanism for diagramming genetic relationships is the family tree, a device created by August Schleicher. As can be seen in the figure, in its basic form, a family tree consists of a parent language (A) as a starting point, with branches showing the daughter languages (B–F).

This is reminiscent of a speech community splitting into dialectal segments that do not communicate with one another until they are mutually unintelligible and become separate languages. Once a dialect achieves the status of a language, it is itself subject to the process of dialectal split and the ultimate generation of new languages. Each branching node in a family tree represents a formerly existing language that is ancestral to the languages branched from it.

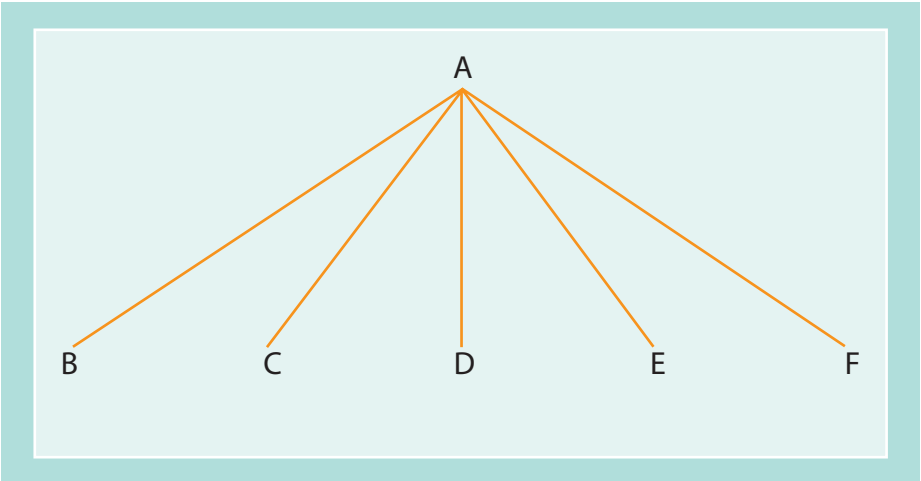
Eurasia

An overwhelming majority of the European languages belong to the *Indo-European* family, which is divided into 10 branches. English is a member of the Germanic branch, as are Frisian, German, Dutch, Yiddish, Gothic, and the Scandinavian languages. The other branches are Albanian, Anatolian (Hittite, Palaic, Lydian, etc.), Armenian, Balto-Slavic (Latvian, Lithuanian, Russian, Serbo-Croatian, Polish), Celtic (Welsh, Irish, Breton, Scots Gaelic), Greek, Indo-Iranian (Sanskrit, Persian, Hindi, Bengali, Romany), Italic (French, Spanish, Italian, Portuguese), and Tocharian.

Eurasia is home to several other language families as well. Among them are *Caucasian* (Georgian, Avar, Kabardian), *Uralic* (Hungarian, Finnish, Lapp), *Altaic* (Turkish, Uzbek, Manchu, Tungus), *Sino-Tibetan* (Chinese, Burmese, Tibetan, Miao), *Dravidian* (Tamil, Telegu, Kannada, Malayalam), *Tai-Kadai* (Thai, Laotian, Kam-Sui), *Austro-Asiatic* (Santali, Mon, Khmer, Nicobarese), and *Palaeo-Siberian* (Chukchi, Koryak). There is a lack of consensus as to whether Korean and Japanese are members of the Altaic family or actually form a language family of their own.

Oceania

The languages of Oceania are grouped into four phyla (superfamilies). The *Austronesian* phylum, also known as Malayo-Polynesian, consists of some 900 languages that are spoken on the islands of the Pacific and Indian oceans from Madagascar off the coast of Africa to Malaysia of Asia. Some of the Austronesian languages are Malagasy, Hawaiian, Fijian, Samoan, Māori, Tagalog, Indonesian, and Malay. The indigenous languages spoken on the continent of Australia are grouped as the *Australian* phylum. Among the indigenous languages that have the most speakers are Tiwi, Walmatjari, Warlpiri, and Aranda. The much smaller island of New Guinea shows a tremendous variety of languages. Collectively, they are known as the *Papuan* phylum, which may contain a large



number of language families. Oceania used to have one more language family, *Tasmanian,* which is now extinct.

Africa

The languages of Africa can be classified into one of four phyla. The *Afro-Asiatic* phylum, also known as Hamito-Semitic, contains languages spoken in north and northeast Africa and the neighboring parts of western Asia. This phylum consists of five families. *Semitic* is the most widespread and includes Hebrew, Aramaic, Arabic, Amharic, and extinct languages such as Akkadian and Phoenician. The other four families all are restricted to Africa: *Berber* (Tuareg, Riff, Kabyle), *Cushitic* (Somali, Gala, Walamo), *Chadic* (Hausa, Gabin, Mandara), and *Egyptian* (Coptic).

Congo-Kordofanian is the largest language phylum in Africa, extending from the equator to the extreme south. *Kordofanian,* however, is a small group of languages spoken in Sudan. The division of *Niger–Congo* is vast and consists of six families. *Benue-Congo* is the most numerous, with some 700 languages, including the Bantu languages (Swahili, Zulu, Kongo, Rwanda) that are spoken throughout central and southern Africa. The other families are *West Atlantic* (Fulani, Wolof), *Mande* (Malinka, Bambara, Mande), *Gur* or *Voltaic* (Mossi, Tallensi, Nupe), *Kwa* (Yoruba, Igbo, Akan, Ewe), and *Adamawa-Eastern* (Sango, Gbaya).

The *Nilo-Saharan* phylum is a highly diversified group of languages that are spoken in three areas. One is around the upper parts of the Nile River, with languages that belong to the Sudanic branch. Another area lies to the east of Lake Chad and is home to the Saharan branch. The third area is spread along the Niger River of Mali and is home to the Songhai branch. The best-known members of this family are Masai, Nubian, Kanuri, and Songhai.

Khoisan is the smallest language family, containing a group of languages spoken in areas scattered around the Kalahari Desert in southern Africa. Until fairly recently, speakers of Khoisan were foragers, known to the outside world by labels such as Khoikhoi, Hottentot, Bushman, and San. Their languages feature the use of click consonants. Through borrowing, this distinctive feature has found its way into certain other African languages such as Zulu and Xhosa.

North America

In North America, the *Eskimo-Aleut* family is found in the extreme north. Eskimo languages are spoken on the Arctic shores of Alaska, Canada, and Greenland as well as along the tip of Siberia. These languages are linked to the native language of the Aleutian Islands that is virtually extinct. A relationship between Eskimo-Aleut and the Palae-Siberian family of Asia has been suggested.

Further south is the *Na-Dené* phylum, a grouping of languages spoken in the Pacific Northwest (western Canada and northern California) and the southwestern United States (Arizona and New Mexico). With a few exceptions, such as Haida and Tlingit, these languages belong to the *Athabascan* family. Some of the main Athabascan languages are Navajo, Beaver, Chipeweyan, Dogrib, Hare, and Hupa.

The *Algonquian* family was found in central Canada and the Great Lakes region in association with a number of tribal languages (Ojibwa, Cree, Arapaho, Cheyenne, Micmac, Shawnee). Other major North American families include *Wakashan* in the Pacific Northwest (Nootka, Kwakiutl), *Salish* in western Canada and the western United States (Flathead, Squamish), *Iroquois* in eastern Canada and the eastern United States (Huron, Mohawk, Seneca, Cherokee, Tuscarora), *Siouan* in the Great Plains (Dakota, Omaha, Osage, Crow, Hidatsa), *Caddoan* in the southern Plains (Pawnee, Wichita, Caddo), and *Muskogean* in the

southeastern United States (Creek, Koasati, Choctaw, Muskogee).

Moreover, there are three language phyla that have an extensive north–south distribution. One is *Hokan,* which links the *Yuman* family in southern California with languages such as Tlapanecan and Jicaque in Central America. The *Penutian* phylum is a grouping of languages spoken in North and Central America and probably in South America as well. *Mayan* is its most important family, with Yucatan, Mam, Quiche, and Kekchin continuing to be widely spoken today. The third phylum is *Aztec-Tanoan,* which had an impressive presence in the western United States and Mexico. Some of its languages are Ute, Paiute, Shoshone, Comanche, and Hopi as well as Nahuatl, Pima-Papago, and Tarahumar, which are still spoken in Mexico. Also included in this phylum are a number of Pueblo languages.

Oto-Manguean is the only phylum restricted to Central America. It consists of several diverse families such as Zapotecan and Mixtecan. Both the vicissitude of pre-Columbian civilizations and a mountainous topography may have contributed to the linguistic diversity of Middle America. Some of the languages in this area are grouped with South American families.

South America

The South American continent is linguistically diversified, with a total number of languages estimated to be between 1,000 and 2,000. Only some 600 South American languages are documented, and some 120 of them are extinct. These known languages are grouped into three major phyla.

The *Macro-Chibchan* phylum covers the northwest of the continent in addition to parts of Central America and certain areas in northern and western South America. Languages of this phylum include Chibcha in Colombia, Esmeralda in Ecuador, Rama in Nicaragua, Cuna in Panama, and Waica along the Venezuelan–Brazilian border. The second phylum is *Ge-Pano-Carib,* found in northern and central South America. *Ge* is a family of languages spoken in central Brazil; the *Panoan* family is concentrated in Peru, Bolivia, and Paraguay; and the *Carib* family is widespread in northeastern Brazil, Venezuela, and the Guayanas. The third phylum, *Andean-Equatorial,* extends from central South America to southern Argentina. Its most important language families are *Arawakan,* once spoken from the Antilles down to Paraguay, *Tupi-Guarani,* whose speakers occupy a large portion of Brazil and most of Paraguay, and *Quechumaran,* which contains Quechua and several languages spoken in Argentina.

New Classification

The Amerindian languages, a new classification, are conventionally grouped into some 200 families. Various links of relationship between and within these families have been proposed. In a new worldwide grouping of languages proposed during the mid-1980s, Joseph Greenberg (1915–2001) held that the native languages of the Americas belong to just three phyla: *Eskimo-Aleut, Na-Dené,* and *Amerind.* Indeed, there is anthropological evidence that links the first two groupings to two late migrations from the Old World into the New World. The arrival of Eskimo-Aleut speakers was more recent and was predated by the arrival of Na-Dené speakers.

The idea that all other New World languages are derived from proto-Amerind has remained controversial. On the one hand, physical anthropology reveals substantial differences among the modern speakers of Eskimo-Aleut, Na-Dené, and all other American Indian languages. On the other hand, many scholars wonder how some 2,000 languages could have diverged from a single tongue within the span of 12,000 to 20,000 years since the earliest migration into the New World. The procedure generating the new classification of Amerindian languages is called "mass inspection." It lists words by language for comparison, and when look-alikes cluster, an earlier genetic relationship is hypothesized. This process is based on the assumption that at remote time depths, regular sound correspondences will be lost and only residual cognates will remain.

Language Isolates

If a language has no known relationship to any other language and does not lend itself to assignment to a family, it is called an isolate. *Basque* is one isolate that is spoken in the region of the Pyrenees (southern France and northeastern Spain). Other well-known language isolates include *Adamanese* (islands in the Bay of Bengal), *Burushaski* (Kashmir and India), *Ainu* (northern Japan), *Fur* (Sudan and Chad), *Keresan* (New Mexico), and *Kutenai* (western North America). Some extinct languages are also considered isolates,

including *Sumerian* (Mesopotamia), *Iberian* (Spain), *Etruscan* (Italy), and *Mohenjo-Daro* (Pakistan).

— *Zhiming Zhao*

Further Readings

Arlotto, A. (1972). *Introduction to historical linguistics.* Boston: Houghton Mifflin.

Brown, C. H. (1999). *Lexical acculturation in Native American languages.* Oxford, UK: Oxford University Press.

Crystal, D. (1987). *Cambridge encyclopedia of language.* New York: Cambridge University Press.

Dyen, I., & Aberle, D. F. (1974). *Lexical reconstruction: The case of the proto-Athapaskan kinship system.* Cambridge, UK: Cambridge University Press.

Greenberg, J. H. (1987). *Language in the Americas.* Stanford, CA: Stanford University Press.

Hickerson, N. P. (2000). *Linguistic anthropology* (2nd ed.). Fort Worth, TX: Harcourt College Publishers.

Hock, H. H. (1991). *Principles of historical linguistics* (2nd ed.). New York: Mouton de Gruyter.

Hockett, C. F. (1985). Distinguished lecture: F. *American Anthropologist, 2,* 263–281.

Langacker, R. W. (1973). *Language and its structure* (2nd ed.). New York: Harcourt Brace Jovanovich.

Shaul, D. L., & Furbee, N. L. (1998). *Language and culture.* Prospect Heights, IL: Waveland.

Linguistics, Transformational

Transformation grammar is a way of viewing syntax first proposed in 1957 by Noam Chomsky, the most influential linguist of the 20th century. It is hard to overestimate the impact this new theory had on all of the social sciences; within a few years, it had replaced the prevailing paradigm of structuralism in linguistics and behaviorism in psychology. Chomsky's method of explaining grammar is far-reaching and offers a unified view of the mind and human behavior.

Until the 1960s, stimulus/response-style behaviorism was at least tacitly accepted by an overwhelming majority of American psychologists (as well as by many working outside the field). Language was believed to be acquired through successive reinforcements of increasingly correct responses of a target item. Native English-speaking children, then, would go from saying *wa-wa* to *wata* to *water* because they would receive more drinks the closer they came to the adult pronunciation.

Until the 1950s, linguists were usually concerned either with historical issues of reconstruction or philology or with formal methods of describing the structures of the world's languages. For example, much attention was paid to how constituents of words or sentences were organized hierarchically. Structural linguists could show why phrases such as "old men and women" were ambiguous (i.e., do we mean old men and *all* women or only old men and *old* women?) by dissecting them into their ordered component parts.

Chomsky showed the limitations of these approaches to psychology and linguistics. First, most infants are exposed more to baby talk than adult speech by their parents, yet most children learn correct forms. Second, Chomsky argued, because most people create new sentences they have never heard before, linguists need to focus their attention on how speech is generated rather than analyze forms already uttered. Chomsky posited a set of *phrase structure* or *rewrite* rules that outline how a basic sentence might be constructed in a language. For instance, in English we might define a rule whereby sentences are composed of (a) noun phrases as subjects (for example, "I") and (b) verb phrases. A verb phrase ("ate") can be rewritten as a pure verb plus a noun phrase direct object ("ate the hamburger"). Thus, a sentence such as "I ate the hamburger" could be made by these few simple rules. With the addition of a lexicon—a set of possible words that could fit into the various slots in a sentence—an infinite number of sentences could be generated.

However, most native English speakers intuitively feel that other sentences, such as "I did not eat the hamburger," "Who ate the hamburger?", and "The hamburger was eaten by me," are somehow related to our initial sentence. Chomsky posited special transformational rules that formally derive these from the basic, or kernal, sentence. For example, a simple English passive transformation might be that if given a sentence of the form "X verbs Y," we can create the well-formed sentence "Y was verb + past tense by X." Thus, "Joe sees Jane" also allows us to say "Jane was seen by Joe." The task, then, is to discover the right phrase-generating rules and all of the different transformations they entail.

Chomsky maintained that these kinds of rules, although specific to each language, are universal.

All languages, then, are really more alike than different. Besides changes in nomenclature, Chomsky's project has gone through several substantial revisions over the past four decades, including government and binding theory, principles and parameters, and the current minimalist program. However, transformation linguistics is still the dominant model in the language sciences (although certainly not without its critics). Thus, no linguists, anthropologists, cognitive scientists, psychologists, or philosophers have been unaffected by Chomsky's theories, even if they are not in full agreement with his claims.

— *James Stanlaw*

Further Readings

Chomsky, N. (1957). *Syntactic structures.* The Hague, Netherlands: Mouton.

Chomsky, N. (1995). *The minimalist program.* Cambridge, MA: MIT Press.

Huck, G. J., & Goldsmith, J. A. (1995). *Ideology and linguistic theory: Noam Chomsky and the deep structure debates.* London: Routledge.

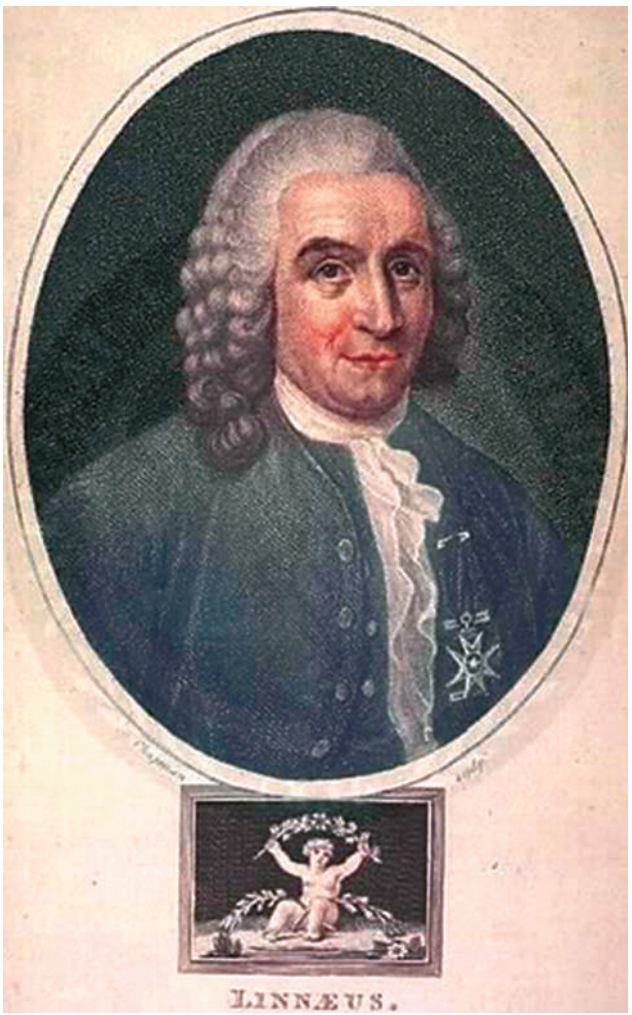
Radford, A. (1988). *Transformational syntax: A first course.* Cambridge, MA: MIT Press.

Linnaeus, Carolus (1707–1778)

Carolus Linnaeus, the originator of the system of classification of animals and plants that we still use today, was eventually ennobled in 1757 as Carl von Linné. He was born in southern Sweden during the first decade of the 18th century, a time when knowledge of exotic faunas and floras was beginning to seep into Europe as a result of mercantile voyages to remote parts of the world. Educated in medicine at Lund and Uppsala universities, he was steered early on into the study of botany by the Uppsala professor Olof Celsius.

From 1732 onward, Linneus undertook a series of botanical surveys in different parts of Scandinavia and also visited other parts of Europe, notably France, England, and Holland, where he completed his medical studies in 1735. That year, he also published the first edition of his great classification of nature, *Systema Naturae, Sive Regna Tria Naturae, Systemice Proposita per Classes, Ordines, Genera et Species.* Back in Sweden, in 1739 Linnaeus participated in the founding of the Royal Swedish Academy of Science, in 1741 he assumed the chair of medicine at Uppsala, and in 1742 he switched that for the chair of botany. Over the next decade or so, he published a series of strictly botanical volumes while at the same time devoting himself to the enlargement and refinement of his encyclopedic *Systema Naturae.* This latter work eventually became his primary preoccupation and the source of increasing international fame, going through 12 editions before his death in 1778. For the purposes of priority in animal taxonomy, the definitive edition of *Systema Naturae* is taken to be the 10th, published in 1758. By international agreement, the correct name for any species is the one given it by Linnaeus in 1758 or the first one to be validly published after that date.

From an anthropological point of view, the most important aspect of the 10th edition is that in it



Source: Courtesy, Wikipedia.

Linnaeus included the species name *Homo sapiens,* within which he formally recognized four "varieties": "Americanus," "Europaeus," "Asiaticus," and "Afer" (essentially African). This was also the edition in which he changed the name of his class Quadrupedia to Mammalia and introduced the order primates to unite the genera *Homo, Simia, Lemur,* and *Vespertilio* (bats). Linnaeus's notion of *Homo* still owed something to the ancient idea of the Great Chain of Being and included certain forms more appropriate to a bestiary, but it did group our own species in the same genus as *Homo troglodytes,* a construction essentially based on the orangutan. In classifying *H. sapiens* in the same genus as an ape, and this genus together with the lemurs and monkeys, Linnaeus took the bull by the horns and included humans as an integral component of nature.

The roots of Linnaeus's system of classification go back to Aristotelianism and medieval scholastic logic with their entailed concepts of essence, but in practice the Linnaean approach has proved to be remarkably adaptable to changing biological perspectives. The 10th edition was published a century before Darwin's *On the Origin of Species* introduced the notion of evolution into biological classification. But with a judicious expansion of rank levels, Linnaeus's inclusive classificatory hierarchy, whereby species are grouped into increasingly comprehensive sets (for example, genera, orders, classes), actually fits the branching pattern of evolutionary descent quite well and is certainly preferable as a practical matter to the alternatives offered.

— Ian Tattersall and Kenneth Mowbray

Further Readings

Blunt, W. (1971). *The compleat naturalist: A life of Linnaeus.* New York: Viking.

Frängsmyr, T. (Ed.). (1984). *Linnaeus: The man and his work.* Berkeley: University of California Press.

Jackson, B. D. (1923). *Linnaeus.* London: Witherby.

Linton, Ralph (1893–1953)

Ralph Linton was an American cultural anthropologist known for his academic bravado and popular appeal, as well as for his long-lasting conceptual and theoretical contributions to anthropology and social science in general, whose main interest was the relationship between culture and personality. One of his more established concepts was acculturation, a phenomenon he witnessed throughout his many travels, published on, and in a sense contributed to through his work for Columbia University's School of Military Government and Administration, where he educated military personnel on the characteristics of extrinsic cultures. Along with Abram Kardiner, Cora Du Bois, and Edward Sapir, Linton was a founder of basic and modal personality structure theory, an interactional approach that challenged earlier, culturally deterministic theories of personality. Although he was not a physical anthropologist, Linton considered the differences between humans and apes—indeed, between humans and other animals in general—by and large trivial ones and ultimately pointed to biological influences as an important factor in understanding the origins and nature of human behavior and culture. He was the first to use the terms "status" and "role," now staple social science concepts. Linton's best known works include *The Study of Man* (1936), *The Cultural Background of Personality* (1945), *Most of the World* (1949), and *The Tree of Culture* (1955).

Linton was born in Philadelphia to a Quaker family on February 27, 1893. His father, Isaiah Waterman Linton, made a living through his ownership of a chain of restaurants. Isaiah and Linton's mother, Mary Elizabeth, took an authoritarian and critical approach to rearing the young Ralph, making for a childhood that was less than ideal. After graduating from Friends High School, Linton pursued a B.A. at Swarthmore College, where one of his teachers encouraged him to study cultures outside his own. Although during his later years Linton would sometimes be criticized for not supporting his theoretical statements with empirical evidence, from the beginning he was anything but an armchair anthropologist. As an undergraduate, Linton interspersed his course work with (prehistoric) archaeological excursions to New Mexico, Colorado, New Jersey, and Guatemala.

Linton earned an M.A. from the University of Pennsylvania in 1916. He married his first wife, Josephine Foster, that same year and then went on to study at Columbia. When World War I broke out, and in violation of the pacifist principles by which he was raised, he left Columbia to join the army and saw combat in France. This caused him to be banned

from attending "Friends Meetings" (the Quaker equivalent of "church"). After the war, Linton returned to America and married his second wife, Margaret McIntosh, with whom he had one child. He then spent several years doing fieldwork in Polynesia, eventually leading to the publication of *The Material Culture of the Marquesas Islands* (1923).

His experiences in Polynesia represented a turning point for Linton. Realizing that he preferred interacting with living people to digging for artifacts, he shifted his focus from archaeology to anthropology. In 1922, Linton became assistant curator at the Field Museum of Natural History in Chicago, a position he held until 1928. He undertook an expedition to Madagascar for the museum in 1925, and for years thereafter he did a great deal of traveling on that island and in East Africa, managing to finish his Ph.D. at Harvard University around the same time (1925).

Linton's academic career began at the University of Wisconsin–Madison when he accepted a professor's position there in 1928. In 1934, after his second marriage ended in divorce, he married Adelin Sumner Briggs. It was at Wisconsin that Linton published what he considered to be his most important work. *The Study of Man* (1936) was an attempt to integrate diverse perspectives and findings in anthropology and related fields into one coherent treatise. Linton explicitly intended the book as a primer for beginning students, and it was used as an introductory text by anthropology departments for a period of time. *The Study of Man* ran the gamut of relevant topics, including human origins, formation of culture, basic social institutions, the birth of states from tribes, and personality. Praised for the qualities he intended, the book was also criticized for Linton's failure to fully document many assertions.

Linton became a professor at Columbia in 1937, where he collaborated with Abram Kardiner, among others, to develop a new treatment of personality by anthropology (basic and modal personality structure theory). After coauthoring key works on the topic with Kardiner, Linton broke with his colleague and wrote *The Cultural Background of Personality* (1945), which reflected his independent take on the subject. In this book, Linton attempted to synthesize ideas from anthropology and personality psychology, and to a lesser extent sociology, toward the purpose of understanding the reciprocal relationship between culture and personality. He discussed several concepts for which he is known today, including status personalities and value–attitude systems. Linton's drive toward synthesis in *The Cultural Background of Personality* included a conscious attempt to create a standardized terminology for the fields in question.

The break with Kardiner illustrates the irony that Linton found he could live easily among the various cultures he studied, yet he experienced difficulties with relationships in his personal and professional life. In addition to being married three times, his tense rapport with colleagues sometimes turned stormy. Another colleague with whom Linton often butted heads was Ruth Benedict, who resented being passed over in favor of him as department head at Columbia. Ultimately, Linton left the university altogether over his academic disagreement with Kardiner.

In 1946, Linton was appointed Sterling Professor of Anthropology at Yale University, where he would finish his academic career. He died in New Haven, Connecticut, after a long period of health problems. His final book, *Tree of Culture* (1957), was written during his tenure at Yale but was published posthumously. Completed by Linton's wife from materials and instructions left by her husband, the book relies greatly on a broad sampling of specific cultures studied by the author over his lifetime. Like *The Study of Man, Tree of Culture* was an attempt at grand synthesis. Culture, Linton argued, is a tree that grows not in the linear sense but rather more in the manner of the tropical "banyan tree," the branches of which send roots back down into the ground, eventually to become trunks themselves. *Tree of Culture* was both criticized and praised for the same reasons as was *The Study of Man.* Indeed, a related criticism was that the books were not terribly different. Perhaps it would be best to say that Linton's final work reflected the man himself—courageous, engaging, and, even if not perfectly pleasing to his colleagues, stimulating throughout for the intended audience.

— Brian Bentel

Further Readings

Linton, R. (1945). *The cultural background of personality.* New York: Appleton–Century–Crofts.

Linton, R. (1957). *Tree of culture.* New York: Alfred A. Knopf.

Linton, A., & Wagley, C. (1971). *Ralph Linton.* New York: Columbia University Press.

RALPH LINTON

Ralph Linton was an American archaeologist, a cultural anthropologist, and a writer who made important contributions to the understanding of human culture. He has been described as a creative thinker who could unite disparate facts into a clear picture. His writings stimulated the popular imagination of anthropological work, but he often failed to fully document his writings.

Linton was born in Philadelphia in 1893. His name was originally spelled Rolfe after his famous ancestor, John Rolfe, the husband of Pocahontas.

Linton attended Swarthmore College in 1910. In 1912, he worked at Mesa Verde, New Mexico, on an archaeological dig. In 1913, he joined an archaeological expedition to Qirigu, Guatemala. In 1915, he graduated from Swathmore, and that summer he excavated a prehistoric site in New Jersey for the University of Pennsylvania's museum. In 1917, he reported his findings in *A Pre-Lenape Site in New Jersey.*

In 1916, Linton received a master's degree in anthropology from the University of Pennsylvania. He then went to Aztec, New Mexico, to join an archaeological dig. During the fall of 1916, he began graduate work at Columbia University. He spent the early part of the summer of 1917 with an excavation group in southern Illinois. In August 1917, Linton joined the U.S. Army during World War I. He served with the 42nd (Rainbow) Division until the fall of 1919. In battle, he was gassed and wounded. Because of his war service, he was expelled from the group of pacifist Quakers to which he belonged.

Linton returned to Columbia in 1919 to renew his studies. In 1920, he went to the Marquesas Islands for the B. P. Bishop Museum of Honolulu, Hawaii, to conduct an archaeological survey. In 1925, Linton received a Ph.D. from Harvard University. That same year, he went to Madagascar for Chicago's Field Museum of Natural History to collect specimens and study the native life.

In 1937, Linton published *Study of Man,* an introduction to cultural anthropology for the general public. The success of *Study of Man* and subsequent publications led to his appointment as the head of the anthropology department at Columbia. At Columbia, Linton published *Cultural Background of Personality* (1945). He also edited *The Science of Man in the World Crisis* (1945).

In 1946, Linton was appointed as the Sterling Professor of Anthropology at Yale University. In 1953, he died in New Haven, Connecticut. In 1955, his book, *The Tree of Culture,* was published posthumously.

— Andrew J. Waskey

Llano Culture

Llano culture refers to late Pleistocene North American people on the Llano Estacado, or Southern High Plains, who used distinctive stone projectile points, known as Clovis points, to hunt mammoths. Formal description of the Llano culture during the 1950s established it as the oldest known prehistoric archaeological culture in North America and reinforced the notion that Paleoindians were specialized big game hunters. The term "Clovis culture" replaced "Llano culture" by the late 1960s, so Llano culture is primarily a historical concept important for its role in Paleoindian studies.

Elias H. Sellards proposed the term "Llano complex" in his 1952 book *Early Man in America* for assemblages of artifacts associated with mammoth (*Mammuthus columbi*) bones at archaeological sites on and near the Llano Estacado (Spanish for "staked plains") of western Texas and eastern New Mexico. The artifacts of the Llano complex consisted of distinctive stone projectile points, stone hide scrapers, hammerstones, and bone tools. Sellards used the terms "Llano culture" and "Llano man" to refer to the people who made and used the artifacts. Sellards included in his Llano complex sites throughout much of North America that contained Clovis points, regardless of whether they also contained mammoth remains.

Sellards was a geologist by training, but since 1915 he had pursued an interest in the antiquity of humans in North America. Not until the discovery in 1927 at Folsom, New Mexico, of distinctive stone projectile points (Folsom points) found in unambiguous association with bones of extinct bison (*Bison antiquus*) did it become generally accepted that humans had

been on the continent for more than a few thousand years. *B. antiquus* was thought to have gone extinct by the end of the Pleistocene, although the exact age of that event was not known until the 1950s when radiocarbon dating placed it at around 10,000 years ago.

Folsom points were lanceolate in shape, very finely made, and distinctive in having a long flake removed from each face running from the base nearly to the tip, giving them a "fluted" appearance. Folsom points immediately set the standard against which all future finds of early points would be compared. As archaeologists searched for additional evidence of early human occupation, they found points that were obviously the same as Folsom points as well as points that were larger, were less finely made, and had shorter flutes. Names for these latter points included generalized Folsom, Folsom-like, and Folsomoid.

During the mid-1930s, Edgar B. Howard and John L. Cotter of the University of Pennsylvania and the Academy of Sciences of Philadelphia conducted excavations at the site of an ancient spring-fed pond on the edge of Blackwater Draw near Clovis, New Mexico, where they found Folsom-like points and beveled bone artifacts associated with remains of mammoths and other extinct mammals.

At the Clovis site, they also found Folsom points with bones of *B. antiquus* stratigraphically above the Folsom-like points. In 1941, the Folsom-like points were named Clovis fluted points. Acceptance of the temporal relationship between Clovis and Folsom points demonstrated here did not occur until Sellards's definition of the Llano complex.

In 1937, Sellards, as director of the Bureau of Economic Geology and later also the Texas Memorial Museum (both part of the University of Texas at Austin), began two decades of excavations at early paleontological and archaeological sites on the Llano Estacado. Sellards was assisted in his work by the geologist Glen Evans and the vertebrate paleontologist Grayson Meade. This team was one of the first to combine geology and paleontology with archaeology in research on North American human antiquity and to use the geological principles of stratigraphy and superposition.

Two of the sites that Sellards investigated became the basis for his Llano complex. In 1937, Sellards and his team excavated at Miami, Texas, where they found the remains of five mammoths with three Clovis points and a stone scraper. In work at the Clovis site in 1949 and 1950, Sellards excavated a Clovis point, a bone tool, a hammerstone, and a stone scraper with remains of four mammoths as well as remains of horse, bison, turtle, and small mammals. Sellards excavated Folsom points associated with bison bones in an overlying stratum and demonstrated that the two strata were separated by an erosional unconformity. He emphasized the relationship of Clovis points with mammoth remains and of Folsom points with bison remains. In addition to Miami and Clovis, Sellards included four mammoth–Clovis point sites excavated by other investigators in his definition of the Llano complex: McLean in Texas, Dent in Colorado, Angus in Nebraska, and Naco in Arizona.

By 1952, the Lubbock Lake Folsom site had been dated to approximately 9,900 radiocarbon years before present (rcybp). There were no dates for the Llano complex, but the stratigraphic positions of the two at the Clovis site necessitated that the Llano complex was at least that old. We now know that the Llano complex at Clovis has been dated to 11,300 rcybp and that the Llano complex at Dent had been dated to 10,980 rcybp. Calibrated radiocarbon ages for the same two sites are 13,350 and 12,950 years before present, respectively.

Different people used the concept of Llano culture in different ways. Sellards included all Clovis point sites in his Llano culture, and most followed his lead. Others, however, restricted the name to only sites with both Clovis points and mammoth remains. Still others restricted it to the Llano Estacado and vicinity.

From Sellards's publication in 1952, the term "Llano culture" competed with the term "Clovis culture." The former term was used primarily during the 1950s and 1960s until it was largely supplanted by the latter term. "Llano culture" is used only rarely now and is discussed primarily in historic treatments of Paleoindian studies. But Sellards's demonstration of an older age and association with mammoths for Clovis points and a younger age and association with bison for Folsom points remains unchanged today.

— *Philippe D. LeTourneau*

See also **Clovis Culture**

Further Readings

Boldurian, A. T., & Cotter, J. L. (1999). *Clovis revisited: New perspectives on Paleoindian adaptations from Blackwater Draw, New Mexico.* Philadelphia: University of Pennsylvania, University Museum.

Evans, G. L. (1951). Prehistoric wells in eastern New Mexico. *American Antiquity, 17,* 1–9.
Haynes, G. (2002). *The early settlement of North America: The Clovis era.* Cambridge, UK: Cambridge University Press.
Hester, J. J. (1972). *Blackwater Locality No. 1: A stratified early man site in eastern New Mexico* (Publication No. 8). Ranchos de Taos, NM: Fort Burgwin Research Center.
Holliday, V. T. (1997). *Paleoindian geoarchaeology of the Southern High Plains.* Austin: University of Texas Press.
Sellards, E. H. (1938). Artifacts associated with fossil elephant. *Bulletin of the Geological Society of America, 49,* 999–1010.
Sellards, E. H. (1952). *Early man in America.* Austin: University of Texas Press.
Sellards, E. H., & Evans, G. L. (1960). The Paleo-Indian culture succession in the Central High Plains of Texas and New Mexico. In A. F. C. Wallace (Ed.), *Men and cultures: Selected papers of the Fifth International Congress of Anthropological and Ethnological Sciences, Philadelphia, September 1–9, 1956* (pp. 639–647). Philadelphia: University of Pennsylvania Press.

Lorenz, Konrad (1903–1989)

Konrad Lorenz was a founder of ethology, the biological study of animal behavior. Ethologists study animals in natural and seminatural conditions rather than in the laboratory. They assume that natural selection is largely responsible for species-specific behavior and that the ecology to which the animals have adapted is essential for normal behavior. Lorenz won the 1973 Nobel Prize in Physiology or Medicine for this pioneering work. He shared the award with fellow Austrian Karl von Frisch and one-time Dutch collaborator Nikolass Tinbergen.

Lorenz grew up in Altenberg near Vienna, Austria, and was a born naturalist. He possessed a unique combination of patience, keen powers of observation, and intuition that allowed him to appreciate the world as his animals experienced it. He kept hundreds of pets. Even before he could read, Lorenz discovered imprinting in ducks, a phenomenon reported incidentally by others at least as early as the 1500s but only first studied in detail by Lorenz.

Lorenz earned his M.D. in 1928 and his Ph.D. in 1933, both at the University of Vienna. Much of his early work centered on a highly social corvid, the jackdaw. He kept a flock in his barn, and in studying them he discovered social imprinting as well as the innate cues used by these birds to respond to food, danger, and each other. His work on jackdaws and other animals is described in his deservedly famous and entertaining book *King Solomon's Ring.*

In 1937, Lorenz and Tinbergen brought their two highly distinctive styles together for a series of experiments on geese that revolutionized our understanding of behavior. In studying an apparently simple response by which geese roll eggs back into their nests, Lorenz and Tinbergen were able to show that there are innate cues (sign stimuli) that trigger the behavior when motivation (drive or what Lorenz called "action-specific energy") is high enough. The resulting behavior is a fixed-action pattern (often called a motor program), a highly coordinated series of muscle movements that proceeds even if the sign stimuli are removed after it is initiated.

Together with imprinting and other innately directed learning, Lorenz and Tinbergen discovered all of the basic units of innate behavior that guide animals in the wild. After World War II brought their work to a stop for nearly a decade, Tinbergen continued with empirical studies that worked out the detailed nature of sign stimuli, motor programs, drive, and innate learning. Lorenz, on the other hand, began to focus on broader theoretical issues and the relevance of ethology to humans.

In one of his most famous books, *On Aggression,* Lorenz argued by analogy with animals that human aggression is designed for a particular group size and involves a set of rituals designed to create and maintain a dominance hierarchy with a minimum of physical conflict. He argued that as human societies grew from the small communities of hunter/gatherers into towns and cities, innate mechanisms were no longer well suited to the challenge. Group loyalty and territoriality, scaled up to a national level, creates the potential for devastating wars. The anonymity of cities makes high crime levels and pointless violence the norm. He even argued that organized sport is an attempt to satisfy our innate urges for small-scale aggression. Anyone dispassionately watching enthusiastic fans at a game cheering on people they have never met must wonder at the underlying urges.

The provocative writings of Lorenz inspired many others to try to find evolutionary lessons in human behavior, both normal and deviant. He began what decades later would become the field of evolutionary psychology, and his impact on at least popular anthropology was reflected in Desmond Morris's *The Naked Ape,* Robert Ardrey's *The Territorial Imperative,* and scores of other books.

— *James L. Gould*

Further Readings

Gould, J. L. (1982). *Ethology: The mechanisms and evolution of behavior.* New York: Norton.

Lorenz, K. Z. (1952). *King Solomon's ring.* New York: Thomas Crowell.

Lorenz, K. Z. (1967). *On aggression.* New York: Bantam.

Lorenz, K. Z., & Tinbergen, N. (1938). Taxis and instinctive action in the egg-retrieving behavior of the Greylag goose. In C. H. Schiller (Ed.), *Instinctive behavior* (pp. 176–208). New York: International Universities Press. (English translation published 1957)

Lorises

Four genera of lorises have traditionally been identified: *Perodicticus* (potto) and *Arctocebus* (angwantibo) of sub-Saharan Africa, *Loris* (slender loris) of Sri Lanka (and possibly also India), and *Nycticebus* (slow loris) of southeastern mainland Asia as well as Borneo and Sumatra. Again traditionally, taxonomists have generally recognized only two species of *Nycticebus* (*N. coucang* and *N. pygmaeus*) while maintaining that the other genera are monotypic. Preliminary morphological and metric studies of skulls and teeth as well as analysis of comparative pelage patterning suggest, however, that what has been attributed to intraspecific variation in both *Perodicticus* and *N. coucang* is best interpreted as reflecting taxic diversity.

Although lorises differ in robustness (pottos and slow lorises) versus gracility (angwantibos and slender lorises), they all are solitary nocturnal insectivores that are capable of both running quickly and moving extremely slowly and cautiously through vegetation without attracting notice. The latter locomotory behavior is reflected at least in *Perodicticus* having extensive collateral vascularization of limbs, a configuration that appears to be correlated with elimination of lactic acid that would otherwise accumulate during sustained periods of physical activity. In the wild, where *Perodicticus* is sympatric with bushbabies, the potto's diet consists primarily of slow-crawling, noxious insects; in captivity, it selects the bushbabies' typical prey of faster, more palatable insects.

Lorises are prosimian by virtue of their possession of a grooming claw on the second pedal digit and a toothcomb. As a group within Prosimii, lorises are distinguished, for instance, by having noticeably short tails, reduced second manual digits, stubby tubes that grow laterally from the petrosal auditory bulla, and ovoid lower premolars. The relationships among the lorises are still in flux. Although some molecular data have been interpreted as uniting the African and Asian taxa as respective sister taxa, morphology overwhelmingly unites *Perodicticus* and *Nycticebus* (for example, more greatly reduced second manual digits, more rounded gonial regions and deeper mandibles, stouter toothcomb teeth, puffier cusped upper and lower molars, laterally bulging snouts), and *Arctocebus* and *Loris* (for example, thin and elongate long bones, deeper lower molar hypoflexid notches, more pronounced and connected upper and lower molar crests, tubular snouts), as respective sister taxa.

Recently, a new genus and species of a loris relative, *Pseudopotto martini,* was described from material from the Cameroons and was interpreted as the sister

Source: © San Francisco Zoo.

taxon of the traditional loris group, being more primitive than the others, for example, in having a much longer tail, more slender ilia of the os coxa, shorter cervical vertebral spines, and an entepicondylar foramen on the distal humerus. It is craniodentally and skeletally different from, as well as much smaller than, the sympatric *Perodicticus batesi.* To date, *P. martini* has not been definitively sighted in the wild.

The status of *P. martini* is complicated by the fact that the type specimen of *Perodicticus* captured in the Cameroons and identified as "Bosman's potto" (*P. potto*), which was housed in the Muséum National d'Histoire Naturelle in Paris, is now lost. If it turns out that *P. martini* is a junior synonym of *P. potto,* it might be simpler to petition the International Code of Zoological Nomenclature to retain *P. martini* and designate a specimen of another species of *Perodicticus* as the type of that taxon.

— *Jeffrey H. Schwartz*

Further Readings

Alterman, L., Doyle, G. A., & Izard, M. K. (Eds.). (1995). *Creatures of the dark: The nocturnal prosimians.* New York: Plenum.

Delson, E., Tattersall, I., Van Couvering, J., & Brooks, A. S. (Eds.). (2000). *Encyclopedia of human evolution and prehistory* (2nd ed.). New York: Garland.

Fleagle, J. G. (1999). *Primate adaptation and evolution* (2nd ed.). New York: Academic Press.

Lovejoy, C. Owen

Most of us, at one time in our lives, have probably wondered how we came about and what our ancestral background has been in terms of human evolution. It is an interesting inquiry and one that has received considerable attention by a number of prominent scholars. However, thanks to the efforts of C. Owen Lovejoy, we are coming closer to a better understanding of where we were and where we have come from since the beginnings of the human species. Lovejoy has given us some valuable insights and will probably continue to do so in the future because he is an individual with a solid background concerning past ancestral human origin studies.

Lovejoy has been alluded to as one of the best scholars regarding human evolution. Considering his background and accomplishments, it is easy to understand why he has become the recipient of this honor and reputation. After graduating from the University of Massachusetts in 1968, he began an illustrious career at Kent State University and has continued to make contributions in his profession. He has engaged in fieldwork on numerous occasions but also shares his knowledge with others in a classroom setting. Like many scholars, he has focused on a particular activity within his profession, and that is a strong interest in bipedal locomotion and its changes over time. Although the subjects of his study are obviously quite old, Lovejoy recognizes that there is a connection between the past and the present in terms of what we can learn about ourselves today.

As one would expect, an individual who has engaged in study for a long period of time, and who is also associated with a prestigious university, will likely be one who shares his knowledge with others. Hence, it is easy to understand why Lovejoy's publication record is outstanding and why it certainly attests to his knowledge about the subject matter that has earned him such a distinction in his professional career.

However, as a complement to Lovejoy's research interests and academic activities, he has engaged in a number of other pursuits relating to his profession. For example, he has been involved in forensic activities that have been important to public agencies that deal with the criminal justice system. In addition, he has been awarded the prestigious directorship of the Matthew Ferrini Institute for Evolutionary Research, a valuable scholarly entity at Kent State University that will likely bring about new and valuable studies of our human origin. Lovejoy believes in the value of the interdisciplinary approach to his studies, and it should provide him and us with a new and better understanding of our past in terms of human evolution. The Ferrini Institute under his direction and guidance no doubt will also affect future scholars who also have a quest for knowledge concerning human evolution. Considering the fact that the institute is led by a person of renowned accomplishments in his area of specialty, this will no doubt come about soon and contribute substantially to a better understanding of that part of our ancestral past that is of so much interest to, or holds so much intrigue for, many of us.

— *William E. Kelly*

Further Readings

Lovejoy, C. O. (1973). Human osteology: A laboratory and field manual of the human skeleton, by William M. Bass. *American Journal of Physical Anthropology, 39,* 324–325.

Lovejoy, C. O. (1974a) New perspectives on ape and human evolution, by Adriaan Kortlandt. *Current Anthropology, 15,* 434–435.

Lovejoy, C. O. (1974b) Primate locomotion. *Science, 184,* 679–681.

Lucretius (94/95–51/55 BCE)

Very little is known about the author Lucretius, whose full name was Titus Lucretius Carus. *De Rerum Natura* (*DRN*) [On the Nature of Things] likely was his only work. Later Christian authors, hostile to Lucretius's views on religion and his statements about the death of the soul, invented some fantastic stories about him, according to which he composed his work *DRN* in a delirium, poisoned by a love potion administered by his wife. Driven to distraction, he committed suicide. Modern authors discard these stories as untruths.

Lucretius lived during turbulent times. Caesar was engaged in his conquest of Gaul, and the Roman army was slowly turning into an army of mercenaries more loyal to generals than to the Roman people. The Social Wars had greatly weakened popular representation, and the people of Rome had lost all power or say in their own government. Soon, civil war would break out and emperors would rule Rome as conquests, confiscations, slave revolts, crucifixions, political conspiracies, and murders increased in number. Lucretius favored a withdrawal from public life and preferred quiet observation. In his scheme, it is the fear of death and of the gods that leads individuals to desire wealth and power beyond what is required for a peaceful and happy life.

Work and Philosophy

Lucretius gave himself the difficult task of expounding the ideas of the Greek philosopher Epicurus (341–270 BCE) in the form of a didactic poem in Latin hexameters, "On the Nature of Things." Epicurus's influence is felt throughout *DRN*. Most of this author's works are lost, but his arguments outlined in his *DRN* have survived in the writings of others. Epicurus and his followers argued that humans should have one goal in life: happiness (i.e., absence of fear and want). Knowledge of the physical world and a theory of knowledge (epistemology, i.e., how we know what we know) were aids to achieving happiness. The Epicurean philosophers believed that all life on the earth was made up of matter, with atoms ("things which cannot be split") being the smallest constituents. Thus, anything that happens in the world has a natural cause that can be revealed by a thorough investigation.

As is customary in didactic poetry, the author addresses a friend (Memmius) and, through the friend, addresses the reader. The poem is divided into six parts, or books, and its total length is 7,415 lines. During Roman times, philosophy included what we would now call "science"—the knowledge of natural phenomena, the gods, life, death, religion, human societies, animals, the stars, inanimate matter, and so on. Lucretius (and his contemporary Cicero) refashioned the Latin language to accommodate the abstract concepts developed by the Greek philosophers of nature. For Lucretius, poetry was the medium of choice: there was a centuries-old tradition of didactic poetry at his time, both Greek and Latin. Moreover, poetry appeals to the senses and thus conveys abstract concepts more easily. As Lucretius phrased it, a poet is like a doctor who smears honey around the rim of the cup that so a child will take his bitter medication.

The poem begins with an allegorical invocation of the goddess Venus, the goddess of love, the beginnings of life, and the mother of the founding father of Rome, Aeneas. It ends with a vivid description of the Plague of Athens taken from Thucydides's *The Peloponnesian War.* Life is a cycle of birth and destruction, of rise and fall. A true understanding of Epicurus teaches us to accept such cycles and to not add to our agony by fear of an afterlife.

In Books II and V, Lucretius argued that the world came into existence by itself—the happy joining of the right atoms at the right time—and that slowly the primeval mud brought forth first grasses and then smaller animals, birds, larger animals, and finally humans. But the earth, the skies, the stars, the sun, the moon, and the oceans all are made of perishable materials and will also die one day. The earth gave birth to everything, but it also represents a shared grave.

Space is infinite, and particles move in all directions; therefore, it is very likely that combinations of atoms like the earth, including humans and animals, also occur elsewhere.

Lucretius's materialistic approach to the world denied the influence of the gods on human life; the gods exist, but because their goal (happiness) is similar to that of humans, they do not need human prayer and sacrifices. The gods also did not have anything to do with the creation of the world. The gods live forever, but the human soul dies when the body dies; thus, fear of the gods (for example, punishment for sins) is useless. Fear of death is useless too because all sensation stops at death. Lucretius's argument that human reason could explain the universe without having recourse to divine intervention was suppressed for nearly 1,700 years until the philosophers of the Enlightenment came to the same conclusion: "Little by little time teases out all discovery, and Reason (Ratio) brings it out into the regions of light." Lucretius's poem played no small role in this revival, although authors of the Enlightenment were conflicted about his ethics and views on religion as opposed to his views on science and progress. Important authors include Gassendi, Montaigne, Dryden, the Cardinal de Polignac ("Anti-Lucretius: Or, on God and Nature" a poem in which he attacked Gassendi, Hobbes, Newton, and Locke), Helvétius, Holbach, Diderot, and Voltaire ("Letter of Memmius to Cicero"), among many others.

Inherent in Lucretius's (and the other Epicureans') understanding of the world as a material construct is his explanation of human societies introduced at the end of Book V. This part of *DRN* has often been mentioned as one of the first manifestations of evolutionary thought and is thus highlighted in many works that tell the story of anthropology's first beginnings, even though it is discussed in only 700 verses. Lucretius's explanation of the stepwise development of human societies follows logically from his main point that everything has a natural cause. Lucretius pointed out that we have no empirical evidence of the world's first beginnings, but analogy (and metaphor) can provide us with a fair idea. At first, humans lived like animals—sleeping by night, hunting by day. Just as animals have different cries for different emotions, so did humans, and eventually these sounds developed into a shared language. Life was short and violent; on the other hand, humans did not die in foolish wars or drown at sea in pursuit of wealth. Sometimes they starved and died; today, humans die of overeating. Every so often, humans poisoned themselves by accidentally eating the wrong thing; today, they actively poison each other. Gradually, humans learned to live in huts, to make fires, to be kind to each other, to be monogamous, and to care for their children because it is right to care for the weak. Next came kings and the parceling out of land, followed by "the invention of property and the discovery of gold." Today, the rich rule rather than the deserving or the beautiful; those in charge now violate "the mutual compact of social life," a concept taken nearly verbatim from Epicurus. Throughout his *DRN,* Lucretius condemned greed, politics, and romantic love, all evidence of human folly and irrationality. In Book V, the poet came very close to satire when he showed that material and technological progress and comfort have not made humans any happier. Early life on the earth, although crude, was used as a foil for modern corruption.

Epicurus's recipe for human happiness was reviled by later Christian authors, especially because of his attacks on *religio* and mortality of the soul. It was mainly the doing of later authors that gave "Epicurean" its current meaning of a hedonistic approach to life. The original doctrine recommended moderation or nearly asceticism; a glass of water served to slake thirst as well as the most expensive wine.

— *Thérèse de Vet*

Further Readings

Gale, M. R. (2001). *Lucretius and the didactic epic.* London: Bristol Classical Press.

Johnson, W. R. (2000). *Lucretius and the modern world.* London: Duckworth.

Lucretius. (1969). *On the nature of things* (M. F. Smith, Trans.). Indianapolis, IN: Hackett.

Sedley, D. (1998). *Lucretius and the transformation of Greek wisdom.* Cambridge, UK: Cambridge University Press.

Lucy Reconstruction Models

Lucy is among the most famous fossil skeletons believed to represent an early stage of hominid evolution following separation of the human lineage from

its nearest living ape relative. At 3.2 million years, Lucy was the oldest and most complete hominid skeleton that clearly showed evidence of bipedal locomotion. The label "Lucy" provided a personal metaphor for an individual believed to be a female approximately 20 years of age at the time of her death. Classified as *Australopithecus afarensis,* Lucy was one of nine species clustered under the genus *Australopithecus* despite a poor understanding of their evolutionary relationships and status.

Numerous portraits of the australopiths have combined the constraints of fossil morphology with the addition of soft tissue features that are imagined to be present based on the presumption that Lucy and other early hominids resembled those apes most closely related to humans. Because those apes are widely believed to be chimpanzees, based on the similarity of DNA base sequences between chimpanzees and humans, the soft tissues assigned to Lucy are those of chimpanzees. Lucy and other early hominids are given the fleshy nostrils unique to chimpanzees and gorillas among the living primates. The body hair is short and dark and projects away from the face as with chimpanzees, and there are no beard and mustache present in males because it is not found in chimpanzees. Instead, sparse hair is shown on the underside of the lower jaw, whereas the forehead is imagined to be free of hair as with humans but unlike chimpanzees.

Although the soft tissues may be a matter of conjecture, the hard tissues offer some constraints that are problematic for any chimpanzee reconstruction for Lucy and other australopiths. The forward-projecting brow ridge extending across and between the eyes that gives chimpanzees and gorillas that classic hooded appearance is missing. Instead, the ridges of Lucy and other australopiths are limited to the region immediately above the eye. Neither do the eyebrow ridges project forward in the manner of chimpanzees and gorillas. Also absent is the channel or sulcus that lies immediately behind the brow ridges in chimpanzees and gorillas. In addition to the absence of these African ape features is the presence of a different kind of cheekbone. The cheekbone of the chimpanzee is narrow and slopes back along the lower margin. The complete opposite is found in australopiths, where the cheekbone is very broad and is vertical or slopes forward at the lower margin.

The combination of these three features is hardly congruent with what might be expected of a chimpanzee ancestry for humans. When artists add

Source: © Robert Jurmain.

chimpanzee features in their reconstructions of australopiths, the result is a very incongruous bipedal "chimpanzee" that has massively broad cheekbones and lacks the classic supraorbital ridge (torus) and posttoral depression of African apes. Perhaps their absence may be attributed to an evolutionary loss of the features since separation from the common ancestor with chimpanzees, whereas the cheekbones are just a novel development that was then later lost in the evolution of *Homo.* This ad hoc scenario may be all well and good, but there is another great ape that shows no such contradictions in skull structure.

Comparisons between australopiths and orangutans demonstrate no such obvious contradictions of skull morphology. Orangutans have broad cheekbones with forwardly oriented lower margins as with Lucy and other australopiths. Orangutans also have eyebrow ridges that do not project up in the African ape manner. These similarities may be passed off as a

Lateral view of *Australopithecus africanus* specimen Sts 71 from Sterkfontein. This view illustrates the lower surface of a flattened orbital plane and anterior orientation of the zygomatic roots.

Source: Reproduced from Tattersall, I., & Schwartz, J. H. (2000). *Extinct humans.* Boulder, CO: Westview. Courtesy of Ron Clark.

phylogenetically meaningless coincidence, but there are at least 42 known features uniquely shared between orangutans and humans—far more than any uniquely shared features between humans and chimpanzees. The skull of the australopiths also shows several skeletal features that are otherwise characteristic of orangutans or recognized orangutan relatives, including upper palate thickness, nasal bone thickness, and cheekbone development.

The orangutan resemblance of australopith Sts 71 is further emphasized by a more forwardly projecting upper jaw and a more marked disparity in size and shape between the upper central and lateral incisors. Although the skull of Lucy is represented by only a few fragments, these are shown in reconstructions to be part of a skull that has an overall similarity to that of the chimpanzee with a relatively low domed cranium on the assumption that the early hominids would show chimpanzee-like skeletal features. This assumption was recently found to be wanting in a reconstruction of *A. afarensis* using a more complete skull for this species. By carefully connecting the skull fragments of the fossil AL 444–2, William Kimbel and colleagues recently developed a most un-chimpanzee-like reconstruction. In addition to the orangutan-like brows and cheekbones, the infraorbital region of the lower region of the face is flat and vertical rather than concave as with chimpanzees. Even the upper jaw shows a slight upward inclination, and the cranial area rises in a gradual dome as with orangutans.

Collectively, the structural features of Lucy and other australopiths give an appearance that is more like orangutans than chimpanzees. When these features are combined with soft tissue features that would be expected of an African orangutan relative, a completely new interpretative portrait becomes possible. This potential was recently explored by the scientific illustrator Bill Parsons at the Buffalo Museum of Science. The result shows a new kind of "Lucy" with the flat, vertical infraorbital region and high cheekbones indicated by skull morphology. In addition, the hair is now forwardly oriented, the forehead is exposed, the nostrils lack the fleshy extensions found in African apes, and Lucy can smile without showing teeth. All of these features are uniquely shared by humans and orangutans, and if these and other unique features indicate a common ancestry, then they can be fully expected to have occurred in early hominids such as Lucy.

The new portrait of Lucy is now on display at the Buffalo Museum of Science in the world's first exhibition showing the contrasting chimpanzee and orangutan reconstructions of early hominids. The purpose of this display is to show that it is possible to derive different results by emphasizing different elements of the same information. The orangutan connection with humans is generally ignored in favor of the chimpanzee connection principally through the widely accepted view that genetic base pair sequence similarities between humans and chimpanzees are the final and only proof of hominid evolutionary relationships. The trouble with this proposition is the fact that australopiths do not look like chimpanzees. Instead, the clearly orangutan features of Lucy and her relatives

Bust of Lucy interpreted from a recently reconstructed skull of *Australopithecus afarensis* supporting a cranial profile with a flattened and vertically inclined orbital region, broad cheekbones, and absence of the African ape supraorbital torus. This illustration, by the scientific illustrator William Parsons, is currently on display at the Buffalo Museum of Science.

suggest something quite different—different enough to make one smile just like an orangutan.

— *John R. Grehan*

Further Readings

Kimbel, W. H., Rak, Y., & Johanson, D. C. (2004). *The skull of Australopithecus afarensis.* Oxford, UK: Oxford University Press.

Schwartz, J. H. (2004). *The red ape* (2nd ed.). New York: Basic Books.

Schwartz, J. H., & Tattersall, I. (2005). *The human fossil record,* Vol. 3: *Craniodental morphology of Australopithecus, Paranthropus, and Orrorin.* New York: Wiley–Liss.

Tattersall, I., & Schwartz, J. H. (2000). *Extinct humans.* Boulder, CO: Westview.

Lyell, Charles (1797–1875)

Charles Lyell was born in Kinnordy, Forfarshire, Scotland, on November 14, 1797, the eldest of 10 children. His father guided his early studies of nature, but Lyell's formal education was received at Exeter College of Oxford University. While there, Lyell was influenced by the works of William Buckland, a geologist and paleontologist. After graduating in 1816, Lyell studied law, but by 1827 he had abandoned the profession to start a long, full-time career in geology. His writings would enhance the ideas proposed by James Hutton, a Scottish geologist considered by many to be the father of modern geology and noted for formulating the concepts of uniformitarianism, in his *Theory of the Earth* (1795) as well as the Plutonists' school of thought. Hutton's new theory was based on his observations that layers of sedimentary rocks, thrust up against other layers at various angles, pointed to the fact that layers had been deposited, transformed into rock, and then tilted only to have further deposition on top. He also proposed that the interior of the earth was hot and that the movement in this "heat engine" resulted in the formation of new rock. The presumption was that these tremendous displacements of rock happened gradually, requiring a vast amount of time to slowly produce the various topographies. A corollary to his argument was that the same geological processes at work today were in operation in the past, whereas the prevalent notion at the time was catastrophism, which stated that all rocks had precipitated out of an enormous flood in a very short time span. Hutton's view of the geology of the earth had "no vestige of a beginning, no prospect of an end."

Lyell was also committed to this steady-state, nondirectional, and nonprogressive view of uniformitarianism. Changes were gradual and continuous, but with no direction. He rejected Hutton's thesis that the earth had been molten when it was first formed and that it was in the process of cooling. This denial posed a serious impediment by ignoring the relevance of astronomy and physics to historical geology.

From 1830 to 1833, Lyell published his three-volume *Principles of Geology.* The work's subtitle was *An Attempt to Explain the Former Changes of the Earth's Surface by Reference to Causes Now in Operation.* However, it restricted all geological explanations to causes that can be observed in the present, ruling out any catastrophies because they are nonobservable in the present, and therefore rejecting them as past events to explain the present formations.

Source: Courtesy of the Library of Congress.

Lyell believed in the uniformity of the laws of nature, as did the catastrophists. His position may be summarized by pointing out not only that geology was to restrict its hypotheses to the same kind of causes as those currently acting but also that the intensity of those causes is to be in the same range that currently exerts itself. This view of uniformitarianism rules out the possibility of a developmental theory of the earth.

Lyell's *Principles of Geology,* and its many revisions, was the most influential geological work of its day and did much to lay the groundwork for the fledgling science of historical geology.

Another important area of geological endeavor was in the field of stratigraphy, a branch of geology concerned with the relationship between sedimentary rocks and their depositional environment. As a result of his fieldwork in Italy and France, Lyell was able to categorize recent strata by kind and proportion of fossil marine organisms, resulting in his proposed division of the Tertiary Period into three segments that he named the Pliocene, Miocene, and Eocene. The second edition of his *Principles of Geology* explained new ideas concerning metamorphic rocks. It delineated the rock changes due to high temperatures in sedimentary rocks adjacent to igneous rocks.

The impact of Lyell's geological uniformitarianism on Charles Darwin was significant and had staggering results. Darwin read the *Principles of Geology* during his 5-year voyage on the HMS *Beagle.* It provided Darwin with the background to contemplate those formations that could result in geology by small and slow processes operating over immense periods of time. Darwin's early papers were, in fact, attempts to explain geological and biological features (i.e., his coral reef work) in a uniformitarianistic manner. His later *On the Origin of Species* (1859) relied on these same premises.

Although Lyell inspired Darwin and became his lifelong friend and mentor, his approach in applying the principles of uniformitarianism in a steady-state, nondirectional, nonprogressive world to the history of living organisms put him in initial disagreement with Darwin the evolutionist. Lyell maintained that the fossil record had no development from simple organisms to more complex ones because the earth always has sustained the full range of living organisms, even predicting that the fossils of mammals could be found in the oldest sedimentary rocks. He believed in the fixity of species, although he acknowledged that many new species had become extinct and that all ecological niches were always occupied with many new species coming into existence, but not something observable in the present. He refused to specify how or what he meant, leaving the interpretation open to discussion.

Later in his life, Lyell acknowledged the accumulation of evidence regarding the evolution of organisms over time and became one of the first prominent scientists to endorse *On the Origin of Species,* although he never fully accepted natural selection as a driving mechanism behind evolution in his public writings. In 1858, Lyell was in fact instrumental in arranging the copublication of the theory of natural selection by Darwin and Alfred Russel Wallace. Darwin had withheld publication of his accumulated evidence regarding natural selection for more than two decades. He was forced into publication due to the independent discovery of a similar

theory by Wallace, who sent Darwin his paper titled "On the Tendency of Varieties to Depart Originality from the Original Type." In 1863, Lyell published his *Geological Evidences as to the Antiquity of Man,* discussing Darwin's theory at length.

For his contributions to the science of geology, Lyell was knighted in 1848 and was made a baronet in 1864. He died on February 22, 1875, and is entombed in Westminster Abbey, as is Charles Darwin.

— *Paul A. Young*

Further Readings

Lyell, C. (1873). *Principles of geology* (Vol. 1). New York: D. Appleton.

Ruse, M. (1976). Charles Lyell and the philosophies of science. *British Journal for the History of Science, 9,* 121–131.

Wilson, L. G. (1972). *Charles Lyell: The years to 1841—The revolution in geology.* New Haven, CT: Yale University Press.

M

Maasai

The Maasai live in rangelands in Kenya and Tanzania. Accurate census data are not available, but estimates of population numbers range between 500,000 and 1,000,000. The Maasai speak a Nilotic language, and their social system is structured by sections (which control areas of space), clans (which run across the whole land), and age-sets (bands of men of similar ages).

The Maasai are probably one of the most famous groups in Africa, and certainly in East Africa, due to their persistent preference for bright beads and blue and red clothes over modern dress and their predilection for cattle. They are popularly believed to value cattle as wealth regardless of the utility of cattle, and they subsist on a diet of milk and blood. They are also famous due to the concentrations of wildlife with which they have shared their land and the beautiful landscapes (e.g., at Ngorongoro, near Kilimanjaro) with which they share them.

The large herds of the Maasai reflect the logic of subsistence milk production and herd survival in arid environments as well as concerns for prestige. But despite the prominence of livestock, Maasai and Maa speakers have long adopted a variety of livelihoods, including agriculture and hunting. Maa speakers have farmed and hunted when raids, drought, or disease reduced cattle numbers. Even during times of plenty, trade of livestock products for grains has been the norm. A purely pastoral diet was a luxury enjoyed by herders in remote cattle camps during the wet season. It may even have been an unusual, and brief, historical development in the long history of pastoralism.

One of the clearest current trends in Maasai society is the decline in livestock per capita. Cattle numbers are fluctuating around a set number, whereas human populations are increasing. As a result, fewer and fewer Maasai are able to live off their herds, and diversification into agriculture, tourism, and diverse businesses is the norm.

Nevertheless, despite the commonplaceness of diversity, the ideological ground of pure pastoralism has remained strong. Who precisely is *really* Maasai is a question that has dominated the Maasai and their governments for many years. The Maasai are contemptuous of "non-Maasai" (*Il-Mek,* i.e., "bumpkins") and believe that they have a right to repossess their cattle, which God gave to the Maasai. Colonial governments in particular, because they sought to make ethnic boundaries and territory rigid, also had tremendous difficulties in deciding who was and was not really Maasai. The reality is that ethnic identity, like livelihoods, is fluid and dynamic. Belonging and identity could and can shift. It was because of this dynamism that debates about identity were so intense.

Maasai recent history has been dominated by land. In the Maasai moves of 1904 and 1911, the British government evicted the Maasai from their lands in the middle of Kenya and concentrated them in a single Southern Reserve, breaking a promise that had allocated them land in the north. Since then, herders have also been moved from private farms and wildlife reserves, including the famous Amboseli and Serengeti national parks and the crater inside Ngorongoro.

Current burning issues in Kenya and Tanzania revolve around land titling and subdivision that threaten the free movement of herds. There is also

Source: © Royalty-Free/CORBIS.

continuing conflict with the wildlife lobby, which is seeking to preserve wildlife's access to pasture and water through both cooperative and coercive measures. Recent scholarship has also emphasized the constructions of patriarchy and gender in Maasai society through encounters with patriarchal governments.

— *Dan Brockington*

See also **Nomads**

Further Readings

Hodgson, D. (2001). *Once intrepid warriors: Gender, ethnicity, and the cultural politics of Maasai development.* Bloomington: Indiana University Press.

Spear, T., & Waller, R. (1993). *Being Maasai: Ethnicity and identity in East Africa.* Oxford, UK: James Currey.

Spencer, P. (1988). *The Maasai of Matapato: A study of rituals of rebellion.* Manchester, UK: Manchester University Press.

Macaques

The macaques are successful Old World monkeys (family Cercopithecidae) that are members of the genus *Macaca,* of which there are some 20 species. Macaques are the most wide-ranging primate species except for humans. One species, *M. sylvanus* or the Barbary macaque, is found in Morocco, Algeria, and Gibraltar. The other species are found from Afghanistan to Beijing and from Sri Lanka through Indonesia to Japan. *M. mulatta,* or the rhesus macaque, has the widest distribution and is found from eastern Afghanistan through northern India to southern Vietnam and southern China. Other macaques have a more limited distribution, including those of Sulawesi and Indonesia and *M. silenus* (the lion-tailed macaque), which is found only in the Western Ghats of India.

Macaques are small to medium-sized monkeys, most of which have a brown or grayish pelage, although a few macaques such as *M. nigra* have black hair. They have naked faces and ears, and their tails vary in length from nearly no tail (e.g., *M. arctoides)*

to tails that are the length of the body or longer (e.g., *M. fascicularis*). Macaques are quadrupedal and basically arboreal, although some species such as *M. mulatta* spend more than half of their time on the ground. Other traits of macaques include cheek pouches and ischial callosities or sitting pads. Their diet is composed mainly of vegetation (fruit, leaves, flowers, and bark) and insects and other invertebrates.

Source: © Royalty-Free/CORBIS.

The fossil record of the Old World monkeys is known from the early and middle Miocene, with a group of remains recognized as belonging to two African genera: *Victoriapithecus* and *Prohylobates*. These two genera preceded the separation of the two extant subfamilies of Old World monkeys: Colobinae and Cercopithecinae. The Old World monkeys shared a common ancestor with the hominoids (i.e., the apes), diverging during the late Oligocene or early Miocene. Overall, monkey fossils from the Miocene are rather scarce compared with the numerous fossil hominoids. Macaques appear in the fossil record during the late Miocene and early Pliocene, first in Africa and subsequently in Europe and Asia. Today only 1 macaque species still inhabits North Africa (*M. sylvanus*), 19 species live in Asia, and none is found in Europe. After 5 million years of successful evolution, many species of macaques are facing extinction due to human activities. According to the International Union for Conservation of Nature and Natural Resources, 57% of macaque species are either endangered or vulnerable, and if one adds the near threatened and conservation-dependent species, the number increases to nearly 100% of the macaques potentially facing extinction. Human greed, overpopulation, and lack of compassion are the reasons why the number of macaques is declining worldwide.

The basic macaque social system is called the multimale, multifemale troop in which females remain in their natal troop and males move to a non-natal troop or become solitary. The core of the multimale, multifemale troop is the matrafocal units composed of related females. Males and females have dominance hierarchies, but males (being larger than females and possessing larger canine teeth) are dominant to females. Rank among females is often inherited from their mothers. There is, however, some variation in this basic social system. For example, in rhesus and Japanese macaques, the males are consistently forced out of their natal troops when they reach sexual maturity around 5 years of age, but bonnet macaque males have been known to remain in their natal troops. The dominance hierarchy is generally stronger in those troops fed by humans than in those that survive by foraging on natural vegetation.

Males and females become sexually mature between 4 and 7 years of age. In the wild, macaques rarely live past 20 years of age. With an interbirth interval of 1 to 2 years, a healthy female can expect to produce 5 to 10 offspring over the course of her lifetime and to live long enough to become a grandmother. Sexual behavior is promiscuous, and females mate with both troop and nontroop males. Mating may be observed throughout the monthly menstrual cycle and during the early stages of pregnancy. In addition to heterosexual behavior, masturbation and homosexual behavior have been reported for several species of macaques.

Macaque communication is multimodal in that macaques communicate with facial expressions and body postures, vocalizations, odors, and touching such as grooming and huddling. Macaque communication usually involves dominance, submission, aggression, and reconciliation; mother–infant relationships;

warnings of danger; friendly overtures; and messages before, during, and after sexual encounters.

Two epic legends and other myths influence the interaction between people and macaques. The Hindu *Ramayana* is one such legend in which a monkey god-servant of Lord Rama named Hanuman plays an important heroic role. The other legend is a Chinese epic called *Journey to the West* in which the Monkey King or Sun WuKong (in Mandarin) is a central character. There are also numerous myths whereby Buddha is reincarnated as a monkey and performs heroic acts. In Asia, there are many variations on these myths and differences in the depictions of the monkeys in the myths. The end result is that macaques are often tolerated and provided with food around temples and other sacred places. Moreover, macaques are often dependent on humans for food because much of their natural habitat has been destroyed. The future of macaques in Asia depends on the good will of the people of Asia and their willingness to provide for their wildlife.

Although the *Macaca* genus as a whole is monophyletic (i.e., all species share a common ancestor that was also a macaque), some species of macaques seem to be more closely related to each other than to other macaque species. Although a complete consensus has not been reached, the list of genus and species that follows is arranged according to evolutionary relatedness following Groves's *Primate Taxonomy.* The species/groups are based on studies of morphology and genetics. It should be noted, however, that macaques, when given the opportunity, will hybridize and produce fertile offspring.

Order primates

Suborder Anthropoidea

Infraorder Catarrhini

Superfamily Cercopithecoidea

Family Cercopithecidae

Subfamily Cercopithecinae

Tribe Papionini

Genus and species, common name, and distribution:

Macaca sylvanus group

Macaca sylvanus (Barbary macaque) (Morocco, Algeria, and Gibraltar)

Macaca nemestrina group

Macaca leonina (Northern pig-tailed) (Thailand to Burma into Bangladesh and India)

Macaca nemestrina (pig-tailed macaque) (Malay Peninsula and Borneo)

Macaca pagensis (Mentawai macaque) (Mentawai Islands)

Macaca silenus (lion-tailed macaque) (Western Ghats of India)

Sulawesi group

Macaca hecki (Heck's macaque) (Sulawesi, Indonesia)

Macaca maura (Moor macaque) (Sulawesi, Indonesia)

Macaca nigra (Celebes crested macaque) (Sulawesi, Indonesia)

Macaca nigrescens (Gorontalo macaque) (Sulawesi, Indonesia)

Macaca ochreata (booted macaque) (Sulawesi, Indonesia)

Macaca tonkeana (Tonkean macaque) (Sulawesi, Indonesia)

Macaca fascicularis group

Macaca arctoides (stump-tailed macaque) (Assam, India, though southern China and the northwestern tip of west Malaysia)

Macaca fascicularis (long-tailed or crab-eating macaque) (Burma to southeast Asia, including the Philippines, Vietnam, Malaysia, and Indonesia)

Macaca mulatta group

Macaca cyclopis (Formosan rock macaque) (Taiwan and surrounding islands)

Macaca fuscata (Japanese macaque) (Japan)

Macaca mulatta (Rhesus macaque) (Afghanistan to southern Vietnam to southern China)

Macaca sinica group

Macaca assamensis (Assam macaque) (Northern India through Nepal to Vietnam)

Macaca radiata (bonnet macaque) (Southern India)

Macaca sinica (Toque macaque) (Sri Lanka)

Macaca thibetana (Tibetan or Milne-Edwards's macaque) (Western India to east-central China)

— *Linda D. Wolfe*

Further Readings

Conroy, G. (1990). *Primate evolution.* New York: Norton.

Falk, D. (2000). *Primate diversity.* New York: Norton.

Fedigan, L. M., & Asquith, P. J. (Eds.). (1991). *The monkeys of Arashiyama.* Albany: State University of New York Press.

Fleagle, J. G. (1999). *Primate adaptation and evolution* (2nd ed.). San Diego: Academic Press.

Fuentes, A., & Wolfe, L. D. (2002). *Primates face to face.* Cambridge, UK: Cambridge University Press.

Groves, C. (1989). A theory of human and primate evolution. New York: Oxford University Press.

Groves, C. (2001). *Primate taxonomy.* Washington, DC: Smithsonian Institution Press.

Napier, J. R., & Napier, P. H. (1985). *The natural history of the primates.* Cambridge, MA: MIT Press.

Rawlins, R. G., & Kessler, M. J. (Eds.). (1986). *The Cayo Santiago macaques.* Albany: State University of New York Press.

Machu Picchu

The pre-Columbian empire and state system of the Incas of South America created Machu Picchu during the mid-15th century as a royal Incan estate. Machu Picchu, a Quechua Indian term translated as "old or ancient" peak, is located just 50 miles northwest of Cuzco, Peru. It sits on the eastern side of an Andes mountain peak 8,000 feet above sea level overlooking the Urubamba River valley. Farther to the east extends the tropical rain forest. To the west, across more mountainous peaks, lies the Pacific coast. The city size fortress was abandoned shortly after the time of the Inca Empire collapse in 1540 and laid in ruins when Hiram Bingham, a Hawaii-born Yale University professor, rediscovered it in 1911 during his search for the Inca city of Vilcabamba. Bingham's landscape and architectural photographs supplemented his many field notes, providing hypotheses for field expeditions to follow.

As archaeologists recover the features of Machu Picchu, they debate its complex functions. It is thought to be the country estate of Inca leader Pachacuti, regarded as the greatest Inca ruler. The roads and pathways that linked Machu Picchu to Cuzco suggest that royalty used it as a retreat from bustling Cuzco nestled in the mountains below. For security, there was only one main entrance to the strategic mountaintop site. On the path to Machu Picchu, the Incas developed a drawbridge made of wooden planks or logs placed over a gap on the narrow orchid-lined footpath. It could be removed for protection from possible invaders.

Machu Picchu is known for its highly complex and sophisticated architecture. Most of the urban structure was constructed of granite hauled great distances with conscripted manual labor using simple levers. The stones were carved to fit so well that it is said that a knife or piece of paper could not pass between the stones at any point. An example of Inca stonework is found in the cylindrical Tower of the Sun that houses the Royal Tomb. The Incas applied their knowledge of gravity, stonecutting, and natural springs to create various stone canals, gutters, and storm drainage systems for water diversion. Their expertise in stonework and hydrology enabled them to create 16 fountains that relied on the groundwater of the mountains to supply the private bathrooms and kitchen of the royal quarters. Excavations reveal bronze weapons and stone tools. Archaeologists say that there are still more mysteries to uncover in Machu Picchu.

Machu Picchu has three main sectors: agricultural, religious, and urban residential. The religious sector features the Intihuatana shrine to the sun god Inti. It is a square structure, with its corners pointing in the four cardinal directions of the earth. Machu Picchu is situated in the midst of significant mountain sites, leading many to speculate on its religious significance. The Temple of the Three Windows, which is trapezoidal in shape, and the Temple of the Condor, in which the Incas carved a stone head in front of two large granite rocks that resembled condor wings, are significant architectural accomplishments. The agricultural sector incorporated the high terraces on the mountain's edge for planting crops such as potatoes and maize. The urban sector was made up of the main courtyards and grassy areas. Many craftspersons lived and worked there, serving the royal family. Houses were usually arranged in small groups. They were constructed of stone, and roofs were woven with thatch.

Machu Picchu attracts 1,500 international visitors per day. The tourist traffic, landslides, and soil erosion

Source: © iStockphoto/Dan Cooper.

threaten the ruins. It was placed on the UNESCO list of endangered World Heritage sites in 2003.

— *Elizabeth A. Dyer*

Further Readings

Bingham, H. (1948). *Lost city of the Incas.* New York: Athenium.

Burger, R. L., & Salazar, L. C. (2004). *Machu Picchu: Unveiling the mystery of the Incas.* New Haven, CT: Yale University Press.

Wright, K. R., & Zeggar, A. V. (2000). *Machu Picchu: A civil engineering marvel.* Reston, VA: American Society of Civil Engineers.

Magic

The words "magic" and "magical" are used in many different ways to refer to a huge variety of supernatural or wondrous phenomena, and even within anthropology there is inconsistency. So varied have been referents of the terms that some scholars have insisted that they have no cross-cultural validity and have urged that they not be used at all. But the word *magic* is firmly rooted in our language; it has been important in the development of anthropological theory, and ethnology has enabled the description of a set of features of magic that reveal important capacities of human cognition and cultural conceptualization.

When the word *magic* is encountered, the student should take care to ascertain just what it means. Some of the most common meanings of magic and magical include illusion or sleight-of-hand performed for entertainment; the ability to change something's form, visibility, or location or to create something from nothing; spirit invocation and command; and having romantic, awe-inspiring, or wondrous qualities. During late medieval and Renaissance times, magical practices involving complex calculations and/or written notations and formulas based in esoteric knowledge were designated as high or hermetic magic to distinguish them from the "low" or simple magic of the uneducated peasantry. Any of the many meanings

of *sorcery* or *witchcraft* may be labeled *magic;* indeed, these three terms are often used interchangeably. Sometimes modifiers, such as "black" (or white) magic and "demonic" magic, are used. During the 19th and early 20th centuries in Europe and America, a number of organizations devoted to "occult" practices developed. Some of these, such as the Ordo Templi Orientalis (Order of the Eastern Temple) and Order of the Golden Dawn, still exist today and designate their specialized ritual practices by the spelling *magick.* During modern times, the terms may designate anything psychic, paranormal, occult, or "New Age" or may designate any of the beliefs and practices of neopagan organizations such as Wicca, whose practitioners also prefer the spelling *magick* or, indeed, any reference to supernatural power or anything seeming miraculous or wondrous. The best anthropological meanings of the terms are quite different from any of the preceding meanings, but it has taken well over a century to arrive at them.

Magic in the History of Anthropology

Influenced by earlier positivism and contemporary evolutionism, scholars of the late 19th and early 20th centuries were interested in magic mainly as it related to religion and science. E. B. Tylor, in his *Primitive Culture* (1871), recognized that magic is based in principles of association, "a faculty which lies at the very foundation of human reason," but he gave it no serious cognitive significance because the assumption of causal connections among associated things, although examples of it survived into modern times, is so clearly false that it represented a primitive stage in human thinking. James George Frazer built on Tylor's writings and set down his lasting theory of sympathetic magic in the third edition of his monumental work, *The Golden Bough* (1911–1915). Frazer insisted on the evolutionary progression from magic through religion to science, and he maintained that the roles of magician and priest are separate and opposed, although he acknowledged that the principles of magic might combine with those of religion.

Marcel Mauss and his colleague Henri Hubert, in *A General Theory of Magic* (1902–1903), recognized the practice of magic as individual and private but emphasized its social implications. They focused on the Melanesian and Polynesian concept of *mana* as exemplifying the mystical power at the core of magical beliefs. The discussion of magic by Mauss's uncle Émile Durkheim, in his *The Elementary Forms of the Religious Life* (1912 in French, 1915 in English), emphasized its distinction from religion; magic is derived from religion, but it is individualistic and hence has no role in social solidarity and no place in his theory of religion.

The Melanesian investigations of the great British social anthropologist Bronislaw Malinowski produced two works about magic that were influential within and beyond anthropology: his great essay "Magic, Science, and Religion" (1925) and the two-volume *Coral Gardens and Their Magic* (1935). In his functionalist theory of culture, Malinowski emphasized that magic is neither primitive science nor a confusion of thinking but rather is a quite logical complement to practical knowledge and technique, integral with and routine in mundane activities. Malinowski paid special attention to the magic act, which has three components: the formula, the rite, and the condition of the performer. He also elaborated at length on the nature and importance of magical speech.

E. E. Evans-Pritchard was a student of Malinowski, and he also presented magic as a rational system of thought, but his great work *Witchcraft, Oracles, and Magic Among the Azande* (1937) stimulated anthropological investigations of witchcraft. With a few exceptions, social science discussion of magic over the subsequent six decades broke little new ground, presuming its uniqueness as a cognitive category separate from religion, and doubted its utility as a cross-cultural category. In his famous Frazer Lecture on taboo in 1939, Alfred R. Radcliffe-Brown advocated avoidance of the term *magic* until there was uniform agreement about its meaning. The French structuralist Claude Lévi-Strauss, in his introduction to a collection of Mauss's major works in 1950 (English translation 1987), agreed that the universality of a mana-like concept represents "a permanent and universal form of thought," but he criticized Mauss for having reduced "all magic" to mana, which is in fact a specific cultural concept and which differs greatly among various Melanesian and Polynesian cultures. And in his foreword to the 1972 English translation of Mauss's *General Theory,* David Pocock said that "the importance" of the appearance of Mauss's work at that time, with Lévi-Strauss's commentary about it, "is that it contributes to the dissolution of 'magic' as a category."

Alice and Irvin Child observed in their *Religion and Magic in the Life of Traditional Peoples* (1993) that "Frazer's study of primitive magic was getting at

fundamentals of human thought," but throughout the 20th century most discussions of magic were premised on assumptions of its falsity and cognitive infancy; it was dealt with as of a totally separate order from religious phenomena, and scholarly concerns with various aspects of its mode and expression precluded investigations of its underlying cultural meanings or cognitive significance. Rosalie and Murray Wax provided an overview in their 1963 essay, "The Notion of Magic." A comprehensive general social science survey, using "magic" to cover a wide range of techniques of supernatural manipulation, was Daniel O'Keefe's *Stolen Lightning: The Social Theory of Magic* (1983). Stanley J. Tambiah's *Magic, Science, Religion, and the Scope of Rationality* (1990) contained insightful assessments of major anthropological studies of magic.

Magic in World Ethnology

Michael F. Brown, in his comprehensive ethnography of magic among the Aguaruna of northern Peru, *Tsewa's Gift* (1986), showed that for these people magic is not distinguished conceptually from religious or instrumental activity, and he seemed to echo Evans-Pritchard's discussions of 50 years earlier: "nor is its logic independent of prevailing notions of material causality." Brown urged more careful examination of the underlying symbolism of magical thinking and recognition of the full integration of magic in cultural conceptualization and expression. Anthropology today has the data, methodology, and philosophy to study magic as a basic mode of human thinking.

Ethnology, the cross-cultural comparative method of anthropology, has revealed certain principles that underlie magical thinking and are absolutely universal and for which there is evidence throughout recorded history and even in prehistory. The fact of their universality, strengthened by some recent discoveries in the brain sciences, suggests that we are dealing with fundamental structures of human cognition. Magic is best understood as beliefs and behavior involving at least some of six basic principles: power, natural forces, symbols, cosmic interconnections, and Frazer's two principles of sympathetic magic (similarity and contact).

Power

Power is the universal idea that Mauss recognized, although it has specific variations and no single cultural concept, such as mana, should be used to generalize. People everywhere believe in a mystical communicable vital force that exists to varying degrees in all nature. Inanimate things have less power than animate things, lower order animals have less power than higher order beings, power increases in intensity up social and supernatural hierarchies, and contact by lower order beings with higher order power is dangerous. The biblical concept of God's "glory" is an example. In people, power is carried in the blood and the breath and is energized by thought and intent. It is concentrated in the reproductive organs, and it is embodied in words and semen and menstrual blood and breast milk. Negative, especially dangerous forms of it are emitted through the excretory orifices and bodily lesions.

Natural Forces

All people also seem to believe that all nature is activated by forces that can be conceptualized as the engines of nature. They are energized by their own power and are programmed to do specific things, either singly or in concert with others. The forces can be manipulated by spirits, either of their own accord or after supplication by people through prayer and ritual, and they can be affected directly by people through magic without spiritual assistance.

Ethnology also reveals that the invocation and command of spirits is a universal feature of religion but that it ought to be reconsidered as a feature of magic. Probably all religions regard at least most of their spirits as sentient, willful, and potentially capricious, and all recognize serious risks in attempting to contact spirits directly and especially to command them. Conceptually, there is a great difference between the invocation of and effort to persuade presumably sentient and willful spiritual beings and the effort to exert direct control over presumably nonsentient forces of nature. Frazer, influenced by Tylor's theory of animism, did recognize this problem, and he tried to get around it by arguing that when magic addresses spirits it treats them as "inanimistic agents" that submit passively to the magician. This lame assumption is unjustified in world ethnology and is surely one of the weakest points in Frazer's generally insightful theory of magic. Even though apparently magical techniques may be involved, spirit invocation and command should be regarded as a distinct phenomenon of religious behavior and not categorized as magic.

In many systems, forces and power mighty not appear separate but may seem to merge, as in mana,

Chinese *qi,* Greek *dynamis,* and the various concepts of flowing energies in traditional and New Age belief systems.

Symbols

Symbols are central to magic. Symbols are forms of representation that not only stand for other things but also can conceptually take on qualities of those other things so that they *stand in for* or take the place of those other things. If the thing the symbol represents has power, the symbol will become powerful. Words are symbols; so too are thoughts. Representations of religious beings and concepts and reproductive organs are especially powerful symbols. The power of symbols, containing the essence of the thing or act symbolized, can be projected through magic.

Cosmic Interconnections

People everywhere believe that all things in nature—past, present, and future—are mystically interconnected, either actually or potentially. And it is widely believed that everything that has happened, is happening somewhere else, or will happen is cosmically programmed and detectable. Magic can project influence through these connections.

Frazer's Principles of Similarity and Contact

In his discussion of sympathetic magic, Frazer provided the best explanations for how the magical symbol is believed to work. Influenced by theories of positivism and natural law, he said that sympathetic magic operates according to the "law of sympathy," which has two subtypes: the "law of similarity," which states that things or actions that resemble others have a causal connection, and the "law of contact," which states that things or actions that have been in contact with others, either spatially or temporally, retain a connection after they are separated. Mystical connections based in these principles, which Frazer called "homeopathic" and "contagious," had been described since classical times, and Samuel Hahnemann had set down his principles of homeopathic medicine more than a century earlier. But Frazer elaborated on them at length and provided numerous ethnographic illustrations. Frazer made it clear that people understand the principles of similarity and contact to be operative in nature. A water-worn stone shaped like a particular fruit might be placed under a fruit tree to prompt its production. A tree or rock formation shaped like a phallus can be a source of power. Or, as recorded by Clifford Geertz, people of the tiny island of Bali feel confident next to the far bigger island of Java because their island is shaped like a fighting cock, whereas the Javanese live on a shapeless mass and so they are weak and aimless.

Other Ritual Practices

These principles of magic and magical thinking can be seen to operate in most manifestations of a number of ritual acts and concepts: good magic, sorcery, blessing and curse, taboo and pollution, divination, and magical protection.

Good Magic

The natural order of things is good. Open, public good magic helps the forces of nature along their predetermined paths. People everywhere perform magical acts, speak persuasive words, and wear "lucky" items to increase the efficiency of the natural forces. Magic may be routine in certain economic endeavors (as Malinowski described for Trobriand gardeners and seagoing fishermen), farmers in Africa and South America employ rain charms, Aka net hunters of Central Africa sing hunting songs over their nets before the hunt or rub parts of captured animals on nets that have not caught anything for some time, and people universally employ magic in love and gambling. Magical control over game animals is a logical explanation for much of the cave art of the Upper Paleolithic, and the so-called "Venus figurines," with exaggerated female reproductive and nurturance features, may well have been personal charms or amulets. On days when they will compete, athletes routinely wear items of clothing that they wore on days when they excelled at their sport, hoping to recreate at east part of the propitious set of cosmic interconnections that were operating on those days. In all cultures, names are intimately connected with their referents; by naming a thing, the individual exerts some control over it.

Sorcery

Sorcery is a loaded term with a great range of meanings having to do with individual manipulation of the supernatural for selfish or directly harmful ends. Referents of sorcery include invocation and command of spirits, but a generally accepted anthropological meaning of sorcery is magic. The sorcerer

employs any of the methods of magic on his or her own behalf or on behalf of the client. Sorcery is clandestine, dangerous, and universally forbidden by society for three reasons. First, it operates directly counter to the natural program by directing the forces to alter their nature or direction, and havoc can result. Second, because the amount of goodness in the world may be considered to be finite, by seeking to obtain extra wealth or advantage for oneself, sorcery automatically deprives others. Third, if sorcery aims at direct harm to another, it is a criminal act.

The best-known example of sorcery is negative image magic, as in the unfortunately termed *voodoo doll* where harm is done to the image of a victim. Some instances of sorcery are quite complex and can be understood only through specifics of the language and culture of the practitioner, but some of the principles of magic can be detected in all. The simplest form of sorcery is a curse, that is, a direct verbal expression of ill will or a similar sentiment conveyed through a gesture.

Blessing and Curse

Blessing and curse are forms of verbal expression that must be distinguished from spirit invocation, which is a totally different phenomenon. "God bless you" asks God to do the blessing and is invocation, whereas "blessings on you" and "have a good day" are blessings or direct expressions of good will. The invocation "God damn you" asks God to condemn the target to eternal punishment in Hell, whereas "go to Hell!" is a curse because it conveys the same meaning but depends solely on the speaker's intent and personal power and on the ability of the words to convey their meaning. Belief in the magical power of words is absolutely universal and is the basis for laws against slander and libel.

Taboo and Pollution

Taboo derives from a Melanesian and Polynesian concept most commonly meaning dangerous due to extraordinary mana. Popularly, it means forbidden by various sanctions. Magically, it means the avoidance of establishing a mystical connection by any of the principles of magic. Pollution means the conceptual "dirt" or malfunction that can result from the intermixing of powers that should remain separate, a possible result of taboo violation. Examples of both are numerous. Pregnant women should not carry pots due to the sympathetic connection to their swollen bellies, nor should they engage in acts of cutting, piercing, tying, tightening, or closing. Wives of harpoon hunters should not cut their hair while their husbands are hunting due to the symbolic connection to the strands of the harpoon ropes. The "uncleanliness" resultant from violation of any of the Jewish kosher laws, or from contact with a Dalit (a member of India's "untouchable" caste), is pollution. Direct intrusion of the profane into the sacred, a concern of all religions, results in pollution. Pollution can cause failure, disorder, sickness, and death.

Superstition is a term that anthropologists should avoid because it indicates superiority of the user's knowledge; but it is clear that many popular superstitions involve avoidance of magical acts. Examples include breaking a mirror, which can damage objects reflected in it; opening an umbrella, which is an object associated with storms, in the house, which is a place of calm and order; and stepping on a crack, which is damage. Any association with the number 13, which is the number of people

Source: © Christophe Serdakowski/photochris.com.

at table in the Christian story of the Last Supper of Jesus, might bring about some calamity. Malinowski noted that people involved in risky or competitive enterprises routinely employ magic, including a range of taboos. In his classic article on baseball magic, George Gmelch described a player who ate pancakes for breakfast on a day he played poorly and who thereafter avoided pancakes on days he was to compete.

Divination

To discover "occult" information, one can ask spiritual agencies, and they may answer in a variety of ways. This is another example of spirit invocation. Magically, divination involves using any of the principles of magic to tap directly into the cosmic program in which there are traces of everything past, present, and future. "Reading" tea leaves, palms, the entrails of animals, or "omens" in nature is based in the assumption of cosmic interconnections. Hidden information can be elicited by the power of words, which carry their meaning into the cosmos and release the desired answers.

Magical Protection

It is universally believed that power can be abducted from any source, reformulated, and used for new purposes. Thus, the power of religious objects can repel evil that threatens a person, the contents of buildings, or activities in ritual spaces. Many such objects are cultural, but individuals can impart special powers to particular objects and behaviors. In many cases, protective magic resembles active magic, and specific cultural investigation into the intent of the maker or user may be necessary to distinguish a *charm,* which generally means an object that activates and directs magical power, from an amulet, which is an object that protects with a passive layer of power. For example, a rabbit's foot, an appendage of an animal widely associated with nimbleness, speed, and reproductive power, can be either a charm or an amulet.

Explanations and Future Research

It seems clear that assumptions of causality according to the principles described in this entry are timeless and universal. Magic is evident in all areas of human endeavor and at all levels of society. The principles of magic explain why the baseball that was hit by Barry Bonds for his 700th career home run, or the baseball that was used to make the last out to win the World Series for the Boston Red Sox in 2004, is instantly so valuable (the former sold at auction in 2004 for $804,000); why clothes or domestic items that once belonged to celebrities fetch such high prices at auction; why the pen that a president used to sign an important bill into law becomes a collector's item; or why the residents of an eastern American town fight to save a 350-year-old oak tree that was "witness to so much history." Magical symbolism accompanies and enhances religious ritual. Manufacturers of pills and furnishings know that colors are popularly associated with particular actions or effects. People become accustomed to daily routines and feel disoriented and incomplete if those routines are altered. A person applies "body English" to bowling balls or billiard balls, and a passenger in a car approaching a stationary object presses his or her right foot to the floor. Examples are endless.

Social science explanations for how magic "works" are various; in healing, either the natural progression of the disease or the placebo effect is most common. Apparent failures are blamed by practitioners on various factors, but rarely on the logic of the magical practice itself. Magic has been explained in terms of its psychological functions of giving people confidence and a sense of control in a complicated and uncertain world.

Better ethnographic studies are clearly needed. In 1963, the Waxes stated that theoretical efforts had failed because writers on magic "had not truly understood how the persons in question conceived the world." And Michael Brown's assertion in 1986 that there is "a pressing need for fine-grained accounts of magic as it is understood and practiced in specific societies" is still valid today, and not just among traditional societies; old magical beliefs are emerging in urban market economies in developing Third World areas. The ancient and universal beliefs that certain parts of the body are loci of concentrated power have stimulated both real and imagined trades in human body parts, presumably supplied by ritual murders of immigrants, homeless people, and orphans.

But it is also clear that magical thinking is a regular, normal, and fundamental mode of cognition. It is not just New Age or neopagan enthusiasts who demonstrate magical behaviors today; everyone does. A variety of functional explanations have been given for the ubiquity of magic, but there is mounting evidence that some of the principles of magic may derive from innate instinctual tendencies. The psychologists

Carol Nemeroff and Paul Rozin conducted a series of studies during the 1980s and early 1990s indicating that ideas of contagion, the transfer of positive or negative influences by contact, are common and apparently natural. The recognition of universals in culture has long prompted anthropologists to suggest inherent biological bases for them, and today the new frontier in the understanding of magic may be the brain sciences. Symboling is at the basis of magic, and the capacity for imitation is at the basis of symboling. Neurobiological bases for the well-known imitation capability among primates were discovered during the 1990s, and recent studies by Marco Iacoboni and his colleagues at the University of California, Los Angeles, have indicated that there are bases for imitation in the cerebral cortex of the human brain.

— *Phillips Stevens, Jr.*

Further Readings

Brown, M. F. (1986). *Tsewa's gift: Magic and meaning in an Amazonian society.* Washington, DC: Smithsonian Institution Press.

Evans-Pritchard, E. E. (1937). *Witchcraft, oracles, and magic among the Azande.* Oxford, UK: Clarendon.

Frazer, J. G. (1911). *The Golden Bough: A study in magic and religion* (3rd ed., 12 vols.). New York: Macmillan.

Gmelch, G. (1989). Baseball magic. In A. C. Lehmann & J. E. Myers (Eds.), *Magic, witchcraft, and religion: An anthropological study of the supernatural* (2nd ed., pp. 295–301). Mountain View, CA: Mayfield.

Malinowski, B. (1935). *Coral gardens and their magic* (2 vols.). London: Allen & Unwin.

Malinowski, B. (1948). *Magic, science, and religion and other essays.* Glencoe, IL: Free Press.

Mauss, M. (1972). *A general theory of magic* (R. Brain, Trans.). London: Routledge & Kegan Paul. (Original work published 1902–1903)

Meyer, B., & Pels, P. (Eds.). (2003). *Magic and modernity: Interfaces of revelation and concealment.* Stanford, CA: Stanford University Press.

Stevens, P., Jr. (1996). Magic. In D. Levinson & M. Ember (Eds.), *Encyclopedia of cultural anthropology* (pp. 721–726). New York: Henry Holt.

Tambiah, S. J. (1990). *Magic, science, religion, and the scope of rationality.* New York: Cambridge University Press.

MAGIC VERSUS RELIGION

Religion has been practiced universally from the earliest peoples until today. It seeks to connect people with a spiritual realm. Religion provides people with means for coping with the uncertainties of life and death, and it offers comfort for sorrows, healing from diseases or traumas, and peace from fears. In religion, there is often an element of faith in the appeal for help from spiritual forces to achieve peace with the powers-that-be.

Magic often accompanies religion and may be woven into some religious practices, but it is not truly a religion. Rather, magic is closer to science because its goal is power to control the forces in the world. The ultimate goal of magic is power to manipulate nature or people so as to achieve desired ends.

Magic may assume a spiritual realm and seek to use spiritual powers to help or harm other people. However, the power that is sought from the spiritual realm is not for purposes of worship but rather for control in the world. Many religions have practices that are magical in character. For example, the Navajo people use sand paintings for healing. A sand painting is symbolic of the spiritual world, and contact with it is believed to yield healing power from the spirits.

Magic, in contrast to religion, is concerned with power over nature, people, or things. Magic assumes that there are causes and effects in the world that are knowable or achievable. It also assumes that contacts can cause effects. If a magician manufactures a chemical concoction that will cause the recipient to fall in love, this is an action based on a belief in causality. The assumption of magic that there are causes and effects in the world produces homeopathic (imitative) magic. A common example of imitative magic is the voodoo doll (*envoutement*), which resembles the person who the magician wishes to control or harm.

The second assumption, that contacts can cause powerful effects, produces contagion magic. Contagion magic operates on the belief that contact with something will give power that can be used to do things or to harm someone or achieve some other goal.

Magic, as it is practiced in some "primitive" societies, may use rituals, material means, and psychological means to achieve its effects. Magic may use rituals to cause gardens to grow, to overcome the uncertainties and dangers of open-water fishing, or to empower a protective "shield" around a canoe or a person.

Most "magicians" in contemporary Western societies are illusionists who entertain with sleight-of-hand or trick devices. Although they act mysterious, their magic is based on deceiving the eyes of the audience members.

— Andrew J. Waskey

Maine, Henry Sumner (1822–1888)

With his ideas influencing lawyers, historians, sociologists, and others, Sir Henry Sumner Maine's writings on law have been extremely influential. Maine, a comparative jurist and historian, is noted for developing comparative studies of law and for focusing on law among indigenous populations.

Maine's notable achievements in the study of law include leading people to situate the study of law in its social and historical setting and noting that changes in laws reveal changes in society at large. Maine believed that all societies evolved from having customs to having laws. In his writings, he arranged the laws of ancient societies to try to develop and confirm a standard process of the evolution of legal and political systems. In *Ancient Law* (1861), Maine's most popular work, ancient laws were examined as an attempt to learn the earliest human belief systems and relate these beliefs to those of modern humans. Maine developed the theory that traditional societies were based on status (personal rights based on kinship or other relationships), whereas modern societies are based on contract (rights based on written ethics). In one of Maine's later publications, *Popular Government* (1885), he outlined his theory that democracy is not necessarily more durable than other forms of government. Moreover, Maine argued that democracy does not inevitably lead to development.

Maine began attending Pembroke College, University of Cambridge, in 1840. His honors include the Craven scholarship and senior chancellor's medalist in classics, and he graduated as senior classic in 1844. Maine became a junior tutor at Trinity College, Cambridge, in 1845. He was named Regius professor of civil law at the University of Cambridge in 1847 and remained in that position until 1854. In 1850, he was called to the bar and held this position until 1854. He also lectured on Roman law at the Inns of Court, London, and was an original contributor to the *Saturday Review*. Maine was then offered the post of legal member of council in India in 1862. Although he turned it down the first year, he accepted the offer when the post was again vacated the following year. In this position, Maine acted as adviser to the government of India on both political and legal issues. He also worked as the vice chancellor of the University of Calcutta. Maine remained in India until 1869, when he returned to the University of Oxford to the position of chair of historical and comparative jurisprudence. Maine became a member of the secretary of states council in 1871 and remained in that position until his death in 1888. In addition, in 1877 he was appointed mastership of Trinity Hall, Cambridge, and then in 1887 he became the Whewell professor of international law at Cambridge.

— *Kristine McKenzie Gentry*

Further Readings

Cocks, R. (1988). *Sir Henry Maine: A study in Victorian jurisprudence.* New York: Cambridge University Press.

Maine, H. S. (1886). *Popular government: Four essays.* New York: Henry Holt.

Maine, H. S. (1946). *Ancient law: Its connection with the early history of society and its relation to modern ideas* (with introduction by C. K. Allen). London: Oxford University Press.

HENRY SUMNER MAINE

Sir Henry Sumner Maine was a jurist and an early student of primitive law. He wrote several important books on ancient laws and was a pioneer in the method of historical and comparative study

of institutions. He influenced many scholars with the idea that law and legal institutions must be studied historically.

Maine was born on August 15, 1822, in Roxburghshire, England. He attended Pembroke College at University of Cambridge, where he flourished as a classical scholar. In 1847, Maine was appointed Regius professor of civil law at Cambridge. He was admitted to the bar in 1850. In 1852, he was appointed as a reader to the Inns of Court. In 1861, he published *Ancient Law* based on his research and lectures before the Inns of Court.

The goal of *Ancient Law* was to present some of the earliest ideas people have had about the conduct of human relations. In addition, Maine attempted to show the relationship among ancient ideas, Roman civil law, and modern thought. Maine argued that people worked with one another in civilized society due to consent, tradition, inertia, and/or mutual advantage rather than force. This meant that civilization rests on contract-like agreements rather than on status.

In 1862, Maine was offered a position as a legal adviser to the consul in India. Declining the offer at first, he soon sailed for India, where he eventually advised the government of India on a number of issues and also prepared the way for the codification of Indian law. In 1869, Maine returned to England. Thereafter, he held a number of teaching positions before being elected master of Trinity Hall in 1877. In 1887, he was named Whewell professor of international law.

Maine's lectures on legal history, given at Oxford and Cambridge, were put into several books, including *Village Communities in the East and the West* (1871), *The Early History of Institutions: Lectures on the Early History of Institutions* (1875), *Village-Communities in the East and West* (1871), and *International Law* (1887). *Village-Communities in the East and West* dealt with Indian law, Islamic law, feudalism, enclosure, family, usury, land, and other laws.

Maine died February 3, 1888, in Cannes, France. Some of his ideas have since been rejected as erroneous. However, he has had a great impact on the study of jurisprudence from a historical perspective in early and modern societies.

– Andrew J. Waskey

Malinowski, Bronislaw (1884–1942)

Bronislaw Malinowski has been called the Joseph Conrad and Rider Haggard of anthropology, reflecting both his "romantic fascination with the culturally exotic" and a career that found him working from the South Seas to Mexico—to say nothing of the halls of the London School of Economics where he taught for more than 20 years. Considered to be the father of modern anthropological fieldwork, Malinowski trained two generations of ethnographers and guided the direction that British social anthropology was to take for decades.

Malinowski was born in what is now Kraków, Poland, on April 7, 1884, to a well-to-do academic family. He

Source: © Hulton-Deutsch Collection/CORBIS.

received his Ph.D. in physics and mathematic from Jagiellonian University in 1908. He read James Frazer's *The Golden Bough* in English while recuperating from an illness, and his interests in anthropology, psychology, and folklore blossomed. He studied with the famous psychologist Wilhelm Wundt for three semesters at Leipzig and went on to the London School of Economics, one of Europe's centers of anthropology, before World War I (receiving a D.Sc. there in 1916 on a library study written in 1913).

Source: © Matthew McKee; Eye Ubiquitous/CORBIS.

At the start of World War I in 1914, Malinowski was traveling back and forth between Australia and various field sites. Technically being an enemy alien in British Commonwealth territory, he could have been arrested but instead was allowed to continue his fieldwork in the Trobriand Islands off the coast of New Guinea for some 2 years. This fieldwork was the basis for much of the classic Malinowski canon, including his most famous works *Argonauts of the Western Pacific* (1922), *Crime and Custom in Savage Society* (1926), *Sexual Life of Savages* (1929), and the two volumes of *Coral Gardens and Their Magic* (1935).

Malinowski is most well known for his major contributions to anthropological theory. Functionalism, in the sense that he used the term, sees every social institution as existing to satisfy one of seven basic needs of the individual: nutrition, reproduction, bodily comforts, safety, relaxation, movement, and growth. The task of the functionalist is to show how cultural beliefs and practices not only smoothly integrate society but also offer psychological and biological sustenance for the individual.

Although Malinowski is not as well known as his work in social anthropology, his contributions to linguistics were also significant. He included, for example, an extensive essay on the role of language in *Coral Gardens*. In addressing issues of translations of Trobriand magic chants, he argued that none could actually be made because they had no real semantic content. Nonetheless, these chants accomplished tasks in Trobriand society, such as ensuring a plentiful harvest and indicating who had rights to certain gardens, even though the chants were meaningless. Malinowski's idea of "phatic communication"—that some language is used to maintain social contact rather than to exchange meaningful information—is still an important concept in sociolinguistics.

Malinowski became a visiting professor at Yale University in 1940, but lingering poor health took his life in 1942. As important as he was, Malinowski was not without faults or detractors. He was sometimes prone to self-promotion, his relationships with women were occasionally tumultuous and much discussed, and some considered his theoretical perspectives to be mere biological reductionism. The posthumous publication of his private journal while in the Trobriands, *A Diary in the Strict Sense of the Term* (1967), and letters to his wife, *The Story of a Marriage: The Letters of Bronislaw Malinowski and Elsie Masson* (1995), revealed some of Malinowski's all-too-human thoughts of both informants and colleagues. But his place in the history of anthropology is ensured. If nothing else, the scores of students he trained, including Raymond Firth, E. E. Evans-Pritchard, Meyer Fortes, Lucy Mair, Ian Hogbin, and Hortense Powdermaker, ensure that nearly every anthropologist today is a Malinowskian functionalist, at least in some way.

— *James Stanlaw*

Further Readings

Firth, R. (Ed.). (1957). *Man and culture: An evaluation of the work of Malinowski.* London: Routledge & Kegan Paul.

Stocking, G. (1995). *After Tylor: British social anthropology 1888–1951.* Madison: University of Wisconsin Press.

Young, M. (Ed.). (1979). *The ethnography of Malinowski.* London: Routledge & Kegan Paul.

Malthus, Thomas (1766–1834)

At the end of each day, the world has more than 200,000 more mouths to feed than it had the day before; at the end of each week, it has 1.5 million more mouths to feed; and at the close of each year, it has an additional 75 million mouths to feed. In the world's poorest countries, where population growth is most rapid, the lives of hundreds of millions of people are constantly plagued by hunger and by diseases aggravated by malnutrition. Humankind, entering the 21st century, now numbers well over 6 billion and is caught in an ambush of its own making. Economists call it the "Malthusian trap" after the man, Thomas Robert Malthus, who stated our grim biological predicament most forcefully: Population growth tends to outstrip the supply of food.

Malthus was born in a country house near the town of Dorking, England, the son of a gentleman who prided himself on his advanced ideas and who was an admirer and friend of both Hume and Rousseau. Young Robert (he was never called Thomas) was at first privately educated. In 1784, he went to Jesus College, Cambridge, where he graduated creditably as Ninth Wrangler (an honors degree in mathematics) in 1788. In that same year, he took holy orders and later was appointed to a rectory. In livelihood, however, he was less a "parson," as his detractors have often chosen to call him, than a college professor, for in 1805 he became the first professor of political economy in the English-speaking world at the new East India College in Hertfordshire, a post he held until his death in 1834. He published his controversial book, *An Essay on the Principle of Population as It Affects the Future Improvement of Society,* anonymously in London in 1798 and brought out a greatly enlarged edition in 1803.

Eighteenth-century thinkers had tended to view population growth as a mark of social well-being; an increase in people was generally taken to imply an increase in wealth. Malthus saw it differently. He began with the awesome redundancy of nature: "Through the animal and vegetable kingdoms," he wrote, "nature has scattered the seeds of life abroad with the most profuse and liberal hand." On the other hand, he asserted that nature "has been comparatively sparing in the room and the nourishment necessary to rear them." It follows that the tendency of populations to multiply, if unchecked by other means, will eventually be checked by starvation; the number of people will simply (and, of course, only temporarily) outstrip the supply of food. This is the most brutal and final of "positive" checks to population growth.

As a former mathematics student, Malthus could not resist a mathematical illustration. He wrote that population can increase geometrically, whereas agricultural production can increase only arithmetically. So, while the population grows "in the ratio of 1, 2, 4, 8, 16, 32, 64 . . . ," subsistence will increase only as 1, 2, 3, 4, 5, 6, 7, and so on. That was a persuasive argument, although only the first part of it was true on its face; the reproductive potential of any plant or animal species verifies it. Both Charles Darwin and Alfred Russel Wallace, impressed with Malthus's argument, found in it the key to the theory of natural selection. Darwin, 2 years after his round-the-world voyage on the *Beagle* and puzzling over the origin of species, happened to read Malthus's essay ("for amusement") and was immediately struck with its relevance to his problem. "A struggle for existence," Darwin wrote in *On the Origin of Species,* "inevitably follows from the high rate at which all organic beings tend to increase. . . . It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms." Darwin reasoned that if more organisms are born than can possibly survive, it will be the best adapted or "fittest" variants that do survive, and with enough new variants over a long period of time, new species could evolve. The second part of Malthus's proposition was problematical because Malthus, depending on his observations of the agricultural practices of the late 18th century, did not foresee the increased food production that would follow the industrial revolution. For more than a century after Malthus's death, food supplies increased far more rapidly than he had predicted. But during the post-World War II period, when antibiotics and other

medical and health improvements caused huge population increases, food supplies would again be inadequate to provide for the world's hungry and malnourished. No doubt, Malthus would now feel vindicated by history.

The earnest effort of many governments to encourage birth control, together with a new self-reliance among better-educated women in the developing countries (and thus their acceptance of family planning), has helped to bring total world growth rates down somewhat during recent years. But birth control information and assistance are not available everywhere, and this is one reason why global growth rates are still ominously elevated. Realistic mid-range projections show world population increasing from 6 billion in the year 2000 to 9 billion by 2050—a 50% increase in only 50 years. Such rapid growth, so long continued, is causing human demands to overshoot not only the world's finite resource base but also its environmental carrying capacity, with potentially tragic results for our own generation as well as future generations.

Environmental overload is already causing dramatic losses of much-needed cropland due to salination, waterlogging, and erosion as well as to urban sprawl, road building, and other effects of larger populations. Rangeland and fisheries are also being exploited beyond their capacity for recovery. Meanwhile, 1 billion of the world's 6 billion people are chronically malnourished, and in densely populated countries such as India, Bangladesh, Pakistan, Ethiopia, and Nigeria, where half of the children are already undernourished, hunger continues to increase as populations grow. Water shortages are a part of the population–food equation that could hardly have seemed troubling to Malthus, living in a country of plentiful rainfall. But freshwater shortages may well be the most severe threat of all, not only to the human need for potable water but also to the needs of industry and agriculture. As populations grow, the demands for freshwater supplies of all sorts—surface water, groundwater, reclaimed water—are increasing. Meanwhile, many ancient aquifers (which are mainly "fossil water" deposited over many centuries) are being overpumped for irrigation and are in danger of nearly total depletion in the foreseeable future, threatening food production on irrigated lands. And irrigation itself, on which so much of world food production depends, can have deleterious aftereffects that eventually make the soil virtually worthless for agriculture.

Source: Courtesy, Wikipedia.

Population growth also causes energy-related problems such as air pollution, global warming, depletion of fossil fuel supplies, and destruction of the ozone layer. These detrimental effects are due partly to voracious fuel consumption in the industrialized societies, but they are also due to the huge increase in energy demands required to double or triple food supplies during this century so as to feed the world's burgeoning population more equitably and adequately. This disparity between increasing energy demands and diminishing traditional energy supplies has prompted a close look at newer or alternative (and less polluting) energy sources, including wind, solar, hydro, geothermal, and hydrogen power. All of these, however, are still in the early stages of commercial development.

Overpopulation also burdens and stresses the environment. It is increasingly clear even to casual observers that dense populations degrade the long-term carrying capacity of the earth. The wealth of the earth is far less a matter of gold and silver than of fertile soil, forests, fisheries, fresh water, and clean air; these are the assets that sustain our lives and undergird

our civilization. But that fundamental wealth is being depleted by a global population that is too numerous and too wasteful.

Various kinds of social disruption are also caused by population growth. Disputes over inadequate supplies of food, water, and other resources can destabilize governments, cause civil strife, and degenerate into social chaos. Meanwhile, preexisting religious or ethnic conflicts can be exacerbated by ongoing demographic pressures, causing riots, massacres, and "ethnic cleansing." They may also spur large-scale emigration to neighboring countries that are often hostile to such massive immigration. Rapidly growing populations can also breed international conflicts over shared or common resources such as water, and these conflicts have implications for other nations, often far removed from the locations of the struggles. In 2002, Thoraya Obaid, head of the United Nations Population Fund, pointed out that rapidly increasing populations in the Middle East have resulted in very high proportions of young people there, and many of them are radicalized by "a growing sense of inequality and injustice" that, she warned, leads to extremism and terrorism. "There is no doubt," she said, "that demographics and population are linked to political instability," and she called for improved family planning services, health services, and education.

From the very beginning, Malthus's message was greeted with widespread hostility, and that antagonism has continued to the present day. Criticisms now come chiefly from those holding left-leaning social ideas or right-leaning capitalist doctrines or from those with religious objections to birth control. The critics operate on the assumption that despite the population explosion of the past half century, all is well nonetheless. They simply assert that there is no population problem, that overpopulation does not cause hunger, that all of the talk about overpopulation is only a mask to conceal capitalist—or socialist—failures, and that the world and its natural resources are, for practical purposes, infinite. However, the desperate conditions in much of the Third World today refute these ideas.

Another obstacle to sensible population limitation is the hierarchy of the Roman Catholic Church, which condemns birth control, calling it "an offense against the law of God and of nature." Most other religions disagree with this opinion, but the Catholic hierarchy, wielding the political power of large congregations, continues to oppose population limitation. Its influence is especially unfortunate in the United Nations, where for many years it has succeeded in weakening or preventing family planning programs despite the current suffering in the Third World and the severe hardships that continuing overpopulation will inevitably bring to people everywhere.

Complicating this picture is the Catholic hierarchy's associating birth control with abortion so that U.N. population programs can be further undermined by the accusation that they promote abortion—even when that is not true and even though birth control has been shown to prevent large numbers of abortions. On the abortion issue, the Catholic hierarchy is joined in an unlikely alliance with certain American fundamentalist Protestant groups. Together, with their strong influence on conservative politicians, they have successfully pressured several administrations in Washington, D.C., to ignore the global population problem and to withhold family planning contributions to the United Nations. When Malthus died in 1834, the total population of the world barely exceeded 1 billion. If he were to return now in the 21st century, he would find a world population that is well over 6 billion. He would be surprised at that because he would find it hard to believe that food supplies had increased sufficiently to keep so many people alive. He would be far less surprised to hear that of those 6 billion people, 1 billion of them—as many as existed in total during his own time—are suffering from malnutrition and in danger of starvation. So, despite two centuries of progress in agricultural productivity, there is little in today's world situation that would cause Malthus to change his mind. In many Third World countries, there is simply not enough locally grown food to nourish the population adequately, and food from foreign sources is increasingly expensive and unaffordable due largely to the high costs of oil and fertilizer. Meanwhile, the world population keeps growing by 75 million mouths per year. Because of rapid population growth, humans everywhere face a future of uncertainty and prodigious challenge. But the same man who anticipated our current predicament also prescribed the only tenable response to it. As Malthus wrote, "Sufficient yet remains to be done for mankind to animate us to the most unremitted exertion."

— *Philip Appleman*

Further Readings

Brown, L. R., Gardner, G., & Halweil, B. (1999). *Beyond Malthus: Nineteen dimensions of the population challenge.* New York: Norton.

Malthus, T. R. (2004). *An essay on the principle of population* (2nd ed., P. Appleman, Ed.). New York: Norton.

Smail, J. K. (2002). Remembering Malthus: A preliminary argument for a significant reduction in global human numbers. *American Journal of Physical Anthropology, 118,* 292–297.

Winch, D. (Ed.). (1987a). *An essay on the principle of population* (2nd ed.). Cambridge, UK: Cambridge University Press.

Winch, D. (Ed.). (1987b). *Malthus.* Cambridge, UK: Cambridge University Press.

Wrigley, A., & Souden, D. (Eds.). (1986). *The works of Thomas Robert Malthus.* London: Pickering & Chatto.

MANA

Mana is the Polynesian and Melanesian concept of communicable supernatural power. This is a variant of a probably universal belief in a power that exists to varying degrees in things in nature. In most cultures, it is believed that the power is vital for the interactive participatory role of things in an interconnected cosmos, but in great concentrations it can be dangerous. It is stronger in animate things than in inanimate things, and it is stronger in higher order things than in simpler things; people have more mana than do animals; and in kings and spiritual beings, its intensity is dangerous to ordinary people. Mana is, indeed, the essence of sacredness or holiness.

It is because their communicable mana is so intense that Polynesian kings were veiled and carried, and because one's shadow is an extension of oneself, care was taken that kings' shadows did not fall on ordinary citizens. The personal attendants to Polynesian kings were obliged to submit to magical rituals to remove the potentially harmful royal mana from their hands when their services were ended. In Melanesia, the intensity and dynamism of mana may vary among members of the same class of things, so fishermen or hunters will treat carefully the particular fishhook, net, or spear that seems to be especially efficient, and if it loses its power, magical rituals will be enacted to strengthen it.

Mana-like Power Elsewhere

If supernatural beings are conceptualized as ranked hierarchically in a society, gods will have more power than other kinds of spirits and the Supreme Being will have the greatest concentration of power. The intensity of divine power is illustrated in the biblical concept of God's "glory," famous as the cause of the shepherds' terror in the Christmas story. In Exodus, Moses asks God to reveal Himself, but God replies, "You cannot see my face, for no one can see me and live"; nevertheless, when Moses came down from the mountain, his people were frightened because his face was shining from being so close to God. Subsequently, after his talks with God, Moses veiled himself to protect his people from the contagious divine power.

Some well-described cultural concepts of mana-like power include Iroquois *orenda,* Algonquian *manitou,* Sioux *wakan,* Malay *kramat,* Indian *brahma,* Greek *dynamis,* Chinese *qi,* West African Yoruba *àshé* and its Caribbean derivatives (*aché* and *axé*), Islam *baraka,* Hindu and Buddhist healing systems' *karma* and *chakras,* the alleged "energies" in Therapeutic Touch and Reiki, and ideas of flowing streams of power in the earth such as "leylines" in Britain and Europe and variants of *qi* as earth energies addressed in the Chinese geomantic system of feng shui. For reasons similar to those in Polynesian monarchies, some African kings were veiled, carried in public, and otherwise separated from commoners. In popular use today, the term *mana* sometimes means an inherent power to bring good luck or good health. New Age adherents to the health food movement of the 1970s and 1980s regarded some "natural" foods as containing mana, charged with a beneficial life force, whereas certain sugary or processed foods were taboo and harmful. In Melanesia, found rocks or other objects with unusual or suggestive shapes might be presumed to have beneficial mana and would be used magically. Similarly, the southern U.S. African American concept of *mojo,* as a beneficial power vested in certain things and behaviors, is a mana-like concept.

Mana in Anthropology

The mana concept seems to have been brought to the attention of anthropology by Robert H. Codrington,

a missionary in Melanesia from 1883 to 1887, and it has been important during various stages of the history of the discipline. Continuing the late 19th-century inquiries into the development of religion, in his 1909 work *The Threshold of Religion,* R. R. Marett presented mana as a more basic concept than a belief in spiritual beings and thus was prompted to propose what he called "animatism" as a precursor to the "animism" proposed by E. B. Tylor as the earliest form of religious beliefs. Marcel Mauss and Henri Hubert used mana as the basis for their 1902–1903 construction of a "general theory" of magic and were later criticized by Claude Lévi-Strauss and others for generalizing from a culture-specific concept.

Herein lies a caution, indicated by various scholars over several decades: Generalizing about mana might violate a fundamental premise of anthropology. Anthropologists emphasize that culture-specific emic concepts might not be transferable to other cultural systems. As E. S. C. Handy's ethnological research (e.g., *Polynesian Religion* in 1927) showed, the concept of mana is superficially similar across Melanesian and Polynesian cultures, but it differs in important ways. For example, in Melanesia people seek mana and work to increase it, whereas in Polynesia mana is more dangerous and unprotected commoners are wary of it. Moreover, within each area, it might not be identical from one culture to another. In some places mana is hereditary, in some it is conferred, in some it is acquired, and in some it occurs naturally and may or may not be ritually strengthened or weakened. In both culture areas, dangerous quantities of mana render something taboo (*tabu, tapu,* or *kapu*), that is, to be avoided lest one suffer injury or become polluted. But the nature of the danger and of its contagion, as well as protection against it and ritual remedies for it, may vary in different places.

And mana can be evil. Handy noted that mana may be intentionally used in destructive ways. By the same ritual process that beneficent mana is increased, the power of a "necromancer's familiar" in Hawaii is "raised to the power of a malicious demon" that presumably can be sent to attack one's enemies. Sorcerers are described as having "great mana for causing sickness and death . . . evil mana, diverted and at work against man's life and well-being." In Africa, it is often a corrupted form of the personal power that becomes witchcraft or purely evil; a well-known example is the Yoruba àshé, which is the basis for the dreaded witchcraft power *àjé* (no etymological connection).

In Polynesia, the system of mana and tabu correlated closely with and obviously helped to define the hierarchical social structure. Other social, political, or cosmological functions might be deduced elsewhere. Similarly, the mana-like concepts described earlier for other cultures are superficially similar, but in specific details they may vary importantly from one culture to another. Each culture's concept should be described in its own terms before cross-cultural comparisons can legitimately be made; and even the phrase "mana-like" might be inappropriate.

— *Phillips Stevens, Jr.*

Further Readings

Codrington, R. H. (1891). *The Melanesians: Studies in their anthropology and folklore.* Oxford, UK: Clarendon.

Dubisch, J. (1981). "You are what you eat": Religious aspects of the health food movement. In S. P. Montague & W. Arens (Eds.), *The American dimension: Culture myths and social realities* (2nd ed., pp. 115–127). Palo Alto, CA: Mayfield.

Hand, E. S. C. (1927). *Polynesian religion* (Bulletin No. 34). Honolulu, HI: Bernice P. Bishop Museum.

Mauss, M. (1972). *A general theory of magic* (R. Brain, Trans.). London: Routledge & Kegan Paul. (Original work published 1902–1903)

Manioc Beer

A mild fermented alcoholic beverage made from the starchy root of manioc, *Manihot esculenta,* is a domesticated woody perennial shrub. Consumed in generous quantities, particularly during feasts and rituals, it has been a significant item in the diet of native tropical South Americans since pre-Columbian times. Adults and children alike drink it. The beer is known by different names (e.g., *yarake, kashirí, chicha, masato*).

Manioc beer can be prepared in different ways to change its taste and alcohol content. Manioc tubers can be peeled, boiled in water, and pounded to make a mash, or they can be peeled and grated and the

resulting pulp can be boiled. Sometimes the tubers are placed in a dugout canoe with water for several days to soften before boiling. Toasted manioc cakes, instead of fresh tubers, are also employed. Although the beer can be made with manioc only, other items are often added to the boiling pot, including one or more varieties of sweet potato, maize, pineapple, and sugar cane. To promote fermentation, boiled manioc or sweet potato is chewed and added to the mash. The mash is then left to ferment for several (at least 2–3) days in a dugout canoe or, more frequently today, in some huge plastic container such as a garbage can. The alcohol content increases with the length of fermentation period. Some native groups will further enhance the beer's alcohol content by adding sugar cane rum, a practice that is related to the introduction of rum into native areas. To drink the beer, water is mixed with the mash, which is then strained through a sieve. Some groups (e.g., the Campa of Peru) follow a strict etiquette when serving the beer. In several groups, women will serve both male and female guests; in others, males will serve males and females will serve females.

Prepared by women and shared beyond the nuclear family or household level, manioc beer highlights camaraderie based on food sharing and the exchange of products between the sexes. In many native groups, manioc beer is given to those who participate in collective work such as the clearing of a garden. Women are frequently judged on their ability to make this beer. Similarly, the quality of feasts is appraised by the amount and excellence of the beer. Although manioc beer is still made and drunk in prodigious quantities by various groups, the art of making manioc beer has been in decline. In the past, women prepared many types of manioc beer (e.g., the Taulipáng made nine types) by using different varieties of both manioc and added crops, mixing other ingredients such as ash, and exploiting different processing methods (e.g., allowing fungi to decompose the toasted manioc bread that is used). Today many women do not know about, or have never employed, these diverse methods of preparation. This is related to the decline of traditional rituals and feasts often brought about by participation in economic and political activities that detract from communal living and sharing, as well as to the proselytizing of Christian missionaries, among other reasons.

— *Lourdes Giordani*

Further Readings

DeBoer, W. R. (1986). Pillage and production in the Amazon: A view through the Conibo of the Ucayali Basin, eastern Peru. *World Archaeology, 18,* 231–246.

Koch-Grünberg, T. (1979). *Del Roraima al Orinoco* (Vol. 1, F. de Ritter, Trans.). Caracas: Ediciones del Banco Central de Venezuela. (Original work published 1924)

Lathrap, D. W. (1970). *The upper Amazon.* Southampton, UK: Thames & Hudson.

Mann, Thomas (1875–1955)

Paul Thomas Mann was born on June 6, 1875, in Lübeck, Germany, and died August 12, 1955, in Zurich, Switzerland. He wrote numerous novels, novellas, and essays and was awarded the Nobel Prize for Literature in 1929.

Mann's parents, Julia née da Silva Bruhns and Thomas Johann Heinrich Mann, belonged to the wealthy Lübeck bourgeoisie. Thomas was the second of five children. His older brother Heinrich also became an important author. After his father's death and the liquidation of the family firm in 1891, his mother moved with the three younger children to Munich while Thomas stayed at school in Lübeck. In 1894, he followed his mother to Munich and began to work for an insurance company but quit after 4 months. During this time, he wrote his first story, "Fallen" (*Gefallen*). During the same time, he attended some lectures at the Technical University of Munich, his only academic education. In 1898, the story collection *Little Herr Friedemann* (*Der kleine Herr Friedemann*) was published, followed by Mann's first novel, *Buddenbrooks,* in 1901. In his novel, Mann described the decline of the family Buddenbrook that was inspired by his own family's history. The financial decline was associated with an unfolding of aesthetic sensibility. The opposition between art and *Bügertum* (the middle classes/bourgeoisie) was one of Mann's main themes, especially in his early works, and also was taken up in his novellas *Tristan* and *Tonio Kröger* in 1903.

In 1905, Mann married Katia Pringsheim, who belonged to a wealthy family of Jewish decent. The

couple had six children. Mann's second novel, *Royal Highness* (*Königliche Hoheit*), was published in 1909. After some difficult years of low productivity, his novella *Death in Venice* (*Tod in Venedig)* was published 1912.

In reaction to World War I, Mann wrote his voluminous essay "Reflections of an Unpolitical Man" (*Betrachtungen eines Unpolitischen*) in 1918. In his novel *The Magic Mountain* (*Der Zauberberg*) in 1924, he showed the decline of the bourgeois world of the 19th century by describing the stay of Hans Castorp, a young engineer from a wealthy family, in a sanatorium in Davos, Switzerland. In 1929, Mann was awarded the Nobel Prize for Literature. In 1930, his story "Mario and the Magician" (*Mario und der Zauberer*) depicted the psychology of fascism using the example of a family's holiday experiences in Italy. Twelve days after Adolf Hitler became chancellor of Germany in 1933, Mann left Germany for a lecture journey and did not return. After visits to several countries, he settled in Switzerland. In 1933, the first part of his tetralogy about "Joseph and His Brothers" (*Joseph und seine Brüder*) was published, and the last part followed in 1943. This epos described the biblical mythos of Joseph in a psychological perspective. In 1936, Mann became a citizen of the Czech Republic and was deprived of his German citizenship. In 1938, he settled in the United States, where he taught German literature at Princeton University. In 1939, he finished his Goethe novel *Lotte in Weimar,* which gave a psychological portrait of Goethe and his environment. *Doktor Faustus,* published in 1947, described the life of the composer Adrian Leverkühn as told by his friend Zeitbloom in Germany during the end of World War II. The novel dealt with the problems of Germany's intellectual identity. Mann's final novels, *The Holy Sinner* (*Der Erwählte*) and *Confessions of Felix Krull, Confidence Man* (*Bekenntnisse des Hochstaplers Felix Krull*), were published in 1952 and 1954, respectively. Alarmed by the anti-Communist hysteria of the Joseph McCarthy era in the United States, Mann moved to Switzerland in 1952. His final work was his essay on Friedrich Schiller in 1955. Mann died that year in Zurich.

Mann did not have any explicit anthropological theory of his own. Nevertheless, his work contained an artistic adaptation of the intellectual discussions of his time, strongly influenced by the thoughts of Nietzsche, Schopenhauer, and Goethe but also by Kierkegaard, Paul, Schiller, and others. His novels and many of his essays reflected on the problems of human existence.

Characteristic of Mann's style was a distance from his subjects that he took by using humor and irony. Irony for Mann was the reconciliation of life and spirit. The opposition between life and spirit mirrored Nietzsche's conviction that life must be taken affirmatively. Mann denied this thought and united Schopenhauer's pessimism with it. In this new conception, life was still unchangeable, but the spirit was not an affirmative one; rather, it denied life by taking an ironic view of it.

The Magic Mountain was representative of Mann's intellectual novels, all of which reflected on the nature of humankind. In this novel, Hans Castorp, a young engineer, visits his cousin in a tuberculosis sanatorium in Davos and stays for 7 years, fascinated by the morbid atmosphere of this magic mountain (the title is an allusion to the Walpurgis Night in Goethe's *Faust*). Castorp is drawn in by the atmosphere and patients and is immersed in a struggle for cognition about the world. The novel circles around the main themes of the intellectual debate of the time, the great questions of humankind—life and death, reason and emotion, and time. Castorp is fascinated by the eros of dying but tries to fight it on lonely ski walks in the dangerous Alps. Reason is symbolized by Settembrini, an Italian freemason and democrat, but is defeated by the erotic attraction of Clawdia Chauchat. After his sexual experience with her, Castorp finally gives up his work ethos. In *The Magic Mountain,* and in all of Mann's other stories, humans are threatened by dark instincts or mysterious forces (e.g., by overwhelming sexuality) that destroy their orderly lives.

Time is of no importance in the magical atmosphere of the mountains, where people seem to live without time and everything runs in big circles. In this motive, Mann took up Nietzsche's idea of the eternal recurrence of the same. After Chauchat's departure, two more characters fight for Castorp's "soul." Naphta, Settembrini's antagonist, is a Spanish Jesuit whose ideology is a mixture of Christian mystics, communism, and totalitarianism. In opposition to Settembrini and Naphta is Pieter Peeperkorn, who is not very intelligent but is very attractive in his vitality. Peeperkorn's impressive personality wins this conflict without any fight. Finally, Castorp finds the synthesis of all polarities—love and goodness—in a dream but fails to understand the dream when he

awakes. He and the whole environment disappear during World War I.

— *Markus Helmut Friedrich Peuckert*

Further Readings

Koopmann, H. (Ed.). (2001). *Thomas Mann Handbuch* (3rd ed.). Stuttgart, Germany: Kröner Verlag.

Mann, T. (1974). *Gesammelte Werke.* Frankfurt, Germany: S. Fischer Verlag.

Robertson, R. (Ed.). (2002). *The Cambridge companion to Thomas Mann.* Cambridge, UK: Cambridge University Press.

Māori

Māori tribes today commemorate in song and dance how their ancestors came to the North Island of New Zealand in seven canoes (*waka*). Believed to have arrived from the Society Islands in central Polynesia during the middle of the 14th century, they escaped warfare and excessive demands for tribute. The migrants assimilated indigenous inhabitants—hunters, fishers, and gatherers of the same Polynesian stock who had arrived earlier in 950 and 1150 and named the land *Aotearoa* ("The Land of the Long White Cloud") for mists visible on the mountains.

In 1947, the Norwegian explorer Thor Heyerdahl drifted across the Pacific from the coast of South America on the *Kon Tiki* in an attempt to show that the first people to arrive might have come that way. In spite of Heyerdahl's successful voyage, scholars believe that the original Polynesians came from the mainland of Southeast Asia. With navigation skills equaling those of the Vikings, they ventured north to Hawaii, west to Easter Island, and south to New Zealand, where they were called Moa Hunters due to the large flightless birds they found there and hunted to extinction. The Moa Hunter harpoon is similar to a prototype found in the Marquesas, whereas the minnow shank lure is a stone copy of the Polynesian pearl shell bonito lure found in other parts of Polynesia.

The Polynesian migrants of 1350 introduced an agricultural economy and competition for open fertile land suitable for cultivation to supplement the hunting with spears and snares; fishing with lines, nets, and traps; and gathering of shellfish, berries, roots, shoots, plant stem piths, and fern roots already practiced. Available protein included fish, shellfish, seals, rats, and birds. The migrants brought plants to grow for food, and several of these plants did not survive the transition from a tropical climate to a temperate one. Taro, yam, gourd, and sweet potato (*kumara*) did. The paper mulberry plants the migrants brought thrived only in the warmest part of North Island.

Cultivation of plants led to a more settled way of life, cooperative work, and a denser population. Men felled trees; cleared ground; planted; trapped rats; dug roots; fished; hollowed trees for canoes; performed rites; carved bones for fishhooks, ornaments, and spearheads; tattooed faces and bodies of men as well as ankles, arms, lips, and chins of women. They also made adzes of greenstone jade and flake knives of obsidian along with wedges, skids, lifting tackles, fire ploughs, and cord drills for tools. Women gathered; weeded; wove; collected firewood; carried water; cooked; and plaited flax for clothes, cords, baskets, and rain capes. Slaves taken captive did undesirable jobs. Sea and agricultural products were exchanged for forest products, and greenstone from the South Island was traded for finished goods from the North Island.

As life became more comfortable, carving and other decorative arts began to include elaborately decorated cloaks for persons of rank, prows of canoes, gateposts of villages (*pas*), and fertility symbols (*tikis*). A beautifully carved war canoe could add greatly to a tribe's spiritual force and status (*mana*), an attribute that could be inherited or acquired.

The greatest change in Māori culture after the arrival of the canoes in 1350 was the progression from a peaceful society toward a warlike one as population and land pressures increased. The earlier Polynesian culture had had no weapons of war or fortifications of any kind. Once the migrants of 1350 arrived, Māori developed an extensive array of palisade forts and wood, bone, and stone clubs. People migrated from open unfortified settlements (*kainga*), consisting of several scattered houses with a cooking shelter, earth oven, and roofed storage pit, to fortified enclosures (*pa*) in which houses were crowded together. Pa were built on terraced hilltops with concentric walls and elaborate ditches, fighting platforms, and earthworks to withstand spears.

The first contact with Europeans occurred in 1769 when Captain James Cook visited the 200,000 to 250,000 Māori of New Zealand. The pig and the

Source: Morgue.File.com/K. Connors.

With the Treaty of Waitangi, signed in 1840 by 500 indigenous chiefs, the Māori gave sovereignty to the British in exchange for recognition and protection. Rapid enculturation followed. From 1860 to 1865, Māori battled with the government of New Zealand over questions of land rights and sovereignty. Britain ultimately confiscated 3 million acres of Māori land. Intertribal warfare was more deadly than before due to muskets that Māori had acquired, and their population fell to 42,000 by 1896.

By 1900, the population began to increase as Māori took a more active role in society, receiving permanent seats in the national legislature. Most discriminatory laws were repealed. Health, housing, and education policies were reformed. Arts and crafts were revived by 1940. Since the 1960s, Māori have struggled valiantly to maintain a distinct culture and identity as urban dwellers. In 1995, the queen apologized for "wrongful and unjust" confiscation of their lands and made reparation. Legally recognized as a minority, Māori receive special legal and economic considerations.

potato, his gifts, became currency for barter when Māori wanted steel tools, blankets, and muskets from European traders and unfriendly whalers and sealers during the 1790s. Māori protected missionaries, who arrived in 1814, as well as ex-convicts and ship deserters because they were intermediaries when chiefs wanted to trade with visitors.

Cultural change became rapid after 1820 when young men who had worked on ships returned after having acquired new possessions and diseases. The status they had achieved challenged the hereditary privilege of chiefs. In addition, large numbers of Europeans and Australians who began to arrive by the 1830s had no regard for the laws of sacredness (*tapu*). Furthermore, the priestly *tohunga* could not compete with the status of teachers trained by missionaries. Māori questioned whether traditional beliefs were valid. The power of chiefs, those descended from the oldest males of each generation with status, was further undermined when missionaries insisted that they put aside wives and free slaves as prerequisites for baptism.

Traditionally, the nuclear family (*whanau*) of a descent group possessed rights to resources and land that could be passed to members' children. Nonmembers had to seek permission of an entire descent group. Conquest was a legitimate way of gaining access to food or land, equal to ancestral right or prior discovery. Even though loss of life was probably negligible from primitive weapons in battles shortened by the demands of the growing season, constant threat of attack made it important to own land communally. Local border disputes continued from the middle of the 16th century.

Battles to avenge insults or extract retribution became one of the best ways for a tribe to promote its *mana.* War had its own worship, sacrifice, ritual, dance, and art forms. Losers often became slaves or food; cooking and eating an enemy delivered the ultimate insult.

A person's brothers and maternal and paternal cousins all were called "brothers." A person's sisters and cousins all were called "sisters." Children were desired, and adoption was frequent. Children were

educated by relatives, particularly grandparents, with songs, stories, and competitive games to imitate adult activities. A Māori child had as many mothers as his or her biological parents had sisters. An extended family, the basic social unit, consisted of an elder, his wife, their unmarried children, and their married sons and their families. Divorce was commonplace and required no more than a simple agreement by two partners to end the marriage. Population control was accomplished by means of abortion, infanticide, and postpartum sexual abstinence.

The largest kin groups were 50 independent political tribes (*iwi*) occupying particular territories. Iwi whose ancestors arrived in the same canoe felt obligated to help one another. Marriage partners, chosen by senior members of the whanau, allowed new relations to be established with other kin groups and brought new members into the subtribes (*hapu*) in each iwi. Aristocrats such as chiefs usually betrothed their children as infants. Aristocratic females brought gifts of land and slaves to marriage. Marriages were monogamous, but chiefs took several wives. Marriages were usually between members of the same tribe, frequently between members of the same hapu, but never between first and second cousins. Commoners exchanged gifts when they married. Rank determined individual and group tapu and mana.

Iwi and hapu members, bilaterally descended from a founding ancestor, owned discrete territory, but the hapu determined land use. Individuals' bilateral descent allowed them to affiliate with more than one hapu if they desired. A household officially affiliated with a hapu by means of genealogical link and participation in daily life of the group. Members could leave an overgrown hapu and start another one led by their chief's sons or brothers.

In a culture where true money did not exist and goods and services were compensated through gift giving, a man of high status who provided food and gift items during times of feasting (*hakari*) would greatly enhance his mana even though he and his family might have few possessions left to them afterward. Craftsmen were descended from chiefly lines in traditional society; each paid homage to the god of his occupation and was initiated through a series of rituals into his craft. Tattoo artists, raft and canoe builders, house builders, and carvers all were classified as tohunga, a title that conveyed the qualities of sacredness associated with "priest." *Rangatira,* or chiefs of the hapu, were often trained priests. They were beneath *ariki,* or chiefs of the most senior hapu and supreme chiefs of the iwi. Commoners (*tutua*) were beneath priests.

Tohanga communicated with a pantheon of gods and repeated rituals associated with offering. They also maintained history, genealogy, stories, and songs by committing them to memory in the absence of written language. In this way, tohanga defined ancestral and family ties and each person's place in the tribe.

A memorial to ancestors was the or ancestral meetinghouse (*whare hui*), the center of community life. The *marae* was an open assembly space of sacred ground in front of it. When someone died, the body would lie in state on the marae for days. Farewell speeches full of mythological allusions and figures of speech could be heard along with high-pitched wailing by women. Then the body was wrapped in mats and placed in a cave or tree. The body was removed 1 or 2 years later so that bones could be cleaned, painted, and carried between villages for a second time of mourning before final burial in a sacred place.

Visitors to the marae brought with them memories of their dead. Māori saw themselves not as individuals but as part of the collective knowledge and experience of ancestors. An elaborate ritual in Māori language awaited visitors. Women called out a greeting that could include a ceremonial challenge. After a visitor replied, welcoming speeches were given, followed by song. Once ancestors had been praised and lineages established, the tapu of visitors was lifted. Hosts and visitors could exchange handshakes and pressing of noses (*hangi*). Before leaving, visitors made farewell speeches in the form of thanks and prayer.

Any business not completed on the marae before nightfall was continued inside the meetinghouse, a structure commemorating a well-known ancestor. The ridgepole inside symbolized his backbone, and the rafters symbolized his ribs. Carved posts on walls represented gods, legendary figures, cultural heroes, and other famous ancestors. Many new maraes today invite city-born children to learn Māori language and culture and to test their ideas against the wisdom of their elders. Voluntary associations and benevolent societies also enable Māori urban dwellers to maintain a distinct culture and identity as they champion their rights.

— *Susan G. Schroeder*

See also **Marquesas**

Further Readings

Agyeman, J., Bullard, R. D., & Earthscan, B. E. (Eds.). (2003). *Just sustainabilities: Development in an unequal world.* Cambridge, MA: MIT Press.

Allen, C. (2002). *Blood narrative: Indigenous identity in American Indian and Māori literary and activist texts.* Durham, NC: Duke University Press.

Best, E. (1954). *Spiritual and mental concepts of the Māori* (Dominion Museum Monograph No. 2). Wellington, New Zealand: R. E. Owen.

Mauss, M. (1967). *The gift: Forms and functions of exchange in archaic societies.* New York: Norton.

Neich, R. (2001). *Carved histories: Rotorua Ngati Tarawhai woodcarving.* Auckland, New Zealand: Auckland University Press.

MĀORI

The Māori are a people of Polynesian stock who were the first human inhabitants of the islands of New Zealand. They arrived in double-hulled seafaring canoes. As a matter of custom and personal pride, Māori can recite their genealogy back to the ancestors who came in canoes. However, the custom, like many other Māori customs, is declining as many Māori have committed their genealogies to writing.

The Māori language is a Polynesian one that is part of the Austronesian group of languages. Māori is a part of the Tahitic branch but is also closely related to the Polynesian spoken on the Society and Cook islands.

Most Māori spoke their native language until after World War II. Māori was used both orally and in some New Zealand newspapers and literature. Today the language is in decline, and most Māori speak English, although there are attempts to preserve the Māori tongue. The disappearance of the Māori language is the result of Māori entering the mainstream of New Zealand life. It is estimated that only 20% of Māori now use the language in their homes.

Recent population estimates are that the Māori now number 250,000, which is roughly 9% of the population of New Zealand. Moreover, white intermarriages with the Māori have occurred frequently, so there is now a considerable population of mixed Māori and European people. These are usually counted in the Māori population.

Most Māori are tall, brown-eyed, and wavy-haired with broad faces. They practice tattooing, an ancient art form called *ta moko* in Māori. The practice is based on an ancient myth about love.

Pre-European Māori were organized into tribes (*iwi*), subtribes (*hapu*), and small groups (*wanau*). They gathered food by hunting, fishing, and farming. They lived in small isolated villages. Woodcarving was used to decorate community houses, canoes, and other possessions. Pre-European Māori culture was oral and complex. Large gatherings were held at social centers to celebrate various rites of passage such as weddings and funerals. Food at gatherings would include fermented crayfish, and the gatherings featured dances called action songs.

Classic Māori religion involved myths, spirits, and taboos. The taboos forbid contact with certain people, places, or things. A violation of a taboo was a *hara* that could invoke the wrath of the gods. A *noa* was a kind of blessing that could lift a taboo.

— Andrew J. Waskey

Marett, Robert Ranulph (1866–1943)

The English philosopher and anthropologist, Robert Ranulph Marett was known for his philosophical analysis concerning the evolution of religious beliefs and rites. Born in Jersey, Channel Islands, Marett was a product of a traditional English educational system that stressed the basic classics common during the latter half of the 19th century. Marett pursued scholastic endeavors at both Victoria College and Balliol College. After completion of his education, he held several positions at Oxford University, including fellow and rector. Besides his academic pursuits, he was cofounder of the Oxford University Anthropological Society. The influence of classical thought with a philosophical perspective can be seen in his views

on both anthropology and religion. These influential views are apparent in his major published works of *Anthropology* (1912); *Faith, Hope, and Charity in Primitive Religion* (1932); and *Head, Heart, and Hands in Human Evolution* (1935).

Contributions and Perspectives

Marett recognized the critical importance of Darwin in the discipline of anthropology. For Marett, Darwinian evolution was the essential theoretical or philosophical framework by which the scientific study of our species becomes possible. Although he did not assign philosophy under the domain of anthropology, Marett had acknowledged that philosophy is the thread by which science operates. In this manner, both critical thought and open scope of inquiry can lead to greater scientific explanations. The philosophical inquiry reduces the rigidity and dogmatic acceptance of unquestioned theoretical explanations, especially when it is applied within an historical perspective.

Marett's perspective on the scope of anthropology would be conducive with most modern perspectives on this topic. Condoning a holistic view, the anthropologist should be well versed in anatomy, geography, linguistics, and the adaptations that the arrays of culture have provided. Although rudimentary, the acknowledgment of variations in phenotypic expressions is by no means an indication of worth; the common psychological operations of our species can express its humanity within the domain of culture. In this process, the anthropologist can understand the uniting factors of both political and religious structures found throughout the world. Thus, the anthropologist can indirectly augment the practical art of "healing" the political and religious fracturing within the world. This inevitably would require that the anthropologist understand both his or her own deepest self and the society that is the object of study. This places the anthropologist beyond the constraints of ethnocentrism inherited in Western philosophical thought and proceeds into the realm of humanism.

One of the greatest contributions made by Marett concerned his unique perspective on magic and religion. With his philosophical perspective and developments in psychology, Marett's views on religion were contrary to the established and influential perspectives presented by James Frazer and Burnett Tylor. For Marett, these views on religion became too restrictive and intellectualized to accurately depict all of the processes involved in religion. The basis of the religion can be found in the subject awe of the individual toward the unknown or mysterious, a supernatural perspective prodded by both intellectual limitation and feelings. This primitive foundation of religion, aptly termed *animatism,* does not indicate a dualistic physical–spiritual existence. Rather, it should be seen in terms of powers constituted within or related to an object, all of which might not be associated with spirits. In this manner, there is a differentiation between the object and its power. Examples of these powers can be seen in the practice of witchcraft and the protective powers of objects or symbols, all of which do not constitute a spirit. Such a mysterious force gives religion a wider base than Tylor's animism.

The same consideration afforded to the basis of religion was also extended to the concepts of magic. In the evolution of religion, the process of performing magic (e.g., spell) is depicted as an extension of the emotional release of stress. Psychologically, for the individual, the process of transference stems from the will for action toward a particular end, although there may be a distinction between the object or symbol and the "reality" for the willed outcome. This process easily develops into prayer. The fluid motion from magic to prayer dwells in mystery of supernaturalism. When infused into social structures, the independence of magic can be seen in the concept of taboos. These unseen forces are unleashed to unknown destructive ends. Although there is a difference between taboo and witchcraft, the concept of magic as a supernatural force remains. Even when developed into prayer, the request for aid involves a perceived magical outcome steeped in awe. This process returns to Marett's view on animatism.

As a social anthropologist, Marett valued social psychology in the process of comparing religions of various cultures. Not totally discounting the individual, it is society that is responsible for the emotive tone of religion and its associated value system. This social reinforcement of values can be seen not only in taboos but also in regard to moral development of the individual. In the social arena, the individual's will and complete psychological constituents both are directed toward its rites of passage. In this manner, both magic and social development are blended to fulfill or complete the individual's maturity with freedom and enlightenment. Authority, both social and religious, relies on these psychological factors, essentially promoting faith and hope as a communal experience.

Although Marett's critique of Frazer and Tylor are perhaps well founded, the advancements made in the fields of both biology and psychology would question Marett's conclusions. These advancements, along with new philosophical perspectives, would certainly call for a reanalysis of his theoretical framework. Despite our scientific advancements, Marett's contribution cannot be diminished. His philosophical inquiry and differing perspective on psychology yielded a differing opinion on the fundamental principles governing primitive religion. Recognizing that feelings play an important role in human activity, the overrationalization of belief structures can be seen as seriously flawed. At the risk of misrepresenting Marett's intentions, it is possible that both the ambiguity of language in regard to religious categorization and "fuzzy" logic associated with emotion are partly to blame for the "pro" rational view. Considering the extensive influence of Aristotelian philosophy in Western thought, both Frazier and Tylor's views are understandable. However, Marett's unique perspective and cultural relativism bring deeper meaning to the evaluation of the human experience. The individual is more than an automaton, that is, a logic machine with incredible associative abilities. Marett's view of the human, as with anthropology, was holistic and complete, providing a deeper meaning for both.

— David Alexander Lukaszek

Further Readings

Firth, R. (1953). The study of values by social anthropologists: The Marett lecture, 1953. *Man, 53,* 145–153.

Hammond, D. (1970). Magic: A problem in semantics. *American Anthropologist, 72,* 1349–1356.

Horton, R. (1960). A definition of religion and its uses. *Journal of the Royal Anthropological Institute of Great Britain and Ireland, 90,* 201–226.

Marett, R. R. (1900). *The threshold of religion.* London: Methuen.

Marett, R. R. (1912). *Anthropology.* New York: Henry Holt.

Marett, R. R. (1932). *Faith, hope, and charity in primitive religion.* New York: Macmillan.

Marett, R. R. (1934). The growth and tendency of anthropological and ethnological studies. *Man, 34,* 141–142.

Marmosets

Marmosets are the smallest platyrrhines or New World monkeys (NWMs). They are closely related to Goeldi's monkeys, tamarins, and lion tamarins, which together form the subfamily Callithrichinae. Marmosets reside in tropical rain forests in the Amazonian regions of Brazil, Bolivia, Colombia, Ecuador, and Peru. They are a flamboyant group of monkeys, with many species boasting fine-textured, multicolored pelage and adorning manes, moustaches, tufts, fringes, and crests. Unlike some NWMs, marmosets do not have prehensile tails. However, like the tamarins and lion tamarins, marmosets are characterized by the development of claw-like nails (tegulae) located on all digits except the hallux (big toe), the loss of one set of molars, and the regular production of twin offspring.

Three genera of marmosets have been classified: *Callithrix, Cebuella,* and *Mico.* Some taxonomists also include *Callimico* in the marmoset group. *Callithrix* are found in the Atlantic coastal regions of Brazil, whereas *Cebuella* and *Mico* are found in the Amazon basin of Brazil and a few surrounding countries. *Callimico* are found in Brazil, Bolivia, Peru, and Colombia. Marmosets, excluding *Callimico,* range in size from 126 to 450 g, with body lengths between 136 and 231 mm.

Cebuella is composed of one species: the pygmy marmoset (*C. pygmaea*). Pygmy marmosets are the smallest of the NWMs, with an average body weight of 100 g. They generally live in groups consisting of one adult male, one adult female, and offspring.

There is also only one species in the genus *Callimico:* Goeldi's monkey (*C. goeldii*). Goeldi's monkeys differ from marmosets in that they are slightly larger (400–535 g, 216–232 mm), retain their third molars, and give birth to singletons. This may mean that Goeldi's monkeys are more ancestral than other marmosets. Many people still debate whether or not *Callimico* should be placed with the marmosets or be considered a close but separate relative.

Marmosets are diurnal, arboreal, and quadrupedal. They are omnivorous, feeding on exudates (gum and sap), fruits, and insects. Marmosets are distinguished from the closely related tamarins and other NWMs by having large, chisel-like incisors that they use to gouge out holes in tree trunks to stimulate the flow of exudates. Their claw-like nails help them to cling to trees while feeding.

Source: © iStockphoto/Michael Lynch.

Marmosets live in communal social groups that have variable social organizations. Some live as monogamous pairs, whereas others live in multiple-female and/or multiple-male groups that are composed of extended family members. Marmosets are most often found in groups consisting of one breeding adult female, other adult females, several adult males, and offspring. Females become sexually mature at around 18 months of age. All group members play an active role in helping to raise the dominant female's twin offspring, carrying the young so that the mother can forage unimpeded. Marmosets have a life expectancy of 12 to 18 years in the wild.

At least 2 of the 14 species of marmoset are considered to be endangered: the buffy tufted-eared marmoset and the buffy-headed marmoset. The cause of the decrease in these populations is deforestation of these species' already small habitats.

— *Lisa M. Paciulli and Brandon Evans*

See also **Monkeys, New World; Monkeys, Old World; Tamarins**

Further Readings

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego: Academic Press.

Hershkovitz, P. (1971). *Living New World monkeys (platyrrhini): With an introduction to primates.* Chicago: University of Chicago Press.

Kleiman, D. G. (Ed.). (1978). *The biology and conservation of the Callitrichidae.* Washington, DC: Smithsonian Institution Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* East Hampton, NY: Pongonias.

Rylands, A. D. (Ed.). (1993). *Marmosets and tamarins: Systematics, behavior, and ecology.* Oxford, UK: Oxford University Press.

Marquesas

The Marquesas, high-rise volcanic islands with jagged peaks and razor-edge ridges, are 740 miles northeast of Tahiti in French Polynesia. Experts believe that Marquesans may have come to their archipelago from Samoa more than 2,000 years ago. The islands lack coastal plains and coral reefs; the number of good anchorages is limited. Warring tribes lived in narrow valleys and sometimes cannibalized their enemies. Today 10,000 islanders, few of them full-blooded Marquesans, raise copra, taro, breadfruit, coffee, and vanilla beans watered by mountain streams.

The largest and most populated island is Hiva Oa, the burial place of French artist Paul Gauguin. Other islands in the southeastern group are Fatu Hiva, Tahuata, and two uninhabited islands, Motane and Fatu Huku, where Captain James Cook visited in 1774. Spanish explorer Alvaro de Mendana de Neira sighted the islands in 1595 and named them for his patron, Marquesa de Mendoza.

The northwestern group of islands consists of Ua Pu, Ua Huka, Eiao, Hatutu, and Nuku Hiva, which inspired Herman Melville to write *Typee.* In 1791, American sea captain Joseph Ingraham sighted the group and named them the Washington Islands. There is no truly urban center in either group today.

During the 18th century, the 100,000 Marquesans had a Neolithic technology based on stone, bone, and shell—clubs with flared semicircular upper ends carved with faces and geometric designs, ancestral tiki, and spears. Accomplished fishermen and sailors, they had the most extensive tattooing in all of Polynesia and raised pigs, dogs, chickens, tubers, and tree fruits from Southeast Asia and sweet potatoes from South America.

When Gauguin arrived in 1901, he found only 1,500 Marquesans left. Contact with Europeans and internal feuding had reduced the population. During

the early 19th century, the whalers who came to trade feathers and whale teeth for sandalwood and sweet potatoes also introduced new diseases. In addition, after France took possession of the Marquesas in 1842, many islanders were taken to South America as indentured laborers.

The Marquesas remain an overseas territory of France and have had internal autonomy since 1984. Public officials control resources, and patronage characterizes regional politics. France controls defense, foreign affairs, nationality and immigration, justice, higher education and research, communication, and currency; islanders send representatives to Paris. Marquesans, whose imports far exceed exports of fruit and flowers, depend on French social programs and military spending. Health care and education are free, and there is a 98% literacy rate. Most Marquesans are proud of their connection with French culture, but some want to return to traditional ways. The French outlawed many traditions and initiated a system of individual land ownership and equal inheritance; people became Catholics and assumed gender roles with men as breadwinners.

Islanders speak both French and Tahitian, the dominant Polynesian language. Older people continue to speak Marquesan, a language similar to Samoan. All maternal and paternal relatives are considered to be kin; use rights to land and mutual aid come from bilateral kin groups. Polynesian social hierarchies no longer exist, but islanders continue to keep genealogies. Reciprocity, generosity, and hospitality are valued. Display of imported goods—autos, appliances, and clothing—is evidence of class structure. Higher status jobs are held by European Polynesians or Polynesian Chinese with university degrees, whereas lower status clerical and public works jobs are held by Polynesians.

— *Susan G. Schroeder*

See also **Māori; Samoa; Tonga**

Further Readings

Finney, B. R. (1973). *Polynesian peasants and proletarians.* Cambridge, MA: Schenkman.

Hanson, F. A., & Hanson, L. (Eds.). (1990). *Art and identity in Oceania.* Honolulu: University of Hawaii Press.

Thompson, V. M. (1971). *The French Pacific Islands.* Berkeley: University of California Press.

Marriage

From the Latin *marito,* "to marry," marriage is the social institution making the sexual union of two heterosexuals (and recently in some societies, also of two homosexuals) official, accompanied by an (often religious) ritual. It is one of the most important areas of study in social anthropology, since it is a social event as widely spread across the globe (despite the objections made as to its universality because of its multiple juridical, economic, ethical, and ritual implications) as it is exceptionally important for each society in particular. Because of this, societies, and especially those defined as "hot" by Claude Lévi-Strauss in *La Pensée Sauvage* (1962), that is, those characterized by continuous change, have instituted the registry of the event.

The aim of marriage is to have legitimate offspring who have the right to bear their ancestors' name and inherit their wealth. By analogy, the biological, material, and symbolic reproduction and perpetuation of the *family* (i.e., the group of relatives, with the married couple and their married and/or unmarried children, etc., at its base, with which they cohabit, work, and share goods) and of the *lineage* (i.e., the wider group of individuals beyond the family who are interconnected through consanguineal kinship either patrilinealy or matrilinealy and who acknowledge a common ancestor) are achieved through marriage. By extension, the biological, material, and symbolic reproduction and perpetuation of the *ethnic group* (i.e., the group of individuals belonging to the same culture and acknowledging themselves as such) and of the *tribe* (i.e., a group that owns a territory and is homogeneous and autonomous from a political and social viewpoint) are also achieved through marriage. As a consequence, unmarried individuals and childless couples are marginalized and of low social esteem.

Marriage develops a dense network of rights and duties, starting from the spouses and the members of their close family (parents/children) and extending as well to those of their extended family (husband's or wife's parents and siblings, wife's or husband's parents and siblings) as to their lineages; in some cases, it even extends to the states they originate from. Its aims range from any sort of benefit and strengthening to the resolution of enmities, as can be seen in the following Greek cases: reconciliation of lineages engaged in vendettas in Anogeia in Crete

or belonging to opposed political parties after the civil war (1945–1949) in the village of Didima in the Peloponnese.

Processes

Despite marriage being primarily about sexual intercourse and resting on sexual attraction, love is seldom the sole criterion for choosing one's spouse. Most often, marriage is the result of an agreement between the two interested parties (arranged marriage), an agreement reached by the said parties after employing *strategies* (in this case, *matrimonial strategies*). These are, according to Pierre Bourdieu, activities repeated in time and aimed at satisfying the material and symbolic interests of families and lineages and, by extension, the interests of the entirety of the local community in a system of determined economic and social convictions. Even the case of marriage because of love is often the result of such a strategy, as ascending relatives from both sides of the intended couple consider the marriage to be in their interest and often arrange favorable conditions to promote sexual attraction between the said individuals that will, of course, conclude in marriage.

Apart from arranged marriage, the other process through which a couple can be driven to marriage is the abduction of the woman. According to common perception, the perpetrator of this act is always the man, although it is performed with the woman's consent in most cases. It is worthy of note that abducting one's wife-to-be is considered a sign of virility. The main reason usually brought forth for the abduction is disapproval of the choice of spouse on the part of the ascending relatives. However, it appears that other reasons, usually connected to *marital prestations,* can drive to this choice (see below).

Marital Prestations

Marital prestations, that is, provision of services and movable and immovable goods by one of the spouses (or their family) to the other spouse (or their family), are within the aforementioned rights and duties and an integral element of marriage in most societies. The most common instances of marital prestation are the *dowry* and the *bride price* or *bridewealth.*

The dowry, that is, the goods offered to the bride by her family (and which, directly or not, are offered to the groom and possibly his family), is encountered in Europe and the Near East. It may consist of one or more houses, farms, servants, animals, jewelry, money, and the bride's trousseau (house equipment such as furniture, cookware, and mainly textiles as well as clothing for both herself and her husband). For instance, in modern Greece, the dowry represents an unofficial but particularly powerful customary institution that was even included in the Civil Code in 1946 and stood until 1983. When the female members of the family acquire the dowry, they waive the right to inherit the family's wealth, a right reserved to its male members. After 1983, the dowry is replaced by a *parental prestation* toward the daughter.

The bride price/bridewealth consists of services, money, or other movable and immovable goods given, as opposed to the dowry, to the bride's father (and occasionally her mother as well) by the groom. This custom stands mainly for societies outside Europe and the Near East. However, it is known that it equally took place in central and northern Greece until about 1950.

Still, there are cases where the marital prestation in place (dowry or bride price/bridewealth) is not given, such as when a woman is abducted. In some societies where the custom of the dowry is present, it is therefore not uncommon for a girl to be abducted with the covert agreement of her relatives; this allows the marriage to take place without them giving any dowry, as an abducted girl loses her right to dowry. Elsewhere, in societies where the custom of the bride price stands, a poor man might abduct his intended wife; in this case, he is relieved of having to pay for her.

Although these two kinds of marital prestation (dowry and bride price/bridewealth) are obviously contradictory and the existence of one appears to exclude the other, this is not necessarily always the case; they can sometimes coexist. Usually, though, if the prevalent custom is the dowry, the value of the bride price/bridewealth ranges from small to entirely symbolic. If the bride price/bridewealth prevails, then the dowry is of little value (usually limited to the trousseau).

Another form of marital prestation is the *premarital donation* (of money or other goods of value) offered by widows wishing to marry again to their next spouse, who has not been previously married. The same tactic can be used toward intended spouses by less wanted individuals, who are, for example, divorced, of old age, bad health, or reputation.

Marital prestations have been explained either in economic terms or in the light of considerations of

Source: © Photo provided by www.downtheroad.org, The Ongoing Global Bicycle Adventure.

reciprocation and exchange. At any rate, however, their analysis and interpretation has clarified several points pertaining to the study of marriage.

Rules

Marriage is regulated by rules, among which one of great and global importance is the interdiction of incest, that is, of marriage between relatives. Each society has different conceptions as to who is a relative, with a view of preventing incest. The stringency of the rule forbidding incest thus varies from the interdiction of marriage between parents and children as well as between brothers and sisters, to the interdiction of marriage if even a single common ancestor is discovered. Some cases of marriage taking place between relatives are known, but these are exceptionally rare and connected with the devolution of authority (e.g., within royal families or the pharaohs in Egypt—Cleopatra originated from such a marriage). In general, societies stand in awe before the case of such a sexual intercourse, as can be seen in examples from mythology and literature (e.g., Oedipus and his mother), history (e.g., Alexander Borgia and his daughter Lucretia, Lucretia and her brother Cesar), and popular literature (fairy tales, ballads) that corroborate this finding. Despite this, in certain cases that border on incest, society (and the Christian Church) appears tolerant in order to avoid illicit cohabitation and especially the birth of illegitimate offspring.

In some societies the rule of *isogamy* or *homogamy* is particularly powerful; according to this, the spouses must be of equal social, financial, intellectual, and so on status. If, on the other hand, the spouses originate from different social, financial, intellectual, and so on environments, this is a case of heterogamy. In this case, there is *hypergamy* on the part of the lower status spouse and *hypogamy* on the part of the higher status spouse.

Other rules govern the postmarital residence of the couple. Its most common forms are the *patrilocal,* if taking place in the groom's father's house or community, and *virilocal,* if taking place in the groom's house. Their opposites are the *matrilocal,* where the newlywed couple settles in the bride's mother's house or community, and more specifically, the *uxorilocal* installation, where they inhabit the bride's house. When the postmarital location is independent, it is termed *neolocal.* The *avunculocal* installation, that is, when the couple settles in a spouse's uncle on the mother's side (e.g., in the Trobriands in Melanesia), is rarer. Still, there are cases where the postmarital residence is *bilocal,* that is, the couple chooses which spouse's relatives to live with, or even *ambilocal,* in case of alternate residence in both.

The locality of postmarital residence is directly connected to the systems of kinship. Usually, patrilocality goes together with patrilineal descent and matrilocality goes together with matrilineal descent. However, there are cases where this does not happen. For example, in the Congo, the husband lives in the same village as his father and sons but inherits goods from his matrilineal descent group. In general, the place of postmarital residence is more inconstant and complex in matrilineal populations, such as the Bemba in Zambia, where the husbands abandon the matrilocal group of their father-in-law after having served him for many years. Patrilineal populations are not entirely exempt from the aforementioned inconstancy and complexity either. The residence of the husband in his wife's homestead, when she belongs in a family with no male children, is such a case present in Balkan patrilineal societies (where patrilocality is the rule). The husband then takes the place of an adopted son, assuming the duties (work and care) toward his in-laws as well as the benefits (e.g., inheritance of their wealth, in addition to his wife's dowry) that come with this place.

The rule of *polygamy,* that is, the existence of more than one legitimate spouse at a time, applies in some

societies. *Polygyny,* the simultaneous occurrence of several legitimate wives, is the most common form of polygamy and is present in most Islamic countries (up to four wives), in China of the imperial era, in some African and Oceanian tribes, among others. *Polyandry,* when a woman has more than one husband (for example, in the Toda in India and some groups in Tibet), is rarer because of the inherent uncertainty as to the children's paternity. Therefore, *fraternal polyandry* is the most common form of polyandry, where a woman's husbands must all be brothers. It is thus at least known which lineage the children originate from. An extreme case of polygamy is *group marriage,* that is, simultaneous intercourse of several men and women, which has been the subject of much discussion in the past; however, this theory never achieved widespread acceptance.

The rule of *monogamy,* that is, marriage to a single man or woman at a time, applies in "cold" as well as "hot" societies and tends to become predominant. As long as this is in place, the spouses are prohibited from incurring another marriage.

The rules of *endogamy-exogamy* are related to the above rules (interdiction of incest, isogamy-heterogamy, postmarital installation, and monogamy-polygamy). In endogamy, the spouse is selected from within the same group (kindred, ethnotic, religious, etc.). Exogamy occurs in the opposite case.

Procreation

As the main aim of marriage is to have (legitimate) offspring, that is, to create a family, a good state of fitness of the individuals to be married is an essential requirement, because it guarantees the viability of the family through the ability to work as much its ability to reproduce through children. The latter is also related to the couple beginning their common sexual life before marriage in some areas (e.g., in areas of France, Corsica, and Greece) in order to prove a woman's fertility. However, in most societies, a woman's virginity is yet another requirement for marriage, and its demonstration during the first night of marriage is widely celebrated.

The inability to have offspring, a condition blamed on the woman, according to popular belief, can lead to several practices. These include social practices, such as breaking up of the marriage and taking a second wife or taking a second wife and keeping the first one in the same house (a type of *polygyny,* as happened, for example, in Mani in Greece). Another social practice is adoption, sometimes of a child chosen from one of the spouses' kindred group (an act with a clear sentimental motive, as children relatives are closer to natural children). In the village Didima, in Greece, the bond between the parents and the child can be further strengthened by marrying the child to a relative of the other spouse. In addition to the aforementioned sentimental dimensions, the above is also a strategy aimed at keeping wealth within a lineage. Nonsocial practices range from taking herbs and other homemade remedies, to, in modern societies, resorting to medical treatment or in vitro fertilization in order to have children.

Dissolution

In monogamic societies, the undoing of a marriage can occur by a legal process, the *divorce,* which does not, however, relieve the spouses of all the rights and duties contracted in their previous marriage. In general, the divorce appears to be an acceptable practice in Western societies, while in others, even when it is present, it receives a particularly skeptical treatment.

The death of one of the spouses does not end the rights and duties deriving from marriage; however,

in monogamic societies, it allows another marriage to take place. This is often almost mandatory, either because there are children (who must be raised by two parents) or, when there are no children, in order to have some. Particular forms of *secondary marriage,* as this type of marriage is termed with regard to the first (*primary*), are the *levirate* and the *sororate.* In some societies the second wife must be a sister of the first (sororate), while in others the second husband must be a brother of the first (levirate). An even more peculiar form of marriage subsists in the Nuer of Sudan, where, when a man dies without leaving any children behind, one of his younger brothers will marry a woman who will be considered the wife of the dead man. The children born through this *ghost marriage* are considered to be the dead man's children.

— *Maria Velioti-Georgopoulos*

Further Readings

Bourdieu, P. (1977). Case study: Parallel-cousin marriage. In *Outline of a theory of practice.* Cambridge, UK: Cambridge University Press.

Comaroff, J. L. (1980). *The meaning of marriage payments.* London: Academic Press.

Evans-Pritchard, E. E. (1951). *Kinship and marriage among the Nuer.* Oxford, UK: Oxford University Press.

Fox, R. (1984). *Kinship and marriage: An anthropological perspective.* Harmondsworth, UK: Penguin Books.

Goody, J. (1976). *Production and reproduction: A comparative study of the domestic domain.* Cambridge, UK: Cambridge University Press.

Goody, J., & Tambiah, S. J. (1973). *Bridewealth and dowry.* Cambridge, UK: Cambridge University Press.

Lévi-Strauss, C. (1949). *Les structures élémentaires de la parenté.* Paris: PUF.

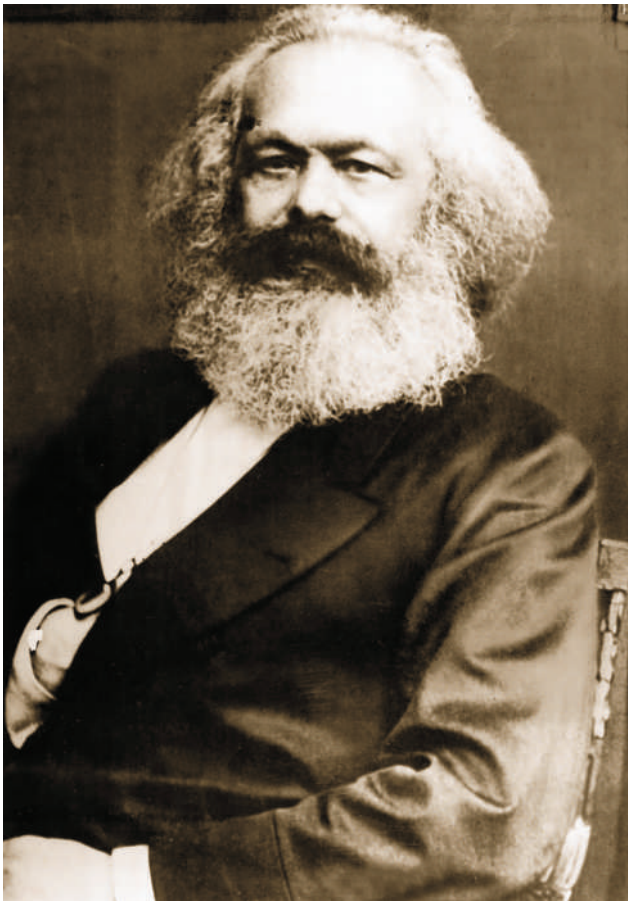
Peristiany, J. (Ed.) (with Handman, M.-E.). (1989). *Le prix de l'alliance en Méditerranée.* Paris: Editions du Centre National de la Recherche Scientifique.

Marx, Karl (1818–1883)

Karl Heinrich Marx was born on May 5, 1818, in Trier, Germany, and he died on March 14, 1883, in London. Both of his parents were Jewish, but a year before Karl was born, his successful lawyer father had converted to Protestantism. His mother, born Henrietta Pressburg, took care of the household. From 1830 to 1835, Marx attended high school in Trier. At 17 years of age, he matriculated at the Faculty of Law of the University of Bonn, but he also attended courses in the humanities.

During his year in Bonn, Marx was a heavy drinker, fought a duel, and wrote poetry for Jenny von Westphalen, whom he married in 1843. She was the daughter of Baron von Westphalen, a city counselor in Trier. In 1836, Marx's father sent him to the University of Berlin, where Romanticism was less dominant than in Bonn. There he studied law as well as philosophy. He came into contact with Georg Hegel's philosophy and joined the left-wing Hegelian society, the Doctor Club, which was led by the theologian Bruno Bauer. Because it was supposed to be easier to receive a doctorate from the University of Jena at that time, he submitted his thesis, which dealt with the natural philosophies of Democritus and Epicurus, and was awarded his degree in 1841. In January 1842, he began writing for the newly founded liberal democratic newspaper *Rheinische Zeitung.* Because the newspaper was suppressed in 1843, Marx decided to move to Paris, where he began to coedit the *Deutsch–Franzoesischen Jahrbuecher* together with the liberal Hegelian Arnold Ruge. Only one issue of the yearbooks was published, but through its publication Marx got to know Friedrich Engels, who contributed to the work. Engels became one of Marx's closest friends throughout his lifetime. Together with Engels, Marx wrote the book *Die heilige Familie* (1845), in which they attacked Bauer. In Paris, Marx also met the poet Heinrich Heine, the Russian anarchist Mikhail Bakunin, and the French socialist Pierre-Joseph Proudhon. After having to leave Paris due to subversive journalism, in 1845 he settled in Brussels, where he further developed his views and founded a network of German, English, and French socialists. In 1847, the London-based League of the Just, a working-class movement, was in need of a solid theoretical foundation and so approached Marx and Engels. Both joined the organization, which was then renamed the Communist League. Marx wrote the *Manifest der kommunistischen Partei* for the organization. As a consequence of his political activities, Marx had to leave Brussels. He then stayed in Paris and Cologne, where he became editor of the *Neue Rheinische Zeitung,* which was strongly in favor of the

democratic forces. However, after the conservatives became stronger in 1849, Marx was expelled from Germany. Then he went to London via Paris. After a few temporary lodgings, Marx and his family moved to Dean Street in Soho, where they lived until 1856. Those years were destined to be full of worries. Marx was constantly in need of money, three of his children died, and he fathered an illegitimate son with the family's German maid, Helena Demuth. Engels, who was well known as a womanizer, agreed to accept paternity and the child was sent to foster care. Marx's financial worries, at least, were caused by his inability to manage his income. He had sufficient income, although his sole regular source of income were the articles he wrote for the radical *New York Tribune,* in which he dealt with all aspects of contemporary politics. In 1856, Marx received a small legacy that enabled the family to rent a house just off Haverstock Hill. Gradually, his financial worries receded, but at the same time his health got worse (boils all over his body) and he tried to treat himself with medicines such as opium and arsenic. Nevertheless, he slowly but persistently worked at his various projects, and in 1867 the first part of his main work, *Das Kapital,* was published. The other two volumes were compiled and published by Engels after Marx's death. Originally, Marx had planned to compose an additional five volumes, but these were never even drafted. One of the reasons why Marx was not able to finish his works was that he was committed to the International Workingmen's Association (First International), which took up a lot of his time from 1864 onward. At the beginning of the 1870s, there was strong conflict within this organization between Engels and Marx, on the one hand, and between the anarchists Proudhon and Bakunin, on the other. From then on, Marx's energies declined, he withdrew from active politics, and he further dedicated himself to his family. Marx managed to live a fairly luxurious lifestyle because Engels, after selling the partnership in a firm he partly owned, decided to support him with a certain amount of money each year. Marx moved into a large house on Maitland Park Road and began gambling on the stock exchange. In 1873, he suffered a kind of stroke, and thereafter he also dedicated a lot of time to improving his health. During the last years of his life, Marx had to cope with some misfortunes. In 1881 his wife died, and in 1883 his daughter Jenny died. Marx died in 1883 while sitting in his armchair.



Source: Courtesy of the Library of Congress.

Social Theory and Materialism

"Just as religion does not create man but man creates religion, so the constitution does not create the people but the people the constitution." This was Marx's main criticism of Hegel, who started his social analysis from the idea of the state, and with this critique Marx was also following Ludwig Feuerbach, but this is not all. Marx had always started his analyses from the individual humans, and the main basis for the decisions of humans, according to Marx, is the class to which they belong (by "class," he was referring mainly to the economic sphere). "It is not the consciousness of men that determines their being but, on the contrary, their social being that determines their consciousness." Engels at some stage admitted, "Marx and I are ourselves partly to blame for the fact that the younger people sometimes lay more stress on the economic side than is due to it."

Marx also applied these insights to his conception of history. It needs to be stressed that Marx himself never used the expression "historical materialism" or

"dialectical materialism"; instead, he preferred to call it the "materialist conception of history." That conception was based on the insight that, for an understanding of history, one must focus on the productive activity of humans: "History was the—mostly unconscious—creation of laboring men." "Labor is a process in which both man and nature participate and in which man of his own accord starts, regulates, and controls the material reactions between himself and nature." Marx referred to the movement necessary for establishing an appropriate relationship between humans and nature as "dialectic." Humans and nature were the two extreme poles of the dialectical movement.

Because he regarded the material conditions of humans as central, Marx claimed that he was a materialist. His understanding of materialism was, however, not connected to a specific metaphysical or epistemological conception of the world. The most detailed account of his materialist conception of history can be found in *Die deutsche Ideologie,* which he wrote together with Engels, who made the perceptive remark, "Just as Darwin discovered the law of development of organic nature, so Marx discovered the law of development of human history." In their letters, Marx and Engels regularly compared their hypotheses to those in the natural sciences, in particular Darwin's theory of evolution.

"History is nothing but the activity of men in pursuit of their ends," and the activities of humans are always related to the social group, or class, to which they belong. "The history of all hitherto existing societies is the history of class struggles." Although Marx referred to several types of classes in various passages, his treatment was not systematic. In *Das Kapital,* he distinguished among wage laborers (proletariat), capitalists, and landowners, and it is this distinction of classes that can be found most often in Marx's work. Concerning his times, he claimed in the *Kommunistischen Manifest* that "society as a whole is more and more splitting up into two great hostile camps, into two great classes directly facing each other: bourgeoisie and proletariat." However, he also noted the "constantly growing number of the middle classes." In addition, the extension of the various classes often was unclear, in particular concerning the group of landowning peasants and the intelligentsia. Another subclass that he mentioned was the lumpenproletariat, to which "thieves and criminals of all kinds" as well as "vagabonds, people without a hearth or a home" belong. What unites people within a class is always their relationship to the prevailing mode of production.

Given the fact that each human individual always belongs to a specific social and therefore economic realm, Marx denied the possibility of any objective account of the world. Of course, this theory also applied to his own account. Nevertheless, Marx distinguished between ideologies that were related to idealist philosophies and an unjust distribution of power and materialist conceptions. If a philosophy concealed the social contradictions, it was supposed to be ideological. Therefore, he justified the superiority of his own philosophical outlook by reference to the quality that it lays open social contradictions. However, this distinction is far from unproblematic. In addition, it was not theory alone that was important for Marx: "Philosophers have only interpreted the world in various ways; the point is to change it."

Marx's believed that laborers in a capitalist society were alienated, and his goal was to free laborers from alienation. He referred to alienated labor as that which occurred when workers were unrelated to the product of their labor and, as such, were alienated from themselves. As a consequence of their labor, there was a strong distinction between the social lives and personal lives of workers, and the workers are alienated from other humans. A central cause of the alienation was the division of labor, and Marx hoped that in a future community it would be dissolved and, as a consequence, that all humans would "hunt in the morning, fish in the afternoon, rear cattle in the evening, and criticize after dinner." He expected and wished for a rural community to replace the mass societies of isolated individuals living in big cities.

Marx was not a prophet who described in detail what the future would be like. Rather, he tried to put forward a utopian ideal in which those aspects he criticized concerning his contemporary society would be dissolved. Such a better social order could be brought about only by revolution, and a revolution could come about peacefully as well as by means of physical force but never via terror. Yet a revolution always presupposes a class consciousness that the proletariat, according to Marx, had not yet developed sufficiently. He expected that eventually the "class struggle necessarily leads to the dictatorship of the proletariat; that this dictatorship itself is only a transitional stage towards the abolition of all classes."

— *Stefan Lorenz Sorgner*

Further Readings

Carver, T. (1987). *A Marx dictionary.* Cambridge, UK: Polity.

Carver, T. (Ed.). (1991). *The Cambridge companion to Marx.* Cambridge, UK: Cambridge University Press.

Marx, K., & Engels, F. (1975). *Collected works.* New York: International Publishers.

McLellan, D. (1980). *The thought of Karl Marx: An introduction.* London: Macmillan.

Megill, A. (2002). *Karl Marx.* Lanham, MD: Rowman & Littlefield.

Marxism

Marxism, both as a political ideology and as a social theory, ultimately derives nearly entirely from the *Communist Manifesto,* a pamphlet of roughly 12,000 words in the German language published in February 1848. This pamphlet allegedly was authored jointly by Karl Marx and Friedrich Engels. It was prefaced by a short, untitled, and extremely misleading Introduction.

Whatever was going to become true in the long-term future as a consequence of this original publication of the *Communist Manifesto,* it was certainly not true that the specter of communism was haunting Europe in February 1848. Certainly, 1848 was to be a year of revolutions. In Austria, Clemens von Metternich had announced that he was sustaining "a rotten edifice." King Frederick William IV of Russia summoned Horwegh, the revolutionary poet, to salute "a worthy opponent" and a man of the future. Most observers also agreed with Marx that the coming revolutions would have a social cause and/or an economic cause.

And so they had. But it was not the cause that Marx had foreseen. Whereas he attributed the forthcoming revolutions to capitalism, it would be nearer to the truth to argue that they were caused rather by the lack of capitalism. Apart from Russia, which had already begun to suffer the same new developments as were occurring in some European countries farther to the west, there were two countries that escaped serious revolutionary disturbances. These were the United Kingdom and Belgium, the two countries in which capitalist industrialization had gone the furthest.

Essentially, Marx was neither a philosopher nor a social scientist but rather a prophet. In his own famous later words, he proclaimed, "Philosophers have only given different *interpretations* of the world; the task is to change it." The Marxist system began as a propagandist myth, although Marx himself later aspired to make a substantial contribution to both economics and social science. Every argument of the *Communist Manifesto* was designed to produce an effect—not to interpret the world but rather to change it. The document that the Introduction was actually introducing purported to be the manifesto of the Communist Party. No such party existed at that time, and one object of the manifesto was to call it into existence. Nor had "Communists of various nationalities assembled in London and sketched the following manifesto," as was stated on the first page. It had been written by Marx alone, without the actual and immediate assistance of even its alleged coauthor Engels.

Nor was the specter of communism haunting all or any part of Europe at the time of that first publication of the *Communist Manifesto.* Its true purpose was rather to produce that specter and thereby to bring about a future period during which communism actually would haunt Europe and other continents as well.

It is remarkable, and should have been remarked far more often than it was, that both substantial and even increasing numbers of professing social scientists, even during the last quarter of the 20th century, still proclaimed their own attachment to the putative theories and methods of a 19th-century predecessor and that there was apparently only one particular predecessor able to inspire such widespread and continuing devotion—representing a sort of "cult of personality."

This is a phenomenon that should make anyone seriously committed to inquiry both suspicious of and curious about Marxism. One discouraging but possibly instructive parallel is with the applied pseudoscience of psychoanalysis, where one hears first of the great divide between Freudians and Jungians and then of further faction fights among rival disciples of those two founders. In the social sciences, however, such party loyalty has been mainly, if not only, to one particular very un-Victorian Victorian sage, namely Marx.

Still more particular, and still more deserving of remark, is the fact that the devotion extended beyond the wide limits of one area of study. In this unique

case, all of the author's works on every subject, as well as his political policies, were treated by his followers with similar respect and taken to be similarly authoritative.

One needs to contrast the social sciences with the natural sciences and, above all, with the standard-setting paradigm science of physics. There, not even the greatest contributors attract this kind of posthumous partisan devotion. Their contributions are quietly added to the ever-expanding corpus of at least provisionally established truth, and their names in the still current literature and textbooks appear solely in stock descriptions of eponymous principles, laws, or effects. Even in biology, the enormous contribution of Darwin—work that Engels, in his address at Marx's graveside, dared to compare to that of Marx in social science—has not inspired loyalties of the same sort. Although at least the vast majority of biologists currently subscribe to the neo-Darwinian synthetic theory of evolution, no one now takes all of Darwin's works as unquestionably authoritative even in biology, much less in anything else. As for the incomparable Sir Isaac Newton, most of his writings have never been, and most likely never will be, published at all. They dealt not with physics but rather with religion and were so grossly heretical that they had to be suppressed by Newton's friends.

In their day, two of the most notorious adherents to this particular Marxist cult of personality were Gyorgy Lukaes and C. Wright Mills. It was, of course, Lukaes who once insisted that the validity of the supposedly distinctive method of Marx could, and should, survive the falsification of all the findings thereby yielded. Mills, calling himself "a plain Marxist" and commending, above all, the method of Marx, apparently was equally reluctant to judge by results. Mills, understandably unwilling or, more likely, unable to offer a clear account of what that putative method was, proceeded to list the 17 "most important propositions of classical Marxism." With one exception, all of these important propositions of classical Marxism were then dismissed as false, unclear, imprecise, misleading, unfruitful, careless, confused, or quite clearly wrong. Proposition 11, the sole exception to this absurdity of errors, was correctly put down as a tautological truism. So, at the end of the day, the plain Marxism of Mills was simply his invincibly stubborn commitment to what only a Greek could, without affectation, describe as Marxist *praxis.* He continued to avow his total solidarity with "the new world" extending from China and the Soviet Union to Cuba.

The significance of such stubbornly blinkered commitments has been fully appreciated by several of the most well-girded critics of Marxism. Lewis Feur, for instance, insisted that the Mosaic myth is "the invariable ingredient of all revolutionary ideologies" and then proceeded to point out similarities between the conversion experiences of both modern revolutionaries and more traditionally religious revolutionaries. Sydney Hook often argued, "Marxism today signifies an ideology in Marx's original sense of that term suggesting more of a religious than of a strictly scientific, rational outlook on society." As Hook well knew, the apocalyptic escatology, the utopian historicism that has been of such decisive importance in winning converts to Marxism, was originally derived by what Marx was pleased to call a philosophical analysis, from the Hegelian secularization of a Christian philosophy of history. The lifelong atheism of the "founding fathers" (Marx and Engels) irrecoverably deprived such reassurances of their only sensible foundation—the promises of a provident Creator.

The second thing to emphasize is that there were, during the second half of the 20th century, many remarkable similarities between defensive expedients favored by contemporary Marxist intellectuals and the maneuvers performed by apologists for the Christian religion. One of the most ancient, as well as the most outrageous, was that summed up in the patristic slogan *Credo ut intelligam* [I believe in order that I may understand]. A sacred system is immunized against hostile criticism by insisting that the necessary prior understanding is vouchsafed only to the totally committed.

When Bertrand Russell returned from visiting the Soviet Union in 1921 to write *The Theory and Practice of Bolshevism,* he became perhaps the first to describe what was not yet labeled Marxism–Leninism as a new secular Islam. Since then, several critics have argued that what Marx and Engels, and their 20th-century followers, loved to call "scientific socialism" is a religious system rather than a scientific theory and that claims to be scientific are as baseless and abandoned, for the same propaganda reasons, as those of Christian science.

Having seen how Marxism started from a barrage of falsehoods and pretensions, it is well to see how Engels saw the achievement of Marx after his death. In the first part of his memorial address, Engels

asserted, "Just as Darwin discovered the law of development of organic nature, so Marx discovered the law of development of human history." This part concluded with the claim, "Thus was this man of science." In the second part, Engels spoke of Marx "as a revolutionary working tirelessly for the enrichment of the poor and the emancipation of the oppressed."

In an often quoted rebuke to Thomas Malthus, Marx wrote, "A man who tries to *accommodate* science to a standpoint not derived from science itself, but from outside interests that are alien to science itself, such a man I call *gemein* [cheap]." It was, nevertheless, a charge of which Marx himself was systematically guilty in respect of what was, for him, the most fundamental issue.

Look first at *Das Kapital,* the magnum opus that was supposed to provide the long-promised scientific proof for the sweeping historical theses of the *Communist Manifesto*—proof for its "philosophy of history." The most fundamental and crucial of these was the immiseration thesis. According to *Das Kapital,* "The accumulation of wealth at one pole . . . is at the same time, the accumulation of misery, the torment of labour, slavery, ignorance, and brutalisation at the other." Faced with the decisive falsification of his crucial contention, Marx simply suppressed the data. Hence, in the first edition of *Das Kapital,* various available British statistics were given up to 1865 or 1866, but those for the movement of wages stopped at 1850. In the second edition, all of the other runs were brought up-to-date, but that of wage movements still stopped at 1850.

Suppose that we look at the *Correspondence,* never forgetting that this was subject to at least two systematic prunings before its eventual publication. The Marquis de Vauvenargues once noted that "for the philosopher, clarity is a matter of good faith." This maxim is equally true for the social scientist. We call into evidence a letter to Engels dated August 15, 1857. The letter is especially notable inasmuch as it also reveals that Marx himself intended dialectics to be, as so many readers have found them to be, obfuscatory. Thus, he wrote, "I took the risk of prognosticating in this way as I was compelled to substitute for you as a correspondent at the *Tribune*. . . . It is possible I may be discredited. But in that case it will still be possible to pull through with the help of a bit of dialectics. It goes without saying that I phrased my forecasts in such a way that I would prove to be right also in the opposite." So much for Marx the pseudoscientist.

There were Communist ideas and spokesmen for them long before the first publication of the *Communist Manifesto.* Among these spokesmen were John Lilburne and his Levellers, who generally opposed the "grandees" or officers in Cromwell's Republican New Model Army during the first phase of the English Civil War during the 17th century. In the various revolutions of 1848, Marx and Engels both participated very actively, trying as hard as they could—and this was to a trifling extent—to make them Communist. All of the relevant writings of both Marx and Engels have been published under the name of Marx as *The Revolutions of 1848.* But the great event of the 19th century that was of most interest to Marx and Engels was the Paris Commune. This, however, was not a Communist revolution, although Marx was to draw many lessons from it. It was a patriotic revolt of the Commune of Paris intended more effectively to organize patriotic defense against the Prussian invaders.

It was not until the 20th century that a revolution led by a Communist Party first achieved state power. This was the Bolshevik Revolution of 1917, which transformed the former Russian Empire of the Tzars into the Soviet Union. Before World War I, there were several at least nominally Marxist Social Democratic parties on the continent of Europe (e.g., in Germany and Italy). But the illegal Russian Marxist Party, led by G. V. Plekhanov, at its 1905 conference split into two factions: the Bolsheviks (majority) and the Mensheviks (minority). It was the Bolshevik faction, led by V. I. Lenin, that later launched the October Revolution and thereby transformed the former Russian Empire into the now also former Soviet Union. Here it should perhaps be remarked that Plekhanov (who was respected as the founder of Russian Marxism) insisted, from 1905 until the end of his life, that there could not be a genuinely Marxist revolution in a country with a relatively tiny proletariat rather than the sort of advanced capitalist country that Marx himself had in mind.

The same is true of the other 20th-century revolution that, in terms of the size of the population involved, was a much greater revolution—that in China. There the relatively tiny Chinese proletariat was wiped out in the suppression of the Canton Commune, and the first Chinese Red Army was manned nearly entirely by peasants. The period of the dictatorship of Mao Zedong, which established a new world record for the number of people starved to

death in a famine (30 million), is now officially forgotten. Everything has changed since the day when the faction of the late Deng Xiaoping, called "the capitalist roaders" by their opponents, won power. That faction apparently still retains power now, years after his death. Anyone now wanting a statement of government internal policy is given a 13-page typescript copy of a conference speech he made on December 13, 1978. It remains only to remark that the capitalist roaders have achieved for China, over the past 10 years or so, by far the highest average economic growth rate anywhere in the world.

— *Antony Flew*

Further Readings

Berlin, I. (1996). *Karl Marx: His life and environment* (4th ed.). Oxford, UK: Oxford University Press.

Deutscher, I. (1973). *Marxism in our time.* Palo Alto, CA: Ramparts Press.

Heilbroner, R. L. (1980). *Marxism: For and against.* New York: Norton.

Wheen, F. (2000). *Karl Marx: A life.* New York: Norton.

NEO-MARXISM

The Frankfurt School has become one of the mostly widely adopted forms of neo-Marxism. It grew out of the Institute of Social Research at the University of Frankfurt, Germany. It is sometimes referred to as *critical theory,* meaning a special kind of social philosophy. It gathered together people who were severe critics of capitalism but believed that Marxism had become too close to communism. They believed Karl Marx's followers were supporting only a narrow selection of his ideas.

Neo-Marxists view class divisions under capitalism as more important than gender/sex divisions or issues of race and ethnicity. Neo-Marxism encompasses a group of beliefs that have in common rejection of economic or class determinism and a belief in at least the semiautonomy of the social sphere. They also claim that most social science, history, and literary analysis works from within capitalist categories and say neo-Marxism is based on the total political-economic-cultural system.

During the Nazi regime, the members of the school fled first to Geneva, Switzerland, then to the United States. They became attached to the department of sociology at Columbia University in 1935. In 1941, they relocated to California. In 1949, some of them—Max Horkheimer, Theodor Adorno, and Friedrich Pollock—returned to Germany and 2 years later reestablished the Institute for Social Research. Horkheimer served as director and believed in a holistic approach, combining theory and practice.

The neo-Marxists, after seeing the failure of working-class revolutions in Western Europe after World War I, chose the parts of Marx's thought that might clarify social conditions that were not present when Marx was alive. They filled in what they perceived to be omissions in Marxism with ideas from other schools of thought.

While in the United States, Horkheimer and Adorno had focused on the commercial media. They argued that the media willingly manipulate a passive and irrational public. They emphasized the great influence the media exerts on the thoughts and attitudes of society and the way in which it encourages people to think about their lives. Neo-Marxism first became an influence in the United States in the late 1960s and the early 1970s, through the work of Horkheimer and others.

— **Pat McCarthy**

Masks, Ceremonial

A ceremonial mask is defined as a headdress or an object that covers the face for purposes of protection, ritual, entertainment, transformation, and disguise. Ceremonial masks have different characteristics and functions, depending on the culture that is associated with the particular mask. There are some areas in the world where masks are worn to communicate with ancestors, to ward off evil spirits, to entertain a

crowd through dramatic arts, or to express prestige and wealth.

The ceremonial masks of Africa vary throughout the continent. Masks continue to be of great importance within certain African societies. Art has a great influence over the masks that have been produced. Art is thought to be an expression of ancestral worship. The most prominent area where ceremonial masks are present is a location from within the center of the continent moving from west to east. African masks serve several purposes. Masks not only are representations of ancestors but also are used as a means of communication between the two groups of living and nonliving individuals.

Andreas Lommel, in *Masks: Their Meaning and Function* (1970), stated that there are four categories of African masks. The first category is composed of realistic masks that often represent beautiful women. These are located throughout western Africa and the Congo. The second category is made up of animal masks. They represent animals and are located in all areas. They date back to hunting societies. The third category is abstract masks. These are more apparent in Sudan, where desert nomads had great influence. The last category is of expressionistic style. Even though this type is seen as being universal, there is evidence that they are more prominent in the Congo and Cameroon. Masks were constructed from bronze, usually worn by a deceased king to preserve his face. Terra-cotta and wood were also materials used to construct masks. Wooden masks were used in ceremonies or rituals to honor the gods.

African masks vary in purpose. There are four main types of African masks: initiation, secret society, fertility, and festival masks. Initiation masks are very sacred and used during initiation rites. It may be forbidden to wear certain initiation masks, but they may be displayed during the ceremonies. Secret society masks hold special powers within the specific groups they represent. Only members of the specific society a mask represents are able to see this mask, and it is destroyed after use. Fertility masks are used by men in relation to agriculture events. These masks contain special powers related to the rain and fertility. There are numerous festival masks used during any spiritual activities, including hunting and harvesting ceremonies.

Melanesian ceremonial masks are similar to those of Africa in that they are used by secret societies. The masks are used during religious or spiritual ceremonies and represent spiritual beings and ancestors. Some masks are associated with protection and are made to resemble skulls. According to Adrienne Kaeppler in *Ceremonial Mask: A Melanesian Art Style* (1953), during some ceremonies, not only are large extravagant masks worn, but also the bodies and faces of individuals are painted with "red burned clay, black with soot, and white with lime from burned shells or coral." Ceremonies are performed to appease specific gods and to shield against tragedies such as illness and natural disasters. Melanesian masks are often referred to as being expressionistic due to the presentation and great amount of emotion expressed from the masks.

Ceremonial masks in Ceylon are associated with dramatic performance and traditional myth. Demons and evil spirits are believed to be the cause of illness. The Ceylonese believe that these evil spirits can cure a disease through performing an exorcism and other ceremonies. The mask is used to vanquish and cure

Source: © iStockphoto/StijnPeeters.

the disease once the disease is transformed into a physical form. These ceremonies allow evil spirits to transform into spirit helpers.

Tibetan masks reflect Indian influences and have shamanistic characteristics. Many masks represent supernatural beings and spirits that aid in decision making and deliver warnings. Some masks are used during midwinter or midsummer celebrations. Ceremonies involving the elimination of illness require dance and other performances of rites to neutralize the illness that is represented through the masks themselves. Tibetan masks see their origins stemming from the Buddhist tradition.

North American tribes have created two main types of ceremonial masks. The first is an animal-type mask that represents the connection between humans and their animal ancestors. The second type consists of masks that reflect spirit helpers. Shamanistic forms of masks are present in the northwest part of the continent. Many masks are highly artistically creative and are usually formulated with both human and animal features.

Wooden carved masks are common among the Iroquois. The masks are reincarnates of mythical creatures and deities. There are several types of masks used during different occasions. These include the motherhood mask, the mask of the adviser, the beggar mask, the mask of storm, and the scalp mask. Masks are used during ceremonies for successful harvests, hunting, and protection. Masks from the southwestern tribes have a unique appearance and are made from soft skin to symbolize male deities. The masks that do represent a deity can stay within a village for a period of time while he entertains through dance, provides gifts for children, and delivers punishment to deviant individuals. Masks represent hierarchy and are representations of gods. Native Americans located in the Plains use minimal masks and ceremonies such as the bear mask and buffalo dance. The focus of each ceremony in which the masks are used is on the object of desire such as the bear or buffalo.

Central America is well known for its death masks. Death masks were found buried with ancient mummies. Others were representations of different gods. Masks were made out of black- or greenish-colored stone found in Mexico and Teotihuacán. One of the most famous masks is called "Our Master the Tortured One." This mask totally engulfs the whole body of the Mexican god Xipe Totec. This particular god is in connection with the spring and has the ability to renew all things.

Japanese masks are no longer a representation of religion. Instead, today they are genuinely works of art. Theater is the foremost driving force of these artistic masks. Japanese masks are some of the oldest masks found in the world. They are also known as *gigaku* and are accompanied with music and dance in a theatrical form. *Bugaku* plays came after the gigaku plays. The main difference between the two is that the bugaku no longer uses masks within the performance. *Nō* is known to be the most impressive Japanese masks. The five characteristics of the Nō masks represent gods, men, women, madmen, and demons.

Australia does not have any records of separately physical masks, but the Aborigines have used another technique. Instead, there has been traditional use of different paint and art that cover the face and body. The paint is arranged in specific patterns. The masking of the face and body uses the same ideology as does a physical mask. Many ritual ceremonies are performed to develop a connection with the ancestors and the Dreamtime. The Aborigines paint their faces and bodies during ceremonies and celebrations involving the transmission of knowledge and legend to their people.

Masks are seen all over the world. Many can be identified by the materials from which they are made and by the style and colors used. There is no common definition of a mask due to its multiple uses and forms. Masks serve the purpose of relating with those beings or forms of other worlds in rites of transformation and recalling historical events within the culture.

The relationship between a mask and the person who wears the mask is intimate. The person becomes a medium for the spirit or power that the mask represents. The person and mask work together to communicate a message or an action. In many societies, there is also a relationship between the artist who creates the mask and the mask itself. It is thought that the energy, attention, and detail paid to a mask during its creation generate a power or spiritual force within the mask from the moment it is completed. The artist or carver takes great pride in the production of the mask.

Different areas use various materials to construct their ceremonial masks. Some of these materials include the objects within the immediate environment such as bark, branches, shells, stones, pieces of leather or hide, clay, and animal parts. Other masks

may include human attributes such as hair, usually from a shaman or a powerful individual within the particular society.

The study of masks continues today. There is much to learn and uncover about the secret world of masks. Masks are hierarchical, religious, spiritual, and representations of the unknown. It is difficult for any one person to fully comprehend the importance of a mask used in past civilizations. Much of what is learned is still considered quite hypothetical and incomplete. Anthropologists have made their best attempts to try to understand these objects, their meanings, and their functions.

— *Karen Hodge Russell and Jenny Etmanskie*

Further Readings

Kaeppler, A. L. (1953). Ceremonial mask: A Melanesian art style. *Journal of Polynesian Society, 25,* 118–138.

Lommel, A. (1970). *Masks: Their meaning and function.* New York: Excalibur Books.

Napier, A. D. (1986). *Masks, transformation, and paradox.* Berkeley: University of California Press.

Richards, D. (1994). *Masks of difference: Cultural representations in literature, anthropology, and art.* New York: Cambridge University Press.

Materialism, Cultural

Societies survive and successfully reproduce themselves only insofar as they meet the elementary material needs of a certain minimum of their members. This observation is the starting point for cultural materialism, a living theoretical tradition founded and defined by the American anthropologist Marvin Harris (1927–2001). Of cardinal importance, in Harris's view, is the fact that people pursue their needs in the context of intimate dependence on the natural environs for their energy requirements. It follows that we may expect the most important causes of the similarities and differences between societies to arise at the sites where humans maintain their most immediate commerce with the natural world. The realms of demography, technology, and economy best answer to this description. Of all sociocultural realms, these are also those most subject to law-like regularities and therefore to scientific investigation. Harris draws the conclusion that if anthropology is ever to rescue itself from the siren calls of various fashionable idealisms, and if it is one day to reclaim itself as a science, then it will be to these "material" aspects of society and culture that it will turn.

Impressively wide ranging, in the hands of Harris and other adepts, cultural materialism has been able to offer empirically informed but connected theorizations concerning an apparently unlimited number of cultural processes and historical periods. The source of food taboos; the origins of egalitarianism in many band societies; causes of the variety of kinship systems; why the Oedipus complex is an expression of aggressive male competition; why beef has been central to U.S. meat consumption; the reasons for the demise of the U.S.S.R.; the role of Haitian peasant voodoo in resource circulation; the origins of the state, war, and capitalism—these and many other social scientific questions have been opened up anew under the confident cultural materialist pen. At the same time, the explanatory power of the theory has been tested against virtually any contending school of thought one cares to name. Needless to say, for its adherents it has not been found wanting in these encounters.

Although cultural materialists seem to have a rather embattled view of themselves, they are not so alone as all that. In fact, they float on a broad if turbulent intellectual stream within modern anthropology. The focus they put on evolutionary dynamics was a hallmark of anthropology's founding fathers and later of Leslie White (1900–1975). The tacit functionalism of cultural materialism was prefigured in the work of Bronislaw Malinowski (1884–1942), and the emphasis on scientificity by A. R. Radcliffe-Brown (1881–1955). Cultural materialism's stress on ecological influences had been taken a long way by Julian Steward (1902–1972), and a concern with history and material culture marked the work of Eleanor Burke Leacock (1922–1987). In the 1960s and 1970s, when Harris was writing programmatic works like *The Rise of Anthropological Theory* (1968) and *Cultural Materialism* (1979), Marxism was a significant force in Western academies. Broader still are the utilitarian, materialist, empiricist, and behaviorist currents that are component parts of much Western common sense, not to speak already of the great prestige of Darwinism. Cultural materialism conscientiously distinguishes itself from each of these trends and viewpoints, but would have been inconceivable without them.

At the heart of Harris's work, and of cultural materialism ever since, are two sets of ideas. The first set is methodological and encompasses an interest in developing a scientific approach to culture and society. This interest is pursued through an insistence on "operationalizing" all major concepts and through a preference for "etic" over "emic" explanations. The second set of ideas is substantive in nature. Humans and human societies being what they are, on the balance of probabilities the best explanations for any given sociocultural phenomenon will be "materialist" ones. The "material" invoked in this instance leads us to distinguish between the "infrastructural," the "structural," and the "superstructural" aspects of any social whole. Let us now turn to these elements.

Operationalism

Anthropology, according to cultural materialists, suffers from a surfeit of half-baked and ill-digested concepts. Kinship, society, culture, symbol, caste, and numerous other concepts tend to be used haphazardly and anointed with idiosyncratic meanings. This is partly because little effort has been put into generating intersubjectively agreed-upon definitions. It is also partly because most anthropologists are convinced that anthropology neither can nor should pretend to the kind of scientificity possible in the natural sciences. And finally it is partly because many anthropologists make it their primary concern to interpret those aspects of culture, such as cosmology, myth, and ritual, which are least susceptible to properly scientific investigation.

Such attitudes are too complacent by far for the cultural materialists. The undergrowth of mutually and often self-contradictory theories needs clearing away. For a start, each anthropologist should shoulder the responsibility of specifying the logical and empirical steps any given investigator would have to take to independently establish the existence of the entities and causal relations posited in their original theory. This is what it means to operationalize one's concepts. Doing so is, in principle, entirely possible for a social science like anthropology and should in any case be accepted as an ideal to strive for. Moreover, as a corollary of this ideal, anthropology should confine itself to investigating aspects of sociocultural life open to being reinvestigated and assessed by other anthropologists. It is fine for a Carlos Castaneda to regale us with stories of his apprenticeship to the Mexican shaman Don Juan; it is entertaining to learn of their epic journeys to the far reaches of the mind; but it is not science, and consequently it is not anthropology.

Etic and Emic

Setting out to understand their fellow humans as objectively as possible, anthropologists encounter a difference between their own thoughts about those they study and the account of themselves given or presupposed by those they study. Typically, different kinds of causal relations and phenomena assume significance in each case. Linguistics, faced with analogous difficulties, developed a useful distinction. It distinguished between phonetics (the study of the different types of sounds generatable by the human vocal apparatus) and phonemics (the study of the sound discriminations that speakers of a particular language employ in making meaningful utterances). The two are not the same (as anyone first encountering the "inaudible" tonal distinctions utilized in some Asian languages will attest). By way of analogy, the linguist Kenneth Pike suggested that the difference between observer and observed in anthropology could be clarified by speaking of "etic" and "emic" orientations to the phenomena, respectively.

This is a distinction, of course, that exists for the anthropologist alone. On Harris's reading, an anthropologist who takes up an emic approach is one who makes native conceptions, whether conscious or unconscious, the standard against which to judge their own anthropological concepts. By contrast, an etic approach is not concerned with whether the explanations it produces would or could make sense to the people concerned. The only issue of moment for an etic approach is whether these explanations are scientifically valid, fruitful, and parsimonious. Insofar as we are interested in the real causes of sociocultural phenomena, and insofar as we do not intend to limit ourselves to ponderously reproducing a people's illusions about the reasons for their behavior, we must necessarily give pride of place to etic accounts.

Material Infrastructures

Where are the real causes of sociocultural phenomena likely to be found? By speaking of cultural *materialism,* Harris indicates his most general answer to this question. This is a materialism of the midrange. It is *epistemological* (natural, and many social entities

and relations exist independently of our thoughts about them), and most important it is *causal* (mental phenomena emerge from and are dependent on material phenomena, whereas the reverse is rarely the case). As for *philosophical* materialism (the contention that reality is ultimately composed of matter rather than ideas), for Harris the issue is a "sterile" one.

Source: © iStockphoto/Ramon Villamar

Darwinism and Marxism provide the main intellectual coordinates for this account of sociocultural causation. From Darwinism, cultural materialists derive an emphasis on humans as creatures who face a series of constraints to which they must adapt. Nature, on this view, is the realm par excellence of physical, chemical, and biological limits. These limits cannot be abolished on a whim. They can be modified, if at all, only at the cost of expenditure of energy. Sociocultural forms either instantiate ways of more or less optimally regulating the capture and expenditure of energy from nature so as to meet the fundamental biological and psychological needs of their members, or they cease to exist.

It is consequently in the areas where a sociocultural formation most directly abuts onto nature that we are entitled to search for the most likely determining influences on the remainder of that formation. This is an idea inspired by the Marxist conviction that the characteristic features of a social totality are derivative of its mode of production. Harris finesses this claim by etically differentiating three sociocultural domains. In the *infrastructural* domain, we find those technologically mediated human activities oriented to producing the means of subsistence and to ensuring biological reproduction. In the *structural* domain, we find the domestic and political organization of these activities and the conflicts arising therefrom. And in the *superstructural* domain, we find everything else: all behavioral events at a greater remove from subsistence concerns (rituals, games, music, science), as well as, in practice, most aspects of a people's mental life (religion, myth, ideologies, philosophies).

Most important, unlike versions of Marxism that credit a single determining factor (perhaps class, perhaps the "economic base"), cultural materialism juggles with a suite of infrastructural variables. Demographic pressures, nutritional requirements, subsistence technologies, ecological changes—these and other factors may be appealed to depending on the nature of the case. On the other hand, cultural materialism distinguishes itself from sociobiology by an ambition to explain sociocultural differences as well as similarities. So rather than saddling itself with a set of would-be explanatory genetic and evolutionary universals, it appeals always to *this* particular land yield, *this* particular climatic pattern, *that* specific advantage of cows over pigs.

Cultural Materialist Ideals

Harris observes more than once that political commitments sometimes trump the commitment to objectivity within anthropology. In any quandary of this kind, he considers anthropologists to have a primary duty to the truth. Perhaps it is not surprising, therefore, that observers routinely fail to notice that for Harris, the mission to secure anthropology as a science has an ethicopolitical significance as well as a cognitive one. Typically, this emerges in the context of intellectual polemics. A good example is the debate over the significance of Aztec sacrifice.

In *Cannibals and Kings* (1977), Harris attempts to account, among much else, for the Aztec practice of sacrificing war captives, a theme also explored in cultural materialist vein by Michael Harner. The point stressed by Harris and Harner is that Aztec cannibalism was almost certainly unique. The functionaries of the Aztec state took what was probably a common practice in the Americas and not only made it the center of ecclesiastical life but also escalated it to unprecedented levels (estimates for the 15th century go as high as 250,000 people killed in some years). This, Harris and Harner contend, must be accounted for by population pressure, the uniquely depleted animal protein sources in the Mexican Valley, and the advantages to the Aztec ruling class in maintaining a "cannibal empire."

Reviewing Harris's book, Marshall Sahlins finds these ideas laughable. He challenges the cultural materialist claim that protein sources were minimal in the Mexican Valley and stresses the impossibility of accounting for the elaborate holy temple rites of the Aztecs on the basis of a simple need for meat. As Sahlins would later comment: "Why build a temple, when all you need is a butcher's block?"

Harris's rejoinder is noteworthy for its tone as much as its content. In his view, Sahlins is not only objectively wrong, but his account is little more than a much belated apology for Aztec ruling class ideology. Hostility to the cultural materialist's etic elucidation of why the priests at the main pyramid in Tenochtitlan and numerous other sites were *really* killing captives merely lends plausibility to Aztec religious mystifications.

Scientific objectivity, then, is for Harris our only reliable weapon against the disguises worn by exploitative social relations, wherever and whenever they might be. And exactly because it alone is capable of tearing off all ideological veils, science is the only possible panhuman way of knowing. Nothing else, as he writes in *Cultural Materialism,* can "transcend the prior belief systems of mutually antagonistic tribes, nations, classes, and ethnic and religious communities in order to arrive at knowledge that is equally probable for any rational human mind."

What jumps out from a statement like this is that it sounds very much like an *idealization.* Surely the *practice* of science is usually less elevated. Harris is happy to grant both points. Nonetheless, it is precisely as an ideal that science deserves to be defended.

Evidently, cultural materialism comes here to its symptomatic point of exception. Alone among all social phenomena, science finally is to be exempted from etic explanation. Its truth, too valuable to be surrendered to materialist demystification, inheres in its ideal. This, speaking loosely, was Harris's emics, the account he rendered to himself of why etic explanations must be paramount.

Criticisms of Cultural Materialism

Cultural materialists shot argumentative arrows in many directions. Not a few have been shot back. For Jonathan Friedman, cultural materialism's causal explanations are merely redescriptions of empirical correlations. Were they to be taken seriously as explanations, they would in any case prove untenable. The unidirectional model of causation from infrastructure to structure and superstructure is not just a travesty of Marxism, it is theoretically implausible. It misses the relative autonomy of any social structure from its technoenvironmental conditions. Empirically, the theory fares no better, since cultural materialism can only account for the many instances of social change within the same technoenvironment, or of technological changes within the same social form, at the price of its own incoherence.

Maurice Bloch likewise attacks cultural materialism's point of pride: the fact that, unlike many "idealist" approaches in anthropology, it actually puts forward concrete explanations to account for specific historical changes and social functions. Bloch's observation is that these explanations are entirely ad hoc. If cows in India are holy and therefore ineligible to be eaten, Harris will look around for why etically this makes good economic sense. Were circumstances otherwise, and cows abhorred in India, Harris would doubtless discover equally meritorious reasons for why keeping cows out of India is economically rational. The explanation, then, is unfalsifiable but trivial. The only way to circumvent the problem would be to hazard a general theory as to the conditions under which cows anywhere will be considered holy; but this Harris does not do.

In the end, most anthropological criticisms of cultural materialism emerge from a common discomfort. This is the unshakable sense that, whatever the denials, for Harris and his cothinkers human cultures are finally not *real.* This is a criticism that cuts along both the substantive and the methodological axes of cultural materialism. The objections in each area might be summed up as follows.

Harris's "cultures" have a sort of emaciated reality, and his "superstructures" in particular are ontologically anemic ("mystifications"). It is as if the further you climb away from the ecological, demographic, economic, and technological determinants, the more insipid and less meritorious of sustained "scientific" consideration do the human phenomena become. The supposed gradient of causality is treated simultaneously as a gradient both of material quiddity and scientific credibility. But nothing else is to be expected if the necessary requirement that a culture adapt to its environment is made to stand in for the entirety of its inner logic.

Kindred objections emerge on the methodological front. Operationalizing one's concepts is not the same thing as subjecting them to critical interrogation. And attempting to ensure that one has an "etic" approach to phenomena will not cleanse one's concepts of the ontological commitments they inherit from their mother culture. To make this point is not, as Harris supposes, to elide the differences between nonscientific and scientific knowledge. It is not to suggest that we can neglect to carefully distinguish between thought and behavior, theory and practice, or subjectively and objectively verifiable statements. Nor is it to promote the simple-minded claim that anthropology's etic science is little more than the imposition of one particular emic universe on another. But such an imposition is exactly what anthropology threatens to become when it neglects to critically reflect on its scientific practice as a sociohistorical and cultural practice.

— *Sebastian Job*

Further Readings

Bloch, M. (1983). *Marxism and anthropology: The history of a relationship.* Oxford, UK: Oxford University Press.

Ferguson, B. R. (2001). Materialist, cultural and biological theories on why Yanomami make war. *Anthropological Theory, 1*(1), 99–116.

Harris, M. (1977). *Cannibals and kings: The origins of cultures.* New York: Random House.

Harris, M. (1979). *Cultural materialism: The struggle for a science of culture.* New York: Random House.

Lévi-Strauss, C. (1987). *The view from afar.* London: Penguin.

Ross, E. B. (Ed.). (1980). *Beyond the myths of culture: Essays in cultural materialism.* New York: Academic Press.

Matriarchy

Matriarchy is a term we use with two main meanings: (1) domination by female members of society and (2) women-centeredness in society (such as in descent, place of residence, economy, politics, religion, family). Scholars who use the term in the second sense stress that the concept of matriarchy does not parallel the concept of patriarchy (domination by male members of a society) insofar as the patriarchal domination structure does not exist in a matriarchal society.

In the 19th century, matriarchy or "mother-right" was thought to be representative of an early and primitive stage of social evolution. This stage was overcome by the "higher" stage of the "male principle." The idea of matriarchal prehistory, however, has not only been used to justify patriarchy but also to overthrow it. In the early 1970s, a feminist understanding of matriarchal pre- and early history and interest in ethnographic studies of matriarchal societies redeveloped.

Matriarchal Pre- and Early History

The question of matriarchal prehistory is especially associated with the Swiss jurist Johann Jakob Bachofen (1815–1887). In 1861 he published *Das Mutterrecht* (Mother Right), in which he proposed a theory of social evolution as a development from an era in which women were defenseless and degraded, followed by an era with mother-right and perfected in classical times with the rise of men and the "male principle." Bachofen, who actually never used the term *matriarchy* but *gynaecocracy*, revived the story of women-dominated societies in prehistory from classical Greek sources. The existence of matriarchies was explained by the assumption that some primitive peoples did not grasp the link between sexual intercourse and pregnancy. They therefore had no clear notion of paternity. When men discovered paternity, according to this hypothesis, they claimed the power to monopolize women and began to claim children as their own offspring. Hence, in 19th-century anthropology, women-dominated societies were regarded as a primitive stage of human evolution and patriarchy as an evolutionary advance. Bachofen was joined in this account by pioneers of the new discipline of anthropology along evolutionary lines (including Herbert Spencer). Socialists (e.g., Friedrich Engels)

and feminists (e.g., Charlotte Perkins Gilman) of these times were also attracted by the theory of prehistoric societies in which women dominated.

However, in the early 1970s, as part of second-wave feminism a feminist understanding of matriarchal prehistory came to be articulated. In this new tradition, *matriarchal* refers to women-centeredness, which does not deny equal power to men. This new feminist understanding of matriarchy is heavily indebted to archaeological finds that 19th-century scholars knew nothing about. Elizabeth Fisher, for example, used the early Neolithic site of Catalhöyük (located in present-day Turkey) to illustrate patriarchy's gradual encroachment into human society. Other scholars refer to the work of the Lithuanian/American archaeologist Marija Gimbutas, who argued for a widespread matriarchal (in the sense of woman-centered) culture in pre-Indo-European Old Europe of the Neolithic. In excavations in southeastern Europe, she uncovered a wealth of female figurines, which she identified as goddesses. Gimbutas's work is taken by some as proof of the claim that prehistoric societies were woman centered and goddess worshipping. However, some historians claim that this "evidence" is not reliable enough to allow for any conclusions. Nevertheless, women's status, role, and living conditions in prehistory and early history form a wide field of investigation in feminist and gender-sensitive anthropology, with new insights to be expected.

Contemporary Matriarchal Societies

Anticipating Bachofen, anthropologists and missionaries had begun to address the issue of female power as they encountered non-European societies in colonial contexts. They were shocked by senior priestesses and female chieftains. It was not later than 1724 when the French missionary J.-F. Lafitau expressed astonishment at the power of Iroquois women. Later on, Iroquois society was described by Lewis Morgan, who spent four decades studying them. Contrary to United States and European women in those days, Iroquois women spoke in council and selected the men who would be chiefs.

This early and more recent ethnographic data is referred to by supporters of the theses that there are (or, until recently, have in fact been) matriarchal (women-centered) societies among contemporary, scientifically observed, and documented societies. Due to the studies of anthropologist Bronislaw Malinowski, the Trobriand Islanders have become one of the most frequently cited examples. He stated that mother-right is the most important and the most comprehensive principle of law, underlying all customs and institutions on the Trobriand Islands, an archipelago lying east of New Guinea in the Western Pacific. On the Trobriand Islands, kinship is established through females only (matrilineal descent). When a male reaches maturity, he goes to live in the village of his mother's brother. And while the father has a warm relationship with his children, it is the mother's brother who is responsible for them. Because of these and further characteristics, researchers like Heide Göttner-Abendroth, the most important German researcher on matriarchy, classify the Trobriand Islanders as matriarchal. The same holds for other matrilineal societies in Africa, Asia, the Pacific, and America. Examples include the Bemba and Luapula in Africa, the Nayar in India, the aforementioned Iroquois and the Hopi in America, and the Minangkabau—one of the largest ethnic groups in Indonesia.

Whether these societies are not only matrilineal but also matriarchal is a matter of debate. Most anthropologists sharply distinguish matrilineal descent from matriarchy and refuse the term *matriarchy* for these societies. They point to studies showing that matrilineal descent and the distribution of power, though interrelated, are separate. Descent theorists maintain that even in matrilineal societies, power and positions of authority are generally held by men (though transmitted through women) and that women can have a high status in patrilineal societies. Their opponents, however, argue that to focus on matrilineality or matrilocality is inadequate and hides the existence of matriarchies. They point to the fact that in most of these societies, it is not only matrilineality and/or matrilocality that can be found, but that in addition, the celebration of life stages (birth, initiation, marriage, death, ancestor cult) are women-only ceremonies, the Earth is seen as the creation of one or more goddesses, and so on.

Due to the disagreement on the meaning of the term *matriarchy* and its loaded history, alternative terms have been proposed, including *matristic, gynarchic,* or *matrix society*. Göttner-Abendroth continues to use *matriarchy* as a strategy to expose the sexist bias still ingrained in academia and the media, as does anthropologist Peggy Reeves Sanday.

— *Anne Siegetsleitner*

Further Readings

Eller, C. (2000). *The myth of matriarchal prehistory. Why an invented past won't give women a future.* Boston: Beacon Press.

Gimbutas, M. (1982). *Goddesses and gods of Old Europe, 6500–3500 BC: Myths and cult images.* Berkeley: University of California Press.

Sanday, P. R. (2002). *Women at the center: Life in a modern matriarchy.* Ithaca, NY: Cornell University Press.

Mauss, Marcel (1872–1950)

The French-born sociologist and anthropologist Marcel Mauss is best known for his analysis of gift-giving societies and their relationship to more modern economic systems. Mauss is often described as the father of modern French anthropology. Although Mauss did not conduct fieldwork himself, his focus on ethnology was instrumental in influencing members of disciplines such as sociology, philosophy, and psychology to recognize the benefits of fieldwork.

Although Mauss studied a wide range of topics, his most significant publication is *The Gift* (1925), which was written as his response to Lenin's New Economic Policy of 1921. Mauss observed the events in Russia and believed that because the market could not simply be done away with, revolutionaries needed to develop a more intellectual and complete understanding of the market economy. He wanted to determine where the market came from and whether there were alternatives to the market economy. At the time, most people believed that the goal of humans was to maximize their pleasure by accumulating goods that would increase their comfort. Therefore, it was thought that some form of the market economy must have always existed and would have, in its early forms, relied on barter exchange.

Using several different societies of Melanesia, Polynesia, and northwestern North America, Mauss examined the roles and functions of gift giving and discovered that barter did not exist in these societies. Mauss described the system of gift giving that existed in these societies and noted that gift giving was related to obligation in several different ways. There was an obligation to give gifts in certain settings, there was an obligation to receive gifts that were offered, and there was the expectation that gifts would be reciprocated at a future date. Moreover, Mauss explained the competitive nature that often accompanied gift giving whereby the person who gave the gift received increased status. This was particularly the case with the potlatch system of societies on the northwest coast of North America. Therefore, Mauss illustrated the complexities inherent in gift exchange and the connections between gift giving and other aspects of society, such as religion, economics, politics, and mythology, while demonstrating that in some societies the goal was not to accumulate goods but rather to give away as much as possible so as to gain status.

At Bordeaux, Mauss studied philosophy and then later turned his focus to religion at the *Ecole Pratique des Hautes Etudes* (Practical School of Higher Studies). On completion of his studies, he was hired by his alma mater as a professor of primitive religion. From 1900 to 1902, Mauss taught Hindu and Buddhist philosophy at the University of Paris before becoming the chair of the Department of History of Religion of Primitive People, where he remained until 1930. Mauss, Lucien Lévy-Bruhl, and Paul Rivet worked together to found the *Institute d'etnologie* (Ethnology Institute) at the University of Paris in 1925. Mauss lectured at the College of France from 1931 to 1939. He was influenced by his uncle and mentor, Émile Durkheim. Together, they founded the journal *L'année Sociologique* (The Sociological Year), in which Durkheim's theories and methodology were developed. On the death of Durkheim, Mauss became editor of the journal. Although Mauss worked on a minimum of five books on a variety of topics, including the origin of money, nationalism, and prayer, he did not complete any of these works.

— *Kristine McKenzie Gentry*

Further Readings

Lévi-Strauss, C. (1987). *Introduction to the work of Marcel Mauss* (F. Baker, Trans.). London: Routlege & Kegan Paul.

Mauss, M. (1967). *The gift: Forms and functions of exchange in archaic societies* (I. Cunnison, Trans., with an introduction by E. E. Evans-Pritchard). New York: Norton.

Mauss, M. (1979). *Sociology and psychology: Essays* (B. Brewster, Trans.). London: Routledge & Kegan Paul.

Mayas

Since ancient times, Mayan peoples have inhabited a region that included the easternmost states of Mexico, Belize, and Guatemala together with the western portions of El Salvador and Honduras. There are only a few parts of the world today where language and culture so closely coincide that a line drawn around the Maya-speaking peoples contains all of the archaeological sites and hieroglyphic texts assigned to ancient Mayan civilization.

Linguists have divided the 31 Mayan languages spoken today into three major subgroups: Huastecan, Yucatecan (Yucatec, Lacondón, Itzá, and Mopan), and Southern Mayan (Greater Quichean, Mamean, Kanjobalan, and Tzeltalan-Cholan). Each of these languages shares a common Proto-Mayan ancestor that was spoken in about 2000 BC in the highlands of Guatemala and Chiapas. It is through research with present-day speakers of Mayan languages that many of the new decipherments in hieroglyphic writing have been made possible.

While the Maya existed as a people for over 2 millennia, they developed a remarkably complex civilization over the span of 6-1/2 centuries (CE 250 to 900), in the rain forest of southern Yucatán and northern Guatemala. They built magnificent cities of stone pyramids, temples, and palaces, produced sculpture and paintings of remarkable aesthetic quality, and screen-fold books on paper. Reaching intellectual and artistic heights, which no other peoples in the New World could match at the time, they carved hieroglyphic inscriptions on monuments and used a writing system that has now been largely deciphered. They created a mathematical notation system more sophisticated than any of their European contemporaries, incorporating place notation and the concept of zero. They counted the passage of time in hundreds of thousands of years and developed a number of calendrical systems. At the center was a sacred calendar of 260 days composed of cycles of 13 numbered days and 20 named days. In addition, they had the *haab,* which was 360 days long plus 5 concluding, unlucky days. Another calendar was the *katun,* which was a cycle of 20 *tuns,* each consisting of 360 days. They also used a Venus calendar (584 days), a half-year lunar calendar, and other cycles. These calendars made the Mayas the most accurate reckoners of time before the modern period. All the days of these calendars were recorded in astronomical almanacs that dictated religious ceremony.

These intellectual accomplishments were what made the "Mayan Classic period" into a kind of golden age during which the Maya, living in over 90 cities, were the only people in the Americas who used a phonetic writing system. Furthermore, they were the only civilization in the New World with chronological records going back to the third century AD. Many advances have been made in hieroglyphic decipherment, which has changed the view of the intellectual culture of the ancient Maya and modified our understanding of Classic Maya political systems. It has recently become clear that not all Mayan polities were equal. The kings of some lesser states were said to be "owned" by the rulers of more powerful states. While city-states such as Palenque and Copan exercised political control over some nearby areas, there were two superpowers, Tikal and Calakmul, that dominated the entire Yucatán peninsula during the Classic period.

The Mayan culture of this Classic period was characterized by hierarchal socioreligious institutions organized on both political and territorial bases. These complex institutions were mediated by monumental civic-ceremonial centers that concentrated royal authority, social stratification, and complex markets. Mayan agriculture was based on slash-and-burn farming, which required that a field be left fallow for 7 to 10 years after only 2 to 5 years of cultivation. Fixed raised fields and terraced hillsides were also used in appropriate areas. While the Mayan diet varied, depending on the local geography, maize was the primary staple, as it is today. Made nutritionally complete with the addition of lime, the kernels are boiled, ground on a metate with a mano, and formed by hand into flat tortillas. These are cooked on a griddle supported on three stones. Chili peppers, beans, and squash are also grown in the family farm plot, or *milpa,* together with the maize, maximizing each crop's requirements for nutrients, sun, shade, and growing surface.

The Mayas enter world history with the appearance and spread of certain architectural styles. Limestone structures faced with lime stucco were the trademark of Mayan architecture. They also developed unique building innovations, including the corbelled arch, achieved by stepping each successive block, from opposite sides, closer to the center, capped at the peak. Tombs were enclosed within or buried beneath buildings. New temples were constructed over existing

structures. Roof combs towered above many structures, providing a platform base for stucco sculpture. In addition to temples, most Mayan sites had multi-roomed structures that served as royal palaces as well as centers for governmental affairs. Historically significant events, such as accessions, the capture or sacrifice of royal victims, deaths of kings, queens, and nobles, and the completion of 20-year katun cycles were recorded on stone stelae and tablets.

In Maya cities the ruling and noble class lived at the center, while most of the population resided in small farming villages at the periphery. Mayan nobility worshipped a complex pantheon of deities and other spiritual beings. Rulers were believed to be descendants of the gods, and their blood was the ideal sacrifice, either through personal bloodletting or the sacrifice of royal captives. The Mayan vision of the universe was divided into multiple levels, above and below the earth, positioned within the four directions. After death, the soul went to the underworld, or Xibalba, a place of fright where sinister gods tested and tricked their unfortunate visitors, but some souls escaped and rose as stars.

Source: © iStockphoto/Ireneusz Skorupa.

The dating of ancient Mayan civilization rests on the stratification of pottery, radiocarbon dating, native historical traditions passed on by postconquest writers, and the correlation of the Mayan and Gregorian calendars. The Maya Long Count, which is a daily calendar that has run from a point in the mythical past, began to be inscribed in AD. For reasons that we still do not well understand, the Mayas abandoned their cities around AD 900. There is evidence for invasion from the outside, and it is also possible that economic and environmental difficulties led them to abandon the cities. The greatest change seems to be the disappearance of most of the nobles. With this disappearance, the Mayas stopped building monumental cities, but the peasants continued to use the land on which they stood.

During the Postclassic, lasting from AD 900 to the Spanish Conquest, political power was wielded by councils of nobles rather than concentrated in the hands of kings who were no longer celebrated in monumental inscriptions. Writing, which was now confined largely to books, saw an increase in the use of phonetic signs. Among the richest documentary sources from the colonial period are the katun prophecies of Yucatán, contained in the books of Chilam Balam, or "The Jaguar Priest." They contain calendrical, astronomical, divinatory, mythological, historical, and medical information. Each book was named for its place of origin: Chilam Balam of Chan Cah, of Chumayel, Ixil, Maní, Kána, Tekax, Tizimín, and Tusik. The Chilam Balam of Nah, however, was named for the Nah brothers, from the town of Teabo, who signed the document. The history these books contain is based upon the Short Count, a cycle of

13 katuns (13 × 7,200 days, or approximately 246 years) named for the Ajaw date on which it ended. Thus, for example, in Katun 13 Ajaw (AD 1262–1283), the Itzá Maya founded a new city, Mayapan, which was populated by provincial rulers and their families. This ensured their dominion over most of the city states on the Yucatán Peninsula. At about the same time, the K'iche' Maya established a large kingdom in the Guatemalan highlands.

The best early Spanish account of the Maya was written by Diego de Landa, who arrived in Yucatán in 1549. While he produced a long descriptive treatise about Mayan culture in Yucatán, he was also responsible for burning a large number of Mayan books because "they contained nothing but superstition and falsehoods of the devil." Thus he destroyed much valuable ancient knowledge. Other important cultural and historical information survived elsewhere. The *Popol Vuh*, a manuscript written shortly after the conquest by the K'iche' Maya in Guatemala, gives the mythology and history of this group. The mythic cycle tells of hero twins who overcome earthly monsters and the lords of the underworld, making the world safe for human beings. They also established the ceremonial pattern for human birth, marriage, hunting, agriculture, and death.

The resilience of the living descendants of the ancient Mayas in resisting invasion, disease, exploitation, and repression is remarkable. Guatemala, which has the largest segment of the Mayan population (4 million), underwent a civil war during the 1980s. Guerrilla takeovers of hamlets triggered massive levels of state violence, during which the government engaged in ethnocide, if not genocide, against the Mayan population. They survived this purge and went on to organize themselves nationally in order to advocate for bilingual education. The Academia de las Lenguas Maya de Guatemala (ALMG) was founded, and Mayas, who were also trained as linguists, voted in new alphabets for writing their languages. Their ongoing activities include advocating for the use of these alphabets, encouraging ancient religious customs, the continued use of the ancient calendar, and the bar-and-dot numerical system. By so doing they are reinforcing their conceptual world, their ethnic identity, and their own time. The Maya have survived and will continue to survive into the foreseeable future.

— *Barbara Tedlock*

Further Readings

Coe, M. D. (2005). *The Maya* (7th ed.). London: Thames & Hudson.

Fash, W. L. (2001). *Scribes, warriors and kings: The city of Copan and the ancient Maya* (rev. ed.). London: Thames & Hudson.

Martin, S., & Grube, N. (2000). *Chronicle of the Maya kings and queens: Deciphering the dynasties of the ancient Maya.* London: Thames & Hudson.

Tedlock, B. (1992). *Time and the highland Maya* (rev. ed.). Albuquerque: University of New Mexico Press.

Tedlock, D. (1996). *Popol Vuh* (rev. ed.). New York: Simon & Schuster.

Mbuti Pygmies

The Mbuti Pygmies, referred to as BaMbuti or Bambuti, are an ancient group of hunters and gatherers living deep in the heart of Africa's Ituri Forest in what is today the Congo. It is speculated that they might be the earliest inhabitants of Africa. Often referred to as the forest people, the Mbuti, whose height rarely exceeds 4 feet 6 inches, have been mystified and romanticized by outsiders since the first written accounts provided by Egyptians around 2500 BC. Some have viewed the Mbuti in a utopian light, noting their egalitarian political and social structure, absence of warfare, sacred rituals, and close-knit social relationships with each other as well as their environment.

African Pygmies

There are a number of pygmy groups throughout Africa, such as the Twa and the Tswa, but it is the Mbuti who form the largest single group of pygmies and have retained their traditional culture for much longer than other pygmy groups. The Mbuti are divided into three primary linguistic–geographical groups—the Efe, the Aka, and the Sua—as a result of adopting the language of those villagers with whom they came into contact. Although there are some marked distinctions among these groups (e.g., some hunt with nets, whereas others hunt with bows and arrows or spears), they nonetheless share many similarities regarding polity, religion, family life, rituals, formalized relationships with villagers, and a current

trend toward assimilation with outsiders as globalization encroaches on their previously isolated home.

"The Mother and Father": The Ituri Forest

The Ituri rain forest located in Africa's Congo lies just north of the equator and covers approximately 70,000 square kilometers (43,496 square miles), an area roughly the size of the state of Wisconsin. It is a world of filtered sunlight under a dense canopy of trees that typically reach 100 feet, with some climbing to 200 feet, leaving the forest shaded, cool, and moist. A single, often impassable dirt road was built during the 1930s and cuts through the forest from east to west, isolating it from much outside influence. To outsiders, the Ituri is a dark and menacing place inhabited with malevolent spirits. Villagers are engaged in an incessant battle with the forest that threatens to overtake their fields. The Mbuti, on the contrary, view the forest as a parental deity deserving love and praise in return for providing them with all they need. For this reason, the Mbuti call themselves *bamiki bandura* (the children of the forest). The forest provides them with materials for shelter (geodesic dome-shaped huts made of saplings and covered with waterproof mongongo leaves), clothing (cloth made of bark and decorated with plant dyes), and food. The forest is the foundation of the Mbuti culture and shapes elements such as sociopolitical structure, economic production, and religion.

The Band

Hunters and gatherers live in small, mobile, politically autonomous groups known as bands. All members of a band are related to one another either directly or indirectly. Each of the Mbuti bands is dispersed over a large territory with a very low population density. As of 1958, there were only an estimated 40,000 Mbuti in the entire Ituri. The band has a territory that is geographically isolated from other bands and is able to provide sufficient resources for its inhabitants. In addition, fluidity of band membership helps to ensure appropriate band size to prevent outstripping resources while providing the group with enough people to hunt. Band members can move to other bands temporarily or permanently as they see fit. Ties of kin through marriage provide one type of link to other bands. Marriage is exogamous (band members are to marry outside of their own band), and so any individual's parents will come from two separate bands. Band size is also variable depending on factors such as seasonal variation in game and hunting style. During times of plenty, such as the honey season, Mbuti bands may break into smaller units while hunting is temporarily suspended. In general, band size is larger for net hunters than for bow and spear hunters.

Economic Production and Gender

Although techniques vary, all Mbuti traditionally have met their subsistence needs by hunting and gathering. The Mbuti make use of up to 100 species of plants and more than 200 species of animals, but the bulk of their diet consists of a smaller number of preferred plant and animal species. Women gather and men hunt, but men often gather while on the hunt if they see food that is especially good to eat, and women—especially among the net hunters—are a vital part of a successful hunt.

Among net hunters, men and women participate cooperatively in the hunt using strong nets made of a forest vine (*nkusa*) that average approximately 1 meter high and 30 to 100 meters long. Men form a large semicircle linking the individual nets, while women close in the other half of the semicircle driving game into the nets. Once an animal is caught in the nets, a man will spear it to death. Because they lack ways in which to store meat over a long period of time, excess meat is traded with villagers for plantation goods, but to hunt too excessively is thought to displease the forest.

Among bow hunters such as the Efe Mbuti, cooperation is also required for a successful hunt, but women do not participate directly in the hunt. Groups that bow or spear hunt do not generally capture as many animals in a hunt but require fewer participants. For this reason, bow and spear hunting bands generally average roughly 6 huts, whereas net hunting requires roughly 15 huts.

Regardless of the way in which a group hunts, securing food requires an average of only 4 hours per day four or five times per week. All meat is shared among the group members, but gathered foods, being more abundant and readily accessible, are kept primarily within the nuclear family.

Other jobs are also divided by gender as well. Men weave and repair hunting nets. Women weave the gathering baskets, cook, and build the family's hut. However, gender divisions of labor are not strictly

Source: © Wendy Stone/CORBIS.

maintained. There is no shame in a man cooking, and bachelors often cook for themselves. It has been suggested that women's contribution to subsistence explains their relatively equal status to men. Women have an equal voice in decision making and control powerful ritual knowledge.

Frequent trade with neighboring villagers may obscure the fact that the Mbuti need only the forest for their subsistence. Beyond a desire for luxury items, they require no outside materials for their survival. In exchange for meat, villagers provide the Mbuti with items such as metal cooking pots and cups, metal spear tips, and plantation foods. Plantation foods, far from being a necessity to the Mbuti, are not as healthy as forest foods. This is especially the case for consumables such as palm wine and tobacco. Even metal spear tips are not essential for a successful hunt and are often replaced by fire-hardened wooden spears.

Polity

The Mbuti have no chiefs or political leaders to threaten the solidarity of the group. Although knowledge and skills of particular band members may be called on during times of need, there is no formal leader. In that cooperation by all members is essential for survival, group consensus is vital and the only political unit is the band itself. Division of the band into age groups further prevents centralization of power by dispersing responsibilities and decision-making authority. Decisions are made jointly, with the welfare of the band placed over that of any particular individual. The worst crime is to sacrifice the safety or welfare of the group. The ultimate punishment is the threat of ostracism from the band. Social inequalities are prevented in that the Mbuti do not individually own property, material possessions (beyond a hunting net or a particular cooking pot), or other resources.

Birth, Marriage, and Death

Birth for the Mbuti begins much as the rest of life will continue, that is, in a hut made of the forest surrounded by members of the band. A woman generally gives birth in her hut with the assistance of female kin. Sometimes a baby will be sprinkled with juice

from vines, which are then tied around the baby's wrist with a piece of wood from the forest. This helps to make the baby strong in that he or she is part of the forest. All men and women of the generation of the parents will help to raise the child, and all children his or her age will be considered brothers and sisters.

Marriage for the Mbuti is more or less monogamous and begins when a man and woman begin to live in the same hut, eating and sleeping together as a married couple. A man must seal the betrothal by demonstrating his hunting ability to the woman's parents. However, the marriage will not be official until the birth of the first child, and until that time the marriage may be easily dissolved.

Death is yet another transition for the Mbuti. Life ends in the same style hut and on the same type of sleeping mat into which the individual was born. The men dig a shallow grave in the hut and then collapse the roof on top of the body. There is a period of ritualized grieving where loved ones will mourn loudly, but this ends quickly so as not to offend the forest. The group then moves to a new camp. It is thought that the spirit of the deceased will join the spirits of other deceased Mbuti who live in the forest as they had lived in life, only invisible to those still alive.

Rituals and Religion

Unlike their village neighbors, the Mbuti do not practice witchcraft, sorcery, or magic, but they do have a rich tradition of ritual and religion. There are two central rituals of Mbuti culture: the molimo and the elima. The elima is a formal ritual to mark a young woman's first menses. This is a time of sexual freedom that may ultimately lead to her selection of a future marriage partner. All of the young women who have recently received their first menses will move to a special elima hut with a group of their close girlfriends. Here they are taught the elima songs as well as aspects of motherhood and sexual relationships. Far from being seen as a time of female pollution, the Mbuti view this as a joyous occasion marking a girl's transition to womanhood and thus motherhood. Sexual freedom is not, however, without some rules and limitations. The girls go out by day whipping boys as an invitation to the elima hut that evening, where they must fight their way through the girls' mothers and other older women to gain access to the hut. If a particular suitor is deemed unfit for any reason, he will likely be barred access. It has been speculated that girls practice a natural form of birth control in that there have been no known accounts of pregnancy resulting from the elima ritual. At the end of the ceremony, the girls will take their place in Mbuti society as adult women.

One of the most important rituals for the Mbuti involves awakening and rejoicing the forest to restore order during times of death, prolonged periods of poor hunting, and other crises that threaten the social solidarity of the group. The molimo is both a tube-shaped instrument (capable of making a wide range of sounds) as well as a ceremony. The instrument is kept hidden from women and children and is brought out only at night for the duration of molimo festivals.

The molimo ceremony lasts approximately a month, and everyone cooperates by providing food and fire for the molimo hearth. Vigorous hunting during the day is followed by equally vigorous singing and dancing by the men at night. Men sing and dance throughout the entire night accompanied by the haunting sounds (often in imitation of the leopard) of the molimo trumpet. Dancing reaffirms the age group bonds at the same time that it affirms belief in the continuity of life and the band despite death. Women and children are secluded from the ceremony at night until the end of the ritual, at which time an old woman dances through the molimo fire, scattering it. This is to portray women as both givers and destroyers of life. The men quickly repair the fire. This dance reenacts the time when women originally possessed the molimo before men stole it. Both men and women are, therefore, regarded as central for a productive forest life. Regardless of the purpose for holding a particular molimo, the goal is to restore harmony by awakening and rejoicing the "mother and father" forest.

Contact With the World Outside of the Forest

The Mbuti's most enduring contact with the world outside of the forest is the relationship with villagers. It might appear that the Mbuti are subservient to villagers in that they are dependent on villagers for plantation foods, metal objects, and even for the substance of their culture. The villagers even refer to themselves as owners of the Mbuti. However, the behavior of the Mbuti when they are in the village mimics that of villagers only superficially and is quickly abandoned once they are in the forest. For example, in the village

the Mbuti have a "chief" who negotiates with villagers, but this individual has no authority over the band once the Mbuti are in the forest. The owner of one Mbuti might wish to marry "his" pygmy to a pygmy of another owner to create political and economic alliances. The Mbuti feign acceptance of this marriage solely so that they may enjoy the marriage feast that must be provided by the couple's "owners." However, once the Mbuti are back in the forest, the band does not consider the couple to be married.

The Mbuti participate in other village rituals such as the *nkumbi* (circumcision ceremony). Villagers believe that a boy must be circumcised to become a man and to be able to join the ancestors on death. Villagers involve the Mbuti in this ceremony so that they too will be able to go to the place of the ancestors and thus serve them on death. The Mbuti do not share the beliefs of the villagers, but they participate to gain the villagers' necessary respect. For the Mbuti, it will be many years after the ceremony before the circumcised boys will be considered as adults. A result of the nkumbi is the bond of brotherhood between an Mbuti boy and a village boy who are paired through the nkumbi ritual. They are expected to trade with each other for life.

Current Trends and the Future of the Mbuti

It is tempting to view the Mbuti as a pristine group of exotic "others" yet untouched by modernity. However, significant contact first began some 300 to 500 years ago as agriculturists moved closer to the Mbuti, bringing new technologies and beliefs. Immigration of agriculturalists was followed by the Arab slave trade and colonialism.

During the colonial period, the Belgian administration enforced an increase in agricultural production of villagers with stiff penalties. Chiefs desperately sought "their" Mbuti to help them with the production. The Belgian government put much pressure on the Mbuti to leave the forest and to resettle as agriculturalists. At this time, the Mbuti remained able to escape into their forest world, but the seeds had been sewn for widespread change.

After the colonial period, the newly independent government of Zaire continued policies of forced resettlement but did so to emancipate the Mbuti, allowing them to contribute to the national economy by farming. They were to be given citizenship and thus subject to taxation. Model villages were constructed to teach Mbuti how to be farmers. Unaccustomed to sedentary life, many became ill and died from contaminated water, nutritional deficiencies, and heat stroke.

By the early 1990s, the effects of globalization were becoming even clearer. The Okapi Faunal Reserve was created to protect the Mbuti and their traditional way of life by, for example, forbidding poaching of animals such as elephants and leopards. Civil wars and the erosion of political control of the Democratic Republic of the Congo, however, made enforcing these laws impossible. The forest has increasingly been cleared for agriculture, logged, and mined for its valuable natural resources such as coltan, a metallic element used in electronics. Such exploitation results in the loss of game and in pollution of the territory. No longer able to hunt and gather, the Mbuti are often compelled to work for cash wages, for the first time introducing sources of material inequality in the band.

The rich cultural traditions and lifestyles of the Mbuti are threatened as their forest foundation is increasingly destroyed. Many Mbuti youths today do not know of the elima, and they hunt excessively for surplus to sell. Previously sacred rituals not to be performed outside of the forest, such as molimo songs, have been brought into the villages. The future of the forest people described more than 3,000 years ago by the Egyptians hangs in the balance as the reach of globalization and modernization continues to expand.

— *Catherine Mitchell Fuentes*

Further Readings

Duffy, K. (1976). *Pygmies of the rain forest* [video]. Santa Monica, CA: Pyramid Film & Video.

Duffy, K. (1984). *Children of the forest: Africa's Mbuti Pygmies.* Prospect Heights, IL: Waveland.

Duffy, K. (1986). The Mbuti Pygmies: Past, present, and future. *Anthroquest, 34.*

Putnam, A. (1955). *Eight years with Congo Pygmies.* London: Hutchinson.

Schebestsa, P. (1933). *Among Congo Pygmies.* London: Hutchinson.

Schebesta, P. (1936). *My Pygmy and Negro hosts.* London: Hutchinson.

Turnbull, C. M. (1965a). *The Mbuti Pygmies: An ethnographic survey.* New York: Natural History Press.

Turnbull, C. M. (1965b). *Wayward servants: The two worlds of the African Pygmies.* New York: Natural History Press.
Turnbull, C. M. (1968). *The forest people.* New York: Simon & Schuster.
Turnbull, C. M. (1983). *The Mbuti Pygmies: Change and adaptations.* New York: Holt, Rinehart & Winston.

McCown, Theodore D. (1908–1969)

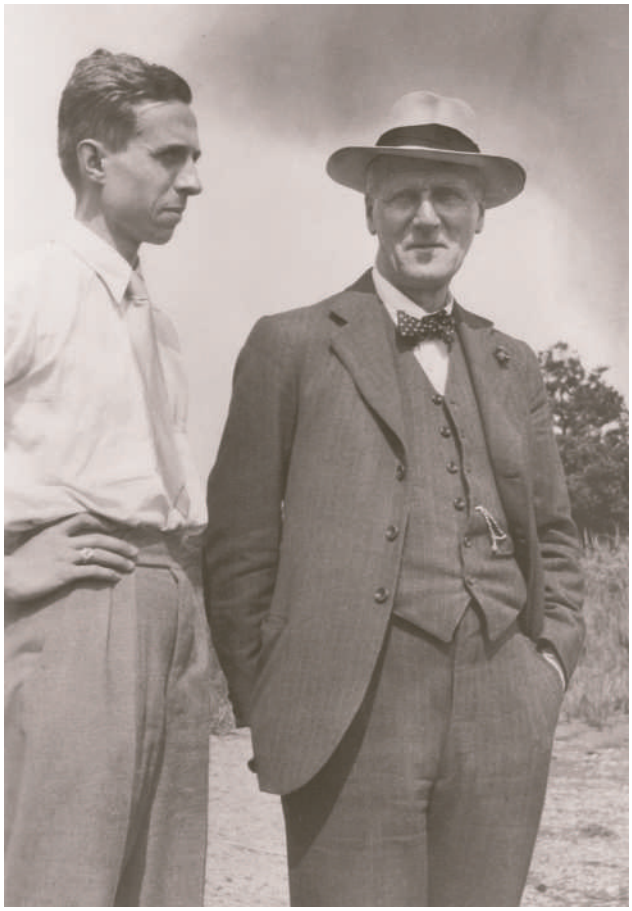
Theodore Doney McCown, an American biological (physical) anthropologist, is best known for three major contributions he made to his science. First is his study of the Neanderthal skeletons from the Skhul and Tabun caves in Israel and the publication of his work in 1939 in collaboration with the British anatomist Sir Arthur Keith (1866–1955), *The Stone Age of Mount Carmel: The Fossil Human Remains From the Levalloiso–Mousterian.* Second is McCown's pioneering program of research and teaching forensic anthropology as a professor at the University of California, Berkeley, during the mid-20th century when there were only a few other practitioners in this applied field of anthropology. At Berkeley's Department of Anthropology, he supervised more than 45 graduate students, with a considerable number of these students constituting the first generation of practicing forensic anthropologists entering academic and institutional positions. Third, McCown led two expeditions to the Narmada Valley of India (in 1957 and 1965), where he established the stratagraphic contexts of the alluvial deposits containing prehistoric stone tools of the Middle Pleistocene epoch.

Born in Macomb, Illinois, McCown moved with his family to Berkeley in 1913 when his father, Chester Charlton McCown, took the position of dean of the Pacific School of Religion. Later, when his father moved to Transjordan to serve as director of the Palestine Exploration Fund and conducted archaeological excavations at the site of Jerash, Theodore participated in the excavations. Theodore shared this interest with his younger brother, Donald Eugene McCown (1910–1985), who became recognized as an authority on the archaeology of Persepolis and various ancient sites in Iran.

Theodore McCown's academic life began with his receipt of a B.A. degree in anthropology in 1929 from the University of California, Berkeley. The following year, he was again in the Near East as a member of the British School of Archaeology in Jerusalem, where he assisted Dorothy Garrod (1892–1968) in her ongoing excavations at the Mount Carmel caves. During his return visit to the caves in 1930, he was involved in the discovery of Neanderthal skeletons in the Skhul Cave. Additional skeletons were found there and at the adjacent Tabun Cave from 1932 to 1937. McCown and Keith undertook a collaborative study of the bones during this period after the fossils had been forwarded to the Royal College of Surgeons in London. McCown had entered his graduate program at Berkeley in 1930; hence, his studies toward the doctoral degree, awarded in 1939, coincided with repeated trips to the Mount Carmel region.

During the year he received his Ph.D. in anthropology, McCown joined the faculty of his alma mater, where the department was then under the chairmanship of Alfred Kroeber (1876–1960). McCown rose to the rank of full professor by 1951 and later served as chairman of his department, curator of physical anthropology at the Lowie/Hearts Museum, joint appointee to the Department of Criminology, and associate dean of the College of Letters and Science. During these years, he conducted archaeological excavations in Peru under the auspices of the Institute of Andean Research. But his academic career was interrupted by the military service from 1942 to 1945 when he was assigned duty in Graves Registration of the U.S. Army Quartermaster Corps at the San Francisco Presidio. His assignments included personal identification of war dead, certainly a stimulus to his postwar interest in practicing and teaching forensic anthropology at a time when the only academic instructors in this discipline were Earnest A. Hooton (1887–1954) at Harvard University and Wilton Marion Krogman (1903–1987) at the University of Chicago and later the University of Pennsylvania.

Among McCown's forensic cases were the identification of Junipero Serra (1715–1784) at the Franciscan Mission in Carmel, California; the identification of Juan Bautista de Anza (1735–1788), founder of San Francisco, in Arizpe, Mexico; and the negative identification of remains reputed to be those



Theodore Doney McCown and Sir Arthur Keith, circa 1938 at Buxton Brown Farm, Downe, Kent, England.

Source: Photograph courtesy of Elizabeth McCown Langstroth, reprinted by courtesy of Kenneth A. R. Kennedy, Cornell University.

of the American aviatrix Amelia Earhart (1898–1937) brought from a Pacific island to McCown's Berkeley laboratory. Other forensic anthropologists have continued identification of the "eminent dead" since McCown's death in 1969.

McCown's philosophy of teaching stressed the interface of biological anthropology and cultural anthropology, arguing that "man is a part of 'brute creation' [and] that the processes of organic evolution apply as well to man as other animals." Sherwood L. Washburn (1911–2000) joined the Berkeley department in 1958, two decades after McCown had created the program in biological anthropology, and together they laid the foundations for the prominence of that field at their university.

— *Kenneth A. R. Kennedy*

Further Readings

Brooks, S. T. (1970). Theodore D. McCown, 1908–1969. *American Journal of Physical Anthropology, 32,* 165–166.

Kennedy, K. A. R. (1997). McCown, Theodore D(oney) (1908–1969). In F. Spencer (Ed.), *History of physical anthropology* (2nd ed., pp. 627–629). New York: Garland.

Kennedy, K. A. R., & Brooks, S. T. (1984). Theodore D. McCown: A perspective on a physical anthropologist. *Current Anthropology, 25,* 99–103.

McCown, T. D. (1952). The training and education of the professional physical anthropologist. *American Anthropologist, 54,* 313–317.

McCown, T. D., & Keith, A. (1939). *The Stone Age of Mount Carmel: The fossil human remains from the Levalloiso–Mousterian* (2nd ed.). Oxford, UK: Clarendon.

McCown, T. D., & Kennedy, K. A. R. (1971). *Climbing man's family tree: A collection of writings on human phylogeny, 1699–1971.* Englewood Cliffs, NJ: Prentice Hall.

McLuhan, Marshall (1911–1980)

Herbert Marshall McLuhan was born on July 21, 1911. The proud parents sent out announcements heralding the birth with the saying, "Unto us a child is born, unto us a son is given."

As a youngster, McLuhan was always quiet and retiring to the point of being antisocial. He had a great love of animals. "Rags," an Airedale collie, was an integral and devotedly cared-for member of the family. In his earliest days at public school, McLuhan showed no promise as a future scholar. His report cards indicated marks ranging as low as 20% for spelling in Grade 3, borderline failures in other subjects, and few distinguished achievements other than in reading. At the end of Grade 6, he failed his year. But his mother Elsie, who was engaged in supply teaching at the time, prevailed on the teacher and school principal to give Marshall a chance in Grade 7. The probation was a success and more. His teacher, Mrs. Muir, proved to be the inspiration McLuhan needed, kindling the interest in English literature that would anchor his career. He put scholastic failure behind him but indulged himself in quirky spellings throughout his life.

At 10 years of age, McLuhan delivered newspapers. His route consisted of approximately 100 newspapers each day. The experience was encouraged by his mother to develop discipline and a sense of responsibility.

As he moved into his early teens, McLuhan began to shed his retiring nature. He played baseball and even formed a team from among the boys of the neighborhood, reserving the coveted position of pitcher for himself.

At 12 years of age, McLuhan became active in the Boy Scouts, participating for 2 years and earning his King's Scout. Scoutmaster Charles A. Hill recognized McLuhan's competence, and when guests were present, Hill invariably directed questions relating to scouting McLuhan's way, confident that he would have the answers.

When McLuhan was 17 years old, he acquired blueprints for a sailboat and enlisted friends to help build the 14-footer. Using a neighbor's garage, they set to work measuring, cutting, planing, and sanding, resorting to outside expertise only when the complexities of the spoon-shaped bow proved to be beyond them. In landlocked Winnipeg, they even managed to find 100 square feet of silk Egyptian sailcloth to ensure the lightness of the craft and improve its performance.

Sailing became a passion with McLuhan, a passion with a dimension he recognized as spiritual when he reflected on it some years later from the vantage point of Cambridge University. The passion for sailing led him to identify throughout his adult life with the sailor who survived the most harrowing of adventures in Edgar Allan Poe's story "A Descent Into the Maelstrom."

Beginning with a 1946 article titled "Footprints in the Sands of Crime," McLuhan would evoke the story of the Maelstrom many times in his writing and teaching. It figured prominently in the preface to *The Mechanical Bride,* with an explicit statement of its place and importance in the McLuhan method: "Poe's sailor saved himself by studying the action of the whirlpool and by cooperating with it."

The manual skill of young McLuhan the boat builder seemed to dictate a career. And the company of practical-minded friends exerted its influence as well. McLuhan joined them in enrolling in the engineering program at the University of Manitoba in Winnipeg in the fall of 1928. Before he had completed a year, however, McLuhan discovered that he was not in his element. Then, as he worked at a summer job among engineers, his misguided choice was confirmed. Some of his coworkers simply ignored McLuhan as he spent every free moment reading, whereas others resented the presence of the lean, self-absorbed 6-footer. In the fall of 1929, he switched to a 4-year B.A. program that would focus on English, history, and philosophy. The excitement of setting out on his intellectual odyssey was dampened as soon as McLuhan saw how vast a job it would be to master a domain he wanted to stake out. And nothing less than mastery would satisfy him. He set his own program of reading and developed his own uses for what he read. "I have to read outside the course to maintain interest," he confided in his diary. Thomas Carlyle was an early favorite because of his bold innovative language. After Carlyle, Thomas Macauley and Samuel Johnson would beckon McLuhan to the heights of greatness. Later still, Trevelyan, Boswell, Thackeray, and Shakespeare did likewise.

By 1936, McLuhan had completed his university studies, and his options were teaching English in Wisconsin, being unemployed, or turning his life in a new direction. To be jobless after 8 years of university study was unthinkable, and the memory of hardships suffered by those around him during the worst of the Depression years in Winnipeg—hardships that the McLuhans themselves managed to escape—was still too vivid.

On September 9, 1937, McLuhan left Wisconsin for a new teaching position at St. Louis University. He was moving to a larger city, to a larger university, and with a larger perspective. McLuhan thrived on intense mental stimulation. St. Louis held the promise of satisfying that need and soon delivered on it.

McLuhan was awarded his M.A. degree on January 20, 1940. Although his time at Cambridge was nearly over, it was a day for looking to the future more than for reminiscing. The return trip to America would require careful planning. A transatlantic crossing during wartime meant restrictions and complications.

On December 11, 1943, McLuhan earned his Ph.D. degree from Cambridge in absentia due to the war. From that point onward, McLuhan's career exploded. By 1970, he was an international celebrity. In 1972, McLuhan made more than 30 appearances in person and on television, addressing audiences with his blend of entertainment and education. He spoke to teachers and writers, clubs and power brokers, medical doctors and business managers. But he aimed

few remarks at their particular interests and made no concessions to those unwilling to be jolted into awareness of media effects by his inseparable weave of style and message: "Sputnik put an end to nature, turning the earth into an art form and the planet Polluto. . . . Roles have replaced goals. . . . We put on our technology as evolutionary clothing. . . . Childhood was unknown to the Middle Ages—it began in the Renaissance with painting and ends now in the TV age."

By 1973, McLuhan had collected eight honorary doctorates, been made a fellow of the Royal Society of Canada, received the Christian Culture Award from Assumption College, received the Gold Medal Award from the president of the Italian Republic in recognition of his work as a philosopher of the mass media, received the President's Cabinet Award from the University of Detroit, and been appointed by the Vatican to the Pontifical Commission for Social Communications.

Although the story of McLuhan's life is an intellectual odyssey, the hero was no wandering Ulysses. In retrospect, the coherence of his work becomes apparent; it stems from his genius for returning constantly not to a single point but rather to a single strategy—probing and testing the forms and limits of an idea, forging links among ideas, developing a method for escape into understanding. This he did by using the prison walls of language as ramparts. In his book *Understanding Media,* McLuhan referred to language as humankind's first technology for extending consciousness. It is the technology that has both translated thought into speech and been translated by a succession of other technologies throughout the course of civilization (e.g., hieroglyphics, phonetic alphabet, printing press, telegraph, phonograph, radio, television, telephone). Language was central to McLuhan's teaching on media, their transformations, and their interactions.

McLuhan, realizing that electronic technology does not depend on words, saw further. The computer is the extension of the central nervous system. It offers the possibility of extending consciousness without verbalization, of getting past the fragmentation and numbing effect that makes the Tower of Babel the counterpart to Pentecost, of providing a way in which to achieve universal understanding and unity. McLuhan's intellectual ferment emphasized the training of perception and prepared the way for the innovations that marked his thought until the end of his life.

McLuhan loved to teach, write, and lecture in public about the intellectual investigations of his life. A summary account of these investigations is given next, with McLuhan's probes serving as section headings.

Acoustic Space

Acoustic space was a key topic for McLuhan. The idea was developed by E. A. Bott in the Department of Psychology at the University of Toronto, and news of it came at an interdisciplinary seminar. Although McLuhan never met Bott, he acknowledged Bott's work as a stimulus for his own "study of olfactory space, and the rest." Writing to one of his friends, McLuhan brought faith, physics, philosophy, and language through the vanishing point by way of acoustic space: "The ear creates acoustic space whose center is everywhere and whose margins are nowhere. This has often been mistaken for God by tribal societies as well as by neo-Platonists and the Oriental world."

Figure and Ground

In the early pages of *Understanding Media,* McLuhan referred to "the unified 'field' character of our new electromagnetism." Only his quotation marks around "field" hinted that the familiar world has a special meaning. Much later in the book, McLuhan discussed the automobile and how it "has quite refashioned all of the spaces that unite and separate men." Figure ground eventually became his favored probe. The automobile could now be described as a figure against the ground of highways, service stations, motels, billboards, drive-in theaters, and suburbs.

Effects

The study of effects is the thread running through all of McLuhan's media analysis, if not its entire rationale. It takes its roots in his training in practical criticism, where McLuhan learned to heed I. A. Richard's call to "give a fuller and more entire response to the words" of poetry and to develop "the fullest realization of the varied powers upon us."

Causes

By the end of his life, McLuhan had long since become an iconic figure in a world that knew little of

his percept that the iconic merges figure and ground. But the popular consciousness of McLuhan the icon had earned him a limerick for his pronouncements on the merging of effect and cause:

> Runs one of McLuhan's mad laws,
> The effect always precedes the cause.
> Thus the baby's produced,
> Ere the maid is seduced;
> Is it impertinent to ask who the pa is?

If the question does not invite a serious answer, McLuhan nevertheless supplied one, naming a hardy reincarnation of efficient causality as the offspring of print. To this, McLuhan added a rare plain statement of definition: "But I refer to formal cause not in the sense of classification of forms, but to their operation upon us and upon one another."

Structuralism

McLuhan's thinking during the 1970s, particularly during the middle years of the decade, was dominated by his own unique brand of structuralism. McLuhan had already outlined structuralism in the broadest terms—the trend of modern thought, in areas as diverse as physics, painting, and poetry, whereby "specialized segments of attention have shifted to total field." Structuralism appealed to McLuhan for its own merits and because it invited the type of interdisciplinary inquiry to which his own natural bent led him.

McLuhan died on December 31, 1980.

— *John A. Xanthopoulos*

Further Readings

Heer, J. (1996, April). Marshall McLuhan and the politics of literary reputation. *Literary Review of Canada,* p. 23.

Neill, S. D. (1993). *Clarifying McLuhan: An assessment of process and product.* Westport, CT: Greenwood.

Nevitt, B., & McLuhan, M. (Eds.). (1995). *Who was Marshall McLuhan?* Toronto: Stoddart.

Stamps, J. (1995). *Unthinking modernity: Innis, McLuhan, and the Frankfurt School.* Montreal: McGill–Queen's University Press.

Wilmott, G. (1996). *McLuhan, or modernism in reverse.* Toronto: University of Toronto Press.

GLOBAL SOCIETY

With the Internet drawing people together from all quarters of the world in an electronic community, the idea of such a global society had its first appearance in the work of Marshall McLuhan, who was director of the Center for Culture and Technology at the University of Toronto. With his *Understanding Media,* published in 1964, McLuhan confronted what he felt was a rapidly moving culture that was still trying to explain itself using the same printed mode of communication that had been in vogue since the invention of the printing press by Johannes Gutenberg in 1455.

Contrary to most people of his time, McLuhan perceived the revolutionary paradigm shift that had occurred with the globalization of communications through the new media of television. Even more, he saw the effect on both information and education as prefigured by the instantaneous delivery of information made possible by communication satellites. Indeed, 2 years before the publication of *Understanding Media,* the first true communications satellite, Telstar I, was launched on July 10, 1962, and on that same day live television pictures originating in the United States were received in France.

McLuhan saw in the revolutionary communications growing around him the means to break down the parochial barriers of class, language, and even nations themselves and to form in their place a vibrant "global village." The information that would be at hand in the global village, in McLuhan's view, would free humankind from the provincial tribalism that had been at the root of human bloodshed and suffering over the centuries. As McLuhan wrote, "In this electronic age, we see ourselves being translated more and more into the form of information, moving toward the technological extension of consciousness. That is what is meant when we say that we daily know more and more about man. We mean that we can translate more and more of ourselves into other forms of expression that exceed ourselves. Man is a form of expression who is traditionally expected to repeat himself and to echo the praise of his Creator.

Man has the power to reverberate the divine thunder by verbal translation."

Within 30 years, McLuhan's vision of a communicating global village had been realized dramatically. During the Gulf War of 1990–1991, the cable TV network CNN, with its heavy reliance on satellites and its innovative 24-hour daily news coverage, became the medium to watch for the unfolding of the war. Indeed, not only did it become the main way in which the American public learned of the progress of the war, but also the American armed forces watched CNN to monitor their own progress in operations against the Iraqi army. Within 5 years, the Internet enabled people with like interests and needs to communicate over thousands of miles literally within seconds, forming virtual communities of people who, due to physical handicap or sheer distance, would otherwise have remained isolated. By 2005, the first part of McLuhan's message, the creation of a virtual community, had been realized. The second part, the quest for his global village to help realize the pacific and loving intentions of humankind's Creator, still remained elusive.

— John F. Murphy, Jr.

Margaret Mead (1901–1978)

Margaret Mead, the most prominent and recognized anthropologist of the 20th century, had a profound influence on anthropology and feminism. She achieved celebrity status and became an American oracle.

Mead was born into a Quaker family in Philadelphia on December 16, 1901, the daughter of Edward Sherwood Mead (a professor of economics at the University of Pennsylvania Wharton School) and Emily Fogg Mead (a sociologist and suffragist). Margaret had lived in 60 houses by 6 years of age. She attended DePauw University (1919–1920), graduated with a B.A. degree from Barnard College (1923), and received her M.A. in psychology from Columbia University (1924) and her Ph.D. in anthropology from Columbia University (1929) studying under Franz Boas and being mentored by Ruth Benedict.

While establishing her home base in New York City, Mead was appointed curator of ethnology at the American Museum of Natural History (1926), associate curator (1942), curator (1964), and curator emeritus (1969). She was appointed adjunct professor of anthropology at Columbia (1954–1978), professor of anthropology while she founded the department at Fordham University (1968), visiting lecturer in the Department of Psychiatry at the University of Cincinnati School of Medicine (1957–1958), and visiting lecturer at the Menninger Foundation in Topeka, Kansas (1959).

Diminutive in stature yet strong in character and stamina, Mead was never known to shrink from controversy. She wielded proclamations of her field research findings in anthropology, her feminist opinions on the role of women, and her recommendations regarding sexual liberation, marriage, and marijuana decriminalization. She carried a big stick—a forked walking stick—and spoke other than softly (an interesting contrast to Boas's nemesis, President Theodore Roosevelt). She seemed larger than life. Only Benedict knew her well. They became intimate friends in their roles as mentor and student, and Mead became the child Benedict never had. She became absorbed in Benedict's work and internalized the theory of cultural relativity.

Mead's findings in her field studies were provocative. Having obtained a National Research Council fellowship (1925) while on staff at the Museum in Honolulu, she traveled to the island of Tau in Samoa to verify Boas's hypothesis that culture and not biology influences adolescent behavior the most. The product of this research, *Coming of Age in Samoa* (1928), caused a public stir due to her descriptions of unrepressed adolescent Samoan girls' sexual activity compared with that of American girls as well as her recommendation that Americans could learn how to raise children from Samoans. The stir was heightened when some colleagues claimed that Mead ignored biological factors in her emphasis on the theory of cultural determinism. At the time, she was married to but separated from Luther Cressman, and she then met and married Reo Fortune (1928), with whom she traveled to Manus and the village of Peri in the Great Admiralty archipelago.

Mead's work in Peri led to *Growing Up in New Guinea* (1930), in which she argued that the difference between the "civilized mind" and the "primitive mind" had been exaggerated; human nature was malleable. The work was highly received and inspired her to study the Omaha Indians of Nebraska (1930),

followed by research in Alitoa, New Guinea (1931). There, Mead developed a typology of aggression based on the pacifist Arapesh mountain people and the violent Mundugamour village people, and she also studied the Tchambuli people while living with the Washkuk tribe. Her typology was a major contribution to the theory of cultural relativity.

Following a divorce from Fortune, Mead married ethnologist Gregory Bateson (1936). They conducted 2 years of fieldwork in Bali, where they used photography in research and annotated more than 25,000 photographs, many taken of the Balinese ritual of trances, a fundamental element in Balinese culture ("Trance and Dance in Bali" in *Balinese Character: A Photographic Analysis*, 1942).

Source: © Bettmann/CORBIS.

In 1944, Mead and Benedict collaborated to form the Institute for International Studies to analyze contemporary societies from which salient elements could be incorporated into a new world order.

Mead's prolific writings include *And Keep Your Powder Dry: An Anthropologist Looks at America* (1942); *Male and Female: A Study of the Sexes in the Changing World* (1949); *New Lives for Old* (1956); *Culture and Commitment: A Study of the Generation Gap* (1970); and her autobiographical *Blackberry Winter: My Early Years* (1972). Feminism is a recurrent theme throughout her writings. She had a demonstrable sense of adventure and heroism along with a disdain for the passive cultural role of women in the United States. Her focus on women's gender roles in cultures and child rearing spotlighted her as an influential leader of feminism and women's liberation while she defended women's right to develop their talents in humanities and intuition. She became one of the most recognized leaders of the women's movement of the 1960s. Whereas her mentor Benedict was introspective and a role model of feminism through her work, Mead was an extrovert who exhorted women's liberation. She gave more than 100 speeches every year, wrote for *Redbook* magazine, and was unswerving about her opinions.

Of particular interest is Mead's experience with her daughter and only child Mary Catherine, who was born in 1939. Mead insisted on natural childbirth, which she had observed in her field research, and she wanted the birth to be filmed and recorded. She enlisted the cooperation of pediatrician Benjamin Spock, and the event gained national attention. Mary Catherine Bateson Kassarjian became an anthropologist and dean of social sciences at Raza Shah Civar University in Iran.

Mead received many kudos, including election to president of seven professional organizations, for example, the World Federation of Mental Health (1956–1957), the American Anthropological Association (1960), and the American Association for the Advancement of Science (1975). She received UNESCO's Kalinga Prize. She died of pancreatic cancer on November 15, 1978. *Time* Magazine's obituary of Mead was titled "Grandmother to the Global Village."

— *Stewart B. Whitney*

Further Readings

Bateson, M. C. (1984). *With a daughter's eye: A memoir of Margaret Mead and Gregory Bateson.* New York: William Morrow.

Howard, J. (1984). *Margaret Mead: A life.* New York: Simon & Schuster.

Lapsley, H. (1999). *Margaret Mead and Ruth Benedict: The kinship of women.* Amherst: University of Massachusetts Press.

Mead, M., & Metraux, R. B. (1980). *Aspects of the present.* New York: William Morrow.

Rice, E. (1979). *Margaret Mead: A portrait.* New York: Harper & Row.

MARGARET MEAD

Margaret Mead was a cultural anthropologist whose studies advanced ideas about "primitive peoples," human growth, race, and issues of cross-cultural developments. Mead viewed human diversity as a form of social wealth.

Mead was born into a family of social scientists in Philadelphia on December 16, 1901. She studied psychology at Barnard College and eventually earned a doctorate at Columbia University under anthropologists Franz Boas and Ruth Benedict.

In 1925, she went to American Samoa to do fieldwork on the behavior of adolescent Samoan girls. She published a description of her work in *Coming of Age in Samoa.* The book, translated into many languages, became a best-seller.

In *Coming of Age in Samoa,* Mead said that the early stages of human development can be shaped by the culture in which a young person lives. The implications were that young people do not all experience childhood and youth in the same way because culture conditions human biology.

In 1929, Mead went to Manus Island in New Guinea to study the ways in which adult society in New Guinea influenced the development of children. Her work on Manus Island was published as *Growing Up in New Guinea.* The Manus Island work changed the views of many people that

"primitive peoples" were like children. She was the first anthropologist to look at human development in a cross-cultural perspective.

During World War II, Mead was unable to continue her New Guinea research due to the fighting in the area. With Benedict, she founded the Institute for Intercultural Studies. The goal of the institute was to apply anthropological methods to the study of contemporary culture.

In 1953, Mead returned to Manus Island to continue her studies. She reported her work in the book *New Lives for Old,* in which she said that people could choose to work out futures that were different from those that seemed mandated by current social arrangements.

In subsequent fieldwork on the mainland of New Guinea, Mead showed how different societies have different gender roles that are a product of both biology and the local culture. She did similar work on Bali.

Mead published numerous works, including *Science and the Concept of Race* (1968) and *Culture and Commitment: A Study of the Generation Gap* (1970). In 1972, she published *Blackberry Winter: My Early Years,* which is an autobiographical work. In 1977, shortly before she died, she published *Letters From the Field: 1925–1975.*

— Andrew J. Waskey

MUNDUGAMOR

The Mundugamor are a primitive society living in New Guinea. In 1932, the American anthropologist Margaret Mead and her husband, Reo Fortune, set out to study three tribes in New Guinea: the Arapesh, the Mundugamor, and the Tchambuli. The three tribes all lived within a 20-mile radius of one another. However, gender roles were perceived entirely differently in each of the three tribes.

In the Arapesh society, both male and female children were taught to be warm, cooperative, and nurturing. Both men and women exhibited what one would call feminine traits. They believed that men and women were equal, and both were actively involved in raising their children. According to their history, they had always been that way.

Mead and Fortune traveled up the Yuat River to the village of Kinakatem, where the Mundugamor live. The 2½ months that Mead spent with the Mundugamor gave her important evidence to support her conclusions in her well-known book, *Sex and Temperament in Three Primitive Societies.* She found that both the males and females of the Mundugamor tribe exhibited what one would call masculine characteristics. She described both men and women as assertive, violent, individualistic, and volatile. Men and women had different social roles, but their personality characteristics were the same. Mead described the ideal Mundugamor male as "a lion fighting for his share . . . surrounded by several equally violent lionesses." The Mundugamor behaved in a hostile and aggressive manner toward outsiders, their own tribe, and even family members. Mundugamor children were often left to fend for themselves. Mead was alarmed to find that infants of the "wrong" sex were often thrown into the river to die.

The third tribe that Mead studied was the Tchambuli, whose people practiced gender roles opposite to those in American society. The women were dominant, the principal workers, and the sexual aggressors. The men were reported to be irresponsible, vain about their appearance, and dependent on the women.

From her study of these cultures, Mead concluded that gender roles are not the result of a person's sex. She came to the conclusion that gender roles are determined by socialization and learning. Children follow the patterns set by adults of their sex and become like them.

— Pat McCarthy

Medical Genetics

Medical genetics is the study of the interrelationship between human biological variation, including both genetic and environmental sources, and the phenotypic outcomes of health and disease. The field has rapidly moved to the forefront of biomedical research. Its overall goal is the detection and treatment of pathological genetic variation. In the past, medical genetics focused on genetic disorders such as chromosomal and single gene conditions, but increasingly medical geneticists are studying common diseases to which genes contribute significantly such as cancer and cardiovascular disease.

The prospect of preventing many diseases seems attainable today with the sequencing of the human genome and the application of genomic techniques to the characterization of disease-related genetic variation and specific mutations. The ultimate goal is to understand how genes contribute to an individual's susceptibility to disease and the individual's responses to the disease and to treatment. Identifying disease-associated genes, identifying novel molecular and genetic targets for chemotherapeutics, and even correcting defective genes through gene therapy hold tremendous promise in medicine. This promise, however, is feared to be advancing faster than society's ability to cope with the ethical considerations concerning what should be done with genetic information and specifically the genetic profiles for disease. The question lingers about how far society should go in modifying an individual's genetic makeup for any reason.

Eugenic concerns aside, medical genetics has revolutionized modern approaches to understanding and treating disease. Using a multidisciplinary approach to studying disease, the tools of medical genetics, genomics, and anthropology can produce a synthetic picture of a disease never attainable previously.

With the completion of the Human Genome Project, disease-associated genes are being discovered at an astounding rate while, at the same time, ancestral characteristics of populations are being defined at the genetic level. The latter are important in our understanding of the global and regional distribution of diseases among ethnic populations and the evolutionary and other contributors to disease variation among populations, a traditional research area in biological anthropology. Many of the disease-related genes and their inheritance characteristics have been made publicly available through online registries such as the National Center for Biotechnology Information (NCBI) and specifically the Online Mendelian Inheritance in Man (OMIM).

Sickle cell disease is a well-described example of studying a disease-causing gene at the population and individual levels and including the perspective of the environment. The mutation that results in the formation of hemoglobin S rather than the normal hemoglobin A causes a severe disease among individuals who are homozygous for the mutation, whereas the same mutation confers resistance to malaria in heterozygous individuals. Within malaria endemic regions, the mutation is maintained at relatively high rates through balancing selective pressures, that is, through the higher fitness (reproductive output) of heterozygous individuals in comparison with the two homozygous genotypes. Sickle cell disease is important in that it is probably the most completely researched example of natural selection in human populations. It is also a prime example of a genetic polymorphism, where the mutation is maintained in the population by selection. However, in African American and other populations no longer living in areas where malaria is endemic, such that there is no evolutionary advantage to this mutation, the frequency of the mutation is decreasing through relaxed selective pressure as well as admixture with other populations.

With the further discovery of genetic variation and specific mutations in the common diseases such as cancer and heart disease, medical genetics will play a key role in the detection, treatment, and prevention of disease as well as in the general understanding of human health. During the next 20 years or so, we will likely achieve for some of the complex diseases, such as diabetes and hypertension, the level of understanding that we have today about sickle cell disease. Combining information from diverse fields, including anthropology, furthers this understanding, forming a more complete picture of the complex relationships among heredity, environment, and behavior in the development and management of disease.

— Olin Feuerbacher and Francis John Meaney

Further Readings

Jobling, M. A., Hurles, M. E., & Tyler-Smith, C. (2004). *Human evolutionary genetics: Origins, peoples, and disease.* New York: Garland.

Jorde, L. B., Carey, J. C., Bamshad, M. J., & White, R. L. (2005). *Medical genetics.* St. Louis, MO: C. V. Mosby.

Strachan, T., & Read, A. P. (2004). *Human molecular genetics* (3rd ed.). New York: Garland.

Medicine Man

The term *medicine man* is derived from (a) the French Jesuit observance of certain individuals with healing roles among Canadian Indian groups (medicine) or (b) the Inuit *angakoq* or medicine person. The term is usually considered an anachronism in contemporary anthropological literature, with the Siberian Tungus word *shaman* preferred in most cases. However, among contemporary Native Americans, the preference remains to refer to individuals with a healing and sacred function as medicine men/women. The term *medicine* itself is a descriptor of a wide range of psychological, physical, and spiritual knowledge that aids in the restoration of balance and equilibrium within the indigenous worldview.

References to medicine men in the literature often assume the phenomena particular to preliterate small-scale societies. Early documentation of the practices are found in the writings of explorers and missionaries (e.g., Soares de Souza in 1587) and was used to describe healers such as the "medicines" of the Topamambos, *heyoka* (Sioux), False Face Society (Iroquois), *Hataal* (Navajo), *Midewiwin* (Great Lakes), *Waken* (Lakota), and leaders of the Native American Prophetic movements (e.g., Neolin, Handsome Lake, Smohala, Wodziwob, Wavoka) as well as practitioners in Africa, Oceania, and Asia. The distinctive element in all cases was the skill at performing ritual healings to restore cultural and ecological equilibrium to the

particular group. The continued importance and revival of many of these roles in literate postindustrial areas illustrate the cultural depths of the medicine way in spite of efforts by missionaries and governments to eradicate the practices.

Arnold Van Gennep's work on the role of medicine men divided their functions into the realms of religion and society. This is most evident in societies such as the !Kung and the Australian Aborigines, where more than half of the adult males are considered to be medicine men. The role of these medicine men, however, includes trances and altered states of consciousness. Victor Turner's work on religious specialists separates these roles and functions and makes a distinction among priests, shamans (or medicine men), and media. These distinctions can blur, however, from society to society. In addition, as Claude Lévi-Strauss demonstrated, medicine men can be equally adept at healing and at performing witchcraft. A more nuanced view of the medicine role is that suggested by writers such as Gerardo Reichel-Dolmofoff, who view that function as an ecological balance for hunting, fishing, and gathering activities.

The key to understanding the phenomenon of medicine people lies in the worldview of those societies. The world is understood as a holistic entity, with the entire world imbued with spirit. In this animistic view, all of creation has moral agency, and the human is integral to the long-lasting efficacy of all of life. For some groups, such as the Navajo, the power of the human is a unique quality that flows from the holiness of words. Thus, singers (*hataal*) continue the work of creation and balance. In other groups, the medicine people are grouped together in societies so that their combined spirits might bring about the desired effects (e.g., Zuni). In every case, the role of magic is essential, and the notion that the human can influence spirits through words and action is at the heart of being a medicine practitioner. In this way, a medicine man is an expert in techniques of contagious and sympathetic magic.

The term *medicine man* can be misleading in that it implies a gender-specific role. Most cultures that have medicine men also recognize women's ability to minister and heal and to become medicine practitioners. However, many women do not attain full status and recognition until menopause because menstruation is often viewed as a power unto itself.

Medicine men can achieve their position through (a) inheriting the position through blood lines, (b) being called through visions, (c) being recognized by others as being specially gifted, and (d) being self-selected to enter training. In most cases, training is undertaken with a well-established medicine man and can take years before one is recognized as a healer. Much of the training involves learning the legends and myths of the group, rituals and ceremonies, and the animals, plants, herbs, minerals, and so forth that are used in the healings. The public role of the medicine man is to be at service to the whole group, and individuals that attempt to gain prestige, power, or personal wealth are often shunned.

— *Ted Fortier*

Further Readings

Capps, W. H., & Tonsing, E. F. (Eds.). (1976). *Seeing with a native eye: Essays on Native American religion.* New York: Harper & Row.

Davies, W. (2001). *Healing ways: Navajo health care in the twentieth century.* Albuquerque: University of New Mexico Press.

Hall, R. L. (1997). *An archaeology of the soul: North American Indian belief and ritual.* Urbana: University of Illinois Press.

Irwin, L. (Ed.). (2000). *Native American spirituality: A critical reader.* Lincoln: University of Nebraska Press.

Kalweit, H. (1992). *Shamans, healers, and medicine men.* Boston: Shambhala.

Kehoe, A. B. (1989). *The ghost dance: Ethnohistory and revitalization.* New York: Holt, Rinehart & Winston.

Kehoe, A. B. (2000). *Shamans and religion: An anthropological exploration in critical thinking.* Prospect Heights, IL: Waveland.

Lévi-Strauss, C. (1968). *The way of the masks* (S. Modelski, Trans.). Seattle: University of Washington Press.

Steinmetz, P. B. (1990). *Pipe, bible, and peyote among the Oglala Lakota: A study in religious identity.* Knoxville: University of Tennessee Press.

Sullivan, L. E. (Ed.). (1989). *Native American religions: North America.* New York: Macmillan.

MEGANTHROPUS

In 1949, based on the large size of a single mandible, G. H. R. von Koenigswald named a new hominid genus *Meganthropus.* Today there is no agreement

among the authorities concerning the taxonomic status of the mandibular specimens that have been assigned to the genus "*Meganthropus.*" Despite morphological differences related mostly to extreme size, most authorities have assigned these mandibles to a proposed highly sexually dimorphic population of early *Homo erectus* in Java. New evidence of cranial material has made this proposal even more problematic. Sangiran 31 consists of nearly complete left and right parietals, part of the left temporal, and an occipital. It also possesses a double sagittal ridge. The overall morphology of Sangiran 31 is different from that of any known specimen of *H. erectus.* An undescribed specimen, Sangiran 27, consists of a nearly complete but crushed cranium. The palate and dentition are intact and are within the size range found for the *Meganthropus*-type specimen and outside the range of known *H. erectus* specimens. Most classifications place *H. erectus* only in Asia. What was previously referred to as *Homo erectus* in Africa is now referred to as *Homo ergaster* and in Europe is referred to as *Homo heidelbergensis, Homo atapuerca,* and *Homo antecessor.* The specimens that have been placed in *Meganthropus* are morphologically different from the newly named species of *Homo* in Europe and Africa. The *Meganthropus* specimens probably represent a speciation event from *H. erectus* in Java and should be referred to as *Homo meganthropus.*

— *Donald E. Tyler*

See also **Homo erectus; Indonesia; Java Man; Sangiran**

Further Readings

Franzen, J. L. (1985). What is *Pithecanthropus dubius* Koenigswald, 1950? In E. Delson (Ed.), *Ancestors: The hard evidence* (pp. 221–226). New York: Alan R. Liss.

Lewin, R., & Foley, R. A. (2004). *Principles of human evolution.* Victoria, Australia: Blackwell.

Swisher, C. G., Curtis, H., & Lewin, R. (2000). *Java Man: How two geologists' dramatic discoveries changed our understanding of the evolutionary path to modern humans.* New York: Scribner.

Tyler, D. E. (1994). The taxonomic status of "Meganthropus." In J. L. Franzen (Ed.), *100 years of* "Pithecanthropus"*: The Homo erectus problem* (pp. 115–121). Frankfurt, Germany: Courier Forschungsinstitut Seenckenberg.

Von Koenigswald, G. H. R. (1954). "*Pithecanthropus,*" "*Meganthropus,*" and the Australopithecinae. *Nature, 173,* 795–797.

Mehan, Hugh

A sociologist by training, Hugh ("Bud") Mehan has made important contributions to the anthropology of schooling, particularly with regard to language use and the construction of students' academic identities. He has published on topics as diverse as the scaling up of school reform, the pedagogical use of computers, and the discourse of the nuclear arms race, but he is best known for his critical analyses of ability grouping ("tracking"), whereby schools segregate students on the basis of their (supposedly innate) academic talent. As director of the Center for Research on Educational Equity, Access, and Teaching Excellence (CREATE) at the University of California, San Diego, he has applied his research findings to improving the education of underserved groups through initiatives in teacher education and university partnerships with K–12 schools.

A substantial amount of educational research has been dedicated to evaluating the effectiveness of tracking and devising appropriate pedagogies for variously tracked students, but relatively little has questioned the processes by which students are assigned to the academic categories that effectively define their futures. During the latter half of the 20th century, anthropologists and other social critics began to question the institutional practices that relegated disproportionate numbers of African American, immigrant, and low-income students to lower academic tracks. Ethnographic studies revealed that low-tracked students also tended to receive a lower quality of instruction, with fewer opportunities for academic and intellectual development and little chance of mobility within the academic hierarchy. Rather than taking academic evaluations of students' intellectual abilities at face value, Mehan and other scholars sought alternative explanations for the ethnic and

economic stratification that is manifest in the distribution of "ability groups."

While numerous critics of tracking have cited possible cultural bias in academic testing, Mehan focused on the school's construction of academic identities, such as "the competent student," "the learning-disabled student," and "the genius," and examined the institutional processes by which various educational actors (e.g., teachers, parents, counselors, administrators) collectively assign academic identities and future trajectories to individual students.

As a remedy for the social and educational inequities perpetuated by tracking, Mehan and his colleagues proposed "untracking," that is, providing all students with the same academically demanding curriculum while giving underserved students the institutional scaffolding and support they need to navigate the school's "hidden curriculum." Mehan argues that by intellectually challenging all students and engaging them in critical reflection on their own schooling, previously marginalized students can transition to college successfully without sacrificing their cultural identities. Employing techniques of ethnography, ethnomethodology, and discourse analysis, he has analyzed educational practice in terms of cultural representations. However, his work is not limited to theoretical formulations of identity construction. Rather, he engages the practical consequences of both tracking and untracking for students' educational careers.

Mehan's work on large-scale school reform, although broader in scope than his fine-grained classroom studies, shares the same concern for applying the theoretical insights of anthropology to the concrete goal of improving students' life chances. His analysis of the discourse of the nuclear arms race likewise manifests his commitment to social justice and the critical deconstruction of "official" representations of society.

Mehan is a member of the National Academy of Education and the recipient of various teaching awards. He has served on the executive council of the American Anthropological Association and as vice president and president of the Council on Anthropology and Education as well as on the editorial boards of numerous journals on language use and educational research, including the *Anthropology and Educational Quarterly.*

— *Aurolyn Luykx*

Further Readings

Mehan, H. (1993). Beneath the skin and between the ears: A case study in the politics of representation. In S. Chaiklin & J. Lave (Eds.), *Understanding practice: Perspectives on activity and context* (pp. 241–268). Cambridge, UK: Cambridge University Press. (Reprinted in A. U. L. Bradley et al. (Eds.). (2000). *Schooling the symbolic animal.* Boulder, CO: Rowman & Littlefield)

Mehan, H., Hertweck, A., & Meihls, J. L. (1986). *Handicapping the handicapped: Decision making in students' educational careers.* Stanford, CA: Stanford University Press.

Mehan, H., Villanueva, I., Hubbard, L., & Lintz, A. (1996). *Constructing school success: The consequences of placing low achieving students in high track classes.* Cambridge, UK: Cambridge University Press.

Melanin

Throughout antiquity, skin coloration has had a tremendous impact on humanity, causing various health effects along with discrimination and racism of ethnic groups. Melanin is a pigment that has been naturally selected to help humans adapt to different geographical regions and selective pressures. Variations in skin coloration, the amount of melanin in the skin, are related to the amount of ultraviolet (UV) radiation and nutrient synthesis in the body. A common misconception is that differences in skin pigmentation have a biological basis in distinguishing among "races." Today, we now understand that with a high correlation between latitude and UV levels, most variations in skin coloration are due to differences among geographical regions.

Evolution of Skin Coloration

Many anthropologists believe that the earliest hominids were covered in dark black hair with low or unpigmented underlying skin. Various models have been produced to show human evolution and the adaptations that favor increased levels of melanin in the skin. During the transitional period, it was thought that the need for thermoregulation led to a decrease in body hair and a subsequent increase in

sweat glands. Because the brain is heat sensitive, these mechanisms allowed for increased activity in growth. In response to a decrease in hair covering, the body adapted by increasing melanin production in the skin to protect against the harmful UV radiation. Throughout human evolution, skin pigmentation has continuously varied and adapted depending on the selective pressures. As a result, skin pigmentation cannot be used to track or determine evolutionary development of humans today.

Melanin Production

Melanin is a pigment that helps to determine skin, hair, and eye color. It is also found in the medulla, the zona reticularis of the adrenal gland, the inner ear, and the substantia nigra of the brain. The production of melanin depends on the enzyme tyrosinase that converts the amino acid (building block of protein) tyrosine into dopaquinone. The dopaquinone molecule is then transformed into a variety of colored pigments. It is the Golgi organelles of the melanocytes that package melanin into vesicles called melanosomes. These vesicles are then shipped into the cell processes (extensions) of the melanocyte, where the processes are ingested by keratinocytes (cells of the epidermis that produce keratin). Thus, the melanin has been transferred from the melanocytes into the keratinocytes of the epidermis (outermost) layer of the skin.

There are a few different types of melanin in the human body. Eumelanin is the most abundant type and is found in skin and hair. Pheomelanin is less common but is responsible for the reddish tone in red hair and is also found in skin. Lastly, neuromelanin is found in the substantia nigra region of the brain and is a dopamine by-product.

Genetic Polymorphism and Natural Selection

Skin pigmentation is one of the most variable human characteristics; however, little is known about its genetic and evolutionary paths. Skin color is a polygenic trait that is controlled by the interaction of multiple genes on different locations of chromosomes (strands of DNA that carry genetic information). The large variations of skin pigmentation among different populations are most likely due to natural selection. Depending on the geographical region, different selective pressures, such as vitamin D synthesis, nutrient breakdown, and photoprotection from UV radiation, would change the amount of melanin produced in the body. Researchers have found that although decreased melanin levels have increased risk for skin cancer, most cases do not take effect until later in life and seldom cause death; thus, they have less of an influence on reproductive success.

Melanin and UV Radiation

In the skin, melanin functions as a filter for UV radiation by means of absorbing and scattering the electromagnetic radiation produced by the sun. The amount of protection is dependent on the amount of UV radiation that is able to pass through the earth's atmosphere (e.g., clouds, ozone, dust particles) to reach the body surface along with the location and density of melanin in the skin. Thus, deeply melanized skin provides protection against UV radiation, which is the primary cause of skin cancer. With ultraviolet-B (UVB) radiation causing sunburns that damage sweat glands, immediate negative effects on thermoregulation occur. Thus, the high density of melanin in darker skin is able to provide enhanced photoprotection along with more efficient recovery from growth inhibitory effects of UVB exposure. In addition, melanin has the free radical ability to absorb any carcinogenic or toxic compounds produced by photochemical reactions.

One of the benefits of UV radiation is its involvement in the synthesis of vitamin D. Because vitamin D is necessary for uptake of calcium and phosphate minerals from the intestines, it is vital for normal bone metabolism and skeletal growth along with nerve and muscle functioning. So long as humans are exposed to sufficient sunlight, UV photons are able to synthesize pre-vitamin D that is subsequently transformed into vitamin D at body temperature. Melanin has the ability to block the absorption of UV light that is needed to make vitamin D. Lighter skinned humans with low to moderate levels of melanin in their skin absorb more UV light; thus, they are able to synthesize more vitamin D. These individuals are at higher risk for developing skin cancer, especially when residing in areas of high UV radiation such as near the equator. On the other hand, there are also people who live in northern regions with low annual UV exposure. These individuals are at risk for having a vitamin D deficiency and must make sure that they compensate by ingesting enough vitamin D in their diets to be absorbed by their intestines. A deficiency

of this vitamin may cause bone disorders such as rickets (bowed bones and inflamed joints), osteomalacia (softening of bones), and osteoporosis (reduction in quantity of bone tissue). These may lead to immobilization, bone deformities, or even death.

Another molecule that is affected by UV light is folate. The photosensitivity of the folate molecule leads to complications because it is readily degraded by UV light. Folate is produced in the body from folic acid, an essential nutrient involved in nucleotide (building blocks of DNA and RNA) formation, and has been found to play crucial roles in red blood cell and bone marrow development. Defective and deficient folate levels have been linked to spermatogenesis (production of sperm) and various neural tube defects during embryo development. Thus, to inhibit the breakdown of folate, humans have adapted by increasing melanin formation in the skin to enhance reproductive success.

Within the eye, the color of the iris varies among humans and is dependent on the amount of brown or black pigment and the scattering of light caused by the tissue of the iris. For example, in some forms of albinism, the pupil appears to be red because there is no melanin pigment to absorb light, thereby causing the light to reflect off the blood vessels in the back of the eye. Furthermore, similar to the reason why the sky is blue and not black as in outer space, blue-eyed individuals are due to light scattering off the iris tissue.

Melanin also determines hair color. Near the base of the hair follicle, the bulb matrix contains melanocytes that produce and transfer melanin to keratinocytes in the outer portion of the hair follicle. Depending on the type of melanin and the amount of brown, black, and red pigment, various shades of hair color can be produced.

Skin Coloration

Skin color is determined by a number of factors, including genetic makeup, hormone levels, carotene levels, and amount of sun exposure. Depending on the location of pigments and the amount of sunlight reaching the human skin, absorbed UV light not only darkens melanin pigments but also stimulates melanin production.

In addition, the reddish tone that is often visible when a human blushes or is angry is caused by an increase in blood flow through the skin, whereas a pale color in the skin is evident from decreased blood flow that occurs during a heart attack. Furthermore, cyanosis or decreased oxygen blood levels cause a dark bluish or purplish coloration of the skin.

During pregnancy, melanin production is affected by the hormones estrogen and melanocyte-stimulating hormone (MSH). The MSH is able to darken the skin by binding to receptors on melanocytes to stimulate melanin production. This is the reason for the darkening of the nipples, areolae (bumpy region surrounding the nipple), and genitalia.

Lastly, a yellow pigment called carotene is a good source of vitamin A and can be found in plants such as carrots. Because carotene is a fat-soluble compound, excess amounts accumulate in the epidermis and fat cells, causing the skin to develop a yellowish color.

Diseases and Complications

Some people inherit specific genes that cause them to be unable to produce tyrosinase, a necessary enzyme for melanin production. This condition, known as albinism, causes little or no production of melanin pigment in these people's eyes, skin, and hair. Aside from risk of isolation and vision problems, so long as sun-protective methods are used, albinos live normal life spans. This is clearly visible when looking at the Hopi Indian tribe. It has been suggested that the extremely high rate of albinism in this tribe, 1 in 200 people, is due to a mating advantage that is favorable and selected for "culturally." Albinism is a recessive trait that occurs in 1 in 17,000 people in the United States. Other diseases, such as Addison's, cause increased pigmentation by increasing the secretion of adrenocorticotropic hormone and MSH.

Because skin cancer is the most common of all cancers, awareness of skin protection methods has become extremely important. The majority of cases with skin cancer are attributed to UV radiation from the sun. Thus, the people with the highest risk are those who are fair-skinned and live in areas of the world where high amounts of UV radiation penetrate the earth.

The most frequent type of skin cancer is basal cell carcinoma. Fortunately, this type rarely metastasizes (spreads to other areas of the body) and can be cured by radiation or removal. Squamous cell carcinoma is more life threatening because it may metastasize, but it usually remains a localized keratinized tumor (a swelling or growth) in the epidermis. Last, although

malignant melanoma is a less common form of skin cancer, it often arises from melanocytes that are within moles and may become life threatening. Although higher melanin skin levels lower the risk of skin cancer, they still occur in all skin colors around the world. The most effective means of preventing sunburn and skin cancer is by limiting sun exposure and using effective sunscreens that block both UVA and UVB radiation.

The fields of medicine and anthropology have made great strides toward uncovering our evolutionary past. Melanin plays a vital role, whether directly or indirectly, in human health, history, and evolution. Depending on the particular geographical region, selective pressures have allowed humans to adapt so as to enhance their reproductive success. With technological improvements, the scientific world will continue to make discoveries to improve our understanding of melanin and its effects on the human body. For example, recent studies have shown correlations between multiple sclerosis and skin pigmentation. Further research will enable our health care system to have a better understanding of factors affecting these diseases that will enable improved preventive measures and more effective treatments. With increased knowledge, dedication, and opportunity, new cures for these diseases and cancers might develop in the near future.

— *Joshua M. Zavitz*

Further Readings

Constantinescu, C. S. (1995). Melanin, melatonin, melanocyte-stimulating hormone, and the susceptibility to autoimmune demyelination: A rationale for light therapy in multiple sclerosis. *Medical Hypotheses, 45,* 455–458.

Hedrick, P. (2003). Hopi Indians, "cultural" selection, and albinism. *American Journal of Physical Anthropology, 121,* 151–156.

Jablonski, N. G., & Chaplin, G. (2000). The evolution of human skin coloration. *Journal of Human Evolution, 39,* 57–106.

Moon, S. J., Fryer, A. A., & Strange, R. C. (2005). Ultraviolet radiation: Effects on risks of prostate cancer and other internal cancers. *Mutation Research, 571,* 207–219.

Parra, E. J., Kittles, R. A., & Shriver, M. D. (2004). Implications of correlations between skin color and genetic ancestry for biomedical research. *Nature Genetics, 36,* S54–S60.

Saladi, R. N., & Persaud, A. N. (2005). The causes of skin cancer: A comprehensive review. *Drugs Today, 41,* 37–53.

Seeley, R. R., Stephens, T. D., & Tate, P. (in press). *Anatomy and physiology* (7th ed.). New York: McGraw–Hill.

Memes

Memes are items that evolve in an evolutionary process covering the social and cultural domain only. They are sociocultural analogues to genes or viruses.

The idea of a cultural item that evolves the same way as biological entities do goes back at least to Herbert Spencer. The notion that culture is passed on like a disease also goes back to the same period. But both metaphors have usually been treated as just that—suggestive similes of no serious import. The first person to take the evolutionary idea seriously was zoologist Richard Semon, a student of Ernst Haeckel, in his 1904 book *Die Mneme* (published in English as *The Mneme* in 1924). Semon's mneme idea was not limited to culture; it also included any impression left on an organism by external factors (*Engramm*), that is, acquired inheritance.

The differentiation of cultural evolution from biological evolution appeared in 1965 in the work of Donald T. Campbell, who influenced Karl Popper to develop an evolutionary epistemology in 1972, and in various other authors, including Julian Huxley in 1957 and Stephen Toulmin in 1972. In 1981, C. J. Lumsden and E. O. Wilson and proposed the notion of a "culturgen" (culture–gene) as the target of evolution in culture. A number of other "dual inheritance" models of culture have been proposed. But the modern fascination with the idea of a meme derives mainly from the writings of the theorist who coined the term, Richard Dawkins.

Dawkins developed a generalized theory of evolutionary processes independent of the physical substrate in which they were realized and termed it *universal Darwinism.* The relevant entities of all evolutionary processes included what Dawkins called a replicator, an entity that copies itself according to three criteria,

namely that it is fecund, it is high fidelity, and it is long-lived. "Longevity, fecundity, and fidelity" is the slogan of this new revolution. Dawkins's view of evolution has come to be known as the gene's eye view.

Replicators in biology are DNA based, Dawkins said. But in cultural evolution, they are something else—*memes,* a term coined to be similar to *gene,* with which it was grouped as a replicator. Dawkins used two analogies for memes. One was that memes, like genes, are the things that evolve, setting up a problem as to the contents of memes. The other was that memes are mobile hereditary elements like viruses, taking over the resources of a host brain the same way as a virus subverts the cellular machinery of its hosts to replicate.

Advocates of the memes-as-germs approach, as one might call it, tend to focus on the epidemiological aspect of culture. In this regard, this approach is closely allied to the anthropological conception of diffusion. Advocates of the memes-as-genes approach, on the contrary, focus on the selectionist aspects of memes, their fitness, and so forth. There are strong advocates and critics of both approaches.

Because the notion of a meme is tied into the universal Darwinism of Dawkins, and the consequent ontology of phenotype analogues (*vehicles* in Dawkins's terms, *interactors* in Hull's terms), two questions that have engendered considerable debate arise. First, what is a meme? Second, what is the phenotype of a meme? Answers have included that memes are neural structures or activated neural constellations and that they are artifacts, behaviors, or the subject of selection pressures in cultural transmission. Examples have included dress practices, snatches of tunes, phrases, pottery styles, and architectural styles. But it remains unclear whether these are the things that replicate or the things that express what is replicated. Some hold that memes are the physical things that are recreated, the practices, or the artifacts. Others hold them to be the ideas or symbolic representations that are passed on and that cause the external behaviors and products of behavior. In short, in the former view, memes are concrete things that get reproduced; in the latter view, memes are abstract things that result in concrete phenotypic behaviors and products. A "multilevel selection" approach, as may be found in modern biological accounts, applied to memes suggests that memes, as selective targets, may be replicators at any level of the hierarchy of the evolutionary domain, and so memes may be both within heads and between them.

A further consideration is whether cultural evolution needs to be strongly selectionist. This reflects in part the motivations of those who find memes interesting because selection is such a powerful explanation of complex dynamic systems—a "universal acid," as Dennett described it in 1995—and also the traditional conflation between Darwinism and natural selection. Strongly selectionist processes run the risk, in a fitness landscape that is not smooth, of being "marooned" on a lower than optimal fitness peak. In cases where culture is regarded to have made considerable progress or to have become especially well adapted, strong selectionist accounts ironically cannot account for this on realistic assumptions about fitness landscapes. A good example is in science, which David Hull analyzed as a memetic evolutionary process in 1988 in the most detailed study to date. Strong selectionism cannot explain why a science progresses if the entire discipline is regarded as a single deme.

Another issue is what counts as the selective regime or environment of a meme. Some, such as Susan Blackmore, think that human brains are the selective environment and that memes take over the behavior of the host the same way as some parasites control the behavior of their biological hosts. In fact, Blackmore, in her 1999 book, maintained that there is no "ego" apart from the controlling memes. Others hold that the society is the ecology, and that the culture is the ecological relations within it, in an analogy between ecosystems and ecotypical trophic webs. A consensual resolution on these issues has not yet been reached.

— *John S. Wilkins*

Further Readings

Blackmore, S. J. (1999). *The meme machine.* Oxford, UK: Oxford University Press.

Campbell, D. T. (1965). Variation and selective retention in socio-cultural evolution. In H. R. Barringer, G. I. Blanksten, & R. W. Mack (Eds.), *Social change in developing areas: A reinterpretation of evolutionary theory* (pp. 19–49). Cambridge, MA: Schenkman.

Dawkins, R. (1976). *The selfish gene.* New York: Oxford University Press.

Dawkins, R. (1982a). *The extended phenotype: The gene as the unit of selection.* San Francisco: Freeman.

Dawkins, R. (1982b). Replicators and vehicles. In King's College Sociobiology Group (Eds.), *Current problems in sociobiology* (pp. 45–64). Cambridge, UK: Cambridge University Press.
Dawkins, R. (1983). *The extended phenotype: The long reach of the gene.* Oxford, UK: Oxford University Press.
Dennett, D. C. (1995). *Darwin's dangerous idea: Evolution and the meanings of life.* New York: Simon & Schuster.
Huxley, J. (1957). *New bottles for new wine: Essays.* London: Chatto & Windus.
Lumsden, C. J., & Wilson, E. O. (1981). *Genes, mind, and culture: The coevolutionary process.* Cambridge, MA: Harvard University Press.
Popper, K. R. (1972). *Objective knowledge: An evolutionary approach.* Oxford, UK: Clarendon.
Toulmin, S. (1972). *Human understanding.* Cambridge, UK: Cambridge University Press.

Mesolithic Cultures

The Mesolithic epoch, or the "middle stone age," nowadays is interpreted as a Holocene stage of hunter-gatherer society development. Two opposing interpretations of historical status of the Mesolithic epoch have competed in archaeological science during the past century. Many researchers regard the Mesolithic as an important phase of human history and as a specific archaeological epoch characterized by a set of features in tool production, livelihood, economy, social organization, art, ideology, and so forth. Another group of Early Holocene settlement investigators regard the Mesolithic as a period of transition from a society of Pleistocene hunter-gatherers to mid-Holocene communities of early farmers and cattle breeders.

Although the term *Mesolithic* had been proposed as early as 1874 by M. Torell, the taxonomic importance and historical essence of this period is discussed in contemporary archaeology. The term *Epipaleolithic* is often applied to this period by those scientists who believe that no principal changes in culture had occurred since the 17 million BC, that is, since the beginning of deglaciation. Another group of archaeologists prefers to use the term *nonceramic* or *preceramic Neolithic,* thereby stressing that the process of productive economy formation had already begun by the beginning of the Holocene. In the course of the discussion about the historical status of the Mesolithic period and about the most suitable term for it, a series of criteria for the Mesolithic epoch has been put forward.

Mesolithic as Historical Epoch: Diversity of Criteria

Technological Criteria

The most striking features of the Mesolithic flint industry were as follows:

- Extreme microlithization of tools, blades, flakes, nuclei, and debitage
- Substantial decrease of percentage of artifacts with traces of secondary processing (e.g., retouch, truncation, chipping) and intensive use of chips (mostly prismatic microblades and blades) without further processing
- Absolute domination of the insert-based tool production technique that actively applied inserts of geometric forms (e.g., trapezes, triangles, segments), opening the possibility of reuse and interchangeability of artifacts in different sorts of activity (e.g., hunting, butchering, gathering, tool making, clothes making, house building, household activities)
- Macrolithic forms (e.g., axes, tranchetes, adres, bits) in wide distribution in boreal territories all over the world

Climatic Criteria

Traditionally, the Mesolithic is correlated with transition from the glacial period (Pleistocene) to the postglacial period (Holocene). Climate global changes were accompanied by transformation of fauna (replacement of big gregarious animals by small nongregarious species) and flora that resulted in formation of contemporary kinds and types of geographic landscapes and zones. Such transformation of natural habitat had caused reformation of the human mode of life and way of cultural adaptation.

Economic Criteria

Differential development of various spheres of a hunter-gatherers economy in direct connection with peculiarities of a local environment was displayed strikingly during the Mesolithic times. At the same

time, it was not only an epoch of nonspecialized hunting of nongregarious animals but also a period when the necessary background for the transition to a productive economy had been formed. In some regions, one can trace the existence of its first developed forms (mainly Fertile Crescent mainly). In others, only specific forms of animal juveniles treating known as "live food supply" and/or simple harvesting were practiced (e.g., Black and Mediterranean Sea region).

Another specific feature of the Mesolithic economy also connected with the necessity to improve the population subsistence base was intensification of the gathering of salt and sweet water mollusks. It is traced to the origin of specific kinds of settlements known as *kokkenmeddings* found in Northern Europe, the British Isles, the Pyrenean peninsula, the Apennines, Crimea, and other seashore areas.

Substantial development of fishing was also connected with the necessity to secure a food supply. It was accompanied by the invention of special means (e.g., wicker nets, fishhooks, rafts, boats) and sometimes provided bases for a rather settled mode of life.

Social criteria include two phenomena traced independently to different parts of the world and different geographic regions:

- Disintegration of numerous communities of the Ice Age and growth of economic importance and social independence of small mobile groups of hunter-gatherers, as reflected in the absolute domination of short-term sites without dwellings and other household construction
- Origin of primitive forms of tribal organization, as reflected in the appearance of collective burials

Other Features

Representatives of different approaches to Mesolithic culture interpretation often mention other features that defined historical specificity of this period. One of the most important among them is the invention of series of means of transport caused by the necessity to secure movement of population groups searching for new foraging territories (e.g., canoes, rafts, skies, sleighs).

The development of an exchange network resulting from the development of transportation means also is regarded as a peculiar characteristic of the Mesolithic.

The wide distribution of stone vessels for bone overcooking and for preparation of herbal tea and decoction, and possibly also meat stock, is traced to most regions of Europe. Such a practice was aimed at efficiency of food procurement maximization by extreme use of products.

Sometimes the origin of Borean (Nostratic) language unity is mentioned. Its further development is traced to the origin of ancestors of Indo-European, Ural, and Semitic languages.

Extreme rock art schematization reflected general symbolization of the outer world, and abstraction of mental activity of hunter-gatherers could be regarded as another Mesolithic culture feature.

Periodization and Chronological Frameworks of the Mesolithic

Two kinds of the Mesolithic periodization are usually used in contemporary archaeology. One of them divides the Mesolithic into two stages:

- Early stage (10,300–8,200 years BP)
- Late stage (8,200–7,000 years BP)

During the first half of the 20th century, these stages were called Azilian and Tardenoisian, respectively. Nowadays, such names are applied to local cultures distributed on the territory of contemporary France and neighboring regions.

During the past decade, one could trace the growth in popularity of the ecological approach of the Mesolithic interpretation and, as a result, a shift toward a preference for another variant of the Mesolithic period, according to which Holocene climatic phases correlate with phases of culture development:

- Preboreal phase (10,300–9,700 years BP)
- Boreal phase (9,700–8,200 years BP)
- Atlantic phase (8,200–7,000 years BP)

At the same time, it needs to be stressed that a series of Mesolithic settlements, in their flint knapping technology sites, are dated by final stages of final glacial times. The earliest examples are correlated with Allerod warming (13 million years BP), and many Dryas III settlements in the southern part of Eastern and Western Europe are interpreted as Mesolithic ones. On the other hand, a series of dates

obtained for Mesolithic sites in the Boreal zone of Northern Europe are dated less than 7 million years BP.

The best explanation of such variability of Mesolithic period dating in different geographical zones was proposed by proponents of an ecological version of the Mesolithic interpretation. According to this version, the Mesolithic is regarded as an objective and reasonable response of hunter-gatherer societies to climatic and landscape changes that occurred as a result of the last deglaciation. So far as this process fit geographic regularities, it began at southern regions much earlier than at northern territories and caused further nonsynchronicity of the Mesolithic culture's existence in different latitudes. Landscape capacity to satisfy subsistence needs of hunter-gatherers defined the upper chronological frame of the Mesolithic. Inhabitants of southern regions, whose source base was explored extensively, and often nonrationally, for a long period of time, needed to transform their culture earlier than did populations of newly settled northern territories.

Local Diversity of Mesolithic Cultures

Although the Mesolithic is characterized by general features, their peculiar displays and relative importance in different regions can vary greatly.

The southern regions of Western and Eastern Europe give us brilliant examples of flint knapping technique improvements and standardization in the genre of prismatic chipping, artifact micritization, reduction of chip secondary treatment, and domination of the insert (often of geometric forms) technique of tool making. In these regions are scarce complex settlements (except those in caves) and an absolute predominance of short-term sites without dwellings, and household objects testify to a highly mobile mode of life and a high grade of dispersion of Mesolithic population specializing in small group or individual hunting of nongregarious game (e.g., red deer, auroch, wild boar) and birds.

The northern territories of Europe illustrate a Boreal variant of the Mesolithic culture connected with a wide distribution of fishing practices and gathering of plants, nuts, mollusks, and the like. Special types of settlements on platforms and so-called kokkenmeddings reflect peculiarities of such a subsistence system caused by natural habitat features. Elk and red deer are represented among hunting species, and their importance in human life is also reflected in objects of portable art. Tool kits contain many tools for wood processing as well as many wooden and bone artifacts. Mollusk shells and fish carcasses also were used in household activities.

The Middle East displays a very different mode of Mesolithic cultures development based on the origin of early farming and cattle breeding as early as 11,000 years BP. The introduction of wheat, barley, and rye, as well as the domestication of sheep, goats, cows, and pigs, took place here. The creation of complex settlements with mono- and multicameral rectangular and circular dwellings on stone foundations and weaved walls covered by clay was inherent to early agriculturists of the Fertile Crescent. A lot of so-called "luxurious" (or simply rare) artifacts made of steatite, volcanic glass, marble, porphyry, resin, and the like have been found at such settlements. They were imported from remote northern and southern territories and indicated a high level of exchange system development.

In North America, after the last glaciation (post-Wisconsin time or Early Holocene), transformation of local culture was not connected with migrations from Asia for the first time in the history of American populations. The origin of the Plano culture, based on specialized hunting of bison, is regarded as an inner process caused by previous phases of culture development in a transformed postglacial landscape. During the Mesolithic, all places suitable for human life near big river flows and in foothills were inhabited. This resulted from the necessity of permanent changes of settlement places in search of game. Hunting weapons were based on a specific kind of grooved inserts called "plano points" and testify to a high level of tool production development. Wide possibilities of social culture, daily life, and ideology of Mesolithic populations of North America are opened by ethnographic analogies based on interdisciplinary studies of Indian populations.

— Olena V. Smyntyna

Further Readings

Bar-Yosef, O. (1980) Prehistory of the Levant. *Annual Review of Anthropology, 9,* 101–133.

Braidwood, R. J. (1962). *Courses toward urban life.* New York: Academic Press.

Dolukhanov, P. M., Kozlowski, S. K., & Kozlowski, J. K. (1980). *Multivariate analysis of Upper Palaeolithic*

and Mesolithic stone assemblages. Warsaw-Kraków, Poland: Panstwowe wydawnictwo naukowe.
Fischer, A. (Ed.). (1995). *Man and sea in the Mesolithic.* Oxford, UK: Oxbow Books.
Frison, G. C. (1978). *Prehistoric hunters of the High Plains.* New York: Academic Press.
Mellaart, J. (1967). *The earliest settlements in Western Asia.* Cambridge, UK: Cambridge University Press.
Sanders, W. T., & Marino, J. (1970). *New World prehistory.* New York: Academic Press.
Smyntyna, O. V. (2001). *Zonalnist rannyopervisnuch cultur: Doslidjennya, facty, hipotezy* [Zonal features of Early Prehistoric cultures: Investigations, facts, hypothesis]. Odessa, Ukraine: Astroprint.
Vermeersch, P. M., & Van Peer, P. (Eds.). (1990). *The Mesolithic in Europe.* Edinburgh, UK: John Donald.
Wedel, W. R. (1961). *Prehistoric man of the Great Plains.* Norman: Oklahoma University Press.

Mesopotamian Civilization

Mesopotamia is the ancient land between the Tigris and Euphrates rivers. It covers modern day Iraq and parts of Iran, Turkey, Syria, Lebanon, and Israel. Mesopotamian civilizations were the first in history to exist in well-populated and fixed settlements. As settlements became larger and more organized, they progressed politically and socially into city-states. They developed irrigation methods and invented the wheel and the plow. After they developed the first written language, economic transactions and legal codes were kept. Mesopotamian literature was recorded. Great architectural structures were built. In time, empires, kings, and innovative military establishments emerged. These advancements, along with scientific, mathematical, and communal ceremonies, are the legacies of the great Mesopotamian civilizations.

Mesopotamia was the heartland of emerging nations and empires that would control the Near East for centuries. Mesopotamia is a general name for a number of diverse ethnic groups that contributed to the culture of the region. The most well-known Mesopotamian civilizations include the Sumerians, Babylonians, and Assyrians. Other cultural groups may have been key players on the Mesopotamian stage, but none was as influential as these groups.

The Sumerians captured the region beginning in the Early Dynastic period (ca. 2900 BC) and ending with the Third Dynasty of Ur (ca. 2004 BC). Over these years, Sumerians developed the first writing system and created epic literature. They invented the wheel, the plow, and the earliest known irrigation methods, enabling an otherwise unstable agricultural environment to prosper as Sumerian settlements grew into the world's first political city-states. Under an Akkadian Empire (ca. 2334–2193 BC), this land of independent city-states consumed the entire Mesopotamian.

Babylon was located in the southern part of modern Iraq, between Baghdad and the Persian Gulf. At its cultural height (1900 BC to 1595 BC), the Babylonian civilization unified its Mesopotamia region. Many adored Babylonian civilization because it was a melting pot of many ethnic groups. Even the emperors and barbarians who battled for control of Babylon preferred assimilation into its dynamic cultural heritage.

Assur lay to the north in the Upper Tigris Valley and around the ancient city of Nineveh. Assyrians were a fierce cultural group, and the Assyrian empire reigned during a time of intense warfare. Assyrian control constantly expanded and receded in its quest for complete domination of Mesopotamia. At one time, the empire had expanded from Egypt, far to the east, to Iran in the west. At another time, Assyrian control receded to near extinction. The civilization reached its zenith from 910 BC to circa 610 BC but would eventually fall to a renewed Babylonian military.

Mesopotamia Begins in Sumer

The first inhabitants of this Mesopotamian region settled in a broad range of foothills that surrounded the Mesopotamian plains known as the Fertile Crescent. The region ran from central Palestine, north to Syria and eastern Asia Minor, and extending eastward to northern Iraq and Iran. During the historic periods known as the Mesolithic and Neolithic periods (ca. 9000–5800 BC), the people of the Fertile Crescent began to abandon a lifestyle where hunting and food gathering prevailed and entered a period of food production. They settled into farming and herding communities. As they became skilled in animal husbandry and farming, they were able to produce more food and the population in this region soared.

Although the villages in the Fertile Crescent became more sophisticated and sedentary, the people migrated southward, into the Mesopotamian Plains, between 6000 and 5000 BC. Some families and clans may have migrated to escape excessive population and overcrowding. Others may have left due to social or political discontent. Still other evidence suggests that a great flood may have wiped out the shores surrounding the Black Sea and that many settlers may have been refugees of this huge natural disaster.

The earliest Mesopotamians existed in a variable climate with a geography that included deserts, mountains, and river plains. Although northern Mesopotamia had adequate rainfall for successful agriculture, the remaining regions required irrigation and skilled control of the Tigris and Euphrates rivers. Southern Mesopotamian settlements may have begun using irrigation principles as early as 5000 BC. Their ability to irrigate allowed growth in settlement populations, which then created a need for organized communal work and complex hierarchical social structures.

During these years, an immigrant group of settlers known as the Sumerians settled into the Mesopotamian region. Sumerians were a very influential culture. Future peoples in this region preserved aspects of the Sumerian political and social customs as well as Sumerian literature and artistic style. Sumerians created the first wheel and the plow. Their skilled irrigation methods enabled an increase in food production. Sumerians rapidly turned agricultural communities into urban developments as they built the first cities. Sumerians also developed the writing system that enabled nobles and rulers to record economic transactions and legal decrees.

Sumerian city-states were independent of one another, and each was focused on controlling and supporting its farmlands and villages. The earliest city-states developed by the Sumerians were originally organized around a temple and a priesthood governed by an *en* ("high priest"). The en represented the local god and managed the temple lands that the people entrusted to work on them. As societies grew more complex, an *ensi* ("governor") emerged to manage civic affairs such as law and order, commerce, trade, and military efforts. In time, people would select a leader, called a *lugal* ("great man"), to rule during times of war and peril. The lugal managed all civil, military, and religious functions of the city. The office of lugal seemed to emerge at a time when defense walls were first constructed. As war became a constant threat, rulers became kings who would remain in power for their lifetimes, passing rule onto their sons as successors to their thrones. As a state of dynasties took root, kings and royal families emerged.

One of the most elaborate and impressive architectural structures of this time was the *ziggurat,* a multilevel platformed temple of worship. The oldest ziggurat was unearthed in the city-state of Ur. C. Leonard Wooley was the archaeologist who discovered most of what we know about this ancient city. He also uncovered ancient burial tombs that included not only the deceased but also physical possessions and domestic servants. Experts believe that the burial tomb included everything that the Sumerians believed would be needed for a comfortable afterlife.

By the second half of the third millennium, the Semitic-speaking people were a significant element in northern Mesopotamia, also known as Akkad. The most notable kings of the time were Sargon of Akkad and his grandson, Narcum-Sin. They enslaved Sumerian city-states and achieved control of the trade routes from the Persian Gulf to the Mediterranean, achieving for the first time a unified Mesopotamian region. Sumerian culture and cuneiform were retained, but Akkadian tongue became the dominant language in Mesopotamia. The empire of Sargon and his grandson reigned for nearly a century. But the Akkadian empire would then fall, leaving its legacy of imperialistic expansion.

The Third Dynasty of Ur came into power circa 2112 to 2004 BC. This Sumerian dynasty governed most of Mesopotamia and southwestern Iran. Its founder, Ur-Nammu, wrote the oldest known collection of laws, intended to protect the economically and politically weak. As this dynasty fell to pressure from the Amorites, another migration of Semites who originated west of the Euphrates, central imperial control disappeared.

Babylonian Culture

According to scholars, the years following the Third Dynasty of Ur are called the Old Babylonian period (2000–1400 BC). For many years, Mesopotamia was disunited, with independent city-states frequently engaging in disputes and wars with its neighbors. This time of intense conflict was a time of great political opportunity for the most powerful men in Mesopotamia. The most successful leaders to

establish dynasties were Amorites, who spoke Akkadian, and Elamites, who spoke a tongue unrelated to any others in the region. The Akkadian speakers settled a strong state in the city of Assur. When Ur fell to the Elamites, Assyrians became a leading political–military force. In 1813 BC, Shamshi-Adad overthrew Assur and established a new dynasty there. Because Shamshi-Adad's troops were consumed by military expeditions, he avoided attacks on the strong city-state of Babylon that lay southeast of Assur. The attacks Shamshi-Adad did launch were relatively small scale and ceased after his death in 1781 BC. His successor was then squashed by a Babylonian army led by the sixth king of an Amorite dynasty that had established itself circa 1850 BC.

This widely respected and feared king was known as Hammurabi and lived in Babylonia. Hammurabi wrote the most famous laws of the time, known as the Code of Hammurabi, which embraced and proclaimed an "eye for an eye" discipline. Hammurabi also became the first king since Sargon of Akkad to unite the entire Mesopotamia land, stretching from the Persian Gulf to the Syrian border and the Armenian foothills. He was a skilled military leader and conqueror. Under his administration, trade flourished. He attended to domestic and economic issues while promoting literature, the arts, and science.

However, the peaceful times he created diminished shortly after his death in 1750 BC. What followed was a time of military conflict and strikes for the captured territories that wanted to break from Hammurabi's Babylonia. Eventually, the city of Babylonia fell to the Kassite nobles, who took the city in 1400 BC. They were so impressed with the refined culture that they became assimilated into the Babylonian way, abandoning their native tongue for the Akkadian dialect of the Babylonians. In fact, the Kassites stabilized the region for more than four centuries, the longest period in Babylonian history.

Great military innovations developed during the Old Babylonian period. The horse was domesticated. After the wheel was redesigned with spokes instead of a solid surface, horses were harnessed to chariots to enable military attacks en masse. The bow was also redesigned to fly faster and farther. These changes were implemented, and large-scale military action was possible.

Although Mesopotamians were famous for building elaborate palaces, the most impressive palace belonged to King Nebuchadnezzar II of Babylon (604–562 BC). Although no archaeological evidence or other physical remains have ever been found, this palace is said to contain the legendary Hanging Gardens of Babylon, built to please one of Nebuchadnezzar's wives who was homesick for her mountainous Iranian homeland that was lush with foliage.

The Assyrians

In 1365 BC, during a time that some modern scholars call the Middle Assyrian period, the Assyrians launched their first major front in the northwest from the border of Hatti, through Armenia, and to the Zagros Mountains. In a series of small-scale attacks, the Assyrians use their newfound military innovations to take human captives, horses, and other war booty. The Assyrians continued a second major front to seize Babylon and placed it under the rule of a monarch, Tukulti-Ninurta I, who reigned from 1244 to 1208 BC. Although this victory filled the Assyrians with great pride and satisfaction, the great Babylonian nobles would rebel. In 1165, a strong Elamite king would lay permanent claim to the great city.

In the next tactical front, the Assyrians fought relentlessly from Syria to the Mediterranean Sea. In the most amazing gain during this period of empirical expansion, King Tiglathpileser I took control of the Mesopotamian region from the Mediterranean Sea to Babylon. He was assassinated in 1077, and because his successors could not hold together this vast land, in time the Assyrian empire shrank until only Assur and Nineveh remained. It lay dormant until reaching its height during the Neo-Assyrian Empire circa 911 to 612 BC. This was a time when the Assyrian army became a highly skilled machine. Merciless warrior kings launched repeated military campaigns and attained impressive imperialistic growth. Assyrian conquest extended across the Near East and made Nineveh one of the richest cities in the Ancient World.

The greed of the Assyrians would be their demise. Nineveh and the Assyrian control would soon fall to the Babylonians and Medes. At this time, the splendor of the three greatest cultures of Mesopotamian civilizations would become legend. Their great contributions to the time and to world history were a finality. For the next several hundred years, the land would fall to many new tribes, new empires, and other dynasties, but none would be as influential as those of the Sumerians, Babylonians, and Assyrians.

From 539 to 331 BC, Persians saw Aramaic replace the long-standing Akkadian language. In 331 BC, Alexander the Great would take the region and make Babylon the capital of his empire. The Parthians, and then the Sassians, would later rule the land. When Islamic control began in 651 AD, a time and a culture known as ancient Mesopotamia ended.

— *Debra M. Lucas*

Further Readings

Bertman, S. (2003). *Handbook to life in ancient Mesopotamia.* New York: Facts on File.

Bottero, J. (2001). *Everyday life in ancient Mesopotamia.* Baltimore, MD: Johns Hopkins University Press.

Kramer, S. N. (1967). *Cradle of civilization.* New York: Time–Life Books.

Nardo, D. (2004). *Ancient Mesopotamia.* San Diego: Gale Group/Thomson Learning.

Nemet-Nejat, K. R. (1998). *Daily life in ancient Mesopotamia.* Westport, CT: Greenwood.

Postgate, J. N. (1994). *Early Mesopotamia: Society and economy at the dawn of history.* New York: Routledge.

METALLURGY

Metallurgy deals with the study of metals and their ores as well as the processes for extracting, purifying, and alloying metals and production of metal objects. Humans have practiced the use of metals in various forms for nearly 9,000 years, beginning with copper during the eighth millennium BC. Cross-culturally, the processes involved with working metals are often shrouded with superstition and magical beliefs. Although the production of some metals requires sophisticated technology, there is virtually no culture in the world today that does not use at least some metal objects.

Common metals employed throughout the world include copper, silver, gold, lead, iron, tin, zinc, and arsenic. Of these, the first three occur in relatively pure or "native" form, whereas the others occur only in chemical compounds from which they must be extracted before use. Common metallic compounds from which metals are extracted include metallic salts, phosphates, and carbonates. Although some of these compounds exist in surface deposits, most metals and metal ores are mined.

The earliest documented uses of metals occurred in Iran and Anatolia during the eighth millennium BC in the Old World and circa 1500 BC in the Andes Mountains of the New World. In both cases, the first metals used were relatively pure forms of copper mined with stone and antler tools and processed with simple cold hammering techniques.

Later metal workers developed uses for alloys, that is, mixtures of a metal with one or more additional elements, often metals. Alloys are often favored because they offer technical properties that are not present in constituent elements. Common alloys include bronze (copper and either tin or arsenic), brass (copper and zinc), and pewter (tin, copper, antimony, and sometimes lead). Steel, one of the hardest metals, is made from alloying iron with carbon and sometimes other components such as manganese, chromium, and nickel.

The so-called "precious metals"—gold, silver, and platinum—are relatively rare and therefore expensive. Gold and silver especially have a long history of use as jewelry and other ornaments. Although they are obtainable in pure forms, they are often used as alloys to reduce the cost of objects and to create desirable characteristics of hardness and color.

Mines are usually used to extract metal ores from the earth if veins of ore are not available on the surface. However, native gold, called "placer gold," occurs in alluvial deposits and can be collected by panning or washing. In most cultures, mining is considered a relatively undesirable job, even where the potential economic benefits are lucrative. This is due in part to the perceived, and often real, danger of underground mining. In addition to the apparent threats from explosives, heavy equipment, and possible cave-ins of mine shafts, miners face unseen dangers in the form of noxious gasses and airborne compounds, such as silica, that can damage the lungs.

Many cultures also maintain beliefs about supernatural beings that can influence the lives of miners. One such being is the Tio of Andean mines. Tio takes the form of a devil, often red with pointed horns, and inhabits a shrine located within the mine tunnels. Andean miners make offerings of cigarettes, coca leaves, and alcohol to propitiate Tio, who is asked to reciprocate in the form of pure ores of high value.

Traditionally, mining has been carried out by men, but women and children often participate by working mine tailings and panning. When mine work is part of compulsory service, families often accompany male miners to provide food, clothing, and other needs for the miners. Children are sometimes preferred workers in mines because their smaller size makes it easy for them to move around in small mine tunnels and their small fingers are thought to be agile at separating ore from other rocks and debris. In most countries, the use of children's labor in metal extraction is officially discouraged, but small subcontractors often continue to employ their illegal labor.

Smelting involves heating metal ore to a high temperature to remove unwanted material from the ore. To achieve this, the ore must be melted in a ceramic crucible. At high enough temperatures normally achievable only in a closed furnace, the waste material (or *gangue*) will melt out and be left behind as slag. The long hours involved in smelting and the enormous requirements for fuel and air circulation, often by the use of bellows, mean that smelting is usually a group activity. Men are most often directly involved with smelting, but women and children may help to provide fuel to heat the furnace. Perhaps because the purification process happens out of sight, in the heat of the furnace, it has often been associated with ritual and magic. For example, worship of the Yoruba orisha Ogun, the deity of iron, is closely associated with male smelting activities.

Whether as native metal or as alloy, metals may be worked and formed into objects in a variety of ways. Soft metals, such as copper and gold, may be hammered cold, representing the earliest metal working techniques. Smithing uses the heat of a forge or hearth to make metals more pliable so that they can be worked into shape with a hammer and anvil. Blacksmithing, the working of iron and steel, is accompanied by both skill and ritual knowledge that can require long apprenticeships to obtain. This is the case with Japanese master sword makers, who use elaborate techniques of folding, annealing, and tempering to produce blades that are strong, flexible, and beautiful. Casting involves the heating of metal to a liquid state and pouring it into a mold. Bronze, one of the first metals to be cast, was so widely spread in the Old World that the periods characterized by its appearance are referred to as the Bronze Age. Metals may also be cut or ground to produce desired shapes.

The use of metals in pure or alloyed form varies among cultures and depends in part on available technology and intended uses. Common uses for metals include tools, weapons, personal adornment, coinage, art, and symbols of state (e.g., medals, crowns, scepters).

— Jo Ellen Burkholder

Further Readings

Allan, J. (2005). *Persian steel: Masterpieces of Iranian art.* London: I. B. Tarus.

Bisson, M. S., De Barros, P., Holl, A. F. C., & Childs, S. T. (2000). *Ancient African metallurgy: The sociocultural context.* Walnut Creek, CA: AltaMira.

Finn, J. L. (1998). *Tracing the veins: Copper, culture, and community from Butte to Chuquicamata.* Berkeley: University of California Press.

Trevelyan, A. M. (2003). *Miskwabik, metal of ritual: Metallurgy in precontact eastern North America.* Lexington: University Press of Kentucky.

Yener, K. A. (2000). *Domestication of metals: The rise of complex metal industries in Anatolia.* Boston: Brill Academic.

Mexico

Mexico ranks among the world's most important locations of anthropologists and anthropological research. It was a center of crop domestication and village settlement and one of the few sites of primary state formation. It witnessed a rich and varied history of complex societies, including writing, urbanization, and class hierarchies. Study of the Spanish conquest and colonial transformations has provided crucial understandings of how apparently "local" peasant communities and other social formations form part of world capitalism. Much anthropological work on power and inequality has taken place about and within Mexico. Finally, Mexico has provided the setting for key studies of cities and migration, and its contemporary politics contributes significantly to our understanding of indigenous peoples and social movements under the conditions of globalization.

Mexico includes most of the cultural region called Mesoamerica. Mesoamerica extends into the northern

half of Central America. On the other hand, the arid north of Mexico falls outside of Mesoamerica proper, being a transitional cultural region with affinities to both the southwestern United States and Mesoamerica. These cultural boundaries, however, are not to be taken as hermetically sealed; during the pre-Columbian era, there was considerable interaction between Mesoamerica and Central America and even South America and North America. Within Mesoamerica, the Maya region in the south and the central Mexican highlands constitute strong foci, but there are other regional cultures due to the rugged and complex topography, so internal differences and interactions are also significant.

Mesoamerica during the post-Columbian period had involvements of even a wider scale, so that it must be viewed in terms of combined and uneven relationships with Europe (via Spain) and the United States. Indeed, emerging from colonial New Spain and then explicitly with Mexican nationhood in 1821, our unit of analysis shifts from a culture region approach (Mesoamerica) to one of a political entity with cultural consequences (Mexico). One cannot speak of the Mexican nation and its people as culturally uniform—indeed, Mexico's linguistic, cultural, and regional variations are enormous—but recent work has addressed precisely the consolidation of the Mexican state as a cultural framework for more specific local and regional phenomena.

There is a long history of written records from Mesoamerica, but deliberate collection and analysis of knowledge about culture (anthropology, we might say) may be said to have begun after the Spanish conquest among literate indigenous Mexicans and European priests looking back on pre-Columbian societies and their practices. A notable instance was the project supervised by Father Bernardino de Sahagun, in which *Nahua* (central Mexican or "Mexica") elites provided to the priest a vast body of information about the Aztec empire and its constituent city-states. Contemporary scholars carefully reread these documents, identifying the Mexica and European elements and noting the agreements, conflicts, and reinterpretations involved in this early anthropological collaboration.

Later colonial accounts are less notable. By the 19th century, much knowledge was hidden in dusty archives and overgrown ruins. Early explorations in Mexico started to recognize an important point, namely that the civilizations of the New World resembled key Old World civilizations in many ways but did not follow exactly the same sequences or have identical traits. This sparked the vital field of Mesoamerican archaeology, which continues to the present. Among its highlights is the study of the domestication of corn, which not only is an important crop but also presents unusual challenges in its reconstruction. The field includes seminal studies of sedentism and the formation of village societies in Tehuacan and Oaxaca and then the emergence of stratified societies in the Olmec and later central Mexican and Maya areas. Long-term longitudinal studies of changing settlement patterns have been particularly influential in Mesoamerican archaeology, addressing fundamental questions such as the relationship between irrigation and the centralization of power. Recent breakthroughs in reading pre-Columbian Maya writing has resulted in a much richer understanding of political dynamics in Maya city-states, and this in turn has provided a more processual approach to the cultural evolution of power that previously had been dominated by stage approaches. Finally, important intellectual linkages between cultural anthropology and archaeology developed in Mexico, notably a shared interest in agrarian class societies and relations among peasants and elites as well as among countryside and cities.

To understand the ethnohistory and cultural anthropology of Mexico, it is helpful to distinguish work done by Mexican anthropologists (including exiled Spaniards) from work done by foreign anthropologists, mostly from the United States (realizing, of course, that the two sets of anthropologists were constantly sharing ideas and findings). Mexican anthropology developed in relation to the Mexican state (sometimes in support, sometimes in opposition) and its project of unifying the varied cultures and regions of the country. U.S. anthropologists, on the other hand, had a more globalizing project, taking Mexican cases as sources for theoretical arguments that extended beyond one country (reflecting, nevertheless, the subtle neocolonial relationship of Mexico with the colossus of the north).

Post-1910 revolutionary Mexican intellectuals turned to Mexico's indigenous past and present, abandoning the openly racist and pro-European perspectives that had existed previously. The pioneering Mexican anthropologist Manuel Gamio took as his agenda creating nationhood, as in the title of his principal book *Forjando patria.* The Mexican essence was

Source: © iStockphoto/John Cross.

supposedly *mestizo,* that is, a mixture of European and indigenous ancestry and cultures. This encouraged the study of native Mexican cultures, especially the glories of past Mesoamerican civilizations, but only as antecedents for the future—the mestizo nation. The problem was that this treated the nonindigenous people of Mexico (who included among them the political and economic elite) as the ideal toward which the nation would evolve, whereas indigenous peoples were relegated to being a cultural resource for nationalists rather than living communities with identities and trajectories of their own. In this way, Mexican anthropology developed a close relationship with the central state, including a national school and museum of anthropology, two large employers (a national indigenous institute and an agency for anthropological and historical heritage management and scholarship), and a presence in school curricula from elementary schools to universities.

This approach was challenged starting in the late 1940s. Gonzalo Aguirre Beltran argued that the obstacle to Mexican modernity came not from indigenous peoples themselves but rather from persistent colonial relationships between mestizo regional elites and indigenous peoples that obstructed change. Angel Palerm and Pedro Armillas (intellectuals exiled after the Spanish civil war) and Eric Wolf (a U.S. anthropologist who was also a European exile from the Nazis) went further, probing the long history of Mexican power and questioning the position of the Mexican mestizos as the carriers of modernity. They traced the continuity and transformations of central rule in Mexico from the Aztec era through Spanish colonialism to the rise of the 20th-century revolutionary elite. They linked seemingly backward Mexican institutions, such as the *haciendas* (great landed estates) and closed indigenous communities, to the most advanced dynamics of the world economy. Intellectually, they shifted the focus of Mexican anthropology from cultural traits to class relations, raising peasant studies to the fore. Palerm, Beltran, and others also labored valiantly to improve the quality of Mexican

anthropological education, including greater knowledge of theory and more sophisticated field methods.

By the late 1960s, anthropologists, as part of the wider Mexican student movement for democracy and social justice, confronted the intimate relationship between Mexican anthropology and the Mexican state. Intellectually, this led to important, if sometimes arcane, debates between those who saw peasants as disappearing into the orthodox Marxist "working class" and those who saw the peasant–state– capital relationship as continuing to hold a vital role in the nation's future. By the 1990s, the limitations of this work were visible. Poorly understood Marxist orthodoxy sometimes substituted for serious fieldwork. More important, indigenous peoples themselves demanded that they be taken seriously in cultural terms, not just as social classes. Radical social movements sprung up among indigenous peoples in Chiapas, Oaxaca, and elsewhere, simultaneously challenging capitalist globalization, the authoritarian Mexican state, and local race/class inequalities. Mexican and foreign anthropologists, by sympathy and necessity, reconsidered their frameworks, no longer contrasting but rather bringing together culture and political economy.

U.S. and other foreign anthropologists came to Mexico, often as romantic intellectual self-exiles from bourgeois societies seeking the culturally distinctive and exotic. This led, in the work of Robert Redfield, to the influential notion of folk culture, an integrated traditional local society and way of life. Other anthropologists focused on the most pre-Columbian features of indigenous Mexican cultures, often finding them in the esoterica of ritual performance. Yet as Oscar Lewis showed, the empirical basis for Redfield's folk ideal was flawed, ignoring violent conflict and severe inequality in the Mexican countryside. Scholars began to follow Eric Wolf's lead in tracing the connections between apparently non-European, traditional cultural practices and the European-focused capitalist world system. U.S. anthropologists, often interacting with Mexican scholars, then took Mexico as a key ground for debating issues of social change such as modernization theory and its critiques. Some of the best studies examined the economics of rituals in indigenous communities in terms of intracommunity and external relations of production and power. Recent work has converged with the social movement focus of contemporary Mexican anthropology.

Alongside this intellectual history, it is important to realize that Mexico itself has changed dramatically. Four topics merit comment. First, the country has urbanized, and both U.S. and Mexican anthropologists followed displaced peasants and plantation workers into cities. Ethnographers demonstrated that the poor living in marginal areas of large cities had organized social patterns and were not anomic, socially isolated individuals. Likewise, huge industrial working classes emerged in Mexican domestic industries and increasingly in global export factories, many of them dedicated to the assembly of consumer goods for wealthier nations. Key studies of new global working classes have been located in Mexico, taking as their focus the interactions among class relations, work, gender, and household economies. Another key change, the emergence of large middle classes, has been less studied. Finally, Mexican migration to the United States is large and dynamic. This has provided a fertile field for Mexican and U.S. anthropologists, often working together. They have been leaders in developing the concept of transnationalism, that is, social–cultural practices that cut across conventional units such as "Mexico" and the "United States." Migration is, in turn, closely connected to borders (e.g., Mexico's borders with the United States and with Belize and Guatemala), and recent anthropology has begun to wrestle with the paradoxical combination of cultural crossing, economic inequalities, and political walls found in such places. In summary, Mexico is a place of nearly infinite complexity and cultural richness and is surely among the most stimulating and creative of all anthropological locations.

— Josiah McC. Heyman

Further Readings

Adams, R. E. W. (1991). *Prehistoric Mesoamerica* (rev. ed.). Norman: University of Oklahoma Press.

Fernández-Kelly, M. P. (1983). *For we are sold, I and my people: Women and industry in Mexico's frontier.* Albany: State University of New York Press.

Hernández Castillo, R. A. (2001). *Histories and stories from Chiapas: Border identities in southern Mexico.* Austin: University of Texas Press.

Hewitt de Alcántara, C. (1984). *Anthropological perspectives on rural Mexico.* London: Routledge & Kegan Paul.

Wolf, E. R. (1959). *Sons of the shaking Earth.* Chicago: University of Chicago Press.

NATIONAL MUSEUM OF ANTHROPOLOGY

Although the National Museum of Anthropology in Mexico City's Chapultepec Park did not open its doors until September 1964, interest in the pre-Spanish heritage of the Mexican people dates back to the 19th century. This heritage includes many early civilizations, including the Aztecs and the Mayas.

Chapultepec Park has historically been a special place. The Aztecs were so impressed by the area's beauty that they made it the exclusive place of the emperors. The architecture of the building is similar to that of the Mayas, with its lower section built of smooth stone and the upper section decorated with geometric bas-reliefs. An imposing statue of Tlaloc, the Aztec god of rain, guards the entrance.

The museum contains 26 exhibit halls, each dedicated to a different culture. They are arranged around a central patio so that visitors may visit the halls in any order they wish. Good use is made of open air, and besides the main patio there are several other patios and a number of gardens. The fountain in the central patio represents the blending of the indigenous peoples with the Spanish to create a new culture.

The museum covers an area of 79,700 square meters. Besides the exhibit halls, it houses a library, areas for archeological and ethnographic research, restoration workshops, and storerooms. Far from being strictly a tourist attraction, the museum is viewed as an educational institution. It is a place where Mexicans can learn about their heritage and feel proud to be Mexicans. The exhibit halls are devoted to cultures such as the Toltecs, the Teotihuacans, the Mayas, and the Aztecs. People can trace their roots from pre-Hispanic Mexico to the Mexico of today.

Displays in the exhibit halls include dioramas and models that show the ways of life of the different cultures. Items on display include ceramics, sculptures, art, toys, and tapestries. Vividly colored Mayan frescoes greet visitors in the Mayan hall and afford a glimpse into the artistic tradition of the Mayan civilization. The Aztec room contains a diorama of the Tlalteloco market, a reproduction of Montezuma's headdress, and the world-famous Aztec Calendar.

In an article about his memories of the construction of the museum, the architect Pedro Ramirez Vazquaz wrote, "My greatest concern was to get the museum's message to all visitors and to increase their interest and get them excited about the relics and works of art."

— Pat McCarthy

Miami Indians

Miami (also called Maumee) is the name of an important Native American nation. Today, the Miami people live primarily in Ottawa County, Oklahoma, and in St. Joseph and Elkhart counties, Indiana. There are also Miami living in Peru, Wabash, Marion, Huntington, South Bend, Fort Wayne, and Indianapolis, Indiana. Tribal rolls in the Peru archives list approximately 6,000 persons of Miami descent. In the Oklahoma tribal rolls, the Miami number approximately 2,000.

French traders and explorers were the first Europeans to arrive in the Great Lakes region and in the Ohio Valley (1550–1600). Sent by the king of France, their primary goal was to chart the river systems as highways facilitating access into the interior of North America. Covered in dense impenetrable forest, the area was interconnected by canoe only. Even during the winter, when many river tributaries froze over, the smooth and unobstructed surfaces were more convenient for travel by dogsled. These French explorers, *habitants* (settlers), fur traders, and Jesuit missionaries discovered that the Miami were a traditional trading nation that controlled most of the Great Lakes region's waterways, possibly having forts at all of the major lake portages.

Linguistic anthropologists offer additional insights into the extent of Miami trading preeminence with the discovery that place names of geographical locations are not arbitrary meaningless designations applied for purely utilitarian purposes. Rather, place names carry symbolic import that also encodes historical data. Significantly, all of the Algonquin-speaking Native American nations of the Great Lakes region (e.g., Ojibwa, Ottawa, Menominee, Potawatomi) referred

to a great number of rivers as "the Maumee" and were unanimous in designating the Ohio Valley (criss-crossed by rivers bearing the Maumee appellation) "Valley of the Maumee."

Little Turtle (1751–1812), the most famous Miami warrior chief, made an historic speech in 1795, when he delineated the relation of Miami to rivers during Treaty of Greenville negotiations. It is also remarkable that not one Native American nation attending the Treaty of Greenville negotiations registered a protest to Little Turtle's sweeping claims.

As late as the 1800s, Tacumwah, the sister of Pacanne (chief of the Fort Kekionga Miami) and possibly a woman chief in her own right, exemplified the regulation of river trade by Miami in that she and her son, Jean Baptiste Richardville, "controlled the portage to the Wabash and enjoyed its revenues," according to Stewart Rafert's 1996 book, *The Miami Indians: A Persistent People 1654–1994.* Tacumwah "transported goods over the portage employing a number of Indians and their horses for that purpose and making a large profit" in the process.

The French documented Miami occupation of the current states of Illinois, Indiana, Michigan, Ohio, and Wisconsin. However, one must be cautious in using the English legal term *occupation,* with its attendant implication of property ownership, when speaking of Native American land use given that Native Americans did not recognize property ownership. This European (and especially British) concept developed most fully during the Industrial Revolution, when landowners succeeded in expropriating the peasantry's "right of the commons" (ownerless land to be used by all) for the gathering of wood, herbs, and berries as well as for the grazing and watering of cattle and the like.

In contrast to land ownership, Native Americans insisted that all humans must share in nature's largesse. Land was not understood as a commodity to be bought and sold. This Native American worldview became especially evident during early treaty negotiations with the United States as Miami, Ottawa, Menominee, Ojibwa, Potawatomi, Shawnees, Delaware, and other Native American nations described to U.S. government officials the Native American practice of mutual land use throughout the Great Lakes region and even beyond, not excluding people passing through. Major John Hamtramck's negotiations with the Miami clans and other Native American nations offer a case in point.

Arthur St. Claire, governor of the Northwest Territory, sent Hamtramck to demand Native American acceptance of U.S. claims to the Great Lakes regions in 1790, during which time Hamtramck was continually frustrated by Native American refusals to meet with him separately and without the knowledge of other affected Indian nations. Hamtramck's missives to the governor stated that Native Americans "could not give presently a proper answer before they consult the Miami nation, their eldest brethren." The Kickapoo also refused to speak with Hamtramck until they had consulted the Wea Miami, and the Wea Miami would not negotiate with Hamtramck until they had received advice from the Atchachagouen Miami, "their eldest brethren." The Atchachagouen warrior chief, Le Gris, told Hamtramck, "We cannot give a positive answer; we must send your speeches to all our neighbors and to the Lake nations." The "Lake nations" also included the Shawnees and the Delaware. Apparently, this show of solidarity angered Hamtramck, who then, in partnership with General Josiah Harmar of the U.S. Army, attacked Miami villages and the autumn harvest, burning them to the ground.

What Hamtramck interpreted as an act of war may simply have been an egalitarian attitude shared by many Native Americans who advocate cooperation with others and nature rather than domination of them. Another of Hamtramck's limitations may have been a lack of understanding of nomadic culture that has survival strategies and subsistence patterns very different from those of sedentary peoples such as Hamtramck. At times, even anthropologists and archaeologists have failed to grasp the difference between nomadic and sedentary cultures evidenced in the following comments: "Village fission and fusion is poorly understood; a village was abandoned, the entire village moved to a new locality, all of which conditions are then attributed to conflict or depletion of resources." Although at times these conditions were true, it is not acknowledged that they are characteristic of specifically nomadic and seminomadic subsistence patterns.

Nevertheless, anthropologists Ermine Wheeler-Voegelin, Emily J. Blasingham, and Dorothy R. Libby made a major contribution to the study of Native American lifeways during the 1970s when they charted Miami seminomadic patterns at the behest of the U.S. Indian Claims Commission comparing Indian claims to use of land with historical documents. For

example, in 1688, the Miami of the Illinois River Valley abandoned this location, with some traveling to the St. Joseph River of southern Michigan, others to the Root River in eastern Wisconsin, and another group moving to the upper reaches of the Mississippi River. In 1695, Father François Pinet reported that the Wea Miami who lived near his mission (present-day Chicago) had formerly come from the Mississippi. During the autumn of 1698, Pinet remarked that none of the Miami villages was occupied due to the Miami subsistence pattern of following the winter game in the ubiquitous pattern of nomads and semi-nomads throughout the world.

The French missionaries and French traders described the Miami as living in large villages of dome-shaped wigwams near major waterways. During the spring, women planted corn, beans, squash, and tobacco, using hoes and digging sticks and staying close to their fields throughout the summer months. Both men and women fished, hunted small game, prepared animal skins, and gathered wild plants. After the autumn harvest, the Miami went into the wilderness to hunt deer, elk, black bear, and beaver while living in small temporary camps. During the spring, the dispersed population reorganized into bison-hunting parties that would travel the southern and western prairies, while others moved to maple forests for the collection of sap and also fished, taking advantage of the spring spawning season. Because French colonization of North America was relatively sparse, this subsistence pattern did not change substantially until the advent of Iroquois and British incursions into New France toward the middle of the 18th century. By this time, Miami had been allied with the French for at least 100 years by marriage, by gift giving between French government officials and Miami warrior chiefs (who were both men and women), and because the French by and large treated Native Americans equitably. Therefore, the Miami joined with the French to fight the British–Iroquois coalition. Unfortunately for the French and Miami–Ottawa-led Native American nations, the British were triumphant. Quebec surrendered to Britain in 1750, and Montreal surrendered in 1760. General Jeffrey Amherst sent Major Robert Rogers to take Fort Ponchartrain (present-day Detroit) in November 1760. On November 19, 1761, the British took possession of Fort St. Joseph on the St. Joseph River (River of the Maumee) in southern Michigan.

The Indians resented their treatment by the British. Whereas French gifts to the Native Americans had been generous, the British were parsimonious and far from cordial if Amherst's racist attitude toward them as "vermin" to be "exterminated" is any indication of British policy in general. This attitude also prevented the British from intermarrying with Miami, a fact that was not lost on Native Americans.

In 1763, the Ottawa chief Pontiac, in alliance with the Miami and other Native American nations, rose up against the British, who surrendered Fort St. Joseph in May and Fort Michilimackinac in June. By August, the British had lost every post east of the Allegheny Mountains except Niagara, Pitt, and Detroit, and although they held onto a few forts, they never again were able to impose British hegemony on the region. The American Revolution sealed the fate of the British, who ceded the Northwest Territory to the United States by the 1783 Treaty of Paris, but not until 1803 did the United States begin to actively take charge of the Great Lakes and Ohio Valley regions. Shortly thereafter, the Miami experienced accelerated culture change that had begun with the tragic loss of Native American lives due to a century of constant warfare and to European diseases such as smallpox.

In describing cultural transformation resulting from European contact, Charles C. Trowbridge had the advantage of being close to the American Revolutionary War and its consequent impact on Miami. Although his work *Meearmear Traditions* (published in 1823 and reprinted in 1938) was somewhat marred by contradictions regarding gender roles, he nevertheless recorded important ethnographic data. Given that he was not an anthropologist but rather a U.S. government agent, Trowbridge discounted what the Miami had to say about themselves, offering his own ethnocentric interpretations instead. On the one hand, he stated that there were "female chiefs, both of war and the village," and that "they are more implicitly obeyed than the male chiefs." Further on he stated, however, that women chiefs were "never listened to the first time." Trowbridge immediately contradicted this statement with "the influence of the woman [sic] chiefs is very great," also describing narratives that explicitly praised the exploits of warrior women. Perhaps Trowbridge may be forgiven for not having understood the social phenomena that he observed. However, this had the deleterious effect of obscuring Miami egalitarianism, although

Trowbridge's painstaking record of Miami customs strengthens an egalitarian hypothesis nonetheless.

The prerogative of women to actively pursue, choose, and desert their husbands and lovers is one indication that a society is egalitarian. Miami women simply walked away from undesirable liaisons, as did men. Both sexes fished and hunted, suggesting that there was little division of labor. For instance, the woman trader Tacumwah organized her own separate hunts.

Miami attitudes about raising children also suggest egalitarianism. Trowbridge recorded that boys and girls were treated with the same affection and that legitimate children were not differentiated from illegitimate children. It was common for unmarried Miami women to have children, and their "reputations" were not affected by doing so. Permitting women to defend themselves is also an indication of high status for women and egalitarianism. If a Miami man physically attacked a Miami woman, she had the right to kill him. Murder, if committed by a woman, was subject to the same punishment as if committed by a man. In nonegalitarian societies, it is usual for women to suffer harsher treatment than men for the same offense. Originally, Miami descent may have been determined matrilineally given that a male Miami chief's "successor" was not his own son but rather the son of his sister. Matrilineality and the importance of the sister's son is often a concomitant of egalitarianism.

The ethnohistorian Rafert offered insights into Miami culture change by documenting the hegemonic forces that influenced Miami to join the Euro-American market economy. Assimilation required the suppression of the Miami and French languages, both Catholicism and Miami Shamanism, as well as egalitarianism. The Miami leader, Meshingomesia, became wealthy during the 1830s after becoming a Baptist minister. He encouraged male agriculture in violation of Miami custom, for traditionally farming was the occupation of Miami women, who then owned the product of their labor. Meshingomesia also pressured Miami elders to permit Miami tribal lands (held in common) to be sold to private owners. Religious pressures for Miami to assimilate were apparently so acute that in 1846 the non-Protestant Miami were marched under armed guard to Kansas Territory, with many of them dying along the way due to exhaustion, hunger, and/or exposure. The Baptist Miami who lived on Meshingomesia's land were not subject to this removal action. In 1873, the Miami people on Meshingomesia's land were also granted exemption from taxes and mortgages.

Whereas Rafert interpreted economic incentives that encouraged Miami to convert to Baptist Christianity as a phenomenon "strengthening tribal leadership," there is an alternative explanation for this Protestant conversion story. Although conversion of Miami by male Baptist ministers strengthened male tribal leadership, it may have done so by usurping women's political power. By the 1850s, all of the most important male Indiana Miami leaders had converted to the Baptist religion, and at the same time Miami councils were becoming all male, thereby disenfranchising Miami women. Yet Miami matrifocal tradition must have remained viable despite patrifocal trends. Ozahshinqua (ca. 1810–1877) seemed to have retained her independence, being the sole owner of many horses and 850 acres of land (the Ozahshinqua Reserve) until her death.

The Indiana Miami are the descendants of Miami who escaped the 1846 removal by the U.S. government. Following widespread starvation and impoverishment after removal to the largely unknown ecosystem of Kansas Territory, some Miami migrated to Missouri in 1860 and many Miami made their way back to the ancestral heartland of Indiana. Eastern Miami who were not forced to relocate to the western territory, and who were joined by returnees from forced removal, were ultimately divested of all treaty rights in 1897.

The U.S. government still has not "recognized" the Indiana Miami at the time of this writing, meaning that they are disqualified from receiving compensation for the expropriation of their lands, the near extinction of their language, and the loss of their ancient religious traditions. Nor do Indiana Miami receive government health care or other services and resources received by "recognized tribes" to which the Oklahoma Miami belong. The Indiana Miami have been fighting nonrecognition ever since Robert Owens, a descendant of the famous Chief Richardville (Richerville) and Chief La Fontaine, began proceedings to regain federal recognition during the late 1970s. By 2005, they still had not gained recognition, even though genealogical data linking the Oklahoma and Indiana Miami are indisputable.

— *Susan Kirwan*

Further Readings

Anson, B. (1970). *The Miami Indians.* Norman: University of Oklahoma Press. (Reprinted in 1999)

Carter, H. L. (1987). *The life and times of Little Turtle.* Urbana: University of Illinois Press.

Leacock, E. (1978). Women's status in egalitarian society: Implications for social evolution. *Current Anthropology, 19,* 139–164.

Rafert, S. (1996). *The Miami Indians: A persistent people 1654–1994.* Indianapolis: Indiana Historical Society.

Trowbridge, C. C. (1823). *Meearmear traditions.* Ann Arbor: University of Michigan Press. (Reprinted in 1938)

Wheeler-Voegelin, E., Blasingham, E. J., & Libby, D. (1974). *Miami, Wea, and Eel-River Indians of southern Indiana: An anthropological report.* New York: Garland.

Middens

Middens are prehistoric rubbish or garbage heaps. The word *midden* in archaeology is a term that is truly a product of this discipline and is now part of its everyday vernacular. Middens are one of the most useful deposits for archaeologists because nearly everything a group of people use in their daily lives eventually will be lost or discarded, and most of what is thrown away ends up in a midden. These archaeological deposits can contain everything from broken tools to used-up artifacts, shells, plant materials, bones, charcoal and ash from fires, and even human remains. Midden contents indicate where people went to obtain their food, what proportions of different foods comprised their diets, and how the types of food and other items may have changed over different seasons or over long periods of time. The deposition of grease and other decomposing organic materials from human habitation means that midden soils typically are darker in color and contain more nitrogen than the natural surrounding soils. Because they are most commonly associated with the accumulation of mollusk shells from food consumption, middens often are referred to as shell middens, shell heaps, or shell piles.

The word *midden* is derived from a Scandinavian word that means kitchen leavings and was traditionally called "kitchen midden," which is a literal translation of the Danish word *køkkenmøddinger.* Japetus Steenstrup, a Danish zoologist, first noted that these deposits were not natural but in fact were the result of human waste accumulation and thus would be of archaeological interest. In 1848, the Royal Academy of Copenhagen established a committee to study these kitchen midden sites, and the committee members were the archaeologist Jens Jacob Asmussen Worsaae, the geologist Johan Georg Forchhammer, and Steenstrup. Their findings demonstrated that these midden deposits could assist not only in the interpretation of past environmental conditions but also in the understanding of prehistoric artifacts. They also helped to prove the viability of the "three-age system," that is, the development over time of stone tools to bronze tools and then to iron tools. Investigations of mollusk shell piles associated with Danish Mesolithic sites, and the heated debate surrounding the origin of these deposits, led Steenstrup to seek similar materials from kitchen midden sites in Greenland during the 1870s. Unlike the Danish sites, these refuse piles were composed primarily of seal and caribou bones. However, the artifacts associated with these tossed food remains documented several cultural layers of deposition and the presence of an early Arctic culture, which made tiny stone tools, that was distinctly different from more recent Inuit deposits.

Coincident with Steenstrup's Greenlandic research, the American geologist William Healey Dall began systematic excavation of stratified "shell heaps" on the Aleutian Islands and interpreted these as three distinct evolutionary stages of subsistence based on their faunal composition and recovered artifacts. Across the Pacific, excavations were under way on the Omori shell midden near Tokyo Bay, where the American archaeologist Edward Morse identified distinct cord-marked pottery that is now recognized to be some of the oldest pottery in the world and attributed to the Jomon culture. In 1902, the German archaeologist Max Uhle excavated a large shell midden at Emeryville on the east shore of San Francisco Bay. Uhle was able to determine two major components characterized in part by the dramatic shift from oysters to clams. Since that time, shell middens have been investigated on nearly every coast from the Shetland Islands to South Africa and from New Zealand to Florida.

— Christyann M. Darwent

Further Readings

Dall, W. H. (1877). On succession in the shell-heaps of the Aleutian Islands. *Contributions to North American Ethnology, 1,* 41–91.

Daniel, G. (1976). *150 years of archaeology.* Cambridge, MA: Harvard University Press.

Fagan, B. M. (2005). *A brief history of archaeology: Classical times to the twenty-first century.* Upper Saddle River, NJ: Pearson Prentice Hall.

Uhle, M. (1907). The Emeryville Shellmound. *University of California Publications in American Archaeology and Ethnology, 7,* 1–107.

Midwifery

Attendance at birth has been suggested to be essential in facilitating mother–child survival as the physiology of birth changed during human evolutionary history. *Midwife,* an Anglo-Saxon term meaning "with woman," aptly describes the role that women have long assumed as birth attendants. The anthropology of midwifery is the study of nonphysician primary birth attendants within and across cultures. Birth attendants are not always specialists, and not all cultures have specifically delineated roles for birth attendants. Thus, our definition of the anthropology of midwifery is expansive enough to include a wide range of biomedical and nonbiomedical, as well as formal and informal, birth attendants. Important elements of study in this field include the definition, education, practices, identities, and knowledge systems of midwives. Much anthropological research is directed toward the documentation and critique of ongoing international battles over the definition and social roles of midwives, especially as viable alternatives to the overmedicalization of birth.

There is a sharp distinction made in international literature and discourse between "professional midwives" and "traditional birth attendants" (TBAs). Health authorities tend to accept this distinction, whereas anthropologists tend to reject or contest it, examining the social roles of definitions as tools of power to determine insiders and outsiders. The international definition of a midwife was created by the International Confederation of Midwives and formally accepted by other international organizations, including the World Health Organization (WHO) and the International Federation of Gynecologists and Obstetricians:

> A midwife is a person who, having been regularly admitted to a midwifery educational programme duly recognised in the country in which it is located, has successfully completed the prescribed course of studies in midwifery and has acquired the requisite qualifications to be registered and/or legally licensed to practise midwifery.
>
> She must be able to give the necessary supervision, care, and advice to women during pregnancy, labour, and the postpartum period, to conduct deliveries on her own responsibility, and to care for the newborn and the infant. This care includes preventative measures, the detection of abnormal conditions in mother and child, the procurement of medical assistance, and the execution of emergency measures in the absence of medical help. She has an important task in health counselling and education, not only for the women but also within the family and the community. The work should involve antenatal education and preparation for parenthood and extends to certain areas of gynaecology, family planning, and child care. She may practise in hospitals, clinics, health units, domiciliary conditions, or in any other service.

Those who meet this definition may be fully incorporated into health care systems; those who do not (the TBAs) may suffer multiple forms of discrimination. Since 1992, the WHO has defined the TBA as "a person who assists the mother during childbirth and initially acquired her skills by delivering babies herself or through apprenticeship to other traditional birth attendants," distinguishing trained TBAs as having "received a short course of training through the modern health care sector to upgrade her skills." The WHO suggests that TBAs are stopgap measures until more "qualified" personnel are available.

Midwifery in the Developing World

Nongovernmental organizations, multilaterals, and bilaterals have invested heavily in professional midwife and TBA training for more than 40 years in their efforts to reduce maternal and perinatal mortality in the Third World. The anthropology of midwifery grew out of this trend and reflects anthropologists'

roles in analyzing TBA training programs for development organizations and the impact of new models on both quality of care and health outcomes. Women trained as official midwives are usually young and have borne no children themselves. They usually are educated in an urban environment and then sent out to serve in rural villages, where they wear the white coat and expect respect from the townspeople for their professional educated status. They usually work in underfunded and understaffed government-built clinics, but for an extra sum of money they will sometimes attend home births if they are called. Workloads and stress levels in such clinics are high, often resulting in maltreatment of women and early "burnout" on the part of midwives.

While some governments have established programs designed to encourage birth in clinics and hospitals, many rural women resist and prefer, instead, to give birth at home with the help of midwives (TBAs). Community midwives are usually older mothers who have become midwives when they were asked to attend the births of friends and relatives. Some embark on long apprenticeships, while others learn gradually and less formally by simply attending births. From the local point of view, the biggest difference between community midwives and professional midwives is that community midwives are recognized by their community as legitimate birth attendants, whereas professional midwives are often seen as young and inexperienced women who must prove their worth to the villagers before they can be trusted.

TBA training courses have been highly criticized for their pedagogy and ideology. The purpose of these courses has generally been to educate TBAs in how to identify risks that require transport and to improve their prenatal and maternity care. Designed by biomedical personnel, course content is often inappropriate given local circumstances and realities. Courses often assume access to material resources that are lacking locally, are taught in a style that is inappropriate given the literacy skills and learning styles of midwives, and fail to provide TBAs with a respected and effective place within an integrated system of medicine. Many anthropologists have called for the replacement of such top-down systems with models of mutual accommodation. But the worldwide hegemony of Western biomedicine has made this an elusive goal. When professional midwives make a sincere effort to learn about and honor local customs and traditions, when they approach local people with an attitude of respect, and when they demonstrate a willingness to work with community midwives, mutual accommodation is achievable.

It is important not to romanticize or demonize professional or community midwives. Both work under discriminatory biomedical systems, and both usually try to give skilled and considerate care and remain, in many parts of the world, the only viable option for millions of women. Anthropologists question the wisdom of dividing professional midwives and TBAs in a hierarchical way that allows government agencies and development planners to support one group while trying to exterminate the other and to suggest that a "real midwife" may be recognized as such by either her government or her community.

Midwifery in the Developed World

Changes in midwifery in the developing world are intimately linked to debates over midwifery in the developed world, where professional midwives provide care for the majority of pregnant women. Their education is generally university based and often postgraduate, giving them skills in research and publication unavailable to midwives in the developing world. They practice in hospitals that are usually well staffed, well funded, and replete with medical technologies. Their major dilemmas are ideological; they struggle both in thought and in practice with the tension between what they themselves call the "medical" and "midwifery" models of care.

Obstetrical dominance over birthing represents not a neutral substitution of one care provider by another but rather a fundamentally different and opposing philosophical approach to birthing care. In the United States and Canada, obstetric control over birth was cemented during the early 1900s, and midwives were nearly eliminated. Since then, midwives have been attempting to achieve their renaissance. American midwifery is split between nurse-midwives (trained first in nursing and then in midwifery), who practice mostly in hospitals and attend approximately 8% of American births, and direct-entry midwives (not additionally trained in nursing), who practice mostly out-of-hospital and attend approximately 1% of births. In Canada, midwifery was illegal until 1993, when it was legalized in Ontario through the work of a coalition of nurse- and direct-entry midwives, a process that has since continued in other Canadian

provinces. The reclaiming and revitalization of midwifery in both countries has resulted from alliances among activist consumers, midwives, and others. European, Australian, New Zealand, and Japanese midwives are engaged in a process of self-examination, attempting to reclaim the autonomy they lost with the obstetrical takeover of birth during the 19th and 20th centuries.

Hundreds of professional midwives in the developed world regard traditional midwives in the developing world as their ideological "sisters" and are working to support and sustain the preservation of traditional midwifery and its future development. Such midwives combine elements of traditional and professional midwifery knowledge in their personal practices, dedicating their professional lives to being, and helping others to be, "with woman" during the processes of pregnancy, birth, and the postpartum period.

— Robbie E. Davis-Floyd and Gwynne L. Jenkins

Further Readings

Davis-Floyd, R., Pigg, S. L., & Cosminsky, S. (Eds.). (2001). Daughters of time: The shifting identities of contemporary midwives [special triple issue]. *Medical Anthropology, 20*(2–4).

Davis-Floyd, R. E., & Sargent, C. (1997). *Childbirth and authoritative knowledge: Cross-cultural perspectives.* Berkeley: University of California Press.

DeVries, R., van Teijlingen, E., Wrede, S., & Benoit, C. (Eds.). (2001). *Birth by design: Pregnancy, maternity care, and midwifery in North America and Europe.* New York: Routledge.

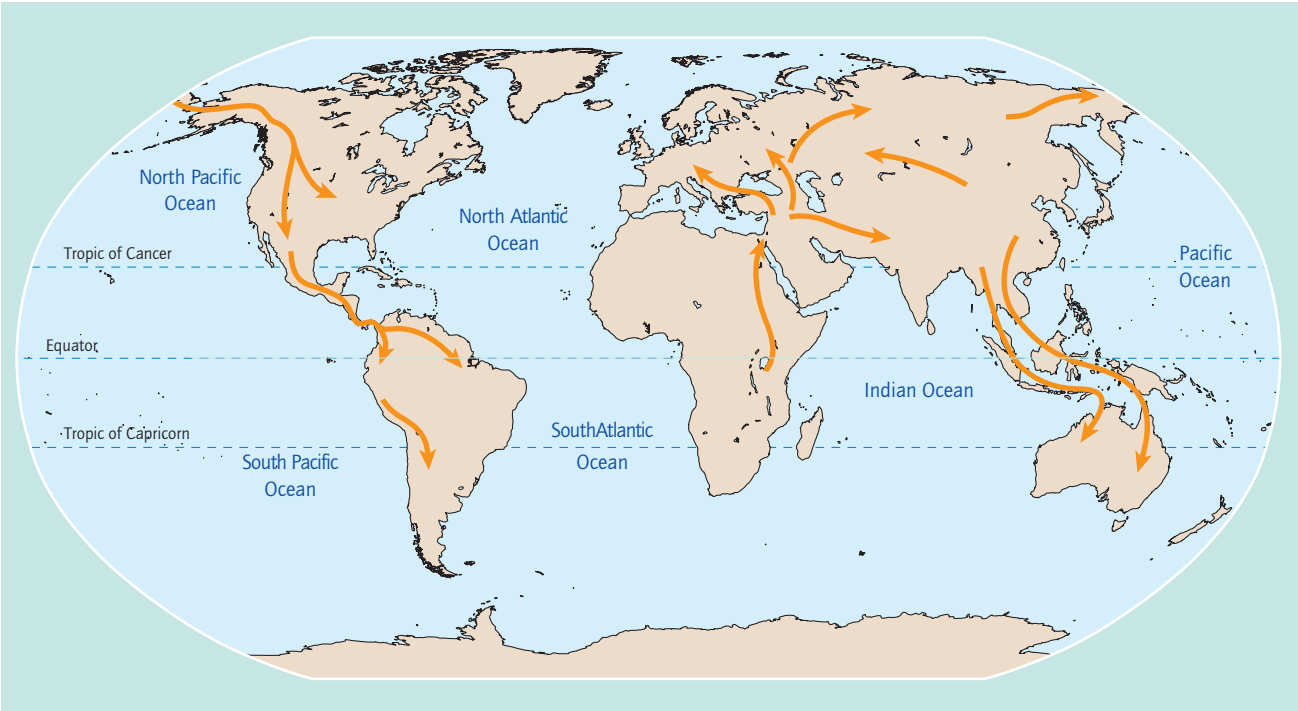
Migrations

Migrations are a constant in human history. Indeed, it is a mistake to treat residential stability as normal and thus not needing explanation while treating migration as abnormal, novel, and thus uniquely needing explanation. Unfortunately, this has not been the way in which the social sciences (including anthropology) have developed, and this entry focuses on migration with only brief mentions of the distinctive, and sometimes unusual, conditions favoring stationary or repetitively circulatory cultures.

Although it is debated whether *Homo sapiens sapiens* emerged in Africa alone or via a trellis work of interacting places across the Old World, migration certainly accounts for the remarkable spread of humanity across the world. To take three dramatic examples, pioneers on simple boats reached Australia no later than 40,000 years ago, the New World was populated (probably on foot across land bridges) no later than 13,000 years ago, and remote Pacific islands have been settled over the past 3,600 years by sophisticated navigators using outrigger canoes. Nor were these pioneering movements into unsettled areas the only instances of migration in the human past. Many waves of migration and cultural change (it is hard to separate these) have shaped the map of world culture regions. A characteristic example is the Bantu expansion, associated with tropical root crops, iron working, and cattle, spreading south and east across sub-Saharan Africa.

Mobility in small-scale societies takes place through group fissioning after disputes (often when existing groups grow in size and have become crowded) and through cross-spatial marriage and gift exchange networks. Such movements can become migrations (a directional flow) for varied reasons, including environmental changes and innovations in social organization and food production. We see the results of such flows as a "diffusion wave" across a large spatial scale. In the past, simplistic and often speculative models envisioned migrations as vast and dramatic movements of conquerors or adventurers. Today, we piece together more complex and gradual changes from three sources of evidence: genetic branching, historically related languages, and the archaeological record. It is often unclear whether a diffusion wave represented the migration of new people, the conversion to new cultural practices and social organizations, or both.

As societies became larger in scale, politically centralized, and more unequal, new patterns of migration emerged. Violent political expansion and consolidation—warfare and repression of subject peoples, especially religious and political dissenters—became a cause of migrations, continuing to the present day. Centralized states deliberately relocated populations and encouraged colonizers, often to consolidate frontiers and sometimes to encourage the production of desired crops. Meanwhile, wealthy centralized cores presented targets for militarily skilled raiding populations, who both displaced other



Source: Hespenheide Design.

peoples and themselves settled down and changed culturally. As a result of these various processes, diasporas formed important commercial, artisanal, and religious networks.

An important phenomenon, labor migration by peasants, links the world of premodern complex societies with the modern migratory world. Situations in which landlords freeze peasants into place through rigid labor duties are important but have never been universal and have broken down thoroughly as capitalism has expanded. Peasants often have too many children to inherit access to land, and those extra sons and daughters then migrate. In some cases, they open up new land, but this option is limited, so that they often become labor migrants in cities and expanding commercial agricultural frontiers. The capitalist world system stimulates migration through the modernization of agriculture in sending areas, the displacement of peasants from previously intensive labor systems, the impact on hand artisans by industry, and the collapse of putting-out production systems. On the other end, employers actively recruit new workers to undercut existing workers or during periods of expanding production. Hence, it is dynamic social change, rather than stagnation and poverty, that causes people to leave their accustomed homes.

The capitalist world system has seen four major kinds of migration: commodity slavery (especially the African slave trade to plantation regions of the New World), displaced peasants from Asia and Europe to the Americas and within these regions, migrations of specialized businesspeople and skilled workers, and refugees from persecution. Even the latter become labor migrants as they find ways of surviving in new economies. Migration includes both internal movement and international movement, which tend to be conceptualized and studied as if they are different but in fact have similar social dynamics except in terms of political status as a national or nonnational matter. For example, internal migration studies often focus on the topic of urbanization of rural people, but this is an important feature of international migration as well.

The nation-state does matter, in particular the status of "citizen." Citizenship, which began in city-states, constitutes an equal collective access to various rights and institutions in exchange for loyalty to the central national executive (e.g., paying taxes, doing military service). But as citizenship collects together insiders, it also excludes outsiders, such as migrants, or creates ambivalent transitional categories for them. Hence, for anthropologists to understand the migrant experience, it is also necessary to understand the specific cultural construction of the insider/outsider divide.

Cultural anthropologists, with their predilection for studying the powerless and culturally distinctive, have provided a large number of ethnographies of migrants, many of which are of excellent quality. They have shown that migration does not necessarily lead to social disorganization and have emphasized the importance of networks for migrants. Anthropologists have explored the concept of transnationalism, in which mobile communities of people have social, cultural, and political presence in more than one nation at a given time. They also have looked at the nuances of social, cultural, and political incorporation into new societies. And recently, critical anthropologists have turned their fine-grained ethnographic focus to the articulations between migrants and dominant populations, including the division of labor and business markets into migrant and nonmigrant segments, the mechanisms of exploitation of the surplus produced through that segmentation, and the borders and other devices of legal classification and enforcement that migrants encounter in their journeys across nation-states.

— Josiah McC. Heyman

Further Readings

Brettell, C. B., & Hollifield, J. (Eds.). (2000). *Migration theory: Talking across disciplines.* London: Routledge.

Cavalli-Sforza, L. L., & Cavalli-Sforza, F. (1995). *The great human diasporas: The history of diversity and evolution.* Reading, MA: Addison–Wesley.

Foner, N. (Ed.). (2003). *American arrivals: Anthropology engages the new immigration.* Santa Fe, NM: School of American Research Press.

MIGRATIONS TO THE WESTERN HEMISPHERE

The peopling of the Western Hemisphere is currently a matter of great controversy. Until recently, the traditional view was that some 12,000 years ago, people came from Asia to the Americas. This theory claimed that during the last Ice Age, the sea levels of the world were several hundred feet lower than they are today because enormous quantities of water were locked in the glaciers covering much of the Northern Hemisphere. Lower sea levels created a land bridge between Siberia and Alaska at the point where the Bering Straits are today. The Bering Land Bridge allowed early hunter-gatherers to cross over from Asia to North America as they followed the migrating herds.

In the traditional view, the peopling of the Americas was a movement from north to south. Until recently, the oldest settlements and other archaeological evidence of humans had been found at Clovis, New Mexico. Scientists speculated that other sites that would have been along the migration route on the Pacific coast would have been covered with water long ago. During recent decades, a variety of evidence that challenges the traditional Siberian migration theory has been discovered.

Debates over the issue of the peopling of the Americas have questioned the number of migrations, the places of origin, and the times of the migrations. Evidence that is challenging the traditional view is archaeological, anatomical, linguistic, and genetic. Archaeological evidence that the peopling of the Americas happened in a different way includes the discovery of settlements in South America dated at 40,000 years old. Other sites, older than Clovis, have also been found in North America.

Evidence also suggests that early humans may have traveled in boats across both the Pacific and the Atlantic to reach the Western Hemisphere. Thor Heyerdahl sailed the Atlantic and Pacific in primitive boats, proving that it was possible that early people could have reached the Western Hemisphere from Polynesia and Africa. The coastal entry theory of migration argues that prehistoric people arrived in the Western Hemisphere by boat from Europe or from areas in the North Pacific or South Pacific.

Based on linguistic evidence, some researchers have argued that there were three major migrations across the Bering Land Bridge. The linguistic evidence has recently been supported by genetic evidence suggesting that genetic markers and anatomical features in Native Americans and in Asian groups have strong resemblances.

— Andrew J. Waskey

Mintz, Sidney Wilfred (1922–)

Sidney Wilfred Mintz is a major figure in anthropology's synthesis of the study of local people and places with world history, and he has contributed significantly to the anthropology of food, work, the Caribbean, and the African American experience. He received his Ph.D. in anthropology from Columbia University in 1961. He spent most of his career at Yale University and the Johns Hopkins University, where he was William L. Straus, Jr., Professor of Anthropology. He was a stimulating and much beloved teacher. Mintz, together with Eric Wolf, William Roseberry, Eleanor Leacock, June Nash, and others, developed the neo-Marxist school in anthropology that is often called "political economy."

Mintz was a member of an influential cohort of students of Julian Steward, who significantly advanced the cultural anthropological study of complex societies, and worked on Steward's *People of Puerto Rico* project. Mintz studied an industrial sugar plantation region of the island's south coast and, together with his close friend and fellow Steward student Eric Wolf, authored a key article comparing haciendas and plantations. This work pioneered the idea that the various social and cultural formations of Latin America and the Caribbean were shaped by their connection to world capitalism over long historical periods rather than being traditional societies only recently affected from the outside; the work anticipated and influenced "dependency" and "world systems" theorists of the global economy. Mintz also compiled a much admired life history of a Puerto Rican sugar cane plantation worker who was also his close friend, Anastacio (Taso) Zayas (*Worker in the Cane*), contributing significantly to the anthropology of work, the study of political and religious change, and life history studies.

Mintz continued in Caribbean ethnography, working in Haiti and Jamaica among former slave populations-turned-free peasants and offering a variety of influential articles on market systems as forms of articulation, Creole languages, and so forth. This culminated in an innovative approach to African American cultural history in a coauthored book with Richard Price. Previous work either had seen slaves as being wiped clean of culture due to the oppression of the experience or had searched for specific African culture traits surviving in the Americas. Mintz and Price argued instead for specific cultural processes within the slave communities themselves, notably the development of shared African American Creole cultures. Mintz continues to explore the Caribbean experience, recently arguing that this region anticipated globalization in the sense of developing new and open-ended cultures as part of global connections from Columbus onward while at the same time maintaining an experience and ethos of local place.

In *Sweetness and Power* (1985), Mintz followed sugar from the production sites in the periphery (industrially organized plantations even during the slave era) to consumption sites, linking sugar as a "drug" to the changes in factory and household work caused by the core's industrial revolution. Thus, he widened our understanding of capitalism, bringing into consideration pleasure and consumption as well as toil and also bringing into consideration geographic sites such as the Caribbean as much as Great Britain and other archetypically modern locales. Mintz continued to develop the anthropology of food in *Tasting Food, Tasting Freedom* (1996), which explored the consumption of food as an arena in which people assemble cultures out of wide-ranging components and relationships in the world economy. Finally, he has articulately restated the case for in-depth ethnography, even as he is noted for his exploration of long historical and global-scale processes.

— Josiah McC. Heyman

Further Readings

Mintz, S. W. (1974). *Caribbean transformations.* Chicago: Aldine.

Mintz, S. W. (1985). *Sweetness and power: The place of sugar in modern history.* New York: Viking.

Mintz, S. W. (1996). *Tasting food, tasting freedom: Excursions into eating, culture, and the past.* Boston: Beacon.

Mintz, S. W., & Price, R. (1992). *The birth of African-American culture: An anthropological perspective.* Boston: Beacon. (Original work published 1976)

Missing Link

The phrase *missing link* is a colloquial term describing a transitional form between taxa in an evolutionary

scheme. Because the primary tenet of evolution is morphological change over time, there is necessarily going to be transitional forms between any two species sharing an ancestor–descendant relationship. Charles Darwin recognized this, and in fact the apparent lack of transitional forms was one of the most significant concerns he expressed in *The Origin of the Species.* This concern reflected Darwin's belief that evolution occurred primarily through gradual changes. Therefore, most species at any one time in the past would be in a transitional state, and the fossil record should be full of such examples.

During the decade following the publication of *The Origin of the Species,* this philosophical idea came to underlie many subsequent works on evolution. A strong form of this belief was the development of recapitulation laws by several different researchers, most notably Ernst Haeckel. The law of recapitulation states that evolutionary adaptations proceeded as additions to the development cycle of organisms (ontogeny) and that, therefore, organisms encapsulate the adult morphology of their ancestors during their own growth and development. In other words, ontogeny recapitulates phylogeny. The development of genetics and embryology eventually discredited the simple idea that additional developmental stages are the sole mechanism of evolution, but the idea had a great impact on later research.

During the 1940s, Richard Goldschmidt proposed the idea that evolutionary novelties might have appeared instantaneously, within one generation, through mutations in parts of the genome responsible for developmental changes. This idea became known as the "hopeful monster" hypothesis. Although there are a few limited cases of significant change that can occur between generations (e.g., possibly hairlessness in the naked mole rat), the vast majority of mutations affecting major developmental sequences are lethal or extremely maladaptive. The upshot of the hopeful monster hypothesis is that evolutionary change could occur nearly instantaneously and that transitional forms might not exist at all in some cases. This hypothesis is largely considered incorrect with regard to phyletic change, but modified forms of the hypothesis that focus on fast evolutionary change are still strongly considered for particular evolutionary sequences. Punctuated equilibrium, in particular, was strongly influenced by this idea.

When the term *missing link* is used, many individuals think of transitional forms between very disparate taxa such as *Archaeopteryx,* which has been presented as a transitional form between birds and reptiles. However, taxa do not reproduce to create other taxa. Rather, individuals reproduce to create other individuals. Therefore, the only true missing links that can exist are individual organisms that form a distinct lineage. There is no single individual that marks a transition between ancestor and descendant; instead, all conspecifics are links with characteristics that show variation. The limits of the fossil record might seem to show *Archaeopteryx* as a fantastic chimera of avian and reptilian features, but the individual specimen was simply a member of a variable lineage and was little different from its parents or its offspring. There are rarely hopeful monsters in evolution.

The politico-religious creationism movement has focused much of its antievolution effort on the erroneous concept of missing links. Creationists often challenge researchers to provide morphological intermediates clearly linking widely disparate taxa. However, when presented with such fossils, they claim that the fossils simply show a different species or member of one of the proposed ancestor/descendant species. These groups never accept any evidence as truly transitional. Fundamentally, there is an expectation that researchers provide the ultimate missing links—individuals—and then sequence every individual that existed between two disparate taxa, else there still be missing links in the ancestral chain between them. The paleontological record will simply never accommodate such an expectation due to taphonomic and collection bias.

There will always be gaps in the paleontological record and, therefore, missing links in the evolutionary sequence of virtually all species. Evolutionary change happens over time (whether relatively quickly or slowly), and a simple typological approach that expects the fossil record to show perfect morphological intermediates connecting taxa is unrealistic. Missing links are not a failing of evolutionary explication; rather, they are simply a consequence of the limitations of the fossil record.

— Christopher David Kreger

Further Readings

Darwin, C. (1859). *The origin of the species.* London: John Murray.

Eldridge, N., & Gould, S. J. (1972). Punctuated equilibria: An alternative to phyletic gradualism.

In T. J. M. Schopf (Ed.), *Models in paleobiology* (pp. 82–115). San Francisco: Freeman, Cooper.
Goldschmidt, R. B. (1940). *The material basis of evolution.* New Haven, CT: Yale University Press.
Gould, S. J. (1977). *Ontogeny and phylogeny.* Cambridge, MA: Harvard University Press.
Martin, R. A. (2004). *Missing links: Evolutionary concepts and transitions through time.* Sudbury, MA: Jones & Bartlett.

Modal Personality

Modal personality was the term used by anthropologist Cora DuBois in her 1944 monograph *The Peoples of Alor: A Social-Psychological Study of an East Indian Island,* based on research carried out in the Alor islands of Indonesia during the late 1930s. The Alor study focused on issues and methods involving both anthropology and psychology. It was designed specifically to explore cross-culturally the potential for the existence of a basic human personality structure embedded in specific sociocultural settings and social–institutional structures. The academic quest was for an applicable statistical mode of analysis to be used in studying personality trait variance cross-culturally.

Methodologically, DuBois applied, tested, interpreted, and integrated standard culture and personality methods supplemented by then standard psychoanalytic testing methods. Many of the research concerns focused on in DuBois's fieldwork, regarding the structure of human personality, were addressed at seminars of the New York Psychoanalytic Society. This forum was headed by Freudian psychoanalyst Abram Kardiner, who had received training in Boasian anthropology. The challenge was to formulate psychocultural testing procedures and explanations in the search for the existence of basic personality differences and similarities while simultaneously exploring the potential for specific personality types linked to specific cultural institutional structures in varying cultures.

What developed from DuBois's fieldwork was the concept of a modal personality. *Modal personality* was defined in *The People of Alor* as "the product of the interplay of fundamental physiologically and neurologically determined tendencies and experiences common to all human beings acted upon by the cultural milieu, which denies, directs, and gratifies these needs very differently in different societies." In other words, biology provides the physical backdrop for an innate personality structure that is then molded by specific cultural practices/institutions in the development of unique group personality types. Cultures then adapt to their surroundings through selected reinforced attitudes, actions, beliefs, and values based on the available basic human biological mental structure. Personality in and of itself was recognized as a biological given. Specific personality formulations were then conceived of as a product of the social structure of the community. DuBois assumed from the beginning that there existed a "psychic unity of mankind" or a template on which a society further designs, redesigns, and manipulates personality traits according to that culture's unique and varied needs. Specifically, DuBois studied the relationship of variations in early mother–infant interaction, care, and treatment and the effects on later personality development within the Atimelang people on the island of Alor.

The primary methodological assessment tools used by DuBois, as shown by William Manson in *The Psychodynamics of Culture,* included autobiographies, life cycle descriptions, personality development, and projective tests (e.g., Rorschach test interpretations, children's drawings, responses to the Porteus maze, word association responses). All were standard tests used in psychoanalytic studies at the time.

Dubois's research was backed financially and professionally by the Science Research Council of Columbia University (Ruth Benedict) and was supported by noted culture and personality anthropologists of the time (including Margaret Mead and Gregory Bateson). The ongoing discussion seminars at the New York Psychoanalytic Society, run by Kardiner and others, formed the backdrop for presentations and interpretations of the ongoing research of DuBois and others. At the same time, Kardiner was developing his own theory of a basic human personality structure, later published in several different articles and texts. Kardiner's research into basic personality structure was described as an important milestone for both psychoanalytical and anthropological studies. This research was supported by other researchers such as Melton Singer, who commented that Kardiner's work was important because

it "combined both psychoanalysts and anthropologists into a new synthesis," interpreted as providing the possibility of a crossing and/or blending of traditional disciplinary boundaries.

The methodological device, applied by DuBois to the Alor population, included the application of both quantitative projective and nonprojective testing procedures in a fieldwork situation. At the time, anthropology was primarily qualitatively driven by methodology, so this was a new and exciting opportunity to bridge the gap between quantitative and qualitative research tools. The content of various tests, as applied in extensive fieldwork situations, was analyzed—not just by the primary researcher (DuBois), the anthropological standard of the time, but also including various quantitative and qualitative tests and data analyzed independently by nonanthropological behavioral scientists not present at the fieldwork site. This was in part an attempt to control experimental bias, as defined in the psychoanalytic field. DuBois supplied the ethnographic data to other researchers, not present in the field, who then interpreted, analyzed, and compared their findings with those of DuBois. The psychotherapist Emil Oberholzer was one of the independent interpreters of the Alor Rorschach test materials results, as was Kardiner, who independently analyzed the data collected on completed autobiographies of the Alor. It was one of the first times that this type of statistical analysis was being applied to ethnographic fieldwork in the culture and personality subfield of anthropology.

In the 1966 update of *The People of Alor,* DuBois refined her original modal personality concept by clarifying and delimiting her original concept: "Modal personality was the term I proposed at the time to designate central tendencies in the personalities of a group of people studied by means of more or less objective and cross-culturally applicable tests, as well as by means of observation and autobiographies. Modal personality was not an explicative concept. It was a purely static and descriptive one." In other words, what she chose to use was a part of many techniques that were available for field-workers at the time, not the sole criteria for establishing personality structure.

Early reactions to the concept of a modal personality varied but did trigger additional research on the subject by other anthropologists in different fieldwork settings. Anthony Wallace applied the modal personality and Rorschach protocols, developed by DuBois, to the Tuscarora Iroquois Indians of New York in his work titled *The Modal Personality of the Tuscarora Indians.* His primary research focused on exploring the existence and causes for deviant personality types. Wallace examined community influences on the molding of basic personality types. He engaged in a methodological refinement of DuBois's modal personality methodology that both supported and enhanced DuBois's initial use of systematic, objective testing assessment tools in searching for a basic personality type. Where Wallace experienced difficulty was in his ambitious attempt to collapse several different concepts including a modal personality: national personality, basic personality, social character, ethos, temper, psychological culture pattern, genius, and communal aspects of personality. He believed that they all referred to a "common class of phenomena," and this flaws his otherwise valuable work on the Tuscarora Iroquois and his methodological contributions. Yet we should also look at the work of Victor Barnouw, who in *Culture and Personality* further contributed that *modal personality* has been used interchangeably with *basic personality structure* by several researchers. Obviously, there have been issues surrounding this concept as a valid and distinct category in anthropology.

George Devereux next took the concept of modal personality and suggested that it be divided into two separate and distinct models—one psychological and the other sociocultural—each with its own form, content, and structure. Devereux's contribution was that social scientists and psychologists approach the same subject matter from very different theoretical and methodological stances. They are asking different questions and using different conceptual frameworks, so it is obvious that they also need to use different models of this same concept. Devereux suggested that there were basic differences between the "psychological–psychiatric (subjective) and sociocultural–historical–economic–political (collective) explanations of human phenomena. These two sets of disciplines study radically different phenomena." There was anxiety being created that anthropology was possibly being collapsed into psychology even though it is, was, and should remain a separate and distinct field. Devereux further supported his suggestion of a dual modal division by pointing out that psychiatry–psychology tends to focus on the individual (psychological), whereas the discipline of anthropology tends to focuses on the group (collective) or the social phenomena. He included a Hungarian

example to further illustrate his point of a difference between motivations of the individual Hungarian person and the motivations of the Hungarian people as a social group relative to a particular political topic. The individual and the group do not interpret reality in the same way because their motivations are different. Devereux attempted to show that because the motives would not be the same, the two factions should and must be studied and interpreted differently. Devereux was clearly stating that *modal* operates on at least two different levels and must be researched and analyzed with this in mind.

— *Beverly J. Fogelson*

Further Readings

Devereux, G. (1961). Two types of modal personality models. In B. Kaplan (Ed.), *Studying personality cross-culturally* (pp. 227–241). Evanston, IL: Row, Peterson.

DuBois, C. (1944). *The people of Alor: A social–psychological study of an East Indian island.* Minneapolis: University of Minnesota Press.

Kardiner, A. (1945). *The psychological frontiers of society.* Westport, CT: Greenwood.

Manson, W. C. (1988). *The psychodynamics of culture.* Westport, CT: Greenwood.

Singer, M. (1961). A study of culture and personality: Theory and research. In B. Kaplan (Ed.), *Studying personality cross-culturally* (pp. 9–90). Evanston, IL: Row, Peterson.

Models, Anthropological

Models are simplified representations of reality that help people to handle the largely undifferentiated mass of stimuli that impinges on their senses. *Model,* then, is a generic term for any systematic set of guesses or interpretations that people make about their surroundings. Some writers label these models as theories, hypotheses, theses, paradigms, propositions, or even just ideas. This entry discusses only two broadly applicable models: folk and analytic.

The models that guide us through our everyday concerns may be termed *folk models.* We have little control over these models; they were here before we were born, and we learned them as impressionable children. In practice, folk models tend to reflect the interests of the socioeconomic elite. Such an outcome might be expected given that members of the elite have the inherent power to control communications and symbols, to reward respectful behavior toward themselves, and to bring sanctions against those whose behavior expresses a dangerous deviation from "model" behavior. Folk models are stereotypical, specific, complex, largely supraindividual, and normative; use as little information as possible for as broad a formulation as possible; and contain no inherent mechanisms through which they may be tested, doubted, questioned, or rejected.

Analytic models, in contrast, are processual, general, simple, individually created, and explanatory and use as much information as possible to form as succinct a hypothesis as possible. Investigators create analytic models to explain what they observed. Folk models do not actually explain behavior and beliefs; instead, they label, justify, and valorize behavior and beliefs.

The components of both analytic and folk models are structure, function, and process. Structure refers primarily to description, which in analytic models is usually phrased in culturally neutral terms from an observers' viewpoint. Description in folk models, however, is only from the actors' viewpoint.

The function of a cultural entity refers to the consequences of its performance. These consequences, however, might not necessarily be the same as the conscious intention of the people. In fact, the long-term effect of the practice of many cultural beliefs and behaviors may be unintended and nonarticulated so far as the day-to-day life of the people is concerned. These hidden consequences are known as latent functions and are part of an analytic model; folk models do not contain a latent function.

Process is the component of models that handles change, history, and evolution. Process in most folk models is quite distorted, generally serving to indoctrinate members of a society with culture-specific values. Process in most analytic models reflects an empirical grounding in documented facts.

Analytic models are not superior to folk models; they simply serve different purposes. It might be expected that the use of analytic models will sharpen our powers of observation, stimulate our thinking, cause us to question the values and judgments that we once accepted without question, and encourage self-understanding. Finally, analytic models should help us to develop a degree of detachment in confronting

the issues of life; we should realize the flexibility of our own beliefs and standards as well as those of society.

— *Robert Lawless*

Further Readings

Bernard, H. R. (2000). *Social research methods: Qualitative and quantitative approaches.* Thousand Oaks, CA: Sage.

Galt, A. H., & Smith, L. J. (1976). *Models and the study of social change.* New York: John Wiley.

Hoover, K. R., & Donovan, T. (2003). *The elements of social scientific thinking* (8th ed.). Belmont, CA: Wadsworth.

Lave, C. A., & March, J. G. (1975). *An introduction to models in the social sciences.* New York: Harper & Row.

Modjokerto

In 1936, Ralph von Koenigswald announced the discovery of a fossil cranium from a very young child outside the village of Perning, near the city of Surabaya, in East Java. Unlike most of the fossil hominids from Java, the cranium of Modjokerto reportedly was recovered in situ. Recent dating of the specimen, using the new 40Ar/39Ar dating method, places Modjokerto at 1.81 million years ago. This is puzzling given that the earliest *Homo erectus* from Africa are placed roughly at the same date.

Assuming that early hominid skulls matured at the same rate as modern humans, the cranium of Modjokerto is that of a 4- to 6-year-old. It is nearly complete but is missing most of the face and parts of the base. It has a very small cranial capacity of approximately 650 cubic centimeters. If the child had survived into adulthood, the brain case would have grown to approximately 700 to 750 cubic centimeters. Based on the immature physical characteristics, von Koenigswald initially considered this specimen to be a new species that he named *Homo modjokertensis,* whereas Cora DuBois regarded it as a youthful representative of Ngandong Man.

Given its young age, the anatomical characteristics that would positively identify the species of the Modjokerto child had not yet developed. However, some beginnings of a *H. erectus* cranium can be seen, including a small but projecting brow ridge, strong postorbital constriction, nucal torus, angled occiput (between the occipital and nuchal planes), and spongy bone development at the cranial base. Most of these features can be found on the juvenile *H. erectus* specimen (WT 15000) from East Africa.

If the date of 1.81 million years ago is correct, the Modjokerto child is the oldest hominid that has been found so far in Asia. Given the very early date and the lack of distinct morphological features, this cranium could be from an earlier hominid.

— *Donald E. Tyler*

See also **Homo Erectus; Indonesia; Java Man; Meganthropus; Sangiran**

Further Readings

Huffman, O. F. (2001). Geologic context and age of the Perning/Mojokerto *Homo erectus,* East Java. *Journal of Human Evolution, 40,* 353–362.

Lewin, R., & Foley, R. A. (2004). *Principles of human evolution.* Victoria, Australia: Blackwell.

Shipman, P. (2001). *The man who found the missing link.* New York: Simon & Schuster.

Swisher, C., Curtis, G. H., & Lewin, R. (2000). *Java Man: How two geologists' dramatic discoveries changed our understanding of the evolutionary path to modern humans.* New York: Scribner.

Tyler, D. E. (1995). The current picture of hominid evolution in Java. *Acta Anthropologica Sinica, 14,* 313–323.

Mohenjo Daro

Since the beginning of excavation at this complex of mounds in 1921–1922, Mohenjo Daro became the most famous site of the "Indus" or "Indus Valley civilization," although the slightly earlier work at Harappa provided archaeologists with a type-site and the historical–cultural designation "Harappan." Even today, the terms *Harappan* and *Harappan civilization* are used as synonyms for Indus (or Indus Valley) civilization and refer to remains at Mohenjo Daro and numerous other sites that share recognizable features with Harappa. In fact, during the Bronze Age (ca. 2600–1900 BC), hundreds of settlements (some of

them quite large) dotted the transborder region of northwestern India and eastern and southern Pakistan. Although each of these Bronze Age sites has its own story, each also shared a sophisticated and distinctive cultural tradition that continues to inspire archaeological research and impress visitors.

Years ago, scholars suggested that Mohenjo Daro and Harappa, the latter of which was located approximately 400 miles to the northeast of Mohenjo Daro, were twin capitals of an empire. More recent surveys and excavations indicate that Mohenjo Daro was instead one of a number of urban centers (including Ganweriwala, Rakhigarhi, Dholavira, and Harappa) that served as hubs, perhaps like city-states, in a vast network of local and long-distance trade, all of which depended on the region's agricultural productivity. Residents at Harappan sites, including Mohenjo Daro, kept many species of domesticated animals, and various crops were grown, with wheat and barley being especially important. There is no hard evidence of irrigation, like that found in Egypt and Mesopotamia, but it is possible that floods destroyed such tangible remains or that the people of Mohenjo Daro used less elaborate systems to divert water. This Harappan economic network, which was concentrated in the alluvial plains of the Indus River and its tributaries, covered an area of at least 250,000 square miles and, at least in size, could be said to rival the territories united by rulers of ancient Egypt and Mesopotamia. The lack of historical accounts from this period and region makes it impossible to describe the political organization that created or protected this territory or to explain precisely how a major site such as Mohenjo Daro fits into the whole picture.

Mohenjo Daro itself is located in southcentral Pakistan's Sind province, on the west side of the Indus River, whose nearest branch is now located approximately 3 miles east of the site. Over time, the artificial mounds (evidence of long-term occupation and extensive use of mud brick), large portions of which remain unexcavated, have been severely eroded and destroyed by Indus flooding. The ruins cover approximately 250 acres, and population estimates for the ancient city range from 20,000 to 35,000. As is the case at Harappa, heavy alluvium has covered ancient occupational deposits at Mohenjo Daro and makes it impossible to determine precisely the site's size and population, which might have been considerably larger than current estimates.

The name *Mohenjo Daro* is modern and is usually translated as "Mound of the Dead"; like all Harappan sites, this city's ancient name is unknown. Mohenjo Daro is better preserved than Harappa, and its exposed remains are impressive in terms of the site's layout and the extent to which buildings have survived. The rising water table has made excavation of the site's earliest levels difficult and sometimes impossible, and the rising water table even threatens the survival of buried remains.

Although it does not show signs of a long development before the Mature Harappan era (between the 26th century and ca. 1900 BC), there was later occupation at Mohenjo Daro, although it ceased to be an urban center during the 20th century BC. Like other cities of the Indus Valley civilization, natural events (e.g., shifting river courses, catastrophic floods) probably account for this cultural decline. Nowadays, fewer scholars attempt to explain the rise and fall of these cities with reference to invasion and migration (e.g., the Aryan invasion).

Mohenjo Daro has witnessed a long history of excavation from the 1920s until more recent times. The current research on the Harappan civilization has raised questions about earlier interpretations (e.g., the nature and extent of defensive structures), but some of those views have stood the test of time. Broad horizontal exposure of ruins on both the high western mound (the so-called "citadel") and the lower town on the huge eastern mound indicate the existence of larger public buildings (e.g., the "Great Bath," the "Granary") and extensive blocks of residential areas (which include many two-story houses with stairways). The features that have made the name *Mohenjo Daro* famous include the lower city's grid or layout, with streets that divide the fired-brick houses into blocks and an elaborate system of drains, brick-lined wells, and private bathrooms. As a whole, the architecture reflects wealth and a detailed construction plan, although not enough of either to prevent the damage caused by catastrophic floods.

Like other cities in the Harappan realm, the affluent class of Mohenjo Daro acquired luxury products by exchanging with distant lands through a system of overland and maritime trade. Indeed, the Harappan traders and their partners abroad used a standard system of weights. Many kinds of crops were raised, and many animal species were kept, especially cattle. Mohenjo Daro also played an important role in the domestication of chickens. Valuable imports included gold, silver, copper, carnelian, lapis lazuli, and turquoise—the raw materials for metallurgists and

jewelers. Timber was brought in from the mountains, and cotton cloth was manufactured. Craftsmen of Mohenjo Daro used the potter's wheel and made small objects from elephant ivory and faience. Some terracotta figurines were used as toys, whereas others represented deities. Objects from the Indus Valley have turned up at distant sites in India and in Mesopotamia.

Excavations at Mohenjo Daro have recovered some sculptures in the round such as the famous steatite bust of a bearded man (perhaps a priest) and the equally famous bronze sculpture of a dancing girl. The greatest artistic accomplishment of the Harappans is seen in their small, square stamp seals (most of them carved out of steatite). These were used to show ownership and have been found in large numbers; they are the principal medium for the 4,000 short inscriptions in the still indecipherable Indus script. Although no temple has been identified at any Indus civilization site, insight into Harappan mythology and religion may be provided by some intaglio scenes on these steatite stamps, which display other plant, animal, and human figures.

The Indus civilization, and each of its component sites, is a virtual laboratory for the investigation of early political and economic centralization and decentralization. Sites such as Mohenjo Daro contain valuable data for studying continuity and change with a regional context in South Asia and beyond.

— Gerald L. Mattingly

Further Readings

Dales, G. F., & Kenoyer, J. M. (1986). *Excavations at Mohenjo Daro, Pakistan: The pottery.* Philadelphia: University Museum Publications.

Marshall, J. H. (Ed.). (1931). *Mohenjo-Daro and the Indus civilization: Being an official account of archaeological excavations at Mohenjo-Daro carried out by the government of India between the years 1922 and 1927.* London: A. Probsthain.

Possehl, G. L. (2003). *The Indus civilization: A contemporary perspective.* Walnut Creek, CA: AltaMira.

Monasticism

Monasticism, from the Greek root meaning "alone" (mono) and from the Latin *monachus* (monk), refers to an institutionalized religious form of life that is characterized by radical solitude and mortification. Although most often associated with great religious traditions of Judaism, Christianity, Hinduism, Islam, and Buddhism, elements of monasticism are also evident in other traditions. The basis of the phenomenon is captured in a Native American elder's words: "True wisdom is only found far away from people, out in great solitude, and it is not found in play, but only through suffering. Suffering and solitude open the human mind, and therefore [one] must seek wisdom alone."

The worldview of monasticism is the ideals of truth and purity. From this perspective, the ordinary world prevents individuals from reaching their spiritual potential, so that a separation is needed. Most commonly, the elements essential to this quest for spiritual perfection are (a) celibacy (i.e., the freedom from familial or physical impairments), (b) poverty (i.e., the relinquishment of comforts of the world), and (c) obedience to some other person, usually a teacher, leading to the surrender of one's own will. These facets of monasticism have fascinated anthropologists for some time, leading to a number of sociocultural interpretations for the motivation and functions of these institutions. For example, Robert Levy, Gananath Obeyeskere, and others have used their work in psychological analysis to explain motivations and cultural structures that underpin the monastic vocation in various cultures.

Monasticism is commonly divided into two types: cenobitic and eremitic. The cenobitic life is characterized by a communal form of existence and is the most common type. The eremetic life is characterized by the life of the hermits, who tend to live in solitude and rarely are in contact with other humans. Most monastic traditions have elements of both. However, the Christian tradition of the Desert Fathers, the contemporary Carthusians, and the Jain ascetics are most often cited as eremitic groups.

Institutionalized monastic traditions are found in Jainism, Buddhism, Taoism, Christianity, Islam, and Judaism. Monasticism was also an element in the Vestal Virgins of Rome, the Peruvian Virgins of the Sun, and the Therapeutae of Egypt. The development of monastic systems runs parallel to the development of state systems in world history and to the organization of full-time religious specialists and the concern with secularization of society. Each of the monastic traditions depends on a philosophy of dualism in

which the world is viewed as corrupt, a burden, or evil. The element of the human that sets one apart from nature is commonly referred to as the soul. In the monastic philosophy, then, the soul must be purified from matter. The universal process of this dualistic opposition is one of bodily mortification and contemplation and study on spiritual things.

Source: © iStockphoto/Jan Raedschelders.

Hindu Tradition

The Hindu tradition of monasticism is often viewed as the oldest form of monasticism. The Sramanas (Sanskrit: "recluse") gathered circa 1500 BC to study the Vedic and practiced bodily mortifications. Also present in Proto-Dravidian and Pre-Aryan areas, these groups developed eremitic styles as well. By 600 to 200 BC, the ashram was an institution primarily for eremitic sects in India.

With the rise of Jainism, the ashrams became organized monastic centers. Jainism, which is noted for its attention to self-denial and mortification, has been especially important in the Hindu monastic tradition. The early organizer, Mahavira, originally established centers of professed monks and nuns who were ministered to by the local laity. An important development was the rejection of the caste system by the Jains and the later general disinclination to allow nuns (especially among the Digamboras). The ascetic life of the Jain monk is that of a wanderer whose five vows are those of nonviolence, truthfulness, nonstealing, chastity (i.e., no dealings with gods, humans, or animals of the opposite sex), and being indifferent to all things experienced through the senses. There has never been a well-organized system of monasticism in Hindu outside of the empire of Baktashiyah in Turkey. Each ashram is independent of the others, allowing a monk/nun to enter and leave relatively easily from any ashram.

Buddhist Tradition

The development of Buddhist monasticism is directly related to the Gautama Buddha (ca. 560–480 BC). According to the Buddha, the perfection of the Hindu way could be attained only through withdrawal from the world. Only those who dedicated themselves to the religious life could attain perfection or Nirvana. As with Jainism, Buddha chose to ignore caste differences and initially opposed the inclusion of nuns in the monastic endeavor. The original Sanga, or organization, was based on relative moderation of discipline and mortification and on a close relationship with the laity. The contemporary Theravada tradition of Southeast Asia is often viewed as an example of this form of monasticism.

Buddhism is a way of life that is essentially monastic in its ideal form. One can attain the perfection of life only by denying the reality of the world and seeking release in meditation. To strip dependency on the self, monks typically will beg for alms and food and will strive to develop the desired characteristics of humility and tranquility. Again, because Buddhist monasteries are also independent of one another, the

rule of the individual abbot varies from place to place. There is relative ease of movement for the monks from one monastery to another or back to the laity.

The levels of importance and dominance of Buddhism among the cultures of Southeast Asia are diverse. Buddhism has dominated life in some countries, such as Burma and Thailand, and in many countries all men are expected to spend some time in monastic enclosures. Buddhist monasticism probably reached a height of influence in Tibet, where monks composed more than a fifth of the population and the Dali Lama ruled the country for more than three centuries. In Ceylon, the local abbot also often served as the local secular judge. Some thousand years after the death of the Buddha, the Zen form of Chinese Japanese Buddhism became a defining revitalization movement in parts of Southeast Asia. Zen Buddhism, allegedly, a truer form of the Buddha's intention for the attainment of perfection, is characterized by rigorous disciplines of contemplation and scholarly pursuits.

Christian Traditions

Monasticism in the Western and Eastern Christian traditions is characterized by a great deal of organization. Although it has never been as dominant as a way of life as has Buddhist monasticism, it has played a very important role in cultural continuity and adaptations. Usually, it is traced to the antisecular movements of the 3rd century AD and to St. Anthony in Egypt, whose form featured the desert anchorites. The Eastern tradition of monastic enclosure is attributed to St. Basil of Caesarea (379 AD) and his sister, St. Macrina the Younger, whereas the Western tradition is attributed to St. Benedict of Nursia (ca. 500). Each of these initial movements was based on a neo-Platonic philosophy of dualism and the withdrawal from the world to contemplate and attain holiness. Also noteworthy here is the fairly radical cultural relative equality of women in the monastic movements.

The spread of monasticism in the Byzantine Empire was rapid, following the establishment of Christianity. It was well established in the East by the 7th century AD and as far as Moscow by the 14th century. To the West, monastic communities were well in place by the 4th century AD in Gaul and by the 5th century in Ireland, Carthage, and Italy. By the early Middle Ages, monasticism had become a defining and powerful economic, political, and religious entity in Europe, with many monasteries controlling land, labor, and commerce.

One of the most significant factors that separate Western monasticism from other monastic forms is the Rule of St. Benedict. Whereas St. Bruno established the Catholic eremitic tradition at Chartres, France (Carthusians), Benedict's monastic community at Monte Cassino, Italy, during the 5th and 6th centuries AD became the role model for highly organized and detailed ways of living that became a way of uniting most of the European monasteries. Individuals living according to this tradition vow perpetual chastity, poverty, and obedience to their abbot and also vow stability to the particular monastery. So, rather than the transitional monasticism of the other great traditions, monks of the Western church became institutionalized professionals and often were elevated to high offices within the Roman Catholic Church. The monks of the West labored in fields, illuminated manuscripts, and devoted themselves to lives of silence, prayer, and study. It was through this diligent regime that the first Western universities came about during the 13th century.

Unlike Buddhist traditions, the Christian traditions became quite popular and welcoming to women. The abbesses of these communities could often attain a great deal of power and prestige. The relative autonomy and access to some venues of learning provided many women with an alternative to their limited options as females in many European countries.

The power centralized in the large monastic communities often led to accumulation of great wealth and prestige. During the 14th and 15th centuries AD, St. Francis of Assisi and St. Dominic led monastic reform movements that attempted to renew poverty as a defining element of the monastic/communal life. Thus, the order of friars, or monks who are also involved with worldly daily life but who live a mendicant lifestyle, was formed. However, the Protestant reformation of the 15th and 16th centuries eradicated monasticism from Protestant areas. They were not reestablished into Protestantism until the Oxford movement of the 19th century in England and after World War II in Taize, France.

Judaic and Islamic Traditions

Judaism and Islam have some elements of monasticism, but they have a much less dominant impact on their history. Withdrawal from the world is not necessary

to find salvation for either religion. In fact, an active engagement with the world is often viewed as a virtue. Muhammad stated that "there are no monks in Islam," and except for some Sufi sects, the Sensui of Sudan, and the Sahara, this remains the case today. Similarly, Judaism has had some elements of monasticism during periods of stress and upheaval (e.g., the Essene community) but has never promulgated a separation of the person from the community.

Monasticism continues to be an important institution in the Christian, Buddhist, and Hindu cultures. The West experienced a resurgence of monastic vocations after World War II, and many monks had a vital role during the Vatican II reforms of the 1960s. Buddhist monasticism experienced a revival during the latter part of the 20th century as well, with a great deal of interest spurred by the persecution of monks in Tibet, China, and elsewhere. And although India has witnessed a great deal of industrialized development, the ascetic path remains an important sociocultural institution for the many Hindus. In the area of anthropology, current scholarship includes psychological studies of monastic methods and motivations, the form and function of monasticism in defining culture stability and change, and the role of monasticism in religious consciousness.

— *Ted Fortier*

Further Readings

Berman, C. H. (2000). *The Cistercian evolution: The invention of a religious order in twelfth-century Europe.* Philadelphia: University of Pennsylvania Press.

Gilchrist, R. (1994). *Gender and material culture: The archaeology of religious women.* New York: Routledge.

Goehring, J. E. (1999). *Ascetics, society, and the desert: Studies in Egyptian monasticism.* Harrisburg, PA: Trinity Press International.

Johnston, W. (Ed.). (2000). *Encyclopedia of monasticism.* Chicago: Fitzroy Dearborn.

Mills, M. A. (2003). *Identity, ritual, and state in Tibetan Buddhism: The foundations of authority in Gelukpa monasticism.* New York: Routledge–Curzon,

Simons, W. (2001). *Cities of ladies: Beguine communities in the medieval low countries, 1200–1565.* Philadelphia: University of Pennsylvania Press.

Suzuki, D. T. (1964). *An introduction to Zen Buddhism* (with a foreword by C. G. Jung). New York: Grove.

Theodoret. (1985). *A history of the monks of Syria by Theodoret of Cyrrhus* (with an introduction and notes by R. M. Price, Trans.). Kalamazoo, MI: Cistercian Publications.

Viker, K. S. (2000). Sufi brotherhoods in Africa. In N. Levtzion (Ed.), *History of Islam in Africa* (pp. 441–476). Athens: Ohio University Press.

Wu Yin, B. (2001). *Choosing simplicity: A commentary on the Bhikshuni Pratimoksha by venerable Bhikshuni Wu Yin* (B. J. Shih, Trans., B. T. Chodron, Ed.). Ithaca, NY: Snow Lion Publications.

Mongolia

Located in Northeast Asia between the Russian Federation and the People's Republic of China, landlocked Mongolia covers an area of roughly 1.6 million square kilometers. Vast steppe regions, mountain areas, and desert areas dominate the country's physical geography, and its continental climate yields long cold winters and brief summers. These basic ecological features have provided the foundation for past and present understandings of the history and culture of the area's peoples. Given the country's considerable size, its population is relatively small at approximately 2.5 million people. Fully 80% of the population is considered to be Khalkha Mongolian, with the second largest group, the Kazakhs, represented in much smaller numbers at 6%. Peoples identified as being of Mongolian descent, however, live beyond the country's political borders in neighboring regions to the north and south. Mongolian populations have been fluid, contracting and expanding across the region and varying with the time period under consideration: the pre-Mongol Empire, the Mongolian Empire, the Manchu-Qing period, or modern Mongolia. This situation is recognized by most anthropological work, which predominantly examines mobile pastoralism, genetic origins, cosmology and religion, social organization, and post-socialist transformations within a broad framework that does not necessarily limit itself to the borders of the modern Mongolian state.

With the establishment of the Communist-based Mongolian People's Republic in 1924, Russian and

Mongolian scholars trained in the Soviet tradition of ethnology dominated research throughout much of the 20th century. Anthropologists from the West gained greater access to research with the country's transition to a democratic system of government during the 1990s. Many research teams now conduct multiparty cooperative research with international teams such as the Joint Mongolian–Russian–American archaeological expeditions. Although a significant amount of research from scholars around the world has been conducted since this period, much of this work remains unpublished or available only in journal articles and online materials. Popular perceptions of Mongolia and its peoples have arguably been shaped by the country's most well-known historical figure, Chinggis (Genghis) Khan, and by the early expeditions into the region by explorers best exemplified by Roy Chapman Andrews (1884–1960). Andrews's expeditions in Central Asia for the American Museum of Natural History provided a wealth of archaeological and ethnographic data that still contribute to ongoing research.

Early anthropological work sought to identify and describe the various groups in the area, emphasizing cultural traits that would, on the one hand, distinguish these groups from each other and from the more sedentary peoples around them and, on the other, enable anthropologists to hypothesize their origins and the possibility of common ancestors. Archaeologists continue to examine material artifacts to help them uncover the different ethnic identities present on the Central and Inner Asian steppes. Physical and biological anthropologists, using genetic and morphological studies, are reassessing evolutionary frameworks for the earliest migrations of modern humans and later migration patterns and development within Asia and the Americas, underscoring the need for more complex understandings of migration. Language has also been used as a marker for differentiating the peoples of the steppe region. Placed within the Altaic language family, the Mongolic languages and their similarities in general structure, agglutination, and vowel harmony have been considered as evidence of the origins of and links between Altaic peoples and also been used to posit theories about shared ancestors or waves of migratory groups. Anthropological inquiries into the peoples of Mongolia have been prompted not only by questions about the population's genetic history but also by historical and contemporary research into the relationships between the area's ecology and its peoples, especially their social practices. Research on Mongolian populations have also focused on the role of borders and boundaries, challenged stereotypes and assumptions held about pastoral peoples both within the discipline and in public perceptions, examined the relationship between ecology and social organization, and highlighted the sociopolitical dimensions of cultural change (particularly during recent years with the impact and aftermath of the socialist transformation).

One of the most well-known scholars associated with anthropological work in the region is Owen Lattimore (1900–1989). In his examination of the origins of differentiation between Inner Asian peoples, Lattimore questioned the barbarian–civilized dichotomy. This dichotomy was based partially on historical and archaeological data on Neolithic groups that were used to rank them in accordance with their perceived level of "advancement." Lattimore preferred a theory that explained divergent political formations (the rise of the state) and economic strategies (the rise of irrigation and rice culture) based on ecological differences in the region. In his *Inner Asian Frontiers of China,* Lattimore presented the idea of "frontier zones" as an analytical framework for describing the peoples and their relations in the area. When described as zones, the permeable and fluid nature of interactions and relationships in these areas is underscored. Lattimore's work opened avenues for later scholars due to its emphasis on cultural exchange in opposition to a presumption of unilineal acculturative forces as others scholars had suggested up to that point. More recent work addresses the legacy of the primitive/barbarian typology as well as ideas of "peripheralness" that continue to have strong social, economic, and political impacts for the peoples in this region. This work included, but was not limited to, issues of identity, processes related to urbanization, and development.

Archaeological evidence demonstrates that mobile herding has taken place across Mongolia's grasslands for at least 2,000 years. Pastoralists in Mongolia practice a complex form of pastoralism involving the herding of several different kinds of livestock across seasonal pastures. Our understandings of a mobile pastoral lifestyle in the region are based largely on which historical period these studies examined, where comparisons of the given situation were often made to an idealized form of pastoralism prior to the advent of new systems. Pastoralism is often treated as

Source: © Dean Conger/CORBIS.

belonging on a spectrum where one end is the ideal pure form (complete mobility), the middle is a combination of different strategies (seasonal pasturing and some agricultural activities), and the other end is total sedentarization of herders (with acculturative forces often given as the cause). Emphasis is frequently placed on the impact of political systems on the demography of these populations and on the ecology of the area. Ecologically based and so-called culturally based arguments present pastoral and sedentary lifestyles as antithetical to one another rather than recognizing possibilities for diversity within these strategies. One recent line of research suggests that these systems' effects, although varied and of differing time depths, demonstrate the flexibility and compatibility of mobile pastoralism with a variety of political and economic systems. As such, mobile pastoralism should be considered as a strategy fully compatible with circumstances on the steppes today.

Debates over the processes and impact of sedentarization and acculturation coexist with debates over colonization and modernization in the entire region. Colonization by the Japanese in northern China and the political and cultural domination of Mongolia by the Soviet Union contributed to population movements that affected not only the ecology but also the structure of people's lives. Descriptions of Mongolian social structure as it existed during the pre-Communist period focused on patrilineal descent and patron–client relationships as dominant forms of social organization. During the Communist period in Mongolia, kinship structure as the basis of social organization became less significant. As production teams of nonkin established by the government became more integrated, relations with kin outside became less important in terms of pastoral production. Kinship ties remained important to procure goods and services unavailable in rural areas so as to ensure the survival of the household. Within the household unit, its operations, division of labor, and ordering of space remained much the same. During the post-Soviet era of privatization, social relationships have changed and scholars are placing greater emphasis on the use of networks to describe social relations within and between pastoral groups, focusing on local ideas of herding groups (*ail*) to examine relationships between kin and relations based on

economic interaction, on use of pasturelands, and on friendship. Structural reforms put in place after the fall of communism also created new conditions that prompted a reevaluation of pastoralism in the area. Recent work focuses on indigenous notions of land use and their interplay with political and legal frameworks and on the larger issue of sustainable pastoral development. Anthropologists have pointed to the incompatibility of notions of land privatization with traditional notions of land ownership described by one scholar as "custodial." Current land law in Mongolia supports public ownership of pastureland. Continuing challenges to pastoral lifestyles have spurred anthropologists to examine both local and global dimensions of political economy and how these often adversely affect cultural norms and values.

Research on religion in Mongolia tends to focus on shamanism, Buddhism, or a specific combination of Buddhist and shamanistic traditions. Shamanism or traces of shamanistic traditions are found throughout Turkic, Mongolian, and Siberian peoples, and researchers have emphasized a general similarity of features within the shamanistic practices in the area (part of a larger academic debate over the universality of shamanistic traditions). This amalgamation of Buddhism and shamanistic traditions is of particular interest to regional scholars interested in placing shamanism in relation to what they see as later traditions—Buddhism, Islam, and (to a lesser extent) Christianity. Research has shown a general resurgence of interest with the change in government. Mongolian concepts about nature are described as an active relationship where nature is conceived as complementary to, and not subordinate to, humans. Many objects in nature are considered to have spirits and relationships with these objects that are described in ways similar to those of human interactions. One example of shamanistic elements, whose survival during various periods may be linked partially to their incorporation into Buddhism, is the stone cairns (*oboos*) and rituals performed around them. They received much scholarly attention in part because these enactments highlight the relationship between humans and the spiritual world—one of responsibility to maintain a balance with nature. This relationship entails an obligation to spiritual authorities similar to that of secular authorities and the maintenance of good relations with the spiritual ones to ensure prosperity. In both social order and indigenous notions of land rights, we can observe these ongoing and often reformulated meanings.

In spite of the marked political, economic, and social transitions in Mongolian history, the preceding themes of religion, social relations, and pastoralism remain a significant part of ongoing research. The upheavals of the postsocialist transformation have reinvigorated the study of earlier models and well-established themes about the area and its peoples, revealing a richer and more complex set of processes that will continue to provide fertile ground for new research.

— *Megan Tracy*

Further Readings

Academy of Sciences, Mongolian People's Republic. (1990). *Information Mongolia.* New York: Pergamon.

Barfield, T. J. (1989). *The perilous frontier: Nomadic empires and China.* Oxford, UK: Basil Blackwell.

Brunn, O., & Odgaard, O. (Eds.). (1996). *Mongolia in transition: Old patterns, new challenges.* Richmond, UK: Curzon Press.

Grousset, R. (1970). *The empire of the Steppes* (N. Walford, Trans.). New Brunswick, NJ: Rutgers University Press.

Humphrey, C., & Sneath, D. (Eds.). (1996). *Culture and environment in Inner Asia* (2 vols.). Cambridge, UK: White Horse Press.

Humphrey, C., & Sneath, D. (1999). *The end of nomadism? Society, state, and the environment in Inner Asia* (Central Asia Book Series). Durham, NC: Duke University Press.

Lattimore, O. (1940). *Inner Asian frontiers of China,* Vol. 21: *American Geographical Society research series.* New York: American Geographical Society.

Sinor, D. (Ed.). (1990). *The Cambridge history of early Inner Asia.* Cambridge, UK: Cambridge University Press.

Monkey Trial [1925]

On July 10, 1925, a high school biology teacher, John T. Scopes of Dayton, Tennessee, was charged in court with teaching evolution in violation of the Butler Act, a law recently passed by the Tennessee State Assembly that made it an offense to teach "any theory that denies the . . . Divine Creation of man." The "Monkey Trial" attracted worldwide attention, filling the

newspapers for weeks as two of the leading lawyers of the day, William Jennings Bryan for the prosecution and Clarence Darrow for the defense, battled it out in the stifling Dayton courtroom. Once the trial was over, it was replayed in books, movies, and plays, being immortalized most memorably in only slightly fictionalized form by the 1960 Stanley Kramer film *Inherit the Wind*. Inevitably, the facts of the trial became lost in a haze of mythology.

Source: Courtesy, Library of Congress.

In the popular myth, Scopes was represented as an innocent victim and the trial itself was represented as an unequivocal triumph of science over religion. Darrow was portrayed as the winner, and Bryan died of a broken heart shortly after losing. The facts are different. Scopes, a substitute teacher with a strong interest in the freedom of expression but no particular attachment to evolutionary theory, had volunteered at the prompting of the American Civil Liberties Union to participate in a deliberate test of the Butler Act. Indeed, it was Scopes himself who had betrayed his actions to the authorities. The case actually was won by the prosecution. However, the judge did not allow the merits of evolution versus creation to be debated in the courtroom, instead restricting argument to whether the law as written had actually been broken—and of course it had been. Although Bryan did die not long after winning the case, he died not from sorrow but rather from complications of diabetes.

Still, the importance of the Monkey Trial lay far less in its legal aspects than in the realm of public perception. Both Bryan and Darrow used every ploy possible in arguing their sides, and even though Scopes admitted breaking the law and was fined $100 at the time (the conviction was later overturned on a technicality, and the state did not see fit to return to court), the cross-examination on both sides yielded the material for high drama. In the court of public opinion, reinforced by continuing media coverage, there was little doubt that Scopes and Darrow had won. All in all, then, the case turned out to be a Pyrrhic victory for the creationist side. Nonetheless, the Scopes Monkey Trial did not lay to rest the matter of teaching evolution versus creationism. Activist fundamentalists in Mississippi and Arkansas soon passed bills similar to the Butler Act, which itself was not repealed until 1967. Another trial, "Scopes II," was to follow in Arkansas in 1981, although this time the finding was in favor of the opponents of "creation science." The issue has not gone away and seems unlikely to do so any time soon.

— Ian Tattersall and Kenneth Mowbray

Further Readings

Fuyuyma, D. (1983). *Science on trial: The case for evolution.* New York: Pantheon.

Gilkey, L. (1985). *Creationism on trial: Evolution and God at Little Rock.* Minneapolis, MN: Winston.

Godfrey, L. (Ed.). (1983). *Scientists confront creationism.* New York: Norton.

Monkeys, New World

New World monkeys (NWMs), also known as platyrrhines, live in tropical forest environments from

Source: © iStockphoto/Ana Pinto.

southern Mexico down through South America. The name *platyrrhine* comes from the broad, flat, external nose characteristic of this group of primates. There are more than 50 species of NWMs, all of which are predominantly arboreal and herbivorous. NWMs are divided into two families: Atelidae and Cebidae.

The first family, Atelidae, is divided into three subfamilies: Atelinae, Callicebinae, and Pitheciinae. The four genera of Atelinae (howling monkeys, spider monkeys, woolly monkeys, and woolly spider monkeys) are the largest of the NWMs, each weighing approximately 10 kilograms. All members have long, grasping, prehensile tails that can be used as a fifth limb. The second subfamily, Callicebinae, has only one member, *Callicebus* (titi monkeys). Titi monkeys are monogamous and eat mostly fruits, but they also eat leaves and insects. The third subfamily, Pitheciinae, is composed of three genera: *Cacajao, Chiropotes,* and *Pithecia.* Pitheciines are known for their strong teeth and the ability to bite through the outer coverings of fruits and seeds that are generally too hard for other monkeys to open.

The second family, Cebidae, is composed of four subfamilies: Aotinae, Callithrichinae, Cebinae, and *Incertae sedis.* Like the Atelidae, some members of this family have prehensile tails. However, cebids have larger brains and more rounded, globular heads than do atelids. The first subfamily, Aotinae, has one genus, *Aotus,* commonly known as owl or night monkeys. Owl monkeys are the only nocturnal higher primate. As a result, they have the largest eye sockets of any anthropoid (higher primate). Individuals in the second subfamily, Callithrichinae, are the smallest NWMs. Callitrichines (tamarins, marmosets, and Goeldi's monkeys) have derived claws (instead of nails) that enable them to cling to tree trunks while feeding. In the third subfamily, Cebinae, there are two genera: *Cebus* (capuchins) and *Saimiri* (squirrel monkeys). These two monkeys are the most omnivorous, as well as the most well-known, NWMs. In addition, there are at least a couple dozen NWMs that are extinct, many belonging to uncertain taxonomic positions grouped as *I. sedis.*

The evolutionary history of the NWMs extends back approximately 30 million years to the ancestral platyrrhines, who may have reached the New World by rafting across the Atlantic Ocean from Africa. One of the oldest platyrrhine fossils is the Oligocene primate *Branisella.*

Today, many NWMs are endangered, especially some of the callitrichines. Although some of the larger species are hunted, deforestation and popularity as pets generally pose the biggest threats to many NWM species. Woolly spider monkeys are one of the most critically endangered primates. Their numbers dropped from 400,000 when Europeans first arrived in South America to 700 in 1996. However, there is hope for some NWMs such as golden lion tamarins, which are a critically endangered species that, through captive breeding programs, have been reintroduced to the wild successfully and are slowly creeping back from the edge of extinction.

— Lisa M. Paciulli and Andreas Jensen

See also **Cebids**

Further Readings

Coimbra-Filho, A. F., & Mittermeier, R. A. (Eds.). (1981). *Ecology and behavior of neotropical primates.* Rio de Janeiro: Academia Brasiliera de Ciencias.

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego: Academic Press.

Hershkovitz, P. (1977). *Living New World monkeys (platyrrhini) with an introduction to the primates* (Vol. 1). Chicago: University of Chicago Press.
Kinzey, W. G. (1997). *New World primates: Ecology, evolution, and behavior*. New York: Walter de Gruyter.
Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.
Terborgh, J. (1983). *Five New World primates.* Princeton, NJ: Princeton University Press.

Monkeys, Old World

Old World monkeys (OWMs) are one of two major groups of monkeys, consisting of all primates belonging to the family Cercopithecidae. The family is composed of 18 genera and approximately 90 species, including baboons, colobines, guenons, and macaques.

OWMs are found throughout large portions of Africa and Asia, living in a wide range of habitats. They range from the savannas of Africa, to the tropical rain forests of Indonesia, to the snowy regions of Japan. Most OWMs are arboreal (tree dwellers), whereas some are terrestrial (ground dwellers). OWMs are nearly completely diurnal, meaning that they are active during daylight hours. Group structures among OWMs vary greatly. Most species live in social groups that consist of several adult males and females with their offspring.

Certain physical traits characterize OWMs. They are medium to large primates with body sizes ranging from 1 to 40 kilograms. They do not possess a prehensile tail like the other major group of monkeys (New World monkeys). OWMs' forelimbs are shorter than their hindlimbs and are characterized by narrow elbow joints. They are quadrupedal animals, meaning that they use all four limbs to locomote. OWMs have a narrow nose with a narrow palate. They also have four cusps on their molars that form two parallel ridges called bilophodont. Most species of OWMs have special sitting pads on their behinds called ischial callosities. In addition, many species are sexually dimorphic in body size, meaning that the males are larger than the females of the same species.

The earliest fossil evidence of OWMs comes from remains of the family Victoriapithecidae and dates to the early Miocene (approximately 20 million years ago) in Africa. The family Cercopithecidae is divided into two distinct subfamilies based on features related to dietary adaptations. The first subfamily, Cercopithecinae, is composed of guenons and papionins. The latter group includes baboons, mangabeys, and macaques. The cercopithecines are omnivorous and have cheek pouches in which they can store food temporarily. Guenons, baboons, and mangabeys are exclusive to Africa. Macaques, on the other hand, are found predominantly in Asia. The second subfamily, Colobinae, is divided geographically. The colobines in Africa are referred to as colobus monkeys, whereas those in Asia are referred to as langurs or leaf monkeys. This is because their diets consist nearly entirely of leaves and unripe fruits and nuts. As such, they have a highly specialized, cow-like stomach that allows them to digest the cellulose in leaves.

De Brazza's monkeys (*Cercopithecus neglectus*) are one of the more recognizable guenons due to their unique facial hair and white beard. Some well-known papionin species include the sometimes snow-dwelling and hot spring-bathing Japanese macaques (*Macaca fuscata*) and brightly colored mandrills (*Mandrillus sphinx*). Long-haired Eastern black-and-white colobus monkeys (*Colobus guereza*) are notable African colobines. Most well known among the Asian leaf monkeys are the well-studied Hanuman langurs (*Semnopithecus entellus*) from India and the very large-nosed proboscis monkeys (*Nasalis larvatus*) of

Source: © Robert Jurmain.

Borneo. Because of habitat loss and hunting, approximately one third of OWMs are endangered.

— Jason M. Kamilar and Nicholas L. Roehrdanz

See also **Baboons; Macaque; Monkeys, New World**

Further Readings

Fa, J. E., & Lindburg, D. G. (Eds.). (1996). *Evolution and ecology of macaque societies.* Cambridge, UK: Cambridge University Press.

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego: Academic Press.

Glenn, M., & Cords, M. (Eds.). (2002). *The guenons: Diversity and adaptation in African monkeys.* New York: Kluwer Academic/Plenum.

Oates, J. F., & Davies, A. G. (Eds.). (1994). *Colobine monkeys: Their ecology, behaviour, and evolution.* Cambridge, UK: Cambridge University Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Whitehead, P, F., & Jolly, C. J. (2000). *Old World monkeys.* Cambridge, UK: Cambridge University Press.

Monogamy

Monogamy refers to the norm or condition of a single male mating with a single female by forming a "pair bond," with both defending territory and caring for the young. The need to care for the young necessitates many of the species to enter into monogamous relationships. For example, monogamous male parent birds care for the young by watching for danger (willow ptarmigans) or defending a territory with a nest cavity (eastern bluebirds), whereas his mate collects the food to feed the offspring. Male birds are involved further in most passerines, where they feed brooding females and/or help to feed the young. In herons, egrets, some woodpeckers, and others, males not only provide food for the young but also share in incubation. On the contrary, for species whose males contribute little or nothing to rearing the young, females are very choosy in selecting the best mates. Males of these species compete to be chosen and are not themselves choosy. Females of these species, because of their biological ability to produce only a limited number of offspring, prefer mating with only the best males. From the male point of view, mating many times and with many females increases the chances of producing surviving offspring. Therefore, males must invest their energy to make themselves more attractive and appealing to as many females as possible. For example, the magnificently tailed peacock's elaborate train does nothing to enhance survival but is necessary for attracting mates.

The monogamous "bond" may vary from a single season to a lifetime. For example, most of the birds seem to form a monogamous bond that lasts from as short a period as single nesting (house wrens) to as long as a lifetime (albatrosses, petrels, swans, geese, eagles, and some owls and parrots). In a similar fashion, many monogamous animals pair for a season, but some (e.g., gibbons) pair for a lifetime.

During recent years, many ornithologists and behavioral ecologists began to view monogamy as part of a "mixed" reproductive strategy, that is, where matings may occur outside the primary pair bond but both members of the pair still contribute substantially only to the care and feeding of the young from their own nest. Some species are viewed to be "facultatively" monogamous; that is, they are monogamous due to certain environmental constraints. Once these constraints are removed or altered, they would typically exhibit some other form of mating system such

as polygyny (one male mating with more than one female) or promiscuity (mating without forming pair bonds). For example, North American dabbling ducks are considered to be monogamous only due to the inability on the part of males to monopolize more than one female. These ducks breed synchronously, and their populations typically contain more males than females.

Prairie voles (*Microtus ochrogaster)* are among a select 5% of mammals that are habitually monogamous. Once they have mated, the males "fall in love" and stay close to their partners, protecting them, helping them raise offspring. Their close cousins, the meadow voles (*Microtus pennsylvanicus*), however, mate with multiple partners and pay little attention to subsequent offspring. When researchers alter the behavior of meadow voles by manipulating a single gene—*vasopressin receptor*—meadow voles become as monogamous as prairie voles.

Among human populations, monogamy stipulates that a man can marry only one woman at any one time in his life. It is essentially a social norm or a cultural custom. Even though various forms of marriages have been practiced through the generations, monogamy has emerged to become law in some countries today, such that the legal registration of more than one wife becomes a violation. Nonetheless, there are still several nations that prefer polygamy. For example, a worldwide ethnographic survey of 849 human societies showed 708 whose customs are polygynous (more than one wife), 4 whose customs are polyandrous (more than one husband), and 137 whose customs are monogamous. Even among those monogamous societies, a considerable number of married men and women tend to have sexual relationships with individuals outside their marriages. In her study on *Adultery,* Annette Lawson noted that various researchers arrived at a general consensus that (a) approximately one quarter to one half of married women have at least one lover after they are married in any given marriage and (b) married men stray more often than married women—perhaps 50 to 65% by 40 years of age. Similarly, Maggie Scarf thought that most experts estimate some 50 to 65% of husbands and some 45 to 55% of wives to be extramaritally involved by 40 years of age. Peggy Vaughan echoed that 60% of men and 40% of women are likely to have extramarital affairs. The significance of these figures is even higher when the total number of marriages involved is considered because it is unlikely that all of the men and women having affairs happen to be married to each other. Vaughan observed, "If even half of the women having affairs (or 20 percent) are married to men *not* included in the 60 percent having affairs, then at least one partner will have an affair in approximately 80 percent of all marriages. With this many marriages affected, it's unreasonable to think affairs are due *only* to the failures and shortcomings of individual husbands or wives." Therefore, these scholars argue that the irony of the "monogamy myth" (a belief system that most people are monogamous and that only a few "bad" or "weak" people have extramarital affairs) is that it prevents societies from dealing with the issues that need to be addressed to make monogamy a more attainable goal for everyone.

Some studies suggest a new term, *serial monogamy,* to denote the practice of restricting sexual contact to a single partner (married or not) for a limited period of time and then ending that relationship before beginning another (although in practice there may be a brief overlapping time period). On the other hand, some have broadened the scope of the term *monogamy* to mean confining a sexual relationship to one other person even in the absence of a legal status of marriage (e.g., an unmarried heterosexual couple, a homosexual couple in a jurisdiction that does not recognize marriage between homosexual persons). Monogamy in this sense is recommended by health professionals discussing safer sex practices.

— Komanduri S. Murty and Ashwin G. Vyas

Further Readings

Ehrlich, P. R., Dobkin, D. S., & Wheye, D. (1988). *The birder's handbook: A field guide to the natural history of North American birds.* New York: Simon & Schuster.

Lawson, A. (1989). *Adultery.* New York: Basic Books.

Lim, M. M., Wang, Z., Olazabal, D. E., Ren, X., Terwilliger, E. F., & Young, L. J. (2004). Enhanced partner preference in a promiscuous species by manipulating the expression of a single gene. *Nature, 429,* 754–757.

Scarf, M. (1987). *Intimate partners.* New York: Random House.

Vaughan, P. (1989). *The monogamy myth.* New York: Newmarket Press.

Montagu, Ashley (1905–1999)

Some might consider Ashley Montagu to be the original sociobiologist, but either they misunderstand the subject or they misunderstand the man. Actually, many of his numerous publications were critical analyses exposing the pseudobiology underlying sociopolitical issues such as racism, sexism, and ageism as well as more general questions about human nature, the nature–nurture controversy, and war and peace. For example, Montagu edited a volume of critiques called *Sociobiology Examined* (1980). Likewise, he was critical of any attempt to rationalize inequality on biological grounds, including eugenics and ideas about the biological basis of criminality. He was a prolific author and/or editor of more than 80 books, and he wrote hundreds of articles. Moreover, many of these publications addressed a general audience as well as an academic one. Thus, he was a pioneer in the arena of public anthropology, often as a penetrating social critic. For instance, he contributed a regular column to the *Ladies Home Journal.* These publications reflect an unparalleled breadth and diversity of scientific interests without sacrificing depth and accuracy, distinguishing him as a rare Renaissance scholar of the 20th century.

Montagu was born in London in 1905. In 1922, he entered the University College of London to study psychology and anthropology, with courses in the latter subject by Grafton Elliot Smith. Subsequently, he pursued social anthropology at the London School of Economics with Bronislaw Malinowski, Charles Seligman, and others. As the first student of Malinowski, his teacher's functionalism is apparent in some of Montagu's writings. (Fellow students included E. Evans-Pritchard and Raymond Firth.) Next, Montagu studied cultural anthropology at Columbia University with Franz Boas and Ruth Benedict. Boas's influence on Montagu's ideas about race is also apparent. Montagu's doctorate was completed in 1937 with a dissertation on concepts of sexuality and reproduction among Australian Aborigines. Accordingly, Montagu emerged as an anthropologist during the second and third decades of the 20th century as anthropology itself emerged as a scientific and academic profession and at two universities that were primary paradigmatic centers.

Never limited to anthropology, Montagu's omnibus interests and contributions spanned anthropology, biology, history, philosophy, psychology, and sociology. This is also reflected in his friendship with other great individuals, including Albert Einstein, Theodosius Dobzhansky, Sir Julian Huxley, Sir Arthur Keith, Bertrand Russell, and Benjamin Spock. By working for most of his life outside universities with their disciplinary compartmentalization of knowledge, he was able to avoid the arbitrary specialization and reductionism that so often stifle other careers, not to mention understanding itself.

Montagu found academic employment at New York University (1931–1938), the Hahnemann Medical College and Hospital in Philadelphia (1938–1949), and Rutgers University (1949–1955). However, in a public lecture, some blunt criticisms of Senator Joe McCarthy's Communist witch hunts did not endear him to some administrators at Rutgers, and he was fired in 1956. Also, Montagu resigned from the American Association of Physical Anthropologists (AAPA) in 1953 and from the American Anthropological Association in 1955 due to the inaction of these organizations in the face of the House Un-American Activities Committee that persecuted him. After Rutgers, Montagu never held a regular teaching post. However, he did lecture in various positions, including the New School for Social Research (1931–1959), Harvard University (1945), the University of California, Santa Barbara (1962), and Princeton University (1978–1983).

Throughout his life, Montagu was a staunch critic of race as a biological idea and of the social phenomenon of racism as well as an advocate of racial equality and integration. In part, this reflects his recurrent personal experience with anti-Semitism throughout his life. For example, Montagu even changed his name from Israel Ehrenberg to avert some of the prejudice. The Federal Bureau of Investigation investigated Montagu off and on from the early 1950s into the late 1970s on the assumption that his ideas and actions against racism, his support of civil rights, and his views against war and for peace might be subversive. There was never any evidence that Montagu had any association with communism or socialism or, for that matter, that his work was even influenced by Marxism. Also, by persistently criticizing ideas about race that were current in early physical anthropology, Montagu alienated establishment personages such as Ales Hrdlicka of the Smithsonian Institution and Earnest Hooton of Harvard University. In 1939, Montagu introduced a motion at the

annual convention of the AAPA asserting that science provided no basis for discrimination based on race, religion, or language, but it was rejected. Nevertheless, eventually Montagu's ideas won out, as evidenced in his book *Man's Most Dangerous Myth: The Fallacy of Race.* This classic was first published in 1942 and was revised in a sixth edition in 1996. Another indication that he won the battle is his 1951 book *Statement on Race* related to his collaborative work with UNESCO. Montagu was not simply being politically correct (or for some, politically incorrect); rather, he was being rigorously scientific, often more so than his opponents in heated exchanges in print and at the annual meetings of the AAPA. At the same time, Montagu's research and writings about race and racism certainly challenged the status quo of American society during the 1940s and beyond.

The genius of Montagu as a didactic scholar and writer, as well as his acute sociopolitical relevance, is mirrored in the marvelous titles of his books, many of which he edited, such as *On Being Human* (1950), *Darwin, Competition, and Cooperation* (1952), *The Natural Superiority of Women* (1953), *Education and Human Relations* (1958), *Prenatal Influences* (1961), *Dolphins in History* (with John Lilly, 1963), *Up the Ivy* (1966), *The Anatomy of Swearing* (1967), *The Concept of the Primitive* (1968), *The American Way of Life* (1970), *The Elephant Man: A Study in Human Dignity* (1971), *Immortality, Religion, and Morals* (1971), *Touching: The Human Significance of Skin* (1971), *The Endangered Environment* (1974), *Race and IQ* (1975), *The Nature of Human Aggression* (1976), *Learning Non-Aggression* (1978), *Growing Young* (1981), *The Dehumanization of Man* (with Floyd Matson, 1983), *Science and Creationism* (1984), and *The Peace of the World* (1988). In 1980, one of his own books became the basis for David Lynch's celebrated movie *The Elephant Man.* Another one, *The Natural Superiority of Women,* remains a classic in feminism and gender studies. These books reflect Montagu's dedication to the adventure of ideas, as Alfred North Whitehead phrased it.

At the same time, Montagu regularly contributed significant purely academic works as well, including a monograph on the pioneering comparative primate anatomist Edward Tyson in 1943. Montagu also published a comprehensive and authoritative textbook, *Introduction to Physical Anthropology* (1945, 1951, and 1960 editions), which was widely used for decades and set a standard for successors. In particular, Montagu was a proponent of the concept of neoteny, that is, the theory that human evolution selected for the retention of a prolonged period of infant dependency and maturation that allowed for educability and in turn contributed to the plasticity and adaptability of *Homo sapiens.* This was a central part of his book *Growing Young.* On the perennial issue of nature versus nurture, Montagu pursued an interactionist position, viewing the individual and group as a product of the interplay of their distinctive biology, culture, and history. He celebrated human potential and the opportunity for the individual to realize it instead of any simplistic biological or genetic determinism and constraints. Montagu also pioneered in studying evolutionary, cultural, and other aspects of aggression, war, nonviolence, peace, and cooperation. Such contributions were officially recognized by the AAPA in 1994 when it presented Montagu with the Charles Darwin Award for Lifetime Achievement.

Clearly, Montagu was an idealist, a humanist, a moralist, a liberal, and an internationalist—all in the best sense of the terms. His positions were not simply rhetorical; he also put them into practice, for example, in protesting the war in Vietnam in various ways. Also, he was a member of many liberal organizations and an ardent supporter of civil rights for African Americans, Native Americans, women, and others. He was a persistent voice of rationality in a society that was often dangerously irrational and unjust. His professionalism, scholarship, and activism led to appearances as a guest on television programs such as Johnny Carson's *Tonight Show* and the *Phil Donahue Show.* Like Margaret Mead, he played a prominent role in public anthropology.

Montagu died at 94 years of age in 1999 in Princeton, New Jersey. However, the substantial body of scientific, scholarly, and public works that he created have not died; they are as relevant today as they ever were, considering the many elemental and perennial questions he addressed.

— Leslie E. Sponsel

Further Readings

Harnad, S. (1980). Ashley Montagu biographical essay. *International Encyclopedia of the Social Sciences, 18,* 535–537.

Lieberman, L., Lyons, A., & Lyons, H. (1995). An interview with Ashley Montagu. *Current Anthropology, 36,* 835–844.

Marks, J. (2000). Ashley Montagu, 1905–1999. *Evolutionary Anthropology, 9*(3), 111–112.
Price, D. H. (2004). *Threatening anthropology: McCarthyism and the FBI's surveillance of activist anthropologists.* Durham, NC: Duke University Press.
Reynolds, L. T., & Lieberman, L. (Eds.). (1996). *Race and other misadventures: Essays in honor of Ashley Montagu in his ninetieth year.* Dix Hills, NY: General Hall.
Sperling, S. (2000). Ashley Montagu (1905–1999). *American Anthropologist, 102,* 583–588.
Sperling, S. (2005). *Love forms the bones: Ashley Montagu biography.* New York: Oxford University Press.

Montaigne, Michel Eyquem de (1533–1592)

Michel Eyquem de Montaigne was influential as a Renaissance courtier during the reign of Charles IX and, especially, as the author of *Essais,* through which he introduced a new literary form impressive for personal candor and humane skepticism.

Montaigne was born on the family estate Château de Montaigne in Perigord near Bordeaux, France. His father was a wealthy merchant who purchased the titled nobility and seigneurie of Montaigne. His mother was of Spanish Jewish ancestry, although her family had earlier converted to Catholicism. Montaigne spoke Latin as his principal tongue until 6 years of age, when he was enrolled at the nearby College de Guyenne. It is believed that he later studied law at Toulouse until 1557, when he became a *conseiller de parlement* in Bordeaux and entered into a close friendship with Etienne Boétie. Boétie's death in 1563 affected Montaigne profoundly. In 1565, he married Francoise de La Chassaigne, and the couple had six children, of whom only one, Lenore, survived to adulthood. In 1568, Montaigne's father died and he inherited the Château de Montaigne.

Montaigne's first major work was a translation—at the request of his father—of Raymond Sebond's *Theologia naturalis.* He then edited Boétie's works and resigned from his judicial post in 1571 to begin his *Essais* in the comfort of his Château library, with the first edition being published in 1580.

Montaigne's retirement was affected by troubles with kidney stones. In 1580–1581, this ailment caused him to seek treatment in France, Germany, Austria, Switzerland, and Italy. Journals from these travels were later published in 1774 as the *Travel Journal.* In retirement, he was also an important figure in the religious wars because his status as a devout but moderate Catholic engendered unique bilateral trust, as was evident in his mediations between the Catholic King Henry III and the Protestant Henry of Navarre (who eventually named Montaigne a gentleman of his chamber). While visiting Rome in 1581, he learned of his election as the mayor of Bordeaux, to which he returned to serve until 1585, again moderating during a period of religious strife and plague.

Montaigne continued his *Essais,* and in 1588 he met the writer Marie de Gournay, whom he took on as his *fille d'alliance.* De Gournay published Montaigne's works posthumously. Also in 1588, while visiting Paris, he was briefly jailed in the Bastille on suspicion of agency for Navarre. On the assassination of King Henry III in 1589, he helped to sustain Bordelaise loyalties to Navarre (who subsequently became King Henry IV of France and Navarre). Montaigne died in 1592 at the family château and was buried with full Catholic rites and a unique legacy of literary, philophical, diplomatic, and theological humanism.

— *Daniel R. Wilson*

Further Readings

Montaigne, M. (1965). *Michel de Montaigne: The complete essays of Montaigne* (D. Frame, Trans.). Stanford, CA: Stanford University Press.
Montaigne, M. (1983). *Michel de Montaigne: Travel journal* (D. Frame, Trans.). San Francisco: North Point Press.
Tannenbaum, S. A. (1942). *Michel de Montaigne: A concise bibliography.* New York: S. A. Russell.

Monte Verde

For decades, there has been a consensus on the migration of people through the Americas. Some 12,000 years ago, as the end of the last Ice Age approached, big game hunters followed mammoth and caribou from Siberia across the Bering Land Bridge into

North America. These earliest people, called Paleoindians, settled into the interior plains of North America between 11,500 and 11,000 years ago, and from there they spread across North America and southward to the southern tip of South America following diminishing game reserves for the next 1,000 years. This Clovis model was named for a site near Clovis, New Mexico, where these hunters' distinctive leaf-shaped spear points were first discovered in 1932. New finds and new methods of dating archaeological materials not only have opened this theory to debate but have eliminated it as a possibility altogether.

After a long and bitter debate, archaeologists have agreed that there is evidence that humans reached southern Chile at least 12,500 years ago, more than 1,000 years before Clovis, the previous benchmark for human habitation in the Americas.

Monte Verde, the Chilean site, is located on the bank of Chinchihuapi Creek in wooded foothills approximately 30 miles from the Pacific Ocean and 500 miles south of Santiago. An excavation team, led by Tom Dillehay of the University of Kentucky, surveyed the site from 1977 to 1985. Another team of archaeologists investigated the site in 1997 and confirmed that Monte Verde does establish an earlier date for human habitation.

Monte Verde is an unusual site, providing materials never before found at early American excavations. It is common to find mostly bone and stone artifacts at Paleoindian sites, which tend to be in caves or are open-air sites where delicate artifacts are not preserved. In addition, Paleoindians generally were small nomadic bands of people, and small transient groups leave virtually no marks on the land, making them invisible to archaeologists. Monte Verde was encroached by a neighboring swamp soon after the inhabitants broke camp, covering the site in a layer of peat. With no oxygen present to decay materials, Monte Verde has yielded remnants of wood plank shelters covered with hides, animal meat, digging sticks, carved bone and tusk tools, grasses tied into ropes, hearths, human fecal remains, and a child's footprint. Dillehay has concluded that a group of 20 to 30 people occupied Monte Verde for perhaps a year before moving on.

More recently, a knoll several hundred feet away from Monte Verde has drawn some attention. A cursory excavation of the hill has yielded possible evidence of human habitation 20,000 years earlier than Monte Verde. Rather than causing an upset, independent archaeologists have verified the antiquity of the level. Dillehay and Mario Pino, of the Southern University of Chile in Valdivia, are planning to formally excavate the site in the near future.

Since the discovery and acceptance of Monte Verde, scattered sites from Wisconsin to Central and South America have indicated the presence of humans before 13,000 years ago. These discoveries are leading archaeologists to look for alternative theories about how and when people first arrived in the Americas.

— Jill M. Church

Further Readings

Adovasio, J. M., & Page, J. (2002). *The first Americans: In pursuit of archaeology's greatest mystery.* New York: Modern Library.

Dewar, E. (2001). *Bones: Discovering the first Americans.* New York: Carroll & Graf.

Dillehay, T. D. (2000). *The settlement of the Americas: A new prehistory.* New York: Basic Books.

MORES

The Yale University professor of political and social science William Sumner (1840–1910) coined the term *mores* from the Latin word *mos,* which is generally translated as "customs." He described mores as a type of folkway that a group of people accepted as the unquestioned way in which they should live. Because people do not question their mores, mores regulate behavior and those who violate them receive extreme punishments. Humans crafted folkways and mores because they have basic needs. They adapted folkways that helped them to survive and gave up those that hurt their chance to survive. Mores determined how people acted, and tradition made the mores fixed and coercive. Sumner wrote that mores were so stable that only rulers could gradually change them. This made it useless to try to reform society. He also said that people made laws to enforce their mores. To describe mores in his book *Folkways,* Sumner used examples from all over the world, so that the book resembles many anthropological works of the early 20th century.

Mores relate to another term Sumner coined, *ethnocentrism.* He wrote that people do not even notice their mores until they come into contact with people who have different mores. Because people are born into a situation with mores already in place, they do not criticize their own mores but do criticize other people who have different mores.

In anthropology, the concept of mores mostly influenced psychological anthropologists in the United States, such as Clyde Kluckhohn (1905–1960) and Alfred Kroeber (1876–1960), in terms of how they understood the concept of culture. They said that culture had developed out of human needs but that once it was in place, it exerted power over people. Kluckhohn said that a group constantly discovers and invents new things but that only those who contribute to the group's survival or who promote psychological adjustment become part of the culture. Then the culture regulates every aspect of a person's life. Kluckhohn also said that once a way of doing something has become institutionalized, people resist changing or deviating from it.

The term *mores* has become a standard term in sociology, although nowadays most sociologists contrast mores with folkways rather than saying that mores are a type of folkway. They describe folkways as norms that are lightly sanctioned and describe mores as norms based on the core values of society. Thus, murderers, rapists, and child molesters violate some of the most important mores of the United States. Other violations of mores, such as stealing, would be less serious. Sociologists say that mores of the past have become folkways and that folkways have become mores. Furthermore, mores in one society are not mores in another society, and mores of members of subcultures of a culturally diverse society, such as the United States, differ. In general, mores have sanctions, so that a person who violates a more is subject to punishment such as imprisonment or even death. Mores can be further divided into prescriptive and proscriptive mores. Prescriptive mores tell people what they must do, whereas proscriptive mores tell people what they must not do. Common proscriptive mores in the world are not to practice cannibalism or incest. Such extreme mores are also called taboos.

— *Bruce R. Josephson*

See also **Ethnocentrism; Folkways; Law; Taboo**

Further Readings

Kluckhohn, C. (1985). *Mirror for man: The relation of anthropology to modern life.* Tucson: University of Arizona Press. (Original work published 1949)

Sumner, W. (1906). *Folkways: The study of the sociological importance of usages, manners, customs, mores, and morals.* Boston: Ginn.

Sumner, W. (1971). *Sumner today: Selected essays of William Sumner, with comments by American leaders.* Westport, CT: Greenwood.

Morgan, Elaine (1920–)

For the first 50 years of her life, Elaine Morgan (née Floyd) did not seem like someone who would be mentioned in an anthropology class, but 30 years after that it would be a rare introductory class on human evolution where at least one student did not ask about her ideas. Born in 1920 in Pontypridd, Wales, Morgan was good at school but leaned toward literature rather than science. She won an exhibition (scholarship) to Lady Margaret Hall, Oxford, where she studied English language and literature. After attending the university, she became a lecturer at the Workers' Education Association. During the early 1950s, she started freelance writing in newspapers and magazines and then began a lifelong career in writing for television, eventually becoming an award-winning writer of serials, documentaries, and adaptations.

After nearly 20 years in television, Morgan read Robert Ardrey's *African Genesis* and Desmond Morris's *The Naked Ape,* did not like what she read, and in reaction came up with her first book on human evolution using the "aquatic ape" idea she had first discovered in Morris's short writeup of the idea. The result, *The Descent of Woman,* was a huge success, at least in the popular arena, and was translated into nine languages. She continued in her successful television career but also followed up on her new aquatic ape work with a slew of articles and talks as well as four more books: *The Aquatic Ape* (1982), *The Scars of Evolution* (1990), *The Descent of the Child* (1994), and *The Aquatic Ape Hypothesis* (1997).

Morgan was also involved in a conference on the subject with both "pro" and "con" participants in 1987 and a resultant book (*The Aquatic Ape: Fact or*

Fiction?), a symposium on the aquatic ape theory at the annual meeting of the British Association for the Advancement of Science in 1992, and a BBC documentary in 1999.

Although Morgan's supporters, faced with people opposing her ideas, often make a bid for leniency and some sympathy based on her age, Morgan herself does not take that tack. She seems to enjoy the parry and thrust of debate. After meeting her during part of the filming of the BBC documentary, anthropologist Bernard Wood described Morgan, in her late 70s, as "a tiny doughty sparrow of a lady whose advanced years have not dimmed her, or her supporters' abilities to literally pin you against the wall so that she, or they, can make their point."

The next point Morgan is planning to make is on evolutionary biology in a forthcoming book titled *Darwin and the Left.*

— *Jim Moore*

Further Readings

Morgan, E. (1972). *Descent of women.* London: Souvenir Press.

Morgan, E. (1982). *The aquatic ape.* London: Souvenir Press.

Morgan, E. (1990). *The scars of evolution.* London: Souvenir Press.

Morgan, E. (1994). *The descent of the child.* London: Souvenir Press.

Morgan, E. (1997). *The aquatic ape hypothesis.* London: Souvenir Press.

Morgan, Lewis Henry (1818–1881)

Lewis Henry Morgan was an influential 19th-century ethnologist who dedicated most of his career to kinship studies. He documented an extensive amount of valuable written and physical material on the Iroquoian culture. Morgan was born on November 21, 1818. He grew up in a farmhouse close to Aurora, New York, and enrolled at the Cayuga Academy. Afterward, he attended Union College, where he graduated in 1840. Morgan studied law, and in 1842 he was admitted to the bar. Because of conditions caused by a depression at that time, Morgan joined a group of individuals who called themselves the Grand Order of the Iroquois. Their main purpose was to help create a society that would treat the Iroquois with more compassion and consideration.

In 1849–1850, Morgan collected information and cultural artifacts from the Seneca Iroquois of Tonawanda. He also obtained articles from the Six Nations reserve on the Grand River in southeastern Ontario. These included traditional ceremonial items, clothing and adornment, containers, transportation tools, war and hunting tools, cooking tools and foodstuff, a house model, containers, cradles and cradleboards, and other miscellaneous items. The Parker family significantly helped to recreate and explain the culture and use of the material objects. As a result, Morgan was able to produce extensive reports on the livelihood of the Seneca people. He gathered approximately 500 objects within the culture that were given to the Historical and Antiquarian Collection of the New York State Cabinet of Natural History.

Throughout his anthropological career, Morgan was best known for three of his books: *League of the Iroquois* (1851), *Systems of Consanguinity and Affinity of the Human Family* (1871), and *Ancient Society* (1877). Morgan researched the lives of the Iroquois on the Seneca more intensely within these books. He studied the social and organizational methods within their culture and focused on their customs and beliefs. This documentation of the Iroquois is believed to have been one of the first concrete scientific descriptions of the Iroquois culture.

Morgan's second book, *Systems of Sanguinity and Affinity of the Human Family,* concentrated on the origins of the American Indians. In 1865, Morgan discovered that American Indians of different language families used similar kinship terminology. He found that even though these tribes were of different and unique cultural backgrounds, they referred to members of their families in the same way. The father's brother would be called father, and the mother's sister would be called mother. The children of either parent's brother or sister would be referred to as brothers or sisters.

Even though Morgan had discovered these similarities, he undertook to find out whether these practices were consistent among all American Indians. From there, he wanted to determine whether this kinship terminology correlated with that of the system in Asia. His theory developed into the belief that the American Indians were actually of Asian origin. Morgan began his research. Over the course of

4 years, he traveled throughout the United States and Canada, where he documented information. He distributed questionnaires to collect data within the United States, India, Africa, and surrounding islands. The results showed him that the Tamil people of southern India used the same kinship terminology as the American Indians. Morgan considered this as proof that the American Indians were in fact of Asiatic origin.

Morgan continued to suggest that there was an explanation as to why families within these communities combined their titles of kinship such as calling a mother's sister "mother" and calling a father's brother "father." In *Ancient Society* (1964), he concluded that there must have been an "ancient existence of a consanguine family in which brothers and sisters intermarried in a group . . . and beyond this, in the remotest antiquity of mankind, lay promiscuous intercourse where no customs of marriage existed at all." Although Morgan's theory proved to be inaccurate, he was acknowledged for his extensive data collection and inquiry. This information was used for his book, *Systems of Consanguinity and Affinity of the Human Family.* Morgan gathered a very significant amount of information regarding his travels and experiences within these cultures unlike any other anthropologist from that time.

With origin on his mind, Morgan began to focus on biological and cultural evolution. *Ancient Society* was written to explain the process that cultures went through to evolve into civilized societies. He suggested that a society went through three main stages during its biological and cultural evolution. A culture began at the very bottom of existence as humans in savagery, then moved toward barbarism, and ultimately reached civilization.

Within savagery and barbarism, Morgan created three levels; lower status, middle status, and upper status. Morgan's theory rested on the assumption that through inventions, discoveries, and the growth of ideas, cultures evolved and progressed to the next stratum of human existence. Within the stratum of savagery, people relied on wild plants to survive. There was no working the land or animal domestication. Barbarism was defined by the initial use of agriculture. Civilization involved the use of the written word and the desire for property. In further detail, Morgan suggested that from barbarism, humankind was able to control subsistence use, and this allowed the continuation of the human species. From the cultivation of plants and cereals and the domestication of animals, societies created an abundance of permanent subsistence and therefore reached civilization. Morgan continued to distinguish between primitive and civilized societies when he stated, in *Ancient Society,* that primitive society was "founded upon ties of kinship, and modern, or civil, society is organized upon the basis of property relations and territorial distinctions."

Morgan died in 1881. Some of his work had since been proven to be false and seen as Eurocentric, but he is still considered as an important anthropologist from his time. Through his timeless research, data collection, analysis, and work with the Iroquois, he is seen as one of the founding fathers of anthropology.

— Simon Brascoupé and Jenny Etmanskie

Further Readings

Ben-Zvi, Y. (2003). National appropriations and cultural evolution: The spatial and temporal U.S. of Lewis Henry Morgan's Native America. *Canadian Review of American Studies, 33,* 211–229.

Morgan, L. H. (1962). *League of the Iroquois.* Secaucus, NJ: Citadel Press.

Morgan, L. H. (1964). *Ancient society.* Cambridge, MA: Belknap Press of Harvard University Press.

Tooker, E. (1994). *Lewis H. Morgan on Iroquois material culture.* Tucson: University of Arizona Press.

Morphology versus Molecules in Evolution

One of the first investigators of the "blood relationship" of organisms was George Henry Falkiner Nuttall. Early in the 20th century, Nuttall sought to demonstrate that the degree of similarity between animals in their blood serum proteins reflected their evolutionary closeness. He produced an antiserum to serum of one animal and combined it with another animal's blood serum, producing a precipitate. The more precipitate that formed, the greater the similarity (due to a greater number of antibody–antigen binding sites) and, consequently, the closer the supposed evolutionary relationship between the organisms

being compared. Nuttall also thought that the reaction rate reflected closeness of relatedness. He concluded in *Blood Immunity and Blood Relationship,* "If we accept the degree of blood reaction as an index of the degree of blood relationship within the Anthropoidea, then we find that the Old World apes are more closely allied to man than are the New World apes, and this is exactly in accordance with the opinion expressed by Darwin." But for the most part, Nuttall's work went unrecognized for decades.

Perhaps the most influential publication of the early 1960s in the area of biochemistry and relatedness was Emile Zuckerkandl and Linus Pauling's 1962 chapter on fetal and adult hemoglobin. They compared human, gorilla, horse, and fish sequences and found that the fish was more dissimilar to the human than to the horse and that the gorilla was most similar to the human. Because this arrangement mirrored the morphologically based phylogeny of these taxa, Zuckerkandl and Pauling believed that their observations "can be understood at once if it is *assumed* that in the course of time the hemoglobin-chain genes duplicate, [and] that the descendants of the duplicate genes 'mutate away' from each other" (emphasis added). From this assumption, they concluded that "over-all similarity must be an expression of evolutionary history," with descendants "mutating away" and becoming "gradually more different from each other." That is, the more ancient a lineage, the more molecular difference its descendants will gradually accumulate. Consequently, evolutionary closeness became equated with molecular difference despite the fact that Zuckerkandl and Pauling's study did not justify assuming that "over-all similarity" is "an expression of evolutionary history," that difference always reflects the same directionality of change, or that molecular change accrues at a constant and gradual rate. Nevertheless, as Adalgisa Caccone and Jeffrey R. Powell wrote in 1989, "Virtually all molecular phylogenetic studies . . . have a major underlying assumption: The genetic similarity or difference among taxa is an indication of phylogenetic relatedness. Lineages that diverged more recently will be genetically more similar to one another than will be lineages with more ancient splits." Embrace the assumption and the rest may follow logically, but not necessarily biologically.

In 1966, Vincent Sarich and Allan Wilson began investigating primate evolutionary relationships using albumin, translating degree of reactivity between albumin and anti-albumin into "immunological distance" (ID). An ID value of 1.0 meant "identical" (as in combining serum and antiserum of the same individual). The closer an ID value was to 1.0, the greater the overall molecular similarity and thus, by extension, the more closely related the taxa under study. As a "check" on the validity of this approach, Sarich and Wilson conceived the "test of reciprocity" (reversing whose serum or antiserum was used), which usually confirmed the initial finding. Because their arrangement of the primates agreed more with than it differed from the morphologically based pattern of primate relationships, they concluded that the "data are in qualitative agreement with the anatomical evidence, on the basis of which the apes, Old World monkeys, New World monkeys, prosimians, and nonprimates are placed in taxa which form a series of decreasing genetic relationship to man."

The following year, Sarich and Wilson argued that molecular change occurred at a constant rate among all major groups of primates and that, if the small difference between hominoid albumins reflected little molecular change, little time must have elapsed since the hominoid lineages separated. They claimed that because molecular change was constant, IDs represented a "molecular clock," which they calibrated on the fossil-based interpretation of when the Old World monkey and hominoid lineages supposedly split and then calculated that gibbons diverged approximately 10 million years ago, orangutans diverged approximately 8 million years ago, and humans and African apes diverged approximately 5 million years ago. The obvious implication was that fossils older than 5 million years, such as *Ramapithecus* (= *Sivapithecus*) from approximately 12 to 14 million-year-old deposits in Indo-Pakistan, could not, as their morphology indicated, be hominid. In 1971, while defending the correctness of the molecular clock, Sarich rejected as being of any phylogenetic significance the very morphology on which the clock was predicated.

But although all molecular systematists accepted the molecular assumption, M. Goodman and others did not embrace a constant molecular clock. Because Goodman accepted the paleontologically derived date of less than 14 million years ago for the hominid–ape split, he had to offer a different explanation for the small difference between hominoid albumins.

Although similar to other anthropoids in having hemochorial placentation, large-bodied hominoids have longer gestation periods. As such, Goodman argued, whereas in animals with hemochorial

placentation but short gestation periods parturition would occur before the mother's immune system could produce antibodies to any molecular differences in the fetus, in large-bodied hominoids the gestation period is long enough not only for maternal–fetal immunological incompatibility to build up but also for maternally produced antibodies to diffuse through the placenta and attack the fetus. Consequently, selection must have acted to reduce the possibility of maternal–fetal immune interaction by slowing down the rate of molecular change in hominoids with longer gestation periods.

Protein sequences were also used to determine evolutionary relationships. As mentioned earlier, Zuckerkandl and Pauling first sequenced hemoglobin in 1962. In 1973, A. E. Romero-Herrera and colleagues analyzed myoglobin sequences of various taxa. The most "parsimonious" arrangement of hominoids placed the gibbon closer than the orangutan to a human–African clade. The order of the gibbon and orangutan could be reversed only by invoking a more complicated scenario of hominoid myoglobin "evolution," including specifying various "back-mutations" to the presumed primitive state.

But although protein sequences were seen by some, especially Zuckerkandl as late as 1987, as appropriate for analyzing evolutionary relationships, others thought that the "best" systematic information lay at a deeper "genetic" level. Because base differences at the third base position did not produce different amino acids, the concern was that demonstration of similarity in protein sequences could produce "false" phylogenies because the underlying nucleotide sequences could be different. The expectation (based on bacteria and inferred for metazoans) was a direct correlation between specific DNA sequences and specific genes. In addition, because DNA sequences are composed of thousands of bases, there was the appeal of a vast amount of supposedly phylogenetically relevant information. But because DNA sequencing, although possible by the late 1970s, was expensive and laborious, an alternative approach—DNA hybridization—was used.

The justification for using DNA hybridization as an approximation of overall DNA sequence similarity between different taxa lay in the fact that not only will two separated strands of DNA from the same individual reassociate (reanneal) via their complementary bases, but any two single strands of DNA from different taxa will attempt to recombine or hybridize at complementary base positions. The more complementary sites between hybridized DNA strands, the more heat is needed to melt the bonds between them. From the molecular assumption followed the assumption that differences in melting temperatures reflected degrees of molecular similarity that reflected evolutionary relatedness. But because DNA hybridization relied on an assessment of overall similarity rather than the identity of sequences of bases, similar differences in melting temperatures obtained for different pairs of taxa might not be due to hybridization of the same regions of DNA. This is not a trivial concern because, DNA sequences, even if homologous, are not the same length in all animals, large-bodied hominoids included.

In 1968, R. J. Britten and D. E. Kohne first employed DNA hybridization in 1968 and found that the genomes of higher organisms—but not of bacteria or viruses—contained "hundreds of thousands of copies of DNA sequences" (repeated DNA) that not only represented a considerable portion of a genome but also were "trivial and permanently inert." Only a small fraction of a genome was composed of apparently active or functional single-copy DNA. They also argued that theories of genomic change must be considered on two levels: the change in nucleotide sequence (gradually via point mutations) and the origin of new families of nucleotide sequences (suddenly via "saltatory replications"). The former explains only the "divergence of pre-existing families" of nucleotide sequences, whereas "saltatory replications of genes or gene fragments occurring at infrequent intervals during geologic history might have profound and perhaps delayed results on the course of evolution." Although a model of "saltatory replication" is not embraced by molecular systematists, it poses a serious challenge to the "molecular assumption" and appears to have been borne out with the identification during the 1990s of the vertebrate *Hox-a-d* genes as replicates of the *Antennapedia* gene of fruit flies.

During the 1980s, Charles Sibley and Jon Ahlquist questioned previous DNA hybridization experiments due to the limited number of cross-hybridizations that were tested. This, they claimed, was the reason why certain evolutionary relationships could not be resolved. They made a point of the lack of resolution of the relationship between humans and African apes that, although based on little morphology, had become the favored molecular hypothesis. They also argued that one must create hybrids only with single-copy

DNA. And because DNA hybrid strands will link up only along complementary stretches of bases, there should be no question about homology.

Sibley and Ahlquist proposed a uniform average rate of genomic change (UAR), which they believed characterized molecular, and thus evolutionary, change in all taxa. By assuming a UAR, they also sidestepped the molecular clock debate. The power of DNA hybridization in "discovering" the phylogenetic relationships of organisms supposedly came from sampling entire genomes. Because an organism's genome is composed of millions of nucleotides, the "law of large numbers" seemingly eliminated the problem of an analysis being thrown off by "false" similarities or parallelisms.

In 1983, Sibley and Ahlquist converted differences in melting temperatures for DNA hybrids into phylogenetic distances using a procedure called "average linkage," which begins "by clustering the closest pair or pairs of taxa," after which "one links the taxa which have the smallest average distance to any existing cluster" until "all taxa are linked." The underlying assumption is that DNA hybridization "measures the net divergence between the homologous nucleotide sequences of the species being compared."

Many aspects of Sibley and Ahlquist's phylogenetic reconstructions of birds were consistent with theories of relatedness derived from study of morphology. But there were some significant differences, for instance, with regard to the broader phylogenetic relationships of, as well as the details of relatedness among, the flycatchers. However, by the 1980s, it was common practice, when molecular and the morphological phylogenies were in discord, to opt for the former. The molecular assumption demands that a molecular phylogeny be correct in its entirety, even if other information contradicts it.

The appeal of Sibley and Ahlquist's "law of large numbers" and UAR was probably the reason why paleontologists finally gave in to the notion that when molecularly and morphologically based phylogenies were in conflict, the former had greater authority. But not all molecular systematists were convinced. Templeton, for instance, rejected DNA hybridization because one could not determine the polarity of the similarity and thus address the question: Is similarity due to distant or recent common ancestry? He favored studying actual nucleotide sequences. Sibley and Ahlquist countered that there was "no reason to expect data derived from base sequences to improve on those from amino acid sequences, which have produced contradictory results." Nevertheless, the role of DNA sequences in deciphering evolutionary relationships assumed special significance due to the supposed information content of nuclear DNA. As E. J. Bruce and F. J. Ayala wrote in 1979, "Information macromolecules—i.e., nucleic acids and proteins—document evolutionary history. . . . [Thus,] degrees of similarity in such macromolecules reflect, on the whole, degrees of phylogenetic propinquity."

In 1979, W. M. Brown and colleagues found more difference between humans and a sampling of Old World monkeys in their mitochondrial (mt) DNA than in their nuclear DNA. Accepting the paleontologically estimated divergence between the human and Old World monkey lineages as more than 20 million years ago, they calculated that nucleotide substitutions occur 5 to 10 times more slowly in nuclear DNA than in mt DNA; that is, mt DNA "evolves" 5 to 10 times faster than nuclear DNA. From this, Brown and colleagues argued that mt DNA is better for studying evolutionary events that occurred "within the past 3–10 million years." Although their data showed the fewest differences (interpreted as substitutions) between humans and chimpanzees, Brown and colleagues presented humans as being related to an African ape group. Given the molecular assumption, however, the data should have yielded a human–chimpanzee sister group, as M. Ruvolo and colleagues concluded from their 1991 analysis of mt DNA.

One assumption about mt DNA is that, because it is single-stranded, it is not subject to the complexities that occur through recombination of maternal and paternal DNA; it is supposed to be inherited clonally only through the maternal line. Another assumption is the existence of a "hotspot" (the "hypervariable zone") in the D-looped configuration of mt DNA that is the primary site of molecular activity and, therefore, the source of evidence of evolutionary change. The introduction of paternal mt DNA into fertilized eggs has been reported, however, and according to Erika Hagelberg, there is increasing indication that mt DNA is not as exempt from paternal inheritance and recombination as was initially believed. Hagelberg also pointed out, in a 2003 article, that "there is no direct evidence of hypervariability," although "most researchers believe that anomalous patterns of DNA substitution are best explained by mutation." Indeed, "because the notion of hypervariability fits with the

received view of mt DNA clonality, anomalies are seldom questioned."

Questions also arose concerning the comparisons of sequence data, especially with regard to alignment. Because compared DNA sequences are usually not the same length, decisions must be made about subdividing the shorter sequence to align its nucleotides with those of the longer sequence. Typically, sequence alignment is presented in the literature without justification and then is used in phylogenetic analysis. But as J. A. Lake warned in 1991, "The order of sequence alignment can bias the selection of tree topology." In addition to assumptions of alignment are those of whether, for one or another sequence, bases were inserted or deleted or one base was substituted for another.

In 2003, in *What It Means to Be 98% Chimpanzee,* Jonathan Marks gave an example of these problems with DNA sequences from a human and an orangutan by showing three different ways in which their bases can be aligned. Of course, one must first assume that the 40 bases in the human sequence have homologous counterparts in the 54 bases in the orangutan sequence:

Human: CCTCCGCCGCGCCG CTCCGC GCCGC-CGGGCA CGGCC CCGC

Orangutan: CC GTCGCCTCCGCCACGCCGCGC-CACCGGGCCGGGCCGGCCCGGCCCGCCCCGC

Human: CCTCCGCCGCGCCGCT CCGCGCCGC-CGGGCACGGCCCCGC

Orangutan: CCGTCGCCTCCGCCACGCCGCGC-CACCGGGCCGGGCCGGCCCGGCCCGCCCCGC

Human: CCTCCGCCGCGCCG CT CCGCGCCGC-CGGG CAC GGCC CCGC

Orangutan: CCGTCGCCTCCGCCACGCCGCGC-CACCGGGCCGGGCCGGCCCGGCCCGCCCCGC

Marks commented,

> The top one invokes five gaps and six base substitutions; the middle has only two gaps but nine base substitutions. And the bottom one has five gaps and only three base substitutions. The three pairs of sequences differ in the assumptions about which base in one species corresponds to which base in the other. While we might . . . choose the alignment that invokes the fewest inferred hypothetical evolutionary events, we still have to decide whether a gap "equals" a substitution. Does the bottom one win because it has a total of only eight differences? Or might the middle one win because a gap should be considered rare and thereby "worth," say, five base substitutions?
>
> We cannot know which is "right," and the one we choose will contain implicit information about what evolutionary events have occurred, which will in turn affect the amount of similarity we tally. How similar is this stretch of DNA between human and orangutan? There may be seven differences or there may be eleven differences, depending on how we decide the bases correspond to each other across the species—and that is, of course, assuming that a one-base gap is also equivalent to a five-base gap and to a base substitution.
>
> In a more general sense the problem of taking *quantitative* estimates of difference between entities that differ in *quality* is prevalent throughout the genetic comparison of human and ape. The comparison of DNA sequences presupposes that there are corresponding, homologous sequences in both species, which of course there must be if such a comparison is actually being undertaken. But other measurements have shown that a chimpanzee cell has 10% more DNA than a human cell. . . . But how do you work that information into the comparison?

These concerns have not, however, been widely appreciated by molecular anthropologists, who portray the analysis of DNA sequences as neutral and objective but still use an assumption of relatedness to inform the way in which they analyze the sequences they have aligned according to certain assumptions. Exemplary is the 1997 multiple DNA sequence analysis by Ruvolo, who sought to resolve the supposed dilemma of which African ape humans are more closely related to by assuming that humans and African apes were indeed a clade and that the orangutan was its sister taxon. Consequently, whatever differences were found in the orangutan data had to be considered primitive relative to any similarities that were delineated between humans and one African ape or both African apes.

In using the popular parsimony-based phylogenetic computer program PAUP (phylogenetic analysis using parsimony), it is common practice to "root" a phylogenetic analysis in a taxon that is chosen as the primitive sister taxon or out-group. But although rooting any analysis in a particular taxon may be

necessary for the algorithm to "work," this procedure artificially determines character polarity given that the taxon in which the tree is rooted is defined a priori as being primitive in its entirety. In turn, the taxa to which this taxon is the supposed primitive sister taxon are predetermined as being derived in whatever ways they differ from it.

This approach to analyzing nuclear DNA, mt DNA, and protein sequences (and most recently to hominoid morphology) presents its own set of problems. Consider the molecular assumption: Because molecular change is supposedly ongoing and accumulated in a succession of descendants, the degree of molecular similarity should reflect the antiquity or recency of lineage divergence. Accordingly, each lineage acquires its own unique array of molecular changes, which should make it increasingly different the longer it is in existence. On the other hand, by rooting an analysis in a particular taxon, one assumes that this taxon is totally primitive relative to the taxa whose sister taxon it is presumed to be. Yet the molecular assumption validates the use of overall similarity as the key to resolving phylogenetic relationships by contrasting it with the unique differences that earlier divergent lineages accumulated along their own and distinct evolutionary trajectories. Clearly, both assumptions cannot be correct at the same time. Either the earlier divergent taxa or lineages did not change but rather remained primitive (which is the logical extension of identifying a taxon as the outgroup in which to root a computer analysis), or they did change by accumulating their own suites of molecular difference (the basis of the molecular assumption), in which case they are at least in some aspects derived (and uniquely so, for that matter, due to their distinctive molecular histories) and not primitive relative to the taxa being compared with them.

In the realm of morphological systematics, according to Hennigian or cladistic principles, overall similarity is not de facto a clue to evolutionary relatedness. Similarity must be sorted out into features that reflect a hierarchy of inheritance—primitive features from ancient ancestors and derived features from more recent ancestors.

Because the pattern of life is a hierarchy of nested sets of smaller and smaller clades, interpretation of primitiveness versus derivedness depends on the hierarchical level that one is investigating. Primitive features (those retained in descendants) do not elucidate the relationships of taxa sharing them. Only derived features (those more recently emergent) can. Furthermore, one must understand that a derived feature at one level is a primitive retention at another level of the hierarchy. As Templeton suggested, theoretically at least, this approach should be applicable to molecular data. But to be cladistic, the comparison must embrace a wide range of taxa because this is the only way in which relative primitiveness and derivedness can be determined. It cannot be justified by a priori assumptions of directionality (i.e., the molecular assumption) or of relatedness or by comparison with a taxon that is defined from the beginning as primitive. In addition, one cannot assume that shared similarity translates directly into a theory of relatedness. Taxa may be similar not because they inherited changes that distinguished a recent common ancestor but rather because they share features that did not change from the ancestral condition.

Nevertheless, molecular studies are increasingly being identified as "cladistic." One argument is that nucleotide bases—C, G, T, and A—represent alternative character states. This might seem logical but is incorrect because bases are characters. Alternative molecular character states would be better represented, for example, by different arrangements of "gene" sequences with regard to *cis, trans,* and interchromosomal elements; patterns of introns and exons and of methylation of transposons or other elements; or pathways of molecular communication. Molecular systematists also claim that their analyses are cladistic because "shared molecular similarity" is supposed to equate with "shared derived." This, of course, reflects the molecular assumption, namely that recently diverged taxa share recently accumulated (and thus supposedly derived) molecular states. Thus, one identifies shared derived molecular states a posteriori, *after* one's chosen algorithm clusters taxa on the basis of their being more or less similar and also typically after rooting one's tree in a particular taxon. But this is not a cladistic analysis. The hypothesizing of primitive versus derived character states (themselves testable hypotheses) occurs *prior to* generating theories of relationship, and this is the only way in which the results of this can be testable.

Also deserving of comment is the assumption of continual molecular change that Zuckerkandl and Pauling used to explain their data: "over-all similarity *must* be an expression of evolutionary history" (emphasis added), with descendants "mutating away" from each other, becoming "gradually more different

from each other." Molecular clocks and UAR, for example, are predicated on this notion. Nevertheless, this is not a demonstration but rather an extrapolation of how something might occur.

The contradiction is that although the molecular assumption also predicts that constant molecular change will occur during gametogenesis, the only physical source of molecular change is ultraviolet radiation, which produces a very low mutation rate of 10^{-8} to 10^{-9} that is random with regard to affecting somatic or sex cells and specific molecules. Thus, any apparent concordance between the reality of the physical world and the concept of a constantly changing molecular world is an illusion.

The notion of constant and accumulative mutation affecting sex cells (the only way in which molecular change can be transgenerational) also contradicts the tendency of cells to be homeostatic, for example, via heat shock proteins that maintain cell membrane physical states through lipid transport, eliminate reading errors that occur during transcription and translation, chaperone other proteins, and ensure proper folding of other proteins such as transcription factors. This makes sense because unabated molecular change would undermine the integrity of cell function and would more likely lead to death than to organismal change.

It may be widely believed, and even true at some level, that "genomes diverge as a function of time," as Sean Carroll recently reiterated. But the fact that genomes differ (in whatever way in which difference, or similarity, is identified) does not inform how this difference arose. No doubt, some difference is due to the rare and random effects of ultraviolet radiation. Genomic difference may also be due to failed DNA repair or, as Britten and Kohne offered, saltatory events. Sibley and Ahlquist's "law of large numbers" may have an intuitive appeal; organisms are closely related because they share "lots" of their genome. But as Marks pointed out, humans share approximately 25% of their genome with bananas. Essentially, there is nothing in the detection of genomic difference or similarity that demands the "molecular assumption" or a theory of evolutionary relatedness.

How might we think about "morphology" and "molecules"? Is there really an evolutionary gulf between the two?

A major area of inquiry in developmental biology is how cells acquire positional information with regard to entire structures (e.g., where limbs will grow) and their components (e.g., limb segments). Morphological differences may be considered in light of differences in regional and overlapping domains of regulatory gene expression as well as in fields of molecular gradients (morphogenetic fields). As C. O. Lovejoy and colleagues hypothesized in 1999 with regard to the emergence of human pelvic shape,

> If a particular PI [positional information] gradient were to span *n* cell diameters, and those cells defined the ultimate anteroposterior dimension of the presumptive ilium (superoinferior in the adult human), then a slight increase in the steepness of its slope would cause that signal to span fewer cells, "distorting" the presumptive anlagen and substantially altering downstream adult morphology.

In other words, although traditionally conceived as involving myriad steps, "the transformation of the common ancestral pelvis [in its entirety] into that of early hominids may have been as 'simple' as a slight modification of a gradient." Thus, morphological novelty can arise via differences in gene expression and pathways of molecular communication and shifting domains of morphogenetic fields in conjunction with the physical and mechanical consequences of cellular organization—and it is at these levels of molecular interaction, not the accumulation of point mutations, that one should address questions of phylogenetic relatedness and also seek a connection between molecules and morphology.

One must realize that there is a difference between change at the genetic level and perceived phenotypic change. Common in the literature on the genetics of evolution is mistaken conflation of the two as constituting macromutation, the origin of species. Nevertheless, especially with increasing awareness from molecular biology that there are not "genes for" features, we must distinguish between what appears morphologically to have been the result of a macromutation (e.g., developing feathers instead of scales) and the underlying genetic–epigenetic interactive pathways.

As M.-C. King and A. C. Wilson alluded to in 1975, it is not through determining overall molecular or genomic similarity of organisms that we will understand their biology; rather, we will understand through delineating the development of their biology. This makes sense. If the inactivation or deletion of a transcriptional enhancer can shift sacral position caudally, or if expansion of a morphogenetic gradient

can fully transform a primitively narrow pelvic girdle with tall, thin ilial blades into a hominid's broad, deep, and squat structure, it is by studying these molecular events that we may profitably explore the molecular basis of morphology and consequently, through the analysis of both, the evolutionary relationships of complex organisms.

It is, then, appropriate to both question and expand our perceptions of what is or will be evolutionarily revealing at the molecular level. There has been a steady increase in the number of studies that demonstrate virtual molecular identity between taxa that are morphologically very different and then express astonishment at this apparent contradiction. As Carroll pointed out with regard to expectations of the human and chimpanzee genome projects, demonstrating molecular similarity is not equivalent to deciphering the pathways that make these hominoids so different in hard- and soft-tissue anatomy, physiology, reproductive biology, cognitive abilities, and behavior. Here, the "law of large numbers" fails to enlighten. Unlike in bacteria, in metazoans there is not a strict correspondence between a "gene" (a sequence of nucleotides bound by start and stop codons) and a "gene product" (a protein). In multicellular animals, RNA essentially directs the "show," for example, in reading select bases and splicing specific introns as it composes different proteins from the same stretches of DNA. The surprise that the International Chimpanzee Chromosome 22 Consortium had on comparing human chromosome 21 with its apparent chimpanzee counterpart chromosome 22—finding that these hominoids differ by 83% in their amino acid sequences but that this significant difference derives from very similar DNA sequences—provides a lesson: It is time to go beyond mechanically comparing molecular sequences or entire genomes and fanning the flames of a "molecules versus morphology" debate in seeking insight into evolutionary relationships. In light of molecular and developmental biology, the former is naive and the latter is certainly artificial.

— Jeffrey H. Schwartz

Further Readings

Brown, W. M., George, M., Jr., & Wilson, A. C. (1979). Rapid evolution of mitochondrial DNA. *Proceedings of the National Academy of Sciences USA, 76,* 1967–1971.

Goodman, M. (1962). Immunochemistry of the primates and primate evolution. *Annals of the New York Academy of Sciences, 102,* 219–234.

Hagelberg, E. (2003). Recombination or mutation rate heterogeneity? Implications for mitochondrial Eve. *Trends in Genetics, 19,* 84–90.

International Chimpanzee Chromosome 22 Consortium. (2004). DNA sequence and comparative analysis of chimpanzee chromosome 22. *Nature, 429,* 382–388.

Lake, J. A. (1991). The order of sequence alignment can bias the selection of tree topology. *Molecular Biology and Evolution, 8,* 378–385.

Lovejoy, C. O., Cohn, M. J., & White, T. D. (1999). Morphological analysis of the mammalian postcranium: A developmental perspective. *Proceedings of the National Academy of Sciences USA, 96,* 13247–13252.

Marks, J. (2003). *What it means to be 98% chimpanzee* (rev. ed.). Berkeley: University of California Press.

Romero-Herrera, A. E., Lehmann, H., Castillo, O., Joysey, K. A., & Friday, A. E. (1976). Myoglobin of the orangutan as a phylogenetic enigma. *Nature, 261,* 162–164.

Ruvolo, M. (1997). Molecular phylogeny of the hominoids: Inferences from multiple independent DNA sequence data sets. *Molecular Biology and Evolution, 14,* 248–265.

Ruvolo, M., Disotell, T. R., Allard, M. W., Brown, W. M., & Honeycutt, R. L. (1991). Resolution of the African hominoid trichotomy by use of a mitochondrial gene sequence. *Proceedings of the National Academy of Science USA, 88,* 1570–1574.

Sibley, C. G., & Ahlquist, J. E. (1983). Phylogeny and classification of birds based on the data of DNA–DNA hybridization. In R. F. Johnston (Ed.), *Current ornithology* (Vol. 1, pp. 245–292). New York: Plenum.

Morris, Desmond (1928–)

Desmond Morris has been referred to as a Renaissance man. He is widely known in both scientific and artistic circles. He has been a prolific author of children's and adult books, nonfiction and fiction. He has made films and hosted television programs on animal behavior and other zoological topics. He has also been a successful surrealist painter for over 50 years.

Morris was born in the village of Purton, Wiltshire, England, in 1928. Even as a young child, he had a strong interest in natural history. Attending Birmingham University, he earned a BSc in zoology followed by a PhD in animal behavior from Oxford University. His thesis was on the reproductive behavior of the ten-spined stickleback.

After being awarded his doctorate, Morris moved to London to become the head of the TV and film unit at the London zoo. He simultaneously studied the artistic abilities of apes. He authored a number of natural history books and hosted a popular TV show, *Zootime,* for several years.

In 1967 Morris authored an international best-seller titled *The Naked Ape.* This work was quite controversial and made him infamous. In it, he used his zoological background to objectively study human behavior. He defines humans as simply another species in the ape family and relates complex human behavior to that of the lesser apes. While many scholars were incited by the content, and content that was not included, millions of copies of *The Naked Ape* were sold worldwide in two dozen languages. Morris left out detailed data and statistics, making his work comprehensible to the average reader. He did footnote his research and data for each chapter at the end of the book for those interested in the research supporting his commentary. After the success of *The Naked Ape,* he relocated to the island of Malta to paint and continue his writing.

Two more significant works quickly followed. In 1969, *The Human Zoo* continued the frank observations of *The Naked Ape* by scrutinizing the society that humans have created for themselves. He saw the neurotic behaviors exhibited by animals confined in zoos reflected in the humans living in crowded cities—"human zoos."

Intimate Behavior, published in 1971, looks at physical contact between human beings. He analyzed the roots of human intimacy from before birth throughout the life span; not only sexual intimacy, but social intimacy, object intimacy, self-intimacy, and substitutes for intimacy when it is lacking.

Morris has traveled extensively around the world making observations and gathering data for his research. He has coauthored several books with his wife, Ramona Morris. Galleries frequently exhibit his paintings. In addition to his art and animal behavior research, Morris has written reference books on dogs, cats, amulets and charms, horses, soccer, and more. A lively intellect and engaging narrative style ensure a wide readership.

In the decades since his first noteworthy studies were produced, Morris has persisted in fascinating us with his observations of his fellow humans. He has continued to produce television and film documentaries, write prolifically for adults and children, conduct animal behavior research, and paint. His broad range of interests from the sciences to the arts does confer on him the title of a modern Renaissance man.

— *Jill M. Church*

Further Readings

Morris, D. (1996). *The human zoo* (reprint ed.). New York: Kodansha Globe.

Morris, D. (1997). *Intimate behavior: A zoologist's classic study of human intimacy* (reprint ed.). New York: Kodansha Globe.

Morris, D. (1999). *The naked ape: A zoologist's study of the human animal* (reprint ed.). Los Alamitos, CA: Delta.

Muller, Friedrich Max (1823–1900)

Friedrich Max Muller was a prominent 19th-century scholar whose voluminous writings popularized the study of Indo-European languages, comparative linguistics, mythology, and Eastern religious thought. He was notable for his varied interests and broad comparative theories and was the author and/or editor of more than 100 books. Like other scholars of his day, including Edward B. Tylor and Sir James Frazer, Muller derived his theories from texts rather than from personal experiences. Biographer Nirad C. Chaudhuri praised Muller for having brought a sympathetic portrayal of Eastern cultures and religions to a European audience. But as Laurens R. van den Bosch emphasized, Muller never actually visited India. Perhaps Muller's best-known scholarly achievement is his editorship of *The Sacred Books of the East,* which was published in 50 volumes between 1879 and 1894. This collection constitutes an important compendium of both Hindu and Buddhist thought. In addition, Muller was responsible for introducing European

audiences to a number of previously unknown Japanese Buddhist scriptures.

Born in Dessau, Germany, Muller was the son of the Romantic poet Wilhelm Muller. The young Muller evidenced an early interest in comparative language studies and studied philosophy, linguistics, and languages at the universities of Leipzig, Berlin, and Paris. Muller moved to England in 1848, became a member of Christ Church in Oxford, and remained at Oxford University for the rest of his life. At Oxford, Muller first taught modern languages. After being denied a professorship in Sanskrit in 1860, Muller's persistence and productivity were rewarded by his appointment as professor of comparative philology in 1868 (a professorship that was established especially for him). Although he was German born, nearly all of Muller's major publications are in English.

Muller is best known to contemporary anthropologists for his debate with Tylor, the founder of British social anthropology, concerning the origin of religion. This debate is still covered in most introductory anthropology textbooks. To summarize this debate, Tylor thought that the origin of religion is psychological experiences (especially dreams), whereas Muller opined that religion began with human perceptions of natural phenomena. Muller contended that at the root of all religions is the experience of the infinite provoked by nature, especially the power of the sun. He also postulated that most Indo-European gods were originally the names of natural phenomena that became falsely deified. Thus, as Muller provocatively asserted, religion is best understood as a "disease" of language. His actual theory, as presented in *Contributions to the Science of Mythology* (1897), is much more tentative and nuanced. He was not so much concerned with so-called diseases of language as with the expansive power of metaphor.

Muller's essays on mythology are among his most accessible writings. It was his explorations of mythology that led him to delve further into the study of comparative religions. As early as 1849, he had seen evidence of nature worship in Indo-European mythology, beginning with the gods of *Rig Veda,* who were portrayed as active forces of nature and only partly personified as imagined supernatural persons. According to Muller, myths transform concepts into beings and stories, and the gods (whose beginnings were words constructed to express abstract ideas) were mistakenly transformed into imagined personalities. Muller's theories concerning the significance of metaphor anticipated the theories of 20th-century anthropologists such as James W. Fernandez and Claude Lévi-Strauss, and his speculations on Indo-European languages also inspired the work of Georges Dumezil.

Muller's scholarly legacy is mixed. He cultivated an engaging persona, hobnobbed with the elites of his day, and occupied a prominent place in Victorian intellectual circles. By all accounts, most of his public lectures were well received. As Roger O'Toole pointed out, during Muller's lifetime, his reputation rivaled that of Tylor, Frazer, and Robertson Smith, but today it is marked by indifference. O'Toole cited Émile Durkheim's critique of naturalism as one possible reason for the neglect of Muller's ideas. O'Toole also faulted Muller for his excesses and sweeping generalizations; nevertheless, he contended that Muller deserves recognition as a founder of the scientific study of religion. Muller himself had coined the term "science of religion" (*Religionwissenschaft*) in 1873, but his notion of science differed considerably from that of contemporary anthropologists. First, he did not embrace participant observation. Muller seldom looked beyond texts. Second, his biases were apparent. Muller was not an advocate of objectivity in the study of world religions and adamantly insisted that the comparative study of world religions would ultimately lead to a greater appreciation of Christianity.

As a comparative linguist, Muller's contributions were again mixed. To his credit, he advocated a modern contextual approach to the study of language and was among the first to suggest that the study of the language should be related to the study of the culture in which it had been used. He was also among the first to tie the development of languages to the study of belief systems, a theme developed in the writings of Benjamin Lee Whorf. But he has been widely criticized for assuming that religions are like languages that can be classified into "families." By and large, his translations of Hindu and Buddhist sacred texts are competent but have been largely superseded.

Finally, Muller's work contributed to a growing interest in Aryan culture that focused on Indo-European (Aryan) traditions as opposed to Judeo-Christian (Near Eastern) traditions. But this new focus had unintended consequences, and some of Muller's findings about the Aryan tradition began to be expressed in terms of racist ideologies. Muller had hoped, to the contrary, that the discovery of a

common Indian and European ancestry would serve as a powerful argument against racism.

— *Stephen D. Glazier*

Further Readings

Chaudhuri, N. C. (1974). *Scholar extraordinary: The life of the professor the Rt. Hon. Friedrich Max Muller.* London: Chatto & Windus.

Crocker, J. C., & Sapir, J. D. (Eds.). (1977). *The social use of metaphor.* Philadelphia: University of Pennsylvania Press.

Littleton, C. S. (1977). *The new comparative mythology: An anthropological assessment of the theories of Georges Dumezil.* Berkeley: University of California Press.

O'Toole, R. (1998). Friedrich Max Muller. In W. H. Swatos, Jr. (Ed.), *Encyclopedia of religion and society* (pp. 314–315). Walnut Creek, CA: AltaMira.

Stone. J. R. (2002). *The essential Max Muller: On language, mythology, and religion.* New York: Palgrave Macmillan.

van den Bosch, L. P. (2002). *Friedrich Max Muller: A life devoted to the humanities.* Leiden, Netherlands: E. J. Brill.

Voigt, J. H. (1967). *Max Muller: The man and his ideas.* Calcutta, India: Mukhopadhyay.

FRIEDRICH MAX MULLER

The son of the poet Wilhelm Muller, German-born Friedrich Max Muller was an influential philologist and Orientalist. Muller is known for advancing philology and mythology as well as for his important works on Indian religion and philosophy. The growth of the study of various topics, including linguistics, mythology, and religion, is at least partially attributed to Muller. Although Muller was famous on an international basis in his day, his fame has decreased to the point that he is now known primarily by some scholars within the disciplines in which he was most influential.

One of Muller's important theories was the belief that mythology grows out of descriptions and understandings of natural processes. Muller was very interested in comparative religion and spent a great deal of time studying Indian belief systems. One of his goals was to trace the history of Aryan people to find their common ancestry. This goal was an outgrowth of his belief (and that of other German Romanticists at the time) that the Orient was the origin of spirituality. The goal of discovering and documenting the history of the Aryan race was a driving force in Muller's career. Muller believed in learning about and understanding cultural and religious diversity, which was a very controversial notion during his time.

Muller was trained in Sanskrit at the University of Leipzig in Germany for both his undergraduate degree (1841) and his Ph.D. (1843). Muller continued his studies of philology and Sanskrit in Berlin. In 1845, he went to live in Paris and earned a living copying Sanskrit manuscripts. In 1846, the East India Company hired Muller to translate the *Rig Veda,* one of the primary texts of Hinduism. The result was a six-volume edition. The publication of the *Rig Veda* in 1848 catapulted Muller to fame, and he was offered a position at Oxford University. In 1854, he was hired as Deputy Taylorian Professor of Modern European Languages. Two years later, Muller became the curator of the Bodleian Library at the Oxford. Muller became a professor of comparative philology in 1868, and he became a privy councillor in 1896. Muller left his professorship in 1875, and from then until his death he dedicated his time to editing and translating portions of the 50-volume *Sacred Books of the East.* Muller authored and edited numerous books and essays. In addition, he translated many important religious texts and other works, including Immanuel Kant's *Critique of Pure Reason* (1881).

— Kristine McKenzie Gentry

MULTICULTURALISM

Culture cannot be defined simply by our ethnic background. It is also family, religion, profession, interests, gender, child-rearing practices, educational background, where we live, the food we eat, our individual uniqueness, sexual lifestyles, and more. Even though we are better understood by someone who considers

our ethnic background, our own cultural definition is much broader than just an ethnic label.

Social Foundations of Multicultural Education

By formulating the scientific concept of culture and destroying the myth of race as a determinant of behavior, cultural anthropologists during the 1920s began to lay the intellectual foundations for multicultural/global education. Franz Boas, Ruth Benedict, Margaret Mead, and their colleagues provided a scientific basis for dealing with the crucial dilemma of the world today: How can people of different appearances, mutually unintelligible languages, and dissimilar ways of life get along together peaceably? This understanding of ourselves as a species capable of creating and carrying culture opened the way for thinking and believing more inclusively about the world. But it was not until the 1960s and 1970s that the image of a multicultural/global perspective burst on our consciousness. Visionary thinkers, best-selling books, and unexpected events sharpened and expanded our understanding.

In 1962, Rachel Carson astonished the public by describing the harmful consequences of the use of pesticides. In 1964, Marshall McLuhan described a "global village" with its people linked through communications technology. In 1964, Pierre Teilhard de Chardin wrote of the convergence of human aspirations and history into the noosphere, a progressive unification of humankind and intensification of our collective consciousness. In 1965 and 1969, Barbara Ward and R. Buckminster Fuller, respectively, conceived the metaphor of Spaceship Earth as a closed life support system with its inhabitants accelerating through time and space depending on each other for survival. In 1968, Paul Ehrlich called our attention to the stunning exponential growth rate of world population and impending ecological catastrophe. In 1970, Alvin Toffler warned of impending future shock. In 1972, Barbara Ward and Rene Dubos coined the now familiar notion of "thinking globally, acting locally." In 1972, the Club of Rome ignited a global controversy regarding the rapid depletion of our nonrenewable resources. And in 1974, the biologist Lewis Thomas portrayed the earth as a single living cell. Critical events on a national/global scale played an important role in raising our consciousness.

The challenge of multicultural/global education is, and will continue to be, the acceptance, respect, and love that can be learned at young ages, as can bigotry, racism, and hatred. Robert Haveman and Barbara Wolfe argued that children's life success is determined by three primary factors: a social or government investment in their lives, a parental investment, and the choices that the children make over time. These authors highlighted that, in addition to parental influence, social institutions such as schools play a significant role in children's lives, so that the importance of good schools and teachers is without question extremely important.

Demographic Characteristics

James Banks estimated that the ethnic texture of the United States is changing substantially. The U.S. Census projects that ethnic minorities, including African Americans, American Indians and Alaska Natives, Asians and Pacific Islanders, and persons of Hispanic origin, would make up 29.4% of the U.S. population by the year 2000. At the time, American classrooms were experiencing the largest influx of immigrant students since the turn of the 20th century.

Understanding the demographics of the American nation is very important to multicultural education as it attempts to assimilate individual students into the dominant field and practices of the classroom. The focus is on the fostering of positive affective relationships among students of different backgrounds and personal characteristics in the school so that each student has a strong self-concept and can work in harmony with the group.

This approach to education promotes social equality and cultural pluralism that can be later transferred to the workplace. The third millennium promises to be as challenging as the second one was. Educators must build on students' learning styles, adapt instruction to the existing skills of students in the classroom, and involve students in thinking through and analyzing the life situations of different people. In managing cultural diversity, the first thing that we must understand is the ways in which people differ from each other. These ways are significant and numerous. Culturally, we vary in gender, age, ethnicity, race, sexual orientation, educational background, religion, physical/mental ability, military/veteran status, lifestyle, immigrant status, and language facility. Functionally, we vary in how we think, learn, process information, respond to authority, show respect, and reach agreements. Historically, culturally, and traditionally, we also vary in family makeup, perspective,

political outlook, and intergroup relationships. When groups are made up of people with many backgrounds, cultures, and lifestyles in a school or workplace setting, promoting teamwork and smooth interactions can be quite a challenge. Finding new ways of working together will require teaching and thinking about people's differences so as not to divide, separate, or exclude but rather to take advantage of those differences. We need to create environments that welcome and encourage the benefits of diversity.

The gap between our own experiences and personal identities and those of the students or workers may be small or may be tremendous. But there is a gap, and it will continue to grow as the student/workplace population becomes more diverse. Thus, the racial, cultural, ethnic, and gender differences at work today can cause trouble if they are not handled sensitively.

The new aspect about what is variably called "managing cultural diversity" and "multiculturalism" is the quantity and variety of differences in the schools and in the workforce. Educators, supervisors, and colleagues should be careful to interpret cultural behaviors correctly and not take offense where none is intended.

In the United States today, the traditional hierarchical, white male-dominated, large corporate environment is no longer the norm. In 2002, women constituted nearly two thirds of all new entrants into the workforce. One out of four people is African American, Hispanic, or Asian American. Immigrants make up the largest share of the U.S. population increase. There are more people over 65 years of age than there are teenagers. At least 10% of the population is gay or lesbian.

Diversity, Business, and Teaching

By learning and understanding the new perspectives brought by a wider range of a diverse population, we can provide better services to the business clients and our schoolchildren. For example, Carlos Diaz, professor of multicultural education at Florida Atlantic University, believes that as a general rule the higher the average socioeconomic status of a school's student population, the more favorably it will compare with the following criteria. The average social class of a school will affect the proportion of high-status (advanced placement) courses available to students, the proportion of the faculty members holding temporary or emergency teaching credentials, the average level of per-pupil funding the school has available (which affects the books, materials, and field trips available to students), student expectations of success in the college preparatory courses, and teacher expectations of high student achievement.

Common sense and the education literature tell us that students have different learning styles and that learning the new perspectives brought by a wider range of employees, educators, and business people can provide better services to students and clients. New perspectives will enhance our problem-solving skills and allow us to make better and more inclusive decisions. Business people and educators can learn to ask better questions initially, to identify new areas of opportunity and increase customer satisfaction as well as enable students to succeed, and/or to adapt to the requirements of the traditional classroom.

Learning style is a complex idea and involves how people perceive, process, store, and retrieve information. In a learning situation in the workplace or at school, to what cues does an individual attend? How does the individual connect cues? What strategies does the individual use to make sense of new information or ideas? With what "old information" in the individual's head is the new information connected and stored? Everyone develops ways of approaching these information-processing tasks, but not everyone develops in the same ways. One way in which to view learning is as information processing. Howard Gardner's idea of multiple intelligences is another way. According to Gardner, there are at least seven different kinds of intelligence, and everyone has a profile of strengths and weaknesses. These include linguistic intelligence and logical–mathematical intelligence (which schools and businesses focus on most heavily), musical intelligence, interpersonal intelligence, intrapersonal intelligence, spatial intelligence, and bodily–kinesthetic intelligence.

Learning styles overlap somewhat with cultural background and gender. It is important for the workplace and all educational settings to understand that not all members of a cultural or gender group learn in the same way; patterns exist concerning how members of different groups tend to approach tasks. These patterns develop due to factors such as child-rearing practices and the roles that children are expected to occupy as adults. Rather than generalizing about students and workers, it would be more useful to investigate and learn the learning style preferences of the students and people in the workplace.

Core Values in Multiculturalism

Multiculturalism has ideological overtones based exclusively on democratic ideals that are lacking in less controversial educational content areas such as mathematics, reading, and computer science.

Four core values provide the basis for an educational and workplace model that will acknowledge that multiculturalism is not a fad but rather a fact of life in the United States today and tomorrow: acceptance and appreciation of cultural diversity, respect for human dignity and universal human rights, responsibility to the world community, and reverence for the earth.

These core values are rooted in democratic theory and Native American philosophy. Together, they illustrate the strong ethical foundations of multiculturalism. In the workplace, the trend in management is away from autocracy and toward consensus. More corporations are shifting from a hierarchical structure to individual contributors and teams.

This shift requires new skills of communication, negotiation, collaboration, and team building. Leaders in the field of education and business must orchestrate teams composed of diverse individuals, and gaining full cooperation from everyone on the team is critical to performance. Businesses will receive many benefits by recognizing and encouraging workforce diversity. Among the many benefits, consider the economic impact of tapping into the tremendous purchasing power of older Americans, African Americans, and Hispanic Americans, among others. As another example, consider the impact of reducing costs by reducing employee turnover given that highly trained workers will stay with organizations that are responsive to their needs, that is, if businesses understand and implement multiculturalism; corporations know that retraining is expensive, and high employee turnover reduces morale and productivity.

Businesses can reap the benefits of productivity, creativity, and innovation from all employees by promoting new perspectives and, therefore, enhancing problem solving. An inclusive environment both at school and in the workplace builds respect, ownership, and loyalty. The process of becoming multicultural is one whereby a person develops competencies in multiple ways of perceiving, evaluating, believing, and doing.

The focus of multiculturalism is on understanding and learning to negotiate cultural diversity among nations, within a single nation, and among individuals. For example, in their book *Communicating With Strangers,* William Gudykunst and Young Kim described the multicultural person as one who has achieved an advanced level in the process of becoming intercultural and whose cognitive, affective, and behavioral characteristics are not limited but rather are open to growth beyond the psychological parameters of any one culture. The intercultural person possesses an intellectual and emotional commitment to the fundamental unity of all humans and, and at the same time, accepts and appreciates the differences that lie between people of different cultures.

According to Gudykunst and Kim, intercultural people have encountered experiences that challenge their own cultural assumptions and that provide insight into how their view of the world has been shaped by their culture, can serve as facilitators and catalysts for contacts between cultures, come to terms with the roots of their own ethnocentrism and achieve an objectivity in viewing other cultures, develop a Third World perspective that enables them to interpret and evaluate intercultural encounters more accurately and thus to act as a communication link between two cultures, and show cultural empathy and participate imaginatively in others' worldviews.

Why Is Multicultural Understanding Essential?

Education

Demand for the reform of schooling in the United States was a continuing theme throughout the 20th century. The educational reform movement gained new momentum during the mid-1980s, beginning with the Reagan administration's report titled *A Nation at Risk.* Nearly a dozen additional major reports on U.S. schools appeared in 1983 alone. The common thread throughout these reports was the demand for a national commitment to true excellence in education.

What many of these reports did not acknowledge, however, is that educational excellence in our schools cannot be achieved without educational equity. Equity in education means equal opportunities for all students to develop to their fullest potential. Evidence of inequity in education exists in the nation's school dropout rates, which are disproportionately high among African American, American Indian, and Hispanic youths as well as among the poor. In many

schools across the nation, racial and language minority students are overrepresented in special education and experience disproportionately high rates of suspension and exclusion. The majority of African American and Latino students attend schools with large concentrations of economically disadvantaged and/or lower achieving students due to outdated texts, poor facilities, and/or inadequately prepared teachers.

There is a lot of rhetoric in education and the workplace about the human potential and the need for equality of opportunity. Multiculturalism moves beyond the rhetoric and recognizes that the potential for brilliance is sprinkled evenly across all ethnic groups. When social conditions and school practices hinder the development of this brilliance among students outside the predominant culture, as is the case within the society, the waste of human potential affects everyone. The cumulative loss of talented scientists, artists, writers, doctors, teachers, spiritual leaders, and financial and business experts is staggering.

Multiculturalism also contributes to excellence in another important way in that it builds knowledge about various ethnic groups and national perspectives into the curriculum. The traditional curriculum is filled with inaccuracies and omissions concerning the contributions and life conditions of major ethnic groups within our society and for nations across the planet. Obviously, the attainment of any degree of excellence is stunted by curriculum content that is untrue or incomplete. Given that we live in an interdependent world that is shrinking rapidly, and in light of the events of September 11, 2001, ignorance of global issues and national perspectives is foolish and even dangerous.

The Business World

Local, state, and federal laws prohibit discrimination based on race, gender, religion, and/or other factors. The laws regarding discrimination require a company found guilty to pay all damages, including all attorney fees and court costs. Plaintiffs are awarded millions of dollars every year.

Corporations have begun to ask the difficult questions that are required to orchestrate teams composed of diverse individuals, and gaining full cooperation from everyone on the team is critical to performance.

The corporation must be concerned about the welfare of its working force. It must promote diversity by challenging people to spend time together during lunch, to work on different projects equally with people from different races and ethnic backgrounds, to provide supplemental training equally to all employees, to promote employees based solely on their qualifications, and to ensure that no group of employees are hired only for certain jobs. Finally, in an effort to recruit and keep good employees of all races and ethnicities and of both genders, Fortune 500 companies have begun to address diversity issues in the workplace.

What Can the Education and Business Worlds Do to Promote Diversity?

As both educators and business executives, we can read articles, books, and journals. We can keep our ears and eyes open and can attend special events, programs, and seminars. We can learn about some of the diversity issues faced by others. If we do not understand something about a culture different from our own, we can ask. What do our colleagues and associates think about our school/organization and its willingness to address multicultural issues? What have they experienced, both positively and negatively, about diversity? Keep in mind that a broad definition of diversity includes all types of human differences—age, gender, ethnicity, positions in the organization, education level, immigrant status, seniority, language facility, and sexual orientation, to name a few.

What do our school's or company's formal statements, such as the vision, mission, goals, and objectives, say about how the school or company conducts its business? Are any direct references made to multiculturalism? If so, it should be easier to build support and find funding in education and also should be easier for a business that is formally committed to diversity. Everyone in school and in the workplace should be a catalyst, a researcher, an advocate, a problem solver, a facilitator, an influencer, a supporter, and a strategic thinker so as to promote and comply with the multicultural vision statement of their institution.

The Social Relations of Class, Race, Gender, and Crime Control: Inequalities of Crime, Culture, and Production

Examining class, race, and gender in relation to law, order, and crime control provides an appreciation not only of multiculturalism but also of the unique histories of the individual social groupings

and interrelated axes of privilege and inequality. In multicultural education, it has been shown, in terms of the history of the social realities of justice in America, that the experiences of diverse groups of people in society have contributed to the shaping of conceptions of criminals and victims. These experiences have helped to shape not only the way in which racial and ethnic majorities have come to regard specific legitimate and illegitimate behaviors but also the patterned ways in which they have (or lack) access to institutional power and privileges.

In the understanding of multiculturalism, the study of class, race, gender, and crime reveals several broad themes about how bias undergirds the construction of what will and will not be seen as criminal. This bias also shapes the construction of individual experience and identity, which varies according to one's socioeconomic position in society. More specifically, there are at least four related assumptions regarding the understanding of the social relations of class, race, gender, and crime control. These categories of social difference all share similarities of justice, especially as they relate to power resources and to the allocation and distribution of rewards and punishments in society. The systems of privilege and inequality derived from the social statuses of class, race, and gender are overlapping and have accumulating effects on the type of crime control that various groups of people encounter. There are connections among these systems of difference, inequality, and privilege in that each helps to reproduce the social divisions of hierarchy and stratification that dynamically affect people's life experiences inside and outside the criminal justice system. And according to relationships of power, status, and authority, systems of crime control socially construct selectively enforced and differentially applied norms to social groups.

The process of changing organizational cultures, as well as social relations of class, race, and gender, is a long-term and difficult process. There is inevitable resistance to alterations of fundamental ways of doing business that have changed little in half a century in many schools and workplace environments.

It is clear that excellence in managing diverse groups will require changes in culture in schools and workplaces. To create this change, we must understand culture with the objective of creating a climate in which members of all identity groups excel. We must understand pluralism with the objectives of creating a two-way socialization process and ensuring influence of minority culture perspectives on core educational and business organization norms and values.

We must understand structural integration with the objective that no correlation should exist between culture and group identity in the school or workplace in the form of job status. We must understand integration in informal networks with the objective of eliminating barriers to entry and participation. We must understand institutional bias with the objective of eliminating bias ingrained in management systems in both school and workplace environments. Finally, we must understand intergroup conflict with the objectives of minimizing interpersonal conflict based on group identity, minimizing backlash by dominant group members, and promoting intergroup understanding.

Multiculturalism is not an easy concept to understand. However, it provides an opportunity for all children to see themselves in the literature. It fosters development and positive self-esteem at school and in the workplace. It strengthens the significance of personal heritage. It helps to raise personal aspirations. It provides for everyone to learn about people all over the world. It recognizes and values the contributions of all people. It helps to build a global community. It blends easily into themes of study found in schools. Most important, it prepares us for the future.

If we work together, learn from each other, and share something of ourselves, we can develop deeper understandings and a tremendous appreciation for our differences, as well as our similarities, at both the local and global levels. We can cultivate our differences, or we can celebrate them.

— John A. Xanthopoulos

Further Readings

American Association of University Women. (1997). *Affirmative action* [position paper]. Washington, DC: Author.

Banks, J. (1994). *Teaching strategies for ethnic studies* (3rd ed.). Boston: Allyn & Bacon.

Diaz, C. F. (2001). *Multicultural education in the 21st century.* New York: Longman.

Diaz, C. F., Massialas, B. G., & Xanthopoulos, J. A. (1999). *Global perspectives for educators.* Boston: Allyn & Bacon.

Nussbaum, M. C. (1997). *Cultivating humanity: A classical defense of reform in liberal education.* Cambridge, MA: Harvard University Press.
Waters, M. C. (1990). *Ethnic options: Choosing identities in America.* Berkeley: University of California Press.

Mummies and Mummification

The term *mummy* describes the corpse of an organism where decay is arrested for a considerable period of time and a semblance of life-like appearance is preserved. Some natural environments can mummify animal and human bodies spontaneously, thereby preserving them over great periods of time. Mummification practices by humans occur worldwide and may represent significant processes designed to preserve a body for important cultural, religious, or political purposes. The exceptional preservation of soft tissues can provide detailed information about ancient environments, cultures, and the evolution of disease not always achievable by traditional interpretations of archaeological assemblages.

Mummification involves the transformation of a once living body or tissue into a state of arrested decay by regulating or denying the water, temperature, or biochemicals necessary for complete decomposition. In the context of the term *mummy,* the process of mummification also infers the preservation of enough soft tissue to resemble its living morphology for a prolonged postmortem interval. Mummification may be classified broadly into two categories: anthropogenic (where humans promote the mummification process) and spontaneous (where natural processes occur to cause the preservation without human intervention).

The origins of the word *mummy* lie in the rocks of 1st-century AD Persia, where deposits of natural bitumen were called *múmiyá* after an Arabic word for "wax." The black tarry substance became popular for medicinal purposes, and by the 13th century the natural deposits could not satisfy burgeoning European demand. So, the black resins found in mummified Egyptian bodies were substituted; thus, the term *múmiyá* was transferred to the resin and later to the ancient human remains. Mummies still found themselves in the service of humans, but in a purpose far removed from that of their original internment thousands of years earlier.

The earliest known example of anthropogenic mummification is from the Chinchorros culture of northern Chile dated at 7,800 years of age. Since at least that time, humans have practiced mummification on every inhabited continent of the earth. Although mummification is widespread historically and geographically, it remains a highly anomalous human mortuary practice compared with the more common methods of burial and cremation for reasons of health and economy. This fact, combined with recognition that the practice of mummification was usually an expensive undertaking in terms of energy, time, and materials, surely indicates the power of motivations for its use by different cultures. Perhaps the source of public wonder and scientific rigor toward anthropogenic mummies is the question of purpose they inherently generate.

Reasons for Mummies

Many cultures share the belief that a deceased person's vital force or spirit remains with or in the vicinity of the person's body for some period after death. Most mortuary practices reflect a desire to pacify or hasten the departure of such spirits, but some others use the mummification process to exploit and regulate this force. For example, in Aleutian Islands culture, the bodies of dead leaders would be mummified and stored in caves or homes so that the living could continue to consult the remains for advice or prophesies, and some parts of the bodies would be carried on hunting trips because the entrapped vital force was expected to enhance success.

A motivation for anthropogenic mummification that has persisted even from historical times is that of war trophies such as "headhunting," where boiling and drying the heads of human enemies causes them to shrink and preserve so that they may be carried easily and displayed over time, instilling status to the wearer and other tribal members. Other values may include magical properties for rituals and security from the deterrent effect to hostile neighbors. It is documented that from the time of early Inca expansion, the Sausas of Peru sometimes skinned their military captives, filling the skin with ashes and sewing it up to erect "skin mummies" in their temples as war trophies.

Mummification as used by Inca, Egyptian, and Roman cultures may be understood from the motivation of political power. Monarchs would install themselves as spiritual deities to increase their authority and power, but such claims of royal divinity then required a series of rituals to instill and support such belief in the public's mind. Perpetuating the remains of a dead king via mummification made the associated divine body available to assist and support the structures of theocracy, linking the currently reigning monarch with the immortal gods by the deceased divine king for the perceived benefit of the people. Continuing display of the mummified remains in overtly visible tombs, such as the Egyptian pyramids, acted to remind the population of the deity status and authority of the king's office. Later there evolved a more personal motive for mummification after the erosion of royal power made the expensive process socially accessible. There arose a personal status from being able to afford mummification in addition to any other religious belief of extension to the afterlife.

Anthropogenic mummification practices have not been used exclusively on human bodies, and those used on other bodies may be preserved by methods similar to those employed for humans. Massive numbers of different animals were mummified by Egyptian guilds exclusively for sale to the public for use in totemic rituals, and pets were also mummified and buried in tombs with their owners. In many other cultures, the practice of sacrificing and mummifying animals may be considerably different in intent from that of mummifying humans, for example, to attract the animal's spirits for assistance with hunting or to appease the spirit of slaughtered prey.

Mechanisms of Mummification

Immediately after death of a living body, highly regulated enzymes in cellular tissue become deprived of vital regulatory controls and begin to autodigest and liquefy the surrounding cells. This process of self-destruction, called autolysis, is the first of a series that acts to break down once living tissue into constituent molecules and return them via soil, water, and atmosphere to the biochemical pool from which all life originates. Mummification can interrupt this cycle by regulating or stopping different parts of the decomposition process.

Because postmortem decay is an enzymatic process and enzymes require an aqueous medium, drying of body tissues is an effective inhibitor of decay and is the most common form of both spontaneous and anthropogenic mummification. This happens naturally in hot dry environments such as are found today in the Atacama region of northern Chile, where one can witness animal carcasses, locally reported to be hundreds of years old, so well preserved as to appear only weeks dead. Desiccation may also take place in cold dry environments by sublimation ("freeze-drying"), as evidenced by spontaneously mummified seals exposed in ice-free areas of Antarctica that are radiocarbon dated to be 2000 years old. Because such hyperarid environmental conditions have been intermittently active on the earth for hundreds of millions of years, prehistoric animal mummies have occurred and may be fossilized in geologically rare events. Several dinosaur specimens with abundant fossilized skin and other soft tissues suggest that conditions favorable for spontaneous mummification were active during the Cretaceous period.

Source: Courtesy, Wikipedia.

Anthropogenic mummification harnesses natural processes to promote desiccation and effect preservation. Evisceration was commonly employed to remove rapidly liquefying organs and promote airflow within the abdomen to hasten desiccation. The drying of a corpse was helped by positioning it in a well-ventilated area, such as the mouth of a cave or on a raised platform, but in wetter climates the process could be forced by exposing the body to fire. A corpse could also be stuffed with desiccants such as cloth and grass, or in areas with suitable ores it could be enveloped in sodium carbonates for a period of time to effect water transfer from the tissues. After desiccation, some cultures wrapped bodies in cloth soaked with botanical resins or sealed them in containers to shelter the remains from subsequent rehydration. There are some (mostly anecdotal) historic accounts of mummification by immersion in honey, including the remains of Alexander the Great and the Agesipolis king of Sparta in Libya, but modern experiments have shown that although honey can desiccate small samples of tissue via an osmotic effect, this has not yet been proven for use on whole bodies.

A different but spectacularly effective type of mummification occurs when a dead body is enclosed within a peat bog containing sphagnum moss. Compounds in the peat act to make calcium unavailable to enzymes and destructive bacteria and thereby halting their destruction of soft tissue, while the same process of calcium removal causes skeletal elements to dissolve away. These so-called "bog people" have the finest details of soft tissue preserved and are some of the best examples of humans dating back to the Neolithic.

Decomposition is also affected when temperature is lowered to levels that essentially suspend enzyme action, and this may halt decay for very long periods. Spontaneously mummified Siberian mammoths recovered from glacial ice show very good gross morphology after 44,000 years, and the 5,000-year-old corpse of a man buried by a glacier contained delicate features such as eyeball tissue and tattoos of the skin. Ancient Inca people took advantage of low temperatures and the sublimating environment found on high Andean mountain peaks to mummify bodies, a technique reflected in the modern mummification practice where liquid nitrogen is used to snap-freeze bodies in the effort toward long-term preservation.

Contemporary mummification is also achieved by embalming, which in modern practice predominantly involves intraarterial injection of chemicals such as formaldehyde to temporarily preserve a body until family members may view it before burial or cremation. The remains of some historical figures, such as Vladimir Lenin, Eva Peron, and Mao Tse Tung, have been preserved in such ways for political or other purposes. The use of arsenic in embalming fluid formulas was once popular and effective, but eventually it was discarded due to its toxicity and potential to confound the postmortem identification of arsenic poisoning in murder victims.

Abuse and Use

Throughout antiquity, looters have targeted mummies to recover precious adornments and to trade whole mummies to collectors. These practices denigrate the integrity of specimens, but modern humans have at times devised even more destructive fates. Mummies have suffered from being "harvested" and pulled apart to recover their linen wrappings for paper manufacture, or the remains have been ground down to provide substances for medicinal purposes. Even animal mummies have not been exempt; for example, 200,000 mummified cats recovered from an Egyptian necropolis site were transported to England and processed as fertilizer.

Such loss should be lamented. The exceptional preservation of soft tissues in mummies can provide detailed information about ancient cultures and historical events not always achievable by traditional interpretations of archaeological assemblages. The discovery of fish tapeworm ova within gut contents of South America's Chinchorro mummies not only confirmed archaeological suggestions of marine subsistence, but also confirmed that the Chinchorro people habitually ingested uncooked fish. The mummified remains of some polar explorers have allowed postmortem autopsies decades after the events, in some cases determining an unlikely cause of death such as lead poisoning or parasites developed by ingesting uncooked polar bear meat. Sometimes the objects and chemicals associated with a mummified body may provide information such as the identification of embalming agents and adornments that may indicate their provenance and extent of trade between cultures of the region at the time. Mummies are also being used increasingly in the area of health, where their retention of pathologies in soft tissue is being used to observe the rate of change in disease with time. Tracking the evolutionary path of disease between ancient people and modern humans may provide clues to control current or future afflictions.

— Mark J. Thompson

Further Readings

Aufderheide, A. C. (2003). *The scientific study of mummies.* Cambridge, UK: Cambridge University Press.

Cockburn, T. A. (Ed.). (1998). *Mummies, disease, and ancient cultures.* Cambridge, UK: Cambridge University Press.

Haglund, W. D., & Sorg, M. H. (Eds.). (2002). *Advances in forensic taphonomy: Method, theory, and archaeological perspectives.* Boca Raton, FL: CRC Press.

Moseley, M. E. (1992). *The Incas and their ancestors: The archaeology of Peru.* London: Thames & Hudson.

Reid, H. (1999). *In search of the immortals: Mummies, death, and the after life.* London: Headline Book.

Spindler, K., Wilfing, H., Rastbichler-Zissernig, E., zur Nedden, D., & Nothdurfter, H. (Eds.). (1996). *Human mummies: A global survey of their status and the techniques of conservation,* Vol. 3: *The Man in the Ice.* New York: Springer.

Mungo Lady/Man

Lake Mungo is 1 of a series of 17 dry lakebeds in the Willandra Lakes World Heritage Area of Mungo National Park in New South Wales, Australia. Today the area is extremely arid, and the lakebeds rarely retain water except at the peak of a flood, but from 40,000 to 20,000 years ago, this area contained an enormous system of freshwater lakes connected by creeks. This ecological system was rich in plant and animal life, and it supported thriving Aboriginal communities. These communities from the distant past are the source of some of the most valuable archaeological sites in Australia, including the burials of Mungo Lady and Mungo Man.

In 1969, Jim Bower of the University of Melbourne found most of a skeleton buried in a hearth near the shore of Lake Mungo. The bones belonged to a woman who had died at approximately 19 years of age. Mungo Woman had been cremated, and the charred bones that remained had been smashed to pieces. The remains had been gathered and buried in a small cylindrical grave. Scholars dated the burial to 40,000 years ago, making Mungo Lady the oldest evidence of cremation in the world.

Five years after Mungo Lady was found, the bones of a male—later dubbed Mungo Man—were discovered nearby. Mungo Man was approximately 50 years old when he died. Before being interred in a shallow grave, he had been laid out with his hands clasped and his knees flexed. Red ochre had been painted all over his body, staining the burial sand pink. Mungo Man's burial was also dated to approximately 40,000 years ago, making Mungo Man the oldest evidence of a ceremonial burial.

Various methods were used to test sand from the actual burials of both Mungo Lady and Mungo Man to date the remains as accurately as possible. During recent years, dates as varied as 26,000 to 50,000 years old have been applied to these burials. The discrepancy was the result of testing sand from the soil layer where the remains were found but not from the burials themselves. Stone tools found in sites at Lake Mungo and other lakes in the region have also been dated to nearly 50,000 years ago, supporting theories that humans occupied many areas of Australia at that time.

Life at Lake Mungo, especially from 40,000 to 30,000 years ago, was ideal for Aboriginal tribes.

There was abundant fresh water, and animals were plentiful. Bones of many animal species have been found, including the butchered remains of Tasmanian tigers, giant kangaroos, and zygomaturus, all of which are now extinct. Scientists have also found mussel shells and fish bones. Tools for grinding flour have been located. Human bones that have been found show very few signs of malnutrition, and fractured bones appear to have healed well. All evidence points to a well-fed, healthy group of people.

Today these former lakes are in a semiarid zone on the eastern edge of the continental dunefield. Rainfall is low and erratic. The dry lakebeds have sparse vegetation suited to desert climates. The eastern sides of the lakebeds have lunettes, which are crescent-shaped dunes formed by the predominantly westerly winds. Human burials, middens (garbage heaps), hearths, earth ovens, and stone quarries all have been found on or near these lunettes. More than 300 sites have now been recorded from the Willandra Lakes region, making the whole region valuable to archaeologists. Mungo Lady and Mungo Man especially have changed the way in which scientists view Aboriginal history.

— *Jill M. Church*

Further Readings

Bowler, J. M. (2003). New ages for human occupation and climate change at Lake Mungo, Australia. *Nature, 421,* 837–840.

Young, E. (2003). Mungo Man has his say on Australia's first humans. *New Scientist, 177,* 15.

Zimmer, C. (1999). New date for the dawn of dream time. *Science, 280,* 1243–1246.

Murdock, George Peter (1897–1985)

George Peter Murdock was an American anthropologist, with strong roots in Yale University sociology, whose major contribution was the testing of propositions with ethnographic data drawn from large samples of societies representing all levels of sociopolitical complexity. He achieved this through a series of cross-cultural studies that focused on various aspects of social organization, including descent systems and kinship terminology. This work reached its culmination in *Social Structure* (1949), a study that is probably the most outstanding book in anthropology of the 20th century. This book, which is still being cited today, established Murdock as the leading student of social organization in America. During the 1950s and 1960s, social organization research dominated both American and British anthropology.

Through a series of studies that spanned nearly his entire career, Murdock developed the database that made modern cross-cultural research possible. William G. Sumner of Yale during the late 19th century compiled files of ethnographic information on societies that he used in his comparative studies. (Sumner's files are housed at the Human Relations Area Files [HRAF] headquarters in New Haven, Connecticut.) Murdock approached the data in the same manner when he wrote *Our Primitive Contemporaries* (1934), a textbook that provided ethnographic accounts of 18 societies arranged from the simplest to the most complex. By 1937, Murdock had founded the Cross-Cultural Survey, a compilation of published ethnographic materials on 90 cultures. To produce comparability of cultures, an *Outline of Cultural Materials* (1938) was developed to sort the passages that had been directly copied from ethnographies. Ten years later, Murdock invited other universities to join a consortium, leading to the founding of the HRAF in 1949. To assist in the development of the database, a listing of all known cultures, *The Outline of World Cultures* (1954), was published. The next major step was publication of the codes of data that Murdock had used in his cross-cultural studies. His first endeavor was the *World Ethnographic Sample* (1957), which consisted of 565 cultures coded for 30 variables. This was followed by the *Ethnographic Atlas,* a series of installments of codes that appeared in the journal *Ethnology,* founded by Murdock in 1962. These were eventually published together as the *Ethnographic Atlas* (1967). His collected papers appeared in *Culture and Society* (1965). The *Atlas of World Cultures* (1981), Murdock's last publication, produced codes for 563 cultures. In 1968, he created the Cross-Cultural Cumulative Coding Center (known as "The 5 Cs"), which produced codes for a 186-culture sample known as the Standard Cross-Cultural Sample.

George Peter Murdock was born May 11, 1897, on a farm near Meriden, Connecticut, the firstborn child

of George Murdock and Harriet Graves. The young Murdock grew up on the farm, attended local grammar and high schools and then Phillips Academy, Andover, and finally Yale, where he received both the A.B. (1919) and Ph.D. (1925) degrees. While a freshman, he enlisted in the Connecticut National Guard, later becoming a second lieutenant of field artillery. World War I ended before he could be sent to Europe. He attended Harvard Law School but left during the second year. Then he spent a year traveling the world, by the end of which he decided to do anthropology. Franz Boas refused to admit him to Columbia University in 1922 because Murdock was a dilettante, but Albert Keller, a former professor, admitted him as a candidate for the Ph.D. degree in a combined anthropology–sociology program. His dissertation was a translation from German of Julius Lippert's *The Evolution of Culture* (1931). In 1925, Murdock married Carmen Swanson. For 2 years he taught sociology and anthropology at the University of Maryland, and in 1928 he returned to Yale University as an assistant professor in sociology. When a new Department of Anthropology was established in 1931 under Edward Sapir, a famous linguist, Murdock received a joint appointment. He carried out field research with the Haida of the Northwest Coast during the summer of 1932 and with the Tenino of Oregon during the summers of 1934 and 1935. Although his time in the field barely exceeded a year, he urged his students and colleagues to conduct intensive fieldwork. He was appointed chairman of the Department of Anthropology in 1938, and he became a full professor a year later. In World War II, Murdock served as a lieutenant commander (1943–1945) and a commander (1945–1946) in the U.S. Naval Reserve. In 1947, he led a team of field researchers to the island of Truk in Micronesia. In 1960, Murdock became the Andrew W. Mellon Professor of Anthropology at the University of Pittsburgh. In 1972, he was instrumental in founding the Society for Cross-Cultural Research, a professional association that draws its membership explicitly from anthropology, psychology, and the other social sciences. He retired in 1973 at 75 years of age. He and his wife moved to Wynnwood in eastern Pennsylvania to be near his son. After his wife died, he moved to a retirement home. Murdock died March 29, 1985, in Devon, Pennsylvania, at 87 years of age.

— *Keith F. Otterbein*

Further Readings

Goodenough, W. H. (Ed.). (1964). *Explorations in cultural anthropology: Essays in honor of George Peter Murdock.* New York: McGraw–Hill.

Goodenough, W. H. (1988). George Peter Murdock's contributions to anthropology: An overview. *Behavior Science Notes, 22,* 1–9.

Murdock, G. P. (1949). *Social structure.* New York: Macmillan.

Murdock, G. P. (1957). World ethnographic sample. *American Anthropologist, 59,* 664–687.

Murdock, G. P. (1959). *Africa: Its peoples and their culture history.* New York: McGraw–Hill.

Murdock, G. P. (1965). *Culture and society.* Pittsburgh, PA: University of Pittsburgh Press.

Murdock, G. P. (1967). *Ethnographic atlas.* Pittsburgh, PA: University of Pittsburgh Press.

Murdock, G. P. (1981). *The atlas of world cultures.* Pittsburgh, PA: University of Pittsburgh Press.

Spoehr, A. (1985). George Peter Murdock (1897–1985). *Ethnology, 26,* 307–317.

Whiting, J. W. M. (1988). George Peter Murdock (1897–1985). *American Anthropologist, 88,* 682–686.

Museums

Museums of the late 20th and early 21st centuries are commonly defined as permanent nonprofit institutions that serve society by acquiring, conserving, and displaying material so as to provide the public with opportunities for education and entertainment. Whether dedicated to art, culture, history, or natural history, museums often provide people with their first introduction to the field of anthropology. Although museums have become a focus of debate over who has rights to collect, conserve, study, and display culture in material and other forms, museums continue to serve as important resources for both anthropologists and the public.

The origin of museums lies in collections. The word *museum* comes from the Greek *mouseion,* a shrine dedicated to the daughters of Zeus, known as the Muses, who presided over various arts and sciences. In this sense, one of the earliest museums might be the 3rd-century BC Mouseion of Alexandria in Egypt that housed the famed library in addition to

Source: © iStockphoto/Mark Owens.

other collections. China might have an even longer history of creating collections, but these were normally private and not open for general study.

Modern anthropological museums originated during the era of European exploration when explorers, such as Christopher Columbus, and later military leaders, such as Hernando Cortez, collected and shipped finds of potential interest to their royal supporters. This initiated a custom of elites acquiring a "cabinet of curiosities" in which they might display a range of natural and cultural specimens acquired at home and abroad. The Ashmolean Museum of Oxford, based on a cabinet of curiosities, opened in 1683 as the first public museum offering a loosely defined "educational" experience for anyone who paid the admission fee.

During the 18th and early 19th centuries, national museums developed in Europe. Although the museums displayed cultural items, the purposes encompassed variations of nationalism, colonialism, and imperialism. Christian Thomsen at the National Museum of Denmark created the "three age system" organizing collections by material type—stone, bronze, and iron—to present a unified national history. The Ethnographic Museum of National Academy of Sciences in St. Petersburg documented the growing diversity of people within the Russian Empire. The Louvre in France originated in collections nationalized under the French Revolution and the booty of Napoleon's campaigns that it legitimized by stressing public education. The National Museum of Ethnography in Leiden centered on the P. F. B. von Seibold collections acquired during visits to Dutch colonies and arranged according to cultural groupings.

Throughout the 19th century, holders of collections followed the trend set by national museums and transformed cabinets of curiosities into permanent public institutions run by academics for purposes of research and education. Although the field of anthropology was still in its infancy in both Europe and the United States, museums served as incubators of the field before the discipline became firmly established in colleges and universities.

The most common variety of modern museum is that dedicated primarily to collections. Most often, these are housed in special facilities designed especially for the collection and include areas devoted to display as well as extensive areas dedicated for storage, conservation, and research. This variety of museum tends to have the largest and most diverse collections of ethnographic and archaeological materials of interest to anthropologists. Many of the world's most famous museums fall into this category and include museums of the Smithsonian Institution, the British Museum in London, and the Field Museum in Chicago. Most university-run museums, such as those at the University of California, Berkeley, Harvard University, Yale University, and the University of Pennsylvania, are also of this type.

A second variety of museum is focused on historic locations, including house museums and interpretive centers. House museums focus on preservation of an historic structure often associated with a particular individual and time period. Collections of these institutions tend to be limited because the focus of the activities tends to be on the structure and its furnishings as they represent or reflect an historic

individual. The Harriet Tubman Home in New York and the Hermitage Museum in New Jersey are of this variety. Interpretive centers are museums associated with particular historic locations, including archaeological sites. Like house museums, interpretive centers are narrowly focused on specific time periods and locations.

Source: © iStockphoto/Beth Skwarecki.

A third variety of museum of interest to anthropology is the living history museum. These often consist of large venues with multiple buildings. Unlike the static presentation of information in collection-based house museums and interpretive centers, living history museums dynamically seek to entertain and educate through the use of live interpreters who interact with the public and sometime demonstrate traditional crafts and skills. Plimoth Plantation in Massachusetts and Colonial Williamsburg in Virginia are prime examples.

With the advent of the Internet, anthropology has also encountered the virtual museum. Virtual museums are digital collections of images and information. Virtual museums often represent the actual collections of a particular institution or set of institutions, such as the Virtual Museum of Canada, where the virtual museum is an opportunity to extend the educational reach of many of its participant institutions. Virtual museums can also extend the educational capacity of an institution beyond its actual collections, as with the Emuseum of Anthropology maintained by Minnesota State University at Mankato.

Since postmodern theorists of the late 20th century began to question the construction of knowledge, museums have become a locus of debate. These debates focus on issues of access, rights, and voices. The access debate concerns not only the physical and linguistic accessibility of museums but also the economic barrier imposed by admission fees. Although fees are generally viewed as essential to the financial health of museums, they also act to exclude those on the economic margins who might benefit from a museum's educational content.

Debates over rights and voices are illustrated by the contention over the Native American Grave Protection and Repatriation Act (NAGPRA). This legislation restores Native American rights to cultural materials, many of which have been held in museum collections. Through NAGPRA, Native Americans have challenged the right of museums to collect, study, and display materials and have opened debate about who should interpret culture—anthropologists or indigenous peoples. Although museums have retorted that they have better facilities for storing and conserving objects and can provide access for more people than can indigenous groups, many museums now accept the importance of indigenous voices in describing and explaining cultures to the public.

— Jo Burkholder

Further Readings

Andersen, G. (Ed.). (2004). *Reinventing the museum: Historical and contemporary perspectives on the paradigm shift.* Walnut Creek, CA: AltaMira.

Falk, J. H., & Dierking, L. D. (2000). *Learning from museums: Visitor experiences and the making of meaning.* Walnut Creek, CA: AltaMira.

Kavanaugh, G. (Ed.). (2000). *Making histories in museums.* New York: Continuum International.

Stocking, G. W., Jr. (Ed.). (1985). *Objects and others: Essays on museums and material culture.* Madison: University of Wisconsin Press.
Weil, S. E. (1995). *Cabinets of curiosities: Inquiries into museums and their prospects.* Washington, DC: Smithsonian Institution.

Music

Music is an integral part of culture. Not only is it interesting in itself and an object worth studying as is any other part of culture, but it also sheds light on various cultural processes. Anthropological interest in music, moreover, is not limited to so-called "primitive" or "folk" music any more than anthropology itself is limited to the study of "simple" societies and cultural forms. Just as anthropology studies complex societies, among others, and complex ways of life, so too does it study all types of musical expressions.

Ethnomusicology, which is the specific branch or concentration of anthropology concerned with the understanding of music in culture, studies music within human society and culture. It is concerned in particular with the way in which music symbolizes the way of life of a people. It studies things such as social transformation and power as expressed through music and its role in sociocultural life.

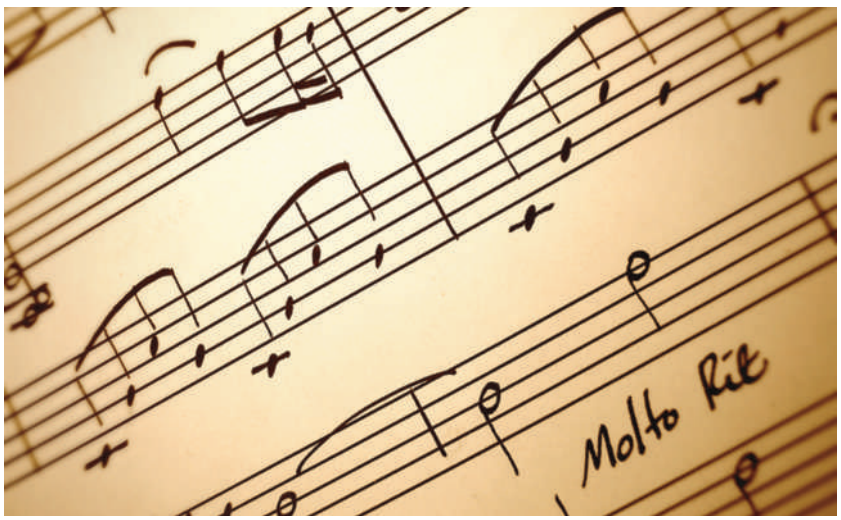
The anthropological study of music is concerned with understanding music as a cultural expression. Ruth Finnegan argued that understanding music is critical to understanding a culture itself. She wrote,

> Any ethnography should obviously include basic information such as relationship, social organization, ways of life, working assignment, economic and political systems, religion, basic language characteristics, historic background, and perhaps some lesser attention to visual and plastic arts, but *marginal* and *specialized* aspects of culture such as musical performance or oral literature could be set aside as minor issues.

An anthropology of music looks at the web of relationships in which music finds itself and is used. Music is part of many social relationships. It is often part of children's games, marriages, parties of all sorts, formal occasions, and many other events—scheduled or not.

Music is certainly part of ritual, both religious and secular. It provides an entrée into understanding these significant aspects of social life. The type of music for these events, the ways in which they are performed, and the manner in which music relates various elements to one another add to the cultural understanding of a society.

However, David Coplan argued that "music shouldn't be studied within its context but as a context itself." Coplan called our attention to the study of music comparable to the study of language. Through studying music in context, he maintained that anthropologists will approach a better understanding of culture itself, looking at the manner in which symbols work to represent meaning.



Source: © iStockphoto/George Argyropoulos.

Nevertheless, most anthropologists who look at music do so within social contexts. They are interested in the meaning it has for specific groups of people at particular times and places as well as its general cultural relevance. Allan P. Merriam argued for the necessity to understand the contexts in which people make and use music and promoted a broader anthropological approach to music and its role in culture. Alan Lomax attempted to demonstrate how the structure of a people's music results from its social and cultural structure and function, an approach

that Joseph Nketia criticized as too mechanical. Nketia found that it ignores the complexity of a society's culture.

Charles Keil is one of the key figures in the development of the anthropology of music. He helped anthropologists to focus on the importance of popular music in understanding culture. Keil studied entertainers, bluesmen, who were popular entertainers and not folk musicians, as they were understood to be during the 1960s. He demonstrated the value to cultural understanding of taking these musicians seriously and understanding their role on their own terms.

Keil took the anthropology of music into urban areas but did not neglect its relationship with music in the forests of Nigeria as well. He also tied music to other aspects of culture, including literary culture. He saw music as related to the literature of a culture, emphasizing the holistic aspect of anthropological understanding. Certainly, the fieldwork that he did in Nigeria reinforced this holistic perspective.

Keil's study of the music of the Tiv of Nigeria and their unique song culture resulted in the award-winning *Tiv Song* (1979). The book is a passionate study of the Tiv people and the role of music in their culture. It is a model for the anthropology of music. Keil poured some of that same passion into his study of other kinds of popular music, including Greek music and polka.

Alan Merriam defined ethnomusicology as "the study of music in culture." He also stated that it was "the study of music as culture." The anthropology of music has attempted to combine both approaches. Merriam's work reoriented the field to concentrate on the study of music from the point of view of the people who made it. He encouraged anthropologists to look for the meaning and purpose that music had for the people who created and used it. He pushed people to understand music in culture and music as human behavior. Anthropology is still working out the implications of this model, as Keil's work demonstrates quite clearly.

— *Frank A. Salamone*

Further Readings

Blacking, J. (1973). *How musical is man?* Seattle: University of Washington Press.

Carlin, R. (1987). *Man's earliest music: The world of music.* New York: Facts on File.

Crafts, S. D., Cavicchi, D., Keil, C., & Music in Daily Life Project. (1993). *My music.* Middletown, CT: Wesleyan University Press.

Finnegan, R. (1970). *Oral literature in Africa.* Oxford, UK: Clarendon.

Keil, C. (1979). *Tiv song: The sociology of art in a classless society.* Chicago: University of Chicago Press.

Keil, C., & Feld, S. (1994). *Music grooves.* Chicago: University of Chicago Press.

Keil, C., Keil, A., & Blau, D. (1996). *Polka happiness.* Philadelphia: Temple University Press.

Lomax, A. (1968). *Folk song style and culture.* Washington, DC: American Association for the Advancement of Science.

Merriam, A. P. (1964). *The anthropology of music.* Evanston, IL: Northwestern University Press.

Nketia, J. H. K. (1981). The juncture of the social and the musical: The methodology of cultural analysis. *The World of Music, 23*(2), 22–39.

Muslims

Muslims, literally those who submit to God's will, are the community of more than 1.3 billion practitioners of one of the world's major and fastest growing religions, Islam. Although Islam began in the Middle East in the Arabian Peninsula, the largest populations of Muslims today live in Central, South, and Southeast Asia in countries such as India (with more than 100 million Muslims) and Indonesia (with more than 160 million Muslims). Islam also is expanding in Africa, Europe, and the Americas. Despite their diversity, Muslims share a belief in one God who sent messages to humankind through His prophets, the last of whom was Muhammad. Anthropologists have contributed to the study of Muslim communities around the world through research on topics such as economic strategies, sectarian and ethnic divisions, and gender relations.

Historical Background

The prophet Muhammad was born in Mecca, a prosperous Arabian town, in 570 AD. At 40 years of age, while meditating in a cave near Mecca, Muhammad received revelations from God and began reciting

these to the people of Mecca. The words comprise the Quran, Islam's holy book and the last, final, perfect revelation from God, according to Muslims. The Quran mentions many people also found in both the Old Testament and New Testament, including Adam, Noah, Abraham, Joseph, Moses, David, Solomon, John the Baptist, Mary, and Jesus. Following persecution by some Meccans, Muhammad and his followers migrated to Medina, where they formed a community of faith, the umma. The Hijra, or emigration to Medina, in 622 marks the first year in the lunar Islamic calendar. The Muslim community returned to Mecca in triumph in 630, gaining many more adherents. During the early years after Muhammad's death in 632, Islam spread rapidly through North Africa and north and eastward in Asia to many groups in addition to the Arabs.

The orthodox majority of Muslims, comprising 90% of the total, are known as Sunnis (from the word *sunna,* Arabic for "customary conduct," referring to the practices Muhammad observed). The Shia, whose origin comes from disputes over appropriate leadership after Muhammad, comprise a minority of approximately 10 to 15%; however, they control the state in Iran and are the majority in Iraq. Shiism has been divided into numerous sects since the eighth century. Most are known as Imamis or Twelvers because they accept 12 imams or leaders, from the 1st, Ali, to the 12th, who is believed to have hidden himself away only to return later to restore justice prior to the end of the world. Others include the Ismailis (Seveners) and the Zaydis, both of whom recognize imams who are not accepted by the Imamis.

Anthropological Studies of Muslims

During the last half of the 20th century, anthropologists conducted research on many diverse Muslim communities. Because of an emphasis on economic lifestyle and subsistence pattern, the ethnographic literature often divides people into three types: pastoralists, village agriculturalists, and urbanites. Although animal husbandry, agriculture, and commerce are interdependent and have formed an integrated system for thousands of years in Asia and Africa, and people frequently change from one lifestyle to another, ethnographies tend to treat each type in isolation. Nomadic pastoralists, comprising approximately 1% of the Middle East's population, were studied disproportionately by anthropologists, especially before the 1970s.

Studies of pastoralists describe two patterns of animal herding: vertical or transhumant (with seasonal movement up and down mountains) and horizontal (with movement following water and other resources). The internal integration of kinship and politics also was a major theme in anthropological writing, as was the conflictual relationship between pastoralist tribes and state organization. In many anthropological monographs about pastoralists, people are described as following their own customs and having little familiarity with normative Islam.

Source: © Earl & Nazima Kowall/CORBIS.

Dry farming and irrigation agriculture have ancient origins in Asia and Africa. Many village studies emphasized traditional land tenure systems and the mechanisms through which access to land and water was regulated. Recent studies have also accounted for the historical and economic transformation of villages, the changing nature of elites, and the expansion of government influence. Anthropologists have written less

about city life than about pastoralism or village agriculture. Studies of urban neighborhoods focus on ethnicity, social class, and culture change.

As U.S. foreign policy increasingly focused on the Muslim world during the 1980s and 1990s, some anthropologists sought to include broader policy implications in their analyses in addition to the particularistic studies of tribe, ethnic group, and village that dominated the ethnographic literature. M. Nazif Shahrani and Robert Canfield's edited volume, *Revolutions and Rebellions in Afghanistan,* brought together articles by a variety of experts who conducted fieldwork in Afghanistan, demonstrating both the commonalities and differences of disparate groups' responses to governmental change there.

Formal studies by various researchers have been complemented by personal accounts of fieldwork experiences. In *Guests of the Sheik,* not only did Elizabeth Fernea describe her interaction with the women of an Iraqi village, but she also accompanied them on a pilgrimage to important Shia sites and provided a unique description of the reenactment of Husayn's martyrdom on the 10th of Muharram. In addition, as part of the development of postmodern ethnography and experiments with writing, various forms of dialogue and emotional encounters with Muslim informants have become important to the general literature in anthropology. Paul Rabinow's frank description of his Moroccan fieldwork detailed his interpersonal difficulties and frustrations in one such account.

The influence of feminism in the United States and Europe during the 1970s sparked interest in studies of gender, women's roles, and women's status in the Muslim world. Early studies emphasized the separation of men's and women's lives, the former in the public realm and the latter in the private realm. Notions of honor and shame also were linked to men and women, respectively. In addition to the examination of women's lives, some ethnographers paid greater attention to children because socialization was another avenue for examining gender identity and roles. Later studies examined influence and agency exercised by women within their own communities and over men. Multiple ideologies and discourses allow women, as well as men, to be poets and warriors.

— *Audrey C. Shalinsky*

Further Readings

Fernea, E. (1965). *Guests of the sheik.* Garden City, NY: Doubleday/Anchor.

Rabinow, P. (1977). *Reflections on fieldwork in Morocco.* Berkeley: University of California Press.

Shahrani, M. N., & Canfield, R. (Eds.). (1984). *Revolutions and rebellions in Afghanistan: Anthropological perspectives.* Berkeley: University of California Institute of International Studies.

Mutants, Human

Mutants, human or otherwise, historically were defined as those individuals whose appearance or functional capabilities lay beyond the boundaries of the perceived "normal." Synonymous words include *monsters, freaks,* and *paranormals.* Today the terms *mutant* and *mutation* refer more commonly to specific alterations at the genetic level that give rise to our full spectrum of phenotypic diversity, including infinite minor variations such as eye color and nose shape. In the strict biological sense, all humans are mutants. This entry is limited to a review of the greater extremes of morphological variations such as the dwarfs, hunchbacks, conjoined twins, savants, and others who have provoked fascination, fear, and the interest of scholars from the earliest epoch.

Originally, the study of the monstrous was known as teratology. More recently, this term has been limited to mean the study of birth defects, thereby removing elements of the mythical or magical. Importantly, however, not all mutants arise merely from congenital events. Freakish forms may also result from accident (any disfiguring trauma) or illness (advanced leprosy). They may be a result of toxic exposures to chemicals (phocomelia from thalidomide) or excess radioactivity. Freaks may also be self-made via procedures such as elective surgery and tattooing. They may also be created unexpectedly, as from an operative procedure gone awry or via the new and unpredictable frontier of transgenic manipulations.

What, then, does it mean to be "abnormal"? The definition is both chronologically and culturally dynamic. The contexts of religion, science, and philosophy all inform the socially constructed ideas of

deviance. Thus, the history of societal attitudes toward mutants reflects the myriad cultural influences that are so important to anthropology.

Antiquity

Monstrous races and beings have been cited since antiquity. Greek, Scandinavian, and Asian mythologies rendered tales of beasts with fantastic skills and/or outlandish proportions. Debate over the origins of these creatures has often focused on whether the images might be based on some remote fact, on pure fancy, or perhaps on both. Pliny the Elder, in his influential book *Natural History,* catalogued hundreds of bizarre creatures culled from the existing texts of the times. The Cynocephali, for example, were a race with dog-faced heads on human torsos. Could these animals have derived from crude descriptions of real humans with exaggerated facial slopes, hypertrichosis, or elongated noses? Alternatively, many of Pliny's other eclectic entities might well have sprung simply from a vivid imagination and an interest in a good story.

During this pre-Christian era, most true birth deformities were ascribed to the supernatural, and explanations abounded. Abnormal infants could be thought to be the result of an inauspicious copulation, perhaps involving the descent of an incubus, or merely of bestial relations. Even if the fertilizing union were pure, however, a developing fetus might be altered, positively or negatively, by environmental influences such as eclipses, comets, and floods. A related concept, propagated through the next several centuries, was the theory of maternal impressions. According to this theory, a trauma or fright to the mother would then transfer to the embryo. Even self-induced maternal imagination or dreams might have an effect. Later investigators soon discounted these beliefs, although the understanding of teratological nutritional and toxic exposures (e.g., thalidomide, alcohol) has advanced.

Middle Ages

The emergence of the powerful influences of Christianity, and subsequently of Islam, led to religious explanations for the monstrous. A polydactylous newborn might be considered demonic but by that time might also be considered a "prodigy" and taken as a sign of God's universal wisdom and dominance. Theological arguments about predeterminism, as espoused by St. Augustine, had obvious implications for embryology. Galen's writings during this time had special influence among both Arab and European thinkers by implying that nature represented God's will and purpose, so that a mutant could be considered divine. Deformity came to be interpreted as either sacred or profane, or as either heroic or deviant, based on the cultural context.

This period also saw the idea of freaks as religious or political omens. Perhaps the most famous example is the monk-calf as published by Martin Luther and Philippe Melanchton during the 1500s. Their monk-calf was possibly a fabrication, but it was nonetheless widely heralded as a portent of the corrupt decline of the Roman Catholic Church. A few years earlier, the fall of the besieged Italian town of Ravenna had been attributed to the birth of a deformed infant, the notorious Monster of Ravenna. Armand Leroi suggested that the monster might have been an example of what is today understood as Robert's syndrome, but whatever the true condition, the implication for the city's defense was clear. Both of these incidents helped to spread the idea of monsters as religious symbols among the population at large.

Enlightenment

The Renaissance brought to Europe a new sense of objectivism that allowed dramatic breakthroughs in teratology. Scientists and natural philosophers began to seek out and collect mutants. The increasing skills and curiosity of anatomists led to the first comparative dissections. The well-known French surgeon Ambroise Pare published *De Monstres et Prodigies* in 1573. He made one of the first attempts at systematic categorizations, although his classifications included both religious and natural domains. Many other descriptive tomes during this period allowed the mutants to be increasingly interpreted as variations within the sum of nature rather than as exotica from beyond. The emergent concept of humanism also began to reduce the religious and symbolic burdens of deformity.

Industrial Age

Scientifically, the study of mutants was restructured at the turn of the 18th century by the investigations of Etienne Geoffroy Saint-Hilaire. This French anatomist

performed several experiments to reproduce deformities by various means and correlated his theories with numerous dissections. The major contributions of his work were twofold. First, he initiated a rigorous taxonomic approach to his subjects that was carried out further by his son Isidore. Second, because he was a contemporary of Chevalier de Lamarck, Etienne's ideas about biological development corresponded with the concept of transformism, presaging Charles Darwin and the broader controversies of evolution.

In the social context, the industrial age was also allowing mutants to acquire a new identity as entertainers. As early as the 1500s, freaks could be either purchased or paid by eager intellectuals. The market for paranormals subsequently grew and was exploited in the West by people such as P. T. Barnum. Barnum skillfully sought out mutants and promoted them to the masses. He made household names out of Prince Randian, General Tom Thumb, and many others. The sideshows galvanized the public's sense of mystery and wonder, and Barnum capitalized on his ability to equate strangeness with fear. As a consequence, he helped to perpetuate a powerful stigma of disability, even though many of his employees lived to enjoy both respect and wealth. The effort to bring the disabled back to the community mainstream continues today and has been the basis of many legal protections in the United States such as the Americans with Disabilities Act (ADA) and the Individuals with Disabilities Education Act (IDEA).

The economic opportunity afforded by the performance stage also led to a rise in the so-called "fake freaks." These were able-bodied individuals who masqueraded as mutants in return for cash. Many viewers became suspect of the cheap ruses being employed, and the popularity of many shows suffered. The gradual disappearance of the freak shows followed, ostensibly due to public disgust and concern over exploitation of the performers. Yet many regulars had few meaningful options to earn a living. Critics have asked whether or not the true impetus for closures was merely the need to remove a taboo that modern audiences were uncomfortable in viewing.

The convergence of the new science of genetics with the growing debate of evolutionary theory set the stage for the eugenics movement of the early 20th century. Eugenics became especially popular in Germany, Britain, and the United States. In this context, the mutants were by this time evaluated on the basis of their potential contribution to the "gene pool" and overall betterment of society. Freaks increasingly became a marginalized group and were even persecuted in the name of "negative" eugenics. Laws were passed to limit reproduction, immigration, and intermarriage outside of an Anglo-Saxon ideal. Eventually, by the late 1920s, the racist connotations of the movement had been discredited and the more onerous restrictions had been lifted.

Modern Era

The explosion of genetic science has provided the latest paradigm for teratology. Many phenotypes can now be explained by genomic models, even if the mechanism of change still is not completely understood. Global increases in mobility and communication have lessened the importance of cultural freaks but also have raised new forums for examination. For instance, how do some humans attain previously unknown levels of performance? Why can some people climb to the summit of Mount Everest without supplemental oxygen, consistently hit high triple C on the trumpet, or speak 22 languages? Answering these questions about "functional mutants" involves the sorting of physiological characteristics from training effects or from features of mental discipline. Yet the causal web is no less complicated than the search for genetic influences, for example, on a man with fragile X syndrome.

Many cultures now also contend with rising trends of self-made freaks. The availability of potent drugs, such as anabolic steroids and synthetic growth hormone, has encouraged the pursuit of being taller, stronger, and/or faster. Sophisticated surgical techniques mean that there is always some other feature that can be altered. The French artist Orlan has undergone serial cosmetic surgeries in the name of art, employing the operating theater as her artistic medium. Instead of mutants such as Joseph Merrick (the "Elephant Man") struggling to live within the societal norms, we see average people going to great lengths to make themselves stand out in a society. More than ever, the line between the normative and the exotic has blurred and continues to raise questions about the cultural values of form, beauty, and diversity.

— Scott McKee

Further Readings

College of Physicians of Philadelphia. (2005). *Mutter Museum of Philadelphia.* Available: www.collphyphil.org/muttpg1.shtml

Le Guyader, H. (2004). *Geoffroy Saint-Hilaire: A visionary naturalist* (M. Greene, Trans.). Chicago: University of Chicago Press.

Leroi, A. M. (2003). *Mutants: On genetic variety and the human body.* New York: Viking.

Pare, A. (1982). *On monsters and marvels* (J. L. Pallister, Trans.). Chicago: University of Chicago Press. (Original work published 1573)

Thomson, R. G. (1996). *Freakery: Cultural spectacles of the extraordinary body.* New York: New York University Press.

Mutations

A genetic mutation is a spontaneous random change in the chemistry of DNA. The word *mutation* is related to the Latin verb *mutare* meaning "to change." Mutagenesis is the process by which mutations arise, and a product of mutagenesis is sometimes referred to as a mutant. Science fiction frequently has popularized mutants as negative beings, but in reality genetic mutations actually can have positive, neutral, or negative results. During the past few decades, DNA research, with much attention to genetic mutations, has greatly expanded as a research area.

Some mutations are not only positive but also crucial because if there were no mutations, there would be no changes in the chemistry of DNA and, hence, no evolution. Of the four evolutionary forces important to the survival and distribution of genes (mutation, natural selection, genetic drift, and gene flow), only mutation is a source of new genetic material. Natural selection does help to increase more favorable mutations in the gene pool (as well as remove less favorable mutations), whereas genetic drift and gene flow affect the distribution of genetic variations.

Mutations can occur in all cells in the body, but only mutations in the germ cells (sperm and eggs) can be inherited and perhaps passed on to future generations. Although mutations in nongerm cells, somatic cells, are frequent and occur throughout life, they are not inherited. These mutations affect only a relatively small number of the billions of somatic cells and usually are neutral and insignificant. However, some somatic mutations can be very serious. A mutation can cause a cell to grow and divide uncontrollably, leading to a tumor and possibly cancer.

During human reproduction, the four building blocks of DNA are adenine, cytosine, thymine, and guanine. They are referred to by their initials, ACTG (the language of DNA), and usually are copied exactly for the next generation. But occasionally an error or mutation occurs. An analogy may be made between a typist making a simple random retyping error and the genes making a copying error with these four letters, with varying consequences in both cases. For example, an original police report might state that cake was in the bag that the suspicious person was carrying, but the retyped report that the judge sees might state that coke was in the bag. Simple errors can have serious consequences. Because some genetic mutations can have very serious consequences, such as disease or death, natural selection has ensured that the number of mutations remain low.

In addition to spontaneous natural mutations, external agents, called mutagens, also can cause mutations, referred to as induced mutations. The two major mutagens are radiation and chemicals. For example, ultraviolet radiation from the sun is mostly absorbed by the ozone layer, but as the ozone hole grows, the odds of being afflicted with skin cancer and melanoma increase. Radiation from X rays also causes controversy. Toxic chemicals from cigarette smoke, many industrial pollutants, and an increasingly recognized number of other sources also can cause harmful mutations. As the overall mutation rate in DNA from mutagens is increased, the odds of a mutation occurring in a cancer-causing gene are increased. The number of known factors that can cause mutations is increasing as more research is being conducted. For example, it has been suggested that increasing the temperature of the male testes, such as can occur by wearing tighter pants, can also increase the mutation rate.

Especially since the 1960s, more understanding of the importance of mutations has led to more interest in medical anthropology. Controlling communicable diseases, making advances in reproductive technology, and understanding the effects of environmental destruction on possible medical advances are examples of ways in which anthropology intertwines with genetic research.

Research advances in genetic mutations have affected previous anthropological explanations of

ancient history in different parts of the world. For decades, physical anthropologists who accept the multiregional school of history have said that historical changes in human physical characteristics are the result of slow adaptation happening simultaneously at different rates in different parts of the world. With support from research on mitochondrial (female) DNA mutations, replacement school researchers have been able to estimate the number of generations it takes for a mutation to occur and, therefore, have been able to go backward in time to estimate the time period of major migrations and settlements in different parts of the world. Using their dates, they argue that mutational changes could not have occurred within the time periods suggested by the multiregionalists.

Genealogy, using the anthropological concept of kinship, also has benefited much from the study of mutations. Mitochondrial DNA mutates too slowly to provide much help for recent genealogical knowledge for females on female lines, but it has been used to classify nearly all women into one of seven genetic groups in the world, referred to by Bryan Sykes as the seven daughters of Eve. The male Y chromosome mutates more rapidly. Using the male Y chromosome to study how closely two males are related, for example, one can count the number of mutations between two males to determine how many generations one needs to go back to find the most recent common direct male ancestor (MRCA). For example, if two males match on 12 of 12 markers (positions tested on the DNA chain), there is a 50% probability that their most recent common direct male ancestor is 500 years in the past.

Forensic anthropology, a specialization area within physical or biological anthropology, continues to put much emphasis on osteology or skeletal biology. But it also has benefited much from recent DNA research based on mutations. Similar to genealogical matches, DNA from a suspect is matched with DNA results from a number of people who have been tested to see whether the DNA of a suspect matches the DNA of any of the people tested or vice versa.

The relationship among linguistics, archaeology, and differential DNA distributions as related to national, ethnic, and other groups received major attention during the 1990s with the work of Luigi Luca Cavalli-Sforza.

DNA research is starting to make major advancements. As academicians studying ancient migration and settlement patterns, or as applied anthropologists concerned with medicine, forensics, or genealogy, anthropologists can make major contributions.

— Abraham D. Lavender

Further Readings

Cavalli-Sforza, L. L., & Cavalli-Sforza, F. (1995). *The great human diaspora: The history of diversity and evolution.* Reading, MA: Addison–Wesley.

Cavalli-Sforza, L. L., Menozzi, P., & Piazza A. (1994). *The history and geography of human genes.* Princeton, NJ: Princeton University Press.

Sykes, B. (2001). *The seven daughters of Eve: The science that reveals our genetic ancestry.* New York: Norton.

Myths and Mythology

Myths may be classified as traditional stories that deal with nature, ancestors, heroes, and heroines or supernatural beings that serve as primordial types in a primitive view of the world. Myths appeal to the consciousness of a people by embodying its cultural ideals or by giving expression to deep and commonly felt emotions. These accounts relate the origin of humankind and a perception of the visible world; the character, attributes, and functions of the ancient gods; and stories concerning an individual, an event, or an institution. The systematic collection and study of myths is termed *mythology.* Mythological research into the earliest literary records of the ancient world is essential for understanding the religions and philosophies of these peoples. Equally important, the study of mythology enhances our appreciation for the art and literature of the classical and modern eras.

Why Were Myths Created?

It is no wonder that myths evolved in primitive cultures when people were faced with impersonal, inexplicable, and sometimes awesome and/or violent natural phenomena and the majesty of natural wonders such as the sun, the sky, the mountains, and the sea. In comparison with these wonders, humans felt dwarfed and diminished. As a result, they bestowed

Source: © Jenn Reese

extraordinary human traits of power and personality to those phenomena that evoked human emotions most profoundly. The origin of the world, the miracle of birth, the finality of death, and the fear of the unknown compelled early humans to create deities who presided over the celestial sphere. In time, every aspect of nature itself, human nature, and human life was believed to have a controlling deity.

These gods, goddesses, and cultural heroes and heroines, as well as their stories, served and continue to serve a multitude of purposes. Initially, myths of cosmogony illuminate the origin of humankind. Virtually every culture embraces a creation myth. Myths explain the beginnings of customs, traditions, and beliefs of a given society and reinforce cultural norms and values, thereby depicting what that society regards as good or evil. Myths assist in defining human relationships with a deity or deities. Judeo-Christian-Islamic societies have established a supreme power, a father figure, whereas the Norse tradition restricts the power and purveyance of the gods. Finally, myths help to dispel the fear and uncertainty that is part of the human condition. Fear of the elements may be explained by the activities of the gods. Fear of failure is overcome by reliance on them. Fear of death is often explained as the passage or transition to another dimension or to another domain. Simply stated, myths are a symbolic representation reflecting the society that created them. Although unjustified and unjustifiable, myths take the raw edge off the surface of human existence and help humans to make sense of a random and threatening universe.

Universal Themes

The themes of great myths are universal, and they center on ancestors, deities, heroes, heroines, and nature. Mythic themes have evolved in every culture, are unique to each culture, and yet often bear striking similarities. Myths are seldom simple and never irresponsible. Esoteric meanings abound, and the proper study of myths requires a great store of abstruse geographical, historical, and anthropological knowledge. The stories underscore both the variety and continuity of human nature. One of the most intriguing characteristics of myths is the way in which they have been transmitted, adopted, and adapted by successive cultures. The abiding interest in mythology lies in its connection to human wants, needs, desires, strengths, and frailties. By their nature, myths reveal the interwoven pattern of circumstances that are beyond the control of the mortal and the immortal.

As we delve further into the world of myths, we enjoy the subtle and dramatic ways in which myths pervade societies, unveiling universal themes, moral direction and inspiration, and how particular myths mirror the society in which they were created and developed. Myths are decidedly human in origin, and they speak of fire and ice, wind and rain, selfishness, anger, jealousy, courage, love and hate, hope and despair. Ironically, it is the human ability to make myths, and the very need to do so, that ultimately sets humans apart from other inhabitants of the earth.

Myths may be drawn from any era and any geographical area. For this treatise, we examine components of Greek and Roman mythology, Norse and Teutonic (Germanic) mythology, Oriental mythology, and the commonalities among these and several other cultures.

Greek Mythology

To people of Western cultures, the most familiar mythology outside of the Judeo-Christian culture is

that of Greek and Roman mythology. The mythology of ancient Greece and Rome stemmed from the human desire to explain natural events and the origin of the universe. The myths chronicle Zeus and his brothers, Poseidon and Hades, who exacted control of the universe from their father, Cronus, and the Titans, a powerful race of giants. Cronus himself had wrenched control from his own parents, Uranus (heaven) and Gaea (earth). Great epics of war and peace and proud heroes and courageous heroines, who represented the basic cultural values of the Greek people, were recorded. Men and women alternately worshipped and feared a ménage of gods and goddesses who traditionally resided on Mount Olympus, attributing failure and defeat to the wrath of the gods and attributing success and victory to the grace of the gods.

Women offered great homage to Hera, the wife of Zeus and queen of the gods, whose name means "splendor of heaven." Hera, the mother of some, but not all, of Zeus's many offspring, was implored by women who were about to give birth to numb the pain of labor and to favor them with healthy and beautiful infants. Because she had been betrayed by Zeus, Hera, who wore golden sandals and sat on a golden throne, deigned to destroy her husband and kill his consorts. Ironically, Hera was worshipped as the protector of marriage. Named Juno by the Romans, Hera is often depicted holding a peacock.

Roman Mythology

Much of Roman mythology had its roots in Greek mythology, although Jupiter and Mars were part of the Roman tradition long before the Romans interacted with and eventually conquered the Greeks. Subsequent to 725 BC, the Romans adopted many Greek deities, renaming them and making them their own. In both Greek and Roman mythology, realms of the universe are delineated. The Greeks and Romans saw the cosmos in terms of the skies, the earth, the seas, and the lower world. Jupiter (Zeus) ruled the skies from atop Mount Olympus, where he controlled the movement of the sun, the phases of the moon, and the changes of the seasons. When Jupiter, the fairest and wisest of all immortals, was outraged, he hurled lightning and thunderbolts down on the earth. Neptune (Poseidon), the second most powerful god, ruled the seas, and Pluto (Hades) ruled the lower world. Pluto, the god of wealth, drove a black chariot powered by six onyx-black horses and was guarded by Cerberus, the three-headed dog.

As we read these highly entertaining and often spiritually uplifting myths, we learn a great deal about human nature and of our debt to Greek and Roman cultures. Modern language is imbued with references to their extensive pantheon and the heroes and heroines of their civilizations. Consider, for starters, the names of the planets, the stars, and the galaxies. Even today, in our struggle to survive, Greek and Roman myths help people to better understand humanity's obedience to a higher power, the relationships of men and women to one another, the power of love and friendship, the horror of war and natural catastrophes, and the strength of parental devotion.

Norse and Teutonic (Germanic) Mythology

Germanic mythology refers to the myths of people who spoke Germanic dialects prior to their conversion to Christianity. These ancient Germanic people from the continent and of England were illiterate. Most of what we do know about the mythology and beliefs of that era comes from literary sources written in Scandinavia and then transcripted into the Old Norse language of Iceland from the 12th to 14th centuries. Two collections of verse, known as the *Eddas,* exist. The earliest, the *Elder Edda* or *Poetic Edda,* contains the earliest Norse mythology, whereas the *Younger Edda* or *Prose Edda* was written by Snorri Sturluson around 1220 AD. In the *Prose Edda,* Sturluson combined a variety of sources with three earlier poetic accounts of the origin of the world to create a wholly representative mythology.

In the *Prose Edda* version of the creation, all that originally existed was a void called Ginnungagap. To the north of the void was the icy region of Niflheim, and to the south of the void was the sunny region of Muspelheim. Warm breaths from Muspelheim melted the ice from Niflheim, and a stream of water flowed into the void, from which emerged the giant, Ymir, ancestor of the Frost Giants. Created from drops of the melting ice, Audhumbla, the cow, nourished Ymir and was nourished herself by licking salty frost- and ice-covered stones. The stones were formed into a man, Bori, who was destined to become the father of Odin, Vili, and Ve. The brothers slaughtered Ymir and created the earth from his flesh, the mountains from his bones, the sea from his blood, the clouds from his brains, and the heavens from his

skull. The heavens, according to the *Prose Edda,* were balanced by four dwarfs—Austri, Westri, Nordi, and Sudri—the directions on a compass. Sparks from the fireland, Muspelheim, became the stars of the sky. This newly created land, named Midgard, was to become the somber home of mortal humans. Even in Asgard, home of the gods, the atmosphere was grave and the only hope was to face disaster and fight the enemy bravely to earn a seat in Odin's castle, Valhalla. As with so many similar myths, Norse mythology reflected the attitude of the culture: In death there is victory, and true courage will not be defeated. Some of these mythic themes are represented in Richard Wagner's music–drama tetralogy, *Der Ring des Nibelungen.*

Oriental Mythology

The myths of India, China, and Japan are highly complex and sophisticated. They differ from Greek, Roman, and Germanic mythologies in that, rather than venerating anthropomorphic deities, the structures of these deities are usually polymorphic, intricately combining human and animal forms. The gods and goddesses of the Hindus take extraordinary human forms with numerous heads, eyes, and arms. During early times, deities in Chinese and Japanese myths were more animistic, but these myths were supplanted by mythologies derived from the three great religions: Taoism, Confucianism, and Buddhism, with Buddhism having been brought to China from India in 300 BC. Shinto, the religion indigenous to Japan, borrowed much from Chinese mythology, resulting in a tradition that paralleled that of the Buddhist pantheon. Notably in Asian cultures, two or more religions may be observed simultaneously because they are less eschatological but more ethical or philosophical in emphasis, showing people how to live rather than what will happen to them on their demise. We may deduce, then, that oriental myths not only explain the origin of the universe but also deal with distinctive aspects and commonly held cultural values of each civilization.

During ancient times, throughout history, and even today, the family is considered to be a critical part of oriental society and culture. Honor and obedience to one's parents is related to ancestor worship. During the Han period in China, emperors set up shrines for their ancestors because they believed that spirits could bring blessings to them and to their families. In general, oriental myths connect the actions of deities and other supernatural beings to the everyday actions of men, women, and the natural world around them. Individual gods protected the family, the home, and the country and represented the sun, the moon, and the planets. Myths describe how the islands of Japan were created and deliberately located by the gods in the very center of the world. The two main books of the Shinto religion are the *Koji-ki* and the *Nihon-gi.* The *Nihon-gi* explains how all of the emperors of Japan are directly descended from the Sun Goddess. Today, the rising sun is symbolized in the Japanese national flag.

Commonalities

What the disparate mythologies from all over the world have in common is their heartfelt desire to explain the origin of humankind and to validate its existence. We are searching to satisfy the very human need to explain our relationship with the powerful and mysterious forces that drive the universe. Throughout the world, myths reflect those themes that deal with nature, supernatural beings, ancestors, or heroes and heroines. In Africa, where myths have been preserved mainly through the oral tradition, the natural elements are immortalized through myths. Many versions of creation stories abound. The Dinka of Sudan believe that the first man and woman were made from clay and put into a tiny covered pot, where they grew to full height. Australian Aboriginal mythology deems that their community and culture were created during dreamtime, "the time before time" when spirited creatures came from the sky, the sea, and the underground to generate mountains, valleys, plants, and animals. We are familiar with the Great Spirit myth of North American Indians and the import that Native Americans reserve for their ancestors. The Aztec people of South America were polytheistic and offered sacrifices to appease their gods. Huitzilopochtli, the great protector of the Aztecs, was portrayed in the form of an eagle, and it was he who deemed where the great pyramid would be built as "the heart of their city and the core of their vision of the universe." From Ireland comes a myth about Cu Chulainn, a hero who could change form to oppose evil forces. A Polynesian myth from the islands of the Kanaka Māori people centers on Maui, who brought the gift of fire to his people. In ancient Egypt, from pharaohs to peasants, each individual had a god or goddess corresponding to his or her place in society.

As we can perceive, during every era and in every geographical area, myths have evolved as nearly sacred literature devoid of theology. Each myth is

unique to a culture, particularly to its beliefs and values. Myths are, in themselves, monuments reflecting the precariousness of human existence.

— *Suzanne E. D'Amato*

Further Readings

Baker, A. (2004). *The Viking.* Hoboken, NJ: John Wiley.

Bellingham, D., Whittaker, C., & Grant, J. (1992). *Myths and legends: Viking, Oriental, Greek.* London: New Burlington Books.

Burland, C., Nicholson, I., & Osborne, H. (1970). *Mythology of the Americas.* London: Hamlyn Publishing.

Christie, A. (1983). *Chinese mythology.* Feltham, UK: Newess Books.

DuBois, T. A. (1999). *Nordic religions in the Viking Age.* Philadelphia: University of Pennsylvania Press.

Guirand, F. (Ed.). (1959). *Larousse Mythologie Générale.* London: Batchworth.

Kirk, G. S. (1974). *The nature of Greek myths.* London: Penguin Books.

Wolfson, E. (2002). *Roman mythology.* Berkeley Heights, NJ: Enslow.

N

Napier, J. R. (1917–1987)

John R. Napier was a British anatomist and primatologist renowned for his comparative studies of fossil primates and early hominids from Africa, and for his pioneering work on primate locomotion.

After medical training at St. Bartholomew's Hospital in London, Napier served as a surgeon in its orthopedic unit. From 1946 to 1967 he taught anatomy at various teaching hospitals and institutions in London, and during this period he became increasingly interested in applying his anatomical training to questions of primate evolution and functional morphology. His initial papers focused on the anatomy and function of the human hand and foot, and this culminated in his landmark contributions on the prehensile movements and grip types of the hand, published in the mid-1950s and summarized in his excellent popular book *Hands* (1980). In 1959, he turned his attention to the fossil record, with functional analyses of the forelimb of the early Miocene ape *Proconsul* and early hominid metacarpals from the South African Pliocene site of Swartkrans. This was followed by research on the postcranial remains of early hominids recovered by Louis Leakey from Olduvai Gorge in Tanzania. In 1964, in collaboration with L. S. B. Leakey and P. V. Tobias, Napier described a new species of hominid, *Homo habilis,* from Olduvai, which constitutes the earliest representative of the genus *Homo.* Napier's interpretation of the prehensile abilities of the species, based on his study of the fossil hand bones, was the basis for the Latin name, which means "handy man." During the 1960s and early 1970s he published a series of influential articles on primate locomotion, a field of investigation that he pioneered, including papers on the classification of primate locomotion, prehension and opposability of the hand, brachiation, and bipedality. In 1967 he coauthored the *Handbook of Living Primates* with his wife Prue Napier, which represented an important synthesis of the literature on primate taxonomy, biology, and behavior. This was followed in 1985 by their successful updated compendium, *The Natural History of the Primates.*

From the early 1960s onward, Napier was responsible for organizing the first primate biology research and training programs in the UK, as well as at the Smithsonian Institution in Washington, D.C. In 1967, he became the founding president of the Primate Society of Great Britain, the first such organization in the world. In addition to his specialist scholarly contributions, he was a successful and enthusiastic popularizer of science, as a radio and television personality and as writer. His books *The Roots of Mankind* (1970), *Bigfoot* (1972), *Monkeys without Tails* (1976), and *Hands* (1980) demonstrate his abilities in this regard, as well as the breadth of his interests and expertise in primate evolution and comparative anatomy.

—*Terry Harrison*

See also **Hominoids; Homo Habilis; Leakey, Louis S. B.; Primate Locomotion; Primatology**

Further Readings

Napier, J. R. (1970). *The roots of mankind.* Washington, DC: Smithsonian Institution Press.

Napier, J. R. (1980). *Hands.* London: George Allen & Unwin.

Napier, J. R., & Napier, P. H. (1967). *A handbook of living primates.* London: Academic Press.

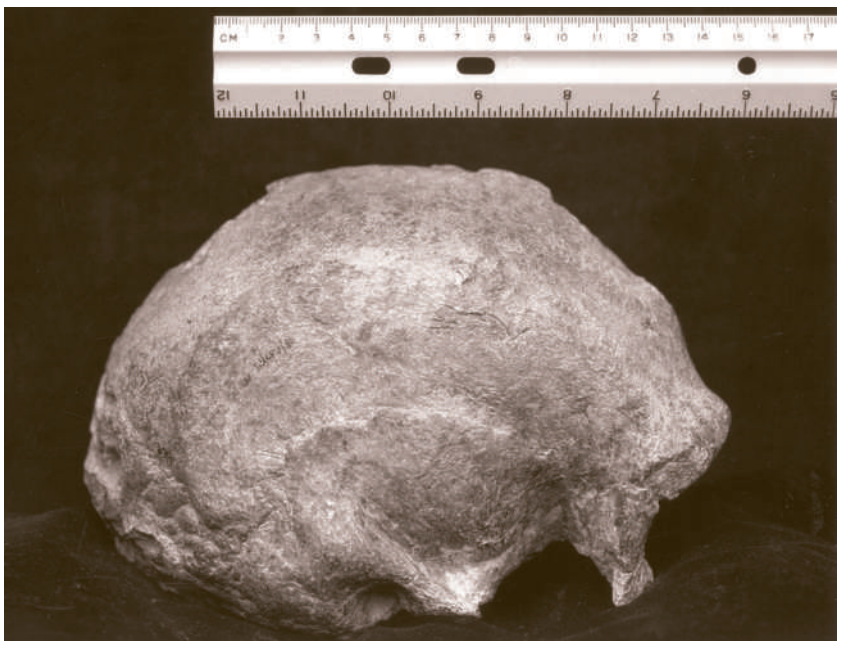
Napier, J. R., & Napier, P. H. (1985). *The natural history of the primates.* Cambridge, MA: The MIT Press.

Narmada Man

The discovery in 1982 of a fossilized skull in the central Narmada valley in Madhya Pradesh, India, provides the first scientifically recorded evidence of human skeletal remains from the Indian subcontinent dating to the late Middle Pleistocene of 300,000 to 150,000 years ago. Dr. Arun Sonakia of the Geological Survey of India found the fossil exposed on the ground surface of a thick Quaternary sediment of fluvial origin and embedded in a fossiliferous gravel conglomerate on the north bank of the Narmada river. This is near the village of Hathnora and some 40 km northeast of Hoshangabad town. Preserved parts of the specimen are the left side of the cranial vault, most of the base of the skull, and the left half of the brow ridges and orbit. Hence, it is a *calvaria,* not a complete skull with a full face including upper and lower jaws. Teeth are absent. In 1997, an announcement was made of the finding of a hominid right clavicle from Middle Pleistocene deposits in the Hathnora region during field explorations between 1983 and 1992, a bone that Dr. A. A. Sankhyan of the Anthropological Survey of India, Calcutta, associates with the Narmada Man calvaria and describes as having belonged to a female the size of a modern adult pygmy of "stocky" build.

In Sonakia's description, published in 1984 in the *Records of the Geological Survey of India,* he assigned "Narmada Man" to the hominid taxon *Homo erectus narmadensis.* Its antiquity is based upon the direct association of the calvaria with stone tools, mainly handaxes and cleavers, typical of the prehistoric Acheulian technological tradition that was dominant in Middle Pleistocene times in India. The fossilized animal remains in the deposit—cattle, buffalo, elephant—include some species that are now extinct, but they are reliable "index fossils" of the late Middle Pleistocene. Radiometric dating methods are not feasible, so the age of the specimen is a relative dating estimate based upon its lithic and faunal associations.

By 1988, reexaminations of the calvaria had been undertaken independently by biological anthropologists from the Laboratory of Human Paleontology and Prehistory at Marseille in France and from the Human Biology Laboratory at Cornell University at Ithaca in the United States. The French investigator, Dr. Marie-Antoinette de Lumley, recognized that some physical features of the calvaria were not typically those found in *Homo erectus* fossils from southeast Asia, China, and Africa. For example, the cranial capacity of these Early and Middle Pleistocene specimens averages 1,000 cm^3, but estimates for the Narmada cranial vault fell between 1,155 and 1,421 cm^3, values within the range of anatomically archaic *Homo sapiens.* Dr. de Lumley christened Narmada Man as an "evolved *Homo erectus.*" This label is acceptable to those biological anthropologists who profess that anatomically modern humans have a lineage that includes *Homo erectus* as an ancestral species, the anatomically archaic hominids of the Middle and Late Pleistocene (called *Homo heidelbergensis*) having an intermediate status in this evolutionary progression.



Source: Photograph by Kenneth A. R. Kennedy.

Aside from learned debates over this matter, the American investigator, Dr. Kenneth A. R. Kennedy, broadened de Lumley's observations by an extensive examination of the calvaria using measurements, morphological analyses, and statistical procedures that support the thesis that Narmada Man (actually a young adult female) merited reassignment as an early *Homo sapiens.* The specimen was compared with crania of other hominid fossils of the Middle Pleistocene (Bodo, Kabwe, Petralona,

Dali, Ngandong, Saldanha, Sambungmachen, and those from other sites in Africa, Asia, and Europe), with which it exhibited a significant number of anatomical similarities. The archaeological data do not rule out the possibility that *Homo erectus* had inhabited the Indian subcontinent, but fossil remains of this species have not been recovered. The importance of the Narmada calvaria is that it demonstrates that the Acheulian tool tradition was practiced by early *sapiens* in a part of the world that lies between the richer hominid fossil sites in Africa and in southeast Asia and the Far East. It is the most ancient hominid fossil recovered in India at the time of this writing.

— *Kenneth A. R. Kennedy*

Further Readings

Kennedy, K. A. R., Sonakia, A., Chiment, J., & Verma, K. K. (1991). Is the Narmada hominid an Indian *Homo erectus*? *American Journal of Physical Anthropology, 86,* 475–496.

Lumley, M.-A. de, & Sonakia, A. (1985). Premiere decouverte d'un *Homo erectus* sur le continent indien a Hathnora, dans la moyenne vallee de la Narmada. *L'Anthropologie, 89*(1), 13–61.

Sankhyan, A. A. (1997). Fossil clavicle of a middle Pleistocene hominid of the Narmada valley, India. *Journal of Human Evolution, 32,* 3–16.

Sonakia, A. (1984). The skull-cap of early man and associated mammalian fauna from Narmada valley alluvium, Hoshangabad area, Madhya Pradesh (India). *Records of the Geological Survey of India, 113*(6), 159–172.

Naroll, Raoul (1920–1985)

Raoul Naroll was an American anthropologist whose major contribution to anthropology and other social sciences, including history, was the development of methods for conducting and evaluating comparative studies. He developed many procedures for subjecting comparative studies to rigorous analysis, and he was equally concerned with the trustworthiness of ethnographic sources. His goal was to have social scientists arrive at conclusions of theoretical and practical importance that could be trusted. The purpose of obtaining trustworthy information—either ethnographic data or well-supported propositions—was to produce a literature that could be used to better humankind. He championed four techniques:

1. In his book *Data Quality Control,* he developed methods for the identification of control factors and bias-sensitive traits in data used in comparative or cross-cultural studies. Witchcraft attribution was one trait he found bias sensitive; it was correlated with two control factors—the length of time the ethnographer spent in the field and whether the native language was learned. Later, these two factors became the basis for constructing a sample of societies and their sources, which he felt offered trustworthy ethnographic data.

2. Naroll was concerned with Galton's Problem (i.e., whether cases in a cross-cultural study were independent) and developed five separate solutions to the problem.

3. Naroll was concerned with the nature of the culture-bearing unit in cross-cultural surveys and developed guidelines for ensuring the comparability of units.

4. He advocated the use of high-quality samples, two of which he was primarily responsible for developing—the standard ethnographic sample and the Quality Control Sample, referred to as the HRAF Probability Sample.

Many of Naroll's contributions are described in *A Handbook of Method in Cultural Anthropology,* edited with Ronald Cohen. This handbook became a major reference work. Of Naroll's substantive contributions, perhaps the most important were his studies of deterrence. He conducted both a cross-cultural study and a cross-historical study to test the theory that military preparedness prevents war. In neither study did he find support for deterrence theory. Also of importance were Naroll's studies of cultural evolution. One of his first articles was "A Preliminary Index of Social Development." In his cross-historical study of deterrence, he summarized the main currents of cultural evolution. Other studies related cultural evolution to warfare and to migration. He believed that humankind was evolving toward a world government. His next book was to review evidence on the cultural evolution of humankind. Another area in which Naroll did important research was "culture stress."

Naroll showed concern for measuring the degree of stress to which individuals, as members of cultures, are subjected. Specifically, he looked at such indicators of culture stress as drunken brawling, defiant homicide, protest suicide, and witchcraft attribution. In *The Moral Order,* alcoholism and suicide are seen as resulting from weakened moral nets.

Raoul Naroll was born in Toronto, Canada, on September 10, 1920, the only child of Tessa Soskin and Albert Naroll. He grew up in Los Angeles, California. He enlisted in the U.S. Army shortly before World War II after attending the University of California at Los Angeles (UCLA) for 3 years. In 1941, he married Frada Kaufman, and they were at Pearl Harbor on December 7. At war's end, he was an intelligence officer in Germany interviewing prisoners of war. He returned to UCLA as a junior in 1949 and continued on to obtain his PhD in history in 1953. His interests soon switched to anthropology. In 1955, he obtained a job as a research associate at the Washington office of the Human Relations Area Files (HRAF). From 1957 to 1962, he taught at California State University, Northridge, first as assistant professor (1957–1960), and then as associate professor (1960–1962). In 1962, he became an associate professor at Northwestern University, where he was promoted to professor in 1965. In 1966, he joined the faculty of the Department of Anthropology at the State University of New York at Buffalo, where he remained for the rest of his career. During this period, he and colleague Keith Otterbein developed a cross-cultural program that trained both undergraduate and graduate students. From 1967 to 1973, he served as a member of the Executive Committee of the Board of Directors of the HRAF, and from 1973 to 1981 as president. In 1979, he became a Distinguished Professor. He died June 25, 1985, of colon cancer in Buffalo, New York, age 64. Naroll's papers are at the SUNY–Buffalo archives. A selected bibliography has been published by Keith Otterbein.

— *Keith F. Otterbein*

Further Readings

Naroll, R. (1956). A preliminary index of social development. *American Anthropologist, 58,* 687–715.

Naroll, R. (1959). A tentative index of culture stress. *International Journal of Social Psychiatry, 5,* 107–116.

Naroll, R. (1962). *Data quality control.* New York: Free Press.

Naroll, R. (1966). Does military deterrence deter? *Transactions, 3,* 14–20.

Naroll, R., with Cohen, R. (Eds.). (1970). *A handbook of method in cultural anthropology.* Garden City, NY: Natural History Press.

Naroll, R., with Bullough, V. L., & Naroll, F. (1974). *Military deterrence in history: A pilot cross-historical survey.* Albany: State University of New York Press.

Naroll, R. (1983). *The moral order: An introduction to the human situation.* Beverly Hills, CA: Sage.

Otterbein, K. F. (1987). Raoul Naroll (1920–1985). *American Anthropologist, 89,* 136–142.

Nash, June C. (1927–)

June C. Nash stimulated feminist anthropology and the anthropology of work, and she has been a key figure in the study of social change within the global economy. She received her PhD from the University of Chicago in 1961 and spent most of her career at City College and the Graduate Center of the City University of New York, retiring as Distinguished Professor of Anthropology. Nash, together with her City College colleague Eleanor Leacock, and Eric Wolf, Sidney Mintz, William Roseberry, and others, developed the neo-Marxist school in anthropology that is often called "political economy."

Nash's first book-length ethnography, *In the Eyes of the Ancestors,* examined a Maya-language peasant community in Chiapas, Mexico. Although using a now outdated and awkward behaviorist terminology, she innovatively addressed how indigenous social relations and ideologies were changing through the commercialization of crops, markets, and transportation systems, and she spoke honestly about the sometimes violent conflict that ensued. Most Mesoamerican anthropologists at this time treated indigenous communities in unrealistic ways—as changeless "cultures" or perhaps as folk traditionalists influenced by "modern" values diffused from outside—and ignored dynamics occurring both inside and outside the local social field.

Nash's next major project took her to the tin mines of the Bolivian Andes. The monumental ethnography she produced, *We Eat the Mines and the Mines Eat Us,* stimulated the slumbering field of anthropology of work. This book explores the roots of the tin miners' radicalism, including their synthesis of apparently opposite pre-Columbian and 20th-century secular Marxist idea systems; the contradictory but also tight relationship between community and workplace (being, at the same time, a relationship between women and men); and the solidarity of work groups in the demanding and dangerous work of underground mining. In addition, she recorded and edited two valuable Bolivian life histories.

Nash's Bolivian fieldwork took place amid open struggles against nationalized mining corporations, military governments, and international economic controls. Her next major ethnographic venture examined a city (Pittsfield, Massachusetts, USA) long dominated by a capitalist giant, General Electric, in the throes of deindustrialization and militarization. Although she identified political struggles in Pittsfield, the lack of resistance compared to Bolivia was striking, with a long history of corporate hegemony over local politics and culture in her view substantially responsible.

From the 1970s through the 1990s, a series of edited volumes developed Nash's key themes: social change within the global economy, artisan production, industrial work, and women's lives. Anthropology, with its romantic attraction to the exotic and apparently traditional, benefited significantly from Nash's attention to social change. In particular, her work on women (from a materialist feminist perspective) did not isolate gender as a topic, but rather examined the ideological and behavioral realities of women's subordination within the context of broader transformations.

Nash's most recent book, *Mayan Visons,* brings her back to the highland Maya country of Mexico and Guatemala. This work synthesizes the struggles of the Maya people to determine their fate in the face of powerful colonial and national political organizations and global economic relations. Nash, a superior ethnographer of local places within the world system, finishes by inquiring into the survival of plural cultures in the global community.

— *Josiah McC. Heyman*

Further Readings

Nash, J. C. (1979). *We eat the mines and the mines eat us: Dependency and exploitation in Bolivian tin mines.* New York: Columbia University Press.

Nash, J. C. (1989). *From tank town to high tech: The clash of community and industrial cycles.* Albany: State University of New York Press.

Nash, J. C. (2001). *Mayan visions: The quest for autonomy in an age of globalization.* New York: Routledge.

Nationalism

Our species, being a product of organic evolution, developed a complex social structure that reflects the biological structure of the human brain. The progression of this social structure is illustrated by both primate behavior and the archaeological record. Driven by biological and environmental factors, the development of culture became a decisive, and often divisive, adaptation. Within this cultural domain, primitive seeds of nationalism took forms of divisions based on shared phenotypic expressions and crude ideologies. Wealth and social status reinforced this social structure. With the development of new technologies, nationalism became more than a solidifying process; it became an aggressive political ideology based on the conceptual term of race.

The primary base of nationalism is the nation state. The concept of nation, defined as a population whose common identity creates a psychological bond and a political community, is often referred to in terms of state or country. Although nations, states, and countries may be comprised of various genetic populations, nationalism focuses on the commonality of language, ethnicity, and history. It is this nationalistic identity that promotes a psychological bond and a justified political community. This process can be seen in the philosophy of ancient Greece and the Greeks' influence on Western thought for centuries.

There are many postulated theories concerning the origin and development of the state. The writings of both Plato (c. 428–348 BCE) and Aristotle (384–322 BCE) had an important influence on the development of basic ideologies in nationalism. Essentially, the form of government is a reflection of the individual; individuals gather for the purpose of security and

Source: © iStockphoto/Arlene Gee.

have a share in the common good that would enable an individual to attain the good life. Whether it was Plato's philosopher king or Aristotle's benevolent monarch, the developmental structure and political ends were to secure domestic prosperity at the expense of the "barbaric world" around them. For example, Plato stated that the development of the stratified state, reflecting parts of the soul (for example, appetites and rationality), provided an illusionary utopia with a justified class system. Although this philosophical class system was an idealized society, the political implications were a justification of class structure of their society. In this manner, the highest form of government being aristocracy would eventually decay into timocracy, then plutocracy, democracy, and despotism. Aristotle had similar, yet different political ideas. True forms of governments that are recognized were monarchy, aristocracy, and polity, whereas the perverse forms are tyranny, oligarchy, and democracy. Acknowledging the inequality within the individual, the state would also reflect this inequality. Essentially, the state becomes an entity that enables individuals to perfect themselves and attain the good life. Ironically, the desire for equality was seen as the chief cause of revolutions and war. The basis of nationalism is to create an arena whereby these rigid social structures were maintained and protected. With the introduction of Christian theology by the theologian Thomas Aquinas (1225–1274), nationalism incorporated the logistics of Greek philosophical thought with divine revelation (for example, divine right of kings).

Aquinas, viewing humankind's order as a reflection of a divine order, held that our species is a social species; therefore, the social hierarchy must exhibit the same qualities depicted in other social animals, but more importantly, the hierarchy that exists in the heavens. Justifying both political and ecclesiastical structure, the rule by one, whether king or pontiff, can be the only form by which a government should operate. In this manner, religion attempted to overcome ethnicity by stressing the unity of humankind by one creator. In Aquinas's view, the king, especially a just king approved by Rome, becomes the social enforcer, just as the church becomes the spiritual enforcer, of the Kingdom of God on earth. Ironically, with each principality claiming God's sovereign charge (the Crusades), the outcome is reduced to those who have the greatest amount of holy favor. Dominions and conquest would fuel this form of nationalism during the age of imperialism.

During the age of imperialism, exploration of the known world led to the discovery of the new world. Prompted by economics and nationalism, the acquisition of new territories led to subjugation of their inhabitants and the demise of cultural aspects. At this point, one can argue that nationalism became more destructive, justifying, both scientifically and theologically, the enslavement of the "inferior" peoples of the world. In these conquered territories, or colonies, the aboriginal peoples were good enough to convert and work, yet not good enough to share in the prosperity of the empire. With the rise of imperialism, the rise of the middle class became problematic for the monarchy. The desire for equality, as Aristotle would state, led to a constitutional monarchy and representative forms of government. Problems for the church-state also arose, causing schisms and, ultimately, the

Reformation. Although philosophical attempts, such as those by Thomas Hobbes and John Locke, tried to reaffirm that the political role between a sovereign authority and subjects of the commonwealth by degree was of issue, the idea of a social contract, nationalistic pride, and newly acquired freedom turned nationalism in a new direction.

The Age of Enlightenment provided a fertile ground for new philosophical and political thought. With political unrest and civil revolutions common, economic and social stability was shaken. The expanding middle class and greater need for political freedom created the setting for acceptance of the influential writings of Jean-Jacques Rousseau (1712–1778). Acknowledging the inequalities of individuals and societies, Rousseau saw each society as developing its own political structure, via social contract, for procuring the "general will" of the society at large. Viewing society as an entity in flux, this social progression was removed from the theological domain to the social domain. Governing was moved toward a democratic form of government, whereby a just society with the common good would yield the greatest freedom for each citizen. Morality for this society would be just as independent from theology as the governing body (politics). Although nationalism would be analyzed critically and perhaps rejected, the critical inquiry and scientific revolutions continued to influence both nationalism and the developing state. With greater civil freedoms and economic independence, nationalism continued to adapt to the changing political and economic framework. However, with the discovery of the theory of evolution by Charles Darwin (1809–1882), the rise of nationalism can be evaluated within an evolutionary framework.

The greatest interpretation of social evolution was given by the British philosopher Herbert Spencer (1820–1903). Spencer, whose philosophical interpretation of social evolution incorporated the "survival of the fittest" motto, viewed society as an organism in flux. He saw societies as units that span the spectrum from simplistic to complex, with each society viewed as being in an ongoing progression from the most rudimentary form to the modern age. Society, paralleling an organism, consists of interdependent parts that function as a whole. The degree of complexity (for example, simple, compound, doubly compound, and trebly compound) was seen in terms of the degree of internal regulation and external conflict. As a society increases in complexity, as in industrial societies, external conflicts are necessitated by changing internal regulations within societies. Stemming from this process found in industrialized societies is the outgrowth of a militant structure. Although complexity is not dependent upon the industrial/militant dichotomy, societies rarely, if ever, fit into Spencer's categorization of society. In terms of "survival of the fittest," rugged individualism and aristocratic classes exclude any sense of shared equality. The intensity of nationalism would act as an imputed aggregate. When applied to promote internal cohesion, conflict arising from alienation can be skillfully reduced or eliminated. The functionality of individuals and society form a cohesive unit, nationalism pitting one race against another in terms of survival.

Because of the advancements made in both anthropology and biology, our species can state with scientific certainty that we have differences only at the phenotypic level. Race, in itself, is a social construct. Yet the evolution from family to clan, tribe, city-state, nation, and empire is well documented. As depicted by James Frazer (1854–1941), cultural aspects encompass a distinctive dialect, organizations, religious beliefs, magical practices, artistic expressions, and mores/laws. Stemming from this evolutionary process, including many aspects depicted by Herbert Spencer, the evolution of sedimentary tribes from traditional hunters and gatherers gave rise to economic prosperity that stimulated trade. Nationalism, in some crude form, became a protective mechanism that spurred economic growth and regulated tribal interaction. The need for raw material and possible access to greater amounts of natural resources became both a source of conflict and a basis for internal unity.

With the advent of superior weapons and skills, dominant tribes would absorb or assimilate weaker tribes into their cultures. Because of an increased internal pressure caused by foreign influx or foreign pressure, the subordinate political system would be controlled by an influential person based on either military power or hereditary succession. This individual was given complete or near-complete authority over communal matters.

The influence of religion (magic) and mythology plays an important part in the creation of the nationalist state. Magical practices, taboos, superstitions, and rituals (sometimes based on mythology) can influence political roles and individual destinies. The crude belief in witches and sorcerers restrained or promoted a leader's position. Eventually, theocratic

governments came to power (for example, Egypt, and Rome under Caesar). Although the relationship between religious and political domains was disrupted by the Reformation and the French Revolution, religious overtones have always remained a factor in maintaining the nationalist state.

With the rise of nations, commanding trade centers and regional resources prompted expansion and conflict with other states, such as Carthage and Rome. In the acquisition of provenances, population groups were incorporated into the mainstream cultural identity. For example, nationalism is the basis of what it meant to be Roman in the Roman Empire. Although imperialism and the Industrial Revolution would revolutionize the economic structure and create a middle class, the power structure would be transferred from one individual to a selected few. Safeguarding their country's interest is a primary issue, and the state would control access to resources. Although not necessarily a totalitarian state of existence, nationalism can bring about a state-controlled system. Re-echoing the philosophies of both Plato and Aristotle, regulation of social and economic systems is necessary for the procurement of the common good. Yet conflict, both internal and external, will never be eliminated. Corruption and incompetence are the Achilles' heel of the nationalistic state. Legitimizing the suppression of natural tendencies for the sake of the state is the hallmark of the ultimate decline of empires, as can be seen in the decline of the Roman Empire. Although far from the ideal or utopian society, the psychological manifestation of alienation is as real as the system that produced it.

As can be seen thus far, the creation of the state has certain attributes that become necessary by the state's very existence. Pressures from the environment, population, and newly created technologies make cohesion necessary for the procurement of both internal and external stability. Concepts of race, ethnicity, religion, and economic prosperity can be a source of both unity and division. Nationalism uses these concepts to create an unwavering patriotic stance. In advanced degrees of nationalism, ethics become utilitarian in nature. Unity in history and stately pride increase this sense of nationalism. Forms of alienation incurred by the individual are expected, all in the name of the state. This process can be illustrated by the conflict between Nazi and communist factions within Germany during the first half of the 20th century. The outcome of this conflict can produce one certainty; communism is the antithesis of the nationalistic state.

Recognizing the social strife caused by the Industrial Revolution, Karl Marx (1818–1883) understood the economic underpinnings of social life. Taking a holistic approach concerning social interaction, the mode of production was seen as a critical pivot for interpersonal relationships among members of a society. With the increase in technological advancements (for example, new modes of production), the stress produces alienation. This process is experienced by those individuals who partake in the segmented process of production. Production's failure to complete or provide a sense of fulfillment leads these individuals to become alienated from their work, from themselves, and from their fellow workers. When taken to the economic level, alienation and economic control produce conflict between class interests. The fundamental principles established by Adam Smith (1723–1790) were seen as part of an evolutionary-based process by which the workers will eventually rid themselves of their "false consciousness" (nationalistic tendencies) for a communal or communistic life. However, Marx failed to realize the true nature of our species. If he had taken both biology and history more seriously, including the critical analysis of his own philosophy, Marx would have come to the conclusion that communism is a utopia that can never be actualized.

In the final analysis of nationalism, it would be extremely difficult to declare any modern society free of any degree of nationalism. Whether by social contract or necessity, our species evolved into a complex social structure that had its fundamental principles rooted in our evolutionary biological past. Indeed, we are a social animal. The emergence of culture has provided our species with both the capability to populate the globe and a distinct identity. When used properly, nationalism can provide necessary psychological security and well-being for a population. This can, in fact, enrich the cultural experience as an aesthetic experience that could diffuse across territorial boundaries. However, political and economic systems rarely seek the "golden mean" when implementing policies.

Extreme forms of nationalism have caused more conflicts than any other "justified" reason. Patriotism (pride), ethnicity, religion, and economics are primary factors in stimulating greater degrees of nationalism. Stimulating the psychological euphoria created by manipulating mythological/religious fervor, justifications for atrocities become ad absurdum. In this

manner, marginalized and venerable individuals can fall victim to the overwhelming onslaught of the ruling class. Essentially, the greatest expressions of our humanity revert and become perverse. Examples of this process can be seen throughout history; Julius Caesar, Genghis Khan, Adolf Hitler, and Joseph Stalin all represent the zenith of unchecked power. War, greed, power, racism, and state-sanctioned criminal activity become rampant and call for a reevaluation of values.

Perhaps, to a certain degree, Plato and Aristotle were correct. Because nationalism is ingrained in our social structure, the leaders who are in control of society must have the proper aptitude and training for such a position. Although this creates philosophical questions concerning the attainment of a true democracy, the cultivation of virtues and seeking the proper mean can only serve to augment the greatest aspects of our humanity. Public and international policies governed by proper rational thought can reduce the amount of conflict, but can never eliminate its cause. Although not necessarily utopian, the degree of personal fulfillment for citizenry and peaceful resolutions for the global community are possible. Respect for sovereignty and human dignity (rights) can diffuse tensions in the global community. Furthermore, it is the duty of every nation, by which freedom and tolerance are upheld, to defend against any aggressive actions by perverse tyrants who wish to enslave members of our species. In terms of the global community, nationalism can do what biology has already done—unite our species as one species, with each expression of culture viewed as accidental rather than essential. Once and for all, the barbarians are transformed into the unexpected—a reflection of our own modern humanity.

— Edward Anthony Lukaszek

Further Readings

Aristotle. (1995). Nichomachean ethics and politics. In S. M. Cohen, P. Curd, & C. D. C. Reeve (Eds.), *Readings in Ancient Greek philosophy: From Thales to Aristotle.* Indianapolis, IN: Hackett.

Hobbes, T. (1988). *The leviathan.* Amherst, MA: Prometheus.

Marx, K. (1988). *Economic and philosophical manuscripts of 1844* (M. Milligan, Trans.). Amherst, MA: Prometheus.

Plato. (1995). Republic. In S. M. Cohen, P. Curd, & C. D. C. Reeve (Eds.), *Readings in Ancient Greek philosophy: From Thales to Aristotle.* Indianapolis, IN: Hackett.

Rousseau, J.-J. (1988). Discourse on the origin and foundations of inequality among men. In A. Ritter & J. C. Bondanella (Eds.), *Rousseau's political writings.* New York: Norton.

Rousseau, J.-J. (1988). On the social contract, or principles of political right. In A. Ritter & J. C. Bondanella (Eds.), *Rousseau's political writings.* New York: Norton.

Native North American Religions

Just as there is no single American Indian "language" and "culture," so there is no single American Indian "religion." There once existed a diversity of Native peoples whose 2 million descendants today represent the heirs of many languages, cultures, and religious practices that still define Indian country. This world of experience included sacred ritual practices that Native peoples regarded as an essential part of secular, everyday life. Such practices were part and parcel of what it meant to be human within the varied cultures that differed from one another.

Time has altered the cultural context that sustained traditions of the past, and most contemporary Indians live very much like non-Indians. However, Native peoples still refer to a "traditional religion," even though there was no religion, per se, that was common to all groups (nor did the word "religion" exist within the hundreds of Indian languages that were once spoken). As a field of study, Indian religion is a broad topic with a vast literature of mixed quality. It is also a contentious topic that often pits Indians against non-Indians who involve themselves in some way with the subject.

This overview focuses on religious practices that have prehistoric roots and that have continued, with modification, up to the present. It will also cite people who have been influential in the field, controversies that have arisen, and works that have been significant. The subject has drawn inquiry since anthropology's birth and will no doubt continue to do so regardless of the heated debates that periodically emerge.

Early Studies of Indian America

Students of culture evaluate all early material related to Native people, and this includes colonial accounts, government reports, military intelligence, and missionary journals. The formal study of the subject began with the Bureau of American Ethnology, a precursor of the Smithsonian Institution. Anthropology's forebears associated with the Bureau were commissioned to "salvage" tribal traditions for posterity by interviewing Native people who remembered, or still practiced, them. Frances Densmore, James Dorsey, Alice Fletcher, J. N. B. Hewitt, Francis LaFlesche, and Elsie Clews Parsons are but a few of the many pioneers who undertook early fieldwork that was later refined by Clark Wissler, Robert Lowie, Franz Boas, and their many successors.

The study of Indian religion has focused on the analysis of rituals, private revelations, dances, revitalization movements, herbal curing, vision seeking, and the biography of men and women specialists. Although traditions are often peculiar to distinctive regions or culture areas, certain themes and traditions do overlap. Unlike other world religions, Indian practice does not have clearly defined dogmas. Because latitude is given religious practitioners, differing opinions and nuanced behaviors occur within communities. This overall pattern should be kept in mind when considering what is described below.

Community, Spatiality, and Nature

Some have argued that individualism was a leitmotif of American Indian religious practice. This position was based on the continent-wide practices of fasting and vision questing, wherein one sought supernatural power. These practices assured participants that their hunting and war exploits would be successful. Achieving these goals meant that prestige and an elevated social standing would accrue to one who exhibited such questionably devout behavior that was so laden with self-interest.

Although persuasive, this argument has been challenged by those who say that all behaviors were community-based. That is, power was sought in order to be the best possible member of a village or camp. After all, a person's existence depended upon the network of kith and kin that composed the social universe. Thus, one sought to make as profound a contribution as possible to the community's continued survival.

A middle position to these contrasting approaches was suggested in the mid 20th century by the "culture and personality" school of anthropology. It detected patterns of behavior that tended to vary from one group to the next, with each group revealing a prominent trait within these patterns. Harold Driver's *The Americas on the Eve of Discovery* illustrates this approach. In the tradition of Ruth Benedict (a prominent theorist), his book describes the "self-effacing Zuni," "the self-assertive Nootka," and "proud Piegan."

Native life is also concerned with spatiality. This involves conducting rituals and orienting village configurations in a manner that makes most accessible the sacred power suffusing all creation. The camp circle, for example, reflects the Eternal, which, like the circle, has no beginning and no end. Rituals also carefully include supplication to the cardinal directions, the sky and earth, while particular places are considered sacred (and visited in time of need).

Spatiality is popularly understood as a Native sense of oneness with the environment. Romanticized, Indian appreciation for geographical sites and the creatures inhabiting them has elevated Native peoples to the status of premier ecologists. Politicized, it has elicited from critics the charge of being a ploy in the guise of religion to recover land that was fairly forfeited or fraudulently removed from Indian control.

Regardless of these perceptions, a fact of life over all culture areas has been a special appreciation for natural phenomena that Native people say are invested with supernatural power. These include everything from mountain tops to lakes, rivers, peculiarly shaped stones, feathers, or claws. Thus, people commonly claim that all creatures and all geographical features command reverence. However, historical accounts suggest that the ancestors were more selective in determining where supernatural power was most likely to reside.

Language, Culture, and Religion

The term *medicine man* has been a well-known referent used by both Indians and non-Indians in historic times, and it was derived from the French word for doctor, *le medicin.* Native practitioners were known by designations unique to their people, whereas *le medicin* referred to people whom the French saw exercising a curative role within a group. Recent history has modified this usage because one now hears a gender-neutral reference to medicine "people." This new term applies to men or women

who possess some kind of curative power *or* to anyone specializing in ceremonies (curative or not) recognized by a group as traditional.

Twentieth-century social thought and traditional Indian life uniquely merged together in transforming what anthropologists call the "menstrual taboo." Not Native parlance, this global phenomenon existed throughout Indian America and is in evidence (among other ways) when women are kept at a distance from ceremonial participation during what some call their "moon time." A prohibition observed uninterrupted in some areas, it has weakened or been ignored in others. Elsewhere, as part of the cultural resurgence movement, the menstrual observance has been enlivened anew, with women themselves advocating its observance.

In a Native form of feminism, the menstrual taboo is not dismissed as a product of oppressive patriarchy preventing ritual privileges to women. Rather, value is imparted to the custom. It is said that the mysterious, monthly flow of blood was a powerful event "traditionally" honored by the ancestors.

Said to be a defining mark of gender, it required a segregation that positively recognized the special birthing power of women. In their efforts to sustain or revitalize this ancient custom, participants emphasize its reverential quality. Its restrictive nature is eclipsed by recognizing the menstrual taboo as a kind of religious salute to, or recognition of, procreation's necessary opposites. Most people, however, simply observe the custom and offer no justification other than saying "something will go wrong if we don't do this," "we have always done it this way," or "it is our tradition."

Phrases like the Algonquian language family's "Kitchi Manitou" or the Siouan language family's "Wakan Tanka" are references to the highest supernatural power. Commonly translated as "Great Spirit," this reference to a Creator-being is as conventional to modern Indians as "God" is to Westerners. Parallel understandings likewise obtain, but controversy surrounds the topic.

Anthropological studies suggest that Wakan Tanka and Kitchi Manitou are associated more with animistic notions than with a monotheistic conception of deity. Such studies identify monotheism with "chiefdom" and state-level societies (as in the southeast and northwest culture areas). However, this often elicits criticism from some Indians, who charge that their tradition recognized "the same God that white people pray to." The counterargument is then made that ethnographic material reveals the meaning of Wakan Tanka or Kitchi Manitou to have changed over time.

Anthropologists will note that cultural continuity or change is a fact of life found universally. Just as for groups elsewhere, Native "tradition" to one era was "innovation" to an earlier period, and an example of this is evident with the Lakota word for dog (*sunka*). When the horse was introduced to this people of the Plains culture area, they needed a name for it. Because this marvelous creature carried burdens as no dog ever could, and because its speed and utility to the people were unequalled, the name that seemed most natural was *sunka-wakan* (*wakan* translated as "sacred" but implied mystery, incomprehensibility, awe, and wonder), or "sacred dog."

Some will argue that when Wakan is associated with Tanka ("great"), the word traditionally referred to the totality of all mysterious, sacred, awe-inspiring phenomena of the supernatural world that humans beheld in wonder. Only in the historic period, it is further added, did the Lakota associate Wakan Tanka with one all-powerful Creator figure. This is extended to numerous Indian groups with comparable language equivalents, but such an understanding generates controversy among those who insist that monotheism was an age-old Native concept.

Sacred Origins

Academic theory has echoed for some time the thought of a 17th-century Jesuit missionary, José de Acosta. He proposed that Asian hunter-groups settled the Americas long ago by following animal herds. The Latter Day Saints (Mormon) founder, Joseph Smith, outlined an alternative theory in his early 18th-century *Book of Mormon*. Most Indians and non-Indians consider this an unsubstantiated connection of Native peoples with Old Testament Israelites, whereas non-Mormon Indian "fundamentalists" propose that their origin stories should be accepted at face value.

Joined even by non-Indians in this reaction against academic theory, Native people sometimes speak of North America as "turtle island," a reference to the earth being on the back of a turtle. Some will claim that Native peoples associated the turtle's head, legs, tail, and shell with geographical features that exist from the Arctic to the Caribbean. Although satellite photography reveals the flaws of this contemporary

"teaching," "turtle island" does describe a type of tale found in Indian oral literature.

In a study of 300 North American creation stories, eight basic types were found to exist (and have global parallels). The "earth diver" category is widespread, but is only one of these types. It involves a Creator-figure who tells animals to dive to the bottom of the sea and bring back mud from the bottom. Generally, after three failed attempts by different creatures, the turtle (or duck, as in California) is then sent and returns with a mouthful. The Creator puts it on the creature's back, and it spreads to become the land that will now support a human population.

The other categories of Native genesis tales are "emergence stories" (in the Southwest), which tell of a people's coming from a lower-world, through several levels, to what is now the earth's surface; "world parents" stories, wherein there is a sky father and earth mother (found in southern California and the Southwest); "spider-as-Creator or first-being" stories; stories that tell of the "creation or formation of the world through struggle or robbery" (along the west coast of Canada extending down to southern California); creation "arising from the corpse of a giant" (in New York and Washington); "two Creators" who are brothers or sisters competing with one another; and one type that tells of a "blind brother" creating people better than his younger sibling. These creation stories are Native America's counterpart to those found in the holy writ of other religions.

The "Peace Pipe"

Although there are many Indian religious practices, the smoking pipe emerges as a recurrent symbol of expression. It is not the totality of Indian religion, nor is it a symbol that synthesizes the creed of any one group. It is, however, a commonly recognized instrument of ritual overarching the North American continent. Popularly referred to by non-Indians (and even some Indians) as a "peace pipe," this religious artifact is now commonly known as a "sacred pipe."

All of Native America made use of pipes with incised, varied designs. They were used for either religious functions or for leisure (different areas of the country maintained one emphasis or the other). Prehistoric pipe usage is evident in the numerous pipe bowls excavated from many sites throughout North America.

The early contact period in eastern Canada is best known through *The Jesuit Relations,* and they report pipe rituals and casual smoking corroborated by later accounts. The Lewis and Clark expedition regularly noted occasions at which the pipe was used, as did George Catlin after them. His name is now associated with the red pipestone ("catlinite") common to many bowls. References in early accounts to a "calumet" are to a special kind of ritual pipe.

Woodland peoples made much use of the pipe, and one scholar asserts that the full depth of Plains Indian religion might be understood only through study of the pipe and its accompanying ritual. Meanwhile, the Southwest culture area developed ceremonies that did not rely on its use. California saw tobacco ceremonially smoked and also eaten in order to test the virtue of young women. Smoking was done in Alaska to alter consciousness and induce guiding visions.

The 20th-century pan-Indian movement drew upon pipe usage as an especially important sacred instrument of ritual. It has become somewhat of a religious thread binding the many-patterned fabric of Indian culture and religion. Such is why a rural Abenaki from Maine can meet with a reservation Shoshone from Wyoming and urban Chippewa from St. Paul and celebrate their solidarity through smoking of this unique religious artifact.

The Sweat Lodge

A practice known continent-wide in both secular and sacred spheres of activity is today generally referred to as a "sweat" or "sweat lodge" ceremony. In a small to large, igloo-shaped structure holding anywhere between 2 and 20 people, hot rocks are placed in a central pit, water is sprinkled on the rocks, and prayers are led by a medicine person, who conducts the ceremony. Both physical and spiritual strength are sought by participants, who some say re-enter the womb and exit the ceremony reborn. Aided by the interest of non-Indians, this ceremony is now practiced in urban and reservation Native settings by young and old alike, where just years earlier it had been a custom preserved by relatively few.

The Native American Church

Drug use of the 1970s led many to Indian country in search of a botanical mysticism thought to exist within the Native world. The reality that existed was

quite different. Alcohol was unknown to prehistoric Indian America other than being ceremonially employed by southwestern and Mexican tribes (even its secular use in this region was limited). Jimsonweed was ingested by an assortment of groups from California to Mesoamerica for the pleasure it induced or for more serious concerns (for example, predicting the future, curing the sick, communicating with supernatural powers). Other narcotic mushrooms, beans, leaves, and plants were part of this complex of Native religious pharmacology, but none of these attained the popularity of peyote.

This carrot-shaped root is native to the deserts of central and northern Mexico (extending into Texas). Its tip rises above the ground and is called a mescal or peyote "button." Either this tip or the whole plant may be consumed. It also can be prepared as a spinach-like porridge, or brewed as a kind of greenish tea. Mescaline, in combination with other alkaloids contained in the plant, produces what nonpeyotists call "hallucinogenic effects."

Sometimes simply referred to as "peyotism" or the "Peyote Road" (by members), organizations began to form after the turn of the century. After 1921, peyotism spread from state to state under the incorporated title of Native American Church. Today, peyotism is found throughout the American and Canadian plains, the Southwest (especially among the Navaho), the Southeast, the Great Lakes region, and isolated places elsewhere. Migration to cities also extended peyote influence beyond the reservation milieu. In the United States, it is associated with the Kiowa and Comanche of Oklahoma (around 1870), and from them, the Church spread rather quickly. In recent years, attempts to outlaw the use of peyote (by both the government and some tribal councils) largely have been abandoned (except among non-Indian users).

Origin stories that relate the coming of peyote vary, but all point to a belief that the supernatural took pity on Indians and decided to communicate spiritual power through a special plant—peyote. Newly subjugated groups appreciated this important gift because it included a merging of Native tradition with the Christianity that recently had been introduced. This blending was regarded as a light in the darkness of social decay. It was a providential outreach to groups feeling supernaturally abandoned.

Even though Protestant or Catholic practice took root among Indian groups, some harbored a spiritual restlessness that yearned for greater Native expression. Word of the "Peyote Way" brought hope that herein might be the awaited revelation—the blending of Native and Christian traditions. For some, the Native American Church represented this union, and peyote missionaries were successful in spreading what some followers call an Indian version of Christianity.

The 20th-Century Revitalization of American Indian Religious Practice

The late 20th century witnessed a revitalization of Indian religion that was significantly influenced by the popularity of John Neihardt's *Black Elk Speaks.* This book's appeal was bolstered by the later publication of Joseph Brown's *The Sacred Pipe* (an account of ritual practices provided by the same "holy man"). Both works revealed an "Oglala Sioux" (Lakota) elder whose religious perspective became associated with all Indian peoples. His was the story of a people disenfranchised from the pristine wilderness that was their idyllic home. Emotionally moving, his biography recounted the destruction of an entire way of life and the religious system that was its underpinning.

Since the 1960s, this man's image determined the trajectory of writings related to American Indian religion. Referred to as the "bible of the hippie movement" and "bible of all tribes," *Black Elk Speaks* became the wellspring of numerous works that strove to surpass its appeal. These works propelled American Indian religious practice into becoming a significant feature of broader social trends that saw many people reevaluate their worldview and way of life.

During this period, a fertile publishing career was launched for Lakota author Vine Deloria when *Custer Died For Your Sins* became a bestseller in 1969. His blistering critique of anthropologists challenged academics to reassess their relationship to the people their work tended to objectify. In 1973, he argued in *God Is Red* that Native religious practice should be appreciated for an integrity that was just as valid as larger world religions that scholars seemed to hold in higher esteem. A corrective to an academic tradition whose harvest he found both inadequate and patronizing, Deloria's work also opened the floodgate for works of disparate quality.

A prolific writer, his *Red Earth, White Lies* later spelled out an ideology reflected in the Smithsonian's Museum of the American Indian. He charged that anthropological analyses are highly suspect and

should be eschewed in favor of a people's myths, legends, and oral traditions. In the same vein as biblical creationists, he insisted that Indian origin stories should be understood as containing literal truths. Following Deloria's cue, the museum exhibits feature Native accounts that conflict with theories suggesting Indians somehow migrated to North America from elsewhere.

An award-winning series of television commercials also significantly affected perceptions of Native religious practice. The series featured an actor in Plains garb a la Black Elk. With a tear on his cheek, he mournfully beheld trash littering the ground. It was this iconic figure that gave impetus to a fledgling environmental movement and equated American Indian religion as more nature-friendly than the prevailing ideologies that brought blight to the land. Indian people accepted this positive stereotype and used it to help them in the courts. It was embraced by activists who lobbied for reclamation initiatives that interwove land claims with religion. Although this trend often polarized affected populations, sympathetic judicial decisions nonetheless restored Indian privileges in, or control of, lake, river, and mountain sites that were adjudged sacred to Native ancestors and their descendants.

Tribes often enlisted the testimony of anthropologists to help win favorable verdicts for cases that were showcased nationally. Varied media brought much attention to the Iroquois, who sought large swaths of land in New York; to numerous Great Lakes peoples, who fought to retain fishing rights; and to the Lakota, who pleaded for a "return" of the Black Hills to their ownership. Within these and most other legal disputes, Native groups insisted that their efforts were grounded on a religious imperative that identified them with the water, soil, or creatures that "the Creator" enjoined them to protect and with whom they identified as a people.

Besides wearing apparel and hairstyles, Native peoples also popularized neutral religious terminology that later became the vocabulary for many non-Indians. Those involved with tribal religious practice espoused a new vocabulary that substituted "spirituality" or "teachings" for the word "religion." Similarly, "God," although used, was often replaced with "Creator." The tenor of the time had given a cadence to "religion" and "god" that reminded too many people of lifeless church buildings, dry texts, and rote prayers from distant Europe.

Carlos Castaneda became a household name after publishing his bestseller *The Teachings of Don Juan.* Deloria chastised scholars who mixed with Native peoples, but Castaneda presented himself as academe's preferred alternative. He claimed to be an anthropologist who lived with the Yaqui people and who learned about their universe from the inside. His books became popular, and Castaneda's life was the cover story for *Time* magazine (March 5, 1973).

Don Juan was a biography that vied with Black Elk material as an inspirational tome of the times for college students. Its several epistle-like spin-offs were used for courses and discussion groups within academic circles. The contention of this literature was that Native peoples preserved a knowledge of drug use that Western peoples would do well to learn. After wielding much influence outside the Indian world (and revitalizing religious interest within it), Castaneda received scrutiny by scholars who called into question the entire corpus he claimed to discover while living with Yaqui religious practitioners.

Castaneda won fame, but an abiding pall hangs over his work because most people, years after the fact, regard it as fiction. Nonetheless, his efforts engendered interest and fascination with Indian religious experience. They spawned literature by and about American Indian religion that now inhabits bookstores and that challenges readers to discern authenticity.

At these bookstores, one finds studies of religion and culture interspersed with volumes that cast popular appeal and sometimes fraudulent representations of Native practice and thought. As a result, consumers made a bestseller of Forrest Carter's *The Education of Little Tree,* and speakers regularly quoted "Chief Seattle's speech" when addressing the sacredness of the environment. Relatively few were aware that both works were written by non-Indian authors.

Lame Deer, Seeker of Visions, the popular biography of a contemporary Lakota medicine man, was anti-establishment in tone and fostered a widespread impression that "real" Indians could not also be Christian. Other works echoed this sentiment, which had been stated by Deloria in angrily direct terms. He distilled an opinion that was frequently heard within the pedagogy of Indian activists: "Christianity has been the curse of all cultures into which it has intruded." Religious attitudes and literature that began to pervade the Indian world were a counterpoint to

the reemergence of Christian fundamentalism in mainstream America.

The biography of *Rolling Thunder,* spiritual guide to a music group known as "The Grateful Dead," won admirers within the band's cult following and many others within the Woodstock generation. Life stories of other medicine people also were numerous over the decades, but the biographies of Lame Deer, Rolling Thunder, and Wallace Black Elk exercised the most influence. Having a marketable name but no biological or theological connection to the holy man of Neihardt and Brown, Wallace was candid in his condemnation of Christian churches within Native communities. He and others evangelized this position by addressing audiences via the lecture circuit.

As the new millennium dawned, so did the hope for new life in Indian America. The casino industry was transforming the economic status of different tribal communities, and religious practitioners were revitalizing traditions that had been suppressed, forgotten, or abandoned. At the same time, television, films, and a broad array of Indian and non-Indian writers fostered a conventional wisdom that Christian affiliation was forced upon ancestors who wanted no part of the new religion.

It was widely assumed that had they been given a free choice, elders would have retained their age-old practices and would not have joined the various Christian denominations that were now found throughout Indian America. By restoring the old practices, their descendants could amend the horrific history wrought by culture contact. Contrasting with a prevailing opinion that had been present since 1492, non-Indian commentators accorded an understandable, sometimes effusive, compensatory respect for Native religious practices.

A century earlier, Christian missionaries sought to replace Native religious practices with those of their own denomination. By 2000, many Christian ministers were assisting Native peoples to derive spiritual succor from tribal religious traditions that even the ministers regarded as having merit. Sectarianism had fallen into disfavor, and ecumenism had become commonplace.

Black Elk Speaks and *The Sacred Pipe* had been in the forefront of Indian cultural resurgence. They also inspired many Indians and non-Indians to appreciate Native religion anew. People saw in Black Elk a vision of the sacred that was compelling. However, the holy man's fuller tale had not been told, and by century's end, it generated a new debate. *Black Elk: Holy Man of the Oglala* revealed in detail that the sainted patriarch of traditional religion had been a devout Catholic for most of his life.

He was best remembered by those who knew him as an elder who lived the Christian faith along with many from his era. Brown admitted that he and Neihardt avoided this topic because they thought their readership would see Christianity as compromising the holy man's "Indian-ness." As a result, their portrayal of Black Elk as a resolute traditionalist made him a beacon for nativists. It moved them to seek religious meaning within Indian practice alone and forsake whatever Christian affiliation they might have had. This position was dramatically advanced by the American Indian Movement (AIM) in many highly publicized national protests, such as the occupations of Alcatraz, Wounded Knee, and the Bureau of Indian Affairs offices in Washington, DC. Activists spearheaded protests that included the restoration of Indian religious practices they understood to be traditional.

In his autobiography *Where White Men Fear to Tread,* Russell Means (a Lakota) stated that one of AIM's concerns was to help restore the religion of people such as the revered Black Elk (Means was unaware of his Christian participation). Because AIM's religious spokesman was Wallace Black Elk, it was only natural for Indians and non-Indians alike to conclude that Wallace was kin to the senior holy man, and that AIM's and Wallace's religious disposition was the same as the elder Black Elk's. By the end of the 20th century, this understanding was as much widespread as it was inaccurate.

Urban Indian and non-Indian academics and activists were at the forefront of a revitalization movement that still unfolds within the Native world. Although the stridency has abated, Christian missionaries are still charged with complicity in bringing about the "End of the Trail" for Indian populations. However, church-going Indians still hear that the only redemption they need is redemption from those who brought Christianity.

Many were not aware that the medicine men, as custodians of tribal religious traditions, formerly claimed membership in some Christian denomination. Others tried to exorcise institutional Christian presence from among their people. This latter group asserted itself in the late 20th century where earlier, an individual might be known as a Catholic, Protestant,

or Peyotist medicine man (as revealed in the biography of the much-respected religious leader, Fools Crow).

Although it was a popular tenet that Indian Christianity was oxymoronic, many Indian people continued their denominational affiliation. They also affirmed the interest in Native tradition that many younger people were expressing. If the next generation could find new life by such means, elders gladly bestowed their blessing. They did so not because they thought the young should forsake Christian practice, but because the gospel itself affirmed teachings that proffered faith and hope. Such virtues were sorely needed among so many Native peoples who were locked in the grip of a haunting poverty.

Sometimes accompanying the revivalism preached by nativists was what one anthropologist has termed "ethno-gnosticism." That is, many began to assert that Indian peoples should have proprietary rights to the knowledge and conduct of rituals traditionally associated with tribal religions. This sentiment sought to have Native people alone speak on matters pertaining to the Indian world. Such exclusivity was prompted by some Indians and non-Indians who were selling their real or purported expertise to anyone who paid for their services.

This nativist position bred difficulties of its own. Anthropologist Sam Gill, teaching at the same university as Vine Deloria, was as outspoken as his colleague when he wrote that Indian hegemony within the public arena had itself become a problem. His argument is shared by others and has stirred debate, but scholars rise above it and still render a faithful reflection of Native practice. Noteworthy Indian anthropologists and their work include Alphonso Ortiz's *The Tewa World* and Robert Hall's *An Archaeology of the Soul.*

Native North America is composed of diverse people who devoutly attend their Christian church, participate in some tribal religious tradition, or do both (atheistic thought is seldom heard within Indian country). As they go about their daily routine, most Indians are not involved with scholarly discussions and the public activism featured on newscasts. Rather, they conduct an everyday life that is filled with the same mundane activity common to non-Indians. It helps them continue to live with a vision of the sacred that family and tribal tradition have always insisted is necessary to possess.

— *Michael F. Steltenkamp*

Further Readings

Brown, J. E. (1953). *The sacred pipe: Black Elk's account of the seven rites of the Oglala Sioux.* Norman: University of Oklahoma Press.

Carter, F. (1976). *The education of Little Tree.* Albuquerque: University of New Mexico Press.

Deloria, V., Jr. (1995). *Red earth, white lies.* New York: Scribner.

Hall, R. L. (1997). *An archaeology of the soul: North American Indian belief and ritual.* Urbana: University of Illinois Press.

Means, R. (1995). *Where white men fear to tread: The autobiography of Russell Means.* New York: St. Martin's.

Neihardt, J. G. (1932). *Black Elk speaks: Being the life story of a holy man of the Oglala Sioux.* Lincoln: University of Nebraska Press.

Ortiz, A. (1969). *The Tewa world: Space,time, being and becoming in the Pueblo universe.* Chicago: University of Chicago Press.

Steltenkamp, M. F. (1993). *Black Elk: Holy man of the Oglala.* Norman. University of Oklahoma Press.

Native Peoples of Central and South America

The study of native peoples of Central and South America addresses many scientific and humanistic debates. It is a subject of considerable intrigue for archaeologists, linguists, and cultural anthropologists. Who are these people? Are they exotic others who engage in hallucinogenic drug use and shamanistic healing? Are they remnants of lost empires, victims of Western civilization's aggressive quest for gold, Christian souls, and subjects for the medieval crowns of Europe? Are they romantic rebels who fight to preserve simple lifestyles in the remote jungles of Latin America? Or are they the blessed poor of the earth, crying for justice? How do we discover their true identities, unmask the myths and mysteries that surround them, sort out the lies and the truths of their histories, and learn how their lives reveal the broader issues concerned with the future and fate of the Western hemisphere?

At the time of the European invasion of Central and South America, it is estimated that between 15 million and 50 million people inhabited the diverse geographic region that stretched 7,000 miles between the

Rio Grande River and Cape Horn. Archaeologists continue to find new evidence to explain how and when they came in various waves from several areas of Asia between 20,000 and 40,000 years ago. As many as 2,000 different languages were spoken among the peoples, whose cultures varied according to their adaptations to a wide range of environments, including rain forests, desert coastal areas, mountains, fertile plains, and marshes. In the 21st century, their numbers are still difficult to discern, but for another reason. Latin America is a land of the *mestizo,* persons of mixed native and European heritages. Despite the fact that most Latin Americans have indigenous roots and many native peoples are assimilated in part into mainstream lifestyles, native peoples can still be identified by distinctive language and cultural practices. They sustain diverse authentic identities in traditional communities, many of them in isolated regions of Central and South America.

Native peoples of Central and South America, referred to as "indigenous," or "Amerindian," can be studied in terms of their historical adaptations to their environments in specific culture areas. In his classic outline of South American cultures, George Peter Murdock defined the following areas: Isthmian, Caribbean, Colombian, Peruvian, Chilean, Fuegian, Pampean, Chaco, Paraguayan, Eastern Lowland, Atlantic, Goyaz, Para, Xingu, Bolivian, Montana, Jurau-Purus, Amazon, Loreto, Caqueta, Savanna, Guiana, Orinoco, Coastal Caribbean, and Floridian. Murdock's culture areas are characterized by linguistic affiliation, food production techniques, crafts, housing types, community organization, and marriage and kinship norms. Peoples within culture areas share religious ideas and knowledge of the environment or practical skills with each other. Their languages typically share mutually intelligible terminology and grammatical structures. Through trade, they share resources. This can but does not necessarily lead to more complex social organization. Culture area studies are primarily ecological in their focus. They are also the focus of linguistic studies.

Native peoples of Central and South America can also be studied in terms of the development of levels of complexity in their social and political systems. While many culture areas remained sparsely populated, the availability of resources, the development of agriculture, and increased trade allowed some populations to grow denser. Peoples like the Aztec, Maya, and Inca developed complex political systems, elaborate ritual centers, and impressive civilizations. They also expanded their territories through warfare and were known to practice human sacrifice of their prisoners. Archaeologists continue to discover evidence of a broad range of human sacrifice practices throughout Central and South America, including voluntary sacrifice of children in some areas.

The study of native peoples of Central and South America also examines how these societies changed over time and how they either collapsed or were destroyed by European invasions. Archaeologists, linguists, and cultural anthropologists uncover evidence to understand the role of ancient native cultures in past developments and present realities. Contemporary Latin American nations are proud of their indigenous roots and support research that recognizes the wisdom of native peoples and their accomplishments. Museums throughout Central and South America display impressive artifacts of gold, jade, and other precious metals as well as pottery, stone sculptures, codices and khipus. Vast architectural ruins, remains of Maya and Inca glory, attract large numbers of tourists to Mexico, Guatemala, and Peru each year.

Native peoples of Central and South America can also be studied as small groups of survivors in remote regions, living in simple relationships to their environments, but certainly not isolated, unchanged, or in peace. These groups face uncertain futures as modern governments typically seek to exploit their natural resource endowments for financial gain. Forests for hardwood, gardens, and small farms that grow food for plantations that produce cash crops, mountains for minerals, and displacement of natives for cheap labor are part of a common policy among all nations of Central and South America. Cultural anthropologists tell the stories of these struggling peoples in diverse environments, published as ethnographies.

Cultural anthropologists also study native peoples of Central and South America in terms of how they adapt to the modern world and assimilate into the multicultural societies of Latin America. They tell the story of native tragedies and triumphs. Native peoples suffer the highest rates of mortality. They are the poorest and the least educated. They are excluded from political processes and suffer the greatest human rights violations. Increasingly, however, many have become successful political leaders in their respective nations, challenging the systems that exclude and oppress them. Others have high-profile international identities as champions of human

rights and environmental justice. And many others work to preserve the dignity of their lives and cultures at local levels through cooperatives that sponsor education, health care, housing, and economic development from the grass roots. Anthropologists work to preserve their languages and cultural knowledge, particularly of their natural environments.

A large number of charitable organizations throughout the world send volunteers and resources to assist native peoples. A growing number of democracies in Latin America are beginning to recognize the importance of native peoples and are including them in democratic processes; however, this is both long overdue and largely unrealized for most native peoples. Native peoples contribute to the economies of Latin American nations through their labors in agriculture, fishing, and mining. They also contribute greatly to the culture of their nations through their costumes, food ways, music, dances, religious beliefs, crafts, and festivals.

— *Barbara J. Dilly*

See also **Argentina; Aztec Agriculture; Brazil; Mayas; Mexico; Peru; Tropical Rain Forests**

Further Readings

Lyon, P. J. (1974). *Native South Americans: Ethnology of the least known continent.* Prospect Heights, IL: Waveland Press.

Murdock, G. P. (1951). *Outline of South American cultures. Behavioral science outlines* (Vol. 2). New Haven, CT: Human Relations Areas Files.

Wilson, D. J. (1999). *Indigenous South Americans of the past and present: An ecological perspective.* Boulder, CO: Westview Press.

Native Peoples of the Great Plains

Native Americans of the Great Plains are an important part of popular culture. They have been represented in anthropological studies, literary works, and the cinema. Many of these representations focus on nomadic communities engaged in hunting bison, military activities, and religious practices alien to many citizens of the United States. Although the vast majority of these perceptions date from the expansion of the settlers from the United States into the region, the occupation of the Great Plains by many indigenous peoples predate the presence of colonial nations.

Early Occupations of the Great Plains

According to archeologists, people began occupying the Plains by at least the Clovis Period, 14,000 years ago. Artifacts associated with these widely dispersed sites suggest that these hunting and gathering populations stalked various types of mega fauna and gathered locally available plants. Sophisticated bifacial tools made of fine-grained lithic material were used to dispatch mega fauna.

As climatic conditions became dryer, temperatures increased, grasslands expanded, and once flourishing streams transformed into marshy areas and small lakes. These environmental changes aided the range expansion and herd size of bison. Predictably, indigenous populations began to focus on ungulates. Innovative hunting techniques led to the ability to mass harvest bison. Corrals and cliff jumps began to appear in the archeological record. In addition, a number of archeological sites evidenced the successful storage of perishable meats over a long period.

Around 2,000 years ago, pottery and evidence for small-scale farming began to appear along rivers in the eastern Plains. Some of the domesticates grown included corn, beans, squash, sunflowers, and tobacco. As time went on, many more varieties of corn and beans were developed. It is estimated that the Arikiras, residing along the Upper Missouri River, grew 18 varieties of corn and 10 types of beans. The Arikiras are a Caddoan-speaking population that represent the northernmost migration of Caddoan-speaking communities that had originated in eastern Texas.

Migrations of Indigenous Peoples Into the Great Plains

As Caddoan-speaking populations, such as the Arikiras and the Pawnees, migrated into more northern portions of the Great Plains, small communities of Apaches also began to make their first entrance into the region. Around the 1700s, however, numerous Native communities began to migrate into the region. Two events accelerated these later migrations: the impact of colonial expansion further east and the ability to mass harvest bison through the use of firearms and horses. This was the period in which the Lakotas, Omahas, Poncas, Osages, Comanches,

Kiowas, Cheyennes, Arapahos, Otos, Missourias, and Quapaws entered the region.

Expansion of Colonial Nations Into the Great Plains

Colonial nations accelerated their expansion into the Great Plains after the 1700s as well. In the Southern Plains, Spanish, French, British, and, later, American entrepreneurs, administrators, and in some cases, missionaries moved into the area. The immigration of these peoples as well as substantial numbers of nomadic populations disrupted earlier trade networks, subsistence schedules, and ultimately the availability of key resources, such as bison.

Transport routes developed along major rivers in order to ease the passage of settlers moving farther west, the ability traders expanding their sphere of influence west, and the provisioning of these new markets. Traffic along the Arkansas, Platte, Missouri, and Red Rivers contributed to the spread of devastating diseases. By the late 1700s, smallpox, measles, typhoid, cholera, diphtheria, and flu were causing demographic havoc among indigenous communities. In general, the elderly and the very young succumbed to these diseases in greater numbers than the rest of the population.

Colonial Expansion and Indigenous Resistance

Colonial nations frequently used Native communities as auxiliary troops in their wars against hostile colonial competitors and indigenous nations. With the use of firearms and horses, warfare became more deadly than in the past. As the United States secured its position in the region through military actions, Native peoples lost their status as allies and, like hostile communities, became a policy problem for the expansionary plans of the states. Consequently, total conquest of Native populations became the goal of the United States. Strategies implemented to succeed in this goal included land dispossession and a growing array of assimilatory practices. These latter aims included forced changes in religious practices; social structures, such as governmental organizations; educational methods; language use; subsistence practices; the function of kinship; the mode of dress; and even the architectural style of houses.

Government administrators implemented three policies to succeed in their assimilatory policies. These included the establishment of reservations, the creation of boarding schools, and the allotment of tribally owned land. Through the use of civilian reservation administrators, often backed by military units, practitioners of indigenous lifestyles encountered punitive consequences. Students attending boarding schools faced difficulties understanding this American style of learning. Not knowing their languages, history, religious traditions, or often the basic aspects of their cultures, the students experienced further alienation upon returning to the reservations.

Fighting for Change Through the Court Systems

Although tribal lands were no longer allotted after 1934, issues concerning the seizure of lands for the extraction of minerals and oil continue to plague contemporary communities. Unfair leases negotiated by the Bureau of Indian Affairs to extract these resources are now under the oversight of tribal governments. A number of communities, such as the Pawnees, Lakotas, and Comanches, have taken cases

Source: © iStockphoto/Tim Pleasant.

to the Indian Claims Court in order to have illegally taken land returned or to receive monetary compensation for the loss of this land.

Current Issues Facing Native Peoples of the Great Plains

Because of recent federal policies, tribal governments have begun to regain some of the sovereignty they had lost in the past. Unlike in the past, these governments can now contract their own leases to corporations, administer their own schools, engage in indigenous religious practices, and attempt when necessary to regain the use of their own languages. Numerous contentious battles continue, however. These center on the ability to run casinos, protect sacred sites located on public or private lands, increase economic development on the reservations, and receive the monies obligated to them because of provisions in past treaties.

The Role of Anthropologists Among Great Plains Societies

During the reservation era, numerous anthropological studies occurred among inhabitants of these agencies. Much of this early work focused on oral histories concerning the pre-reservation era. Because most of these early fieldworkers were employed by museums, they also collected numerous culturally important artifacts. After the passage of the Native American Graves Protection Act in 1990, many of these culturally significant items were returned.

Currently, many anthropologists working in the Great Plains engage in ethnohistorical research and/or applied work. One area in which many anthropologists have been involved is the issue of sacred sites. Because these sites are often located on public and private lands, little effort is made to protect them. Native leaders and anthropologists have collaborated in a number of cases in order to keep these sites whole.

Other anthropologists have worked hard to dispel some of the popular myths of Native American lifestyles during the 1800s. Through this work, it is hoped that future movies, popular books of literature, and general stereotypes of Native peoples can be reassessed.

— *Martha McCollough*

Further Readings

Andrist, R. (1964). *The long death: The last days of the Plains Indians.* New York: Macmillan.

Ewers, J. C. (1958). *The Blackfeet: Raiders on the northwestern Plains.* Norman: University of Oklahoma Press.

McDonnell, J. A. (1991). *The dispossession of the American Indian, 1887–1934.* Bloomington: Indiana University Press.

Niezen, R. (2000). *Spirit wars: Native North American religions in the age of nation building.* Berkeley: University of California Press.

Native Peoples of the United States

Currently, the United States has 562 federally recognized Native American communities and more than 270 reservations. Reservations range in size from the largest, inhabited by the Navajos in New Mexico and containing approximately 16 million acres, to fewer than 10 acres, as is the case for various Native communities in states across the United States. Populations today are beginning to equal those that existed at the time of contact. Most demographers assume that the United States supported 5 to 8 million people prior to the spread of newly introduced diseases. Diseases such as smallpox, measles, influenza, bubonic plague, diphtheria, cholera, and typhoid spread with the advance of contact. Some of these diseases occurred in waves and frequently disrupted subsistence cycles, the transmission of knowledge between generations, and the ability of communities to remain viable polities.

In some cases, epidemics eliminated entire communities, and in others, it resulted in the death of 85% or more of the population. Generally, these epidemics killed the young and the elderly in disproportionate numbers. This resulted in the loss of numerous categories of knowledge retained by the elderly. These new diseases definitely accelerated the region's depopulation and probably contributed to the inability of indigenous communities to resist the continual encroachments of colonial nations.

Because of patterns of Euro-American colonization and the disappearance or relocation of indigenous

communities caused by newly introduced diseases, most Native peoples currently reside west of the Mississippi River in the states of Oklahoma, California, and New Mexico.

Ever since colonists arrived in the United States, researchers have been interested in the origins, political economies, kinship structures, and religious beliefs of Native peoples. As anthropology emerged as an academic discipline, knowledge about these areas became more systemized and contributed to both the development of federal policies as well as paradigms associated with cultural, archeological, and linguistic anthropology.

Bureau of American Ethnology

The development of the Bureau of Ethnology in 1879 accelerated these areas of study. Throughout the reservation era, anthropologists, often working in concert with museum or other collecting agencies, began to participate in ethnographic and archeological studies of Native communities across the United States. Information about aspects of kinship, warfare, religious ceremonies, social structures, political organizations, economic activities, and a wealth of other details was obtained from numerous indigenous communities in the United States. Much of the information collected led to the development of central theories in anthropology. For example, work with the Shoshones in the Great Basin permitted Julian Steward to develop his evolutionary scheme of political societies and to contribute a lexicon critical to anthropological discourse.

With the help of Elias Parker, a member of the Iroquoian nation, Henry Morgan illustrated the diversity of kinship systems among Native populations. Building on his work, future anthropologists contributed to the study of the various functions of kinship.

Scholars such as Harrington, Worf, and Powell focused their efforts on the linguistic diversity within Native North America. Through their efforts, language families became systematized. Noting the rapid disappearance of Native American languages, these scholars attempted to record as many of these languages as possible. Although only 150 of the approximately 8,000 languages spoken at contact are currently used in the United States, most current linguists estimate that as few as 10 indigenous languages will remain viable in 2050.

The Beginning of Applied Anthropology

Speculations concerning the origin of Native Americans have riveted scholars since the time of contact. Prior to the 1800s, whether viewed as remnants of the Lost Tribe of Israel or survivors of Atlantis, many researchers believed indigenous occupants of North America had degenerated from some ideal Caucasian past. Continental thinkers correlated this degeneration with environmental factors. Recognizing the implications of this philosophy for the future of the recently arrived colonial inhabitants to North America, local scholars searched for alternative explanations to account for phenotypic differences between indigenous and colonial peoples.

As an outgrowth of this conundrum, by the 1800s, ethnological research emerged as a method to study and systematize information about Native Americans. During this early anthropological era, researchers inverted European explanations of change by attributing human diversity to societal progression rather than to externally induced factors affecting the mental capacities of individuals.

With this shift in paradigms, American scholars speculated that societies progress from savagery to civilization. Whereas these early ethnological perspectives caused a shift from a paradigm of degeneration to one of progression, the early evolutionary model assumed a predictable evolutionary trajectory. Many researchers assumed that social engineering could accelerate the transition from "savagery" to "civilization." For example, reindeer herding was taught to Arctic populations in order to transform these hunting populations into pastoralists. Farming was instituted among nomadic communities in the Great Plains in order to change these societies into sedentary agricultural communities.

Although these evolutionary perspectives colored the kinship studies of Henry Lewis Morgan, the biological research of Samuel G. Morton, and the historical research of Henry Rowe Schoolcraft, each of these works contributed to a greater understanding of social complexity among indigenous peoples. Their work also opened the door to a more scientific study of the peopling of North America.

Origins of Native Peoples

Like many other human societies, Native peoples understood their origins through religious teachings.

In some cases, Native peoples emerged from the earth, were created from mud by powerful gods, or were transformed into humans from another form. Even with these variant viewpoints, indigenous religious beliefs emphasize that Native peoples originated in North America.

Through the use of scientific methods to gain a better understanding of the origins of Native peoples, anthropologists lack the paradigms to account for these faith-based beliefs. Instead, their inquiries rely on archeological, linguistic, and biological data to determine the timing of indigenous migrations into North America and the location of the original homeland of these populations.

Archeological Evidence of Native American Origins

Among archeologists, there are two major theories employed to account for the presence of Native peoples in North America. The most common theory presumes that Native peoples migrated into North America sometime after 18,000 years ago. In this scenario, small indigenous populations walked across Beringia, a land bridge that spans across the Bering Strait during ice ages. As glaciers advance, shallow seas, such as the Bering Strait, become bridges between land masses. According to this theory, small communities migrated from Asia into North America.

A second theory assumes that indigenous communities used boats to travel from Asia to the North American continent. Although no evidence of watercraft dating to 18,000 years ago have been found in the Americas, this theory provides an explanation of early sites located in South America.

Debates rage over the timing of these migrations into North America. The first agreed-upon occupation of the continent is a sparsely populated group referred to as the Clovis. Clovis sites appear suddenly in widely dispersed parts of the United States and northern Mexico. Issues arise over whether any archeological sites predate those associated with the Clovis. Potential pre-Clovis sites include San Diego Complex, Old Crow Flats, Orogrande Cave, Pedra Furada, Pikimackay Cave, Monte Verde, Chesrow Site, and Fort Rock Cave.

Linguistic Evidence of Native American Origins

Linguistic evidence of the peopling of North America suggests three main migrations into the continent. Using stable categories of words, such as body parts, base numbers, and pronouns, lists of indigenous words associated with these stable categories have been compiled. Based on this effort, three clusters of languages were identified; the Amerind, Na Dene, and Eskaleut. According to the study's conclusions, Amerind speakers entered the continent around 9000 BC, Na Dene languages about 7000 BC, and Eskaleut by 2000 BC.

Biological Evidence of the Peopling of North America

A number of researchers have explored skeletal structures, dental morphology, and, to a lesser extent, genetic information in order to determine both the origin and the timing of migrations into North America. Based on this work, most scholars assume indigenous peoples migrated into this continent from Siberia as early as 12,000 years ago. A smaller contingent of researchers suggests that numerous migrations into North America occurred and originated from places other than Siberia. Possible homelands have been identified in the Causcoids, Japan, and China.

Earliest Agreed-Upon Indigenous Occupants of North America

About 12,000 years ago, the PaleoIndian Tradition began. This period included a series of temporally separated big game hunting groups. At the beginning of this era, numerous small sites exhibiting similar technologies appeared in the United States. Referred to as the Clovis Period, these sites encompassed a sophisticated bifacial tool technology. In addition, excellent lithic materials were used to manufacture Clovis tools. Because of issues of preservation, little is known about other aspects of their material culture. Archeologists believe that Clovis peoples hunted big game animals, many of which are now extinct. According to Martin's Overkill Hypothesis, overhunting by Clovis drove many of these mega fauna to extinction. This view is currently in dispute.

Approximately 1,000 years after Clovis, the Folsom Period arose. Like Clovis, Folsom peoples created excellent bifacial tools made from exquisite lithic materials. Folsom populations developed sophisticated mass harvesting techniques for capturing bison. These included corrals, as illustrated by the Jones Miller Site, and cliff jumps, as shown at Blackwater Draw. During this era, evidence of storage occurs as well.

The last population to be included in the PaleoIndian Tradition is the Plano peoples. As with the Folsom before them, Plano populations mass harvested bison. Because of the lack of preservation, little is known about their homes, their use of plants, and the manufacturing of items not made of stone.

After the PaleoIndian Period, the Archaic Period arose. During the Archaic Period, numerous changes took place. These included dramatic increases in the number of sites located in the United States, population increases, greater diversity of tool types and subsistence practices, the emergence of long distance trade networks, more complex human burials, and ultimately the development of social inequalities.

In the Archaic Period, populations engaged in broad-spectrum subsistence. They gathered and hunted for seasonally available resources. Critical resources included small game, tubers, seed plants, nuts, and other locally available foods.

The Archaic Period ended with the emergence of domesticated plant production. There were three centers of initial domestication in the United States. These included the Southwest, eastern Great Plains, and northeastern United States. In the Southwest, maize, beans, and squash diffused from central Mexico and began to be grown by southwestern communities by 1500 BC. Although this was an arid region, the presence of a high water table permitted the development of sustainable plant production.

In the eastern Great Plains, incipient farming of maize, beans, and squash first emerged around 500 BC. In this region, however, bison always supplemented these horticultural activities.

In the eastern United States, maize, beans, and a variety of seed plants began to be domesticated approximately 1000 BC. Throughout this region, the practice of swidden agriculture occurred. This extensive type of farming seems to have led to the presence of endemic warfare prior to contact.

Elsewhere in the United States, communities continued to participate in broad-spectrum subsistence by specializing in seasonally available resources. In the Great Plains, this subsistence strategy continued until forced into farming during the reservation era.

Historical Relations Between Native Peoples and the United States

Colonial policies initially focused on trading relations and the development of alliances with Native peoples. Until the 1830s, Native peoples played a pivotal role in the securing of furs for overseas markets. Because of the competing interest of colonial powers in North America, indigenous nations often acted as auxiliary armies for the colonial nation with which they were allied. Once America dispatched weaker colonial states and secured its position as the sole colonial state in the United States, the importance of Native peoples to geopolitical events began to decline.

This change transformed the political relationship between heretofore sovereign tribal nations and the federal government. Suddenly, these tribal nations became conquered populations that only retained sovereignty not taken by the federal government. In order to legally institute these shifting political realities, the U.S. Supreme Court declared Native tribes dependent nations similar to a guardian-ward relationship. In this new administrative role, the federal government placed tribal communities under the aegis of the Bureau of Indian Affairs, an agency within the Department of the Interior. As a result of this policy change, the United States became legally obligated to protect and develop indigenous resources and to provide economic and social programs to raise the standard of living of Native peoples to a level comparable with the rest of society.

Through treaties, executive orders, and congressional legislation, however, indigenous communities have experienced the erosion of political, economic, religious, legal, and social sovereignty. In addition, they have been forced to transfer vast amounts of mineral, land, and cultural wealth to the dominant society.

Reservations arose as aboriginal title over territory was extinguished. With the development of reservations, Native peoples lost the right to travel freely and expand their land base beyond reservation boundaries. With little say over the organization of reservations, Native peoples were forced to accept the rules of Indian agents and mandates passed by the Bureau of Indian Affairs.

Prior to the establishment of the Allotment Act in 1887, the tribe controlled the dispensation of Native lands. This led to numerous legal and illegal sales of lands to settlers and speculators. A number of anthropologists, Native leaders, and interested citizens believed that if individuals owned their own land, they could more easily maintain control over it.

As a result, the 1887 Allotment Act was passed. The census taken of all Native peoples living on reservations was used to parcel blocks of land to indigenous

peoples. This act failed to account for the needs of future generations, nor did it provide equal amounts of land to each Native person. Instead, the largest blocks of land went to heads of households, smaller ones to the spouse, and the smallest amounts to minors. Allotments ranging in size from 80 to 160 acres were passed down to heirs and, in some cases, sold to non-Natives. Land not allotted was sold to non-Native peoples on a first-come basis. Tribal governments had no control over who would buy the surplus lands. Instead, acreages were sold to the first buyers able to pay the below-market prices.

Between 1887 and 1934, when allotment ended, Native land ownership fell from 138 million acres to 55 million acres. Because of the methods used to dispose of surplus lands, non-Natives often surpass Native populations on reservations. Even so, however, more enrolled Native peoples live on rather than off the reservations. This is the case even though unemployment is more than 50% on many reservations; housing, when available, is often substandard; schools are often dilapidated; and health problems abound. For example, on the reservations, lifespans are the shortest and mortality rates for newborns are the highest in the country.

Because of the small size of allotments and the fact that current allotments may have numerous owners because of laws of inheritance, it is difficult for Native peoples to work their land. Until recently, the Bureau of Indian Affairs leased allotments for farming, ranching, or extracting resources at below-market prices to non-Native businesspeople or corporations. The Bureau's slipshod record keeping resulted in the nonpayment of monies owed allotment owners. This has led owners of leased allotments to file a class action suit against the Department of the Interior and the Bureau of Indian Affairs. Although filed more than a decade ago, this case is still winding through the court system with no final solution in sight.

The Indian Reorganization Act

In 1934, the Indian Reorganization Act was passed to remedy some of the past abuses. With this act, monies were provided for economic development and the establishment of an apprenticeship program to maintain artistic traditions. In addition, the parceling of land into allotments came to a stop, and democratic forms of government were instituted for most federally recognized tribes.

Although allotments no longer occur, land is still taken from tribes for the development of roads, dams, and other types of infrastructure viewed as necessary by the federal government. Monies provided for economic development are given to the tribe, but no incentives are given to attract outside investors. As a result, economic enterprises not funded by tribal governments are a rarity on reservations. Because the federal government woefully underfunds apprenticeship programs for the transmission of artistic styles, few tribes are able to participate in them.

Tribal governments organized on democratic principles have also faced their share of problems. Generally, tribes elect members to the tribal council. These councils regulate tribal membership and economic development, provide for public welfare and safety, and have the limited right to maintain justice.

Membership

Although the U.S. census permits individuals to self-identify their ethnicity, tribal governments maintain sovereignty over their own membership. Enrollment in a tribe is determined in a variety of ways, the most common of which is through blood quantum. These can vary from one half to one sixty-fourth. Some Native communities determine membership through descent. This can be matrilineal, patrilineal, or bilineal descent. In other cases, individuals must show descent from a specific person on the Dawes Rolls. These rolls were developed prior to allotment in the 1880s.

The Erosion of Tribal Control Over Criminal Behavior

Since the late 1800s, the United States has given the federal government greater control over criminal activities on the reservations. Beginning with the passage of the Major Crimes Act in the 1880s, tribes have experienced continual erosion over their criminal justice programs. At this point, the federal courts maintain jurisdiction over murder, rape, assault with a weapon, and a variety of other violent crimes. In some cases, states are also beginning to take over aspects of tribal justice. Most recently, they have taken control over the management of wildlife on reservations.

Land Claims and Sacred Sites

Congress established the Indian Claims Commission in 1946 to redress the loss of Native territory. From the start, the courts decided, except in a handful of rare cases, to award money rather than the return of land titles to Native claimants. This has resulted in numerous disappointments among Native litigants. For example, the Lakotas refuse to accept monies awarded them for the illegal loss of the Black Hills. Hopis have also decided to forgo monies for land illegally seized from the tribe.

Results have not been much better for the protection of sacred sites on public and private lands. The uses of areas of sacred geography vary according to the meanings attributed to them. Consequently, some may provide a physical expression of sacred events; others may contribute to the efficacy of ceremonies or act as a portal to spiritual power; and in some cases, a place is sacred because of its relationship to the ancestors or spirits in general. Complicating the issue further is the fact that a number of Native communities may express different beliefs and practices about the same sacred area.

Throughout the United States, various geographical places are perceived as sacred by Native peoples. In some cases, these are sites for religious ceremonies and spiritual renewal. In others, however, the landscape's presence is all that is needed to retain its sacredness.

Because many of these sites are not on Native land, nor do they have any objective proof of their importance beyond the land itself, it has been difficult for Native peoples to protect how these spaces are used. Currently, 44 sites sacred to Native Americans are in danger of being destroyed. In most of these cases, resources located at or near these places are considered important to the nation's economy. For example, water from a sacred lake is needed to process coal in the Hopi area. In Montana, an area of sites sacred to a number of Native communities will soon be made available to oil exploration.

Sites may also be destroyed in order to develop the region's tourism industry. Mount Shasta's expansion of skiing facilities destroyed religious areas used by various indigenous communities in California. Anthropologists, Native religious leaders, and concerned citizens have fought the destruction of these sites on religious grounds.

According to the Supreme Court, however, the 1978 Religious Freedom Act does not cover geographical religious sites. As a result, sites that are located on public and private lands receive no special protection.

In some cases, however, public agencies are attempting to accommodate Native religious activities at sacred sites. One of the best-known examples is the effort of the National Park Service to accommodate the use of Devil's Tower by both tourists and Native peoples. This igneous outcrop located in Wyoming has religious significance for numerous Native tribes. It is also a popular place for climbing enthusiasts. Most of the religious ceremonies take place during the month of June, which was also the peak season for climbing the tower.

Two issues concerned religious leaders: that the distraction caused by the climbers weakened the connection between the prayers and the area's spiritual power, and that the pounding of pitons into the face of Devil's Tower disrespected the sacredness of the place. As a result, the National Park Service, which oversees Devil's Tower, requested that during the month of June, tourists forgo climbing the Tower. In addition, they strongly suggested that climbers reuse pitons already in place or obtain a permit to hammer more pitons into the rock's face. This strategy led to a significant drop in the number of climbers practicing their sport during the month

Source: © iStockphoto/Tim Pleasant.

of June. Unfortunately, in 2004, the number of climbers rose.

Native American Religions

Native American religions have undergone numerous changes since contact. In the 1900s, as anthropologists tried to salvage information about the traditional religious life of Native peoples, the government was busy trying to eradicate "paganism." Sun Dances, giveaways, potlatches, ceremonial clowns, and pilgrimages were being outlawed on all of the reservations. As these types of religious expression became seditious, many Native peoples converted to Christianity or joined newly emerged religious movements. One of the most contentious religions to gain popularity is the Native American Church. Using peyote, a type of cactus that grows in northern Mexico and southern Texas, as a sacrament, members of the Church participate in group prayers, songs, healing ceremonies, and Bible readings.

Because peyote has been classified periodically as an illegal drug by the federal government, and sometimes by state governments as well, the Native American Church has undergone periods of persecution. In 1918, Native peoples, anthropologists, and concerned citizens halted legislation to outlaw the use of peyote. With the help of James Mooney, an ethnologist with the Bureau of American Ethnology, practitioners of this religion incorporated the Native American Church. This strategy provided a modicum of protection against religious persecution.

A more complicated situation occurred when the Navajo Tribal Council outlawed the presence of the Native American Church on the reservation. Not until the 1960s did the Navajos' tribal council adhere to the U.S. Bill of Rights guarantee of religious freedom. Finally, in the 1990s, President Clinton passed an executive order that protected members of the Native American Church from prosecution by the states for ingesting peyote.

Economic Development

Tribal economies have had a difficult time, particularly because they lost such a vast amount of land between allotment in 1887 and the Indian Reorganization Act in 1934. Obtaining capital for economic ventures is difficult for a number of reasons. One of the most daunting relates to the fact that most tribal land is held in trust by the federal government. Other issues stem from the lack of infrastructure to get products to market, and conflicts with state governments.

Responding to these problems, President Nixon passed the Indian Self-Determination and Education Assistance Act in the 1970s. Basically, this Act transferred some power from the Bureau of Indian Affairs to the tribal governments. As a result, tribes can negotiate leases with external companies, contract their own educational services, and try to attract businesses onto the reservation.

Gambling, which has an illustrious history among many Native communities, has become an important area of revenue for many tribes. Since the 1980s, when the Indian Gaming Regulatory Act was passed, tribes have been permitted to operate one to three classes of gambling on reservation land. Class I gaming recognizes social gaming, often in connection with ceremonial activities that offer minimal monetary values. For example, in some communities, such as the Navajos and the Comanches, gambling has a spiritual dimension. Among other tribes, wagers are placed on hand games. Currently, tribes regulate this type of gambling.

Class II gaming, which includes bingo, pull-tabs, and lotto-style games, is under the jurisdiction of tribes and the National Indian Gaming Commission. Class III gambling, which involves casino-style games, requires approval by the tribe, the Indian Gaming Commission, and the state in which the activity will occur. Problems arise if the state does not allow Class III gaming. For example, in Nebraska, the Santee Sioux tribe has been running lottery-style gaming on its reservation. The state deemed the tribe's actions illegal, and the Supreme Court ruled in favor of the state.

Another obstacle to establishing gaming operations is lack of funding. Loans may be obtained from the Bureau of Indian Affairs, or joint ventures between tribes or between a tribe and a state have been established in order to operate casinos.

For some tribes, casinos have been an economic boon. As competition increases, however, casino revenues have begun to decline. In some states, such as Minnesota and Wisconsin, numerous Native-owned casinos operate, and the market has become saturated. Many states wanting to share a larger portion of the gambling profits have constructed their own

casinos. When this occurs, the profit margin of Native American gaming diminishes further.

Native American Graves Protection and Repatriation Act

During the 1970s, Native peoples began to dispute anthropological perspectives of Native peoples and also to raise ethical concerns about research practices. Particularly contentious were the countless cultural objects with varying degrees of significance, skeletal remains, and photographic images of Native peoples that had been collected by researchers. Many Native peoples expressed anger that an estimated 600,000 of their ancestors' remains were being stored in universities, museums, and private collections in the United States.

Through the efforts of Native peoples, anthropologists, and concerned citizens, the Native American Graves Protection and Repatriation Act (NAGPRA) was passed in 1990. This federal legislation demanded the repatriation of skeletal materials and objects sacred to a community or an individual. Only federally recognized tribes are recognized as repositories for these returned items. In addition, these tribes must be able to prove a direct connection to the ancestral remains or culturally significant artifacts.

The controversy surrounding Kennewick Man, also known as the Ancient One, illustrates some of the problems with NAGPRA. Found in 1996, this skeleton of an adult male was dated to around 8,000 years ago. Using NAGPRA as their justification, members of the Confederated Tribes of the Umatilla, Wanapum Band, Yakama Confederated Tribes, the Nez Perce Tribe, and the Colville Confederated Tribes requested the reburial of this skeleton. Some members of the anthropological profession fought this request. According to their argument, no proven linkage could be documented between current Native populations and a skeleton dating 8,000 years ago, it could not be shown that these remains were Native American, and the remains could provide valuable information about the peopling of North America and the health of early communities.

At this point, the Native tribes have lost their bid to rebury Kennewick Man. It is unclear at this time what sort of effect this will have on future anthropological work with Native peoples in the United States.

— *Martha McCollough*

Further Readings

Basso, K. (1996). *Wisdom sits in places: Landscape and language among the western Apache.* Albuquerque: University of New Mexico Press.

Castile, G. P., & Bee, R. L. (Eds.). (1992). *State and reservation: New perspectives on federal Indian policy.* Tucson: University of Arizona Press.

Nason, J. D. (1997). Beyond repatriation: Cultural policy and practice in the 21st century. In B. Ziff & P. Rao (Eds.), *Borrowed power: Essays on cultural appropriation* (pp. 291–312). New Brunswick, NJ: Rutgers University Press.

Thornton, R. (Ed.). (1998). *Studying Native America: Problems and perspectives.* Madison: University of Wisconsin Press.

Native Studies

Native studies is a relatively new discipline. Although there is no common definition, it is generally distinguished as dialogue between Western and Aboriginal perspectives to a critique of Native-state relations. Many focus on the need for an Aboriginal perspective that encompasses Aboriginal history grounded in colonization, traditional knowledge and language, Aboriginal rights, and decolonization focusing on healing and wellness. Native studies contributes to an awareness of issues, priorities, and events as they relate to Native peoples. Others see Native American studies as a critique of dominant society, history, and relations. The term *Native studies* is used primarily in Canada to mean a study of Aboriginal peoples, defined in the 1982 Canadian Constitution as Indians, Métis, and Inuit. In the United States, frequently used terms are American Indian studies; Native American studies; or, alternatively, Indigenous studies, meaning a study of Native American peoples or Indigenous peoples internationally. Emerging from disciplines such as history, ethnohistory, and anthropology, it is touched upon by other fields, such as political science, law, art, community development, social science, and medicine. Native studies has become multidisciplinary and holistic in approach. Native academics are currently pushing the boundaries of Native studies to include academic inquiry written in the Native languages and informed by their traditional knowledge. There has been a movement

by Native peoples to establish their own institutions of higher learning.

Recognition for the Need for a Separate Discipline

Acknowledgment for Native studies separate from other disciplines was first shown in the late 1960s to early 1970s. Previously, Native issues had been discussed almost exclusively among anthropologists, ethnologists, and historians. According to Noel Dyck, these early interests included traditional ethnology, acculturation studies, and Native-state relations. Anthropologists and historians first attempted to reconstruct, analyze, and document the precontact life before extensive European incursion. Ethnology consists of the examination of acculturation among Native communities. Native peoples were forced to assimilate and integrate into Euro-Canadian and Euro-American culture, as well as having to abandon their own culture and languages in order to be a part of the national whole. Fieldwork was conducted concerning the changes that were taking place within the Aboriginal communities brought about by assimilation policies and practices. The third category is studies of Native-state relations, which focus on the characteristics of the relations between Native peoples and the government, institutions, or agencies. A large topic of interest is the difficult issues of land claims, Aboriginal rights, and federal Native policies.

During and after World War II, it became apparent that tensions between Native peoples and governments were problematic. Again, anthropologists began to investigate changes caused by these relationships and state agencies, the Department of Indian Affairs (Canada), and the Bureau of Indian Affairs (U.S.). There was recognition of changes taking place with Native peoples at the community and individual level. Scholars explored the activities, procedures, and administration of Native affairs at all levels of government. Most of the published material on Native peoples before the 1970s was written by anthropologists employed by museums, universities, and the government, and read mainly by these scholars.

Even though research was based on the lives of Native Americans, most results or analysis never reached the Aboriginal communities themselves. In the 1970s, Native leaders voiced their concern over the anthropologists working in their communities. They were tired of being studied to death by outside experts, and they wanted to have ownership and control over, access to, and participation in the research in their communities. This became a new development in research—anthropologists' and other researchers' roles have shifted from power and decision-making roles to partnerships with Native communities. Today, Native communities are establishing protocols and bodies to manage research done in their communities. New bodies are formed, such as elders' committees to approve and oversee research to legislation to regulate research. Many communities are insisting on final joint approval of research results conducted in their territories. These measures are in place because of past abuses and misappropriation of culture and knowledge. Since the 1990s, there has been a growing concern from Native communities over protection of their traditional knowledge under intellectual property and cultural rights laws and declarations, particularly their medicinal knowledge. Internationally, there has been growing interest because of unauthorized reproduction of traditional designs, the publishing of secret knowledge, and issues around access and benefits. These and other issues are being discussed and negotiated at meetings of the World Intellectual Property Organization and other international venues.

In the past, states have sought to resolve the "Native problem" by eliminating Native rights, resulting in attention to the need for Native rights protection, legal decisions protecting those rights, and identification of the need for Native studies. The 1969 Canadian government White Paper, in fact, proposed to solve the "Native problem" by eliminating Indian rights granted under the Canadian Indian Act of 1876 and transferring administration to provinces and territories. The resulting public and Native outcry brought attention and extensive media coverage to Native issues across the country. The United States had implemented a similar termination policy prior to this, but eventually it was overturned. In the United States, Native Americans were granted citizenship in 1924; in Canada, citizenship was not granted until the 1960s.

Also, in 1969, Native American literature boomed with the publication of numerous protest books written by Native authors, many of which became bestsellers. During the same year, with the increase of interest in Native issues, three postsecondary institutions began to offer Native studies programs: the Navajo Community College and the University of

Minnesota in the United States, and Trent University in Canada. These schools would mark the beginning of a growing field within social sciences.

In the 1970s and 1980s, Native studies literature by anthropologists was predominantly ethnohistory, ethnology, community studies, and Native-state relations. There were literary and oral accounts of life histories, detailing the positive and negative impacts of the social, economic, and ecological consequences caused by colonization. Ethnological studies focused on Native cultural practices and beliefs. This expanded to studies of social organization, kinship, and domestic relations. There was some literature on traditional botanical knowledge, traditional medicine, and material culture. There was much interest in the significance of traditional economic activities such as hunting, fishing, and trapping. Anthropologists conducting research in communities considered themselves participants in these studies, which typically looked at change and adaptation within specific Native communities compared to other Native communities' experiences and identities.

Topics and Issues Discussed Within Native Studies Courses

The purpose of having Native studies as a separate field resulted from the hugeness of the task and the relevance to the national agenda. The Native and academic communities recognized that a large portion of North American history and experience was not being studied and told. Native studies was absent from school curricula and education, and what was being taught was biased and simply inaccurate. Native peoples also wanted their story and perspective to be taught as part of a national decolonization process. Native students and leaders demanded separate programs to teach their traditional lifestyles and perspectives in educational institutions. They wanted Native studies programs that taught their histories, philosophies, language, and traditions. These programs—situated in academia and accessible to the wider population—would allow for a greater understanding of Native peoples in a national context. The discipline would not only educate non-Natives by acknowledging misconceptions and stereotypes associated with Native Americans, but also serve as a means to acknowledge that Native peoples have a significant national heritage and played a central role in the founding and molding of the North American history and culture. For Native students, their culture is celebrated, their history forms part of the national history, colonization is understood in the context of decolonization, and hope is restored for the healing and wellness of Native peoples.

Native studies has grown to include history, traditional and contemporary health and healing, art and literature, political science, business, law, linguistics, economics, and environmental science. There are now a number of Native Studies departments across North America, and in addition, many academic departments and disciplines now include Native studies scholars and courses. The result has been the indigenization of other fields and disciplines with both Native and non-Native scholars. This is indicative of the relevance of Native perspectives and knowledge on national issues and what traditional knowledge brings to ecology, science, law, development, and other fields.

The history of Native peoples is an integral part of Native studies. Understanding how Native peoples adapted and evolved from precontact to postcontact periods is critical to understanding the present. A thorough examination of Native peoples' history allows North Americans to become conscious of the magnitude of influence that Aboriginal peoples had on North American society. Native peoples have made contributions to the food we eat, our language, our institutions, our place names, and our view of the world. Native studies gives us another look at history with Native peoples as participants, recognizing their struggles, injustices, and inequalities exclusive of former biases and stereotypes.

The history of Native peoples' health is central to the history of the Americas. At contact, there was a huge decline in Native populations because they had no natural immunities to European diseases, such as smallpox and influenza. Historians have speculated that without great losses in Native populations, the history of the Americas would be more like China's, with Europeans making only minor incursions at the edges. Native peoples still have the poorest health compared to the rest of the population. The history of their health falls into two major periods: the reservation period, characterized by deaths from tuberculosis caused by poor nutrition and inadequate housing; and the past 50 years, characterized by heart and respiratory diseases and diabetes from a poor diet and inactive lifestyles. Poor health has contributed to colonization. Assimilation policies directed at Native

peoples, such as outlawing traditional culture and residential schools, have contributed to their high suicide rates and substance abuse. In response to ill health, Native peoples are revitalizing their language, culture, and healing ways. There have been some remarkable turnarounds in Native communities as a result of using traditional healing techniques such as healing circles and sweats and purification ceremonies.

Art and literature have created effective dialogue between Natives and non-Natives, contributing to growing awareness of Native issues, culture, and teachings. Art has always been a source of expression and communication, beginning with trade in Native products such as canoes, baskets, and so on to souvenirs such as beadwork and leather products. Contemporary Native art includes paintings, jewelry, and traditional arts, such as totem poles and masks. Today, Native arts participate in all areas of art, sculpture, music, dance, and literature.

Native peoples are said to be the first ecologists. Native concepts such as a living earth, making decisions for future generations, and living in harmony have made a significant impact on how the world sees the environment. Native peoples are making contributions to the environmental movement and environmental science. The Inuit in arctic Canada are noticing significant changes in the environment caused by global warming, such as shorter winters. The Inuit have expressed their concerns internationally about the changing environment and the danger of toxins in their food chain that affect their way of life.

Mi'kMaq scientists in Cape Briton Island have studied their environment and teamed up with local communities to reverse the adverse effect of polluted waters and a decline in shellfish. Scientists are working with traditional knowledge holders to improve the environment, knowing that these people have accumulated knowledge over hundreds of years.

Native studies now covers a wide range of disciplines and fields of study. There are Native studies academic journals, and it is clearly a growing field of scholarly study. Anthropologists and historians continue to work, but their methods have changed; methods such as participatory action research and research partnerships have replaced older methodologies. Native studies continues to be a catalyst in informing and educating the public and strengthening Aboriginal communities.

— *Simon Brascoupé*

Further Readings

Dyke, N. (1990). Cultures, communities and claims: Anthropology and Native studies in Canada. *Canadian Ethnic Studies, 22*(3), 40–55.

Price, J. A. (1978). *Native studies: American and Canadian Indians.* Toronto: McGraw-Hill.

Natufian Culture

Since Dorothy A. E. Garrod's 1928 excavations at a cave in Wadi en-Natuf (located about 10 miles northwest of Jerusalem), archaeologists have continued to define and explain the distinctive cultural phase that is called "Natufian." As the type-site for this cultural subdivision of the late Epipalaeolithic period, Shuqba Cave's Layer B yielded a configuration of material remains that has been discovered at a number of sites in the Levant. The behavior reflected in those remains represents a very significant step in human prehistory, because the Natufian people stood at the threshold of the "Neolithic Revolution," just before the Near Eastern economy shifted dramatically as a result of plant cultivation and animal domestication. The landscape surrounding these Natufian sites, located primarily in the region whose southern limit runs across northern Sinai into southern Jordan and then stretches to the Euphrates Valley in North Syria, provided the conditions for the relatively rapid transition to plant and animal domestication. Along with Shuqba Cave, in Wadi en-Natuf (which is still under investigation), important Natufian sites are Beidha, Hayonim Cave and Terrace, Ain Mallaha, Salibiya I, Nahal Oren, el-Wad and Kebara Caves (Mount Carmel), and Tell Abu Hureyra and Mureybit (in Syria).

Scholars have reached general agreement concerning the material components of a Natufian site. On the basis of the early excavations in the caves of Mount Carmel and in the Judaean hill country, Garrod (and other pioneering researchers) identified this pivotal culture by means of a distinguishable inventory of stone and bone artifacts and mortuary practices. It is clear that the Natufian phase is transitional between the end of the Epipalaeolithic (the so-called Geometic Kebaran cultural complex) and the earliest stage of the Neolithic Period (defined as Pre-Pottery Neolithic A [PPNA] in Kathleen Kenyon's

work at Jericho/Tell es-sultan). By the nature of the case, there is some variation in the actual dates that are proposed to define this Natufian transition, although about 12,500–10,200 BP is a well-established range and a reasonable compromise.

There are further differences of opinion concerning the geographical range of a distinguishable Natufian artifactual and behavioral inventory; this has led to more chronological wrangling and the identification of Natufian and early Neolithic subdivisions, and distinctive but clearly related regional variations (for example, Harifian culture, in the Negev and Sinai). The most interesting debate regarding this Natufian phase concerns various factors that allowed/caused a segment of the Levantine population to give up its nomadic ways and adopt a sedentary lifestyle. In this important discussion, the most contentious question concerns the role of climate change (for example, the impact of the "Younger Dryas" on the Near Eastern environment as the determinative factor in demographic changes and the shift to cereal cultivation in the Natufian–PPNA transition).

Because of abundant food resources in the late Epipalaeolithic period, the Natufian population adopted a diversified subsistence economy that was based on hunting, fishing, and gathering. Their stone and bone tools enabled them to forage more intensively and settle down in permanent villages, although seasonal movement and the use of temporary camps probably continued in some areas. In this era, just before the Neolithic transformation took place, the diet of Natufian hunters and gatherers included meat from small game, gazelle, goats, birds, and (occasionally) large herbivores (among other animals). Such prey was often supplemented with fish and mollusks. Bones recovered from Natufian sites make this part of the picture clear, but seed remains are not as plentiful. Still, there is evidence for widespread consumption of nuts, legumes, and wild barley and wheat (among other plants). Because of this relative abundance of wild foods, the Natufian people could live in year-round villages before agriculture began.

As noted above, the distinguishable material components and behavioral patterns at sites associated with Natufian culture include a number of categories.

Small villages consisted of circular houses with stone foundations and organic superstructures. Some settlements include stone-lined or unlined pits, which have been interpreted as silos, although that was not necessarily their function in every case. Natufian sites include heavy limestone or basalt grinding implements of various kinds, which were necessary for food processing. Since Garrod's work in Wadi en-Natuf, a key feature of a Natufian settlement is the distinguishable lithic industry, in which microliths and geometrics (including Helwan lunates) are present in large numbers. Of course, this flint toolkit is not unique to the Natufian culture, but flint sickle blades made their appearance for the first time. These sickle blades, which were hafted into bone or wooden handles, were used in the intensive collection of wild grains and often include the telltale sickle gloss that results from usage. The Natufian bone industry was also well developed and consisted of fishing hooks, harpoons, awls, needles, and pendants.

Natufian villages are characterized by the accumulation of considerable debris and the skeletons of rodents (i.e., commensalism), and graves and cemeteries were also present in these settlements. Mortuary practices varied widely, in terms of grave location, composition, mode of inhumation, and burial position; variations in the ornamentation found on some skeletons (for example, shell and stone jewelry) point to some level of social or familial differentiation. Simple forms of art were part of the Natufian cultural complex and included carved stone and bone figurines. Although it was practiced on a limited scale, long-distance trade was involved in the exchange of obsidian, shells, and stone for certain beads.

— Gerald L. Mattingly

Further Readings

Bar-Oz, G. (2005). *Epipaleolithic subsistence strategies in the Levant: A zooarchaeological perspective.* Leiden: Brill.

Bar-Yosef, O., & Valla, F. R. (Eds.). (1991). *The Natufian culture in the Levant.* Ann Arbor, MI: International Monographs in Prehistory.

Henry, D. O. (1989). *From foraging to agriculture: The Levant at the end of the Ice Age.* Philadelphia: University of Pennsylvania Press.

NATURALISM

Naturalism is the term that summarizes the coherent philosophical application and generalization of the

methods and conclusions of the sciences. Naturalism is a tendency among thinkers, one that spans most disciplines of thought. Naturalism is not a closely defined school of philosophy, as materialism and idealism have tended to be. Thinkers identified as naturalist often have little else in common.

The principal feature that naturalist thinkers share is an appreciation of the value of grounding their methods in the sciences, because of the heightened chances of securing reliable information, which in turn yields reliable knowledge. Following the thoughts of Dale Riepe, we can make some more specific points: The naturalist places a high value on reason and sense experience as the most reliable avenues of knowledge; the naturalist believes that knowledge is not mystical, innate, or intuitive; the naturalist believes that the external world, of which humans are an integral part, is objective and therefore has existence apart from anyone's consciousness; and the naturalist believes that the world manifests order and regularity, and that, contrary to some opinions, this does not exclude human responsibility. This order cannot be changed merely by thought, magic, sacrifice, or prayer but requires the actual manipulation of the external world in some physical way. The naturalist also rejects supernatural teleology. The direction of the world is caused by the world itself. And finally, the naturalist is humanistic. Humans are not a mirror of some supernatural deity or absolute principle but a biological existent whose goal it is to do what is proper for humans' continued existence and fulfillment. These goals can be determined in a naturalistic context by the moral philosopher.

Dale Riepe's observations were made before embarking on a study of naturalism in Indian philosophy, which illustrates the cross-cultural and transnational nature of naturalism.

This understanding of naturalism involves the rejection of all manifestations of supernaturalism *in their capacity as truth-claims* on the grounds that they are often culturally specific, whereas naturalist claims are applicable to all nature. Furthermore, supernaturalist claims cannot be repeated, tested, or verified, and in the end, they rely upon mere assertion. However, this does not involve a complete rejection of supernaturalism as a factor worthy of consideration. Supernaturalism is a valid subject of study as a cultural phenomenon within naturalism—a way some people choose to interpret the universe. But it is not an alternative to naturalism.

Historical Overview

The most notable feature of naturalism is its transcontinental origins. Where most philosophical systems have their roots in one culture and bear the marks of that culture's emphases, naturalism can trace its origins back to ancient India, China, and Greece.

A credible case can be made for Uddalaka as the first recorded naturalist. His dates are far from certain, and doubts even about his historicity have been raised. The least unlikely dates for Uddalaka are about 640–610 BCE, which means that he predates the better known Carvakas of India and pre-Socratic Greek philosophers. Uddalaka was a teacher-philosopher who enjoyed disputation and developed a sizable following. He taught that breath was the essential element in a human being. Many idealist thinkers of the time held that thought is the essential element, but Uddalaka argued that thought is itself made up of matter in the same way that breath is. He was also skeptical about reincarnation. Uddalaka provided the first versions of a monistic universe, atomistic physics, and deliberation based on appeal to what is physically observable rather than to mystical slogans.

Shortly after Uddalaka came the Carvakas, the materialist school of thought (*darshana*) in India and one of the oldest materialist traditions in the world. Carvaka is thought to be the name of the founder of the school, but nothing is known of him beyond his name, and even his historicity is uncertain. Tradition has Carvaka as the moral accuser of Yudisthira, a leading figure in the Hindu epic, the *Mahabharata*. Alternatively, Carvaka also means "sweet-tongued," or "pleasant words," which may refer to the general perception of Carvaka philosophy as hedonistic.

Carvaka philosophy regards the universe as interdependent and subject to perpetual evolution. Central tenets of the Carvaka school are the following: Sacred literature should be regarded as false; there is no deity or supernatural; there is no immortal soul or afterlife; karma is inoperative and illusory; matter is the fundamental element; and only direct perception, and not religious injunctions or sacerdotal classes, can give us true knowledge. The aim in life is to get the maximum amount of pleasure from it. This had various interpretations, from unalloyed hedonism, on one hand, to an altruistic service of others as a means of maximizing one's own happiness on the other.

Most authorities acknowledge that the Carvaka tradition has saved Hinduism from lapsing into dogmatism or ritualism and has operated as an important irritant to majority patterns of thought. Although overtly expressed naturalistic thinking in India died out, a naturalistic strand of Indian thought persists to the present day, to the extent that India has no strong moral prohibition against naturalist thinking, which is often a feature of Western thinking.

Chinese thought to this day reflects a naturalistic bent. Chinese thought sees laws in physical nature and in human nature, but has no sense of a supernatural lawgiver. The logician Hui Tzu (380–300 BCE approx., Hui Shih in old spelling) spoke of the universe as "that which has nothing beyond." This means that all things are part of the universe, the central precept of naturalism. More striking even than this, however, are the concerns of Chinese thinking. Whereas Indian thought is always tempted toward metaphysics, Chinese thought is more about human nature and the ethical imperatives for a sound state, family, and individual. Kongfuzi (551–479 BCE, Confucius in Latinized spelling) urged his readers not to worry about the gods unduly, but to get on with life. Kongfuzi, long recognized as China's most influential thinker, was concerned with establishing a good society. Such a society can be based only on good government, which in the end relies on harmonious human relations.

In Greece, the earliest naturalist thinker was Thales (approximately 625–545 BCE), who is also credited (not entirely accurately, as we have seen) as the first philosopher. Thales was unprepared to accept the received wisdom about how the universe works. The historian Herodotus tells of a battle that came to an abrupt halt because of an eclipse that took place according to a prediction made by Thales. This established his reputation and, more importantly, the reputation of naturalism as a successful way of understanding the world. The eclipse took place on May 28, 585 BCE, and this date has been given as the day science was born.

Thales was followed by a succession of thinkers that developed different theories of how the universe works. Their theories differed but the thinkers' desire to understand the world in naturalistic terms brought them together.

For reasons beyond the scope of this topic, the naturalists of India, China, and Greece were overwhelmed by a reaction from idealist philosophers and religious apologists. For almost 2,000 years, the naturalist understanding of the world was dormant. The works of its leading thinkers were destroyed and forgotten, and a dark age of superstition and religious dogmatism spelled an end to the intellectual developments of the ancient world. But although the naturalist world was dormant, it did not die altogether. Some of its works survived and were rediscovered between the 12th and 15th centuries. The rediscovery of the works of the ancients stimulated a renewal of interest in the world and in humanity. The most notable of these flowerings is known as the Renaissance, which took place roughly between the 1370s and 1600, and especially between about 1400 and the 1520s.

Since the Renaissance, naturalism has returned to the center stage of all intellectual and scientific life. Three great revolutions in naturalism have been instrumental in achieving this. The first of these great realignments of thought was what is now called the Copernican revolution. Following discoveries by Copernicus, Kepler, Galileo, and others, no longer was it credible to see Jerusalem, or even the entire planet Earth, as the center of the universe. Instead, it has become apparent that our planet is one among many billions in a universe that is many billions of years old.

The Copernican revolution was followed in the 19th and 20th centuries by the Darwinian revolution, which continued the trend toward the naturalistic outlook becoming the normative way of understanding the universe. If the Copernican revolution meant that humans were no longer the center of the universe, then the Darwinian revolution meant that humans could no longer see themselves as sitting at the peak of the hierarchy of living creatures. The ancient world subscribed to a hierarchy later known as the Great Chain of Being, which went in a line from God or gods, downward through men, then women, higher animals, lower animals, plants, and rocks. But like the earlier habit of seeing the earth as the center of the universe, the Great Chain of Being hierarchy was supported by a supernaturalist outlook that new facts no longer supported. It was now apparent that humans were more like the other animals and shared a planetary ecosystem with them.

The third great naturalist revolution is still unfolding today. It is the revolution in genetics and neurophilosophy, which is rendering obsolete the last major prescientific conceit of our having incorporeal souls and a mind, which is not the same thing as our brain. These three great revolutions in our understanding

have elevated naturalism to its current position as the normative outlook for all serious thought.

Cosmological and Methodological Naturalism

But if naturalism has won the day over its prescientific predecessors, this does not mean that the intellectual challenges are over. The debate now is centered on the features and priorities of naturalism. Contemporary naturalism is seen as consisting of two aspects, the relations between which are close or not, depending on one's philosophical outlook. There is, on one hand, *cosmological naturalism,* which is dedicated to providing a coherent cosmological picture, a worldview that is based on reliable knowledge and without recourse to metaphysics or supernaturalism.

Cosmological naturalism is an outlook on the world that is informed by, although not exclusively composed of, the sciences. John Passmore, one of the 20th century's greatest historians of philosophy, said that naturalism emphasizes the interconnectedness of things. Cosmological naturalists seek to understand the interconnectedness of things without recourse to supernaturalism or subjectivism. As Richard Dawkins has devoted his career to showing, our orderly universe, a universe indifferent to us as a species "is a more beautiful, more wonderful place than a universe tricked out with capricious *ad hoc* magic."

Cosmological naturalism tends to be atheistic or agnostic on matters of the existence of God or gods, and indeed of all other supernatural phenomena. A prime example of cosmological naturalism from the ancient world is *De rerum natura* (*On the Nature of Things*), a poem by Lucretius (100–55 BCE) that was completed in 60 BCE. *De rerum natura* gives expression to the atomist view of the universe as originally expounded by Democritus and adapted by Epicurus. In China, cosmological naturalism has its finest expression in the works of Wang Chong (27–97 CE), whose work *Lunheng* (*Discursive Equilibrium*) was written over 82 and 83 CE. Wang Chong argued that natural events are simply that—natural events without any supernatural implications. He opposed the widespread superstitions about attracting fortune to oneself and preventing misfortune. Moral virtue has no essential connection with personal destiny. Wang Chong insisted that any theory must be tested by concrete evidence and tried at all times to argue in a rational manner, supporting his claims with appropriate levels of evidence.

The ideas of Lucretius and Wang Chong have been built on through to the present day and are best represented by philosophers such as Daniel C. Dennett, mathematicians such as Norman Levitt, psychologists such as Steven Pinker, scientists such as E. O. Wilson and Richard Dawkins, and novelists such as Margaret Atwood.

But there is also *methodological naturalism,* which is not concerned so much with constructing worldviews as it is in determining a valid method of acquiring reliable knowledge. This used to be called the "scientific method." In general terms, we see that the ancient naturalists were more overwhelmingly methodological naturalists than they were cosmological naturalists.

Among contemporary philosophers, Richard Rorty, Hilary Putnam, and Kai Nielsen have been cosmological naturalists without being methodological naturalists. This is usually because of an unwillingness to accord science a privileged position as an arbiter of reliable knowledge. They have sought, in Nielsen's words, a naturalism without foundations. It is rarer, but not impossible, for people to be methodological naturalists, that is, to accept the use of empirical methods to ascertain reliable knowledge, while not employing that methodology to then build a worldview from it.

One of the main reasons some philosophers wish to distance cosmological from methodological naturalism is that they fear an unwarranted scientism in the methodological program. Kai Nielsen is one of the most recent and lucid articulators of this view. Following Putnam and Rorty, Nielsen questions what is meant by "scientific method," and he is suspicious about what he sees as a tendency to freeze out art, morality, and religion "while naturalizing them in the spirit of an uncompromising atheism." However, the writings of those who embrace metaphysical naturalism and methodological naturalism show no sign of this fear having any grounding in fact.

What actually is methodological naturalism? Tad Clements has ascribed the following characteristics: intellectual curiosity; the desire for defensible, reliable knowledge; the tendency to think of the subject of the study as related to other elements of nature in lawful ways, that is, thinking naturalistically; the recognition that anyone may be mistaken; a tendency to skepticism; a predilection toward manipulating conditions so as to be open to experiment; a preference for logical simplicity; an aversion for vague or confused

concepts; a preference for the ideal of moral neutrality when seeking knowledge; the tendency to avoid anthropomorphism.

Ironically, these points we have used to itemize methodological naturalism were employed by Clements to illustrate what he called scientific method, so we need not take too seriously differences between the two. And Clements's account of methodological naturalism carries enough caveats about the uncertainty of our knowledge and the avoidance of unwarranted dogmatism to reassure those worried about the dangers of scientism.

Methodological naturalism needs to overcome two main problems in order to establish its value. First, it needs to demonstrate that the mechanics of methodological naturalism—mathematics and logic—are empirical. And second, it needs to show that nonempirical methodological principles used outside the sciences are unnecessary. The standing of naturalism suffered somewhat during the 1960s and 1970s, when the first of these conditions went through a period of difficulty.

These objections have largely been resolved, and there are now few outside the more radical exponents of science studies or variations of postmodernism who would question the notion that science does involve a gradual accumulation of knowledge, and that we can say we know more now than was known at some point in the past. From this, it follows that we have had more opportunities to weed out error from our account of the universe. That is not to say that our current knowledge is all true, let alone perfect, simply that more is known than was once the case. And to the degree that this is correct, one can speak meaningfully of progress.

The other important point is that science has shown its validity by being the instrument by which so much of this reliable knowledge has come to us. Under the influence of the American philosopher of science Thomas Kuhn, claims like this were problematic for a while in the 1960s and 1970s, but Kuhn's account was unable to provide an explanation of how scientific knowledge *does* increase if not by the steady accumulation of knowledge by people working toward a goal of attaining the truth. It ends up that the traditional explanation was right after all: There is an objective reality out there, and, through science, we are slowly getting a better idea of how that reality operates.

Then there is the argument that says that any explanation that goes over and beyond a naturalist explanation violates Occam's Razor, which requires that we do not unnecessarily multiply entities in explanation. Centuries earlier than William of Occam, the Greek atomists, followed by Strato of Lampsacus, employed Occam's Razor when they denied that the phenomena of the universe can be explained by appealing to some entity said to be beyond the universe. Antony Flew, following David Hume, has called this the Stratonician Presumption. Flew used this argument in the context of debating the existence of God, but it is clear it has a wider application. Atheistic naturalism, Flew argued, "must have at least this initial priority over theism [because] it is the more economical view. The theist as such postulates more than the atheist; and, in consequence, the onus of proof must rest on him."

This approach has also been taken up by some prominent scientists and mathematicians. Norman Levitt has argued for what may be called a presumption of science. If the conclusions of science contradict with those of another belief system, then the benefit of doubt goes to the scientific explanation and the burden of proof falls on the supernaturalist explanation. On the face of it, this seems unacceptably arrogant. Why should science be accorded this sort of priority? Levitt's answer is simple. Because science works and has got an incomparably more reliable track record of providing accurate answers than any other system. Levitt's claim also becomes more understandable when we recognize that he is not making a distinction between naturalism and supernaturalism as two equally situated systems of thought. He insists that there is no "natural" way to distinguish the natural from the unnatural. In other words, the distinction between nature and culture is itself a cultural construct.

Quentin Smith has advanced a similar argument, but in the interests of the broader concept of naturalism. Smith maintains that naturalists have allowed opponents of naturalism—in his case, theistic apologists—to swing the argument so that theism becomes normative and naturalism becomes marginalized as skepticism about religion. In fact, Smith writes, it is naturalism that is normative, and the various theisms should be seen as skepticisms about naturalism.

As we have seen, Smith's argument on the normativity of naturalism goes back a long way. Bertrand Russell perhaps understood the problem most clearly when he noted that knowledge is an unimportant feature of the universe, and that a science that omitted to

mention knowledge is not going to suffer from any significant imperfection.

What Russell is reminding us is that the universe is a lot larger than is our knowledge of it. Or, to put it more bluntly, anthropocentrism is a serious flaw. It follows, then, that when laying out our intellectual foundations, we must begin with the method of knowledge that is the least inadequate in yielding good quality information about the universe. That has proved to be science. Naturalism is the study of nature in a way that is repeatable and that yields reliable knowledge. Naturalism is, as Paul Kurtz puts it, the philosophical generalization of the methods and conclusions of the sciences. And by virtue of studying nature on its own terms, naturalism avoids, for the most part, the faults that anthropocentrism inevitably brings with it.

This understanding of naturalism does not necessarily equate it with physicalism, which is the claim that only physical entities exist. The claim made by those who are both cosmological and methodological naturalists is not that there are only physical things, but that the methods of study of physical things have yielded the least inadequate information by which we may understand the world. This caveat also has important implications for the alleged conflict between a naturalist and nonnaturalist view of the world, whether it be supernaturalist, idealist, or subjectivist. The emerging discipline of evolutionary psychology is making exciting progress on this question. One of evolutionary psychology's principal findings is that religions are phenomena of nature, just as gravity, giraffes, and governments are. And like the last of those three examples, religion is also a human creation.

Naturalist Ethics

It is rapidly becoming clear that one of the most interesting areas of research and debate in the first half of the 21st century will be the field of naturalistic ethics. As noted earlier, the third great naturalistic revolution involves genetics, the brain, and what being human actually means. The ethical consequences of these fields of study are enormous.

But before beginning any discussion of naturalistic ethics, we need to ask, can we even speak of ethics derived from naturalism at all? Would this not run into the problem of the so-called naturalistic fallacy? This is an important and highly controversial idea, first developed by David Hume, but made known by G. E. Moore (1873–1958) in his 1903 book *Principia Ethica.* Moore believed that any attempt to define "good" was bound to fail, because "good" is a simple, nonnatural (although not supernatural) quality that could not be analyzed. With this in mind, Moore was critical of some of the social Darwinist theories fashionable at the time that claimed to be able to derive notions of good from their readings of science. Moore drew on the insight of David Hume, who criticized the tendency to draw conclusions about what *ought* to be the case from information that speaks only about what the case actually *is.* A graphic example is the tendency of deformed animals to die or be killed by the mother (the "is" in the equation) as evidence that humans suffering from some disability *ought* to be similarly dealt with.

An important, though neglected, point about the naturalistic fallacy is that it applies not only to naturalistic theories but to *all* ethical theories. For instance, the claim made by many evangelical Christians that the Bible says X, therefore we ought to X, is an example. So, although the naturalistic fallacy has some worthwhile things to say about the more simple forms of inappropriate is-to-ought rationalizing, it is far from established that any attempt to treat the concept of "good" as something open to analysis is, by definition, mistaken. To take a simple example, polluted water causes illness in people, therefore we ought not to pollute water. Is this really such a bad argument?

We can, therefore, conclude that the naturalistic fallacy serves as a useful corrective to making unduly confident is-to-ought conclusions. But we should not shy away from using science as a tool to help us improve life and happiness on the grounds of a supposed fallacy in philosophy from a century ago.

Having decided that the topic of ethics derived from naturalism is valid, we then need to appreciate fully what is being excluded. All of the conventional items of supernaturalism are abandoned—an incorporeal soul, immortality, resurrection, reincarnation, karma. All of them are removed from consideration because they cannot be validated by any method recognized by methodological naturalism. These precepts are religious ones and are believed as an article of faith and/or cultural practice. This is an important first step, because only now can we see how naturalist ethics works. It also pushes into first place the value of humility, a cosmic humility when one takes on board

the implications of being thoroughly unimportant to the cosmos as a whole.

It was Bertrand Russell who articulated this understanding most effectively in some of his ethical writings. Russell urged us to take the longer view. Given that we can't presume any cosmic reward for ourselves, we must take the longer view and look at what is best for the universe as a whole.

Opponents have frequently criticized this view as "arid," "bleak," and lacking in consolation. The last criticism is valid, but the first criticism depends on one's point of view, and there is no necessary link between the two. What may seem arid to the religious believer is seen as realistic by the naturalist. It is a basic premise of naturalistic ethics that one should not believe *in* unless one can believe *that.* In other words, believing something that is untrue but consoling is a fatal subversion of any well-grounded ethics. But this understanding of the cosmos also provides something else with which naturalists are not often credited—an understanding of the tragic sense of life. Miguel de Unamuno (1864–1936) wrote a book by this title that was published just before World War I. However, Unamuno's understanding of the tragic sense of life was undermined when he then offered the full range of traditional Roman Catholic consolations.

In contrast, the naturalist cannot offer a range of supernaturalist consolations. This understanding has motivated some of the most moving and poignant writing. From Bertrand Russell's *A Free Man's Worship* to Rohinton Mistry's novel *A Fine Balance,* some of the more sensitive observers of the human condition have spoken of this fine balance between hope and despair that is the stuff of life. It has been this understanding that has motivated so many of the finest novelists and artists, such as Emile Zola, George Eliot, Arnold Bennett, Maurice Gee, and Iris Murdoch.

Existentialists also understood the central significance of the lack of sustaining consolations, but then could do nothing but counsel despair. Man is condemned to be free, Jean-Paul Sartre wrote, and he himself then spent his life working for political change and helping causes he thought worthwhile. But for so many existentialists, the slogan "existence precedes essence" was taken as an invitation to narcissism. Nothing mattered except creating one's essence; nothing mattered except oneself. This trend toward narcissism became even more pronounced with the advent of postmodernism, which allowed the next step—nihilism—to present itself. Now, any sort of commitment to a cause or belief larger than oneself was dismissed as little more than an arbitrary snatch at one unwarranted metanarrative rather than another. The only alternatives offered were irony and wallowing in the detritus of a civilization declared by them to be tawdry.

We can now suggest some preliminary conclusions that can be drawn from this survey of naturalist ethics. Of the many articulations of naturalistic ethics, among the clearest was presented in 2003 by Gerald Larue, who also stressed the interconnectedness to which other naturalistic scholars have referred. Larue listed the main conclusions of naturalistic ethics as the following: We are one family, all life forms have had to learn to adapt, and we have a common world ecology.

Larue also concluded that our species has not yet learned to replace our native aggressiveness with aggressiveness for learning about and coming to terms with the limitations of our world ecology.

Naturalism in Art

Before concluding, it is worth returning to the observation made above that naturalism is understood in different ways in different disciplines. We can illustrate this by giving a brief outline of the way naturalism is understood in the visual arts. In the visual arts, naturalism is a term used to refer to the growing interest in portraying objects in nature, particularly the human figure, as the artist actually sees them rather than as exemplars of some ideal.

However, naturalism in art is not to be confused with realism, the accurate representation of nature. Naturalism as a complete and specific style in art reached its apogee in the second half of the 19th century, but naturalistic tendencies or emphases can be seen throughout the history of art. In this way, Egyptian or Assyrian reliefs can be naturalistic in the way human figures are represented, even though the reliefs are by no means realistic accounts of nature. And the romantic paintings of Caspar David Friedrich are naturalistic in their portrayal of nature, even though the inspiration for the paintings owes more to the Romantics.

The specific desire to portray humans naturalistically first found expression during the Renaissance when the idealized figures of Christ or the Virgin Mary

were replaced by figures with more human proportions. The work of Leonardo da Vinci (1452–1519) provides the finest illustration of this. It is not that naturalistically rendered works are free from idealization. It is more that whatever ideal values are being presented in the work are transmitted through the representation of people and objects as the artist experiences them.

In conclusion, we can restate the central points that constitute the naturalist worldview. Human knowledge is a fragile flower and forms a less-than-minimal part of the cosmos. From that core assumption, it follows that it is desirable that we adopt a form of knowledge that recognizes its fallibility and resists the temptation to disguise our ignorance by making unverifiable leaps in the dark. The default position goes to the naturalist option for a number of reasons. First, it is most in accord with Occam's Razor, which leaves supernaturalist systems with the burden of proof. Second, the methods of scientific inquiry are repeatable and testable with regard to circumstances of creed or belief, unlike supernaturalist systems, which are largely dependent on place, time, and station. And third, the record of science in providing reliable knowledge is superior to that of nonnaturalist systems. As such, science contributes most effectively to providing us with some reliable knowledge of the universe, without falling into the temptations of anthropocentrism and anthropomorphism. The worldview that emerges from this process is called naturalism.

— *Bill Cooke*

Further Readings

Boyer, P. (2001). *Religion explained: The evolutionary origins of religious thought.* New York: Basic Books.

Bunge, M. (2001). *Philosophy in crisis.* Amherst, NY: Prometheus.

Nielsen, K. (2001). *Naturalism and religion.* Amherst, NY: Prometheus.

Nola, R. (2003). *Rescuing reason: A critique of anti-rationalist views of science and knowledge.* Dordrecht: Kluwer.

Shook, J. R. (Ed.). (2003). *Pragmatic naturalism and realism.* Amherst, NY: Prometheus.

Solomon, R. C. (2002). *Spirituality for the skeptic.* Oxford, UK: Oxford University Press.

Nature

The universe, including the planet Earth, was established by means of natural evolution; the process and the result of the Big Bang activity. Usually, nature is understood as something that originated naturally, that is, the opposite to culture or just the opposite to spiritual culture (human mind, activities). The term *nature* sometimes comprises the whole objective reality, including human society (i.e., even the so-called second nature). As it is used today, the word *nature* is not only rather inexplicit but also rather inaccurate. Its content doesn't imply that the Earth is connected with the universe; that humans, as a biologic species, are a part of the Earth environment; or that humans are organisms closely connected with the other live systems of the biosphere. It doesn't also reflect the scientific knowledge that only biosphere, as a whole, is the smallest, comparatively autonomous system capable of a long-term progressive development in time. Humans and other organisms living in the biosphere, individuals, populations, and species are temporary and nonindependent, dependent on the structure, integrity, and prosperity of the planetary biotic whole. Therefore, integrity and prosperity of the biotic whole are also critical for the human culture.

Nature is one of the oldest philosophic terms. The Greek word *physis* was an everyday term designating those things that originated naturally, without the influence of human activity. The Latin word *natura* was understood similarly. The Middle Ages interpreted both humans and nature as created by God. The theoretical interest in humans and nature was revived in Renaissance thinking, but the term didn't acquire any specific theoretical contents. Indeed, it has been disappearing from theoretical thinking since the end of the 17th century because of the high prestige of Newtonian physics. It seemed that it was finished as a term whose etymological root referred to birth and origination. It was also the influence of Descartes's nature-human dualism that forced the idea that humans, who learn about nature and transform it, don't belong in nature, that they are superior to it. Nature was understood as an expanse, as an indestructible substance and energy, as a substance where nothing new comes into existence ontically. The term *nature* was diluted in the ontologically more important term *substance.*

Source: © iStockphoto/Evert van Scherpenzeel.

Development of the mechanical technology after the Industrial Revolution supported the idea that the character of natural events is best described by physics cooperating with mathematics. Yet even those categories of physics, such as body, force, distance, movement, acceleration, and so on, that were understandable to general thinking, reduced nature into bodies moving in space, into a mechanism without its own history, ontical creativity, and value. The emphasis upon the energy and mass conservation law, expressed by the well-known Einstein equation $E = mc^2$, concealed the fact of the natural evolution of the universe, that is, the irreversibility of time and the temporary character of structures.

The needs of establishing an adequate anthropology and of dealing with the conflict between culture and nature make us define nature in an evolutionally ontological way, not only as an objectiveness independent from humans but also as a human-including procedure, as a natural evolution embodying the irreversible constitutive time. If there is any deep sense in natural evolution, it is the construction of the grand structure of the universe, the creation of its large-scale physical order, including also the complete terrestrial abiotic and biotic orders.

For the purpose of the theoretical and value rehabilitation of the currently ill-defined term *nature,* we will have to make a difference between its two content layers: nature in the general sense—the universe—and nature in the specific sense—the Earth. This differentiation then offers a new reply to the old antique and medieval question: What is the position of the Earth within the universe? It is possible to reply either from the traditional physical-mechanical viewpoint or from the new evolutional-ontological viewpoint.

The first reply, which surpasses the antique and medieval geocentric viewpoints and is still considered to be the top performance of scientific knowledge, can be summarized in the following way: The Earth is a planet of the sun, that is, of a second-generation star; it is not a fixed center of the solar system or the galaxy or the universe. In fact, it is not a spatially significant body within the universe at all. Even our sun

is just a tiny and insignificant part of the universe, which, as a whole, in the large scale, is homogeneous and isotropic. It is the same in all directions, and it consists not only of hydrogen and helium, but also of a tiny amount of other elements that can be found even on the Earth. The surrounding universe is not animated; as far as we know, it lacks any signs of life.

The other, evolutional-ontological answer to the same question seemingly contradicts the above-mentioned physical-mechanical characteristics of the Earth. It seemingly brings to life the old geocentrism because it returns those characteristics to Earth nature that it was wrongly deprived of by Newtonian physics: exceptionality, creativeness, and solemnity. It characterizes the Earth as a highly organized system of animate and inanimate features and subsystems, as a structure compatible with humans and as the only possible home to humans and human culture. The spatially insignificant position of the Earth within the universe has been connected with the narrow range of conditions that permitted the origination of life and its long, never completely interrupted evolution. This evolution also depends on the reliable functioning of the not-so-distant thermonuclear reactor—the sun. Biosphere is an open, nonlinear system powered with the energy of the sun, a continuation of the development of the natural abiotic evolution of the universe. The organizational complexity of the biosphere has grown gradually, in steps that couldn't possibly have been larger because they have been connected with both the more or less constant input of solar energy and the high degree of reliability of the genetic information transfer. Evolution also makes use of the nonreliability of the natural information transfer.

Current organisms are therefore the live historical memory of the long development of the biosphere. They seem to be concurrent bearers of its "spiritual and material cultures." Evolutional conditions are not only encoded in their genomes, but also embodied in their body parts, tissues, and structures. This explains why there are serious informational reasons for the awakening of human responsibility for all culturally eradicated or endangered species, for a respectful approach of humans toward the Earth.

Life on Earth is the only large organism of which we are a part and whose health condition is rather critical because of our activities. Because we have destroyed most of the original ecosystems, we have seriously damaged not only the physical structure of life on Earth but also its memory, its informational structure. We have destroyed a part of the genetic information of the current biosphere, which is the only bearer of its inner constitutive information. We have damaged the precious memory of live nature, which had appeared and integrated life a long time before the origination of our biologic species. The genetic information of planetary life serves as a barrier against its disintegration, and therefore, we are currently facing the gravest danger in all of human history.

Natural information is absolutely superior both to human life and to human social-cultural information. In the world where an ontically creative evolution operates at the background of a generally destructive process, the biospheric memory (the natural information) is an indicator of the development of life: It automatically expands and contracts, a part of its structure can be destroyed by a natural disaster or culture, but as a whole, it is as immortal as life itself. Contrary to that, humans—items of life—are mortal not only as individuals but also as a species. Without humans, even human works are mortal. Life on Earth cannot use and develop any human artistic or technical works without humans. The disappearance of humans will cause entropy of the human culture, its natural destruction.

— Josef Šmajs

Further Readings

Capra, F. (1996). *The web of life: A new synthesis of mind and matter.* New York: HarperCollins.

Šmajs, J. (1997). *The threatened culture.* Brno: Dobromysl & Slovacontact.

Wilson, E. (1992). *The diversity of life.* Cambridge, MA: Harvard University Press.

Nature, Role of Human Mind in

Nature, at its microphysical level, constitutes the subject matter of quantum theory, also known as quantum mechanics. Never in the history of physics has there been a theory that has changed so drastically the shape of science as quantum mechanics; nor has there been a scientific theory that has had such a profound impact on human thinking. Since its inception in the early part of the 20th century, quantum mechanics has played, and still does play, a significant

role in philosophical thought both as a source of metaphysical ideas and as an important example of a scientific revolution. Thus, the advent of the quantum paradigm has gradually challenged the traditional philosophical substratum of science, the representational-visualizable description of microphysical entities and phenomena, the commonly perceived part-whole relationship that is built into classical physics, the relationship of cause and effect, the unrestricted validity of deterministic laws, and even the nature of physical reality and its independence from the process of knowledge.

Quantum mechanics is a statistical theory of the microscopic structure of matter. Within the standard framework, the codification "statistical theory" should not be understood as referring to our incomplete knowledge of the real physical state of a system, or to our computational insufficiency arising because of the complexities of the microphysical situation. On the contrary, it should be considered as an aspect of the *irreducibly probabilistic* behavior of matter at the microscopic level of description, as a genuine feature of reality that breaks with the apparent determinism of the classical Newtonian world. Quantum features such as noncommutativity, nonlocality, nonseparability, and the generalized phenomenon of quantum entanglement have been forcing us to revise radically the intuitive classical ideas about physical reality. According to our current understanding, for a consistent realist interpretation of quantum theory, the concept of realism must not be associated with ideas taken over from classical physics, such as atomism; localizability; separability; or similar philosophical presuppositions such as strict subject-object partition, mechanistic determinism, and ontological reductionism.

The Classical Conception of Nature

Classical physics is essentially *atomistic* in character. It portrays a view of the world in terms of analyzable, separately existing, but interacting self-contained parts. Classical physics is also *reductionistic.* It aims to explain the whole of forms of physical existence, of structures and relations of the natural world in terms of a salient set of elementary material objects linked by forces. Classical physics (and practically any experimental science) is further based on the *Cartesian dualism* of *res cogitans* ("thinking substance") and *res extensa* ("extended substance"), proclaiming a radical separation of an objective, external world from the knowing subject that allows no possible intermediary.

In fact, the whole edifice of classical physics—be it point-like analytic, statistical, or field theoretic—is compatible with the following *separability principle,* which can be expressed schematically as follows:

> *Separability Principle:* The states of any spatio-temporally separated subsystems S1, S2, . . . , SN of a compound system S are individually well-defined, and the states of the compound system are wholly and completely determined by them and their physical interactions, including their spatio-temporal relations.

The aforementioned separability principle delimits the fact, upon which the whole classical physics is implicitly founded, that any compound physical system of a classical universe can be conceived of as consisting of *separable, individual* parts interacting by means of forces that are encoded in the Hamiltonian function of the overall system (determining the total energy of the system), and that, if the full Hamiltonian is known, maximal knowledge of the values of the physical quantities pertaining to each one of these parts yields an exhaustive knowledge of the whole compound system.

The notion of separability has been viewed within the framework of classical physics as a principal condition of our conception of the world, a condition that characterizes all our thinking in acknowledging the physical identity of distant things, the independent self-autonomous existence of spatio-temporally separated systems. The primary implicit assumption pertaining to this view is a presumed *absolute kinematic independence* between the knowing subject and the object of knowledge, or equivalently, between the measuring system (as an extension of the knowing subject) and the system under measurement. The idealization of the kinematically independent behavior of a physical system is possible in classical physics because of both the Cartesian-product structure of phase space, namely, the state space of classical theories, and the absence of genuine indeterminism in the course of events or of an element of chance in the measurement process. During the act of measurement, a classical system conserves its identity. Successive measurements of physical quantities, such as position and momentum, which define the state of a classical system, can be performed to any degree

of accuracy. The results combined can completely determine the state of the system before and after the measurement interaction, because its effect, if not eliminable, takes place continuously in the system's state space and is therefore predictable in principle.

Consequently, classical physical quantities or properties are taken to obey a so-called possessed values principle, in the sense that the values of classical properties are considered as being possessed by the object itself independently of any measurement act. That is, the properties possessed by an object depend in no way on the relations obtaining between it and a possible experimental context used to bring about these properties. No qualitatively new elements of reality are produced by the interaction of a classical system with the measuring apparatus. The act of measurement in classical physics is passive; it simply reveals a fact that has already occurred. In other words, a substantial distinction between potential and actual existence is rendered obsolete in classical mechanics. Within the domain of the latter, all that is potentially possible is also actually realized in the course of time, independently of any measuring interventions. It should be noted, in this respect, that this is hardly the case in the quantum theory of the measurement process.

The Quantum Conception of Nature

The Generalized Phenomenon of Nonseparability

In contrast to classical physics, standard quantum mechanics systematically violates the conception of separability. From a formal point of view, the source of its defiance is due to the tensor-product structure of Hilbert-space quantum mechanics and the superposition principle of states, which incorporates a kind of objective indefiniteness for the numerical values of *any* physical quantity belonging to a superposed state. The generic phenomenon of quantum nonseparability, experimentally confirmed for the first time in the early 1980s, precludes in a novel way the possibility of defining individual micro-objects independently of the conditions under which their behavior is manifested. Even in the simplest possible case of a compound system S consisting of just two subsystems, S_1 and S_2, that have interacted at some time in the past, the compound system should be treated as a nonseparable, entangled system, however large is the distance among S_1 and S_2. In such a case, it is not permissible to consider subsystems S_1 and S_2 individually as distinct entities that enjoy intertemporal identity. The global character of their behavior precludes any description or any explanation in terms of individual systems, each with its own well-defined state or predetermined physical properties. Only the compound system S, as a whole, is assigned a well-defined (nonseparable) pure state. Therefore, when a compound system such as S is in an entangled state, namely a superposition of pure states of tensor-product forms, *maximal knowledge of the whole system does not allow maximal knowledge of its component parts,* a circumstance with no precedence in classical physics. Erwin Schrödinger, one of the eminent founders of quantum theory, explicitly anticipated this counterintuitive state of affairs by acknowledging the phenomenon of nonseparability as the most characteristic trait of quantum mechanics, the one that enforces its entire departure from classical lines of thought.

The generic phenomenon of quantum nonseparability casts severe doubts on the existence of isolated (sub)systems and the applicability of the notion of atomism, in the sense that the parts of a quantum whole no longer exist as precisely defined individual entities. The nonseparable behavior of an entangled quantum system precludes the possibility of describing its component subsystems in terms of well-defined pure states. In fact, whenever the pure entangled state of a compound system is decomposed in order to represent subsystems, the effect can extend only up to a representation in terms of incompletely specified statistical (reduced) states of those subsystems. Consequently, the state of the whole system cannot be determined by the states of its component parts, this being the case even when these parts occupy distinct regions of space however far apart, because at the quantum domain, in complete contrast to classical physics, it is only the compound state of the whole system that exhaustively specifies the probabilistic entangled correlations among the states of the parts. In this respect, the phenomenon of quantum nonseparability undeniably reveals the holistic character of entangled quantum systems. Quantum mechanics is the first—and right now the only—logically consistent, mathematically formulated, and empirically well-confirmed theory that incorporates as its basic feature that the "whole" is, in a nontrivial way, more than the sum of its "parts," including their spatiotemporal relations and physical interactions. Contrary to the situation in classical physics, when considering an entangled compound system, "whole" and "parts"

Source: © iStockphoto/Paige Foster.

are dynamically related in such a way that their bidirectional reduction is, in principle, impossible.

The Context Dependence of Objects

From a foundational viewpoint of quantum theory, quantum mechanical nonseparability and the sense of quantum holism arising out of it refer to a context-independent, and thus to an observer- or mind-independent, reality. The latter is operationally inaccessible. It pertains to the domain of entangled correlations and quantum superpositions obeying a non-Boolean logical structure. Here, the notion of an object whose aspects may result in intersubjective agreement enjoys no a priori meaning independent of the phenomenon into which it is embedded. In quantum mechanics, in order to be able to speak meaningfully about an object, to obtain any kind of description, or to refer to experimentally accessible facts, the underlying wholeness of nature should be decomposed into interacting but disentangled subsystems, namely, into "measured objects" and "detached observers" (measuring apparata) with no (or insignificantly) entangled correlations among them. This subject-object separation is sometimes metaphorically called the Bohr/Heisenberg cut.

The presuppositions of the latter are automatically satisfied in classical physics, in conformity with the separability principle mentioned earlier. In a nonseparable theory like quantum mechanics, however, the concept of the Bohr/Heisenberg cut acquires the status of a methodological regulative principle through which access to empirical reality is rendered possible. The innovation of the Bohr/Heisenberg cut, and the associated separation of a quantum object from its environment, is mandatory for the description of measurements. It is, in fact, necessary for the operational account of any directly observable pattern of empirical reality. The very possibility of devising and repeating a controllable experimental procedure presupposes the existence of such a subject-object separation. Without it, the concrete world of material facts and data would be ineligible; it would be conceived in a totally entangled manner. In this sense, a physical system may count as an experimental or a measuring device only if it is not holistically correlated or entangled with the object under measurement.

Consequently, any atomic fact or event that happens is raised at the observational level only in conjunction with the specification of an experimental arrangement—an experimental context that conforms to a Boolean domain of discourse—namely, to a set of observables co-measurable by that context. In other words, there cannot be well-defined events in quantum mechanics unless a specific set of co-measurable observables has been singled out for the system-experimental context whole, because in the quantum domain, one cannot assume, without falling into contradictions, that observed objects enjoy a separate, well-defined identity irrespective of any particular context. One cannot assign, in a consistent manner, definite sharp values to all quantum mechanical observables pertaining to a microscopic object, in particular to pairs of incompatible observables, independently of the measurement context actually specified. In terms of the structural component of quantum theory, this is due to functional relationship constraints that govern the algebra of quantum mechanical observables, as revealed by the Kochen-Specker theorem and its recent investigations. In view of them, it is not possible, not even in principle, to assign to a quantum system noncontextual properties corresponding to all of its observable quantities. In fact, any attempt to simultaneously attribute context-independent, sharp values to all observables of a quantum object forces the quantum statistical distribution of value assignment into the pattern of a classical distribution, thus leading, for instance, to contradictions of the so-called Greenberger-Horne-Zeilinger (GHZ) type.

This state of affairs reflects most clearly the unreliability of the commonsensical possessed values principle of classical physics, according to which the values of physical quantities are regarded as being possessed by an object independent of any measurement context. The classical-realist underpinning of such an assumption is conclusively shown to be incompatible with the structure of the algebra of quantum mechanical observables. In general, well-defined values of quantum observables can be regarded as pertaining to an object of our interest only within a framework involving the experimental conditions. The latter provide the necessary conditions whereby we make meaningful statements that the properties we attribute to quantum objects are part of physical reality. Consequently, the nature of quantum objects is a context-dependent issue, with the experimental procedure supplying the physical context for their being. Because of the genuinely nonseparable structure of quantum mechanics, a quantum object can produce *no* informational content that may be subjected to experimental testing without the object itself being transformed into a contextual object. In this respect, the introduction of the experimental context operates as a formative factor on the basis of which a quantum object manifests itself. The classical idealization of sharply individuated objects possessing intrinsic properties and having an independent reality of their own breaks down in the quantum domain. Quantum mechanics describes physical reality in a substantially context-dependent manner.

Accordingly, quantum objects cannot be conceived of as things in themselves, as absolute bare particulars of reality, enjoying intrinsic individuality. Instead, they represent carriers of patterns or properties that arise in interaction with their experimental context/environment or, more generally, with the rest of the world; the nature of their existence—in terms of state-property ascription—depends on the context into which they are embedded and on the subsequent abstraction of their entangled correlations with the chosen context of investigation. As Werner Heisenberg has frequently declared, what we observe is not nature itself, but nature exposed to our method of inquiry. Or, to put the same in purely physical terms, because of underlying quantum nonseparability, the world appears as a complex whole. However, once a particular question is put to nature and therefore a given context is specified, the oneness of the whole falls apart into apparent parts. Thus, whereas quantum nonseparability refers to an inner level of reality—a mind-independent reality that is operationally elusive—the introduction of a context is related to the outer level of reality—the contextual or empirical reality that results as an abstraction in the human perception through deliberate negligence of the all-pervasive entangled correlations between observed objects and their environments. The latter abstraction is dictated by the fact that, within the framework of quantum mechanics, it is solely the process of disentanglement that generates the perceptible separability and determinateness of the objects of empirical reality by means of an experimental intervention that suppresses (or sufficiently minimizes) the factually existing entangled correlations of the object concerned with its environment. It is then justified to

say that the fulfillment of the disentanglement procedure provides a level of description to which one can associate a separable, albeit contextual, concept of reality whose elements are commonly experienced as distinct, well-localized objects having determinate properties.

Active Scientific Realism

The context dependence of quantum objects does not contradict a realistic view of the world as usually assumed. Scientific realism and quantum nonseparability are not incompatible, but the relationship between them points to the abandonment of the classical conception of physical reality and its traditional metaphysical presuppositions, most notably atomism and strict ontological reductionism. Because of the substantially context-dependent description of reality suggested by quantum mechanics, one ought to acknowledge that the patterns of nature emerge and become intelligible through an active participation of the knowing subject that, by itself, is not and cannot be perspective-independent. In this sense, the conceptualization of the nature of reality, as arising out of our most basic physical theory, calls for a kind of contextual realism that we call *active scientific realism.*

It is active because it indicates the contribution of rational thought to experience; it acknowledges the *participatory* role of the knowing subject in providing the context of discourse; as previously argued, the identification of a specific pattern as an object depends on the process of knowledge, on the abstraction or suppression of the entangled correlations between the object concerned and its external environment, and this may be done in different, physically nonisomorphic ways depending on the chosen context of investigation.

It is realism because, given a context, concrete objects (structures of reality) have well-defined properties independent of our knowledge of them. According to the conception of active scientific realism, the experienced or empirical reality is a functional category. Functional to the engaging role of the knowing subject, so that the empirical reality is perceived as not something given a priori, a "ready-made" truth dictated allegedly by an external point of reference, but as something affected by the subject's action. Whereas in the old classical paradigm, scientific descriptions were regarded as being independent of the knowing subject and the process of knowledge, in the new quantum paradigm, epistemology, namely, the understanding of the process of knowing—has to be explicitly included in the description of natural phenomena. In other words, epistemology inevitably becomes now an integral part of the theory. The nonseparable structure of quantum theory, the experimentally well-confirmed holistic features arising out of it, and the subsequent context-dependent description of physical reality conflict with the rather comfortable view that the world's contents are knowable in an intrinsic and absolute sense. Within the domain of quantum mechanics, knowledge of reality in itself—the real such as it truly is, independent of us—is impossible in principle.

Independent Reality and Contemporary Physics

It should be underlined, however, that even if our knowledge will never be knowledge of reality itself, independent of the way it is contextualized, there is no reason, from the viewpoint of natural philosophy, to reject as meaningless or redundant the notion of a mind-independent reality. On the contrary, we consider the latter as unassailable in any scientific discourse; we amply recognize its existence as being logically *prior* to experience and knowledge; we acknowledge its externality to the mind structure as being responsible for resisting human attempts in organizing and conceptually representing experience. But, significantly, in the quantum domain, the nature of this independent reality is left unspecified. Because of the generalized phenomenon of quantum nonseparability, we must conceive of independent reality as a highly entangled whole with the consequence that it is impossible to conceive of parts of this whole as individual entities, enjoying autonomous existence, each with its own well-defined state. Neither reality considered as a whole could be comprehended as the sum of its parts, because the whole, according to considerations mentioned earlier, cannot be reduced to its constituent parts in conjunction with the spatiotemporal relations among the parts. Therefore, quantum nonseparability seems to pose a novel limit on the ability of scientific cognizance in revealing the actual character of independent reality itself. Any detailed description of the latter necessarily results in irretrievable loss of information by dissecting the otherwise undissectable. From a fundamental viewpoint of quantum mechanics, any discussion concerning the

nature of this indivisible whole is necessarily of an ontological, metaphysical kind, the only confirmatory element about it being the network of entangled interrelations that connect its events. In this respect, it can safely be asserted that reality thought of as a whole is not scientifically completely knowable, or, at best, in D'Espagnat's expression, it is veiled. Hence, our knowledge claims to reality can be only partial, not total or complete, extending up to the structural features of reality that are approachable by the penetrating power of the theory itself and its future development.

The Role of Mind in the Physical World

The term *reality* in the quantum realm cannot be considered to be determined by what physical objects really are in themselves. As already noted, this state of affairs is intimately associated with the fact that, in contrast to classical physics, values of quantum mechanical quantities cannot be attributed to a quantum object as intrinsic properties. The assigned values cannot be said to belong to the observed object alone regardless of the overall experimental context that is relevant in any particular situation. Hence, the quantum mechanical framework seems to allow only a detailed description of reality that is co-determined by the specification of a measurement context. What contemporary physics, especially quantum mechanics, can be expected to describe is not how mind-independent reality is, as classical physics may permit one to presume. Within the domain of quantum mechanics, the role of the knowing/intentional subject, that is, the experimenter/observer, is indelibly marked. According to the physico-mathematical structure of standard quantum mechanics, the mere freedom, on the part of the experimenter, to select the experimental context, to choose the question asked of nature and specify the timing of its asking, allows him or her to exert an indelible influence on a quantum system that is not, in general, fixed by the prior part of the physical world alone. Thus, by way of a generalized example, if A, B, and C represent observables (physical quantities) of the same quantum system, so that the corresponding Operator A commutes with Operators B and C ($[A, B] = 0 = [A, C]$), but not, however, the Operators B and C with each other ($[B, C]$ 0), then the result of a measurement of A *depends* on whether the experimenter had previously subjected the system in a measurement of the observable B, a measurement of the observable C, or none of them. Hence, the value of the observable A depends upon the set of mutually commuting observables with which one may consider it; that is, the value of A depends upon the set of measurements one may select to perform. In other words, the value of the observable A cannot be thought of as pre-fixed, as being independent of the experimental context actually chosen. This may simply be viewed as a lemma of the Kochen and Specker theorem noted earlier, whereas analogous, still more vivid statements to this consequence can be made through recent investigations of established effects in quantum theory such as the quantum Zeno effect and the so-called delayed choice experiments.

Thus, quantum mechanics undeniably reveals a sense in which the knowing subject participates in bringing reality into being. Indeed, the conception of active scientific realism—put forward here as an interpretive, regulative hypothesis to physical science—attempts to incorporate the human factor into our understanding of reality within which human knowledge forms an indispensable part. It aims at appropriately expressing within physics the sense in which this is a "participatory universe," just to recall John Wheeler's phrase. It acknowledges the subject-object inherent engagement that is built into quantum theory by appropriately integrating the subjective human increments into an objectively existing physical reality. There is an ever-growing recognition that the Cartesian ideal of an absolute dichotomy between the human mind and the external world, allowing no intermediate medium, is fundamentally flawed. It leads to an alleged construction of decontaminated-by-human-qualities knowledge—a supposedly perspective-free view of the world—that is insufficient to really understand reality. In contradistinction, active scientific realism attempts to convey that the actual relation of the knowing subject to a world is not of absolute dichotomy, nor of independence or externality, but of active participancy. Thus, in coming to know the physical world, we also come to know ourselves as knowers and consequently understand how our perspective affects or contributes to our conceptualization about the world, because in contemporary physics, such an *effect* is unavoidable. And conversely, by knowing how we contribute to the knowledge claims about the world, we identify more securely the informational content the world itself contributes. In this view, human

subjectivity and scientific objectivity, within the respective limits of their appropriateness, are no longer contraries; they are jointly achieved.

Viewing the World From Within

In light of the preceding considerations, the common philosophical assumption concerning the feasibility of a panoptical, Archimedean point of view is rendered illusory in quantum mechanics. In contrast to an immutable and universal "view from nowhere" of the classical paradigm, quantum mechanics acknowledges in an essential way a perspectival character of knowledge. Although possible in classical physics, in quantum mechanics, we can no longer display the whole of nature in one view. Access to the non-Boolean quantum world is gained only by adopting a particular Boolean perspective, by specifying a certain Boolean context that breaks the wholeness (the underlying nonseparability) of nature. Consequently, the description and communication of results of experiments in relation to the non-Boolean quantum world presuppose the impossibility of a perspective-independent account, because one must, at the outset, single out an experimental context (determined by a set of co-measurable observables for the context-cum-quantum system whole) and in terms of which the definite result of a measurement can be realized.

Be sure that there is only one external reality, but every description of it presupposes—according to quantum mechanics—the adoption of a particular point of view. There is no such thing as a "from nowhere" perspective or a universal viewpoint. A complete knowledge of the world as a whole would have to provide an explanation of the perception process or the pattern recognition mechanisms of the knowing subject, because this is part of the world. It would have to include within a hypothetically posited ultimate theory an explanation of the conditions for observation, description, and communication to which we ourselves, as cognizant subjects, are already subjected. We cannot transcend them. This would be like attempting to produce a map of the globe that contained itself as an element. The usage of this metaphor is meant to convey the conceptually deep fact—reminiscent of Gödel's famous undecidability theorem for axiom-system in mathematics—that a logically consistent theory cannot generally describe its universe as its own object. In particular, the scientific language of our hypothetical universal ultimate theory would have to be semantically closed, and hence engender antinomies or paradoxes especially in relation to self-referential descriptions, as in the case of von Neumann's account of quantum measurement that leads to an infinite regress of observing observers.

Be that as it may, the assumption of a "view from nowhere" appeared realizable prior to quantum mechanics, because in classical physics, the validity of separability and unrestricted causality led to the purely reductionist presumption that one could consistently analyze a compound system into parts and consequently deduce the nature of the whole from its parts. Because the part could be treated as a closed system separate from the whole, the whole could ultimately be described—by applying the conservation laws of energy, momentum, and angular momentum as the sum of its parts and their physical interactions, and hence the knowing subject would achieve its knowledge of physical reality from the outside of physical systems.

In the quantum theoretical framework, that picture is no longer valid. Because of the genuinely nonseparable structure of quantum mechanics, any compound entangled system is characterized by properties that, in a clearly specifiable sense, refer to the whole system but are not reducible to, implied by, or derived from any combination of the local properties of its parts. Hence, the legendary notion of the classical paradigm that wholes are completely describable or explicable in terms of their constituent parts is flagrantly violated. In quantum mechanics, as already adumbrated, the whole is simply not equivalent or reducible to the sum of its parts, including the spatio-temporal relations and physical interactions among the parts.

When all is said and done, the present situation in physics suggests that the natural scientist as a conscious being may operate within a mild form of the reductionist paradigm in trying to analyze complex objects in terms of parts, with the absolute certainty, however, that during the process, the nature of the whole will not be disclosed. The value of the reductionistic concept as a working hypothesis or as a methodological tool of analysis and research is not jeopardized at this point, but *ontologically,* it can no longer be regarded as a true code of the actual character of the physical world and its contents. Quantum mechanical nonseparability strongly suggests that the functioning of the physical world cannot just be

reduced to that of its constituents, thought of as a collection of interacting but separately existing localized objects. Any coherent conceptualization of the physical world that is compatible with the predictions of quantum mechanics requires us to view the world as a complex network of relations or processes among events that may interchange or overlap or coalesce and thereby determine the texture of a unified dynamic whole. Although the latter can hardly be fully knowable, an enlightenment of its actual character may be given by the penetrating power of the theory itself and its future development. In this respect, it is rather safe to conjecture that the conception of quantum nonseparability will be an integral part of the next conceptual revolution in physics and may even be used as a regulative constructive hypothesis guiding the search for our deeper understanding of nature.

— *Vassilios Karakostas*

Further Readings

Bub, J. (1997). *Interpreting the quantum world.* Cambridge, UK: Cambridge University Press.

D'Espagnat, B. (1995). *Veiled reality.* Reading, MA: Addison-Wesley.

Fine, A. (1996). *The shaky game: Einstein, realism and the quantum theory* (2nd ed.). Chicago: University of Chicago Press.

Karakostas, V. (2004). Forms of quantum nonseparability and related philosophical consequences. *Journal for General Philosophy of Science, 35,* 283–312.

Wheeler, J. A., & Zurek, W. H. (Eds.). (1983). *Quantum theory and measurement.* Princeton, NJ: Princeton University Press.

Navajo

The Navajo have an amazingly rich history and cultural background. One of the best known Native American groups because of their weaving and silver jewelry, it is difficult to adequately paint their picture in a condensed historical portrait. The Navajo, also known as Dine (or "the people"), are relative newcomers in the American Southwest. More than 1,000 years ago (ca. AD 1000), the Navajo migrated south from northern Canada to the American Southwest. When they arrived, this region was already occupied by ancestral Puebloan populations. The ancestral Puebloans lived in settled agricultural communities, a way of life that conflicted with the nomadic hunting and gathering practices of the Navajo. Prior to their arrival in the Southwest, the Navajo primarily hunted animals such as deer and buffalo, and gathered wild plant foods. Although hunting and raiding were formerly important in Navajo economy, they are essentially obsolete today. Their cultural adaptability is compelling, as is their ability to remain relatively unchanged; maintaining their original lifeway was a struggle for the Navajo as they negotiated relationships with their new Puebloan neighbors and strained under the arrival of Europeans.

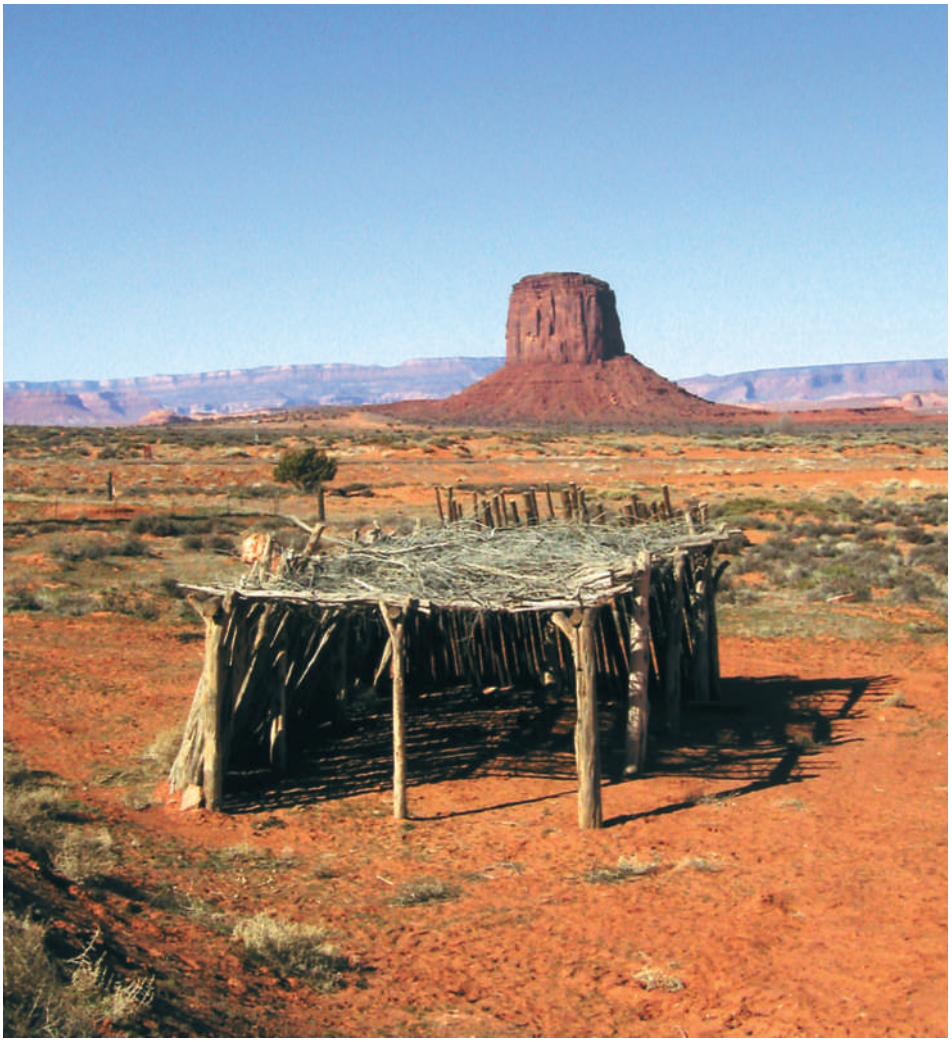
Adaptation and Survival

The Long Walk

In 1860, the Navajo attacked Fort Defiance, a post that had been established in their territory. As a result, the U.S. military planned the evacuation of the Navajo homeland, and forced resettlement of Navajo and Apaches at the Bosque Redondo (Fort Sumner) in eastern New Mexico, where they were to be taught how to become farmers. The plan, and subsequent "long walk" (of more than 270 miles), were carried out between 1863 and 1864; more than 8,000 Native Americans were led to Fort Sumner. The attempt at forced acculturation at Fort Sumner was a disaster; the land was unsuitable for farming and sheep herding, and there were inadequate supplies of water and fuel. Finally, in 1867, those held captive at Fort Sumner were allowed to leave, and a reservation that was created for them in 1868 contained less than 10% of the land they had originally used.

Despite their status as newcomers in this region and the reduction in their territory, however, the Navajo currently comprise one of the largest Native American tribes in North America, numbering around 200,000 members on a 17 million acre reservation that extends from southern Utah to the northern portions of Arizona and New Mexico. Hoover stated that "the solid block of Navajo reservation area included 25,000 square miles or 16,000,000 acres. Nine states of the United States are smaller. The real Navajo country, the country occupied chiefly by Navajo, comes nearer to 28,000 square miles, an area larger then Ireland." The land that was designated to the Navajo was land that was considered of no real

use or benefit. Some parts are considered desert, and other parts have intermittent trees. Over the subsequent years, this reservation land has been greatly expanded, removed, renegotiated, exchanged, and disputed, but the region of the land has generally remained constant.



Source: © iStockphoto/Paige Foster.

A Changing Way of Life

Following the failed experiment at Bosque Redondo, the Navajo way of life changed significantly. Continued contact with Pueblo culture certainly affected that change. Although the Navajo continued to supplement their diet with foraging and minimal hunting, reduced territory greatly affected their ability to continue to survive as hunter-gatherers. Sheep and goat herding increased in importance. Goat herds provided sources of meat, milk, and cheese, whereas the maintenance of sheep herds provided meat and the ever-important wool used for weaving blankets and garments. Some families also kept pigs and chickens to use for other food sources, as well as horses for transportation and for an additional meat source. Minimal farming of items such as corn, squash, beans, and melons was also a small aspect of changing Navajo subsistence strategies, but sheepherding eventually became the primary focus of subsistence strategies.

Although herding still continues, much of the economic survival of the Navajo today depends upon artistic traditions such as silversmithing, especially with turquoise; hand-woven blankets, rugs, and garments; and pottery. The Navajo learned silverworking from the Spanish and pottery-making from their Puebloan neighbors, and both of these crafts are certainly coveted by collectors. The beautiful baskets, rugs, and blankets woven by the Navajo are one of the signatures of their culture. These crafts are typically the art of women, and even though weaving provides significant economic assistance to the Navajo, its significance is so much more than economic. The Navajo have a history of myths that continues to inspire them in daily life; weaving is one aspect of that inspiration. As McPerson noted, "The knowledge associated with it originated in the times of the Myths, when Spiderwoman taught the first Navajos this trade."

> Spider Woman instructed the Navajo women how to weave on a loom which Spider Man told them how to make. The crosspoles were made of sky and earth cords, the warp sticks of sun rays, the healds of rock crystal and sheet lightning. The batten was a sun halo, white shell made the comb. There were four spindles; one a stick of zigzag lightning with a whorl

of cannel coal, one a stick of flash lightning with a whorl of turquoise; a third had a stick of sheet lightning with a whorl of abalone; a rain streamer formed the stick of the fourth, and its whorl was withe shell. (Navajo Legend)

The Hogan

Stephen Jett noted that "despite modifications during the several centuries that the Navajo (Dine) have inhabited the Southwest, basic Navajo settlement practices derive from those of the Navajo Northern Canadian Athapaskan hunting and fishing forebears who migrated to the Southwest." A distinctive feature of Navajo material culture is the hogan, a traditional domed dwelling that today is used almost exclusively for ceremonial purposes. Hogans are generally one-room structures made of wooden poles, tree bark, and mud with doorways always facing east. The entrance faces the rising sun because the hogan is designed to symbolize the security of shimah (the Navajo mother or the earth). On reservation lands, hogans are often still used as residential structures, but their use for this purpose is decreasing. These domed, mud structures can also often be seen in the back yards of city Navajo, although plywood and lumber versions are becoming common in such locales. Despite the persistence of the hogan as a ceremonial structure, Navajo spirituality has changed over the years.

Spirituality

A distinctive feature of Navajo religion is the sand paintings created during a ritual in order to ascertain the cause and cure of a malady that may be spiritual, physical, or emotional. The sand paintings are filled with a religious symbolism that is indicative of the nature of Navajo spirituality today. They frequently feature images or embodiments of the First Man and First Woman. Interestingly, the Navajo origin myths embodied in these sand paintings share much with the Christian story of creation. It is such similarities that allow for spirituality that blends Christian beliefs with traditional ones. "Most native Americans believe the universe has some kind of Almighty, a spiritual force that is the source of all life. The sun is viewed as the power of the formless and exists in the universe. The sun is viewed as the power of the Almighty." It is said that the Indians do not worship the sun but the symbol for which it stands. They look at the land on which they live in the same way; they often feel that the land has some kind of life and power, and that it is a deity in itself. McPherson said that "the Navajo perception of their land was rooted in their belief that it was imbibed with power and religious significance. The earth was a living breathing entity that nourished, blessed, healed and protected its people." Rather than existing in conflict with, such traditional ceremonialism exists side by side with the practice of Christianity. It is this side-by-side existence that allows for the malleability of the Navajo culture.

The Present Day

The Navajo contribution during World War II continues to demonstrate the flexibility of the Navajo and the richness of their culture. Navajo soldiers served as "Code Talkers" during this war. Their role was in secret communications because the language of the Navajo was recognized as an impermeable military code. The Navajo language was so complex that with every syllable change, the meaning of the words changed. This made the Navajo a great asset to the United States. During this war, they fought in battles as well as used their language to code secret messages to other parts of the Army. Despite their ill fate during the early years of European colonization, the Navajo took an active part in World War II. They volunteered for service and fought overseas battles, while the women worked for the Red Cross on the Navajo reservation. These brave men and women have only just been recognized by the United States. In July 2001, more than half a century after the end of the war, the original 29 Navajo Code Talkers who developed the code were given the Gold Congressional Medal of Honor.

Following World War II, cultural changes emerged in the Navajo nation. In modern times, although sheep and goat herding are still carried out and crafts are still produced for sale to tourists, much economic revenue on the Navajo reservation is generated from the extraction and processing of oil, coal, and timber. The importance of these commodities and the amount of revenue they generated led to the formal creation of a self-governed Navajo tribal council. The Navajo gained authority over education, health services, cultural resources, and other important aspects of culture as they created a new infrastructure. Today, the Navajo Nation Council has grown into the largest and most sophisticated American Indian government in the United States.

The story of the Navajo is one of strength and perseverance. Once strangers in a new land, they have

shown that through adversity, they are survivors, accepting change yet maintaining key traditional values. The continuing success of the Navajo nation is certain because of this persistence.

— Caryn M. Berg and Seth Williamson

Further Readings

Griffin-Pierce, T. (2000). *Native peoples of the Southwest.* Albuquerque: University of New Mexico Press.

Hoover, J. W. (1937). Navajo land problems. *Economic Geography, 13,* 281–300.

Jett, S. C. (1978). The origins of Navajo settlement patterns. *Annals of the Association of American Geographers, 68,* 351–362.

Jevec, A., & Potter, L. (2001). The Navajo code talkers: A secret World War II memorandum. *Social Education, 65,* 262–268.

McPherson, R. (1947). *Navajo land, Navajo culture.* Norman: University of Oklahoma Press.

Oswalt, W. H., & Neely, S. (1999). *This land was theirs: A study of Native Americans.* Mountain View, CA: Mayfield.

Nazca Culture

Nazca culture, also known as Nasca, flourished in southern Peru during the period around A.D. 1 to A.D. 700. The Nazca culture emerged in distinct stages: Early, Middle, and Late, with a Classic period between A.D. 250 and A.D. 750, the time during which the Nazca lines were constructed. From studies of ceramic designs in the region, archaeologists assert that Nazca culture appears to have developed out of the Paracas culture before it. Additional archaeological evidence shows that after A.D. 900, the Nazca apparently fell under the Tiahuanaco culture influence until the Inca eventually conquered the entire region in the 15th century.

Nazca agricultural settlements were located in the Nazca, Pisco, and Ica River valleys on the desert coast. Nazca farming was possible on the desert because of the irrigation systems they constructed to bring water down from the mountains. In addition to their crops and animal husbandry, the Nazca relied on hunting and fishing. In the 1930s, aerial exploration of the desert land surrounding the Palpa Valley revealed a remarkable network of lines and trapezoids. The lines formed giant animals, flowers, plants, and human figures. Through radiocarbon dating and the resemblance of the geoglyphs to pottery designs, archaeologists were able to identify the lines as Nazcan. Anthropologists further theorize that these figures were built to be seen by giant condors, which the Nazca people believed brought the rains to their desert croplands. The lines are also thought to be related to Nazca astronomy and to collectively form a giant calendar. Some 300 figures, well preserved, cover nearly 400 square miles of the desert pampa sand, where there is little rain or wind to erode the ancient past.

Nazca artisans excelled in their production of beautiful ceramics and textiles. Highly polished, expertly designed, and polychrome painted, the pottery of the Nazca is unlike that of any other Peruvian culture known. Nazca textiles show multitudes of weaving techniques and exemplary skills in dyeing with several shades of the same color. Archeological excavation reveals that both coastal cotton and highland alpaca wool were used in Nazca textiles. The Nazca also traded with other cultures in the region.

Although some theorists argue that the Nazca were a violent and warlike pre-state people, no crucial evidence has been found to support this claim. The Nazca engaged in regional warfare only to protect

Source: © Yann Arthus-Bertrand/CORBIS.

their territory. Long before the encroachment of Europeans, the Nazca were assimilated into other cultures. Their lives lived on, however, in local legends and lines until archeologists reconstructed their culture and its role in the development of later and larger empires. The Nazca are now understood to have contributed greatly to the development of subsequent state societies through (a) complex irrigation systems, (b) weaving technologies from cotton grown on the coast and alpaca raised in the mountains, and (c) the production of pottery for food storage and trade.

— *Adam Nurton*

Further Readings

Browne, D. M. (2002). *The Nascas.* Oxford, UK: Basil Blackwell.

Scarre, C. (1997). *Ancient civilizations.* New York: Longman.

Silverman, H. (2002). *Ancient Nasca settlement and society.* Iowa City: University of Iowa Press.

Neandertal Burials

Although it is possible that early humans buried their dead for purely hygienic reasons or to discourage scavengers, many anthropologists view intentional burial as a kind of symbolic behavior. Some have even suggested that it represents the earliest evidence of religion. Therefore, it is understandable that the subject of Neandertal burials is a controversial one. Although not always explicit, this controversy is linked to different perceptions regarding Neandertal cognition and intelligence. It is also rooted in the debate over modern human origins and the "humanness" of Neandertals.

In general, opinions among anthropologists fall within three camps. First, some anthropologists believe that all evidence for Neandertal burials can be explained by natural processes. They claim there is no scientifically sound evidence that Neandertals buried their dead. Second, other anthropologists accept that Neandertals may have buried their dead occasionally and sporadically. They believe the motives behind Neandertal burials were different from those of modern human burials (for example, practical vs. symbolic). Finally, still other anthropologists believe that the characteristics of, and motivation behind, Neandertal and anatomically modern human burials were the same, suggesting that the cognitive capacities of the two groups were similar, if not identical.

Much of the disagreement over whether or not Neandertals buried their dead is linked to different standards used to identify a burial. For some, the criteria may be quite simple. For example, good preservation may be enough for some anthropologists to conclude that an individual was intentionally buried. Others require more rigorous criteria, such as the position of the body (flexed), evidence of a burial pit, grave markers, and/or inclusion of grave goods. Although not the most popular view, some anthropologists claim that one must completely disprove the role of natural processes in order to properly interpret a skeleton as a burial.

More Neandertal sites lack rather than possess evidence of intentional burial. Generally speaking, Neandertal burials are simpler than those of later Upper Paleolithic humans. When present, the burial pits associated with Neandertal skeletons are shallow, and some clearly have a natural origin. Only about half of the Neandertal burials include possible grave goods (for example, stone tools, animal bones, and/or pigment). Because these grave goods are not very different from the items found in the surrounding deposit, it is difficult to rule out the possibility that the items were accidentally included in the grave fill. This contrasts sharply with graves associated with later Upper Paleolithic European burials, which often contain large numbers of art objects and are clearly contained in a pit of human manufacture. The most convincing evidence that Neandertals occasionally buried their dead is that many of the skeletons, especially those of juveniles and infants, are well preserved.

If we use the somewhat looser criteria of most anthropologists, there are approximately 20 Neandertal sites for which there is probable or certain evidence for one or more intentional burials. Some of the better known sites are discussed below.

In 1908, at the site of La Chapelle-aux-Saints, France, a Neandertal skeleton was excavated from a large, roughly rectangular depression. The "old man from La Chapelle" was the first Neandertal skeleton to be interpreted as deliberate burial. The skeleton was well preserved and nearly complete, found lying on its back in a tightly flexed position. Animal bones may have been included as grave goods.

Not long after (1908 and 1914), two individuals, a young adult and an infant, were excavated from another

French site called Le Moustier. Both individuals are said to have been intentionally buried. Le Moustier 1, the young adult, is hypothesized to have been laid on a pillow of stone artifacts. Le Moustier 2, the nearly complete skeleton of an infant, was associated with a shallow pit, but its excellent preservation is the strongest evidence that it was intentionally buried.

Between 1909 and 1920, two nearly complete and five fragmentary Neandertal skeletons were excavated at Le Ferrassie, France. Although La Ferrassie 1 (an adult) was not associated with a grave, it has been interpreted as a burial based on its flexed position and the presence of three limestone blocks near its head and shoulders. A year later, a second adult (La Ferrassie 2) was found only a half-meter from the first. La Ferrassie 2 was positioned head-to-head with La Ferrassie 1, and evidence suggests that both were buried at about the same time. As excavations continued, two immature individuals were discovered. La Ferrassie 3 is the partial skeleton of a 10-year-old. La Ferrassie 4 is the skeleton of a newborn infant. Both were discovered in shallow pits. Their association with burial pits and their good preservation has been considered evidence of intentional burial. La Ferrassie 5 was found beneath one of nine meter-sized, cone-shaped mounds that have been assumed to be ritually placed. La Ferrassie 6 consists of the partial skeleton of a 3-year-old child. The skeleton was discovered in a very large pit. Some anthropologists believe that the cranium—which was found 1.25 m away from the body—had been ritually removed.

Excavated in 1939, the burial at Grotta Guatarri, Italy, consisted of an irregular ring of rocks surrounding a Neandertal skull that was missing the base of the skull. The rock ring has been interpreted as being ritually placed. The missing skull base has been interpreted as evidence that Neandertals extracted the brain as part of a cannibalistic ritual. However, the skull lacks evidence of human butchering, and it is possible that carnivores, rather than humans, were responsible for the damage. In addition, some have questioned the placement of the skull inside the ring, because it had been moved and replaced before it was seen by scientists.

One of the most famous Neandertal burials comes from Shanidar Cave in Kurdistan, Iraq. Excavated in the 1950s and 1960s, most of the individuals at Shanidar are presumed to be burials based on the position of their bodies, their preservation, or their association with alleged grave goods. Of these, Shanidar 4 (the flower burial) is the best known. The discovery of a substantial quantity of flower pollen in the soil surrounding the individual led to the conclusion that the individual was buried ceremoniously with flowers. Skeptics of this interpretation point out that the accumulation of the flower pollen could be the result of rodent activity rather than mortuary ritual.

Another possible Neandertal burial was found in 1938 at a site called Teshik Tash in Uzbekistan. Teshik Tash consists of a partial skeleton of a 9-year-old Neandertal child. It has been hypothesized that the individual was buried in a shallow grave and subsequently surrounded by ritually placed goat horns. Skeptics, however, claim that the child's bones had been disturbed by scavengers, which suggests that its (natural) burial occurred some time after its death. The evidence for a grave—intentional placement of the goat horns—has also been questioned by some.

Although not uncritically accepted, the hypothesis that Neandertals at least occasionally buried their dead appears to be supported. Exactly what this means—in terms of religion, symbolism, and ultimately the humanness of Neandertals—probably will not be resolved any time in the near future.

— Shara E. Bailey

Further Readings

Belfer-Cohen, A., & Hovers, E. (1992). In the eye of the beholder: Mousterian and Natufian burials in the Levant. *Current Anthropology, 33,* 463–471.

Gargett, R. H. (1989). Grave shortcomings: The evidence for Neandertal burial. *Current Anthropology, 30,* 157–190.

Riel-Salvatore, J., & Clark, G. A. (2001). Grave markers. *Current Anthropology, 42,* 449–479.

Neandertal Evidence

Neandertals made their appearance midway through the 19th century, at a critical moment in intellectual history, when old but comfortable ideas about the human past were beginning to fall apart and new but shocking ideas (such as evolution) were coming in. The old ideas did not explain Neandertals. The new ones, which could, were generally poorly understood. Therefore, no one was prepared for the sight of a

Source: Courtesy, Harry Nelson.

primitive-looking skeleton in the human closet. But when such a skeleton appeared in Germany in 1856, in the Neander Valley (or Neandertal in old German), it brought on a sense of denial to its connection to *Homo sapiens.* The workmen, who had blasted open a small cave in their search for limestone, never realized the significance of their find.

Neandertals and present-day *Homo sapiens,* although they have many similarities, have significant anatomical differences. Neandertals lived 100,000 to 35,000 years ago and are considered by many to be a direct relative of modern humans. Over the past two decades, new analyses of fossil remains and sophisticated models have shown greater anatomical differences between humans and the Neandertals. The Neandertal's bone and ligament size are much greater and thicker than ours. Their arm, leg, shoulder, and even finger bones were very thick and durable to deal with their harsh conditions. These findings have also led to new conclusions concerning the behavior of Neandertals, such as their ability to care for the sick and weak, and also the possibility of aggression within the species itself, both of which are modern human qualities. Neandertal's place in human evolution has been both strengthened and weakened by this relatively new information.

All muscles that go from the shoulder blade to the upper end of the arm demonstrate massive development in the Neandertals, particularly the muscles responsible for powerful downward movements of the arm and muscles that stabilized vigorous shoulder movements. Because the skeleton must be capable of supporting increased levels of stress within its environment that are frequently several times as great as body weight, the enlarged attachments for muscles and ligaments are associated with leg bone shafts that have been reinforced. The shafts of all of the arm and leg bones are tubular structures that have to absorb stress from bending and twisting without fracturing. The Neandertal's ligament surface area was also greater than a modern human's, therefore effectively reducing the force per square unit of pressure on its joints and cartilage to deal with increased levels of stress.

Between 1953 and 1960, anthropologist Ralph Solecki of Columbia University excavated a series of partial skeletons from Shanidar Cave in northern Iraq. From studies on these skeletons by Dale Stewart, an anthropologist at the Smithsonian Institute, and Erik Tinkhaus, they discovered that several of the skeletons showed signs of trauma during their life. The left ninth rib of the skeleton at Shanidar 3 showed a partially healed wound by a sharp object. The position of the wound on the rib, the angle of incision, and the cleanliness of the cut make it unlikely that the injury was inflicted accidentally. It appears exactly like a wound inflicted by a right-handed adversary in face-to-face combat. Many finds from the Neander Valley, La Chapelle, and La Quina have all shown signs of trauma, but the interesting fact lies in that, despite these traumas, the Shanidars did not die until they were somewhere between 40 and 60 years old, providing evidence that individuals were taken care of long after their economic usefulness to the social group ceased.

Neandertals, therefore, are anatomically quite different from modern humans, but behaviorally, they show many similarities. Neandertal limbs and ligaments were tougher, thicker, and stronger than our own to deal with the harsher conditions they faced, such as hunting and defense from predators. Their arms, fingers, and legs were able to handle increased

levels of stress, showing they led very active lives. Behaviorally, however, a Neandertal was quite similar to *Homo sapiens.* Signs of trauma, perhaps caused by other Neandertals, were found at Shanidar Cave, revealing aggression much like that of our own species today. The fact that some of the Neandertals lived to a relatively old age, despite these traumas, details their ability to care for the injured or weak long after their usefulness to the group ended, just as we do today. Neandertals are a key link in human evolution, and many of our modern traits can be discovered in this species. Perhaps with time, we will discover that we have even more similarities with them.

— *Ken Gutwein*

Further Readings

Brace, C. L. (1964). The fate of the "classic" Neandertals: A consideration of hominid catastrophism. *Current Anthropology, 5*(1), 3–43.

Eiseley, L. (1957). Neandertal man and the dawn of human paleontology. *Quarterly Review of Biology, 32*(4), 323–329.

Solecki, R. S. (1971). *Shanidar: The first flower people.* New York: Knopf.

Trinkaus, E. (1978). Hard times among the Neandertals. *Natural History, 87,* 58–63.

Neandertal Sites

Neandertal sites are found throughout most of Europe, in Western Asia, and in parts of Central Asia. In the early and mid-1900s, anthropologists Franz Weidenreich and Aleš Hrdlièka proposed that all modern humans went through a Neandertal stage of evolution. Under this model, all Middle Pleistocene hominid fossils that were morphologically intermediate between *Homo erectus* and anatomically modern humans were referred to as Neandertals. Thus, literature in the mid- and later 20th century may refer to Asian or African Neandertals, but this has generally fallen out of practice.

Neandertals are often thought of as cave dwellers because most sites are discovered in rock shelters and caves. However, it is important to remember that certain biases may be partially responsible for the distribution of Neandertal sites on the landscape. For example, there is a bias toward finding fossils in caves and rock shelters where they are better protected and more likely to be preserved. Moreover, the number of sites discovered in Europe is at least partially a result of European historical interest in (and thus interest in finding evidence for) human evolution.

The first Neandertal recognized as such was found at Feldhofer Cave in the Neander Valley near Dusseldorf, Germany. It is for this site that Neandertals were named (valley = *Tal* in German). Feldhofer 1 was discovered in 1856, 3 years before Charles Darwin published *On the Origin of Species.* Without any evolutionary framework in which to interpret the fossils, they were first believed by Johann Fuhlrott to represent an extinct human race that was replaced by the ancestors of modern Germans. In contrast, the famous biologist Rudolf Virchow believed the Feldhofer specimen was a pathological modern human. Still others believed the bones were the remains of a Cossack from the Napoleon Wars. The original fossils from Feldhofer Cave included a skull cap and a partial postcranial skeleton. Excavations at Feldhofer Cave have been recently reopened, and additional remains of Felhofer 1, together with those of other individuals, have been recovered.

Although Neandertals were named for the Feldhofer site, the Feldhofer specimen was not the first Neandertal discovered. The cranium of a Neandertal child (Engis 2) had been discovered near Engis Village, Belgium, in 1829. Likewise, the cranium of an adult Neandertal from Forbes Quarry, Gibraltar, had been reported in 1848. However, as with the Feldhofer specimens, their evolutionary significance was not appreciated until much later.

The fossil from the site of La Chapelle-aux-Saints, France (discovered in 1908), has played an important role in how we view Neandertals. The Neandertal image—that of a hunched over, bent-kneed, awkward-looking caveman—can be traced to Marcellin Boule's inaccurate reconstruction of this fossil published between 1911 and 1913. Boule believed that Neandertals played no part in human evolution. Thus, it is no surprise that he would describe Neandertals as intellectually inferior despite this specimen's cranial capacity of more than 1600 cc (well above the modern human average of 1450 cc). However inaccurate, this negative image has been difficult for Neandertals to shed. We now know that La Chapelle-aux-Saints ("Old Man from La Chapelle") was a severely arthritic old man whose bent posture

was the result of the disease. As such, it was not representative of Neandertals as a whole.

Since these early discoveries, thousands of Neandertal sites have been discovered. Not all Neandertal sites are associated with fossils, however. In fact, most have been identified on the basis of Middle Paleolithic or Mousterian tools. Indisputable Neandertal remains are currently known from more than 80 sites dating to between 130,000 and 28,000 BP. They span Europe and parts of Western and Central Asia.

Among the most ancient Neandertal sites are Krapina, Croatia (130,000 BP), and Saccopastore, Italy (120,000 BP). The Krapina remains were excavated between 1899 and 1905. They represent one of the largest collections of Neandertal fossils, with close to 400 cranial and mandibular fragments and nearly 200 teeth. The Saccopastore individuals were excavated in 1929 (Saccopastore 1) and in 1935 (Saccopastore 2). Saccopastore 1 is a nearly complete adult cranium and Saccopastore 2 is a less complete adult cranium.

The two most recent Neandertal sites comprise the fossils from Zafarraya, Spain (27,000 BP), and Mezmaiskaya in the northern Caucasus, Russia (29,000 BP). Excavated in the early 1980s, the fossils at Zafarraya play a pivotal role in the hypothesis that the Iberian Peninsula was a refugium for late surviving Neandertals. The individuals at Mezmaiskaya are also quite recent. Excavated between 1987 and 1997, the specimen that has received the most attention is an infant dating to 29,000 BP. Mitochondrial DNA extracted from the infant shows that it is very similar to DNA extracted from other (geologically older) Neandertals, indicating little genetic change in the species over time.

Outside Europe, excavations above the Wadi Amud, Israel, took place in the 1960s and were resumed again in the 1990s. Two important fossils are known from this site. Amud 1 is the tallest known Neandertal (1.8 m or 5'8") with the largest cranial capacity (1740 cc). Amud 7 is a 10-month-old infant, which demonstrates that distinctive Neandertal cranial morphology is present even in very young individuals. Both date to approximately 40,000 to 50,000 BP and are presumed to be burials. Excavations in Tabun Cave, Israel, took place between 1969 and 1971. The fossils from Tabun may be as old as 120,000 years. The Neandertal fossils from Shanidar, Iraq, excavated in the 1950s and 1960s, date to 70,000 BP. The site is notable for (among other things) the number of skeletons discovered (seven) and for their alleged status as Neandertal burials, including the famous "flower burial" (Shanidar 4).

Further east, in Uzbekistan, a site named Teshik-Tash (70,000 BP) is the easternmost Neandertal site known to date. Here, a 9-year-old child was discovered in 1938. It is frequently cited as an example of Neandertal burial because of its association with presumed ritual placement of goat horns.

Finally, one of the most recently discovered Neandertal fossils comes from a site not far from Teshik-Tash. The fossils from Obi Rakhmat (published in 2004) consist of cranial fragments and teeth from two individuals. The analysis of these fossils is not complete, but initial results suggest that they are somewhat different from those Neandertals found in western Europe. This indicates that geographic variation existed among Neandertals, just as it does among modern humans today.

From the discovery of the first Neandertal, our image and interpretation of these enigmatic humans has been changing. Excavations of Neandertal sites, both old and new, are ongoing. There is no doubt that new fossils will continue to come to light and shape our understanding of Neandertals for decades to come.

— *Shara E. Bailey*

Further Readings

Gamble, C. (1999). Gibraltar and the Neandertals 1848–1998. *Journal of Human Evolution, 36,* 239–243.

Johanson, D., & Edgar, B. (1996). *From Lucy to language.* New York: Nevraumont.

Mellars, P. (1996). *The Neandertal legacy.* Princeton, NJ: Princeton University Press.

Ovchinnikov, I. V., Gotherstrom, A., Romanova, G. P., Kharitonov, V. M., Liden, K., & Goodwin, W. (2000). Molecular analysis of Neandertal DNA from the northern Caucasus. *Nature, 404,* 490–493.

Tattersall, I. (1995). *The last Neandertal: The rise, success and mysterious extinction of our closest human relatives.* New York: Macmillan.

NEANDERTALS

Neandertals were a morphologically distinct human population that existed in Europe and Western Asia from about 200,000 to 30,000 BP (before present). The first recognized Neandertal discovery occurred in

1856, when the remains of part of the skeleton of one individual was discovered in the Feldhofer grotto, in Neander Valley, near Düsseldorf, Germany. This material was recovered by quarry workers and set aside for a local teacher and amateur naturalist, Johann Karl Fuhlrott. Fuhlrott suspected that the find might be important and took the material to anatomist Hermann Schaaffhausen. The material was jointly announced in 1857, two years before Darwin published *The Origin of Species.* The term *Neandertal* is derived from the species designation *Homo Neandertalensis,* given to the material by William King in an 1863 meeting of the British Association. Feldhoffer was the first recognized Neandertal discovery, but in later years, other earlier finds were placed within the Neandertal clade, including the Engis child discovered in Belgium in 1829, and the Forbes Quarry material discovered in Gibraltar in 1848.

Early History

Early interpretations of Neandertals were marred by misrepresentation and misdiagnoses of the nature of the anatomical features seen in the material. In the early years after the Feldhofer discovery, many researchers did not even recognize the antiquity of the material. For example, in 1872, Rudolf Virchow published a report claiming that the Feldhofer individual was simply an early 19th century Mongolian Cossack afflicted by rickets, a view originally proposed by Geheime-Rath Mayer soon after the material was announced. Once the antiquity of the Neandertals was established, researchers began to develop hypotheses regarding who the Neandertals were and what relationship they had to modern human beings.

While many proponents of Darwin's theory of descent with modification were willing or even eager to accept the Neandertal material as evidence of an intermediate in our evolution, the prevailing view quickly became that Neandertals were much too primitive in form to be directly related to modern human beings. This development could be considered an unhappy circumstance, as the more spectacular Neandertal discoveries in France overshadowed the description of the large, fragmentary Krapina sample from Croatia. Furthermore, several important French finds at this time, such as Le Moustier and La Chapelle-aux-Saints in 1908, La Ferassie in 1909, and La Quina in 1911, were published in a sequence that became quite detrimental to the interpretation of Neandertals for years to come. The description of Le Moustier was delayed and incorrectly reconstructed, while La Ferassie was trusted to Marcellin Boule, who was preoccupied with the description of La Chapelle. When Boule published his description of La Chapelle, it overshadowed the La Quina find and quickly became the penultimate description of Neandertal morphology. Unfortunately, La Chapelle was an elderly individual suffering from a variety of ailments, and Boule interpreted the material to mean that Neandertals were bent-knee walking brutes with little intelligence, much closer to apes than modern humans. This view of Neandertals dominated in academic circles until after World War II.

Boule had created the typological characterization of Neandertals based on one of the most atypical Neandertal specimens known: an older individual afflicted by a suite of pathological conditions. While the French Neandertal material created the dominant image of Neandertals, the Krapina assemblage was also available to these early researchers, an assemblage that not only clearly indicated that the anatomy of La Chapelle was not typical of Neandertals, but one that gave a sense of the wide range of variation seen within this population. The lack of the recognition of this variation underlay much of the early work that unequivocally dismissed Neandertals from the ancestry of modern humans.

Morphology of the Neandertals

The question of what makes an individual a Neandertal is a difficult one to answer because, while many *autopomorphies* or unique derived characters have been proposed for the Neandertals over the years, none are true autopomorphies. Some proposed features are characteristic of Neandertals from only particular geographic regions, many are found in some modern human populations in varying frequencies, and others are known to be present in more archaic populations and represent primitive characteristics. Regardless of the degree of contribution to the modern human genome, the Neandertal morphotype is essentially a matter of character frequency rather than a matter of unique derived characters. While the Neandertals apparently lack true autopomorphies to distinguish them from modern humans, the suite of character traits found in Neandertals do distinguish them as a distinct group, either as a racial variant or as a closely related sister clade to modern humans.

The typological perspective common in treatments of the differences between Neandertals and modern humans is unfortunate in that it impedes an appreciation for normal variation seen in individuals within a population. As noted, there are no true autopomorphies in Neandertals that unequivocally exclude them from having had gene flow with contemporary populations in other parts of the world or from contributing to the Upper Paleolithic populations that follow them. This creates a quandary when we compose a list of morphological characteristics that distinguish Neandertals, as there are not many features that we can use to distinguish them from their ancestors, from contemporary populations, and from modern humans at the same time. Instead, we make a more useful distinction when we compare Neandertals to these other populations individually and describe how they differ from each group as opposed to the characters that distinguish them as a group.

Although we cannot overstate the importance of viewing characteristics of Neandertal morphology from the perspective of evolutionary trends rather than simple typology, a number of general morphological features characterize Neandertals inclusively. Lambdoidal flattening at the rear of the parietals and top of the occipital creates a short vertical face to the occipital, forming the characteristic "bunning" seen in Neandertal crania. This feature results in the elongation of the cranium, so that the central limit of the nuchal muscles is delineated by small pits on the occipital called suprainiac fossae, rather than the external occipital protuberance on the vertical surface, as seen in modern humans. The suprainiac fossae are generally superior to another Neandertal characteristic, the occipital torus, which is a bony ridge that runs horizontally along the occipital. Another consequence of the cranial elongation seen in Neandertals is the position of the foramen magnum more anterior relative to the position of the external auditory meati. In earlier pre-Neandertals as well as in modern humans, when a line is drawn between the external auditory meati, the foramen magnum is positioned posterior to the line, but in Neandertals the foramen magnum is positioned much more anteriorly, so that the line passes behind the foramen magnum. This positioning improves the leverage of the sternocleidomastoid muscles, which act to turn the head and stabilize the head during anterior teeth use. The improved leverage in Neandertals results in a reduction of the strength of the muscles needed to perform these actions, and, therefore, a reduced attachment area represented by a reduced mastoid process. While the mastoid process is reduced in size in Neandertals, the juxtamastoid process just medial to the mastoid process is well developed, often larger than the mastoid process. This area marks the attachment site for the digastric muscle, which retracts the mandible, suggesting an adaptation to anterior tooth loading. These changes to the temporal region may be partially responsible for the inner ear morphology seen in Neandertals that Fred Spoor claims as a potential autopomorphy in Neandertals.

Neandertals are also characterized by a well-developed supraorbital torus. This bar of bone across the top of the eye sockets is much reduced relative to earlier pre-Neandertals and is formed by two arches that follow the contour of the orbitals with a supratoral sulcus separating them. The reduction relative to earlier forms is a consequence of absolute reduction in robusticity, as well as the frontal rising more anteriorly. In Neandertals the supraorbital torus is characterized by the expansion of the frontal sinuses. The maxillary sinuses are also expanded in Neandertals, creating a puffy midface appearance on either side of the nasal aperture, such that most Neandertals lack a canine fossa. The zygomatics are swept backwards, facing much more laterally than seen in non-Neandertal populations. Another prominent feature of Neandertals is their large nose. Neandertal noses are characterized as both very wide and very tall, with the wide nasal breadth apparently a feature inherited from their ancestors and the increased nasal height a Neandertal character. Considered together, these features combine to give Neandertals the appearance of well-developed midface prognathism.

The mandible form also shows a number of features we use to characterize Neandertal morphology. Most individuals have a retreating mandibular symphysis, thereby lacking a mental eminence or chin. The lack of a chin is widely used as a peculiar Neandertal trait, but many later Neandertals have some degree of development of this feature, and many archaic *Homo sapiens* lack a well-developed mental eminence. Many Neandertal mandibles have a retromolar space, which is a space on the horizontal ramus of the mandible between the distal surface of the third molar and the anterior border of the ascending ramus. The horizontal-oval morphology of the mandibular foramen on the internal surface of the ascending ramus is another trait characteristic of Neandertal mandibles.

This morphology is created by the strong development of the sphenomandibular ligament insertion site, thus, probably related to the strong masticatory musculature of the Neandertals.

Neandertals have relatively reduced postcanine dentition compared to their antecedents, but their size is larger than that seen in most modern human populations. The anterior dentition of Neandertals, however, is enlarged over any earlier, contemporary, or later humans. Characteristic wear patterns seen in many Neandertal individuals indicate that they probably used their anterior teeth as tools, likely for use as vices to clamp down on material that was being worked.

Neandertal brains have always been characterized as being absolutely large, with many researchers emphasizing that Neandertals had bigger brains than modern humans. This is not quite correct and is an interpretation that was influenced by several biasing effects. There are many more male than female crania among the known Neandertal specimens for which a cranial capacity may be confidently determined. With a degree of sexual dimorphism grossly similar to modern humans, this means that the mean cranial capacity is skewed toward the larger male size. For example, the middle sex mean for Würm Neandertals is approximately 1430 cc, a figure that compares favorably with many modern populations. In fact, when compared against body size, Neandertals are slightly less encephalized than modern humans. Neandertals had appreciably larger brains than their Middle Pleistocene ancestors, however.

In general, the postcranial morphology of Neandertals is little differentiated from that of modern humans. Almost all characteristics of the Neandertal skeleton fall within the modern human range, often most similar to modern cold-adapted populations such as Eskimo groups. Some of the features peculiar to Neandertals includes the morphology of the axillary border of the scapula and the shape of the pelvis. In modern humans, the axillary border of the scapula has a ventral thickening for the insertion of the teres minor muscles, while the majority of Neandertals have dorsal thickening indicating that the muscles insert on the back of the scapula along its lateral border. This feature has at times been argued as a Neandertal autopomorphy, but is actually present in early European modern humans and decreases in frequency in favor of first a bisulcate (dorsal and ventral thickening), then ventral pattern. There are also known examples of the dorsal morphology in modern humans of particular occupations and is quite likely more a reflection of behavior than ancestry.

The shape of the Neandertal pelvis differs slightly from that of modern humans. Unfortunately, the known Neandertal specimens are male, making it difficult to make statements relating the shape of the pelvis to birthing differences between Neandertals and modern humans. In Neandertals, the superior pubic ramus is long, thin, and relatively flattened. This morphology primarily acts to widen the pelvis at the front, rotating the blades of the pelvis outward along the hip joint. This difference causes very little difference in the depth of the birth canal, front to back, and therefore likely has little to do with adaptations to birthing larger headed offspring. Yoel Rak conducted a detailed analysis of the complete Kebara pelvis and argued that the differences in the shape of the pelvis relative to the position of the femur indicate stronger abduction movements in Neandertals relative to modern humans. The significance of the morphology of the Neandertal pelvis is still subject to quite a wide range of ideas and very little agreement. Most researchers agree, however, that there was likely very little substantive differences in Neandertal gait and that such relatively minor differences may very well be the result of behavioral locomotive patterns than genetic differences.

The relative limb lengths of Neandertals reflect cold-adaptation as predicted from Bergman's and Allen's rules. Compared to body length, Neandertals tend to have relatively shorter arms and legs and distal limbs that are short in proportion relative to proximal limbs. Scientists generally accept that these characteristics are a consequence of cold-adaptation and are similar although more developed to those seen in modern human cold-adapted populations. Neandertals also tend to have much deeper and wider chests than most modern human populations, reflected by the radius of curvature of their ribs and clavicles that are long relative to their stature. These features of thicker trunk size and shorter limbs are characteristic of the cold-adapted European Neandertals and do not particularly apply to the West Asian Neandertals. This indicates that these are yet more Neandertal characteristics that result from adaptation to their environment rather than real species differences between them and modern humans.

The shape of the Neandertal trunk and limbs may explain some researchers' claims that Neandertals

were quite short, but, in reality, Neandertals show very little difference in height with modern humans. Neandertal males average 165 cm and females average 156 cm, slightly shorter (approximately one to two inches) than the European average but taller than many other modern human populations. Neandertal stature is approximately equivalent to pre-World War I French. Neandertals are not particularly short at all, simply heavily built with relatively shorter limbs reflecting cold adaptation.

Behavior of the Neandertals

Far more vigorously than differences in morphology, scientists and researchers continue to debate the cultural differences between Neandertals and early Upper Paleolithic modern humans. Evidence of behavior from the archaeological record is subject to a variety of interpretations that often reflect the bias of the researcher. Researchers who see Neandertals as significantly different from and perhaps inferior to early modern humans will invariably interpret sites and data conservatively with regard to behavioral complexity. In the same vein, researchers who view Neandertals as ancestral to later European populations consistently interpret sites and data as showing high degrees of mental and social complexity. As in all such polarized intellectual debates, there resides a middle ground.

While scientists continue to debate the degree of complexity shown by Neandertals, evidence points to a definite increase in complex behavior from the beginning to the end of the Middle Paleolithic. For example, most known Neandertal burials come from the later Middle Paleolithic, with many of them representing the classic Neandertals of France (70,000–35,000 BP). Although a few researchers question whether these burials are deliberate, the majority of researchers accept that burial was a common occurrence that became more common as Neandertals evolved over time.

We can relate behavioral complexity with other strong pieces of evidence, including

- the creation of structures at sites such as Lazaret (presumably for shelter)
- the presence of worn blocks of pigments such as red and yellow ochre or black manganese remnants in various cave sites (potentially for body adornment or for processing hides)
- pierced teeth and other beads and pendants from some later Neandertal sites (evidence for body adornment or totems)
- the flute found in Divje Babe Cave

Evidence of Neandertals' care of the sick, injured, or elderly comes from several sites where individuals show healing of cranial fractures whose seriousness likely meant the individuals were incapacitated for a period of time and, most convincingly in one male from Shanidar, who survived to maturity despite several crippling injuries that left one arm useless and also may have left him blind. While the significance of these pieces of evidence is arguable and a few researchers have vehemently challenged the validity of some of these examples, they are well-supported interpretations. As with some other anthropological sleuthing, however, the frequency of potential clues is very low, bringing up the question of whether the presence of isolated pieces of evidence for symbolic or complex behavior is enough evidence to support the contention that such behaviors were widespread, as they clearly were among later Upper Paleolithic people in Europe.

Researchers who question the strength of the evidence for such behaviors have good reason to be dubious. We know that a number of interpretations of Neandertal behavior were incorrect. For example, researchers have strongly criticized the widely reported Shanidar burial with flowers, the Teshik-Tash burial surrounded by goat horns, and the Neandertal bear cult. The presence of grave goods in many of the reported Neandertal burials is also suspect, considering that the so-called artifacts are no different than the debris found in surrounding sediments. While the presence of grave goods is unlikely, other mortuary practices may be indicated by the evidence for secondary burial and defleshing at Krapina, Kebara, and on several of the Neandertal infants.

One of the most important aspects of behavior for paleoanthropologists is subsistence behavior, in particular, meat-eating behaviors. These behaviors are important because they often leave direct evidence on fauna recovered from archaeological settings. This may be particularly important for Neandertals, as isotopic analysis of Neandertal remains indicate a very high level of animal protein, similar to that seen in high latitude indigenous Eskimo populations. The interpretation of Neandertal subsistence patterns has led to very disparate proposed behavioral and cultural

suites. Work by Mary Stiner on Italian cave sites indicated a shift in subsistence patterns from nonconfrontational scavenging prior to 55,000 BP supported by a head-dominated assemblage, to hunting behaviors after 55,000 BP supported by the presence of more complete carcasses of prime age. This work led to a flurry of speculation by researchers that earlier Neandertals were highly mobile foragers with wider geographic ranges and focused on opportunistic scavenging as well as exploitation of primarily high value foods. This argument was used to support a lack of foreplanning by Neandertals, essentially intimating roving bands of dim hominids eating whatever was available and moving on when food ran out. Only near the end of their existence did Neandertals focus on more residential behavior with less expedient tool use, wider exploitation of food resources, and active hunting of particular game. However, the assemblages on which these analyses were conducted were earlier in the century. Curtis Marean made a convincing argument that changing excavation techniques artificially created the differences between the two time periods, and he followed the argument with analyses of other Middle Paleolithic sites that have been excavated with different procedures that showed no evidence of scavenging as a major subsistence pattern in Neandertals. This interpretation is convincing, considering the presence of spears as early as 450,000 BP at Schöningen, and many sites throughout the Middle Paleolithic show a single-species-dominated faunal assemblage indicative of selective hunting. In fact, Marean has found no meaningful difference in subsistence patterns between Middle and early Upper Paleolithic sites based on faunal collections. From the perspective of hunting behavior and carcass processing, the shift in tool technology does not necessarily mean a shift in subsistence behavior.

Other direct pieces of evidence for behavior in the Neandertals are the tools that they created and used. The designation of the Paleolithic stages is based upon technological types, and, therefore, the transition from the Lower to the Middle and the Middle to the Upper Paleolithic took place at different times in different places. The pre-Neandertals used the Acheulean industry that is associated with bifaces, stones flaked on both sides to create the cutting edge. The typical Acheulean form is that of the teardrop-shaped hand axe. As the Neandertals emerged approximately 250,000–200,000 years ago, there was a shift from the typical Acheulean industries to the Middle Paleolithic Mousterian industries. Mousterian industries are the principal technology associated with Neandertals. This industry appeared in various forms, including a Mousterian of Acheulean tradition that includes a large component of hand axes, as well as more complex forms with a high frequency of burins, side scrapers, points, and denticulates. Many of the Mousterian assemblages are associated with the Levallois technique of flake removal around a core, followed by blade removal from the center of the core across the dome created by peripheral flake removal. The Upper Paleolithic is associated with high frequencies of blades (flakes more than twice as long as wide) and common use of bone and antler rather than stone. The Middle to Upper Paleolithic transition was more of a transition in frequency of tool usage rather than the invention of new tool types, as Upper Paleolithic type tools have been found at varying frequencies from the Lower Paleolithic upward. While the differences may be more quantitative rather than the qualitative that is often described, there are particular identifiable features in Upper Paleolithic industries. There are two Upper Paleolithic traditions of primary importance in the discussion of Neandertals: the Châtelperronian and the Aurignacian. The Châtelperronian is definitively a Neandertal technology, while the origins of the Aurignacian are less clear. The Châtelperronian is characterized by backed bladelets, and while the Aurignacian was similar in many ways to the Châtelperronian, it was characterized by much more use of bone and antler in tool production, the creation of split backed bladelets, and barbed spear points with more developed hafting.

Many researchers have argued for a cultural revolution in the shift from the Middle to Upper Paleolithic, but the actual shift was more of a gradual change that occurred at various times across the European landscape. It may very well indicate more complex behavior, but, although the tools are seemingly more sophisticated, they are actually no more difficult to manufacture than Mousterian tools and do not seem to perform functions distinctly different than that of earlier assemblages. There are differences, and some hypotheses have been proposed to explain differential behavior, such as Olga Soffer's proposition that the need for more microblades was to thinly fillet meat for drying, allowing food storage. These behaviors do definitively occur later in the Upper Paleolithic, but during the important period of transition and the

disappearance of the Neandertals, there is little unequivocal evidence for these behaviors. The bulk of the information available on Neandertal culture does not lead to an unequivocal conclusion regarding Neandertal behavior and affinity, or lack thereof, with early modern humans.

Replacement of Continuity?

Two polarized positions—the *replacement model* and the *continuity model*—characterize the argument over the fate of the Neandertals. The extreme manifestations of these positions is that Neandertals were either summarily replaced by invading anatomically modern humans or that they evolved in situ into modern Europeans. As we have gained a better understanding of population genetics and speciation over the past several decades, scientists have abandoned completely the extreme continuity position, but with the development of mitochondrial DNA (mtDNA) studies of both modern human groups and several short Neandertal and early Upper Paleolithic modern human mtDNA sequences, more scientists have embraced the extreme replacement model. Although the extreme positions may be easiest to characterize, a wide range of hypotheses exist regarding the degree of potential interbreeding between Neandertals and populations of early moderns outside of Europe.

The argument involves three primary pieces of data: skeletal morphology, technological industries, and population genetics. Replacement models have their history in the erroneous description of La Chapelle by Boule and the initial discoveries of early modern humans that were thought to be direct ancestors of modern Europeans (for example, Galley Hill and Grimaldi). The contemporaneity of the Neandertals and early moderns led to the development of the Presapiens Hypothesis proposed by Boule and Sir Arthur Keith and later developed by Henri Vallois. The hypothesis posited that the lineage leading to Neandertals and the lineage leading to modern humans split early in the Pliocene (between 5–2 mya) and diverged along separate evolutionary trajectories. As newer finds were excavated and some older finds were shown to be misdated or fraudulent (such as Piltdown), the Presapiens Hypothesis gave way to the PreNeandertal Hypothesis, which suggested a more recent split just before the last glacial. The fundamental point of both theories was that early moderns and Neandertals coexisted in Europe at the same time. Thus, the Neandertals could not be ancestral to early modern humans.

During this time, following in the intellectual footsteps of researchers such as Carleton Coon and Ales Hrdlièka that pointed out affinities between Neandertals and later Europeans, Franz Weidenreich proposed a multiregional theory of human evolution. Weidenreich suggested that a single ancient form ancestral to all modern humans (and Neandertals) had spread across the Old World and had adapted to its own environments while sharing enough gene flow to maintain a single species, developing differences that are seen in geographic races today. In this candelabra view of human evolution, Neandertals are simply an ancient race of modern human beings that are directly ancestral to the population sharing the same geography as them, modern Europeans. In response, William Howell proposed the "Noah's Ark" model in which all modern humans developed from a more recently evolved form in Africa that then spread around the Old World, replacing indigenous ancient humans (such as the Neandertals).

In the 1960s and 1970s, the debate took on much of its modern form. Loring Brace pointed out that many of the apparent morphological differences between Neandertals and modern humans were not as extreme as some had claimed and that many of the features could be related to relaxation of evolutionary pressures to maintain robust structures via the development of more advanced technology. In Brace's arguments, Neandertals developed Upper Paleolithic technology and cooking technology that led to gracilization of cranial form that put them on a trajectory toward modern Europeans, not necessarily requiring any gene flow from "more advanced" forms from Africa and West Asia. Following Brace, Milford Wolpoff restated Weidenreich's multiregional model, focusing on regional characteristics seen in modern human populations and arguing that these differences appeared first in the regional *Homo erectus* populations and gene flow between regions maintained species integrity, ensuring that evolutionary trends were shared between all human populations. Shortly afterward, a group of researchers such as Christopher Stringer and Günter Braüer became convinced that the differences between modern humans and Neandertals were too great to be the result of "short" term evolution during the Middle to Upper Paleolithic transition. These researchers published a number of works highlighting the differences between Neandertals and

early moderns that showed that the modern human cranial form appeared first in Africa and spread into Europe, replacing the Neandertals. The Out of Africa and Multiregional model battle lines were firmly drawn at this stage. The proponents of replacement focused on the differences between Neandertals and moderns and argued that these differences were too great for the time period that it would take for the evolution from one to the other; they believed that the earliest modern forms occurred in Africa. The proponents of continuity focused on the similarities between the Neandertals and later modern humans and argued that there was a clear evolutionary trend leading from one to the other.

If we are to objectively analyze the relationship of Neandertals to the early moderns that succeeded them, we must review several pieces of paleontological and archaeological evidence.

1. With regards to technology, Neandertals are known to have created the Châtelperronian industry, meaning that they were capable of developing the technology characteristic of the Upper Paleolithic.

2. The earliest known modern humans associated with the Aurignacian postdate Neandertals in the geographic regions in which they are found. A number of intermediate sites in the 40,000–30,000 BP range exist where lithic materials are either unassociated with any human remains or are associated with undiagnostic fragmentary material such as isolated teeth. Some researchers have claimed these show Neandertal affinities and, alternatively, some have claimed they show modern human affinities. However, these remains are not diagnostic to group affiliation, making their use in either argument unconvincing.

3. Site usage patterns are often extremely similar in Middle and early Upper Paleolithic sites, as are subsistence patterns.

4. Early Upper Paleolithic modern humans show a variety of morphological characteristics that are unknown or rare among the few earlier African modern forms or in the early anatomically modern human forms from Qafzeh and Skhūl in West Asia but are widespread in Neandertals. These same features decrease in frequency through the Upper Paleolithic, Mesolithic, and Neolithic until they are rare or nonexistent in Europeans today.

5. The rate of evolutionary change needed to go from the Neandertal form to the early Upper Paleolithic modern human form is less than is known in the same features among later European moderns. Essentially, the time needed to evolve the modern form from the Neandertal form is a non sequitur, because it is based not on the differences between Neandertals and their immediate successors, but rather on either non-European contemporaries or modern Europeans.

6. A factor rarely considered is the glaciation cycle in Europe and the effect it had on depopulation in Europe. The Neandertals "disappeared" from much of Central and Eastern Europe during a time of extreme glaciation, and a similar gross reduction in human populations in Europe occurred during the last glacial maximum in the Mesolithic. These facts are difficult for the replacement without interbreeding models to deal with, as they seem to point toward Neandertals evolving toward the modern condition, perhaps with strong influx of non-European moderns during the last few interstadials when the ice sheets receded, exposing Europe to colonization with a much reduced indigenous Neandertal population. While comprehensive analysis of the archaeology and anatomy does seem to support the continuity argument, the development of the mtDNA data revolutionized the debate and shifted the consensus opinion squarely to the replacement camp, and created data that are particularly difficult for multiregionalists to satisfactorily explain.

In 1987, the journal *Nature* published a paper by three molecular biologists who argued that the known restricted variation in modern human mtDNA could be interpreted to mean that the ancestors of modern humans went through a genetic bottleneck in Africa between 280,000 and 140,000 years ago, and then spread throughout the rest of the world without intermixing with indigenous populations. The analysis was attacked on a number of grounds, but further analysis of mtDNA variation and distribution supported the initial claims, with only slight modification of the dates involved. The replacement proponents took this data as unequivocal support for the Out of Africa model of human evolution. In 1997, a small sequence of mtDNA was recovered and amplified from the original Feldhofer Neandertal individual by Svante Pääbo and colleagues. The variation in the sequence was at the very edge of known modern

human variation and statistically supported a split between the lineage leading to Neandertals and the lineage leading to modern humans between about 690,000 and 550,000 BP. Samples from several other Neandertal specimens and a few early modern humans were recovered that seem to strongly support the contention of an early split between the two lineages.

For many, this definitively answers the question of Neandertal ancestry for modern humans, with the new question how and why they became extinct. Scientists and researchers have put forth a number of arguments, including violent replacement of Neandertals by invading moderns, deteriorating conditions resulting in the decline of the Neandertals and the expansion of moderns into their previous geographic range, and indirect competition between the more behaviorally "primitive" Neandertals and the more "advanced" moderns leading to a decline and extinction of the Neandertal clade. Some researchers propose that absolutely no interbreeding occurred between populations, while others accept statistically insignificant interbreeding as a possibility, and others propose a "genetic swamping" of Neandertal genes by the much greater numbers of moderns leading to the eventual extinction of Neandertal mtDNA lineages rather than a complete lack of Neandertal ancestry for modern humans. This last position is functional similar to many multiregional models but differs on the issue of evolutionary trends toward modernity within the Neandertals and the degree of gene flow during earlier eras that link the two populations as species.

The debate is not so easily resolved, however, and many multiregionalists point to the fact that much of modern human nuclear DNA does not show the same pattern of extreme bottlenecking traceable to approximately 200,000 years ago. A number of analyses have given nuclear DNA coalescence dates much closer to one million years or more. Molecular geneticists have, however, attacked these analyses, and it is unclear whether they support multiregional claims. A greater problem with the molecular data is the nature of the data themselves. Studies on mtDNA bottlenecks are analyses of variation within particular sequences that have relatively well-known mutation rates. A coalescence date is determined by working backward from the variation seen in a population, presuming a constant mutation rate, to a single sequence with no variation. From the number of mutations needed and a generation time, we may calculate a time range. This method necessarily is unable to deal with the biological reality of expanding and retracting variation of varying strengths throughout evolution or stasis created from relatively stable population levels. The analytical method works best for evaluating the situation it is modeled after: a period of much reduced variation followed by a relatively stable period of expansion in variation to the modern level of variation. While the molecular procedures and analytical methods are becoming more advanced and providing greater confidence in the results themselves, the continuing question of many multiregionalists is what the significance of the results actually are in the context of complex population genetics.

Neandertals were the first nonhuman hominids discovered and have been the focus of some of the most strident debate in paleoanthropology. A seemingly endless number of morphological features, cultural characteristics, and, in modern times, genetic analyses have been used to either differentiate them from modern humans or include them as an ancient variant that contributed to modern humans. Often the questions asked about them are less a reflection of objective scientific inquiry about an extinct human population than a reflection of the most basic question in anthropology: What makes us human?

— Christopher David Kreger

Further Readings

Brace, C. L. (1995). *The stages of human evolution.* Englewood Cliffs, NJ: Prentice Hall.

Delson, E. (Ed.). (1985). *Ancestors: The hard evidence.* New York: Alan R. Liss.

Dibble, H. L., & Mellars, P. (1992). *The Middle Paleolithic: Adaptation, behavior, and variability.* Philadelphia: University of Pennsylvania.

Mellars, P. (1996). *The Neandertal legacy: An archaeological perspective of western Europe.* Princeton: Princeton University Press.

Mellars, P., & Stringer, C. B. (Eds.). (1989). *The human revolution: Behavioural and biological perspectives on the origins of modern humans.* Edinburgh: Edinburgh University Press.

Schwartz, J. H., & Tattersall, I. (2002). *The human fossil record, volume 1. Terminology and craniodental morphology of genus* Homo *(Europe).* New York: Wiley-Liss.

Schwartz, J. H., & Tattersall, I. (2003). *The human fossil record, volume 2. Craniodental morphology of genus* Homo *(Africa and Asia).* New York: Wiley-Liss.

Smith, F. H., & Spencer, F. (Eds.). (1984). *The origins of modern humans: A world survey of the fossil evidence.* New York: Alan R. Liss.
Stiner, M. C. (1994). *Honor among thieves: A zooarchaeological study of Neandertal ecology.* Princeton: Princeton University Press.
Stringer, C. B., Barton, N. E., & and Finlayson, J. C. (Eds.). (2000). *Neandertals on the edge.* Oxford: Oxbow Books.
Stringer, C. B., & Gamble, C. (1993). *In search of Neandertals.* New York: Thames & Hudson.
Tattersall, I. (1995). *The last Neandertal.* New York: Macmillan.
Trinkaus, E. (1983). *The Shanidar Neandertals.* New York: Academic.
Trinkaus, E., & Shipman, P. (1992). *The Neandertals: Changing the image of mankind.* New York: Alfred A. Knopf.
Wolpoff, M. H. (1999). *Paleoanthropology.* Boston: McGraw-Hill.

NEANDERTALS

Anthropologists still disagree as to whether modern humans descended from Neandertals. There are three schools of thought: those who think we are descendants of the Neandertals, those who believe the Neandertals are a completely different species, and those who are reserving final judgment until more evidence is discovered.

Those who see the Neandertals as a separate species cite the fact that Neandertal behavior was very different from the behavior of other hunter-gatherers. Proponents of this theory believe that the thought processes of the Neandertals were significantly different from those of modern humans in that they did not seem to anticipate future needs. The skull shape and brain shape of the Neandertal are quite different from those of present-day humans. Some believe that this was a matter of survival of the fittest, and that the Neandertal could not compete after the better-adapted *Homo sapiens* arrived on the scene. The Neandertals, with their huge protruding nose, large brow ridges, and laterally facing hip sockets, differ greatly from *Homo sapiens.* They would have walked with a distinctive gait unlike ours. It is also likely that the Neandertals had little ability to use spoken language because of the structure of their upper respiratory tracts. These scholars believe that Neandertals were loners, not living in family groups. Neandertal males devoured meat wherever they killed it, rather than taking it home to a family, and most females seem to have survived on a diet of plants and small animals.

Other respected anthropologists believe there is no question that modern humans evolved from Neandertals. These scientists refute the theory that Neandertals could not speak, based on a discovery made in Kebara Cave in Israel in 1982. A hypoid bone from the throat and larynx of a 60,000-year-old Neandertal was found there, and it was determined to be indistinguishable from that of a modern human. To many scientists, this proved that the Neandertals could speak. Some of the same proponents of our Neandertal ancestry cite evidence that Neandertals lived in groups and were provided for and protected by the group. Neandertals survived for more than 100,000 years. They buried their dead, dug flint from quarries so fashion spear tips, and had crude musical instruments.

The debate will likely continue as we unearth more evidence that supports one school of thought over another.

— Pat McCarthy

Neo-Darwinism, Origin of

What is the theoretical framework of modern biology? If we would question a professional biologist, or even an eager reader of popular books on biology, we would await the answer: Darwinism, that is, Charles Darwin's theory of evolution by natural selection. But this answer is not entirely precise. Of course, Darwin's position in the history of biology can be compared to that of Galileo Galilei in the history of physics. But it would be surprising if the nearly 150 years since the first publication of Darwin's main work, *On the Origin of Species* (1859), had not brought forth new discoveries and fresh theoretical ideas that changed

the original version of Darwinism. And, indeed, this was the case. Therefore, a terminologically more precise answer to our initial question would be that Neo-Darwinism is the theoretical framework of modern biology.

What are the most important theoretical developments after Darwin that shaped Neo-Darwinism? The title *Neo-Darwinism* was used in the history of evolutionary thought to denominate, above all, the following three theoretical developments:

- August Weismann's panselectionism assumed that natural selection works, not only on the level of organisms, but also on the levels of chromosomes, cells, and populations (since the 1870s).
- Theoretical population biology constructed mathematical models for the workings of natural selection in the history of life (since the 1910s).
- The Modern Synthesis integrated all subdisciplines of biology into an overall picture of Darwinian evolution (since the 1930s).

Contemporaries called the evolutionary thought of the German biologist August Weismann (1834–1914) Neo-Darwinism (or even Ultra-Darwinism) because he extended the range of the Darwinian principle of natural selection so that it comprised the struggle for existence, not only between organisms, but also between populations, cells, and chromosomes. Weismann did much experimental research on specific biological phenomena in the light of evolutionary theory, and he interpreted his experimental results with the help of courageous conceptualizations. That is why Weismann can be called the second most important Darwinian of the 19th century (excelled only by Darwin himself).

We shall give a first impression of the importance of Weismann's work by describing how he embedded the empirical falsification of a then widely accepted genetic theory into a new conceptual framework, and how he used this framework to sketch a radical Darwinian picture of the evolution of life.

Weismann tested experimentally, in the years 1875 to 1880, the theory of the inheritance of acquired characters. The idea that organisms transmit knowledge acquired by practice and learning genetically to their offspring was developed into a biological theory by the French biologist Jean Baptiste de Lamarck at the beginning of the 19th century. From edition to edition of *On the Origin of Species,* Darwin more and more became a Lamarckian in genetics. Weismann tested Lamarckism by experimenting with lines of mice, whose tails he cut generation after generation. But he did not succeed this way in breeding mice that have shorter tails as compared to mice of the same origin whose tails were never cut.

How to explain this result? Weismann developed, in the first half of the 1880s, the theory of germ-plasm. He distinguished two types of cells in every organism: germ cells and somatic cells. The germ cells (in sexually reproducing organisms, the male sperm and the female egg) secure the reproduction of an organism by means of the germ-plasm they contain in their nuclei. It is, in modern terms, nothing else than the carrier of genetic information. All other functions of the organism are fulfilled by somatic cells.

Then Weismann postulated that the differentiation of somatic cells during the development of an organism is controlled by the structure of the germ-plasm. Additionally, he proposed that somatic cells do not have any retro-effects on the germ-plasm, so that Lamarckian inheritance of acquired characters is not possible. The continuity of the germ line from generation to generation is thus declared to be the fundamental base of evolution. Phenotypical variation of somatic cells is caused by genotypic variation.

What does, in turn, cause genotypic variation? Because Weismann considered the components of the germ-plasm (which he could identify with the chromosomes) as being little self-replicating and metabolizing systems, he came to the conclusion that the struggle for existence, and thus natural selection on the molecular level of the germ-plasm ("germinal selection"), is the ultimate cause of genotypic variation.

In his famous lectures on evolutionary theory, which filled three voluminous editions that were published between 1902 and 1913, Weismann integrated his genetic determinism into a radical Darwinian picture of evolution. He extended the explanative scope of the principle of natural selection from the level of organisms, the level on which Darwin had studied it, to other levels of the hierarchy of biological organization. Weismann's pan-selectionism assumes that natural selection works also on the level of populations, organisms, cells, and germ-plasms.

By so doing, Weismann could not only analyze separately the constraints on selection for every level and describe the role of each level in the development of an organism and in the history of life, but also have a synthetic look on the interactions of all those levels

in an ecological environment. So, events concerning whole populations can strongly influence the dynamics of selection on lower levels, such as if a natural catastrophe were to isolate a population. Therefore, every level constitutes a boundary condition on the mechanism of natural selection on all other levels.

Weismann represented selection-driven evolution as the natural dynamics of a self-regulating hierarchical system of biological organization. This system has a center of gravity: germinal selection between chromosomes. Weismann's emphasis on genetics lets us understand why the most radical of today's Neo-Darwinians, like Richard Dawkins, still accept the name "Weismannism" as an adequate denomination of their evolutionary thought.

Whereas the overall architecture of Weismann's evolutionary thought of evolution has an up-to-date outlook, important parts of his theory of inheritance were falsified by empirical research on molecular genetics. The functional distinction between germ cells and somatic cells had to be reshaped into a difference between nucleic acids and proteins, which are components of every cell. Weismann's idea of germinal selection as resulting from a direct struggle for survival between chromosomes is, taken literally, completely false.

But the main obstacle to Weismann's project of constructing a pan-selectionistic picture of evolution centered in genetics was not his lack of biochemical knowledge. He simply knew too little about formal genetics. Weismann learned about Gregor Johann Mendel's genetics of discrete hereditary units, first published in 1866, just when it was rediscovered in 1900, although he had prepared the ground for this rediscovery by postulating the existence of such units in the germ-plasm.

Weismann lived too early to get the chance to base the Darwinian theory of evolution on Mendelian genetics. The feat of doing this and of developing a new kind of Neo-Darwinism was performed by the three founding fathers of theoretical population genetics, Ronald Aylmer Fisher (1890–1962), John Burdon Sanderson Haldane (1892–1964), and Sewall Wright (1889–1988), who published their foundational works between World Wars I and II.

Theoretical population genetics is the biological discipline that tries to construct a formal theory of evolution, which must be inspired and controlled by empirical research. A theoretical population geneticist understands natural selection as a hypothesis that

Theodosius Dobzhansky

Source: Reprinted, with permission, from the *Annual Review of Genetics, 10.* Copyright © 1976 by *Annual Reviews*, www.annualreviews.org.

can be established by mathematical models of the origin of evolutionary mechanisms.

Fisher, Haldane, and Wright began to describe the most various biologic phenomena by their quantitative effects on the frequency of genes in populations with Mendelian inheritance. Thereby, they founded theoretical population genetics as the core discipline of this second type of Neo-Darwinism. Because a complete survey even of the works of those founding fathers is not possible here, I shall concentrate on Fisher's theory, who is well known for his work not only in mathematical genetics, but also in statistics and experimental design.

Fisher's fundamental insight in evolutionary theory was that natural selection is not a principle that must be axiomatically posited instead of being deduced from natural laws. If biologists knew the laws of variation and heredity, could embed them in a model of ecological dynamics, and had sufficient data about present-day biodiversity at their disposal, they should be able to deduce natural selection as the resultant mechanism by which life on Earth has evolved.

The first sentence of Fisher's main work in genetics, *The Genetical Theory of Natural Selection* (1930)—"Natural selection is not evolution"—contains implicitly his fundamental insight. Fisher saw that

Ernst Mayr

Source: © Rick Friedman/CORBIS.

natural selection is an abstractly describable mechanism that can be described formally without referring to the history of life on Earth. But its mathematical description also states which conditions real evolution must meet if natural selection is to be accepted as an explanatory rule in biology.

On the basis of his fundamental insight, Fisher formulated a theorem that he called "the fundamental theorem of natural selection." Why fundamental? Fisher drew an analogy between his theorem and the second law of thermodynamics, which describes statistically how a measurable property of an aggregate of units, the specific nature of which is not important for the formulation of the law, increases constantly. And the same is true for Fisher's fundamental theorem. It describes the adaptive improvement of organisms that is caused by natural selection in a population, which is supposed to live in a constant environment and within which do not happen any arbitrary fluctuations in the gene pool.

Fisher's theorem states that "the rate of increase in fitness of any organism at any time is equal to its genetic variance in fitness at that time." What does this mean in more informal terms?

We have to remember that the fitness of an organism is defined as the number of its adult offspring. If an organism is better adapted to its environment than its rivals, its chances are better to also have a higher fitness. Transposed to the genetic level of a population, this means that the fitter an organism, the higher the relative frequency of its genes in the genetic pool of its population.

Now, natural selection causes the average fitness of our idealized population to always increase over time. But how fast? Fisher's fundamental theorem gives the answer. The more the organisms in the population vary in fitness, the faster this increase will turn out. This is intuitively evident. If there is, for example, a difference in fitness between two subpopulations, the subpopulation with higher fitness will have more offspring than the one with lower fitness proportional to their difference in fitness. Eventually, the offspring of the fitter subpopulation will make up the whole population. The average fitness of this new population will then be, at least, the average fitness of the former subpopulation with higher fitness.

Yet Fisher was not a naïve selectionist. From his point of view, the ecological environments in which natural selection is working permanently influence considerably the evolutionary process. There are, for example, environmentally caused mutations that will probably have negative effects on the fitness of organisms. In general, all ecological changes and the simultaneous evolution of competitors in the struggle for existence set up new conditions on the adaptedness of an organism and change the average fitness of its population. Fisher called this ecological component of the total change in fitness of a population over time the "deterioration of the environment," because it represents destructive environmental effects on well-adapted organisms.

After Fisher's generation came to an understanding of the hypothesis of Darwinian selection as a deductive consequence of a formally describable natural dynamics, the history of theoretical population genetics has led to mathematically more and more complex models of natural history. Thereby, this second type of Neo-Darwinism formalized the Weismannian picture of evolution, which is to be explained by the dynamics

of the hierarchy of biologic organization with a center of gravity on genetics.

But the theoretical population geneticists also found astonishingly simple formulations of fundamental evolutionary laws. For example, Fisher's separation of two types of evolutionary factors, natural selection and environmental effects, can be mathematically expressed in a plain formalism using the statistical concepts of covariance and expectation value. Such an example shows that theoretical population genetics still is a very important part of evolutionary thought because it uses a high level of abstract reasoning, comparable to the use of mathematics in physics, to convey a vivid understanding of the fundamental processes of the history of life. So, it is not surprising that the most important Neo-Darwinians after World War II tried to base their theories on models from theoretical population genetics.

The formal kind of Neo-Darwinism founded by Fisher, Haldane, and Wright sometimes seems to be more similar to a mathematical than to a biological discipline. One has to learn a lot of calculus and be able to program computers in order to test the mathematical models by simulations. These models show how natural selection causes the gradual evolution of populations by calculating the change in gene frequencies. But how can they be related to the empirical reality of living populations, which the naturalist observes? What do they tell us about the origin of today's biodiversity, in which the field biologist is interested? Isn't theoretical population biology just a too-impoverished picture of nature—even on the genetic level? Does it think too mechanistically by assuming that everything is built on the base of single genes, the effects of which have to be simply added in order to generate a complex organism?

One of the men who asked all these questions very intensely since the 1930s was an ornithologist with extensive experience in field research, a staunch Darwinian with a broad knowledge of the history of biological thought, and a theoretical biologist with a deep interest in the foundations of evolutionary thinking. His name is Ernst Mayr (born 1904 in Germany), and he is one of the builders of the "Modern Synthesis," which was seen as being a renewal of Darwinian thought—a modern kind of Neo-Darwinism.

The English biologist Sir Julian Sorell Huxley (1887–1975), the grandson of Darwin's "bulldog," Thomas H. Huxley, and the brother of the famous writer Aldous Huxley, published in 1942 his book *Evolution: The Modern Synthesis* and established thereby the "official" title for this kind of Neo-Darwinism. But why "Synthesis"?

The aim of Mayr and his colleagues was to counteract the specialization of biological disciplines by showing how the fundamental ideas of Darwinism were able to bring them all back in fertile connection. For example, the gap between abstract models of theoretical population genetics and naturalist knowledge should be bridged. This could be done only if, on one hand, the naturalists would learn the theoretical geneticists' models of gradual evolution, and only if, on the other hand, the theoreticians would take into account the naturalists' knowledge about how populations in the wild behave.

The unification of theoretical modeling and empirical research began in the 1930s. The Russian experimental geneticist Theodosius Dobzhansky (1900–1975), who worked since 1927 in Thomas Hunt Morgan's famous Drosophila research group first at Columbia University and then at the California Institute of Technology, connected his empirical research to Darwin's evolutionary theory in his book *Genetics and the Origin of Species* (1937). This publication has to be honored as the starting signal of the Modern Synthesis. The programmatic allusion of the title of Dobzhansky's book to the main work of Darwin is clear. The same is true for the following important document of the Modern Synthesis.

Ernst Mayr, who worked since 1932 at the American Museum of Natural History in New York, wrote an important book on questions of taxonomy and gave it, in parallel to Dobzhansky's, the title *Systematics and the Origin of Species* (1942). In it, he tried to answer the question of speciation: What are the processes responsible for the origin of new species? This question was not systematically treated by Dobzhansky.

It is, by the way, an interesting question whether it was necessary that two biologists of continental European origin and traditional taxonomic training were implanted into the Anglo-American environment of genetic thought in order to start the unification project of the Modern Synthesis.

That the Modern Synthesis was swiftly successful in the research community of evolutionary biology became evident at a 1947 conference in Princeton, New Jersey, where some of the most important biologists gathered. The proceedings of this conference

were published under the title *Genetics, Paleontology, and Evolution* (1949), and they document that the Modern Synthesis ruled over the evolutionary Zeitgeist. This title brings together three main aspects of the history of life seen from the Neo-Darwinian perspective: first, the base for the transmission of biological information from one generation to the next, whereby evolution is made possible; second, the fossil data to reconstruct the concrete course of evolution on Earth; and third, the resulting process of evolution itself.

Today, Mayr considers the Modern Synthesis to have been confirmed in the past 60 years by innumerable empirical findings, especially in the field of molecular genetics (like the discovery of deoxyribonucleic acid as the carrier of genetic information). Yet the history of Darwinism did not stop after the Modern Synthesis found a codification at the end of the 1940s.

An important tendency was that the evolutionary biologists came, compared with the Modern Synthesis, to an even more radical understanding of the foundation of the history of life on genetic processes, so that we can even diagnose a return to Weismann. This "Neo-Weismannism" uses formal models of evolutionary processes (via theoretical population genetics), and its genetic theory is based on the knowledge of the biochemistry of inheritance (via molecular genetics).

***

Three kinds of Neo-Darwinism arose successively in the history of biology and are still important for current debates on evolutionary theory. They show many important differences but have also some main features in common, such as their emphasis on natural selection and their theoretical base in genetics.

The bold outlook of today's Darwinism should not suggest that the foundational problems of biology are all solved. Nowadays, it is clear that mechanisms other than selection are effective in evolution. One important example is, on the molecular level, genetic drift, that is, the spread of selectively neutral genetic information in the gene pool of populations. How these mechanisms played, and still play, together in the history of life is a heavily debated topic.

Perhaps Darwin's theory of natural selection need not be supplemented only by other evolutionary mechanisms. Perhaps it must be integrated together with them into a new conceptual framework. Then, Darwin would remain biology's Galilei, but some day he would be succeeded by its Newton.

— *Stefan Artmann*

Further Readings

Dobzhansky, T. (1937). *Genetics and the origin of species.* New York: Columbia University Press.

Fisher, R. A. (1999). *The genetical theory of natural selection* (variorum ed.). Oxford, UK: Oxford University Press. (Originally published 1930)

Gayon, J. (1998). *Darwinism's struggle for survival: Heredity and the hypothesis of natural selection.* Cambridge, UK: Cambridge University Press.

Huxley, J. S. (1942). *Evolution: The modern synthesis.* London: Allen and Unwin.

Jepsen, G. L., Mayr, E., & Simpson, G. G. (Eds.). (1949). *Genetics, paleontology, and evolution.* Princeton, NJ: Princeton University Press.

Mayr, E. (1942). *Systematics and the origin of species.* New York: Columbia University Press.

Weismann, A. (1904). *The evolution theory* (2 vols.). London: Edward Arnold.

NEO-DARWINISM

Neo-Darwinism is the "new" Darwinism. It is a blend of Charles Darwin's 19th-century theory of evolution through natural selection and Austrian biologist Gregor Mendel's theory of genetic inheritance. It states that evolution takes place because of slow changes in the environment. Those individuals within a population that have characteristics adapted to the new environment are the ones most likely to survive and reproduce, passing on those characteristics. Eventually, this can lead to the formation of a new species.

Darwinism is based on Darwin's treatise, *On the Origin of Species,* which he wrote in 1859. Scientists immediately hailed it as a viable alternative to creationism, which some thought was mere conjecture. Darwinism is based on several observations about living things. These include the

observations that offspring generally outnumber parents, species numbers generally remain fairly constant, and that individuals differ in small ways and inherit these differences from their parents. The conclusion he drew was that individuals whose variations best allow them to adapt to their environment will be more likely to survive and reproduce. This is commonly called the principle of natural selection. Darwin incorrectly believed that characteristics of the parents were transmitted to the young through the blood.

Darwinists believe that Darwin's theory explains the origin of all biological species. On the other hand, creationists and other non-Darwinists argue that evidence to prove this is totally lacking. Neo-Darwinism blends Darwinism with genetics. In 1866, Mendel published a paper showing that characteristics were transmitted by what we now call genes. Geneticists found in the 1930s that a variety of genetic errors can occur during reproduction. These are known as mutations. In order for Neo-Darwinism to be true, some mutations must be beneficial to the organism. Most of the mutations that have occurred in humans have proved to be harmful. Therefore, Neo-Darwinism asserts that evolution will be a long, slow process.

Neo-Darwinism is also known as the modern synthesis because it synthesizes, or brings together, Darwinism and modern genetic theory. The theory is still not universally accepted by scientists, however. Some questions remain unanswered. For example, why have some organisms evolved greatly while others have scarcely changed over millions of years? Nearly 150 years after Darwin advanced his theory, the controversy still rages between the creationists and those who believe in Neo-Darwinism.

— Pat McCarthy

Neolithic Cultures

The term *Neolithic* is frequently used to refer to that stage in humanity's history when people became sedentary and started farming. The Neolithic is normally conceptualized as a package that includes farming, sedentism, the making and use of stone tools, and crafts such as pottery and weaving. It is thus viewed as a new food-producing economy that, following Andrew Sherratt, eventually led to the Secondary Products Revolution, when people intensified production and labor and made use of secondary products, such as milk, traction, and wool. The Neolithic is also viewed in terms of what Service termed tribes and chiefdoms.

Although this general view sometimes captures the spirit of the Neolithic, it presents a homogenized picture of a time frame that is as varied geographically as it is materially. The concepts of Neolithic and Secondary Products revolutions imply a definite break with the preceding period, the Mesolithic, and a universal, homogeneous change in lifestyle. Moreover, the long-standing emphasis on tribes and chiefdoms has led to Neolithic tribes being defined by what they lack, rather than by what they have.

The idea of economic revolution was mostly articulated by Vere Gordon-Childe, who was influenced by both culture-history and Marxism. Childe saw the Near East as the starting point for the Neolithic, with the Natufians branded as the first farmers. In his view, plant domestication preceded animal domestication.

It was Robert and Linda Braidwood who, in 1948, launched the Iraq-Jarmo project to recover primary evidence for the earliest food-producing economies in the Near East, long considered the cradle of civilization. The work at Jarmo, coupled with Willard Libby's new C14 lab at the University of Chicago, indicated that, contra Childe, the earliest food-producing economies had been in the hilly flanks of the Fertile Crescent rather than lowland oases and riverine areas.

However, Lewis Binford and Kent Flannery came up with the marginality hypothesis, arguing that food production deliberately started around optimal-zone margins. On the other hand, Ofer Bar-Yosef and his colleagues put forward the Levantine primacy view, arguing that drier conditions between 13,000 and 12,800 BP forced hunter-gatherers westward. The consequent population increase resulted in reduced mobility; a broad-based economy; and the establishment of large, aggregated sites. What distinguishes this work is that Bar-Yosef and his colleagues consider complex social organization together with environmental change and population growth as reasons for the start of sedentism.

The New Archaeology also saw the Neolithic in terms of chiefdoms and ritual sodality, and there was

substantial focus on the origins of inequality within the Neolithic. The postprocessual movement, by contrast, focused on people (rather than the system behind them) and applied poststructuralism to the study of meaning and symbolism. The Neolithic thus came to be viewed as a world full of rich, symbolic meanings that are manipulated and renegotiated by social actors.

What makes the Neolithic difficult to conceptualize as a whole is the diversity within cultures. The transition from Mesolithic to Neolithic is by no means clear-cut. Moreover, the Neolithic did not spread and appear everywhere at once. In many areas (Britain being a case in point), the Mesolithic lifestyle survived far longer than conventionally thought, and for a while, it existed side by side with farming. Ethnographically, it is known that foragers are often very resistant to farming, and this seems to be the case archaeologically as well.

How the Neolithic spread remains a contentious subject, and it is unlikely that the phenomenon can be explained by a universal theory. It is also unlikely that one can explain Neolithic cultures as a monolithic phenomenon. The remainder of the discussion will focus on the Neolithic of Europe, while acknowledging that Africa, Asia, the Americas, and other parts of the world have complex Neolithic biographies.

Broadly speaking, the European Neolithic started about 7000 BC in southeastern Europe, about 6000 BC in the Mediterranean, and about 5500 BC in central Europe. The Neolithic of northwestern Europe dates only to about 4500–4000 BC. In each area, the Neolithic assumed its own distinctive character.

Southeastern Europe and Greece

The Karanovo settlement in central-southern Bulgaria dates to about 6000 BC and is built on an earlier settlement. Rectangular houses built of mud or daub had clay ovens inside. Clay figurines were also found in a domestic setting.

Such mounds, which are found in Greece, the Balkans, and as far north as Hungary, have been the subject of intense debate. Sites like Karanovo in Bulgaria and Sesklo in Thessaly were used periodically over a long time, whereas other sites (for example, in Britain; see below) were used for only short periods of time. Simply considering them in terms of a new subsistence economy would be excluding them from a wider landscape that was profoundly and constantly manipulated and renegotiated. The new trends in economy are part of a wider change in identity in an increasingly complex world.

The Neolithic is also a time of socially important exchange networks; obsidian was traded throughout much of the Mediterranean, while in Britain, stone axes from the Langdales were found as far as Scotland and throughout much of Britain. In terms of food, wild animals were still hunted and formed an important part of the sociocultural context. Most sites, however, show a preponderance of sheep, goats, cattle, and pigs. On the plant front, cereals and legumes dominate most assemblages. Materially, pottery was present almost everywhere, and clay figurines played an important role in many communities.

This general picture of a diverse material culture applies broadly to an area stretching from Turkey to Iran, where domestication and sedentism culminated in a process lasting from 9000 to 7000 BC. By 7000 BC, there were established Neolithic communities in Hacilar and Catal Hoyuk. As Neolithic communities expanded, they settled in Cyprus, Crete, and other coastal areas. However, whereas there seem to be many people in areas like Thessaly, population density seems to be lower in the Struma, Vardar, and Danube valleys.

By 5000 BC, there appear a handful of sites with a large, centrally placed building, normally called a megaron, such as those at Sesklo and Agio Sofia. It appears that these were meeting houses. New settlements were also founded, for example, at Dimini, a site with concentric retaining walls with communal spaces and individual buildings having their own hearths.

Figurines become increasingly distinctive, with the Vinca culture producing figurines that are now almost iconic. Figurines had triangular faces, large eyes, and body decoration, and they occurred mostly in domestic contexts. Together with many other figurines from Europe and the Mediterranean, they have often been placed within a Mother-Goddess and/or fertility paradigm, one that has been challenged and debated for at least the past 50 years.

By about 4000 BC, profound changes are detected throughout the area. Most sites are abandoned, many for good. Those that are reoccupied are in a much reduced form. Although cemetery burials still continued in parts of Romania and southern Ukraine, other regions, such as those around the lower Danube and the steppe zone of southern Ukraine, opted for small

mounds. The picture in Greece also becomes more complex. Although change occurred over a wide geographic area, it was regionally different.

Central and Western Europe

The Linear Pottery culture (termed *Linearbandkeramik,* or LBK) is the first Neolithic culture in central and western Europe. It is found from western Hungary to the southern Netherlands, eastern Belgium, central-northern France, Slovakia, the former Czech Republic, Austria, parts of Poland, and Germany. LBK settlements are typically found on fertile soils and near water sources. Compared to the rest of Europe, the LBK looks far more uniform in terms of settlement location, longhouses, enclosures, and cemeteries. There are similarities in stone tools and pottery, but toward the end of the phase, pottery styles became more regionalized.

Although the LBK has been presented as a clear-cut case of a break with the preceding Mesolithic, scholars like Alasdair Whittle point to evidence for continuity, noting that physical and anthropological evidence from cemeteries is compatible with continuity of indigenous populations. Moreover, he notes that the basic flint tool kits of indigenous foragers and LBK people also had much in common.

Early LBK sites were well dispersed through the landscape, with large intervals between regional clusters. Settlements were small, and the majority were used only in the earliest phase. Timber longhouses were built for the outset, generally divided into two and even three sections. As yet, early cemeteries are not known.

In the middle period, settlement extended to the main limits of the loess soil and to the edge of and parts of the northern European plain. Within areas already occupied, settlements became more numerous. Burial gounds are also known in most areas. In the late phase, settlement was further extended, for example, the Paris basin and central Poland. Pottery styles became increasingly regionalized, and there may have been long-distance context with the central-western Mediterranean.

Soon after 5000 BC, different cultural groups are found in the same LBK area, such as the Lengyel, *Stichbandkeramik,* and Villeneuve-Saint-Germain cultures. Longhouses remained in use, although their shape and construction changed. The dead were disposed of in and around the settlement area. There is also a noted increase in ditched enclosures and the formalization of space.

Britain remains one of the most intriguing Neolithic cultures. Traditionally considered as homogeneous, recent scholarship has shown great regional diversity. Moreover, it is often difficult to distinguish between domestic sites and enclosures. Northern Britain and Ireland present a picture of small social units, mostly farmsteads, scattered across the landscape. Most of the evidence for early farming is based on stock rearing rather than grain.

The Mediterranean and Its Islands

The biography of the Mediterranean is very different. The diversity within this area is intimately tied to the Mediterranean Sea. The Neolithic "package" was adopted slowly in the central and western Mediterranean. Stratigraphic sequences from caves in mainland Italy and Sicily show a mix of foraging and farming from about the early fifth millennium BC, but non-cave, ditched settlements in the Tavoliere date to almost 1,000 years later. The general impression is of mostly nonsedentary communities that combined foraging and farming. Similar trends can be discerned in southern France and coastal Spain, and perhaps in North Africa.

By 5800 BC, most of southern Italy was Neolithic, although the earlier Impressed Ware cultures survived in enclaves, such as Liguria. Moreover, although the Neolithic reached Sardinia and Corsica by 5500 BC, foragers were still present in the central Appenines, and Neolithization occurred by 5000 BC.

Southern France shares similarities with Italy, such as a lack of Mesolithic sites and sparse Mesolithic populations. The majority of Neolithic sites are caves and open settlements (mostly lost to a rise in sea level). Hunting was incorporated more in France than in Italy.

Iberia also shows a preponderance for coastal sites, and by 5500 BC, there is rapid expansion, including Portugal and Gibraltar. The interior experienced the Neolithic by 5000 BC, and foragers remained on the Cantabrian coast by 4700 BC.

Islands expressed the Neolithic in different ways. Although islands like Sardinia and Malta show plenty of evidence for extrainsular contacts, they developed their own distinct cultures. Sardinia exhibits increasing complexity from the early Cardial phases to the Middle Neolithic, which is characterized by plenty of

villages in the fertile Campidano plain. Distinct regionalism is present by the Late Neolithic. Whereas the San Michele d'Ozieri culture spread over large parts of the island, Gallura developed its own distinct stone-circle culture.

On the other hand, the small island of Malta seems to have been first colonized by Sicilian farmers in 5000 BC. As the Neolithic developed, the island gave birth to a very complex megalithic culture expressed by temples and underground funerary structures.

Monumentality

Finally, the Neolithic is often associated with monumentality, such as the causewayed enclosures of Britain and the megalithic temples of Malta. Both have been the subject of intensive studies.

The monument phenomenon has been explained in terms of chiefdom societies; territorial delineation; ostentation; and, following Richard Bradley, forming a new sense of time and space. Indeed, the study of monuments entered a new phase in the 1990s with the application of phenomenological theory.

Mortuary mounds in Europe are frequently tied to the importance of ancestry and communities establishing a claim to agricultural land. However, the first mounds typically contained a single individual; only later did they contain multiple burials. Bradley notes that it was at that point that the monument permitted access between the living and the dead.

Causewayed enclosures became the focus for special deposits of artifacts and bones. At the same time, settlement (in the orthodox sense) became more scattered and ephemeral. Early enclosures do not exhibit many common elements, although there is a trend for them to be closely integrated into the pattern of settlement. Over time, earthworks were increasingly constructed toward the margins of settled landscape, and instead of occupation sites, they became centers for feasting and ritual activity.

On the other hand, the megalithic temples of Malta do not exhibit signs of being used as settlements. Billed as the first freestanding stone buildings in the world, they are the remains of a remarkable civilization that, until the beginning of this phenomenon, was not that different from other Mediterranean societies.

These monuments have a number of elements. They are approached across an oval space, and the forecourt is overlooked by a façade and is composed of a row of orthostats. The side and rear walls are also built of orthostats. The inside of the temples varies greatly, but all have a number of apses. Materially, they have yielded animal (but no human) remains, obsidian, tools, and an array of statuary. Burial was initially in rock-cut graves, but as temple society developed, it was transferred to necropoli. Two are known. The first is a monumental, underground structure known as the Saflieni Hypogeum, and the second is the Brochtorff Stone Circle at Xaghra.

In conclusion, the Neolithic world is a complex and varied one, and it would be fallacious to consider Neolithic cultures as a monolithic whole. Although elements of the Neolithic "package" are common to many areas, when and how these appear and how they are negotiated are vastly different. The Neolithic is a time of the creation of new worlds and the creation and renegotiation of various identities.

The end of the Neolithic is equally contentious. Southeastern Europe is embroiled in an Indo-European controversy, and for a long while, the invasion hypothesis was favored for much of Europe. Perhaps the epochalistic Three Age system does not always express the complexities of any period. The impression of a clean, definite break between one epoch and the other is often misleading. There is still much scope for research into this period, bearing in mind that we do not have one Neolithic but many.

— Isabelle Vella Gregory

Further Readings

Blake, E., & Knapp, A. B. (Eds.). (2005). *The archaeology of Mediterranean prehistory.* Oxford: Basil Blackwell.

Bradley, R. (1998). *The significance of monuments: On the shaping of human experience in Neolithic and Bronze Age Europe.* New York: Routledge.

Scarre, C. (Ed.). (2002). *Monuments and landscape in Atlantic Europe.* New York: Routledge.

Trump, D. (2002). *Malta: Prehistory and temples.* Malta: Midsea Books.

Whittle, A. (1996). *Europe in the Neolithic: The creation of new worlds.* Cambridge, UK: Cambridge University Press.

Neurotheology

Neurotheology is the scientific study of religious or spiritual experiences and feelings. By using psychology and neuroscience, scientists explore the biological basis of religious experiences and are beginning to uncover the capabilities of the human mind. Neurologists have found evidence in the mechanics of the human brain that facilitates the capacity for spiritual, religious, or mystical experience and leads to an intermingling of science and religion. Neurotheology claims that the hardwiring of the human brain not only makes religion possible, but also makes it capable of being passed on through the genes as a physically distinct mechanism of cultural transmission, allowing religion to be selected as an adaptive behavior.

Religion has contributed to human evolution and continues to be a universal behavior even in apparently scientific times. In fact, statistics show that 70% of the world's population affiliate themselves with some religious or spiritual practice, whether they engage regularly or not.

It is important to understand what is meant by religious, mystical, or spiritual experience. It is the universal, transcendental state described by many as a feeling of being at one with the world, their God, everyone, or themselves, depending on the vocabulary of the religion with which they are affiliated. It often involves a period of deep concentration that is termed meditation or prayer by some religions, but also has been known to happen spontaneously to those without conventional religious belief. This would lead one to believe that it is in the potential of all human brains to have a mystical experience, not just those using religious vocabulary to describe it. Studies show that the potential of each person lies in his or her willingness to let the experience happen.

To understand how the human brain could possibly be wired for the internal mystical experiences of religion, we must first understand how our brain works to interpret our surrounding environment. The brain has several association areas in the cerebral cortex that are designed to put together all of the perceptions our other sensory organs experience. The ultimate goal of these areas is to help us understand the world around us and decide on specific responses.

Andrew Newberg and Eugene D'Aquili believe that four association areas play an important part in producing the potential for religious perception. The visual association area aids in our ability to visually recognize people, places, and things, allowing our memories to hold a visual composition of events or perceived events. The verbal conceptual association area allows us to generate abstract concepts and describe them with words; it is located in the temporal, parietal, and occipital lobes of the brain.

The orientation association area (OAA) and the attention association area (AAA) are the most important to religious experience. The OAA is in the posterior section of the parietal lobe and receives sensory input that creates the three-dimensional sense of body and orients the body in its surrounding space. There are two OAAs in each hemisphere of the brain that function in related but distinct fashions. The left OAA creates the sensation of a limited, physically defined body. The right OAA generates spatial coordinates that provide the body with the limits of its surroundings. The two OAAs intermingle information to create a defined body that has a definite space around it in which it can move. Because spiritual experiences involve an altered sense of the time and space in which the body or the "self" exists, the OAAs are important to the reality of the experience.

The AAA is referred to as the seat of the will and is in the prefrontal cortex of the brain. It is involved in the complex choreography of integrating bodily movements and behaviors associated with reaching goals. From the seemingly simple task of reaching for an object to the laborious thought process involved in deep concentration or focus, function is therefore a main factor in the experience of transcendental states of being.

To test their claims, Newberg and D'Aquili's research involved the study of deep meditation. For the experiment, a Buddhist sits in a dark room setting up his ritual meditation scene. Candles, incense, and a picture of his deity are all important to the mood and thus important to the experience that the subject will have. Newberg and D'Aquili state that the acts of rituals themselves are the first steps in preparing the brain to be open to a transcendental experience.

The subject sits in meditation position, and a piece of string stretches into another room, where the doctors wait for a signal, a tug on the string that the "peak" state of meditation has been achieved. When the string is tugged, the doctors inject a radioactive tracer solution into an I.V. that has been placed in the subject's left arm. Because the solution goes directly

into the bloodstream, it "locks" onto the brain cells almost immediately and will stay there for hours.

The meditation session is quickly ended, and the doctors move the subject to another area of the hospital where a single emission computed tomography (SPECT) camera is located. The SPECT is an imaging tool that will detect the radioactive tracer in order to photograph the peak of the meditation experience. The imaging will give the doctors a freeze-frame of the brain.

Because increased blood flow to an area of the brain represents higher activity levels, this photograph will show what areas of the brain are active during meditation. What shows up is unusual activity in the posterior superior parietal lobe, or OAA. Remember that this is the area that helps us to determine which end is up and the physical limits of the self. People who suffer injuries to this area would have difficulty maneuvering in their physical surroundings. They are unable to tell where things begin and end, particularly because they cannot conceive of their own physical limits.

A brain scan taken before meditation showed normal, furious activity all over the subject's brain, which shows up in vibrant bursts of reds and yellows. The peak scan, however, shows markedly reduced activity in the area of the OAA, which shows up as cool blues and greens. Normally, this area never rests. Newberg and D'Aquili have come to the conclusion that the OAA is working as hard as ever. What has changed is the sensory perception of the outside environment. The incoming flow of sensory information essentially has been blocked by a deep state of concentration inward. The OAA has no incoming information with which to define the limits of the self, and while continuing to search for this information, the brain perceives no distinctions between the limits of the self and the physical boundaries of the outside world. The brain perceives the self as endless. To the subject, this experience is unquestionably real.

Newberg and D'Aquili also researched several Franciscan nuns during prayer. The SPECT scans of the nuns revealed similar changes in brain activity. Unlike the Buddhist's feelings of oneness with the world, however, the Sisters tended to describe their experience as closeness to God. The doctors describe both experiences as absorption of the self into something larger and conclude that the mystical experiences are scientifically observable, neurological events that are experientially and biologically real.

What Newberg and D'Aquili believe they have found is the core of neurotheology, the evolved biological link to spirituality that has the ability to be passed on through genes. We hold a physical memory of our past in our genes and an implicit and explicit heritage in our cultures, languages, and moral and religious traditions that are passed on by our brains and our books. To realize the co-evolution of culture and biology is important to the perpetuation of religion and availability to mystical interpretation of the transcendental experience. Newberg, D'Aquili, and others claim that humans are naturally equipped to induce effortless self-transcendence. They describe such everyday experiences as being moved by music or the feeling of being swept away by an inspirational speech as examples of everyone's potential for transcendence.

Neurologists have previously found a connection between temporal lobe epilepsy and new interest in religion. It is during seizures involving this portion of the brain and those of the association areas that patients describe religious experiences occurring. When the electrical impulse of a seizure disturbs areas of the brain, hallucinations, voices, and feeling of a presence or infinite space occur, creating an imitation enlightenment.

In fact, with this discovery, it is believed that many religious and historically significant individuals actually suffered from temporal lobe epilepsy. For instance, Joan of Arc, a historic woman who led the French army against the English with her perceived voices and visions of God, is now believed to have suffered from temporal lobe epilepsy. The condition would have caused her to hear her own conscious thoughts as if they were coming from an outside entity. She also described bright lights and hallucinations, which are known to be symptoms of temporal lobe epilepsy.

It is also speculated that Moses, a prominent prophet in one of the world's most popular religions, was afflicted with temporal lobe epilepsy. His visions of the Archangel Michael led the Israelites out of Egypt and are the basis for a portion of the Old Testament.

The affliction of imitated enlightenment is not seen only in historical accounts. Psychologist Dr. Oliver Sacks encountered a patient in the early 1970s named Greg F. Greg was in his early 20s when he joined the Hare Krishna, a religious group. Shortly after taking up residence in the main Krishna temple in New Orleans, Greg began to lose his vision and experience

a glazed-over feeling. The Krishna interpreted this as Greg's path toward spiritual enlightenment. However, when his parents came to visit him 3 years later, their once-healthy young man was now a bald, fat, 25-year-old man with a huge midline brain tumor. Greg was able to have surgery to remove the tumor, but he never recovered his vision and remained forever blissed out.

Richard Dawkins sees religion in terms of pathology. He considered the God-meme (a unit of culture) a virus that infects an organism and produces copies. Susan Blackmore, referring to religious laws about killing nonbelievers, describes religion as a way that "even evil and cruelty can be redefined as good." Religion itself and its practices are not always as beneficial. For example, being involved in a doomsday cult and participating in mass suicide would not improve anyone's inclusive fitness. There is also evidence of psychological damage wrought by dogmas of guilt and fear. And, some religions allow the blatant physical and psychological abuse of women, including genital mutilation. Historical accounts describe hundreds of years of Holy War and the persecution of people because of their faith or lack thereof. Even today, in a scientifically modern world, some religions justify the killing of people throughout the world. Religion has, however, persisted for thousands of years, and there must be adaptive benefits resulting from it.

One benefit that has long been known in the East is that meditation has health benefits. Physical benefits to the body include a reduced heart rate, lower blood pressure, and decreased levels of stress hormones that would inhibit the immune system. These benefits seem to transcend religious affiliation. Religion appears to generally increase longevity, which in turn increases relative fitness.

While some see religion's persistence as self-delusional superstition, others believe it still exists for healthier reasons. Studies suggest that people who are affiliated with and practice a religion have fewer strokes and heart attacks, and lower blood pressure. Newberg believes that religion bonds families and individuals, providing them with unifying beliefs. It encourages more peaceful and productive community settings. Clearly, the benefits of religion would give those inclined an advantage in the evolutionary struggle for survival.

However, the benefits of religion are not always outwardly apparent. What would the benefits of religion have been to our ancestral cousins that would have allowed it to continue to be selected for? Even today, like in the past, religion brings people together with a sense of community. Within this community, it is less likely that you will go hungry or be without shelter or care when you are ill. There is evidence, though disputed in Neandertal burials, of osteoporosis and arthritis, suggesting that they took care of their elderly and enfeebled.

In the past, environmental stress would have been difficult to understand. Indeed, it was in times of famine that ancient Native Americans created deities such as the Great Stag, to whom they prayed for increased deer populations. Newberg describes a speculative but interesting scenario in which a hunter is out searching for deer for days with no food or water and begins to hallucinate of a talking deer. After returning to the village and telling his story, some other hunters also return with an excellent amount of meat, which the Great Stag had foretold in the hallucination. Whether the benefits are coincidental or divine intervention, it is easy to see how the hard-wiring of the human brain could have created and perpetuated the mystical experiences that led to the development of hundreds of religions and vast interpretations of transcendental episodes.

As far as Newberg and D'Aquili are concerned, religion has been around since before modern *Homo sapiens*. However, they do not think that the hard-wiring used to genetically transmit potential for religious experience evolved specifically for this purpose. In fact, Newberg and D'Aquili have hypothesized that the potential for religion is actually a by-product, having risen from the circuitry involved in mating and sexual experience. They state the vocabulary of mystical experiences of the past as part of their evidence. Such words as *bliss, rapture, ecstasy,* and *exaltation* have been used to describe transcendental experiences and sexual experiences alike. "Mystics speak of losing themselves in a sublime sense of union, of melting into elation and of the total satisfaction of desires."

This theory is also based on the fact that many of the areas of the brain involved in transcendence are also involved in sexual arousal and the connection to the powerful sensation of orgasm. A similar blocking off of outside senses is experienced in both situations. They are not the same experience, just functioning on some of the same neural pathways. Falling in love involves the same sense of reception to the experience as the potential for a transcendental experience.

That religion is a by-product does not necessarily lessen the experience. Many of the brain's most sophisticated functions evolved from more humble beginnings. For instance, the ability to appreciate music and art developed from simple survival tasks. For religion, evolution stumbled in the right direction and took hold, continuing to allow the biological and cultural facets to co-evolve.

The way that we perceive our surrounding environment lays in the inner workings of the brain. The evolution of the concept of self led to the distinction between mind and brain, leading humans to contemplate more than where their next meal was coming from. Neurotheology does not claim to either support or deny the existence (now or in the past) of one all-knowing God, as believed in many religions. It does, however, thoroughly demonstrate the ability of the human brain to create and therefore experience religious, mystical, or spiritual experiences.

— *Jackie L. Orcholl*

Further Readings

Blackmore, S. (1999). *The meme machine.* New York: Oxford University Press.

D'Aquili, E., & Newberg, A. (1999). *The mystical mind: Probing the biology of religious experience.* Minneapolis, MN: Augsburg Fortress.

Dawkins, R. (1990). *The selfish gene.* New York: Oxford University Press.

Newberg, A., D'Aquili, E., & Rause, V. (2001). *Why God won't go away: Brain science and the biology of belief.* New York: Ballantine.

Ngandong

Ngandong is an archaeological site located on the High Terrace deposits near the Solo River in eastern Java, Indonesia, that includes remains of early *Homo sapiens.* Excavations of the site were conducted between 1931 and 1933 by Eugene Dubois.

Originally called *Homo solonesis,* or "Solo Man," the remains were thought to belong to a more advanced population than *Homo erectus.* Remains found at the site include 13 skull caps. Of the 13 crania or cranial fragments, nine are adults or at least fully grown, and one is clearly a child. Additional finds include two fragmentary tibia bones. These indicate that one individual was 167 cm and the other 188 cm tall, which is larger than other finds of early *Homo sapiens* in Indonesia. The general impression of the Ngandong hominids is that they were a very powerful and muscular people. This is indicated by the bony evidence of muscle attachments, as well as in the form and thickness of the bones themselves. The specimens were not intentionally buried, and there are no archaeological associations found directly with these remains. Healed cranium wounds were common in the Ngandong specimens and are found more on presumed female than male crania.

Most of the crania were faceless and/or baseless, and it is uncertain whether this was the result of ritual treatment of the dead, taphonomical factors, or perhaps preferences of those who collected the specimens. Some even suggested that they were used as water bowls. The most probable explanation, however, is that the face and base contain the most fragile bones of the skull, and either the action of carnivores or natural damage through the process of fossilization led to the destruction of these parts.

Found near the broken crania was a fossil bed of 23,000 mammalian bones, mostly of extinct elephants, oxen, and hippos. Along with the mammal remains, an assortment of scrapers, borers, choppers, and stone balls for use as slings was found. Evidence that these early *H. sapiens* had social organization and used simple tools is supported by these findings.

Previously, it was thought that the Ngandong remains dated to about 100,000–250,000 years ago. But recently, teams have reexamined the Ngandong excavations using electron spin resonance and mass spectrometric uranium-series techniques to reach a date as recent as 43,000–27,000 years ago.

The Ngandong hominids are considered by most authorities to be ancestral to modern Australian Aborigines. The date of the earliest hominids in it is in dispute, but most authorities would agree that Australia has been occupied by humans for at least the past 120,000 years. If this is the case, then the Ngandong population cannot be ancestral to the Australian Aborigines.

— *Donald E. Tyler*

See also **Homo erectus; Indonesia; Java Man; Sangiran**

Further Readings

Lewin, R. (2004). *Principles of human evolution.* Victoria, Australia: Basil Blackwell.

Shipman, P. (2001). *The man who found the missing link.* New York: Simon and Schuster.

Swisher, C., Curtis, G. H., & Lewin, R. (2000). *Java man: How two geologists' dramatic discoveries changed our understanding of the evolutionary path to modern humans.* New York: Scribner.

Tyler, D. E. (1995). The current picture of hominid evolution in Java. *Acta Anthropologica Sinica, 14,* 313–323.

Wolpoff, M. (1999). *Paleoanthropology.* New York: McGraw-Hill.

Nietzsche, Friedrich (1844–1900)

The German thinker Friedrich Nietzsche presented scathing criticisms of the human sociocultural world (particularly religion and theology) and called for a rigorous reevaluation of all values. Like Darwin, Nietzsche presented a dynamic view of reality. The philosopher had been greatly influenced by the evolutionary movement of the 19th century (although the intellectual relationship between Darwin and Nietzsche is not often emphasized or recognized).

Nietzsche is often referred to as the bold father of atheistic existentialism, a severe critic of science and reason, and even an early postmodernist. But if one comprehensively examines his worldview, it then becomes apparent that Nietzsche was also a philosopher of evolution (although he disagreed with Darwin's interpretation of biological history). And despite his perspectivism, Nietzsche never rejected science and reason outright; surely he thought that some theories are closer to the truth than others, and for him evolution was a fact on all levels of reality. He also looked at the human condition from a cross-cultural perspective, thereby anticipating the ongoing anthropological framework that emerged in the 20th century.

Early Evolutionists

Darwin was troubled by the issues that were raised by his theory of evolution, particularly questions concerning the place of emerging humankind in planetary history. Evolution challenged the alleged uniqueness of our species, and it drew more attention to the existence of evil in the world. Furthermore, Darwinism did not support order or design or teleology in organic evolution. Darwin's early interest in natural theology had been replaced by natural science.

Actually, Darwin himself never defended his theory in public, and he rarely answered his critics in print. Fortunately, two famous naturalists were eager to defend Darwinian evolution: Thomas Huxley in England and Ernst Haeckel in Germany. To further support scientific evolution, Huxley contributed evidence from his studies in comparative morphology, while Haeckel offered evidence from his research in comparative embryology.

Unfortunately, the early evolutionists did not know the correct age of the earth or the true mechanisms of inheritance. Moreover, no fossil hominid evidence had yet been found outside of Europe to clearly demonstrate the evolution of our own species. But during the 20th century, significant advances in science and technology, as well as momentous discoveries in genetics and anthropology, would answer many of those perplexing questions raised by the early evolutionists.

Still, before the end of the 19th century there were a few philosophers who accepted the fact of evolution. One in particular did not hesitate to seriously consider both the ethical and cosmological aspects of evolutionism as he saw them. Enter Nietzsche.

Friedrich Wilhelm Nietzsche has emerged as the most influential philosopher of the last 100 years, although both controversy and confusion surround his life and thought. He was born on October 15, 1844 at Röcken in Saxony, Germany. His father, Karl Ludwig, a Lutheran pastor, died when Nietzsche was only five years old. Consequently, the precocious boy was raised in a household of females: his mother, sister, two aunts, and a grandmother.

The young Nietzsche enjoyed music and poetry. Later, his academic research shifted from theology through philology to philosophy. He developed an intense interest in classical Greek culture (especially the ideas of Heraclitus) and interpreted artistic expression as the synthesis of Apollonian individuality with Dionysian creativity.

Nietzsche read Charles Darwin and Arthur Schopenhauer, befriended Richard Wagner, and became a professor of classical philology at Basel University, Switzerland without completing a doctorate

Source: © Hulton-Deutsch Collection/CORBIS.

dissertation. After ten years, because of poor health and grave illness, he resigned his teaching position and, with a pension, became a solitary wanderer in the Alps of Italy and Switzerland. He remained isolated and lonely but authored remarkably prophetic and intellectually profound works of lasting significance.

With time to think and write, Nietzsche critically analyzed Western civilization and revealed the falsehoods and illusions that were pervasive within the conformity and mediocrity of modern society (as he saw it). He boldly proclaimed that "God is dead" and subsequently called for a rigorous reevaluation of all values. His penetrating genius not only distinguished between the "master morality" of creative individuals and the "slave morality" of the inept masses, but also contributed disquieting insights into the psychological motives of Christian beliefs and religious practices, for example, guilt, pity, and resentment.

Nietzsche was deeply concerned with what constitutes the "good life" for a human being and, as an existentialist, he stressed that self-fulfillment ought to be the goal of any creative and critical person who is challenged to overcome the pervasive conflicts in both the natural and social environments.

Nietzsche presented three remarkable ideas: the will to power, the future overman, and the eternal recurrence of the same.

Rejecting nihilism and pessimism, Nietzsche offered a radically new worldview that was optimistic and in step with the evolutionary movement of the 19th century. He held dynamic reality to be essentially the will to power and prophesied the coming of the overman (seeing the human species as a temporary link between the fossil apes of the past and those superior intellects that will emerge in the future).

In terms of metaphysics, Nietzsche taught his awesome and engaging concept of the eternal recurrence of the same as the endless and identical repetition of this finite and cyclical universe throughout all time. Essentially, the German philosopher emulated those pre-Socratic thinkers who had focused their attention on cosmological issues. Concerning ethics, Kant's universalization of a free moral decision is transformed into Nietzsche's eternalization of a seemingly free personal choice. As a result, Nietzsche claimed that each moment has infinite value and therefore one should live as if each decision is a choice made for eternity. In fact, he stressed that one should even love the pervasive necessity of determined reality.

Among his brilliant books, Nietzsche's major work, *Thus Spake Zarathustra* (1883–1885), best represents his iconoclastic philosophy of perspectivism, overcoming, and fulfillment. With piercing insights, its author examined the human condition and found it to be oppressed by outmoded beliefs, narrow perspectives, and false values. His own emerging atheistic, this-worldly, and life-affirming vision challenges an individual to accept the endless flux of nature and to create new values beyond traditional conceptions of good and evil.

Scientific Evolution

The scientist Charles Darwin had awakened the philosopher Friedrich Nietzsche from his dogmatic slumber by the realization that throughout organic history, no species is immutable (including humankind). Pervasive change replaced eternal fixity.

Darwin had embraced the facts, concepts, and perspectives in historical geology, comparative paleontology, and biogeography. For him, the "struggle for

existence" in the living world always results in organic evolution by natural selection or the extinction of species due to their inadaptability. Although his scientific interpretation was mechanistic and materialistic, he himself did not get involved with the profound existential issues raised by this new worldview.

Darwin was not a philosopher. He did not concern himself with those questions that deal with the meaning and purpose of life on earth. Issues in ethics, metaphysics, and epistemology did not deter him in his rigorous investigations into the mechanisms of and evidences for organic evolution. No doubt, Darwin the scientist would have found Nietzsche's philosophical speculations on life to be both incredible and inconsequential. But, if evolution is true, then what are the scientific implications, philosophical ramifications, and theological consequences for taking this brute fact of dynamic nature seriously?

Going beyond Darwin, Nietzsche offered a bold and provocative interpretation of dynamic nature that considered both the philosophical ramifications and theological consequences of taking the scientific fact of biological evolution seriously.

Clearly, Nietzsche was not oblivious to either geological time or the paleontological record. He accepted the most controversial implication of Darwin's theory: humankind had evolved from remote apelike ancestors, in a completely naturalistic way, through a process of chance and necessity (fortuitous random variations appearing in, and inevitable natural selection acting on, individuals in a changing environment). Even the mental faculties of human beings, including love and reason, were acquired during the course of evolutionary ascent from earlier primate forms. Of course, this position rejected the traditional dualistic interpretation of our species as mind and body, and made clinging to a dogmatic ethical principle or a fixed set of values impossible. One is reminded of John Dewey's interest in evolving values, although he could never accept Nietzsche's focus on the value of an individual instead of the value of a community of inquirers.

For Nietzsche, evolution is the correct explanation for organic history, but it results in a disastrous picture of reality, since evolution (as he saw it) has far-reaching truths for both scientific cosmology and philosophical anthropology: God is no longer necessary to account for either the existence of this universe or the emergence of our human species from prehistoric animals. In fact, this philosopher held that Darwinian evolution led to a collapse of all traditional values, because both objective meaning and spiritual purpose for humankind had vanished from interpretations of reality (and consequently, there can be no fixed or certain morality).

Nietzsche knew that the previous philosophical systems from Plato and Aristotle to Kant and Hegel were inadequate to deal with the crisis of evolution. As a result, a totally new philosophy of the world was now required. So, Nietzsche offered an interpretation of reality that accepted the fluidity of nature, species, ideas, beliefs, and values. Furthermore, he held that it is nonsense to think that the fact of evolution can ever be taught as if it were a religion (since, for him, the process of evolution contains nothing that is stable or eternal or spiritual). Consequently, he would have rejected theistic evolution as an unsuccessful reconciliation of science with religion.

One can imagine Nietzsche's tirades against the biblical fundamentalism and religious creationism that continue to threaten science and reason. An unabashed atheist, Nietzsche would have also abhorred Stephen J. Gould for upholding an unwarranted dualistic ontology that supports both the natural world of the scientist and the transcendent realm of the theologian. Instead, as a monist, Nietzsche would have admired Richard Dawkins and Daniel C. Dennett for their strictly naturalistic framework, which gives no credence to supernaturalism or spiritualism.

Nietzsche had assumed that the result of Darwinian evolution could only account for the success of inferior (weak and mediocre) forms of life simply in terms of sheer numbers, for example, the ubiquitous viruses, bacteria, insects, and fishes. The philosopher argued that Darwin's blind species-struggle of the masses for existence needed to be replaced by his own discovery of the individual struggle by a few for self-creation and excellence.

Nietzsche saw the explanatory mechanism of natural selection as merely accounting for the quantity of species within organic history, but (for him) it is a vitalistic force that increases the quality of life forms throughout progressive biological evolution. He held that nature is essentially the will to power. Evolving life is not merely the Malthusian "struggle for existence," but, more importantly, it is the ongoing striving toward ever-greater complexity, diversity, multiplicity, and creativity. In short, reminiscent of the interpretations offered by Lamarck, Henri Bergson, and Pierre Teilhard de Chardin (among others), Nietzsche's

pervasive vitalism had substituted Darwin's adaptive fitness with creative power.

The philosopher held that the evolution of organisms had its origin in primordial slime, but the human species now stands high and proud on top of the pyramid of life. Even so, he saw a natural tendency for the human animal to evolve toward common mediocrity. But, through the will to power, superior individuals have the potential to master their lives (overcoming nihilism, conformity, and pessimism), as well as the intellect to actualize creative activity.

Philosophical Anthropology

As with Thomas Huxley, Ernst Haeckel, and Darwin himself, Nietzsche taught the historical continuity between human beings and other animals (especially the chimpanzees). However, the philosopher as elitist did assert that some individuals will rise far above the beasts, including the human species, but this will only occur in the remote future with the emergence of the noble overman.

If humans have ascended from the fossil apes, then why should they not be followed by an even higher form of life (as the ape has been surpassed by the human animal of today)? According to Nietzsche, the human biological species is the meaning and purpose of the earth so far, because it is the arrow pointing from the past ape to the future overman. But what is an overman? This exalted but unimaginable being will be as intellectually advanced beyond the present human animal as our species of today is biologically advanced beyond the lowly worm.

For Nietzsche, the aesthetic evolutionist as sculptor, the coming overman is like an ideal image sleeping in a crude rock. In carving out this superior being, the philosopher was guided by its shadow, although he remained indifferent to the destruction resulting from his intense creativity: "Fragments fly from the stone; what is that to me?"

Unlike the silenced priest Pierre Teilhard de Chardin, a geopaleontologist and Jesuit mystic, Nietzsche did not foresee a final end-goal or an ultimate omega point for human evolution. Instead, the finite becomes infinite. Nietzsche's metaphysics is grounded in the colossal idea of an eternal recurrence of this same universe, that is, an infinite series of identical finite cosmic cycles. Although there is organic evolution on earth within each cycle, there is no progressive evolution from universe to universe. Consequently, Nietzsche's process cosmology represents being as becoming, and its teleological evolution from primordial slime to the future overman within each cycle is strictly determined. In the future, the noble and radiant overman will accept the eternal recurrence of the same, with its existential consequence being the affirmation of life as it was, is now, and always will be.

Reflecting on the immediate future, Nietzsche foresaw horrific wars due to conflicts of interests. Nevertheless, he himself was always optimistic that at least some gifted individuals would surmount the trials and tribulations of the human condition. The quintessential value of our advancing species (as he saw it) lies in its superior artists, philosophers, and scientists.

Nietzsche did not speculate on life or intelligence or evolution elsewhere in this universe. Furthermore, this philosopher could not have imagined mass extinctions, nanotechnology, genetic engineering, artificial intelligence, and human space travel to other planets. However, continuing advances in science and technology will offer incredible possibilities for neolife and overbeings in the ages ahead.

Nietzsche had taken time, change, and evolution seriously. He had naturalized metaphysics (ontology and cosmology), epistemology, and values. Furthermore, Nietzsche was acutely aware that this universe is totally indifferent to human existence. Yet, his philosophy presents an optimistic challenge for those individuals who are willing to follow the lightning bolts of his heroic vision.

Darwin's influence on Nietzsche is obvious, although the two geniuses offered vastly different interpretations of evolution. Nietzsche saw human creativity as the extension of creative evolution within a creative universe. Taking this dynamic perspective to its logical conclusion, he saw our species as merely a temporary link between those past (lower) apelike forms and the future (higher) overman to come. For this philosopher, the "good life" of an individual is one that overcomes problems while it devotes itself to creativity.

In Turin on January 3, 1889, while attempting to protect a horse from being beaten by its owner, Friedrich Nietzsche collapsed in the street. He was diagnosed clinically insane due to tertiary syphilis. During the next ten years, first under the care of his mother Franziska and then his sister Elisabeth, Nietzsche remained unaware of his growing reputation as a

singularly influential thinker. His genius was now silent. After his death on August 25, 1900, the teacher of eternal recurrence was buried in Röcken, the town of his birth.

In the decades and centuries to come, our understanding of and appreciation for both organic evolution and our own species will increase in light of new facts, new concepts, and new perspectives. No doubt, there will be surprising discoveries concerning the history of life and human nature. As such, science and philosophy will move far beyond both Darwin and Nietzsche, but certainly never without them.

—H. James Birx

See also **Anthropology, Philosophical; Bergson, Henri; Biogeography; Darwin, Charles; Dawkins, Richard; Evolution, Human; Haeckel, Ernst; Heraclitus; Postmodernism**

Further Readings

Cate, C. (2005). *Friedrich Nietzsche.* New York: Overlook Press.

Köhler, J. (2002). *Zarathustra's secret: The interior life of Friedrich Nietzsche.* New Haven: Yale University Press.

Safranski, R. (2001). *Nietzsche: A philosophical biography.* New York: Norton.

Welshon, R. (2004). *The philosophy of Nietzsche.* Montreal: McGill-Queen's University Press.

Nomads

Nomads are mobile people with no fixed settlement and whose livelihoods integrally involve frequent movement. There are many manifestations of nomadism. Perhaps the most common is pastoral nomadism, but hunter-gatherers can also be nomadic, and shifting cultivators are sometimes described as seminomadic. Throughout the world, Gypsies (and in the West, Travellers) also lead nomadic lifestyles.

For anthropologists in search of "the other," nomads have been clearly fascinating. In this century, nomads have seen many restrictions on their livelihoods, particularly changing property rights that make temporary access to the space and resources they require problematic. Nomads' politics and relations with other groups have been dominated by the evolution of these contests.

In part, the conflicts reflect the fact that nomadic use and tenure of property fits uneasily within state frameworks. States have sought to settle and control populations (Maasai pastoralists in Kenya and Tanzania). They have also sought to expropriate resources perceived to be unused (Barabaig pastoralists in Tanzania). Other conflicts arise because of nomads' antipathy with the values of modern society (the conflict between the San Bushmen and the Botswanan government) or because of long-running hostility and suspicion between them and their settled neighbors (Gypsies and Travellers in Europe). Equally, their unintensive use of space and resources and their rejection of modern values provides fertile ground for potential collaborations with conservation interests.

Pastoral Nomads

Herding in many parts of the world requires moving animals to the best pastures, particularly if herds are large. Pastures in dry and semiarid lands may be inaccessible outside the rainy season for want of water, and pastures in temperate mountains and cold regions may be closed in winter. Good herd and pasture management will require moving stock according to the availability of pasture. Nomadic pastoralism is practiced in the drier regions of Asia, the Middle East, and Africa, as well as mountainous regions of South America and Europe. There are no clear estimates of nomadic pastoralists' numbers, but global populations could be about 30–50 million.

It is useful to distinguish between nomadic pastoralists, who can move to a wide variety of places within a given range according to the availability of pasture, and transhumant pastoralists, who move between fixed places each season. This is particularly appropriate in mountainous regions, or in less arid rangelands where precipitation is more predictable. However, providing a robust categorization of the pattern of movements is not straightforward. Within one group in one area, the type of stock moved, the herding arrangements employed, and the reciprocal access arrangements to pasture can be enormously diverse.

Pastoral nomads are generally marked by their specialized production systems, which focus principally on livestock products that are sold or exchanged for agricultural crops and other goods. Their trade and

pasturing arrangements can rely upon longstanding, but individually negotiated, exchanges. In West Africa, for example, the southerly migration of the pastoral Fulani is facilitated by arrangements with local farmers to graze their cattle on the crop residues in fields.

Pastoral nomads have faced increasing pressure on their pastures, in particular because their seasonal use is rarely well recognized in formal law. In East Africa, there is a long history of pastoralists being evicted from their lands in the face of development or conservation projects. Land titling now threatens further subdivision and possible restrictions on movement. In Mongolia, however, the collapse of collectivized agriculture has seen the revival of nomadic practices.

Hunter-Gatherers

Like pastoralists, hunter-gatherers are found in many places around the world: in arid lands, tropical forests, and the far north. Once widespread, there are now approximately 250,000 hunter-gatherers in the world. Their migration patterns reflect the need to follow migrant animals on which they depend, and to avoid excessive hunting in one place. The latter is driven by the need for a successful hunt, not by any conservation ethic.

Hunter-gatherers' diets are dominated by plants and wild foods that are collected on hunting expeditions. Although they do not generally cultivate or herd, they do regularly and deliberately alter their environments, planting edible or medicinal crops, protecting useful trees, and burning rangelands and forest.

African anthropologists are locked into a bitter dispute as to the history of hunter-gathering. For analysts such as Marshal Sahlins, hunter-gatherers were the "original affluent society" who have little work that they must do in order to meet their needs. For Wilmsen and others, hunter-gatherers are the impoverished relations of pastoral and agricultural groups who have been forced into this livelihood after losing wealth and livestock.

Gypsies and Travellers

These nomads are found throughout the world. The most well known are the Roma, who originated in northern India, from where their language (Romani) derives. There are approximately 12 million Roma throughout the world. Romani slavery was abolished in Eastern Europe in the mid-19th century, prompting a migration to the New World. In the 20th century, some 500,000 Roma are believed to have been killed by the Nazis, and they suffered further under Ceausescu's dictatorship in Romania. Irish Travellers, or Tinkers, are a minority group of some 50,000 who live in Ireland, the United Kingdom, and the United States and are a distinct ethnic group from the Roma with their own language.

Both groups live from trade and short-term work but have long had strained relationships with settled people, which threatens their lifestyle. Years of marginalization have enhanced their exclusion, but also their attraction to people disillusioned with mainstream society. Recently, the term *Travellers* has been applied more generally to people who live lives similar to the Roma and Tinkers, but who do not have the tradition or family history of doing so. In western Europe, Gypsies and Travellers live in caravans and are allocated marginal unwanted lands, often in unpleasant areas. Recently, British gypsies have sought to buy

Source: © iStockphoto/Hatem El-Toudy.

land on which they rapidly construct the facilities they need for their homes, occasioning conflict with locals and planning authorities.

— *Dan Brockington*

Further Readings

Chatty, D., & Colchester, M. (2002). *Conservation and mobile indigenous peoples: Displacement, forced settlement and sustainable development.* New York: Berghahn.

Dyson-Hudson, R., & Dyson-Hudson, N. (1980). Nomadic pastoralism. *Annual Review of Anthropology, 9,* 15–61.

Faser, A. (1995). *The Gypsies.* Oxford, UK: Basil Blackwell.

Non-Darwinian Evolutionary Mechanisms

Charles Darwin was never entirely satisfied with the evolutionary role he originally gave to natural selection in *On the Origin of Species.* He later expressed reservations about attributing too much of evolution to the action of natural selection and survival of the fittest because he became convinced that nonfunctional structures evolving without natural selection could later prove to be useful and therefore come within the range of natural selection. Darwin thought his failure to sufficiently consider the existence of structures that are neither beneficial nor injurious was one of the greatest oversights in his work. He realized that he was not able to eliminate entirely the influence of his former belief that each species had been purposely created and each structure was of some special service. He felt that anyone with this assumption in mind would naturally extend the action of natural selection too far.

Darwin's observation on the link between natural selection and a belief in the purposeful creation of species remains applicable to much of evolutionary biology today. Evolutionary approaches in anthropology and archeology are largely reduced to imagining the evolutionary advantage conferred by an adaptation, and this presumed advantage is supposed to explain why the adaptation came into existence. In a recent compendium on the evolution of great ape intelligence, for example, authors repeatedly imagined selection pressures that were supposed to have increased the intellectual ability of great apes compared with other primates. Because a larger and more complex brain was more costly, it had to be an advantage so that it could be selected to provide the advantages by which it would exist in the first place. Never, in any of these arguments, is there any empirical demonstration that such adaptations owed their origin to the past action of natural selection or that the advantages incurred had anything to do with their origin.

The appeal to imagined selection pressures is superficially very attractive because it requires no deeper understanding of biological structure beyond the constraints of imagination. As Darwin correctly identified, the mode of reasoning is scientifically problematic because it involves an explanation of the origin of a structure in terms of its purpose in servicing the organisms' future survival and reproductive success. Many modern practitioners of evolution appear to be unaware of Darwin's concerns, and with natural selection shown to have an ecological reality, it would seem to be a simple extrapolation to assume its role in evolution as well.

The use of teleological reasoning—the explanation of origin in terms of future purpose—is perhaps one of the greatest ironies of evolutionary biology. Evolution was supposed to end this kind of reasoning and yet it continues as the most popular and pervasive form of biological reasoning. Teleology makes nonsense of biology because it reverses the actual relationship between morphology and genetics by treating morphology as a response to a need that in turn determines the genetic basis for a feature's existence. This developmental relationship is the wrong way around because it is the pathways of molecular communication that produce morphology in the first place, and it is the organism's morphology that constrains what the organism can or cannot do. In what Jeffery Schwartz recently called the "vacuum theory of evolution and adaptation," the biological structure or adaptation of an organism is sucked into a function, and the genetic foundations of this form are sucked along the way.

Darwin not only questioned the applicability of natural selection to evolution, he also attributed the origin of nonbeneficial structures to "laws of growth" acting independently of natural selection. The nature

of these laws was characterized as being largely unknown, although he suggested general possibilities such as "correlation," "compensation," and structural "pressure." His views reflected a concept of biological organization that determined the kind of changes that could take place in the evolution and adaptation of an organism. With the widespread skepticism about natural selection among most evolutionary biologists through the late 19th and early 20th centuries, there was considerable interest in alternative models that looked to a biologically mediated process of evolution. One of the most prominent non-Darwinian models was "orthogenesis," proposed in 1893 by William Haacke. Like many other evolutionists, Haacke noted a sequential pattern of changes in the biological structure, particularly in the fossil record. These changes suggested to Haacke that there was a biological link historically connecting the sequence of evolutionary changes. He cited the well-known example of the single-toed modern horse that did not evolve directly from a five-toed ancestor, but involved interim toe combinations. Terms such as Berg's *nomogenesis* and Rosa's *hologenesis* also represented similar concepts. These alternatives to natural selection encompassed the principle of organisms evolving as a consequence of their biological properties. Organisms were not passive blobs of organic jelly that sat around doing nothing until pushed by an external force such as natural selection. Rather, there were two active elements in evolution—the organism and the environment.

The combination of Mendelian and population genetics in the 1930s was seen by architects of the Darwinian synthesis to substantiate the primary role of natural selection in evolution. As selection became more popular, orthogenetic models waned under the burden of having no comparable explanatory mechanism and the problematic application of orthogenesis to teleological models by some evolutionists. Prominent Darwinian scholars such as George Gaylord Simpson, Ernst Mayr, and Stephen Jay Gould dismissed orthogenesis as an imaginary, if not a mystical, dead end, often equating the concept to the idea of "straight-line" evolution (instead of branching), even though this representation was historically incorrect. Ironically, Darwinians such as Gould and Eldredge ended up dabbling with orthogenetic ideas when they acknowledged that the origin of variation could not be entirely random because it was apparent that there were structural constraints in the type of organization of an organism at any given time. However, unlike Darwin's laws of growth, structural constraints were not a mechanism generating change, just a limit on the mutational possibilities that were still random and spread through the action of natural selection.

Concurrent with the Darwinian evolutionary synthesis was a distinctly non-Darwinian panbiogeographic synthesis proposed by the French-Italian biologist Leon Croizat. Whereas most evolutionary theorists focused on the origin of species in terms of their biological differentiation and adaptation, Croizat developed a theory focused on their geographic differentiation, because all species evolve in both space and time. It was geographic distribution that provided Darwin with evidence for evolution. Darwin attempted to synthesize the great problem of spatial separation between related species by proposing an original, localized birthplace or center of origin from which the species dispersed either before or after the formation of geographic barriers. This idea of geographically localized origin allowed for natural selection to affect the evolution of individual populations, and therefore speciation.

Croizat's unique insight was to test Darwin's theory of evolution as no one had done before, by graphically comparing distributional patterns of related taxa with each other and their dispersal ability. He found that there was no correspondence between dispersal ability and the geographic range or pattern of a group. A group of poor dispersers could be distributed as widely as a group of good dispersers. The lack of concordance between dispersal ability and distribution suggested that the location of related species in different localities was the result of their having each originated in their different localities. This vicariant origin required a different evolutionary model to that of Darwin's centers of origin theory. Croizat suggested that vicariant species (or any other taxonomic entities) occur in different localities because the ancestor was formerly widespread and each descendant species differentiated over part of the ancestral range, giving the appearance that they had each resulted from dispersal, particularly when they may now be geographically isolated by topographical or ecological barriers. In a spatial context, the center of origin for any one vicariant species would be the entire ancestral range established during earlier geologically mediated periods of mobility.

The biogeographic process of geographically widespread differentiation involving multiple species led Croizat to propose a biological mechanism for speciation and evolution. His model was for different evolutionary trends to take place over different parts of the ancestral range as a consequence of the geographically heterogeneous distribution of ancestral characters. An ancestor with characters (a + b + c + d . . .) would vicariously evolve into descendants with characters (a + b), (a + c), (b + c), and so on, according to the geographic clustering of those characters. He also looked to biological structure and, as Gould and Eldredge noticed many years later (although Gould had read Croizat's 1958 book during graduate school), Croizat recognized that organisms represented particular types of organization that constrained and oriented the range and direction of evolution without requiring natural selection. Croizat identified the process as orthogenetic and compatible with Darwin's concept of laws of growth.

Croizat was the first evolutionist to attempt a comprehensive synthesis of orthogenesis and natural selection by viewing orthogenesis as the primary constraint upon the evolution of novelty, whereas natural selection provided fine-tuning between the structure of an organism and its environment. He also drew attention to the developmental relationship between different morphologies, such as the interchangeable positions of legs, wings, and antennae on flies, as the result of a common developmental process. These observations led to a general model of biological development that he called morphogenesis, whereby a single developmental process could be altered slightly to generate many different individual morphologies. In genetic terms, Croizat described this as the recombination of ancestral characters resulting in descendants as specialized versions of the generalized ancestor.

Despite objections by Darwinian theorists to orthogenetic models, molecular and developmental studies also point to a complex, interconnected biological foundation for the origin and evolution of variation. The geneticist Gabriel Dover (University of Leicester) and the primate systematist Jeffrey Schwartz (University of Pittsburgh) have both proposed radical departures from the general Darwinian assumption of evolution being primarily the result of natural selection acting on minute incremental changes in variation. In contrast, they emphasize the role of regulatory genes affecting the presence or absence of entire structures or organ systems, so evolution may not require incremental missing links between different biological forms or structures (for example, the evolution of the eye may not require intermediate and incomplete ancestral eyes). Although selection may change the pattern of variation for a given structure, selection acting upon that structural variation will not make it disappear altogether.

Developmental genetics suggests that the origin of biological structure involves a web of interactions between regulatory and structural genes in which one gene can turn a variety of other genes on or off. This is not a simple relationship between particular regulatory and structural genes and a specific structure, because both master and target genes may participate in many different functions involving unrelated developmental, metabolic, and behavioral processes. With genes each contributing to a function or structure through molecular interactions with other genes and their proteins, any given gene can be involved with multiple partner genes, and it is the combination of partners in any given cell at any time during development that gives rise to a particular part of the individual organisms. No individual gene, or even complex of genes, exists uniquely for a given biological function. A given species-specific structure emerges at the right time and place when a group of multifunctional genes is active or inactive in the appropriate combination at a given location and point in time. This coincidence of gene interactions at a particular stage of development is, itself, contingent upon earlier combinations of genes that can also involve some of the same genes.

This complex and contingent relationship between regulatory and structural genes does not support the popular selection-based narratives that assume that biological structures and adaptations are the result of incremental changes in variation. Morphogenesis involves a complex relationship between regulatory and structural genes that lies outside the popular model of incremental variation and natural selection. Dover focused on the nonindependent evolution of repetitive DNA sequences called concerted evolution, which suggests that there are nonreciprocal transfers of sequence information, such as biased gene conversion, that spread mutations through an entire gene family and a sexually reproducing population. This spreading mechanism, called molecular drive, can result in a long-term change in the genetic

composition of a population, and where the gene involves multiple copies, it cannot be spread through natural selection because the mutation must convert multiple sites. As these mutations become established, a phenotypic transformation of a population may permit the organism to exploit previously inaccessible components of the environment. Schwartz looked to a Mendelian mechanism of genetic turnover involving the accumulation of recessive mutants within a population giving rise to relatively rapid evolutionary events when they reached a critical level of representation to produce a high number of homozygote individuals who could preferentially mate and produce a new lineage or allow the exploitation of different ecological relationships.

The molecular and developmental evolutionary models are non-Darwinian in the sense that they do not assume natural selection as the predominant mechanism for the spread of evolutionary novelty and adaptation. By providing an alternative biological context for evolution, the models are Darwinian in the sense that they develop Darwin's laws of growth in the context of molecular genetics and development. These models demonstrate a genetic and developmental foundation for earlier non-Darwinian orthogenetic models of evolution, and they call into question the widespread assumption that there is a functional purpose for adaptations that is the reason for their existence, or that imaginary selection pressures or advantages necessarily have anything to do with evolutionary novelty. Once selection is no longer necessary for the spread of novel mutations, the evolutionary questions shift to the origin of the mutation itself. Is the origin of any given mutation contingent in some way with preceding mutations? It is this consequence of the structural constraints inherent in each type of organization that is implicit in orthogenetic models and that remains to be explored by evolutionary biologists.

A biologically based model for the evolutionary spread of novelty reverses current models for interpreting the evolution of humans and human ancestors. For example, the evolution of bipedalism may be the result of a shifting relationship between regulatory and structural genes producing a skeletal and musculature structure that resulted in the evolution of obligate bipedalism, whether or not the ancestor was arboreal or terrestrial and whether or not these ancestors liked it. As an ecological consequence, the bipedal mode of locomotion may have decreased exposure to radiation that allowed, in turn, for ancestral hominids to survive in open habitats. Hair loss may be necessary for effective survival of a biped in open situations through greater cooling, but it is the loss of hair that made this possible in the first place rather than the need to lose hair. Increased intelligence may have afforded hominids greater opportunities for survival, again as a consequence of changes in brain evolution, not as a cause of that evolution. The benefit is the result, not the origin, of evolution.

Even with molecular and developmental evidence suggesting a biological foundation for evolution without natural selection, it is highly unlikely that these models will gain much popularity among historical evolutionists in anthropology and paleontology. The temptation to continue to construct imaginary narratives assigning purpose to the meaning of life through untestable notions of historical selection pressures and advantages will be a temptation too hard to resist.

— John R. Grehan

Further Readings

Croizat, L. (1958). *Panbiogeography.* Caracas, Venezuela: Author.

Croizat, L. (1964). *Space, time, form: The biological synthesis.* Caracas, Venezuela: Author.

Dover, G. A. (2000). *Dear Mr. Darwin.* Berkeley: University of California Press.

Schwartz, J. H. (1999). *Sudden origins.* New York: Wiley.

Norms

Norms (from Latin *norma,* a square, used by carpenters, masons, and other artificers to make their work rectangular) are either statistical or ideal. In the statistical sense, the norm is the average. In the ideal sense, however, a norm prescribes or expresses an ideal pattern or standard of behavior in a given social group or social context to which conformity is expected. Confusion between these two kinds of norms should be avoided. Under certain circumstances, it may be normal in the statistical sense to transgress norms of an ideal nature.

Cultural and social anthropology are mainly interested in ideal norms. Norms as standards of behavior

are an essential part of any culture. They provide a system of order and orientation. Nevertheless, they are subject to transformations and may differ from culture to culture. Moreover, societies develop not only several types of norms (such as folkways, mores, and laws), but also sanctions to help enforce the norms, reward conformity, and punish deviance.

One of the tasks of the cultural or social anthropologist is to describe the contexts that distinguish acts of deviance from acts of conformity in a particular community, and to reconstruct the social and cultural norms that generate such judgments. In addition, an anthropologist who works in different social or cultural contexts requires knowledge and sensitivity to social or cultural norms.

Norms, Culture, and Socialization

Ideal norms expressing standards of behavior are part of any society and culture. In many respects, humans are not genetically programmed for one pattern of behavior, but rather have the capacity to learn many different patterns. Any given society institutionalizes a specific set of behaviors selected from the wide range of possibilities. Behavior that may be seen as appropriate in one culture may be called scandalous in another. For example, gender norms define appropriate behavior for men and women. In some societies, young girls are given their own house in which they are allowed to play "wife" with boys they choose. In others, girls are not even allowed to talk to boys. Gender norms define not only appropriate sexual interaction but also behavior, even to the extent of appropriate vehicles for transportation. In many African countries, motor vehicles are driven primarily by men. In some countries, certain vehicles are even taboo for women to drive. At times, these may be motorcycles, and at others, trucks or cars.

In the socialization of (young) people to the norms of a society, most of the cultural symbol system that carries these norms is passed on without being explicitly taught.

Types of Norms: Folkways, Mores, and Laws

Social and cultural norms vary immensely regarding importance and the intensity of the reaction when they are violated.

Folkways are conventional norms of custom generally regarded as useful but not essential to society, and they are fairly weak kinds of norms. For example, when people of Western societies who know one another meet in the street, they probably say "hello" and expect the other one to respond in kind. Likewise, people are expected to be courteous to pregnant women and to eat with a knife, fork, and spoon. Violations of these norms may bring about only mild forms of censure or punishment. One may be reprimanded or considered boorish, rude, impertinent, a nuisance, or an eccentric.

Mores are norms of custom generally regarded as more important for the welfare of a society than mere folkways. They often express high values and are associated with strong feelings of right or wrong, morality or immorality. Their violations may inspire intense reactions and some type of punishment, because violation would endanger the basic stability of a group. Examples in Western societies include the incest taboo, sexual abuse of children, and murder. Someone who violates fundamental mores will be considered socially unacceptable and may be expelled, banished, exiled, or imprisoned. In some societies, the breach of certain mores may even be met with the death penalty. Mores are set up, maintained, and enforced by public sentiment.

Laws are norms whose violation is met (by a state authority) with sanctions that are publicly acknowledged, socially approved, and—at least in principle—consistently applied. Some theorists stress the characteristic that laws must be formally chosen by a state and backed up by punishments for failure to conform to them, with particular social agencies designated to do the enforcing. The formulation of law has long been considered a defining feature of state-level societies. Many fundamental social institutions in state-level societies are bound up with a concept of law; examples include the sovereign authority to create law, courts established to try disputes, and a police power to prevent or punish illegal acts. Whether the absence of these institutions implies the absence of law has posed a fundamental problem for the anthropology of law, insofar as cross-cultural understandings of political institutions and of social control are concerned.

The *anthropology of law* describes the definitions of crimes in particular cultures and the procedures through which cases are adjudicated and remedies applied in particular communities. Some anthropologists claim that an anthropological approach to law must be relativistic in recognizing the variety of cultural settings in which lawmaking occurs. A variety

of approaches have been taken to the problem of defining the domain of law and the application of a concept of law to those societies, such as tribes, that lack clear, centralized political institutions. These approaches differ in the distinction drawn between laws and more general social norms. One solution has been to retain an essentially Western concept. This was the position of A. R. Radcliffe-Brown (1881–1955), who argued that simple societies have no law, although all have customs that are supported by sanctions. Another approach has been to merge law into the domain of custom. This view states that although norms obeyed by indigenous peoples have been refused the name of laws, customs that are fixed and generally obeyed are indistinguishable from laws. Holding this view, Bronislaw Malinowski (1884–1942) equated law with the field of effective social constraint. A third approach takes law to be culturally universal, yet distinguishable from a more general field of custom or social sanction. For E. Adamson Hoebel (1906–1993), a social norm is legal if its neglect or infraction is regularly met, in threat or in fact, by the application of physical force by an individual or a group possessing the socially recognized privilege of so acting. In this sense, the norm of traditional Inuit culture that a recidivist murderer may be executed by the kin of one of her or his victims—who seeks and obtains, in advance, community approval for this act—would constitute a legal norm. In addition to this general theoretical debate, ethnographic studies of law have been conducted. To name only two famous works, Karl N. Llewellyn (1863–1962) and Hoebel analyzed the character of Cheyenne legal reasoning in *The Cheyenne Way* (1941). And Max Gluckman (1911–1975), a South African anthropologist, provided detailed evidence regarding legal reasoning and standards of justice among the Barotse of Zambia in *The Judicial Process Among the Barotse of Northern Rhodesia* (1955). A main topic of contemporary legal ethnography of U.S. law is how difficult it is to "get justice" in light of the disempowerment on the basis of race, class, gender. or ethnic origin.

Deviance and Sanctions

The opposite of conformity to social and cultural norms is called *deviance.* Deviance includes psychopathology, crime, rebellion, or the simple violation of social conventions. An action accurately coded as a social misdemeanor—crime, rebellion, and so on—could be coded as conformity in another. For example, there is a danger that conformity to the norms of one culture will be misinterpreted as a symptom of mental illness in another. A Hopi woman who reports conversing with her dead husband may be thought to be hallucinating by an unsophisticated Anglo-American psychiatrist, despite the fact that her behavior is highly appropriate in the Hopi context. In general, one of the ethnographic tasks of the social anthropologist is to describe the contexts that distinguish acts of deviance from acts of conformity in a particular community, and to reconstruct the social and cultural norms that generate such judgments. The study of psychopathology, in particular, is one task of medical or psychiatric anthropology.

Crimes are deviant acts that violate the legal norms of a particular community and for which there are legal remedies, such as punishment or compensation. Again, the appropriate kind of remedy may differ from culture to culture. In some East African cultures, for example, intergroup homicide is treated not as a punishable act of deviant behavior by an individual, as it is in Western societies, but as something like a debt that can be compensated through payment by the group responsible for the killing.

Rebellion is a form of deviance conspicuously antagonistic to authority or intended to overthrow a hierarchical status system. In some societies, the phenomenon of a *ritual of rebellion* can be found. In such rituals, roles are reversed, such as those of commoners and their king. Gluckman argued that such rituals serve the function of renewing the existing social order, while appearing to overthrow it. Likewise, historians of early modern Europe have examined the extent to which annual rituals like the European carnival expressed real social protest.

Sanctions are responses to both conformity and deviance. They function to maintain social order and social control by rewarding conformity and punishing deviance, thus reintegrating a society after a breach. They are based on collective norms and reflect a shared sense of wrongdoing. Negative sanctions are punishments of varying degrees, ranging from disapproval, gossip, and imprisonment to execution. Positive sanctions are reinforcements or rewards, such as words of praise, bestowal of honors, or canonization. Moreover, some theorists distinguish between formal sanctions, which are imposed by the state, and informal sanctions, which are imposed by members of a community. Respective studies have shown that

formal sanctions are used most often in urban settings and include arrest and imprisonment, whereas in rural areas, informal sanctions, such as gossip, are more prevalent. In addition, one may distinguish sanctions by whether they address the body or the psyche. Whereas physical sanctions, such as beating, bring about physical pain or pleasure, psychological ones, such as rewards, address the feelings and emotions.

For native members of a particular society or culture, their norms are usually a matter of course and, much like the rules of grammar, go unnoticed until they are violated and met with sanctions.

— *Anne Siegetsleitner*

Further Readings

Barfield, T. (Ed.). (1997). *The dictionary of anthropology.* Oxford, UK: Basil Blackwell.

Freilich, M., Raybeck, D., & Shavishinsky, J. (Eds.). (1991). *Deviance: Anthropological perspectives.* New York: Bergin and Garvey.

Merry, S. E. (1990). *Getting justice and getting even: Legal consciousness among working-class Americans.* Chicago: University of Chicago Press.

Winthrop, R. H. (1991). *Dictionary of concepts in cultural anthropology.* Westport, CT: Greenwood.

Oakley, Kenneth Page (1911–1981)

Kenneth Page Oakley was born on April 7, 1911 in Amersham, England. He received an undergraduate degree in geology in 1933 and a Ph.D. from University College, London in 1938. From 1935 to 1969 he was curator of paleontology at the British Museum of Natural History. While Dr. Oakley carried out research in the fields of physical anthropology, geology, and paleontology, his considerable fame today can be attributed to his practical work on a relative dating technique that relies on the differential fluorine content of fossils. Although this concept had been around since 1893 when French mineralogist A. Carnot demonstrated its utility for sorting relative ages of buried materials, the chemistry was imperfectly understood. But with the awareness that hydroxyl ions in bone apatite are replaced by groundwater-bearing fluorides to form a relatively insoluble form of fluorapatite (the same principle that is used in tooth anti-decay arguments), application of the concept became a reasonable relative dating possibility. Although early experiments with the technique had been unsuccessful, in 1947 at the Pan-African Congress on Prehistory, Oakley proposed that fluorine dating might solve the riddle of the Piltdown man (found 1911–1912), which for almost 40 years was considered by many scholars to represent the "missing link" in human evolution. In 1949, Oakley had the mandible and cranial fragments of Piltdown man tested at a government forensic science laboratory, and the results were ambiguous, suggesting that the two items were of a similar age but younger than originally thought. He voiced his concerns about the genuineness of the fossil in the first edition of his 1949 British Museum of Natural History handbook, *Man the Toolmaker*. The decoding of the Piltdown man enigma was a team effort. In July, 1953, J. S. Weiner, a South African anthropologist and visiting researcher at Oxford, was the first to propose that Piltdown man was a hoax. Weiner reasoned that the teeth had been artificially ground and conveyed his thoughts to Oakley through Sir Wilfred Le Gros Clark of the Anatomy Department at Oxford. It was readily apparent to all concerned that if Piltdown man was a fake, the fallout from an uncoordinated release of information on the subject could have local (museum), national, and international implications. Between July and November, 1953 a second round of fluorine analyses was carried out at a government lab. The results showed that the skull and mandible were of different ages. In addition, the flint artifacts were examined by E. T. Hall of Clarendon Labs, Oxford, using X-ray fluorescence analysis. Hall found Fe-based paint on the cherts, with the exception of one that had chromate applied, which when removed looked like normal unweathered chert. Indirectly, Oakley contributed to the establishment of the Research Laboratory for Archaeology and the History of Art at Oxford and established the career of Hall, its first director. Oakley, as the chief proponent of the fluorine dating technique and spokesman for the Piltdown research group, was catapulted into the limelight in late 1953 with the official announcement of the fraud. He and his colleagues wrote numerous articles and books that gave the public a clear picture of the results. Radiocarbon dating in 1959 showed the age of the Piltdown modern human braincase to be 620 ± 100 BP (GRO 2203) and the Piltdown orangutan jawbone to be 500 ± 100 BP (GRO 2204). Oakley, over his long career, had a wide range of interests in which he published, but he is remembered

today for his fluorine dating of Piltdown man. He died on November 2, 1981.

— *L. A. Pavlish*

See also **Dating Techniques; Hoaxes in Anthropology; Missing Link**

Further Readings

Oakley, K. P. (1949). *Man the Toolmaker*. London: British Museum (Natural History).

Oakley, K. P., & Hoskins, C. R. (1950, March). New evidence on the antiquity of Piltdown man. *Nature, 165,* 379–382.

Weiner, W. S., Oakley, K. P., & Le Gros Clark, W. E. (1953, Nov.). *The solution of the Piltdown problem.* Bulletin of the British Museum (Natural History) Geology.

Ochre

A broad name for a class of pigment bases, ochre is a fine clay that has been deeply colored by iron oxide in the soil. The amount of iron oxide present in the soil is the largest determinant of the degree of redness of the ochre; excavations of an aboriginal mining site showed that the highest quality ochre (darkest red) contained roughly 30% iron oxide and 50–60% SiO_2. Depending on the amounts of iron oxide and trace impurities it contains, ochre can range from yellow to reddish brown. The presence of SiO_2 (quartz grains) accounts for its gritty nature.

Indigenous people all over the world, from Aborigines in Tasmania to the Cherokee in North America, mixed ochre with water or grease from animal fat to create thick pasty paints. Its relative proximity to the surface of the earth, typically in the first meter of topsoil, made excavation simple. Tools used for harvesting were constructed from local vegetation and stone; metal was not needed because of the ochre's shallow depth. Ochre-based paints, like other paints, can be applied with a variety of tools, such as brushes or one's fingers, and there is evidence that at the Pech-Merle cave in France artists used tubes to blow the paint onto the cave wall.

That the deep red paint had inherent magical properties was and is a widely held belief. The Wiradjuri, a tribe of aboriginal Australians, use red ochre in the initiation ritual of their adolescent males. The ritual consists of two parts: during the first part, the elders symbolically kill the initiates with flaming sticks; during the second part, the initiates' bodies are marked with red ochre paint, symbolizing their birth into manhood. In tribes along the coast, adolescent females undergo their own initiation ritual. When a young woman first menstruates, she is segregated from the tribe with a group of tribeswomen who train her for her role in the tribe. After this, she is covered in red ochre and bathed; now clean, she returns to the tribe as a woman. Some aboriginal groups also used ochre paste to coat wounds. Australian aborigines covered themselves, their tools, and their weapons with ochre, as did the Beothuk Indians of Newfoundland, who were called the "Red Ochre People" by European explorers. Other North American tribes covered themselves with ochre paint, and in addition they would coat their bodies in ground hematite (ochre), producing a glistening shine. This coating had not only symbolic and magical intent, it also had the practical value of insulation. Peoples worldwide have found a variety of uses for ochre: as an artist's medium, as a body paint with status and intimidation value for warriors, in funerals and other rites of passage, and for healing and other magical purposes.

— *James Paul McMillan*

See also **Aborigines; Australian Aborigines; Cave Art; Pictographs**

Further Readings

Clottes, J. (2002). *World rock art.* Los Angeles: Getty Publications.

Sagona, A. (1994). *Bruising the red earth: Ochre mining and ritual in aboriginal Tasmania.* Malaysia: Melbourne University Press.

Ogbu, John (1939–2003)

John Ogbu was a major figure in educational anthropology. The impact of his writings and his influence on hundreds of students and colleagues will be felt for decades to come. His work has been translated into numerous languages and has influenced educational debates within and beyond the field of anthropology.

Like many scholars before and since, Ogbu searched for explanations for the disproportionate rates of academic failure among ethnic minorities in the U.S. He found explanations based on "cultural differences" unconvincing, noting that some minorities manage to succeed at rates equal to or above those of white students, despite being culturally and linguistically quite different from the "mainstream." He instead proposed that the essential factor shaping minority students' orientation toward formal schooling was their status as either "voluntary" or "involuntary" minorities. Voluntary minorities are immigrants by choice who aspire to succeed on the terms of their host country; success may lead to cultural assimilation but is not in itself incompatible with membership in the minority group. Involuntary minorities, however, are the descendents of enslaved or colonized peoples (e.g., African Americans) who formed their collective identity in a context of oppression by the dominant group (whites). An essential element of involuntary minorities' group identity is their oppositionality vis-à-vis the dominant group, expressed through alternative cultural practices and resistance to dominant institutions, including the school.

Ogbu stressed the importance of students' own cultural practices and group identity to their school experience, but unlike "cultural difference" explanations of minority school failure, he situates minority students' oppositional culture and identity in larger structures of racism and economic marginalization. According to Ogbu, as African American youth become cognizant of the "glass ceiling" limiting their economic advancement, they reject the ideology that posits educational achievement as the key to social mobility. Furthermore, since academic achievement is equated with "acting white," it is viewed as incompatible with full cultural membership in the minority culture. Ogbu saw African Americans as a "caste-like" minority, their subordinate status enforced by dominant ideologies of contamination and inferiority, similar to those pertaining to rigid caste societies. While subject to the criticism that the U.S. racial hierarchy is in fact considerably less rigid than actual caste societies, Ogbu's ideas are supported by research showing that many groups that are low-achieving "involuntary minorities" in their home countries become high-achieving "voluntary minorities" after migrating to the U.S. While recent theories of race and ethnicity posit such categories as considerably more fluid and arbitrary than Ogbu presents them, those same theories also support Ogbu's notion that dominant and subordinate identities are forged relationally in the same historical cauldron, rather than as independent cultural entities. Furthermore, the growing body of research into youth cultures has demonstrated the centrality of oppositional identities and resistant cultural practices to the lives and values of minority adolescents.

Ogbu was also a prominent voice in the debate over the role of Ebonics (African American Vernacular English) in formal education. As part of a California task force on African American education, he stressed the incompatibility between the linguistic norms of Standard English and those of African American communities. The task force and the Oakland School Board called for the educational use of Ebonics to help African American students transition to Standard English, but their position did not ultimately prevail. The Ebonics controversy spread far beyond academia to eventually engage the entire nation, evoking (but not resolving) myriad conflicts and popular misconceptions about race, language, and minority education in the United States.

At the time of his death, Ogbu was still theorizing the relationship between collective identity and cultural/linguistic boundaries, and using cross-cultural data to shed light on notions of intelligence and "scientific testing" of minorities. His interest in the influence of culture change on cognitive skills led him to examine what he called "cultural amplifiers of intelligence" (e.g., schooling, art involvement, indigenous economic activities) and their effects on cognition. Ogbu was buried in his native Nigeria.

— *Aurolyn Luykx*

See also **African Americans; Caste Systems; Education and Anthropology**

Further Readings

Gibson, M. A., Ed. (1997). Ethnicity and school performance: Complicating the immigrant/involuntary minority typology. Theme issue of *Anthropology and Education Quarterly*, *28*(3).

Ogbu, J. (1978). *Minority education and caste: The American system in cross-cultural perspective.* New York: Academic Press.

Ogbu, J. (1999). Beyond language: Ebonics, proper English, and identity in a Black-American speech community. *American Educational Research Journal, 36*(2), 147–184.

Ohio Hopewell

The 1848 publication of *Ancient Monuments of the Mississippi Valley* by Ephraim G. Squier and Edwin H. Davis marks not only the jumping-off point for American archaeology as an academic discipline but the beginning of our nation's fascination with the mounds and earthworks of central Ohio and the ancient Americans who built them. Today we call these ancient Americans the Ohio Hopewell. They flourished in the fertile landscape of the middle Ohio Valley at roughly the same time as the Golden Age of the Roman Empire.

As the focal point of their research, Squier and Davis mapped and excavated dozens of mound and earthwork sites in south central Ohio, centering on Davis's hometown of Chillicothe, Ross County. Some of the mounds they excavated, like those at Mound City (now a National Park Service site designated Hopewell Culture National Monument at Mound City), contained impressive examples of artifact styles rich with symbolism based on geometric and zoomorphic designs. Not long after their seminal publication, these two nascent archaeologists had a falling out. Unfortunately for modern Americans, a large portion of their collection was sold by Davis to the Royal British Museum in London. Even today, many of the most beautiful carved Hopewell effigy pipes and mica cutouts from sites like Mound City are displayed in London, rather than in the United States.

As is common for many Neolithic-stage populations, the Ohio Hopewell mounds contain the tombs and bodies of the honored dead (predominantly, but not exclusively, males) for whom the monuments were built. Thus, America's earliest significant attempt at academic archaeology represents a glorified form of grave robbing. Ironically, archaeology most clearly reveals its delicate balance between the humanities and social science when it uses the dead for data, as both social role and social status are often well marked in burials. Today, the excavation of ancient human remains is restricted by the Native American Graves and Repatriation Act, passed in 1991 to redress over a century of mistreatment of Native American dead by a scientific community who viewed them as nothing more than specimens. Sadly for the ancient Hopewell dead whom they disturbed, the mound excavations of Squier and Davis would most likely not have been acceptable under the provisions of this Act. Nonetheless, their research set the stage for the next 150 years of Ohio Hopewell archaeology.

Hopewell: Culture or Cosmology?

In addition to their work at Mound City, in 1845 Squier and Davis also mapped and excavated another key Ross County site located on the north fork of Paint Creek, which we now call the Hopewell Earthworks. This mound and earthwork cluster is considered the type site and lends its name to the entirety of the Hopewell cultural phenomena. The Hopewell name comes from the family name of the landowner, Capt. M. C. Hopewell, who owned the farm during the second major excavation at the site. When Squier and Davis worked there earlier in the century, the property was owned by the Clark family, so accordingly in *Ancient Monuments* they called it Clark's Works. However, the name Hopewell certainly has a ring to it that Clark does not; so goes the serendipity of the naming of archaeological names. This second excavation was directed in 1891–1892 by archaeologist Warren K. Moorehead and was conducted during his explorations to collect artifacts for exhibition at the 1893 World's Columbian Exposition in Chicago.

The Hopewell Earthworks includes an oblong embankment that stretches lengthwise west to east along the terrace of the north fork of Paint Creek. This embankment is called the Great Enclosure. The embankment walls in the Great Enclosure are estimated to have been around 35 feet wide and upwards of 6 feet high, meaning that people on the outside could not have easily looked in upon the enclosed space. It encloses over 110 acres and has a square shaped earthwork attached to its east side, each side of which is almost exactly 850 feet in length. The Hopewell Square has openings, or gateways, located halfway down along each of its four walls, with the gateway along the west edge opening into the Great Enclosure, and an additional two openings in the northeast and southeast corners respectively. Rectangular mounds are placed across the mouth of each of the four gateways located along the midpoints of the square so that again, even as one enters this enclosure from these gateways, the entrant cannot look directly in upon the enclosed space.

Within the Great Enclosure there were at least 40 mounds ranging in size from small and inconspicuous conical mounds only a foot or two high to large and massive loaf-shaped mounds (the exact number

is impossible to know because various forms of degradation and destruction have taken place at the site, beginning with the Squier and Davis excavations). These mounds are placed throughout the enclosure in no apparent pattern, although some archaeologists believe there is significant symbolism in their placement and that alignments are linked to astronomical phenomena. The largest loaf-shaped mound in the Great Enclosure is a tripartite, conjoined, multi-layered mound labeled Mound 25. The mound itself was encircled by a low D-shaped embankment approximately 2000 feet in circumference, which had the straight side of the D located along the north edge. The immensity of Mound 25 is difficult to convey. At an estimated size of just over 30 feet tall, 550 feet long, and 180 feet wide (equivalent to three stories high and three city blocks long), it is by far the largest of all of the Ohio Hopewell mounds. Mound 25 is also one of the two largest man-made earthen structures in North America, being surpassed only by Monk's Mound, which is located near St. Louis, Missouri at the site of Cahokia, a large Mississippian center that may represent the only urban site in North America. Dating to the 9th–11th centuries, Cahokia was almost 600 years later than Hopewell.

Mound 25 at the Hopewell Earthworks is at the heart of what many archaeologists mean when they use the term Hopewell. It contains the most impressive burials, altars, and artifact deposits, in terms of both quantity and quality, of all of the Hopewell mounds, in Ohio and beyond. The mound and its remains appear, at many levels, to represent the ideological or cosmological center of the Hopewell world. It is important to note that the mound covers the remains of a large, multi-roomed, wooden structure, on the floor of which were buried the Hopewell dead. This structure was undoubtedly the location of the critical social interactions and expressions of ritual knowledge that define Hopewell cosmology. The mound-building activities not only closed the use of this structure but put an end to the use of the ritual knowledge in this location, making Mound 25 a monument.

The term *Hopewell* was first used to represent a prehistoric culture at the turn of the 20th century. The term was popularized following analysis and synthesis of Moorehead's collections and in association with other major mound and earthwork excavations that had taken place in south central Ohio up to that time, including the third and final major expedition at the Hopewell Earthworks led in 1922–1925 by Ohio Historical Society archaeologist Henry C. Shetrone. However, exactly what is meant by the cultural term Hopewell has undergone considerable revision and refinement since its inception. Likewise, the term *Ohio Hopewell* now has a specific meaning of its own too, independent of the broader concept of Hopewell. Originally, Hopewell was confined to Ohio (i.e., Hopewell = Ohio Hopewell in modern terminology), but mound excavations in other parts of the Eastern Woodlands clearly showed a broad similarity with the archaeological remains excavated in Ohio. The core area in Ohio, centering on the Chillicothe region, is also sometimes referred to as Scioto Hopewell in the literature, although herein Ohio Hopewell is used as the more inclusive cultural term.

Archaeologist Joseph Caldwell proposed a concept in the 1950s that he called the Hopewell Interaction Sphere to link these widespread mound-building traditions together. However, instead of a monolithic Eastern Woodlands culture, Caldwell viewed Hopewell as a pan-Eastern ideology or cosmology, centering on

the rituals of mortuary ceremonialism. The Hopewell Interaction Sphere functioned as an exchange network that moved the raw materials and finished symbolic artifacts deposited in the mounds with the dead, but more importantly, it moved the ideology that grounded these customs. Thus, as a result of Caldwell's contribution to Hopewellian studies, regional "cultures," traditions, or phases within Hopewell emerged. Current research suggests a broadly similar time frame for all of these regional groups, which are now encompassed within what is known as the Middle Woodland period, approximately 2200 to 1600 years before present (B.P.), or 200 BC. to AD. 400.

Next to Ohio Hopewell, the Havana Hopewell, centered in the Illinois River Valley, appears to be another significant regional expression during the Middle Woodland period. Including these two important core areas in Ohio and Illinois, at least 12–18 Hopewellian regional cultures are spread throughout the south as far as Florida, along the Mississippi River corridor from Louisiana to Wisconsin, out the Missouri River as far west as Kansas City, across the upper Midwest, and into the Ohio River Valley as far northeast as the Upper Great Lakes in upstate New York. Conservatively, it has been estimated that there were over 20,000 mounds erected by Eastern Woodland peoples over the span of about 1500 years. Yet, with few exceptions, Ohio is the primary location of the Hopewell earthwork-building tradition, especially of the large geometric variety like the Hopewell Square and the complex geometric constructions at Newark, Ohio, in Licking County, which included an octagonal earthwork attached to a large circle (large enough to encompass an 18-hole private golf course, which has been rented in perpetuity from the Ohio Historical Society), another large circle, two large squares, several small circles, an elliptical enclosure, dozens of mounds, and miles of parallel embankments linking the complex together.

Origins

The origins of the Hopewellian mortuary ritual ceremonialism can be found in the Late Archaic and Early Woodland period cultures occupying the Great Lakes and upper Midwest in the millennia preceding the Middle Woodland period. In the Late Archaic period, approximately 5000–3000 years ago, the ideology that focused cultural energy on mortuary ritual ceremonialism emerged in these regions. Important individuals were buried in prominent locations with rich symbolism. Symbolism was present in artifacts interred with the burials, but also in the construction of the burial tombs and the methods of treatment of the dead. Rubbing corpses with red ochre was practiced by some of these cultures. Burial locations were chosen that included visible natural knobs or prominences, shell middens, and sometimes glacial kames. Names given to identify some of these cultural complexes include Old Copper, Red Ochre, Glacial Kame, Orient, and Meadowood. Very little definitive knowledge exists concerning the broader questions of settlement and social organization for most of these peoples, although evidence seems to point to most of them being seasonally mobile hunters and gatherers, some of whom began to experiment with the plants that later became the EAC crop system.

The presence of ceramic technology in Eastern Woodlands cultures about 3000 years ago has been used to create one of the period boundaries between the Archaic and Woodland periods. During the Early Woodland period, approximately 3000 to 2200 years ago, the first burial mounds were erected in the middle Ohio Valley. Meadowood people, in Ohio and upstate New York, may have been among the first people to erect small earthen mounds for the dead. Some of the people who erected these mounds were the direct ancestors of the Ohio Hopewell. One of the clear purposes behind building the mounds, besides the obvious function of providing a final resting place for the dead, was the social separation of ritual and domestic space. What the Hopewell later accomplished with the separation of space by their earthwork and mound centers is a logical conclusion to this practice.

In the middle Ohio Valley, beginning about 2500 years ago, a distinctive burial ceremonial complex had emerged that focused on the building of dispersed conical mounds. This complex is today known by the term Adena. It, too, was named at the turn of the 20th century, based on the excavation of a 26-foot-tall conical mound by Ohio Historical Society archaeologist William C. Mills on the Adena Estate of Governor Thomas Worthington in Chillicothe, Ohio, less than a mile from the Hopewell Culture National Monument at Mound City. The Adena are also known to have constructed small geometric circles, sometimes encircling mounds and sometimes not. The Adena are logically the clear ancestors of Hopewell, at least in places like the Chillicothe and Licking regions of central

Ohio. However, the Adena did not evolve into Hopewell throughout their range, creating a complex dual-tradition phenomenon that has vexed archaeologists who prefer simple ancestor-descendant relationships between cultural traditions. In peripheral locations, like the Muskingum River Valley and the Hocking River Valleys of southeastern Ohio, the Bluegrass Region of northern Kentucky, the White River Valley of eastern Indiana, and the Kanawha River Valley of West Virginia, Adena communities appear to have existed until as late as A.D. 200–300, living alongside contemporary Hopewell communities located in the Scioto, Licking, and Miami Valleys in south central Ohio.

Symbolism

Hopewell symbolism is generated in several different mediums and scales. The exact meaning of these symbols is, of course, shrouded in mystery, but there is scholarly consensus about the self-evident iconography in some mediums, like the effigy pipes. A dominant Hopewell motif is the raptorial bird. This motif occurs in the form of stylized eagles, hawks, or falcons on ceramic vessels, on copper plaques (cold hammered from nuggets collected near Lake Superior), on shells collected on the Gulf Coast, on pipes carved from Ohio pipestone, and on carved mica sheets (collected in western North Carolina). Other animals, like waterfowl, deer, and bear, are also common motifs in Ohio Hopewell art. Human forms are more rarely depicted, but human hands cut out of mica and copper are known, and a series of ceramic figurines were recovered from mound contexts, which provide insight into clothing and hair styles (men may have used the "Mohawk" hair style).

Next to the zoomorphic forms, there were an abundant number of geometric forms represented in Ohio Hopewell symbolism. The overriding principle seems to be symmetry. Circles, commas, and squares are common; examples of swastikas have been recovered as well. Geometric forms are expressed in the earthworks. In the case of the large squares, circles, and the two known octagons, a convincing case can be made for elaborate astronomical alignments. The solstices are marked, but so, too, are still stands of the moon. Alignments to bright stars and constellations are less well marked by Hopewellian astronomy but do appear to have been important in some cases.

The underlying symbolism in Hopewellian art, burial customs, and earthen architecture has been interpreted in a variety of ways. Some view the earthworks as a symbolic great house capable of bringing together all the members of a community within one socially circumscribed place. The symbolism expressed by artifacts, on the other hand, seems to have functioned at various societal scales, conveying social status and marking social boundaries. Individuals displayed artifacts that sent messages to observers; some of these messages could only be understood locally, while others were more universally understood across regions. The mortuary rituals may be interpreted as marking cults of world renewal. These cults served to incorporate individuals from divergent age-sets, but also from neighboring communities, into inclusive social identities, which dampened conflict and promoted within- and between-group cooperation.

Finally, some of the symbolism is clearly representative of magical or shamanistic practices. In some cases, such as the way obsidian is used, there is an implication of cross-country treks to the very edge of the known world; the obsidian in Ohio Hopewell mounds and earthworks was obtained from the Yellowstone region in the western United States, a distance of upwards of 1800 miles from the Ohio Hopewell centers. Some unique burials may be interpreted as representing shamans, and if so, include the ritual tools or paraphernalia that Hopewell shamans used in their craft.

Settlement, Social Organization, and Subsistence

When the great Hopewell earthwork and mound centers were first observed by Euro-American settlers, the assumption was that only a complex society with a centrally organized political system, itself supported by full-time intensive agriculturalists, could have carried out such a cultural achievement. In fact, scholars like Squier and Davis linked Hopewell, via the trait of mound/pyramid building, to the classic Mesoamerican civilizations in order to provide the level of complexity they perceived to be necessary to account for the archaeological record. Few agreed with Squier and Davis, although some sort of Mesoamerican connection based on symbolism continued to be discussed well into the mid-20th century.

Similarly, it was also widely popular during the 19th century to explain the Hopewell earthworks as the product of some mysterious lost civilization.

Source: © Art Department, CSULA.

Some, like the emerging Church of Jesus Christ of Latter-day Saints (the Mormons), saw this civilization as evidence for the presence of the Lost Tribes of Israel in North America; others saw the mounds as evidence of a Phoenician presence or even a Viking presence linked to the classic Greenland sagas relating the travels of Leif Eriksson and his kin. These explanations are now collected together under the rubric of the "Myth of the Moundbuilders." In all of the various versions of this myth, the explicit assumption at the center is that Native Americans, as typified by the "savage" tribes encountered by Europeans upon contact with the New World, could not possibly have built the earthworks and mounds. This perspective is clearly an extension of the prevailing view of progressive cultural evolution that dominated 19th-century thought. Native Americans were placed so low on the cultural development ladder that supporters of the myth could not perceive how they could accomplish works of such civilized complexity.

The height of absurdity was reached when, in order to strengthen their claim, adherents to the Moundbuilders myth began planting fraudulent tablets and other similar evidence in the mounds for excavators to recover. Some of these, like the Newark Holy Stones from Licking County, Ohio and the Davenport Tablet from Iowa, took generations to expose as frauds, while others, like the Bat Creek Tablet from Tennessee, still have supporters who believe in their authenticity. Ultimately, the foundations of the myth unraveled from the ground up as a result of the extensive mound explorations sponsored by the Bureau of American Ethnology, which were led by archaeologist Cyrus Thomas. He clearly identified ancient Native Americans as the moundbuilders in his classic 1890–1891 *Report on the Mound Explorations of the Bureau of American Ethnology,* debunking the "Myth of the Moundbuilders" and setting the stage for a productive period in Hopewell archaeology that eventually led archaeologists to focus on habitation sites, subsistence patterns, and community organization, rather than myopically continuing the efforts that focused on digging up the Hopewell mounds.

One aspect of the Moundbuilders myth that did not fade with Thomas's research was the assumption that Hopewell populations relied on some form of intensive agriculture. No one could envision how ancient Americans could have built the mounds and earthworks without a reliable food source. Most assumed that this crop system would be based on the same system of food production seen across the Americas: the "three sisters" of corn (maize, *Zea mays*), beans (*Phaseolus vulgaris*), and squash (*Cucurbita pepo*). When Europeans first arrived, the three sisters were prevalent among the Northeastern Iroquoians and Algonquians, the Southeastern "five civilized tribes," the Southwestern Puebloans, and throughout Mesoamerica and South America. Yet, even by the mid-20th century there was no concrete evidence supporting this assumption for Ohio Hopewell. Then, in the first major excavation at an Ohio Hopewell habitation, a couple of carbonized corn cobs were recovered in a sealed midden context that seemed to solidify the case for Hopewellian maize agriculture. This excavation was conducted in Ross County by Olaf Prufer in 1963, at a site he called the McGraw site. While the legitimacy of these cobs has been debated, at this time they do seem to represent real examples of Ohio Hopewell corn. However, what has failed to materialize is widespread evidence of an intensive maize agriculture

lifestyle that supported the mound- and earthwork-building activities of the Hopewell people.

Instead, abundant evidence has been collected suggesting that the Ohio Hopewell populations were food producers, but that they cultivated an extensive array of indigenous starchy and oily seeds instead of the three sisters. These crops have come to be known as the Eastern Agricultural Complex (EAC), and except for widespread use of squash (especially the bottle gourd (*Langenaria sp.*), but also relatives of the pumpkin and summer squashes, (*Cucurbita pepo sp.*)) and an occasional ear of corn, the EAC is composed of locally derived woodland species. Individual aspects of the complex appear to have evolved as domesticates in the Eastern Woodlands beginning between 3500–4500 BP, but did not take form as a fully integrated food producing system until the Early-Middle Woodland periods, approximately 2500–2000 years ago. The list of starchy seed plants includes Goosefoot (a type of chenopod, *Chenopodium berlandieri*), Maygrass (*Phalaris caroliniana*), Erect Knotweed (*Polygonum erectum*), and Little Barley (*Hordeum pusillum*), while the oily seed list includes only two plants, Sunflower (*Helianthus anum*) and Marsh Elder (*Iva annua*).

Smithsonian archaeologist Bruce Smith refers to the EAC complex as a form of low-level food production, which probably contributed no more than 20–40% of the calories the Hopewell populations needed to sustain themselves. He believes that the EAC complex contributed a reliable and predictable food source for Hopewell populations, but at caloric levels far below those contributed by intensive agricultural systems based on maize, beans, and squash (or the wheat, barley, and lentils crop system of the Fertile Crescent). Rotating small garden patches, most likely relying on a slash-and-burn method for forest clearance, is the consensus view of how these crops were cultivated. No evidence, or need, seems to have existed for water supplementation such as irrigation canals. Wood charcoal evidence recovered from Hopewell earth ovens and storage pits indicates that the EAC crop system began to produce the first significant cultural effects on the mature Eastern Woodlands deciduous forest—effects that were considerably magnified by populations utilizing the same crop system, but much more extensively, during the following Late Woodland period, beginning after A.D. 400. It should also be noted that it was not until after about A.D. 900 that intensive agriculture centered on the three sisters took a serious foothold in Eastern Woodlands populations.

The relatively low caloric input from the EAC crops required Hopewell populations to maintain an active practice of collecting natural, seasonally occurring plants and animals; by necessity they continued to practice the hunting-gathering techniques evolved in innumerable local environments by their Archaic ancestors. Whether or not the Ohio Hopewell populations were tethered to the land by their crop system, and could therefore be considered a sedentary population as opposed to a seasonally mobile population, is a current point of major contention in the Hopewell literature. It is clear, though, that the limitations on sources of reliable protein created by the lack of domesticated animals in the Eastern Woodlands, as elsewhere throughout the Americas, put a premium on the hunting of large wild animal species during the Middle Woodland period. Of these wild animals, the white-tailed deer (*Oedocoileus virginiana*) is by far the most important game species, typically comprising over 75% of faunal remains recovered from Eastern Woodlands sites, Ohio Hopewell sites included. After deer, almost every conceivable mammal, fish, and bird species that could be hunted or collected was utilized. Turkey, elk, bear, rabbit, raccoon, and a variety of waterfowl, fish, and shellfish appear frequently in the faunal record alongside deer. On the plant side, emphasis appears to have been placed on collecting a variety of nuts, including hickories, walnuts, hazelnuts, and acorns. Likewise greens, tubers, and berries were also collected when seasonally available. The unique system of Hopewell land management has led some archaeologists to argue for a distinct Hopewell niche. They argue that the gardening system produced a synergistic effect on the landscape that increased the carrying capacity of local environments by creating artificial breaks in the mature climax deciduous forest. Abandoned garden patches promote the growth of forest edge plants such as berries and hazelnuts, which attract animals such as deer and raccoons. The higher local carrying capacity, combined with the EAC food production, may have provided these populations with the necessary resources to limit their seasonal mobility.

Even though evidence for this component of Ohio Hopewell culture is now relatively abundant, there remains a great deal of controversy surrounding the interpretation of settlement, social organization, and subsistence patterns. An index fossil artifact type that characterizes Ohio Hopewell sites is the small delicate blades, called bladelets, produced from prepared cores

of the highest quality cherts and flints, like those found on Flint Ridge in Licking County, or the Harrison County cherts of southern Indiana. Evidence indicates that Ohio Hopewell populations were dispersed across the landscape in small family or extended family groups, rather than aggregating together in towns centering on the earthworks. Over 150 years of excavations at earthwork and mound centers failed to produce much evidence of permanent habitation at these sites. Consequently, it was Prufer who began to look for evidence of Hopewell habitations in the river valleys away from the great centers. His McGraw excavation, though admittedly limited to the midden deposit, formed the cornerstone for his central thesis that came to be known as the Vacant Center model. Prufer's interpretative framework for Ohio Hopewell settlement patterns included the following key elements: (1) the general settlement pattern is based on territorially defined, vacant ceremonial centers, supported by dispersed dependent villages; (2) these dispersed habitation sites were small, consisting of no more than one to a few families, so he referred to them as hamlets or farmsteads; (3) the dispersed habitation sites were semi-permanent, meaning they shifted their households and gardens frequently, although specific locations were inhabited year round; (4) the dispersed habitation sites practiced some level of food production; and (5) these dispersed groups periodically congregated at the earthworks to conduct rituals, like the mound burials, which also served to socially integrate Hopewell communities and provide the interaction context for creating mating networks and other kinds of social bonds.

Additional research, especially in the Licking River Valley, 60 miles northeast of the Chillicothe region, has produced additional support for Prufer's model. This research, conducted by William S. Dancey and Paul J. Pacheco, has produced a refinement and revision of Prufer's model into what they call the Dispersed Sedentary Community–Vacant Ceremonial Center model of Ohio Hopewell community organization. However, some archaeologists argue that the available evidence can also be interpreted as supporting a view of Ohio Hopewell communities that moved seasonally as the resources they were dependent upon became available. Yet, all archaeologists are in general agreement that the Hopewell populations were neither dense nor plentiful in number. Thus, it is assumed that they represent a tribal society, most likely organized along the lines of segmentary lineages. The conundrum of building massive earthworks and mounds, even if they were built slowly over time, all the while relying on potential natural resource fluctuations, remains a central mystery for those attempting to understand Ohio Hopewell.

Demise

The demise of Ohio Hopewell from the archaeological record has long been considered a classic example of cultural collapse. Internal conflict, invasion by outsiders, climate change in the direction of cooler temperatures, population pressures, adaptive transformation, and even simple cultural fatigue have all been offered as explanations for the demise of the Hopewell. Yet, none of these explanations is fully accepted or supported by available evidence.

Some archaeologists see these changes occurring in what were formerly Adena groups, peripheral to Hopewell, as perhaps central to an explanation for the Hopewellian demise. Throughout the middle Ohio Valley, beginning as early as A.D. 300, a new kind of cultural arrangement in the form of aggregated villages was spreading, ultimately at the expense of Hopewellian communities. These village communities continued to cultivate EAC crops but did so more extensively, utilizing the greater manpower available in village arrangements to make larger garden patches, and presumably extracting a greater caloric return from the crop system. The necessity for hunting and gathering was, of course, never eliminated in these populations, even when they began to farm the three sisters, because of the lack of domesticated animals to provide a reliable source of protein. In this scenario, Hopewell populations are simply replaced, or out-competed by the new social arrangement. It is also true, however, that the social integrative function of Hopewell earthworks and mound centers is replaced in nucleated villages by the day-to-day, face-to-face interaction of the community. Whatever explanation is finally accepted for the end of Hopewell, it is clear that after about 600 years of stability, by approximately A.D. 400, the earthworks and mounds we attribute to Ohio Hopewell were no longer being built in the Ohio core area.

— Paul J. Pacheco

See also **Archaeology; Burial Mounds; Death Rituals; Middens; Native Peoples of the United States; Neolithic Cultures**

Further Readings

Byers, A. M. (2004). *The Ohio Hopewell episode: Paradigm lost, paradigm gained.* Akron: University of Akron Press.

DeBoer, W. R. (2004). Little Bighorn on the Scioto: The Rocky Mountain connection to Ohio Hopewell. *American Antiquity, 69*(1), 85–107.

Romain, W. F. (2000). *Mysteries of the Hopewell: Astronomers, geometers, and magicians of the Eastern Woodlands.* Akron: University of Akron Press.

Woodward, S. L., & McDonald, J. N. (2002). *Indian mounds of the middle Ohio Valley: A guide to the mounds and earthworks of the Adena, Hopewell, Cole, and Ft. Ancient people.* Newark: McDonald and Woodward Publishing.

Ojibwa

The Amerindians known as the Ojibwa, Ojibway, Ojibwe, Chippewa, Bungi, Mississauga, Saulteaux, or Anishinaabe (as they call themselves) number well over 220,000. Their territory extends east to west from Lake Ontario to Lake Winnipeg and north to south from the Severn River Basin to Minnesota, Wisconsin, and Michigan. In Canada there are over 100 Ojibwa First Nation bands located in the provinces of Ontario, Manitoba, Saskatchewan, and Alberta. In the United States there are 22 federally recognized Ojibwa bands: the Turtle Mountain, Sault Ste. Marie, Red Lake, Minnesota, Lac Courte Oreilles, White Earth, Bad River, Leech Lake, and many others in Michigan, Wisconsin, Minnesota, North Dakota, and Montana. Historically the Ojibwa were never a single tribe in the political sense but rather consisted of a number of bands sharing a language and culture. They are grouped by scholars into four subtribes: the Southeastern, Southwestern, Northern (or Saulteaux), and Plains (or Bungi) Ojibwe.

There is disagreement concerning pre-contact origins and cultural development: while most Ojibwa maintain that they, like all other Native Americans, are autochthonic, many scholars insist that the ancestors of the Ojibwa originated in Northern Asia and moved across the Bering Strait to the Atlantic Ocean. Then, following an epidemic in 1400 C.E., they retraced their steps, going as far as the western shores of Lake Superior. The Ojibwa heartland today is located in the vicinity of Sault Ste. Marie, Michigan, but this was not always the case. The ancient migration legend, recorded on birchbark scrolls, recounts a long journey from the lower St. Lawrence River up past present-day Montreal, continuing northwest behind Manitoulin Island to St. Mary's River. During the 17th and 18th centuries, they moved into Michigan, Wisconsin, Minnesota, Western Ontario, and Manitoba, with later migrations onto the northern Great Plains in North Dakota, Montana, and Saskatchewan.

The Ojibwa share in both a Woodlands cultural heritage with the Ottawa, Pottawatomie, and Menominee and in a Plains cultural heritage with the Dakota and Lakota Sioux as well as the Cree. Thus, Ojibwa ethnic identity includes a combination of traits from these two distinct traditions. They practice Plains shamanic vision quests and healing rituals, a Rain Dance that is similar to Plains Sun Dances, a Cree-based Smoking Lodge Ceremony, horse breeding and racing. While they share in a Woodlands subsistence pattern that emphasizes fish, wild rice, and maple sugar, they also hunt deer and plant corn and squash. Ojibwa elders smoke and make ritual offerings of *kinnikinnick,* a tobacco mixture of dried leaves and bark.

Ojibwa society is patrilineal with six major clans—Crane, Catfish, Bear, Marten, Wolf, and Loon—along with several minor ones including Pike, Eagle, Goose, Cormorant, Moose, and Reindeer. Each of these clans is exogamous; thus when a male member of the Loon clan marries a woman of a different clan, their children all belong to the Loon clan. Upon death, the clan animal is drawn, upside down, on the grave marker of everyone given a traditional non-Christian burial. Membership in the Midewiwin, or Great Medicine Lodge, involved many years of vision quests and instruction in herbal healing. The Midewiwin is described by its members as a "gift" carried by the Bear and Otter spirits, or *manitook,* and a megas shell. This shell, which is the main symbol for the society, first appeared in the Atlantic Ocean and then moved westward, disappearing and reappearing again and again until it reached Lake Superior. Members of the society institutionalized shamanism as a philosophy and a religion. The Mide philosophy, which is taught to all initiates, stresses the importance of maintaining balance in one's life and showing respect for all other life forms.

Among the Ojibwa there is an extremely close relationship between personal and mythic experience, with myths serving as primary resources for cosmology and worldview. Their life-world is traditionally

Source: © iStockphoto/Robert Kyllo.

described and experienced through key religious symbols, beliefs, and practices as alive with the presence of manitook. These beings inhabit trees, rocks, streams, winds, thunder, lightning, animals, and the sun and moon. Manitook are perceived as other-than-human persons. Spiritual experiences of shamans and dreamers give birth to mythic narratives, and these narratives inform their experiences. Through dreams and vision quests, the Ojibwa elicit revelations that they commemorate in story and perform in ritual. They also gain reverence for the mystery of life that animates all things: humans, animals, plants, and the earth.

Dreams and visions play a central role in Ojibwa culture. Gifted dreamers become respected artists and elders, and children are encouraged to remember and tell their dreams. Since a newborn baby is born "empty" of personality, pressure is exerted upon children to get them to learn about the spiritual world in order "to fill their emptiness." This is accomplished by learning traditional stories and developing a loving relationship with dream images. In this way, children become proficient at a special state of awareness halfway between waking and sleeping consciousness. During such dreaming, people experience a form of "doubling" or conscious awareness of both being in a dream state and of being sound asleep. Such dream experiences involve self-awareness, or self-reflectiveness, while otherwise asleep.

Today, while many Ojibwa engage in traditional craft production as well as occupations such as fishing, hunting, and harvesting of wild rice, many others teach in community colleges and universities, or run manufacturing companies, banks, marinas, fisheries, and ferry services, as well as hotels and casinos. U.S. reservations and Canadian reserves are using their casino revenues to establish community infrastructures. Thus, the northern Minnesota Mille Lacs Band used the profits from their casinos to build streets, schools, a tribal complex, and a museum on their reservation. Today they have nearly full employment together with numerous job opportunities for non-Indians. This has resulted in steadily growing political influence in nearby non-Indian towns. Other Ojibwa bands, however, have not profited from casinos, and unemployment, together with all of the accompanying social ills, is seriously damaging these groups.

— *Barbara Tedlock*

See also **Exogamy; Native North American Religions; Native Peoples of the Great Plains; Shaman**

Further Readings

Peacock, T., & Wisuri, M. (2002). *Ojibwe waasa inaabidaa: We look in all directions.* Afton: Afton Historical Society Press.

Peers, L. (1994). *The Ojibwa of western Canada 1780–1870.* St. Paul: Minnesota Historical Society Press.

Smith, T. (1995). *The island of the Anishnaabeg: Thunderers and water monsters in the traditional Ojibwe life-world.* Moscow: University of Idaho Press.

Oldowan Culture

The Oldowan is the earliest of the Lower Paleolithic or Early Stone Age typological "cultures." At present, the earliest Oldowan sites date from about 2.6 my and come from Gona, in the Afar region of Ethiopia. The Oldowan industry terminates at about 1.6 my, which coincides with the beginning of the Acheulean. The Developed Oldowan, which is concurrent with the Acheulean industry but lacks the characteristic bifaces, continues for several hundred thousand years after the end of Oldowan. However, numerous researchers do not consider the Developed Oldowan separate from the Acheulean industry. In the strictest sense, the Oldowan culture is restricted to Africa, although stone tool assemblages predating the Acheulean have been found in other parts of the Old World recently.

The Oldowan culture is named for the type-site of Olduvai Gorge in Tanzania. Olduvai was first investigated by Heinrich Reck during the early 1910s, establishing the basic stratigraphic framework for future investigations. However, it was Louis Leakey who first recognized the significance of the archaeological remains at Olduvai, and established the Oldowan as a stone tool cultural sequence. Leakey established the Oldowan as a new typological culture. Leakey also established the extreme age of the Oldowan culture at Olduvai during the 1950s, when radiometric dating techniques became available. The realization of the extreme age of the Oldowan had a dramatic impact on the study of hominid evolution during this time period.

The Oldowan is frequently defined as a "chopper" or "chopping tool" industry, and it is usually thought of as made on either rolled stone cobbles or nodules of stone. These notions stem from the prominence of pebble choppers, which occur in high frequencies at many Oldowan sites. These choppers are made by removing a few large flakes from one edge of a cobble. In addition, the Oldowan is defined by the presence of a few other core types: discoids, polyhedrons, spheroids, and simple bifaces. These other core tools are made in a very similar process to the chopper, with flaking simply extended around the perimeter of the core in varying degrees. These core tool types are also accompanied by vast assemblages of unmodified flakes, or *debitage*. The Oldowan also has low frequencies of modified flakes, such as simple scrapers and denticulates. The Oldowan is also frequently defined by the presence of battered stones, perhaps used for smashing objects or used in reducing stone cores.

Many archaeologists have viewed the Oldowan as a primitive version of the later Acheulean. In this respect, many have seen the pebble choppers as a more basic version of the Acheulean hand axe. In addition, many have noted that the Oldowan and Acheulean are extremely similar and are differentiated mainly on the basis of presence or absence of hand axes. This problem was further complicated by the discovery of many sites concurrent with the Acheulean that lacked hand axes. Such sites were often attributed to the Developed Oldowan. In more recent research, such perspectives have been considered increasingly problematic because of the decreased significance given to hand axes as type specimens of the Acheulean.

In this respect, the descriptions above may be somewhat misleading in terms of the variability present within the Oldowan culture. A seminal study by Nicolas Toth showed that unmodified flakes are actually much sharper than the core tools, such as the characteristic choppers. This pointed to the possibility that the focus on core tools was misplaced, and that the real desired end product was sharp flakes, which had been seen as waste up to that time. Toth suggested that core tools were, in fact, the result of particular strategies of core reduction aimed at producing usable flakes, and were thus not intentionally designed. In this way, the morphology of cores, which was the typological basis on which the Oldowan had been defined, was really the accidental result of strategies for the removal of sharp flakes. This presented a substantial critique of Oldowan stone tool typology, which was based entirely on core tools. For this reason, current research tends to give less significance to such typological labels, and focuses more on the inference of behavior linked with a more specific absolute chronology.

Most early researchers of the Oldowan culture felt that its makers were primarily hunters of large game and that this was the evolutionary force that caused both the development of large brains and cognitive complexity and the development of stone tool technology. Evidence of this was initially perceived in the large assemblages of faunal remains that accompany many Oldowan assemblages, such as Olduvai. Later investigations, such as those of Lewis Binford, criticized this notion, instead pointing out the role of carnivores in the accumulations of such faunal

assemblages. Despite this, the view remains pervasive that the lithics of the Oldowan culture were primarily butchery implements.

There are numerous species of hominid present in Africa during the span of the Oldowan, significantly complicating the question of who the makers of this industry were. These hominids include the later australopithecines, *Homo habilis,* and *Homo ergaster.* When Leakey discovered the first specimen of *Homo habilis* at Olduvai, he suggested immediately that this hominid, with a larger brain relative to its known ancestors and contemporaries, was the first maker of stone tools. Indeed, this remains the most commonly held opinion on the subject. However, it is also possible that the late australopithecines or even early *Homo ergaster* individuals were the first to make the Oldowan industry. It is extremely unlikely that there will be any unequivocal evidence concerning this question.

— *Grant S. McCall*

See also **Acheulean Culture; Australopithecines; Axes, Hand; Dating Techniques, Radiometric; Hominoids; Leakey, Louis S. B.; Leakey, Mary; Tools and Evolution**

Further Readings

Klein, R. G. (1999). *The human career: Human biological and cultural origins.* Chicago: University of Chicago Press.

Leakey, M. D. (1971). *Olduvai Gorge: Excavations in Bed I and II, 1960–1963.* Cambridge: Cambridge University Press.

Schick, K. D., & Toth, N. (1993). *Making silent stones speak: Human evolution and the dawn of technology.* New York: Simon and Schuster.

Toth, N. (1985). The Oldowan reassessed: A close look at early stone artifacts. *Journal of Archaeological Science, 12,* 101–120.

Olmecs

The term "Olmec" derives from Olmeca-Xicalanca, the Aztec name for conquest-era Gulf Coast traders. This designation, however, is not without problems given the ethnic and historical links it implies. Indeed, "Olmec" refers to two things: (1) an art style and symbolic system widely dispersed throughout Mesoamerica; and (2) a pre-Columbian culture that flourished from 1200 to 600 B.C. along the Gulf Coast of Mexico, specifically in southern Veracruz and western Tabasco. Both of these definitions acknowledge the culture's impact on the pre-Columbian Mesoamerican world; however, debate persists concerning the nature and development of this impact.

Occupation of the Gulf Coast's lowlands, which comprised the Olmec heartland, occurred as early as 2200 B.C. After 1200 B.C., identifiable characteristics of Olmec culture crystallized. Members of the culture may have collectively spoken an early version of the Mixe-Zoque language. Egalitarian farming communities developed into a multi-tiered hierarchical system of settlement, which integrated towns, smaller villages, tiny hamlets, craft workshops, and isolated sacred spaces. Within this system, the archaeological sites of San Lorenzo, Laguna de Los Cerros, La Venta, and Tres Zapotes were four important centers, which were located in distinct eco-zones. Recent archaeological projects involving survey and excavation have documented considerable and long-term occupation within these centers' cores, as well as in their adjacent hinterlands. This finding has effectively debunked the long-held belief that these sites functioned as vacant ceremonial centers.

San Lorenzo, the earliest of the known Olmec centers, was established around 1200 B.C. The center is located atop a low hill looking out over the Río Chiquito, an arm of the Río Coatzalcoalcos. Most likely, this location facilitated movement of ideas, goods, and people. Between 1150 and 900 B.C., the center's inhabitants leveled San Lorenzo's hilltop and erected earthen terraces, an endeavor requiring considerable human labor. By 900 B.C., San Lorenzo's population had declined, and for reasons not yet understood, the center was eventually abandoned. Following San Lorenzo's decline, the sites of La Venta and Laguna de Los Cerros rose in prominence. Ongoing research at Laguna de Los Cerros has shed light upon the site's history and recognized its prime geographic location. While investigations at Laguna de Los Cerros have been recently initiated, La Venta has long been a focus of researchers' interests and is the most intensively investigated of the Olmec sites. Frans Blom and Oliver La Farge first documented the site in 1926, incorrectly identifying it as Maya. Subsequent research at La Venta drew attention to the

Source: © iStockphoto/Neil Sorenson.

Olmecs' substantial population levels, complex sociopolitical organization, and far-reaching trade networks. The site is located atop a salt dome and surrounded by marshes. In keeping with placement of lowland sites near rivers, La Venta overlooked the Río Palma, which has since run dry. The center's most distinguishing architectural feature is the Great Pyramid, an artificial "mountain" approximately 100 feet high. Despite heat, humidity, and periodic flooding, the center's apogee extended for three centuries. By 400 B.C., the site was abandoned. Tres Zapotes emerged as an important center following La Venta's demise. Despite being distinguished as the first archaeologically investigated Olmec center, Tres Zapotes is less remarkable in size and sociopolitical stature. In 1939, Matthew and Marion Stirling commenced the long history of research conducted at the site. In more recent work, David Grove has highlighted the upland environment in which Tres Zapotes is situated, arguing that its proximity to specific, local resources like basalt would have facilitated commercial relationships with lowland centers to the east. The same hypothesis can be extended to Laguna de Los Cerros, which was also located on the western edge of the Olmec heartland. Recent work has found that occupation of Tres Zapotes extended into the Classic period (ca. 300 B.C.–A.D. 300), debunking the idea of an Olmec "collapse." In this period, the inhabitants of Tres Zapotes retained elements of Olmec culture but also incorporated influences from elsewhere in Mesoamerica.

In common, all of these Olmec centers possessed architectural features requiring considerable construction effort, such as monumental earthen platforms and ridges, ball courts, artificial reservoirs, and drainage systems carved from stone. These centers were also characterized by conspicuous consumption, as excavators have uncovered rich offerings of luxury goods intentionally cached beneath buildings. At La Venta, for instance, four large mosaic masks of serpentine blocks situated in colored sands were uncovered beneath the site's Complex A. Furthermore, it is argued that the arrangement of buildings at sites conveys cosmological beliefs, while buildings' forms replicated landscape features regarded as sacred.

In addition to major centers, Olmec sites included isolated sacred spaces used expressly for repeated and long-term ritual purposes; these sites have no evidence of domestic occupation. Proximity to bodies of water, mountains, and caves—natural features deemed cosmologically important—perhaps provided the impetus for their characterization as sacred. El Manatí represents one of these sacred sites. Located 20 km from San Lorenzo, the site, which served as a place for ritual offerings from 1600 to 1000 B.C., is associated with a natural spring and hill. Fortunately for archaeologists, the inorganic bog soil into which offerings were deposited preserved them for millennia. Offerings included remarkably well-preserved wood busts of adult males and females, jade axes, rubber balls, copal, dismembered human remains of children, and faunal remains. Idiosyncratic and realistic features, suggesting individual portraiture, characterize wood busts.

The nature of political organization and social integration of Olmec centers remains a point of scholarly contention. General consensus advocates

the notion of a theocratic chiefdom. Such a sociopolitical system involves governance of each center by a single, elite individual, or chief, who exercises authority over all things religious and monetary. With respect to the former, artistic representations' iconographic symbols and motifs suggest that the Olmecs practiced a religion distinguished by shamanism. Shamans, or shamanic chiefs, mediated between the natural, earthly realm and the supernatural realm of the ancestors and deities. As first pointed out by Peter Furst in 1968, Olmec sculpture also depicts shamans' supernatural power and ability to transform from human to animal spirits. Use of psychotropic drugs may have facilitated shamanic transformations. Aside from religious activities, the chief's monetary responsibilities were related to food production and collection of tribute. An elite minority, presumably related to the chief, would have also exercised economic control over food tribute and trade networks. Trade with Mesoamerican groups distant from the Olmec is evidenced by materials such as blue-green jade from the Motagua Valley in Guatemala, fine white kaolin clay from Chalcatzingo, magnetite from the Valley of Oaxaca, and obsidian from central Mexico and the Maya highlands. Interactions via trade would have afforded the opportunity for communication of religious, social, and political ideas as well.

Much of this dialogue between the Olmecs and their distant Mesoamerican neighbors is supported by the appearance of Olmec art, or local expressions with characteristic features, in widely dispersed locales. Olmec art possesses distinctive stylistic traits that first appeared in the Olmec heartland between 1250–1150 B.C. Rulership and shamanism are the dominant themes. Most notable for their size and early dates are the three-dimensional human figures carved from stone. These include colossal basalt stone heads, seated and kneeling individuals, throne-like altars, and stelae. The effort that would have been required to procure enormous basalt boulders from their source, the Tuxtlas Mountains, cannot be overstated. First reported in 1862 at the site of Hueyapan in Veracruz, colossal stone heads were in fact investigators' earliest exposure to Olmec culture. Scholars have convincingly argued that carved heads portray individual Olmec leaders. Often these monuments were found defaced or intentionally broken, which possibly signified the cessation of a leader's rule or life. Olmec-style art is also found on a considerably smaller scale, as exemplified by portable artifacts. Ceramics include incised pottery vessels, hollow baby-faced figurines, solid female figurines, and zoomorphic vessels. Jade, a notoriously difficult stone to work with, skillfully carved into figurines, plaques, pendants, and axes were also included in the repertoire of Olmec artisanship.

The appearance of Olmec artistic styles throughout Mesoamerica gave credence to Miguel Covarrubias's argument that the Olmec represented a pervasive "mother culture" from which all other Mesoamerican civilizations sprang. Advocates of this model argued that Olmec culture was unequaled with respect to sociopolitical complexity, religious influence, and economic reach. Subsequent excavations at sites in the Olmec heartland have uncovered numerous artifacts with typical attributes, adding further support for the dispersal of these artistic symbols and their encoded beliefs from the center outward. Since Covarrubias's pronouncement in the 1940s, scholars have heatedly debated the notion of the Olmec culture as Mesoamerica's first civilization.

The counterargument to the "mother culture" model has been deemed the "sister culture" model. Scholars who argue against Olmec-centric models do not emphasize diffusion but consider the developmental processes and interactions of multiple societies. The notion of a central political authority concentrated in the Olmec heartland is disputed, and Olmec-style art is explained as the product of interaction by artisans from different Mesoamerican cultures. Proponents of this model also suggest that the Olmec were no more advanced than other contemporaneous Formative cultures, such as those found at Chalcatzingo in Morelos, the Valley of Mexico, and the Valley of Oaxaca. Sociopolitical development in these areas appears to be concurrent and not influenced by the Olmec. For instance, archaeologists working in the Valley of Oaxaca have identified hierarchically organized chiefly centers, craft workshops, buildings constructed with lime plaster and stone masonry and solar or astral orientations, and trade networks of prestigious goods. Distinct from Olmec imagery of rulers linked to powerful forces in the cosmos, Oaxacan authority is depicted by slain captives and territorial triumphs. Kent Flannery and Joyce Marcus, proponents of this model, argue for the Olmec as a paramount chiefdom, a large chiefdom that combines sacred authority and secular power, that rose, peaked, and eventually collapsed in a landscape of traditional or open chiefdoms. Chiefly

centers throughout Mesoamerica were concentrating power, intensifying agriculture, and exchanging sumptuary goods and ideas.

Drawing on both of these opposing models, Kent Reilly, III has suggested a happy compromise that does not de-emphasize the Olmecs' importance but situates the culture within a larger Mesoamerican landscape. He recognizes that the Olmecs were a significant cultural force whose influence continued after their decline, but he also acknowledges interaction with other Mesoamerican cultures. Art styles and associated symbols did originate with the Olmecs, but the culture did not represent a centrally organized society. Rather, sharing of ideas, beliefs, and practices occurred throughout Mesoamerica, resulting in a localized variation on a theme. Continued research efforts in the Olmec heartland and throughout Mesoamerica will further clarify our understanding of this long-debated issue.

— Pamela L. Geller

See also **Shaman**

Further Readings

Clark, J. E., & Pye, M. E. (Eds.). (2000). *Olmec art and archaeology in Mesoamerica.* Washington, DC: National Gallery of Art.

Coe, M. D., Diehl, R. A., Friedel, D. A., Furst, P. T., Reilly, F. K., Schele, L., et al. (1995). *The Olmec world: Ritual and rulership.* Princeton, NJ: The Art Museum, Princeton University.

Flannery, K. V., & Marcus, J. (2000). Formative Mexican chiefdoms and the myth of the "mother culture." *Journal of Anthropological Archaeology, 19*(1), 1–37.

Miller, M. E. (1996). *The art of Mesoamerica.* New York: Thames and Hudson.

Omaha Indians

The Omaha (also called Maha) are a Native American nation with a reservation in the northeastern corner of Nebraska, tribal headquarters in Macy, and a government-to-government relationship with the United States that was documented by the treaty of March 16, 1854. This treaty ratified reservation boundaries and recognized the Omaha as a sovereign nation governed by a constitution and elected tribal council.

Today, the Omaha farm private reservation holdings (allotments) and collectively operate a casino and resort. They have also entered the professional workforce, becoming attorneys, doctors, accountants, and administrative executives. For example, Susan La Flesche Picotte (1865–1915) was the first Native American woman physician. The Omaha also cooperatively own the Reservation Health Center, which provides food to the elderly and a youth program, among other services.

The Omaha speak English, though new activism encourages young people to study Omaha-Ponca (the Cegiha, Dhegia, branch of the Siouan language family). During the colonial period, forced removal of Omaha children to residential Protestant mission schools where they were forbidden to speak their language caused many to cease speaking Omaha-Ponca. Fortunately, due to the diligence of many anthropologists and linguists, there exist dictionaries, grammars, and Omaha-Ponca texts.

The Omaha intellectual Francis La Flesche (1857–1932) initiated both the Reverend James Owen Dorsey (missionary, linguist, and ethnographer for the Smithsonian Institution's Bureau of Ethnology) and Alice Cunningham Fletcher (ethnographic researcher for Harvard's Peabody Museum) into Omaha language and culture, which resulted in classic studies. Francis La Flesche also wrote a text of Omaha tales at the behest of Franz Boas that was never published, though La Flesche published other works. An ethnographer himself, La Flesche's obituary appeared in the *American Anthropologist.* There are many excellent studies that focus on Omaha folklore and literature as well as biographical accounts of prominent Omaha.

Because Omaha-Ponca was an orally transmitted language, written documentation of the Omaha begins with the journals of French trader Louis Jolliet and French Jesuit Father Jacques Marquette in the latter part of the 17th century. Both men recorded that the Omaha were semi-nomadic hunters, gatherers, and horticulturalists of corn, squash, and beans who lived in earth-lodge villages during the spring and summer months. Women owned the earth-lodge houses, and following marriage a man resided in the household of his mother-in-law. In July, all the clans

hunted the bison together with great ceremony, returning to their villages for the autumn harvest. After the harvest, Omaha villages broke up into small family bands to hunt game in the Upper Missouri Valley, which is the region now designated Iowa, Nebraska, and Minnesota, at which time the Omaha lived in portable, hide-covered *tipis* also traditionally constructed and set up by the women.

Throughout the U.S. colonial period (1776–1900), the government regarded these semi-nomadic subsistence patterns as evidence of the supposed "uncivilized" nature of Native American culture. Because earth-lodge horticultural villages were left unoccupied during the winter months, American authorities defined them as "abandoned." In fact, Native American tradition did not recognize private ownership of land. The U.S. government used these semi-nomadic subsistence patterns to expropriate the North American continent from the Native Americans. However, prior to the expropriation of Omaha territory by the U. S. government, and in addition to hunting, gathering, and horticultural subsistence activities, by the late 1700s to the early 1800s the Omaha controlled Missouri River trade. Consequently, the Omaha were considered quite wealthy by the standards of the day.

In terms of social organization, the Omaha divided themselves into two moieties (Earth People and Sky People), subdivided further into ten clans. Among the ten clans, seven particular clans were the holders of the Seven Sacred Pipes of Omaha traditional religion. From these seven clans were drawn the Council of Seven Chiefs. The moieties and clans ensured (and continue to do so) a place for every individual within the Omaha nation, connecting the clans by means of social relations and obligations that regulate not only economic pursuits and conflict but also spiritual life.

Traditional Omaha religion is complex and subtle. An elaborate cosmology reflects the system of moieties, clans, and gender relations. The Sky People moiety represents the great cosmic Father Spirit or father principle symbolized by The Sacred Pole, "Umon-hon'ti," also referred to as the "Venerable Man." The Earth People moiety represents the great cosmic Mother Spirit. Her emblem is the Sacred White Buffalo Hide, "Tae-thon-ha." The Omaha refer to Tae-thon-ha as Umon-hon'ti's "companion." Both Umon-hon'ti and Tae-thon-ha have a Sacred Pipe to connect the Omaha to these spiritual principles by means of "fragrant smoke," which carries prayers to the world of spirit. Many Omaha continue to practice an amalgamation of traditional Omaha religion with various forms of Christianity.

Many excellent anthropological, historic, linguistic, and biographical works focus on the Omaha people.

— *Susan Marie Kirwan*

See also **Native North American Religions; Native Peoples of the United States**

Further Readings

Ridington, R., & Hastings, D. [In' Aska] (1997). *Blessing for a long time: The sacred pole of the Omaha tribe.* Lincoln and London: University of Nebraska Press.

Smith, H. G. (1974). *Ethno-historical report on the Omaha people: Commissions findings.* New York and London: Garland Publishing.

Tate, M. L. (1991). *The upstream people: An annotated research bibliography of the Omaha tribe.* Metuchen, NJ: The Scarecrow Press.

Onas

At the time of the first European contact, among the aboriginal groups that inhabited the archipelago of Tierra del Fuego were the Selk'nam, or Onas. Onas was the name their neighbors, the Yaganes or Yámanas, gave to this group. The Selk'nam lived in the northern steppe grassland of the grand island of Tierra del Fuego. However, they did not have a permanent settlement; they migrated throughout their territory according to seasonal climate changes and in search of a better campsite, food, firewood, and water. Like the Tehuelches of Patagonia's plateau—to whom, according to some archeological records, Onas are related—they had a pedestrian-hunter economy that made the guanaco their most important resource, not only for alimentation but also for apparel and dwelling.

Guanaco hunting required strategies such as high prey dismembering, high-value anatomical part selection, and long distance transportation. Archeological remains provide accounts of these strategies reflected

in the tools found: projectile points, harpoons, wedges, scrapers, axes, drills, and wooden bows. Some of theses tools were made of bone and guanaco tendons or nerves. Guanaco nerves, tendons, and membranes were used as sewing threads and also to tie and braid fishing nets and baskets. Selk'nams also consumed sea lions and other marine mammals beached on the coasts. Their diet was complemented with mushrooms, wild celery, and different kinds of berries, birds, fish, and mussels. An increased consumption of fish and shellfish after European colonization may reflect sea lion diminution caused by sealer activity in the region.

Onas were organized in groups or bands of individuals related to each other. Bands were the basic unit of geographical residence, subsistence, and travel. They did not have a permanent chief except during war periods. However, they did respect the authority of elders and shamans. Each Ona group lived in its own territory or hunting zone and migrated through it in search of food. They had a clear social division of labor: women were in charge of food, water, and wood collection and men of hunting. The violation of hunting delimitations was a sufficient reason for war between groups. Their nomadic life was momentarily interrupted when a sea mammal became stranded. In this case, different groups gathered together at the beach until the animal was consumed. Another situation that made groups stay in the same place longer than usual was when young men were inducted in religious ceremonies called *hain*. The purpose of this induction was twofold. First, it was aimed at maintaining and justifying masculine hegemony. Second, it served as a youth intensive training on hunting, surviving, and instruction on Selk'nam's beliefs about the world. Ethnographers and colonizers alike were impressed by the complexity of the Onas belief system.

By the late 19th century, Onas existence was precarious. Not only had they been engaged in a process of acculturation that altered most aspects of their livelihood, but they had been segregated by European ranchers to the innermost section of the island or in Salesian missions and reservations. The last full-blooded Selk'nams died at the end of the 20th century.

— M. Fernanda Astiz

See also **Tierra del Fuego, Yaganes**

Further Readings

Briones, C., & Lanata, J. L. (Eds.). (2002). *Archeological and anthropological perspectives on the native peoples of Pampa, Patagonia, and Tierra del Fuego to the nineteenth century.* Westport, CT: Bergin & Garvey.

Champman, A. (1986). *Los Selk´Nam, la vida de los onas.* Buenos Aires: Emecé Editores.

Martinez Sarasola, C. (1992). *Nuestros paisnos los indios. Vida, historia y destino de las comunidades indígenas en la Argentina.* Buenos Aires: Emecé Editores.

Oparin, A. I. (1894–1980)

Aleksandr Ivanovich Oparin, a Russian biochemist, advanced theories on the origin of life based on the chemical components of the early atmosphere. At first his theories were met with skepticism, but later they achieved some measure of acceptance in the scientific community.

Oparin was born in the village of Uglich, near Moscow. His family moved to the Russian capital when he was nine, due to there being no secondary school in Uglich. Oparin stayed in Moscow and eventually attended Moscow State University, where he majored in plant physiology. He was greatly influenced by a plant physiologist at the university by the name of K. A. Timiryazev. Timiryazev had known Darwin, and the influence of this relationship can be seen often in Oparin's writings.

Oparin's theory was intended to extend Darwinian evolution back through time to show how simple chemical compounds, both organic and inorganic, could have formed into complex organic compounds, and how the first organism could have formed from these complex organic compounds.

Oparin made his first public presentation of these views in 1922 during the meetings of the Russian Botanical Society. Oparin's theory relied on several ideas that were regarded with skepticism by his peers, for example, the method of nourishment acquisition he proposed for the first organism. Oparin claimed that the primordial organism was heterotrophic; that is, it obtained nutrients by consuming organic compounds. More popular was the theory that the first

organisms would have had to create their own nutrients in a manner similar to that of modern plants.

He also proposed tenets in his theory that contradicted the view of life as essentially molecular and further claimed that living organisms cannot survive without receiving energy and nutrients from their environments. Both views were controversial. Despite opposition, Oparin was able to do much of his work as a result of advancements in organic chemistry, the likes of which were not available to earlier researchers in the field.

In 1935, the Soviet government created a biochemical institute in honor of Oparin's friend and mentor A. N. Bakh. Oparin was instrumental in the founding of the Moscow-based institute and served as its director until his death. While at the institute, Oparin did much to advance the study of the origin of life. In 1957, the first international conference on the origin of life was held under his direction in Moscow, with 16 countries represented. The conference met twice more, once in 1963, and then again in 1970. It was during the 1970 meetings in Pont-à-Mousson that Oparin was named the first president of the new International Society for the Study of the Origin of Life.

Oparin also performed research in the fields of enzymology and industrial biochemistry along with his studies into the origin of life, but he remained focused on the last for the most part. On his 70th birthday, the book *Problems in Evolutionary and Industrial Biochemistry* was published in Oparin's honor, reflecting his important contributions to that field. He received a multitude of awards during his life including the Order of Lenin, Hero of Socialist Labor, and the Mechnikov Gold Medal. Oparin died on April 21, 1980.

— Daniel Horace Fernald

See also **Darwin, Charles; Life, Origin of**

Oral Literature

Oral literature, or oral mediums, are stories that are or have been transmitted in spoken forms, such as a public recitation, rather than through the medium of writing.

Many societies, both pre-literate and literate, have a tradition of oral literature that includes short folktales, legends, myths, proverbs, and riddles. As well, many have a tradition of longer narrative compositions or epics, like the *Odyssey* and the Mesopotamian Gilgamesh creation myth. These oral compositions were added to over many centuries before they were committed to paper.

When compared to written literature, oral literature's distinctive features include spontaneous outbursts of feelings; deep, traditional roots preserved through memory. Folklore and folktales are part of oral literature; it is literature that is not normally read in an academic setting but is more often told at informal gatherings, such as a wedding or a funeral. Those who practice oral literature or "story telling" are not always educated; rather, they tend to be the working person or the elderly member of a family to whom one may normally not pay attention. Many of these stories or oral histories are traceable to ethnic groups; others incorporate elements of more than one ethnic group.

Some prime examples of this type of oral history, or oral literature, that is still very prevalent can be heard in Central America, specifically in Belize and Guatemala, where there is an ethnic mix of Africans, Mayans, and the dominant ethnic group, the Spanish. The oral literature in Belize and Guatemala is rich in the overlapping of these peoples. The overlaps underline remarkable degrees of concurrence, not only in the folk legends but also the cosmology of Central America, despite ethnic differentiation. It is the appreciation and depth of such cross-fertilization that produces the collective consciousness of these peoples as one people tied together by their oral history and their oral literature.

Oral literature and oral histories are inevitably tied to the concepts of time and memory. At the level of oral literature and oral language, however, permanence depends solely on memory. Implicit in this concept of an oral literature is the recollection of time, not as a defining method of measurement, but in the sense and awareness of duration and also the differences between past, present, and future. B. L. Whorf's study of Hopi oral literature provides powerful evidence of a universal connection between time and language and the advent of oral histories and oral literature.

Oral literature often incorporates elements of the past and the present with some mention of the future; such stories are rich with metaphors and often contain moral and ethical messages. Other times oral

literature is simply a story that involves the recollection of a particular historical event, or a great message of passage, or an odyssey. Oral literature is often a simple trip through the recollected experiences of a storyteller, the sum of his or her life, loves, passions, and the ways in which an individual acts in a given situation. Oral literature is, in many cases, the only knowledge that a people have to understand their heritage and their ancestry, where they came from, where they have been, and where they are going.

The Yucatec Maya of the Belize River Valley are centuries removed from their great historical ancestors; removed by time, but not by memory. The oral literature of the Yucatec is rich with the myths and legends of the ancient Mayans who once ruled the entire Yucatan Peninsula. Their lives are tied to their past, both Mayan and later Spanish Catholicism. Such oral literature is bursting with memories and images of the people, their land, and the spirits of the jungle places. One such folktale is of the Alux, the guardian spirit of the archaeological site and the surrounding land. The Alux is a dominant oral character among the Yucatec Maya and is spoken of mainly in villages such as San Antonio and San Jose Succotz, in the Cayo District. Oral stories of the Alux are also told at Ambergris Caye on the coast of Belize. The Alux is also referred to as Duendecillo, and Donato and his brothers. Although only one foot high, the Alux has the appearance of a robust, arrogant Maya. The Alux is united to the Mayan farming community and the milpa, and is said to take care of the lands and the villages that are near the milpa. The oral story of the Alux is told by the Yucatec medicine people, while they fashion from clay and other fluids the Alux figure. The Alux serves a social function within the village; it is the reminder of the past tied together with the present and the daily struggle to work the land. Each variation on the Alux is the interpretation of the storyteller as he or she weaves the tapestry of life in the Belizean River Valley and the daily interaction with the land.

Oral literature can also be seen as the combination of personal history and the cultural history of an ethnic group, a region, and a smaller social unit: family and community. Thus, such oral stories are the ways and means of a society to understand and be united with its past and present and future.

Oral literature has its roots in the consciousness of the western experience and can be traced back to the Assyrians, Hittites, and especially the Greeks. The works of Homer are the commutation of the oral tradition that tells the story, in oral literature fashion, of the great Mycenaean empire, the Trojan War, and the odyssey of Odysseus. In ancient Rome, part of the oral literature was the combined works of Virgil, a collection of stories and adventures of Aeneas, the Trojan father of Romulus and Remus, the ancestors of the Roman republic.

Oral literature can be both stories that tell a history and the myths and legends that a people believe explain where and how they came to be. For example, in one Native American creation myth, White Buffalo Calf Woman gave the seven nations tobacco, maize, and the sacred pipe ceremony. Implicit in the oral literature of North American indigenous peoples are the understanding of the earth's spirit and the place of the human being in this delicate balance.

Oral literature, oral histories, and the oral tradition is a rich fabric of personal stories, legends, morals, and oftentimes the history of a people that transcends time and place.

— Frederick Meli

See also **Hopi Indians; Myths and Mythology; Orality and Anthropology**

Further Readings

Belize UNESCO Commission. (1991). *Characters and caricatures in Belizean folklore.* Belize: Author.

Whorf, B. L. (1956). *Language, thought and reality.* Cambridge, MA: MIT Press.

Orality and Anthropology

Orality, a term used in anthropology to interpret the performances of "verbal art," was not a term created or defined by anthropologists for their particular use. It is a very old concept, formulated as the opposite of "literacy," and has a long history in the humanities. It is encrusted with many beliefs and ideas that apply mostly to verbal art in Western societies with alphabetic writing systems. Thus, the tools used by anthropologists were created for one purpose, while anthropologists in the field must try to use them for another. A brief examination of the term's history will

clarify why "orality" as currently understood is a problematic notion.

Orality was framed as the opposite of literacy, not by modern authors but by Roman scholars active during the first century B.C.E. The virtues and characteristics of written texts had been molded earlier by Alexandrian scholars between the third and first centuries B.C.E. Scholars and researchers hired by the Greek pharaoh Ptolemy I to fill his libraries were confronted with a high volume of scrolls. In order to cope, the scholars were forced to become critics (lit.: "choosers") and to select, to emend, and to create exemplary texts fit to belong to the "first class," or "classics." Discussions always revolved around the Homeric texts; many scholars of the time wrote learned commentaries, now mostly lost. Textual fixity (i.e., unchangeability) turned into the norm, not the exception. Cicero (1st century B.C.E.), the famous Roman orator, argued that the Homeric poems were a collection put together by the Athenian statesman Peisistratus during the fifth century B.C.E. The 1st century C.E. Jewish author, Josephus, living in Rome, pointed out in his *Against Apion* (a famous Homer scholar) that the Homeric texts (the *Iliad* and *Odyssey*) probably were recorded quite recently: "[Homer's] date . . . . is later than the Trojan war; and they say that even he did not leave his poems in writing. The scattered songs were at first transmitted by memory, and not united until later; the numerous inconsistencies of the work are attributable to this circumstance." Josephus contrasted the famous epics with the Hebrew texts, whose origins were known to be very old (2,000 years, he claims), transmitted in writing from father to son. Josephus's goal was to discredit the high esteem in which all things Greek were held by the Romans. He did not achieve this goal, but his (and Cicero's) claim that the Homeric poems were a collection of fragments put together during the fifth century B.C.E. became part of common knowledge. There are numerous references to Homer in earlier Greek authors, but none state as clearly as Josephus that the poems must have been orally transmitted (although many modern scholars read this into these texts).

After the fall of the Roman Empire, the invasions of the Barbarians, and above all, the conquest of Christianity over paganism, the Homeric poems fell out of use in the West. The epics were copied and preserved in the East, in Byzantium. The Renaissance brought them back, but few people knew Greek, so their difference in style and content did not immediately strike readers. But during the late 17th century all that changed: scholars began to comment that the Homeric poems were very unlike the Latin ones with which they had grown up, and the "oral origins" of the poems once again came to the fore. The 18th-century *Battle of the Ancients and the Moderns* in France (which spread to all European intellectual centers) was provoked by some authors defending Homer and his style, whereas others believed him to be outmoded. A few generations later, the Romantic reaction allowed the poems back into polite society, but under a different banner: now, they were considered to be similar to the primitive poetry of the natural peoples whose lives and ways were just being discovered in the Americas, except, of course, that the Greek poems were more complex and lengthy. The final connection between "primitive and oral," and "civilized and literate" had been made.

As in antiquity, classical scholarship and biblical scholarship remained closely connected: many scholars, afraid to work on the Bible, worked on Homer instead. Methodologies and interpretations were borrowed; for instance, the arguments made by Spinoza in his *Tractatus Theologico-Politicus* (1670) about the interpretation of biblical texts are echoed in the 18th by Gianbattista Vico, whose oeuvre, *La Scienza Nuova Segunda* (1744), examined the Homeric texts for similar information and conclusions about human societies and their relationship to the divine. In the second half of the 18th century, a German biblical scholar, Johann Eichhorn, worked on the text of the Old Testament, separating out the "original" sayings of the prophets and their meaning and purpose from what he believed to have been added at a later date. His methodology, "higher criticism" combined with exacting philological analysis, was borrowed by Friedrich August Wolf, a German Homerist who carefully (in Latin) in his *Prolegomena ad Homerum* (1795) laid out all the "evidence" from the ancient texts to prove that Homer was an oral poet. During the 19th century, more evidence about orality was gathered from the new worlds and populations. Each new population provided more evidence that "the illiterate sang" whereas the literate and civilized composed in writing. Meanwhile, Homerists spent their time eliminating verses and stories that they assumed to have been added to the epics at a later date. Very quickly, "literate" and "civilized" always came to mean alphabetic literacy and Western civilization. Homer,

however, was never fully labeled as primitive; he remained a genius, the ancestor of Western literature, equal to the prophets of the Bible.

When, during the last half of the 19th century, anthropology slowly established itself as an independent and separate discipline, assumptions about orality and literacy were not reconsidered or recalibrated, possibly because they were so deeply ingrained in the worldview and belief system of the time. In addition, many of the early anthropologists had received a classical education and had internalized Greek and Roman classificatory systems and concepts.

During the 1920s and 1930s, orality and the oral origins of Homer once again were brought to the attention of scholars. Again, the impulse came from classics. An American classicist, Milman Parry, moved to France to obtain his Ph.D. In Paris he came into contact with the structuralist scholarship of Saussure, with its emphasis on spoken language. He similarly was influenced by the work of Lévy-Bruhl and his studies of the primitive mind. One of his mentors put him in contact with a Yugoslav scholar, Matthias Murko, a professor of linguistics at the University of Prague and a member of Jakobson's Linguistic circle. After his return to the U.S., Parry proceeded to compare the style of the oral performances of Yugoslav illiterate performers with that of the Homeric poems. The use of formulas, themes, meter, and so on appeared to confirm the earlier hypotheses that Homer's poems were oral poems. The oral characteristics, Parry argued, had been preserved by a recording in writing shortly after their (oral) composition by a master singer (Homer?). It was generally believed that oral characteristics would be lost after the arrival of literacy, an event thought to have occurred in Greece between 800 and 750 B.C.E. The comparison of ancient Greek poetry of uncertain provenance with the productions of illiterate performers of early 20th-century Yugoslavia was grounded in the evolutionist belief that human societies move through different phases, and in the unity of the human mind: pre-literates function in one way, literates function in another. It is thus that ideas stemming from antiquity received a modern blessing and confirmation. Initially, the Parry/Lord hypothesis seemed to solve many conundrums, such as the origins of the *Chansons de Geste,* or poems such as *Beowulf,* all created during the early Middle Ages, when writing was a skill limited to clerics and some bureaucrats.

Increasingly, however, it is becoming clear that the verbal art of other (non-Western) peoples cannot be made to fit into an "oral theory" derived from two millennia of Homeric and Biblical scholarship. The most telling counterexamples come from areas such as India and Southeast Asia, where literacy has coexisted for a long time with oral improvised performance. The advent of literacy does not seem to have affected the "orality" of the millennia-old epics, the *Ramayana* and *Mahabharata,* which continue to flourish and expand, both in written and in oral forms, while textual fixity is nonexistent for either poem. To accommodate such cases, anthropologists have attempted to represent orality and literacy as points on a continuum rather than opposites, but even with such adjustments, the underlying evolutionist line of reasoning still seems to suggest that the oral mind works one way, and the literate in another, and that all oral works eventually will achieve fixity due to their being written down. Anthropologists working in oral societies (i.e., where alphabetic writing is slowly introduced, usually by Christian missionaries) report a different set of problems, whereas scholars in South and Central America, where indigenous writing systems were systematically destroyed by the Catholic missionaries during the 16th and 17th centuries, present another. The oral performances of Native Americans as well as those of African singers are also difficult to fit into the oral theory as currently defined.

— *Thérèse de Vet*

See also **Language Use, Sociology of; Lévy-Bruhl, Lucien; Oral Literature; Rome, Ancient**

Further Readings

Blackburn, S. H., et al. (1989). *Oral epics in India.* Berkeley: University of California Press.

Finnegan, R. (1992). *Oral poetry: Its nature, significance and social context.* Bloomington: Indiana University Press.

Scribner, S., & Cole, M. (1981). *The psychology of literacy.* Cambridge, MA: Harvard University Press.

Street, B. (1993). *Cross-cultural approaches to literacy.* Cambridge: Cambridge University Press.

ORANGUTAN-HUMAN EVOLUTION

A PERSONAL REFLECTION

In the fall of 2000, I attended a seminar on primate evolution at Pennsylvania State University by a renowned primate paleontologist. The lecture was unremarkable until the subject of evolutionary relationships between humans and great apes. His reference to the chimpanzee as the natural choice seemed almost too obvious to need any particular justification, as the relationship is consistently presented throughout the popular scientific literature, textbooks, television, and movies as a virtually undeniable and established fact. But the speaker then chose to make a most unusual comment. He noted that the chimpanzee relationship was accepted by all except a "lunatic fringe" who favored the orangutan.

This colorful label in an otherwise straightforward presentation perked my ears up. I have learned over the years that few subjects in science are closed, and I was intrigued by this obscure reference to an alternative view. Over the last two decades, I contributed to changing the scientific landscape for the discipline of biogeography, which involved the exploration and promotion of views that were widely denigrated by prominent specialists. Through my research activities, it was necessary to consider the spatial evolution of many animal and plant groups, including humans. I therefore found the speaker's strange reference to orangutans too intriguing to be ignored without examination.

The culprit responsible for the lunatic fringe was not named, but I had an idea who it might be. By coincidence, my wife had found a book titled *The Red Ape: Orang-utans and Human Origins* in a Pittsburgh used bookshop nearly a year earlier. Due to her own interest in primates, her eye caught the title, and she thought it might be relevant to my biogeographic interests in human evolution. The jacket synopsis said the book offered "persuasive evidence that our closest relative is neither the chimpanzee nor the gorilla but the orangu-utan." I did not think much about it at the time. My wife bought the book nevertheless. Following the lecturer's comments, I felt compelled to now take a good look at *The Red Ape* for myself.

I admit, I almost expected an assortment of miscellaneous conjectures and circumstantial arguments that so often populate unorthodox compilations. Here, I was in for a surprise. The author, Jeffrey Schwartz, was a professor of primate evolution at the University of Pittsburgh. In *The Red Ape*, he presents a sequential and coherent account of his investigations into human origins and a detailed outline of the evidence in support of our orangutan relationship. I was impressed by his professional argument based on accepted principles of systematics by which uniquely shared characters (traits) are the accepted standard for identifying evolutionary relationships between species. I was also intrigued to read how earlier studies involving fossil hominids had led to a very different conception of human ancestry from the now popular chimpanzee model.

Schwartz explained how prominent primate paleontologists such as Richard Kay, Martin Pickford, David Pilbeam, and Elwyn Simons once believed the 11-million-year-old fossil ape *Ramapithecus* (later subsumed under the name *Sivapithecus*) represented a direct human ancestor. Fossil fragments comprising the jaw and teeth exhibited several characteristically human-like features, including low molar and premolar crowns and flat chewing surfaces. We also find these in modern humans, and they therefore place the ape within the human lineage. When the facial region of *Sivapithecus*'s skull was later discovered, it looked—to everyone's surprise—more like an orangutan than an African ape, which had been the accepted model for human origins. Schwartz pointed to this partucular discovery as a major historical turning point, confronting paleontologists with two alternatives: Either the orangutan was more closely related to humans than previously thought or *Sivapithecus* was no longer closely involved with human origins. Because there was already a widespread acceptance of humans having evolved from ancestors of African apes, paleontologists favored the latter alternative, and they banished *Sivapithecus* from human ancestry without further debate.

With *Sivapithecus* and orangutans separated from human origins, the presence of thick dental

enamel and flatted molars could no longer be accepted as evidence of evolutionary relationship because this also applied to orangutan teeth. Because the molars of African apes have thin enamel and a higher surface than either humans or orangutans, orangutan teeth were explained as the result of chance convergence. Schwartz challenged this conclusion by pointing to another possibility—that the shared dental characteristics are really evidence of a close evolutionary relationship between orangutans and humans. Was it possible, Schwartz asked, that *Sivapithecus* and orangutans together formed part of a larger group more closely related to humans than either of the African apes? To answer his own question, Schwartz set about determining whether and to what extent other features paralleled the dental similarities. In several publications, he detailed 14 characteristics that were exclusively shared between humans and African apes, less than the 17 characteristics restricted to just the African apes and far less than 35 characteristics that he found exclusively shared between humans and orangutans. The orangutan-human characteristics ranged from obscure differences in skeletal structure, such as the single incisive foramen in the upper palate, to prominent differences in bone formation, shoulder girdle structure, reproductive hormone levels, and brain asymmetry.

The total number and the range of human and orangutan characteristics were quite impressive, particularly in comparison with the chimpanzee, where proposed uniquely shared features with humans are often much less, ranging from 21 to as little as seven. What really caught my imagination was the way in which the orangutan characteristics could radically change theories about the evolution of human structure and biology. Schwartz contrasted the unique forelimb structure of African apes that allows them to walk on their knuckles with the absence of any supporting evidence for knuckle-walking in humans, orangutans, or any of the proposed fossil human ancestors. Another major difference between humans and African apes is the presence, at birth, of thickened or keratinized pads on the buttocks in many chimpanzees and gorillas. This feature is found in all other Old World primates with the sole exception of humans and orangutans. Before reading Schwartz's work, I had wondered about the lack of beard and mustache in chimpanzees, since facial hair is such a prominent characteristic of male humans. Male orangutans also grow a well-developed beard and mustache—a condition otherwise absent among primates.

Absence of prominent African ape features in humans could be attributed to their evolutionary loss after the two groups separated, but this fails to anticipate the range of unique similarities shared between humans and orangutans. When we consider how these similarities encompass significant aspects of human biology and reproduction, it is increasingly difficult to find justification for dismissing the orangutan theory. In particular, a chimpanzee relationship seems to make nonsense of human reproduction. Female chimpanzees and gorillas, like mammals in general, have a physiologically focused period of mating called *estrus*. This coincides with ovulation and a correlated anatomical condition of genital swelling. Humans, in contrast, have concealed ovulation where genital swelling is absent during the menstrual cycle and mating patterns are not keyed by anatomical modifications. The human pattern appears to occur in orangutan females where genital swelling occurs only during pregnancy. Other reproductive similarities between humans and orangutans include the highest concentrations of the reproductive hormone estriol, and, when adjusted for body weight, a nearly identical gestation period that is longer than any other primate.

The numerous morphological and physiological characters shared between humans and orangutans indicate that Schwartz's theory was a robust alternative to the chimpanzee model and one that merited serious consideration. I reviewed the literature to find the critical response. To my surprise, Schwartz's evidence was barely acknowledged. Of the limited response, the most extensive came in some book reviews of Schwartz's orangutan book. Andrew Hill said that, while Darwin had Huxley as bulldog to promote and support his theory, Schwartz has yet to find as much as a poodle. Colin Groves actually accepted more orangutan shared characters as valid than he had found for chimpanzees, but then dismissed the orangutan theory as science fiction. These comments seemed to say more about the nature of

scientific debate in primate anthropology than any necessary deficiency in the orangutan theory itself.

I found the molecular genetic relationship to be the most often cited and repeated evidence for deriving humans from a common ancestor with the chimpanzee. Molecular techniques emerged during the 1960s, and, by the 1980s, they replaced the old, classical morphology to become the authoritative evidence for evolutionary relationships between living primates. Geneticists argued that noncoding regions of DNA were less prone to error from selection and, therefore, more reliable than morphology. This argument is contradictory, Schwartz noted, because genetic relationships were originally justified by their close match with well-established morphological relationships, relationships that were now seen to be unreliable. Another problem was the absence of any way to know which genetic characters were uniquely shared without constructing a phylogeny in the first place. Genetic methods might produce consistent results, Schwartz argued, because they represented overall similarity in DNA base sequences due to primitive retention or convergence rather than different sets of uniquely character relationships associated with evolutionary relationships as one can identify in morphological approaches.

In an attempt to resolve the conflicting views on orangutans, morphology, and genetics, I contacted several prominent primate researchers to find out how they explained the orangutan evidence. A molecular researcher chided me for taking any interest in the orangutan theory and expressed some alarm that I was considering the subject suitable for public information. I was told that the chimpanzee relationship was proven by genetic studies, and that was all there was to it. Three paleontologists declared that morphology was so unreliable that we had to accept the molecular evidence, although they declined to explain how they could know, in the absence of genetic evidence, whether the fossil ape taxa they studied were related to humans. When I asked the speaker who had originally prompted my interest to justify his confidence in genetics that proved the chimpanzee relationship, he had to ask a molecular colleague, as he could not explain it himself. And neither could he explain how his paleontological research on hominids remained valid if we could no longer rely on morphology to predict human relationships.

I also contacted some prominent morphological systematists who supported the chimpanzee relationship. I found their studies problematic because they did not address the proposed orangutan characters, and their evidence for a chimpanzee relationship was weak. Over a 10-year period, for example, Colin Groves at the Australian National University reduced his own chimpanzee-human characters from 25 to six. An orangutan ecologist expressed her alarm about a Buffalo Museum of Science exhibit on the orangutan theory because it had been rejected by the so-called anthropological community. The only exception to this general pattern of routine resistance was Ian Tattersall of the American Museum of Natural History. He suggested to me that the general unwillingness to even consider the notion of humans being more closely related to orangutans than African apes is testimony more to the power of received wisdom than it is to the power of the evidence. He also wondered whether the resistance would have been so strong if Darwin had not backed the African apes in the first place.

The more I looked at the available morphological evidence, the more the orangutan relationship appeared better supported. If Schwartz's evidence was so weak to justify such summary dismissal, I expected to see substantial contradictory morphological evidence, particularly in the fossil record. According to molecular reconstructions, humans evolved from a common ancestor with chimpanzees as recently as 6–7 million years ago. This model led me to consider the oldest members of the hominid ape genus *Australopithecus* to exhibit more than a passing resemblance to chimpanzees and certainly provide some definitive African ape characters. Instead, it appeared that these hominids bore a more-than-passing resemblance with orangutans. The most prominent similarity is the broad, forwardly facing cheekbone, quite unlike the chimpanzee where the ventral surface of the cheekbone slopes away. The facial region across the eyes is also vertically flattened like the orangutan (and incidentally, like *Sivapithecus*) rather than forming into a concavity in the chimpanzee. Australopiths do have prominent brow ridges, as do some later hominids, and some systematists have

identified this with the prominent brow ridges of chimpanzees. Schwartz pointed out that the brow ridge of chimpanzees and gorillas forms a forwardly projecting bar above and between the eyes with a prominent channel or sulcus immediately behind. Neither the bar nor sulcus is present in the orangutan or in *Australopithecus,* where the brow ridge is confined to an upraised area above each eye, much like the orangutan.

A sense of clarity is something that we may expect of a good theoretical model and yet the nearly absolute confidence in the chimpanzee model belies the confused picture of hominid origins. A recent *Scientific American* article noted that researchers cannot agree over what makes the human lineage unique, and they even have trouble defining hominids. Hominid characters at the beginning of the human lineage are elusive and increasingly so the closer we get to the supposed last common ancestor with chimpanzees. With all this confusion, I cannot help but wonder if these problems are somehow more a function of looking for the wrong ancestor.

The orangutan model may provide paleontologists with opportunities for developing clarity about human origins. The fossil apes *Sahelanthropus* and *Ardipithecus,* both widely portrayed as hominid ancestors on the basis of very tenuous evidence for bipedalism, may not be hominids at all because they lack thick dental enamel and low molar cusps. In contrast, the thick molar enamel claimed for *Orrorin* from Kenya would be congruent with being a member of the human-orangutan group. Other possible candidates for the human-orangutan lineage include the thickly enameled *Kenyapithecus* (East Africa, 16 million years), *Ouranopithecus* (Europe, 9 million years), as well as the orangutan affiliated *Sivapithecus* (Central Asia, 14 million years), *Gigantopithecus* (2 million years) and *Lufengpithecus* (East Asia, 8 million years). The modern relationship between humans and orangutans may, therefore, represent the surviving eastern and western remnants of a formerly diverse ancestral group spanning Africa, Europe, and Asia at least 16 million years ago.

By the time I reached these conclusions, I decided that the contrasting theories of human origin would complement the primate exhibit at the Buffalo Museum of Science. The museum already displayed a replica of the famous 3.2 million-year-old *Australopithecus afarensis* skeleton known as Lucy. An artistic reconstruction prepared in 1987 by scientific illustrator Bill Parsons followed established conventions and showed a face with the appearance of an African ape, including soft tissue features such as the broad, fleshy nostril and short cranial hair with a hairline close to the eyebrows. Artistic representations of hominids continue to follow this protocol, partly because of how australopithecine skulls were often represented. There are only a few skull fragments of Lucy available, so the question of how they fit together is a matter of some conjecture. The popular reconstruction that shows similarities to the chimpanzee now face critical challenge through a recent reconstruction for another specimen of *Australopithecus afarensis* that shows a relatively high domed cranial vault, more like an orangutan in profile than a chimpanzee.

I asked artist Bill Parsons to render another representation of Lucy in light of the new skull reconstruction and in consultation with Jeffrey Schwartz. When Bill followed the form of the skull, the result was a facial shape fully consistent with an orangutan appearance. This similarity was enhanced by the addition of soft tissue features uniquely shared between orangutans and humans. The cranial hair was longer and oriented forward (a feature common to humans and orangutans), the hairline was high on the forehead (unique to humans and orangutans), and the nostrils lacked the fleshy extension found in African apes. A dense covering of body hair was included, but this is an entirely conservative speculation. Last, but not least, Lucy was given that enigmatic closed-mouth smile so characteristic of humans and sometimes seen in orangutans.

I was beginning to see that the common ancestry with orangutans would lead to some very different speculations about our immediate ancestors. For example, the recent BBC film *Walking With Cavemen* reduced Lucy's species to the condition of a frenetic, agitated, and gregarious social life dominated by aggressive, polygamous males. Orangutans are famous for their isolated social lives, yet recent studies indicate a more complex pattern of social cohesion involving dispersed social groups and long-distance

vocalization. As a bipedal, orangutan-like hominid, Lucy may have lived in a group that was far less communally ordered than that of the chimpanzee; her social relationships may have involved a spatially dispersed cooperative group more like orangutans and modern humans. Communications between dispersed individuals may have employed artificial means of amplification, as observed in orangutans where hands or leaves are used for this purpose. Human children also often use the latter technique.

Other features found in both orangutans and humans led me to consider specific predictions about the possible biology—and even psychology—of early hominids. As an individual of about 20 years, Lucy may have already given birth—an event that may have involved assistance from her mate or other members of her group. This practice of what is effectively a midwife function in humans has been observed in some orangutans in captivity.

It is also possible that sexual behavior included face-to-face mating with sustained periods of copulation unrestricted by ovulation cycles, all features found in both humans and orangutans. Even the practice of using artificial aides for sexual arousal is present in the orangutan and may, therefore, be expected to already be present at the beginning of human evolution. Lucy may have also engaged in mate choice or even experienced mate jealousy as found in orangutans. As an adult, Lucy may have been involved in long-term pair bonding as an extension of the orangutan pattern where females may reestablish consort relationships with the same male after a child-rearing interval of many years. This expression of mate fidelity may anticipate a hominid social structure that included family units comprising the presence of both parents and offspring. Like orangutans, Lucy would be expected to engage in long-term child care, and, as a teenager, Lucy may have exhibited her most gregarious social interactions as found in both humans and orangutans.

Lucy's source of shelter, whether on the ground or within trees, may have taken the form of housing that included roofing as protection from rain or sunshine as well as personal protection in the form of leaf umbrellas, as found in orangutans. Her sense of artistic creativity may be anticipated by aesthetic expressions found in orangutan designs, such as artistic "pillows" whereby orangutans use similar twigs to line their nests, sleeping with leaf bundles (dolls), or personal adornment or ornamentation using foliage, a practice also found in gorillas. Finally, we would expect the ability to form a complex tool kit that involved a range of functions, as we find in both chimpanzees and orangutans, with both sexes being involved in their construction. Even without the use of stone tools, we must consider the possibility of the development of wooden spears, because the ability to strip stems of leaves and throw them is found in orangutans.

As long as we leave orangutans out of our consideration in understanding human origins, we must also dismiss out-of-hand the disturbingly "human" qualities of orangutan morphology and biology as mere curiosities. That they continue to be dismissed in this way by all but two primate evolutionists does not appear to be justified by the available morphological facts. While the veracity of some or all of the features that point to the orangutan could be contested, the genetic and morphological arguments for the chimpanzees relationship are also open to critical doubt. It is clear at the very least that the morphological evidence raises critical questions about the prevailing popularity of the chimpanzee theory. The weight of morphological similarities between humans and orangutans is far stronger than between humans and chimpanzees, and the fossil record shows what are disturbingly orangutan-like similarities. At the very least, Schwartz presents a substantial case. The more I look at the orangutan, the more I find myself looking at a mirror where the past becomes the present.

— John R. Grehan

Further Readings

Kaplan, G., & Rogers, L. J. (2000). *The orangutan.* Cambridge: Perseus.

Kimbel, W. H., Rak, Y., & Johanson, D. C. (2004). *The skull of Australopithecus afarensis.* Oxford: Oxford University Press.

Schwartz, J. H. (1988). *Orangutan biology.* New York: Oxford University Press.

Schwartz, J. H. (2004). *The red ape* (2nd ed.) New York: Westview Press.
Schwartz, J. H., & Tattersall, I. (2005). *The human fossil record, vol. 3, Craniodental Morphology of Australopithecus, Paranthropus and Orrorin.* New York: Wiley-Liss.

Orangutan Ecology and Behavior

Wild orangutans are now found only in the lush, swampy forests on the islands of Borneo and Sumatra in Indonesia. In prehistoric times, there were huge orangutans that roamed over Asia. The genus *Gigantopithecus*, the largest fossil ape known to science, is related through primate evolution to the living orangutans of today.

The orangutan is the only great ape of Asia. Like the three African pongids (bonobo, chimpanzee, and gorilla), the orangutan is a vanishing animal threatened with extinction. This is primarily due to two factors: the wanton destruction of its natural environment as a result of the encroachment of human civilization (especially by loggers and miners) and the poaching of this so-called red ape for the purpose of selling orphaned infants on the black market after their adults have been killed. If serious and immediate measures are not taken, wild orangutans may become extinct by the middle of this century.

To understand and appreciate orangutans in their natural habitats, several primatologists have focused their research on studying this pongid on the islands of Borneo and Sumatra. Knowledge about the ecology and behavior of this shaggy red ape is necessary to enhance those methods that are dedicated to preventing the extinction of this great ape.

Having been encouraged by anthropologist Louis S. B. Leakey, Biruté Mary F. Galdikas has devoted her professional career to the study of orangutans for the specific purpose of saving them from extinction. Her books and lectures, based on close-range and long-term research on Borneo, have added invaluable information about this red ape of Asia. Camp Leakey is her fitting tribute to the anthropologist who had realized that studying the great apes is crucial to comprehending the origin and evolution of our own species.

Orangutans spend most of their time in the trees. They are, in fact, essentially arboreal and semi-solitary. The relationship between mother and infant is a temporary one over a period of five years. Large adult males will come to the ground, spending much time shambling along the forest floor before climbing back into the trees. Peering down from the forest canopy, their faces resemble those of human beings, a characteristic that has earned the orangutan the the informal title of "person of the woods."

Although they build nests in the trees or on the ground, orangutans do not live in complex structured societies or exhibit group social discipline. Adult males and females are primarily asocial or live in loose social groups. There is no family unit or lasting relationship between an adult male and an adult female. Orangutans spend much time feeding, resting in nests, and leisurely moving through the trees of the dense tropical jungles. They rarely groom each other and are usually silent. However, the powerful adult male will attract adult females by making a long shrill call when he releases air from his throat sac (gular pouch).

The orangutan diet is essentially frugivorous and includes buds, shoots, nuts, seeds, honey, soft bark, wood pith, young leaves, flowers, and insects, as well as wild unripe and ripe fruits but very rarely meat. Orangutans will use sticks to extract honey from bee hives in trees. Both in terms of their biology and behavior, these apes have adapted to life in the trees over thousands of years. Unfortunately, in captivity, the orangutan is lethargic and therefore prone to obesity and, consequently, the possibility of early death.

Because the orangutan is one of the four pongids, it is not surprising that this primate shows many biological similarities to the human animal. In fact, some scientists claim that our own species is closer to the orangutan than it is to the bonobo or chimpanzee or gorilla. This hypothesis encourages more research into the physical characteristics and behavior patterns of this Asian great ape.

In Pongoland at the Leipzig Zoo, visitors will see orangutans living in a large, natural forest-like habitat that allows these apes to roam freely. The project is sponsored by Germany's Max-Planck-Institute for Evolutionary Anthropology. Along with DNA databases preserving the genetic information of pongids

as well as other primates, such exhibits help ensure the survival of the orangutan and the other three great apes.

The wild orangutan is a gentle, independent, and free-ranging ape. It lives a somewhat lonely existence in the rain forest canopy and, until recently, was isolated from human civilization. The ongoing studies of Galdikas and others will help to protect this unique pongid from abuse and extinction.

— *H. James Birx*

See also **Galdikas, Biruté Mary F.; Gigantopithecus; Orangutan Survival, Threats to; Orangutan-Human Evolution; Orangutans; Pongids**

Further Readings

Galdikas, B. M. F. (1995). *Reflections of Eden: My years with the orangutans of Borneo.* Boston: Little/Brown.

Galdikas, B. M. F. (2005). *Great ape odyssey.* New York: Harry N. Abrams.

Galdikas, B. M. F., & Briggs, N. (1999). *Orangutan odyssey.* New York: Harry N. Abrams.

Orangutan Survival, Threats to

The last populations of orangutans are in dire straits and possibly face extinction within the next few decades. Over 80% of wild orangutan populations live in Indonesian Borneo and Sumatra, while 20% or less are found in Malaysian Borneo. The survival of orangutans is threatened by massive habitat destruction, forest degradation, and forest fragmentation. Orangutans are arboreal and totally dependent for long-term survival on forest. The establishment of large palm oil concessions carved out of remaining forests, as well as widespread illegal logging, especially in Indonesia's reserves, protected forests, and national parks, may spell doom for the orangutan species in the wild. The future of wild orangutans is tied to the fate of Indonesia's and Malaysia's forests.

Past estimates for orangutan populations in the wild have ranged from 15,000 to 30,000 individuals, but recent surveys and better census methodologies have indicated that as many as 50,000 orangutans may still survive in the wild. The largest populations are found in Tanjung Puting National Park and the recently (2004) declared Sebangau National Park in the Indonesian province of Kalimantan Tengah (Central Borneo). Each of these two parks contains about 6,000 orangutans. The most recent estimates for Sumatra indicate that only 7,000 orangutans remain in the two Indonesian provinces of Aceh and North Sumatra. As in Borneo, massive deforestation and the killing of orangutans as agricultural pests and for food are responsible. Orangutan females are also killed for their infants, who are sold into the pet trade. However, this trade is very opportunistic and closely tied to the opening up of rain forests.

Indonesia's tropical forests are the second largest in the world, after those of Brazil, and, as of 1995, covered at least 100 million hectares. Indonesia boasts about 10% of the world's remaining tropical forests. But the recent decline in Indonesia's forests is very dramatic. More than 1% of Indonesia's and Malaysia's forests have been lost each year over the past decade. The conservative figure for Indonesia's loss of forest is a rate of 1.3 million hectares per year.

The establishment of palm oil plantations at the expense of native forests is probably the most important direct cause of orangutan population loss. Plantations are increasing at the rate of 3% per year, and a large proportion of this consists of plantations of the African oil palm. Malaysia and Indonesia together produce over 95% of the world's palm oil. In Indonesia, most of the new plantations are being opened up in Kalimantan (Indonesian Borneo) and Sumatra. Of the 1.3 million hectares of forest lost each year in Indonesia, at least 330,000 hectares are lost through the establishment of palm oil plantations.

The widespread presence of unregulated and unsustainable logging, both legal and illegal, throughout Borneo and Sumatra also threatens orangutans. In Indonesia, illegal logging, much of it from parks and protected areas, is the primary source of logs, accounting for at least 52% of the total. In Kalimantan Tengah, illegally logged timber may account for up to 70% of the total.

In addition to being killed as pests—particularly when they, as refugees from destroyed forests, raid plantations for food—orangutans traditionally have been eaten by Dayaks as a source of bush meat. Although this hunting is not commercial, the greater availability of firearms and the decrease in forest

cover makes orangutans much more vulnerable than these animals were in the past.

Orangutans face another threat: fire. Massive forest fires during droughts exacerbated by the El Niño weather phenomenon have destroyed large areas of forest, as much 2.7 million hectares in 1982 and 10 million hectares of forest, woodlands, and grasslands in 1997. Historic accounts indicate that El Niño is a periodic weather phenomenon that was associated with droughts and small, naturally caused fires in the past. However, in the last few decades, massive forest clearing in Borneo and Sumatra to establish plantations and a rapid increase in illegal logging have left huge fuel loads of dead branches and other dry wood litter on forest floors. The presence of this dry timber has led to enormous fires, which proved to be disasters of epic proportions for orangutans and other wildlife.

Source: © iStockphoto/Marco Kopp.

In association with these fires, the Rice Bowl Project was disastrous for orangutans. This project was initiated in 1995 to convert one million hectares of peat swamp forest into a major rice-growing region of Indonesia—in an area that held, at the time, probably the largest wild orangutan population in the world. The 1997 El Niño drought, intentional burning of the one million hectares of forest, timber waste from reckless illegal logging, and intentional drainage combined to produce unmitigated disaster that left thousands of orangutans dead. Fortunately, the project was abandoned a few years later.

To ensure the survival of orangutans as biologically viable populations in Indonesia and Malaysia, it is essential that the enforcement of laws dealing with the protection of endangered species be implemented in a consistent and firm way. The killing and capture of orangutans should be punished with jail sentences and fines. Hopefully, local people will be educated to view conservation and wildlife protection as moral issues. The establishment of more protected areas where entire orangutan populations can be protected from human encroachment is also a very important measure needed to save orangutans from extinction.

—Biruté Mary F. Galdikas

See also **Apes, Greater; Galdikas, Biruté Mary F.; Gorillas, Saving; Indonesia; Orangutans; Primate Extinction**

Further Readings

Galdikas, B. M. F. (2005). *Great ape odyssey.* New York: Harry N. Abrams.

Galdikas, B. M. F., et al. (2000). *Orangutan odyssey.* New York: Harry N. Abrams.

Galdikas, B. M. F. (1995). *Reflections of Eden: My years with the orangutans of Borneo.* Boston: Houghton Mifflin.

Orangutans

Orangutans are great apes of the genus *Pongo;* they are the largest living nonhuman primates after gorillas, and one of the most critically endangered. They live only on the islands of Borneo and Sumatra, in Southeast Asia. They are found over most of Borneo,

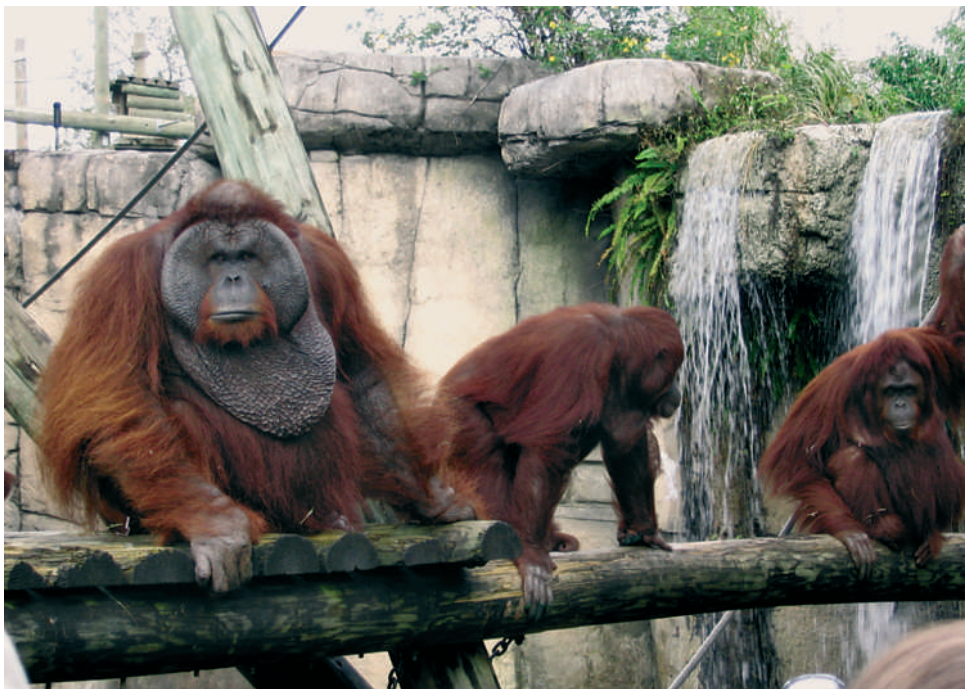
but in Sumatra they are restricted to the northern quarter, with a few isolated populations some way down the west coast. The name is a corruption of *orang hutan* ("forest-living person") and may originally have designated tribal people such as the Penan of Borneo or the Kubu of Sumatra, but it became commonly used in Europe to refer to any ape. Most indigenous peoples refer to them as *mawas.*

Orangutans have sparse reddish hair covering dark grey skin. The arms are longer, compared to the legs, than any other primate: the intermembral index (arm length as a percentage of leg length) varies between 135 and 150%. The face is strongly prognathous (the jaws jut forward); the profile varies from concave to nearly straight; the orbits are tall and oval, without supraorbital tori (thickened brow ridges); the forehead is round and ascends at about 60° behind and above the orbits; the braincase is short, high, and rounded. As in other great apes (gorillas and chimpanzees), the canine teeth are relatively long but thick in males and shorter and smaller in females, but unlike other great apes, the orangutan's upper central incisors are expended and spade-shaped, while the lateral incisors are thin and pointed. The molar teeth are large and flat, with thick enamel that is minutely wrinkled. Fully grown male orangutans weigh from 80 to 91 kg, adult females less than half of this, from 33 to 45 kg.

Genetically, orangutans differ from gorillas, chimpanzees, and humans by about 3.1%, implying that their ancestors separated from them before they separated from each other; in other words, orangutans are the third most closely related ape to us. These phylogenetic relationships are recognized by placing them all in the family Hominidae, but in different subfamilies: orangutans belong by themselves in the subfamily Ponginae, while gorillas, chimpanzees, and humans belong in the subfamily Homininae.

Bornean and Sumatran orangutans are very different and are today placed in different species. The Sumatran orangutan (*Pongo abelii*) is taller and leaner in build, the hair is usually gingery in color (though there is some variation in this), and the face is covered in light downy hair and is an elongated oval shape. The Bornean orangutan (*Pongo pygmaeus*) is shorter and fatter, the hair is usually dark maroon, and the face is hairless and figure-8 shaped, with deep hollows under the cheeks. The chromosomes have characteristic differences. Molecular clock calculations suggest that they may have separated as much as 1.5 to 2 million years ago.

Orangutans are almost wholly arboreal—except, perhaps, for some old Bornean males—and largely solitary. This does not mean that they lack a social organization; on the contrary, their social relations are highly complex and reflect their prodigious cognitive skills, which seem to be barely, if at all, inferior to those of chimpanzees (like chimpanzees, some orangutans quickly learn to recognize themselves in mirrors). They feed mainly on fruit, falling back on figs during periods when fruit is scarce, and also eat leaves, bark (especially in Borneo), and insects (especially in Sumatra). In one study site, Suaq Balimbing in northern Sumatra, females occupy overlapping home ranges averaging 850 ha, whereas fully grown males have



Source: © Photo by Richard T. Nowitz/National Geographic/Getty Images.

much larger ranges, about 2,500 ha, which overlap those of both females and other males. In Borneo, these home ranges appear to be generally smaller. Females may associate together temporarily, but males do their best to avoid each other. Males who are not fully grown have similarly large ranges, and avoid the full-grown males. There are also nomadic males who may wander from site to site looking either for food or for fertile females.

They are very slow breeders. Their gestation period is about 240 days, and they give birth to a single young who is dependant on its mother for years. Both sexes become sexually mature at about 8–10 years. The interval between live births is perhaps the longest of any mammal—at least 6 years, and as much as 8 years in some populations. They may need this time to learn the complexities of life in the rain forest. In captivity, they may live well over 50 years; in the wild, they certainly reach considerable ages, but exactly how long they may live is not known.

The big males have flanges of connective tissue at the sides of the face, beards and moustaches (longer in Sumatran orangutans), and large throat pouches (bigger in Bornean orangutans). With the aid of the throat pouch, a male makes a booming call, which alerts females and rival males alike to his presence. The females are attracted to the big-flanged males and mate with them at midcycle; the menstrual cycle averages 29 days long. The males who are not fully grown, but are sexually mature, try to mate with females who are, however, unwilling; their attempts have been described as "rape"; in Borneo, even flanged males may force copulations in this way, but this is very rare in Sumatra.

Two surprising discoveries have been made recently. First is that these unflanged males—at least in the Sumatran species—are not necessarily subadult; they may remain in that condition for years, perhaps for their whole lives. It has been proposed that it is a way of avoiding the stress of maturing fully when a flanged male is around. Second is that, at least in one study site in Sumatra, unflanged males sire as many offspring as the big flanged males, so it is obviously a very successful alternative reproductive strategy.

Different orangutan populations have different cultures, just as do different chimpanzee populations. All orangutans make an aggressive sound called a "kiss-squeak"; in just two populations, both in Borneo, an individual will hold a leaf to the mouth to amplify this sound. Only in the Suaq Balimbing population do orangutans use sticks to winkle out insects from tree holes. In one Borneo population it is customary to wipe sticky substances from the chin with a "napkin" of leaves. Each population is remarkably different and has built up its own culture over years or perhaps even centuries.

As recently as the Late Pleistocene, orangutans lived all over Sumatra, in Java, and on the mainland of Southeast Asia as far north as southern China. Today, they are crashing toward extinction. In historic times they are known to have inhabited only Malaysian Borneo (Sabah and Sarawak) and Indonesia. In Malaysia the numbers declined during the early 20th century but are today stable, if fairly low. The coming of democracy to Indonesia in the late 1990s was unfortunately accompanied by a breakdown of law and order, and illegal logging, forest fires, and clearing of land for oil palm plantations have destroyed much orangutan habitat, while hunting and the smuggling of young orangutans overseas have greatly increased. Although the situation is slowly coming under control, there will probably be very few orangutans remaining in five years' time—perhaps none in at all in Sumatra. This will be a scientific, cultural, moral, and humanitarian tragedy.

— *Colin Groves*

See also **Apes, Greater; Chimpanzees; Gorillas**

ORANGUTANS IN CAPTIVITY

In early 2005, there were approximately 900 orangutans in captivity. Western Europe had the most, with 303, while the United States had 268. Most of them live in zoos.

Orangutans are very intelligent animals, and it can be boring for them to live in a cage at the zoo. Efforts are being made at most zoos to relieve that boredom by using what the zookeepers call enrichment. For example, when the Sacramento Zoo in California first obtained orangutans in 1965, the exhibit was a cement grotto with dry moats. In 1984, that grotto was demolished and modernized.

That exhibit continues to undergo changes through the years. Artificial trees and ropes are provided for climbing.

When animals live in the wild, they have lots of opportunity to make choices. In a traditional zoo atmosphere, all the choices are made for them—what they eat, when they eat, where they sleep, and so on. The Sacramento orangutans have an indoor area available to them when the weather is too hot or too rainy to be outside. They can make the decision as to where they want to be.

Enrichment programs provide the animals with novel experiences that stimulate and encourage the types of behaviors that would be typical of these animals in the wild. In the wild, almost half an orangutan's time is spent in foraging for food. Besides occupying time, this provides intellectual stimulation for the animal. Food in captivity is often provided in such a way as to encourage natural foraging behavior. In modern zoos, food is sometimes concealed in different places around the exhibit so the animal can look for it. Sometimes food is placed inside a puzzle that the animal has to manipulate in order to obtain the food. Using the puzzle feeder results in increased feeding-related behavior and more activity.

Besides being good for the animal, enrichment tends to make a visit to the zoo more enjoyable for the visitors. It's a lot more interesting to watch an orangutan swing on ropes, climb through trees, and manipulate a puzzle feeder than to watch it pace back and forth on a well-worn path. No program can duplicate the natural environment, but an enrichment program can provide opportunities and motivation for the orangutans to practice appropriate behavior, reduce stress, and generally improve the animals' physical, mental, and social well-being.

— Pat McCarthy

Orce

Orce is a Spanish village famous for the controversy regarding the supposed finding of the oldest Eurasian hominid: the Orce man. Orce is near the Venta Micena paleontological site in the Guadix-Baza basin, Granada province, Spain. In 1982, a small cranial fragment was found in the Venta Micena excavation quarry and was published in 1983 as *Homo sp.* by Josep Gibert, Jordi Agustí, and Salvador Moyà Solà. They claimed that this fossil, unearthed from sediments 1.8 million years old, constituted the oldest hominid found in Eurasia and belonged to *Homo erectus* or even *Homo habilis*. Once the fossil was cleaned, in the inner face a prominent crest appeared, and the controversy began. The prestigious French paleoanthropologists, Henry and Marie Antoinette de Lumley, retracted their support of the hominid attribution. Agustí and Moyà Solà published a paper in 1987 concluding that the suture and the crest made impossible the attribution to *Homo* and the fossil was reattributed to *Equus*. Nevertheless, Gibert decided to maintain his attribution to *Homo* and began a controversial search for evidence and support.

The fragmentary fossil, popularly named the "biscuit," given its small size and rounded form, was exhaustively analyzed. Domènec Campillo concluded, based on the contradictory morphology, that it belonged to an infant of the genera *Homo*. Enrique García Olivares also concluded, based on immunological analyses, that the fossil belonged to a hominid, but it was suspicious that a fossil so old contained such high quantities of human albumin. Paul Palmqvist studied the cranial suture using fractal analysis and also concluded that the fossil could have belonged to the genus *Homo*. However, Palmqvist soon realized that the oversimplified suture sent by Gibert was not real, accused him of fraud, and published another paper in the *Journal of Human Evolution*, reevaluating the evidence and concluding that the fossil may have belonged to a 3- to 5-month-old horse. The details regarding this controversy were reported in 1998 by Eustoquio Molina in the journal *El Escéptico*, concluding that this could be a case of pathological science.

The controversy was magnified by the mass media, where Gibert looked for support, making many sensational claims. Three outstanding Spanish paleontologists replied in a newspaper article, criticizing the Gibert methodology. As was stated long ago by David Hume, extraordinary claims demand extraordinary evidence (Occam's razor), however the evidence found by Gibert and his colleagues is not extraordinary but very suspicious and controversial. Consequently, the

most plausible attribution of the fragmentary fossil is to *Equus,* which is very abundant in the site, although based on a recent reinterpretation of the anatomical evidence by Bienvenido Martínez Navarro, it could be attributed to a ruminant, which is also frequent in the site. Nevertheless, Gibert still maintains the hominid attribution in his controversial book, *El Hombre de Orce: Los Homínidos que Llegaron del Sur* (2004). At present, few scientists believe Gibert's sensational claims, but he still has the support of his friend Campillo, who published another controversial book, *El Cráneo Infantil de Orce: El Homínido Más Antiguo de Eurasia* (2002).

The oldest fossil hominid remains in Eurasia cannot be the controversial fossil fragment from the Venta Micena site, which is not considered human. At present, the oldest human remains in Spain are those of *Homo antecessor* from the Trinchera Dolina site (Atapuerca) dated at 0.78 million years. Furthermore, the oldest hominid evidence is the lithic industry that has been recently found at the Sima del Elefante site (Atapuerca) and Barranco León-5 and Fuente Nueva-3 sites (Orce). This evidence is dated at about 1 to 1.3 million years, having been found just below Jaramillo in the Matuyama magnetochron.

— *Eustoquio Molina*

See also **Arsuaga, J. L.; Atapuerca; Bermúdez De Castro, J. M.; Creationism vs Geology; Homo Antecessor; Homo Erectus; Homo Habilis; Paleoanthropology**

Further Readings

Agustí, J., & Moyà-Solá, S. (1987). Sobre la identidad del fragmento atribuido a *Homo sp.* de Venta Micena (Orce, Granada). *Estudios Geológicos, 45,* 535–538.

Gibert, J., Campillo, D., Arqués, J. M., García-Olivares, E., Borja, C., & Lowenstein, J. M. (1997). Hominid status of the Orce cranial fragment reasserted. *Journal of Human Evolution, 30,* 1–15.

Molina, E. (1998). El polemico fósil de Orce: "falta de rigor o fraude" *El Escéptico, 1,* 73–76.

Palmqvist, P. (1997). A critical re-evaluation of the evidence for the presence of hominids in Lower Pleistocene times at Venta Micena, Southern Spain. *Journal of Human Evolution, 33,* 83–89.

Oreopithecus

One of the most controversial fossil primates known, *Oreopithecus bambolii* has generated substantial debate since its original discovery in the 1870s. Although only distantly related to humans, this Miocene hominoid shows several features that later evolved in parallel in the earliest human ancestors, including potential bipedalism and hand grasping ability. While its taxonomic placement and phylogenetic affinities have garnered controversy, scientists recognize *Oreopithecus bambolii* as an important species in understanding the evolution of certain human characteristics.

The first *Oreopithecus* specimens were discovered in the early 1870s in the lignite mines of Tuscany. In 1872, noted French anatomist and paleontologist Paul Gervais named these fossils *Oreopithecus,* which he described as similar to both gorillas and macaques. Much debate over the phylogenetic position of *Oreopithecus* soon followed, with some scientists arguing that the species was perhaps ancestral to modern humans and others pushing for a close linkage to the Cercopithecidae. A cache of additional specimens, including a complete skeleton of a young adult male, was unearthed near Baccinello, Italy, in 1958. Originally studied by Johannes Hürzeler, these specimens have settled much of the taxonomic debate. Although *Oreopithecus* "jumps around" in many modern cladograms, most researchers agree that this genus is a primitive hominoid closely related to *Dryopithecus.* Depending on which classification one follows, *Oreopithecus* may be placed in the Hominidae, but is far removed from humans.

Although known only from Italy and possibly Moldova, *Oreopithecus* is the best represented European fossil hominoid. Its fossils have been found in the Late Miocene sediments of Tuscany and Sardinia, which have been dated to 7–9 million years ago. During the Late Miocene, this region is thought to have been an island, and the insular environment of *Oreopithecus* is often cited as the source of many of its unusual features.

Oreopithecus was a relatively large-bodied primate, reaching sizes of 30–35 kilograms. Chief among its distinguishing features were a small brain, extremely short face, small postcanine and canine teeth, gracile carpals, and robust facial bones that indicate strong chewing muscles. The primitive and conservative

postcranium of *Oreopithecus* has often been described as similar to the ancestral hominid morphology, and several studies have shown similarities in dentition between this genus and modern hominids. Additionally, the strong chewing muscles and small brain of *Oreopithecus* suggest a strongly folivorous diet, although some scientists have disagreed with this conclusion.

Also controversial is the notion that *Oreopithecus* was a habitual biped with human-like hand-grasping abilities. Based on a study of the internal bone structure of the pelvis, along with an examination of leg and foot morphology, it has been suggested that *Oreopithecus* was bipedal, perhaps as a consequence of its insular environment. The development of bipedalism freed the hands of *Oreopithecus* from locomotion, which enabled the evolution of an improved grasping ability similar to that seen in modern humans. Although unrelated in an evolutionary sense, these features make *Oreopithecus* an important species for understanding human bipedalism and grasping abilities. However, the hypotheses of bipedality and grasping in *Oreopithecus* have not been met with total acceptance. Other scientists have argued that *Oreopithecus* was an arboreal form, and that its unique hand and hip morphology reflect ape-like power, grasping, and suspension, not bipedalism.

As material of *Oreopithecus* is well-known, disagreements such as these should extend into the near future. However, despite the frequent debates and controversy, scientists agree that *Oreopithecus* is an important early hominoid that reveals much about early human relatives and the evolution of certain human characteristics.

— Stephen L. Brusatte

See also **Cercopithecines; Cladistics; Dryopithecus; Hominoids**

Further Readings

Begun, D. R. (2002). European hominoids. In W. C. Hartwig (Ed.), *The Primate Fossil Record* (pp. 339–368). Cambridge: Cambridge University Press.

Köhler, M., & Moyà-Solà, S. (1997). Ape-like or hominid-like? The positional behavior of *Oreopithecus bambolii* reconsidered. *Proceedings of the National Academy of Sciences, USA, 94,* 11747–11750.

Moyà-Solà, S., Köhler, M., & Rook, L. (1999). Evidence of hominid-like precision grip capability in the hand of the Miocene ape *Oreopithecus. Proceedings of the National Academy of Sciences, USA, 96,* 313–317.

Ornamentation

Ornamentation is decorating or beautifying objects or human bodies. Architecture is ornamentation on a larger scale; human beings alter their surroundings using artistic methods such as stained glass, textured walls and ceilings, and murals. Throughout history human beings have esthetically improved their surroundings. Ornamentation is present in physical objects such as pottery, textiles, and art. It is believed that the *Homo sapiens sapiens* were the first to sculpt animal and human figurines from ivory, engrave images on limestone blocks, and create ornamentation from ivory, shell, soapstone, and animal teeth. Tools and weapons have been found that appear to have originated 40,000 years ago, possibly to help construct personal ornaments. Cave art and paintings have been discovered at Lascaux dating back around 17,500 years, believed to be made by the Cro-Magnons. The site Sungir, located in Russia, shows signs of personal ornaments of ivory and schist carved into geometric and animal forms and dating back 28,000 years. Another site in Russia, the site of Kostenski 17 in the Don Valley, dates back 36,000 years and shows signs of ornaments constructed out of fossil coral and belemnites. With the advancement of technologies, both the pottery and textile industries have seen dramatic improvements. Although there have been many instances of extravagant items created from pottery and textiles in the past, new technologies continue to make the process easier and faster than before. Individuals use these artistic techniques to create functional objects, to express a certain characteristic about themselves or their culture, and to leave a footprint of human evolution. These expressions may be made consciously or unconsciously.

Humans adorned themselves from early ages. Human ornamentation involves decorating the body by wearing specific clothing, jewelry, headdresses, body paints, tattoos, body piercings, brandings,

scarifications, or cicatrizations. Decorating the body is a means to communicate and express a variety of meanings that are symbolic of the individual or his or her culture. Some theories associated with ornamentation suggest that certain adornment practices, such as tattooing, serve the purpose of closely connecting social and spiritual customs in a population. Certain cultures believe that the use or wearing of specific ornaments will protect them from evil spirits or bad luck. There is also a belief that body ornaments unify groups of people while placing them in certain geographical areas depending on the characteristics of the ornaments.

Jewelry

Different types of jewelry may be worn by people depending on their age or whether they are male or female. Jewelry is found all over the world, in different styles, colors, shapes, and made from diverse components. Many ancient societies created beautiful pieces from stones, shells, gems, rocks, wood, and precious metals. In Hawaii, personal ornamentation had great importance. Leis, worn to fend off evil spirits, were made from nonperishable and perishable objects. The nonperishable objects included stones, feathers, and shells. Perishable leis consisted of flowers, fruit, and leaves. Beaded necklaces are popular among African tribes. Most people in eastern and southern Africa wear some form of beaded jewelry, but in the western part of Africa, beadwork is reserved for members of royalty. The colors of the beads used, shapes, and patterns carry much significance. The type of necklaces worn in these societies can also communicate information about the individual. Women tend to wear their beadwork to illustrate their wealth. Depending on the number and types of necklaces worn, a woman may be seen as wealthy or not. Furthermore, wearing a specific beaded necklace tells other individuals in the society that the woman is nursing.

In India, jewelry plays an important role in ornamentation. Bangles, bracelets, or wristlets are popular among Indian women. It is the variety and number worn that expresses whether a woman is married or betrothed. It is also suggested that a woman wearing wristlets is able to express different emotions nonverbally by the tinkling sound they produce. Armbands and armlets are prevalent among Indian and Egyptian cultures.

Body Painting

Body painting involves decorating parts of the body using natural or artificial paints. In many cultures, body painting is used as a temporary disguise or simply to decorate the body. Henna is a popular source of paint in India and Egypt. Henna is often used to paint parts of a woman's body for traditional Indian weddings. The Australian Aborigines frequently use body paints during ceremonies and rituals. They decorate the body with patterns for protection, as a mark that the individual is in transition, and to aid in the recollection of dreams.

Headdresses

Headdresses are any objects covering the head partially or completely. They are made of various materials such as cloth, animal skin, or plants. In many societies, past and present, there are figures of authority or of specific importance who wear special headdresses. Warriors and shamans wear special garments to differentiate them from other members of the society and to command respect. In Western society, headdresses may identify figures of authority or of religious importance, such as police officers and priests. Headdresses may also be worn because of geographic location and condition. The Plains Cree wore winter hats made of buffalo and coyote hides in cold weather; however, they also wore a variety of ceremonial headdresses such as eagle feather bonnets and buffalo horn caps. Only those possessing magical powers were allowed to wear these headdresses during pursuit of a vision. Hats worn by the Naga tribes were mainly composed of boars' tusks, fur, horn, and feathers. These represent qualities such as courage, merit, and other values important to the Naga tribes.

Tattoos

Tattooing involves the piercing of the skin using needles or other sharp objects to create a specific image on the body. Tattooing, as well as cicatrization, is often practiced in order to permanently mark the body as a form of association with a particular society or with characteristics the individual possesses. It is also suggested that indigenous or tribal motives for tattooing involve connection with the Divine, sacrifice, or a form of permanent good fortune and health.

The Māori and the Native Americans have used many painful techniques during puberty rites and rituals expressing manhood. Among the Māori of New Zealand, tattooing—called *moko*—is widely practiced. Cuts one-eighth of an inch deep are made into the flesh with a mallet and a sharp blade or chisel. This procedure is very painful, but the individual is regarded as strong and brave and is highly respected. In the British Isles, ancient tribes used to tattoo their bodies in order to scare their enemies. The Romans adopted this idea and implemented it in their society by tattooing convicted criminals and slaves; the tattoos represented a low social status. A few early Christians tattooed symbols of the cross onto their bodies, but tattooing was forbidden once Christianity was declared the official religion of Rome. Once they reach puberty, Ba Thonga women are tattooed on the shoulders and stomach to represent fertility and eligibility for marriage. The Japanese introduced the use of colors in tattoos to Europe and America.

Body Piercing and Augmentation

Body piercing and body augmentation are other forms of personal ornamentation. The Marshallese pierce the earlobes with shark teeth to create holes that are gradually enlarged by inserting leaves. The enlarged earlobes may then be used to carry items such as tobacco sticks or clay pipes. Some tribes use lip plates and lip wedges that are inserted into the lip by a precision cut. The lips conform to the shape of the implanted objects as the flesh heals. The Lobi women in Ghana and the Ivory Coast, as well as the Kirdi of Cameroon, believe that evil spirits are unable to enter through the mouth if they wear lip plugs. At a young age, children are pierced with a thorn by their mothers. The hole is enlarged by inserting stalks of grass and finally a plug made of clay. Women from Chad and Sudan install lip plates resembling the beaks of the spoonbill and broadbill, which their culture deems sacred.

Scarification

Scarification is a technique in which cuts and incisions are made into the flesh to leave permanent scars on the body. It is believed that forms of scarification were considered to be marks of civilization. Natives from the Andamans use scarification practices on young males and females to mark the transition from childhood to adulthood. The elder generation believes that by this painful experience, children will grow up to be strong individuals.

Cicatrization

The purpose of cicatrization is to cut wounds in the flesh that will create a decorative pattern of scar tissue. It is similar to scarification, but the scars are more severe and protruding. Cicatrization is thought to be a process in which individuals physically mark their passage through various stages of their lives. This procedure has been performed by tribes in Africa. In addition, female mummies have been found with decorative scar tissue along the stomach area, possibly for protection and to promote fertility.

Ornamentation in the World Today

Today there are numerous forms of ornamentation used all over the world as a means of personal expression. Globalization has allowed the acculturation of ornamentation to occur. Although certain aspects of an individual's life may be revealed by the type of clothing or jewelry he or she wears, most types of ornamentation are available to a vast number of individuals. Some people adorn themselves with expensive jewelry and designer clothes to express their accumulated material wealth, while others attempt to portray themselves as wealthy by purchasing inexpensive replicas of the same materials. The symbols of wealth, beauty, and power are always in transition, and there are often revivals of adorning techniques that were popular in the past. Tattoos, for example, were originally used to decorate and communicate different messages. They evolved from a technique of ornamentation that was practiced first among native tribes and later by criminals and the rougher individuals in society. Today, tattoos are accepted as a means to express an individual's uniqueness and creativity.

Modern society carries historical knowledge in its ornamentation. Traces of family history and culture are found in the way individuals decorate their houses, offices, and themselves. Using items that have been passed down from generation to generation, as well as new items, individuals define

themselves in the ways they decorate themselves and their surroundings.

— *Karen Hodge-Russell and Jenny Etmanskie*

See also **Jewelry; Māori; Ochre**

Further Readings

Eicher, J., Johnson, K., & Torntore, S. J. (2003). Fashion foundations: Early writings on fashion and dress. New York: Burg.

Orwell, George (1903–1950)

George Orwell's contributions to the field of anthropology are related to his opinions on individual freedom in relation to the state. Through both his writings and his many exploits, Orwell stressed the importance of each person's individuality over the threat of authority. He reached adulthood at a time when fascism and communism were both making gains against liberal democracy throughout Europe. Orwell was squarely on the side of the common person and the right to self-determination. In his books, his main characters consistently stood for intellectual freedom in the face of state authority.

George Orwell was born Eric Arthur Blair on June 25, 1903 in Motihari, India. He was the son of Richard Walmesley Blair, a British civil servant. His mother, Ida Limouzin, was a native Londoner who had moved to India to work as a schoolmistress. Richard and Ida were married on June 15, 1897, despite a 17-year age difference. Orwell's older sister, Marjorie Francis Blair, was born on April 21, 1898. Shortly after Orwell's birth, an outbreak of the plague struck their home district and Ida prevailed upon her husband to take the family back to England.

Richard Blair traveled back to India the following year to resume tending his opium fields. Ida set to raising nine-year-old Marjorie and little Eric, with the help of a series of nursemaids, in the small market town of Henley-on-Thames. During this time Eric was sick with bronchitis and confined to bed for five days. This type of illness would become too common as he was to have problems with his lungs throughout his life. In the summer of 1907, Richard returned from India on leave. This reconciliation of Eric's parents soon produced his younger sister, Avril Norah, on April 6, 1908. Richard was back in India when his youngest daughter was born, and he spent the next four years in Bengal until his retirement in January, 1912. At the age of 55, he returned to the family home in Henley for good. Young Eric finally had a male presence in his house, but unfortunately, the elder Blair was not the loving, sentimental type.

Orwell's school years were not happy ones. He first attended St. Cyprian's school from age eight until thirteen, and then took the entrance examination to attend Eton College; however, his score was fourteenth at a school that only accepted twelve per class. He would have to wait until two dropped out, so he attended Wellington College. This school had a military focus, particularly during the Great War of 1914–1918. This atmosphere hardly suited young Eric, and at the first chance he took his spot at Eton.

After his graduation, he applied for a position with the Indian Imperial Police Force. His scores placed him seventh out of twenty-nine candidates, and when asked for his preference of station, he listed Burma.

In January, 1936 he traveled to the north of England to study and write on the lives of coal miners. His experiences there culminated in the novel *The Road to Wigan Pier.* He spent three months among the poor, dirty men and their families. He lived in their smelly, beetle-infested homes, sharing a small bedroom with three other men. He attended meetings of communists and followers of Oswald Mosley. Orwell was distraught to see the high level of support both these groups could muster in the region. He felt that during the 1930s, England and the other democracies of Europe were asleep at the wheel.

It was during the summer of 1936 that Orwell found his opportunity to put all of his socialist-leaning fervor into concrete action. In Spain, a civil war had begun as a result of an army-led coup against the left-wing government. Adolf Hitler of Nazi Germany sided with the rebels, organizing the return of General Francisco Franco and his Moroccan Army of Africa to aid in the fight against the socialists. Before long, a stalemate developed between the Fascists aligned with Franco and Hitler, and the leftist Republicans, supported by the Communists including Soviet Russia.

Orwell went to Barcelona and spent roughly a year there, fighting as a militiaman aligned with the Communists, but not as a member of their army.

Orwell was wounded by a shot through the neck, the bullet nearly hitting his carotid artery. After a short recovery in a field hospital, he decided there was nothing more he could do to help the Republican cause while he was in Spain. His experiences there ranged from periods of trench warfare to being targeted by the Communists who saw him as a potential "Trotskyite" and therefore an enemy of the cause. Orwell's novel *Homage to Catalonia* is his memoir of not only his experiences there but also his declaration of undying loyalty to the socialist cause over totalitarianism, whether it leans to the left or to the right. The bitter rivalry between the Stalinist Communists and the leftist socialists led to actual jailing, torture, and murders of the other by each group. The loss of a good friend under these circumstances pushed Orwell permanently into the socialist camp. Going forward, he would not sympathize with the Communists under any conditions, not even during the Second World War.

At this time, Orwell continued to have the chronic lung problems that would prove to be his ultimate downfall. Despite this, and perhaps because of it, he continued to be quite a prolific author. He began to write pieces for the BBC, review many novels, submit essays related to the war, and keep up his wartime diary.

In 1945, Orwell completed *Animal Farm,* thought by many to be his finest work. In it, barnyard animals are increasingly exploited and disenfranchised after their revolution against their human master succeeds on a small farm. The main character, Napoleon (a pig), symbolizes Joseph Stalin and the rulers of the Soviet Union. The classic slogan, "all animals are equal, but some animals are more equal than others" describes how the totalitarian leaders justify their positions in the farm's leadership. The elite should not be expected to do any work; their intelligence is too valuable to the well-being of the farm. The book succeeded, in part, because Orwell used a barnyard fable and animal characters to describe a contemporary, vital issue: the battle between freedom and self-determination against the all-powerful, undemocratic state. As Napoleon and the ruling pigs continue to exploit the other stronger, less intelligent animals in order to run the farm, the leaders also change the history of the revolution itself. Events that all the animals have witnessed are later declared to have never happened. The fact that no animal even challenges the rewriting of facts is clearly the warning that Orwell has for us citizens. The citizens of all nations must be on guard against this kind of revisionist history.

In many people's opinion however, Orwell's greatest contribution was his last novel, *Nineteen Eighty-Four.* It is a terrifying, futuristic novel describing life under total state control. Each individual's actions, language, and even thoughts are scrutinized by all-knowing Big Brother—the state. Omnipresent telescreens view each person's every moment, other citizens may denounce one another for alleged violations, and the Thought Police are at every corner. The world is ruled by three large nation-states. The country of Oceania is in a perpetual state of war with either Eurasia or Eastasia. The enemy is sometimes one or the other, making it necessary to eliminate or justify the current state of alliances depending on the proper enemy. The story's main character, Winston Smith—*Smith* as in Everyman—labors in the Ministry of Truth, literally rewriting history.

As far as predicting conditions in the year 1984, Orwell was quite accurate in his description of life in Eastern Europe and the Soviet Union (Eurasia in the novel). China also (similar to Eastasia in the novel) was under a totalitarian system. Citizens of those nations were spied on by secret police and could not freely criticize government policies or expect an improved standard of living. Consumer goods were of poor quality, in short supply, and travel was severely restricted. In Orwell's native Britain (Oceania in the novel), however, the political reality was still one rooted in parliamentary democracy.

But Orwell was not attempting to *predict* what the political future would be in *Nineteen Eighty-Four,* he was *warning against* a potential political future. Orwell challenged us as a democratic citizenry and he implored us to ward off the loss of individual liberty at the expense of government control.

By the time *Nineteen Eighty-Four* was published, Orwell was a very sick man. Hospitalized in the fall of 1949, he was to suffer for months until the end. He died on January 21, 1950 at the age of 46 of complications from tuberculosis. Orwell had lived a short but full life. He had traveled extensively, been a soldier, been married twice, and lived his convictions throughout it all.

— Thomas M. Prince

See also **Communism**

Further Readings

Bloom, H. (1999). *George Orwell's Animal Farm: Modern critical interpretations.* Philadelphia: Chelsea House.

Bowker, G. (2003). *Inside George Orwell, A biography.* New York: Palgrave MacMillan.

Stansky, P. (1983). *On Nineteen Eighty-Four.* Stanford, CA: Stanford Alumni Association.

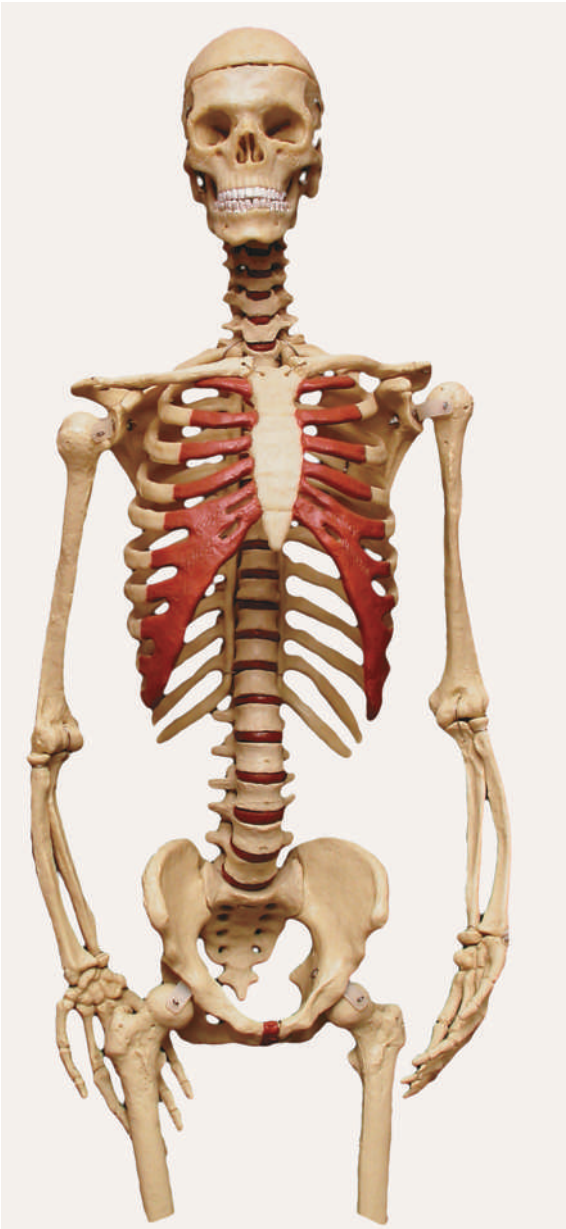
Osteology, Human

Osteology is the subdivision of anatomy pertaining to the study of bones of vertebrate animals, including humans. It comprises the names of specific bones of the skeleton, their placement and articulations in relationship to other bones, body proportions, and visible and microscopic features of osseous tissue. Among Greco-Roman anatomists, who followed the Hippocratic proposition that body proportions of the trunk and upper and lower extremities were related to various illnesses, the term *skeleton* meant a dried body (mummy) as well as the bony framework of a cadaver or a defleshed specimen.

Painters and sculptors of the Renaissance were interested in size and shape relationships of the living body and skeleton, and by the 17th century, systems of measurement using calibrated instruments were invented for scientific and medical purposes. Osteology continues to play a critical role in medicine, as in the fitting of prostheses to severed limbs, and in sports medicine, where size and shape variables of athletes' bodies may be indicative of success in particular sporting activities. Osteology is relevant to engineering, space travel, architecture, and anthropological investigations of prehistoric and modern human skeletons.

Systems for measuring and describing morphological features of the human skull, dentition, and postcranial bones of skeletal, cadaveral, and living subjects constitute the methodology of *anthropometry.* Standards for taking measurements and classifying size and shape variables evolved in the mid-17th century in Europe, along with measuring instruments. A century later, "schools of anthropometry" were established in France by Paul Broca (1824–1880) and his successors Leonce-Pierre Manouvrier (1850–1927), Paul Topinard (1830–1911), Theodore Hamy (1842–1908), and Armand de Quatrefages (1810–1892); in Germany by Rudolf Virchow (1821–1902) and Rudolf Martin (1864–1925); in England by Karl Pearson (1857–1956) and Geoffrey M. Morant (1899–1964). In the United States, Ales Hrdlicka (1869–1943) of the Smithsonian Institution introduced methodologies of the French school, but Earnest A. Hooton (1887–1954) of Harvard University taught the anthropometric standards he had learned from Robert R. Marret (1866–1943) and Arthur Keith (1866–1955) while studying in England. The professions of these investigators of osteological diversity were in anatomy, medicine and pathology, anthropology, and biometrics. Their research goals were human racial classification, phylogeny based upon studies of assumed relationships between fossil hominid specimens and living populations, biological affinities of humans to other primates, and more recently, an expansion into questions about growth and development, health and nutrition, genetics, and applications of osteology and

Source: © Robert Jurmain.



anthropometry to human identification in medical-legal contexts (forensic anthropology).

Osteology in its anthropometric context acquired a unique nomenclature: *craniology* and *cephalometry* with respect to cranial studies of skeletal and cadaveral and living subjects, respectively; *osteometry* and *somatometry* of postcranial bones; *cranioscopy* and *anthroposcopy* with respect to morphological (nonmetric) observations; *somatotypology,* which focuses on ranges and classification of body forms of cadavers and living subjects. These terms are not widely used today, but *osteology* and *anthropometry* remain in scientific parlance.

Among the multiple applications of osteological data in the biological sciences is a developing interest in bone tissue remodeling in response to muscular-skeletal stress. *Markers of occupational stress* (MOS) or *musculoskeletal stress markers* (MSM) may be observed in a skeleton in cases where a habitual activity has resulted in the formation of lesions at loci of muscle and ligament attachments. For example, hypertrophy of the supinator crest on the proximal end of an ulna may result from repeated supination and hyperextension movements of the forearm, as in spear-throwing and baseball pitching. Although a specific lesion may be the consequence of several behavioral activities, their recognition, particularly in the presence of an archaeological record containing weaponry, tools for food preparation, or evidence of strenuous boat paddling, may shed light on lifeways of extinct populations whose remains have been preserved for osteological analysis. Other current osteological studies conducted by biological anthropologists include examination of fossil and living primate postcranial bones in order to better understand the evolutionary course of patterns of locomotion, including the origins of bipedality, effects of stress experiments on volunteer subjects in order to estimate osseous modifications, and bone scanning to acquire fuller knowledge of microstructures and developmental changes. Thus osteology provides data about our evolutionary history, adaptability to changing and different ecological settings, and medical-legal issues.

— *Kenneth A. R. Kennedy*

See also **Anthropometry; Biological Anthropology; Biometrics; Genetics, Human**

Further Readings

Byers, S. N. (2002). *Introduction to forensic anthropology: A textbook.* Boston: Allyn and Bacon.

Ruff, C. B. (2002). Long bone articular and diaphyseal structures in Old World monkeys and apes 1: Locomotor effects. *American Journal of Physical Anthropology, 119,* 305–342.

Wilczak, C., & Kennedy, K. A. R. (1998). Mostly MOS: Technical aspects of identification of skeletal markers in forensic anthropology. In K. Reichs (Ed.), *Forensic osteology* (2nd ed., pp. 461–490). Springfield, IL: Charles C Thomas.

Pacific Rim

The Pacific Rim is an area that encompasses those land masses surrounding and within the Pacific Ocean. The Pacific Rim as a region is significant due to its high levels of volcanism and tectonic activity. The boundaries are often referred to as the "Ring of Fire" because it is home to the world's foremost belt of volcanic activity, comprising over 75% of the world's active and dormant volcanoes. The Ring of Fire arc stretches from New Zealand to the eastern edge of Asia and then north across the Aleutian Islands of Alaska and south along the coasts of North and South America. The Ring of Fire is situated at the juncture of the Pacific and the Antarctic, Nazca, Cocos, North American, Eurasian, and Indo-Australian tectonic plates.

As the Pacific Plate moves northwestward, colliding with and sliding underneath other plates (known as subduction), rock is melted into magma and rises to the surface as lava, forming volcanoes over "hot spots." Island chains are a result of the plate passing over these hot spots leading to volcanic eruptions. Linear island archipelagoes such as Hawaii are characterized by volcanism, earthquakes, and deep ocean trenches surrounding the islands.

All of Earth's tectonic plates are in flux; when they move, intense geologic activity occurs along the edges. Several things can happen as a result. For example, when the plates move away from each other, magma from the earth's core will rise up to form a new seafloor and may eventually break through the ocean's surface to form an island. Alternately, when the plates move toward each other, they will either slide past each other, or subduction will occur.

If parts of a plate boundary slide past one another in opposite directions (for example,the San Andreas Fault), minor earthquakes can occur. The faults also may create cliffs thousands of feet high on the ocean bed. When two plates collide and one is forced under the other, deep into the Earth's interior, the subsumed plate encounters high temperatures and pressures that partially melt solid rock. Some of this newly formed magma rises to the Earth's surface and erupts, forming chains of violent volcanoes like the Ring of Fire. These narrow plate-boundary sites, known as subduction zones, are also associated with the formation of deep ocean trenches and big earthquakes. When there is an earthquake under the sea, one side of the ocean floor suddenly drops downward, beneath the top edge of the subducting plate. The resulting vertical fault will generate a tsunami with often devastating consequences.

The movement of the Indo-Pacific Plate under the Pacific Plate has created volcanoes in New Guinea and Micronesia. The resulting volcanism has created a myriad of different island types. High volcanic islands such as the island volcano of Krakatau ("Krakatoa") in Indonesia, which erupted on August 26, 1883, created a series of huge tsunamis, some of which reached heights of 40 meters and killed more than 36,000 people on the islands of Java and Sumatra.

The Ring of Fire—and hence the Pacific Rim—are important not only because of the natural catastrophes which can result, but for the impact they have had—and still have—on human populations. The formation of new land masses in the ocean greatly influenced the movement of prehistoric peoples across the seas, led to the development of hundreds of unique cultures in partially or totally isolated environments, and helped us to understand how people adapted to insular environments.

— Scott M. Fitzpatrick

Further Readings

Irwin, G. (1992). *The prehistoric exploration and colonisation of the Pacific.* Cambridge: Cambridge University Press.

Kirch, P. V. (2000). *On the road of the winds: An archaeological history of the Pacific Islands before European contact.* Berkeley, CA: University of California Press.

Page, B. M., Ernst, W. G., & Coleman, R. G.(Eds.). (2000). Tectonic studies of Asia and the Pacific Rim: A tribute to Benjamin M. Page (pp. 1911–1997). *International Book Series, 3.* Geological Society of America.

Pacific Seafaring

Few subjects captured the imagination of early European explorers more than the seafaring exploits of Pacific islanders. In 1768, the French explorer, Bougainville, dubbed Samoa "The Navigators' Islands," and the British captain, James Cook, noted that Polynesian canoes were often as fast and maneuverable as his ships. Subsequent commentators, particularly within the anthropological community, have retained their predecessors' fascination.

Western views of oceanic seafaring abilities have shifted several times. Through the mid-20th century, indigenous traditions of voyaging, exploration, migration, and settlement were taken quite literally. In 1957, Andrew Sharp argued that, unless aided by instruments, human beings couldn't navigate successfully over long distances. Therefore, colonization of new islands was almost certainly the result of accidental drift voyages by sailors blown off course or forced, against their will, out to sea.

Sharp's conclusions were challenged by the pioneering ethnographic work of Thomas Gladwin (1970) on Puluwat in Micronesia and David Lewis's more wide-ranging survey. They and others have documented voyages of hundreds of miles with accuracy comparable to that of Western mariners aided by modern instruments, and they carefully described indigenous navigational techniques.

A second line of evidence casting doubt on Sharp's drift voyage argument is provided by the direction of settlement: from west to east, against the prevailing winds. Computer simulations comparing winds and currents with the geographical and cultural relationships of various islands and archipelagoes have demonstrated that oceanic exploration and settlement could not have been a result of accidental drift, but must have eventuated primarily from purposeful voyaging by skilled navigators.

The final line of evidence supporting the proficiency of oceanic navigators comes from experimental voyages with replicas of traditional canoes, using traditional navigational techniques. *Hōkūle'a,* a performance-accurate replica of a Hawaiian double-hulled voyaging canoe, built with modern materials but to traditional design, was sailed successfully through almost all of Polynesia. In the aftermath of *Hōkūle'a*'s success, other voyaging canoes were built in the Cook Islands of Aotearoa (New Zealand), and elsewhere in Polynesia. In 1993, the Hawaiian Voyaging Society launched *Hawai'iloa,* a voyaging canoe constructed out of natural materials. *Hawai'iloa,* like its predecessors, has now logged thousands of miles of deep-sea inter-island travel. Meanwhile, many indigenous

Source: Copyright © Aska and David Krantz. www.askadavid.org

communities are working to revive their seafaring heritage. Noteworthy in this regard are the efforts of the Vaka Taumako Project in the eastern Solomon Islands.

Canoe Design

Most commonly, Pacific mariners used single-outrigger canoes ranging from small vessels paddled by one or two men (or occasionally women) for coastal travel and inshore fishing to vessels that might approach 100 feet in length and rival European sailing ships for speed. In Micronesia, parts of Melanesia, and most Polynesian outliers, canoes are designed with an interchangeable bow and stern. The vessel is tacked (i.e., has its course changed) by moving the sail from one end to the other, thereby always keeping the outrigger upwind. In most of Polynesia, bow and stern are distinct; the outrigger is always kept to the same side (most often, to port, i.e., the left side of the ship); and the canoe is sometimes sailed with the outrigger in the craft's lee (sheltered side).

The most imposing of Pacific voyaging canoes were the great double-hulled vessels of the Polynesian heartland. Such canoes have been reported from Aotearoa and Tonga to Rotuma, Tuvalu, and north to Hawai'i. Voyaging canoes could cover more than 100 miles per day with a favorable wind. The outrigger or double-hull design provides resistance to leeway drift without the need for a deep keel, which is a hazard when sailing among shallow reefs. More specialized developments included the New Zealand Māori's impressive single-hulled, outrigger-less canoes. For an inventory of Pacific Islanders' canoe construction and design, Haddon and Hornell's encyclopedic treatment remains unparalleled.

Navigation

Most Pacific navigators rely mainly on the movements of celestial bodies. Ideally, the navigator identifies a star that rises directly over his target island and points the canoe's bow toward that star. When the first star rises too high, he turns his attention to another following approximately the same trajectory. If a sequence of stars does not rise or set directly over the target island, the navigator sets off the bow at an appropriate angle while compensating for wind and current.

Most problematic is detecting currents on the open sea. A capable navigator knows the prevailing currents. He confirms their direction and speed while near the point of embarkation or when sailing over shallow reefs. Some navigators assert that by feeling wind velocity and seeing or feeling the condition of the sea, they can even discern a current's direction in deep water, far from land.

The navigator may gauge latitude by identifying zenith stars or by observing the altitude at which specific stars rise and set. Longitude must be estimated by dead reckoning—the navigator fixes the canoe's position by estimating the vessel's speed, direction, and how long it has been at sea. Since he must keep a running total of the vessel's progress at all times, he cannot sleep, other than occasional brief naps, even on a lengthy journey.

When stars are not visible, the navigator relies upon prevailing wind and wave patterns. In addition, long-distance voyagers may have employed "latitude sailing"—sailing to the latitude of the target island but well to windward, then making landfall by running downwind. They minimized their risk by island hopping, thereby breaking lengthy journeys into shorter segments. Wherever possible, they aimed for groups of islands rather than isolated targets.

Navigators usually attempt to make landfall during daylight. Before land is visible, its presence may be indicated by birds that roost on shore but feed at sea during the day. Reflected waves are shaped differently from waves produced directly by the wind and can, at times, be felt at distances of more than twenty miles from land. Clouds tend to accumulate around the peaks of high islands, indicating their presence; and a greenish tint to clouds may reveal the presence of an atoll that cannot be seen from a canoe.

— Richard Feinberg

Further Readings

Feinberg, R. (Ed.). (1995). *Seafaring in the contemporary Pacific Islands: Studies in continuity and change.* DeKalb, IL: Northern Illinois University Press.

Finney, B. (2003). *Sailing in the wake of the ancestors: Reviving Polynesian voyaging.* Honolulu, HI: Bishop Museum Press.

Gladwin, T. (1970). *East is a big bird: Navigation and logic on Puluwat Atoll.* Cambridge, MA: Harvard University Press.

Haddon, A. C., & Hornell, J. (1975). *Canoes of Oceania.* Honolulu, HI: Bishop Museum Press.
Irwin, G. (1992). *The prehistoric exploration and colonisation of the Pacific.* Cambridge: Cambridge University Press.
Lewis, D. (1972). *We, the navigators.* Honolulu: University of Hawai'i Press.

Paleoanthropology

Paleoanthropology is a multidisciplinary approach to exploring the evidence for the evolution of humans and their fossil ancestors. Paleoanthropology explores human anatomical structure, archaeological remains, habitat, and chronology through the diverse disciplines of biological anthropology, primatology, archaeology, ecology, geology, paleontology, biology, genetics, and cultural anthropology. In exploring the question of human evolution, paleoanthropologists link ideas through evolutionary theory, comparative anatomy, environmental and cultural influences on behavior, and geological time.

History of Paleoanthropology

In the 1860s, only a few pre-modern fossils had been found; scientists did not agree upon their identification or age, let alone upon the model to explain human evolution. Charles Darwin had just published *On the Origin of Species* in 1859 on natural selection as a mechanism to explain evolutionary change through time. Few people yet realized the extent of the antiquity of humanity.

On the European continent, most people subscribed to the school of Catastrophism, led by the writings of French paleontologist Georges Cuvier. According to Cuvier, fossils found in different geological strata illustrated successive revolutions, during which all living things were destroyed and replaced by new forms. Cuvier and his supporters were unwilling to accept early ideas of evolution, and did not believe in the existence of human fossils. In Britain, the prevalent school of thought was Uniformitarianism, led by James Hutton and Charles Lyell. Uniformitarianism held that natural processes observable today were responsible for the gradual modification of the earth. Proponents of this view believed that the earth was at least several millions of years old. The Uniformitarian position set the stage for the relatively quick acceptance of Darwin's work and the theory of evolution as a whole.

The idea that humans had evolved from an ape-like creature was not problematic for proponents of Uniformitarianism. Many perceived a gradual evolution of humans from a form of anthropoid ape. As more fossil hominid forms were unearthed, such as the Spy Neandertals from Belgium, people began to search for the "missing link" between apes and humans. Ernst Haeckel suggested that there should have been a completely transitional form between apes and humans, one that was neither ape nor human. Paleoanthropologists of the mid- to late-19th century focused primarily on description and typology, organizing fossils into successive evolutionary stages and racial categories. This temporal and typological sorting of fossils (and living people) did little to explain why and how humans evolved in the patterns they did.

In the 1930s a movement began to form a synthetic theory of evolution, combining genetics, evolutionary theory, and populational studies into a single perspective, known subsequently as "The Modern Synthesis." It rejected the descriptive, typological emphasis commonly practiced in zoology and physical anthropology up until that point. By the early 1950s, this major paradigm shift had a most profound effect on American biological anthropologists. Researchers began to focus on ecological change and cultural behavior as factors in human evolution. Today, paleoanthropology as a research focus spans a broad range of topics and disciplines.

The Paleoanthropological Approach

Paleoanthropology differs from paleontology in that it primarily studies human origins; because of this, the application of some of the standard tools used by paleontologists can be problematic. Early fossil humans, like other animals, were subject to evolutionary forces such as natural selection, and had to adapt biologically and behaviorally to specific environments or ecological niches. When fossil humans began to rely on cultural adaptations to assist them in survival, biocultural feedback created a cultural buffer between hominids and their environment. Because of this, there is considerable debate over what types and levels of selective forces can be used to

predict fossil human lifeways. Dietary habits, advanced cognitive abilities, communication and language skills, and technological sophistication all played a role in shaping human adaptation to the environment, making the concept of the ecological niche, and even natural selection, less useful as a research tool.

Paleoanthropology in the Field

Like most fossils, human fossils are rare and difficult to find. As a result, fieldwork is an important part of paleoanthropology. Early fieldwork, such as that conducted by Robert Broom or Louis and Mary Leakey, was a small-scale effort by one or two individuals and their hired crew. These individuals were experts in some areas, such as excavation or anatomy, and called in experts on key questions such as fossil species identification or interpretation.

Today, while one individual still leads a field project, there has been a shift in focus toward a team approach. This interdisciplinary approach, first championed by F. Clark Howell, encourages collaboration among an international team of specialists, representing many fields of study.

Biological anthropologists examine fossils for anatomical features of hominids using their knowledge of comparative primate anatomy and biomechanics. Geologists help to locate potential human occupation sites by examining maps, aerial and satellite photography, and the stratigraphy of a region. They also help to develop a dating sequence for the region. Paleontologists estimate the age of the site through a comparison of fossil animals, or fauna, in other nearby sites. Reconstructing past environments, or paleoenvironments, involves cooperation from paleontology as well as ecology, paleobotany, palynology (fossil pollen grains), and geomorphology (water, land features). Archaeologists recover material cultural remains from human behavior and can provide dates for the site based on features of the artifact's style, location, and raw material.

Paleoanthropology in the Lab

While fossil recovery and description are important (without which there would be no fossils to study), equally important are the research questions these fossils can help answer. Like all fields of science, paleoanthropology relies upon the scientific method of inquiry, hypothesis formation and testing. Through the collaboration of researchers from many fields, paleoanthropologists examine the broader picture of human origins through developing competing phylogenies, or evolutionary trees, which reconstruct possible relationships between fossil species. These phylogenies are tested against the fossil record and refined with new discoveries or interpretations. Among the key research questions asked by paleoanthropologists are:

Source: © Robert Jurmain.

- How, when, and where did modern humans evolve?
- When did bipedalism evolve, and why?
- When and why did tool-making develop, and who were the first toolmakers?
- What is the ancestor of the genus Homo?
- How many fossil species of hominids existed?
- How did the modern human brain evolve, and why?
- How did the human capacity for language evolve, and why?
- How and when did modern humans become so diverse?

These questions, approached using many lines of evidence and fields of study, guide our understanding of human origins and our unique adaptations.

— *Cathy Willermet*

See also **Human Paleontology**

Further Readings

Institute of Human Origins, Arizona State University. (2005). Retrieved January 10, 2005 from http://www.becominghuman.org.

Johanson, D., & Edgar, B. (1996). *From Lucy to Language.* New York: Simon and Schuster.

Wood, B. (2004). *Human evolution: A very short introduction.* Oxford: Oxford University Press.

Paleoecology

Paleoecology is both a field of ecology concentrated on the study of the ecology of fossil organisms and a branch of cultural and environmental anthropology aimed at the detection of the mutual influence and interdependence of prehistoric culture (or society) and its natural environment.

The formation of paleoecology as special field of knowledge coincided with the middle of the 20th century, and was the crucial time for the initial comprehension that human livelihood systems' diversity is directly connected with the features of the natural geographic environment. As a result, the analysis of the geographic components of certain ambient adjoining areas inhabited by separate groups of population has become a subject of principal importance. From the early 1960s the process of the creation of a database necessary for cataloging prehistoric fauna, flora, relief, and any climate reconstruction has been significantly intensified.

As a result one can trace the formation of new direction in the field of archaeological investigation–environmental archaeology, which developed mainly in the context of European Stone Age archaeology. From the very beginning its primary goal has been postulated as an interdisciplinary analysis of the geographic environment inhabited by Prehistoric populations. Since the late 1970s two fundamental approaches could be distinguished in its frameworks, and gradually each of them has become an independent discipline. The first one—geoarchaeology—concentrates its attention predominantly on the natural geographic context of archaeological objects. Methods of geology, geomorphology, and climatology are used in conjunction by the highly skilled geoarchaeologists in order to reconstruct the circumstances that have had local influence on archaeological sites, that have led to the formation of cultural remnants, and also to reconstruct the further history of their fossilization. In recent years artifact and site conservation, preservation of the same from natural ruination, technical analysis of artifacts and their raw material source base, artifact absolute dating, and other issues have also become the part of the scientific concerns of the representatives of this discipline. The other group of environmental archaeologists concentrates their attention on ecological links between human society and natural environment.

In the former Soviet Union the prehistory of the ecological context of separate settlements became the subject of intentional investigation during the late 1960s and early 1970s. Since that time representatives of a broad spectrum of natural sciences have taken part in numerous archaeological excavations, and the results of their activity have enabled them to reconstruct in concrete the natural geographic environment inhabited by a certain group of hunter-gatherers. The first attempt by Soviet archaeologists to theoretically generalize the results of such interdisciplinary excavations was made by S. Bibikov. In 1969 he proposed the method of paleoeconomic simulation, the frameworks of which call for the specificity of the material culture and household activities of the concrete settlements' inhabitants, on the one hand, and the features of their natural environment, on the other, to be taken into account. During the 1970s to 1980s, he and his many apprentices explored this method in many prehistoric settlement case studies. As a result, it was established that natural environment had significantly influenced the formation and development of separate groups of the populations and their culture, and, in its turn, was subjected to many essential changes caused by these human collectives' activities. Based on this conclusion Bibikov elaborated his concept of paleoecological and paleoeconomic crisis, which is regarded as an objective theory and a natural result of prehistoric populations' advances and activities taking place in a permanently changing environment. It also becomes possible to distinguish several

stages of such crisis development during 9000–6000 B.C., development which is correlated with phases of geographic ambient evolution as well as with changes of the "livelihood activities" of hunter-gatherers. As a result, a new specific direction of archaeological and historical investigation—an ecological one—was founded. Its purpose is often regarded as the detection and analysis of connections that exist between a specific cultural object and its natural environment.

Representatives of Western-European environmental archaeology and experts in the ecological approach in Soviet archaeology and prehistory are taking rather close paths in looking to a prehistoric population's culture and specific features of its mode of life for explanation. Questions of the hunter-gatherers' mobility as well as their livelihood activity in certain localities are at the center of attention of practitioners of both approaches. At the same time, there is also a clear difference in their initial idealized theoretical postulates. So, in contrast to the Western-European and American environmentalists, the majority of the Soviet researchers believe that the social sphere of the prehistoric culture levels an environmental impact on material culture that can already be seen at the earliest phases of human history.

Practitioners of the paleoecological approach in both Soviet and Western archaeology see their main task in interpretation of any results of concrete site investigation as taking into account the site's natural ambient dynamics. In order to realize this goal, they try to avoid broad generalizations or the creation of a simplified or complicated simulation of nature-society relationships, so they prefer a simple explanation. Of late it was proposed to distinguish local paleoecology, which concentrates its attention on problems of residence, place, and visiting a territory's ecological situation reconstruction, from regional paleoecology, the object of which is to study features of the settlement system as well as a regional source base evaluation. Conversely, an original simulation of historical processes that took place on the territory of what is contemporary Ukraine during the Mesolithic times illustratively proves the high cognitive potential of the use of this approach in wider spatial frameworks.

Today the ecological approach is gradually improving not only in Stone Age archaeology but also in many adjacent fields of knowledge that are concerned with the investigation of prehistoric societies. First it happened with cultural and social anthropology, ethnology, paleodemography, paleosociology, paleogeography, as well as with other sciences and humanities. In particular, since the 1970s it has been repeatedly stressed that in prehistoric times the main stages of natural geographic environment changes correlate well with human morphology evolution as well as with the society's material culture and livelihood systems development. The main role in this process, as a rule, was given not so much to the living conditions of a prehistoric population as to their dynamics in time.

Recent decades have brought new insight to the theoretical background of paleoecological studies. Today the concept of the influences of cultural adaptation, stresses, resilience, and adjustment of a society are an integral part of paleoecology along with the application of theories of sustainability, socio-economic metabolism, co-evolution, and nature colonization.

— Olena V. Smyntyna

Further Readings

Bibikov, S. N. (1969). Nekotorye aspekty paleoeconomicheskogo modelirovaniya paleolita [Some aspects of palaeoeconomic modelling of Paleolithic]. *Sovetskaya Archeologia, 4*, 5–22.

Boyd, F. W. (1990). Towards a conceptual framework for environmental archaeology: Environmental archaeology as a key to past environment. *Circaea,* 7, 63–79.

Dincauze, D. F. (2000). *Environmental archaeology: Principles and practice.* Cambridge: Cambridge University Press.

Smyntyna, O.V. (2003). The Environmental approach to Prehistoric studies: Approaches and theories, *History and Theory: Studies in the Philosophy of History, 42*(4).

PALEOMAGNETISM

Paleomagnetism is both the fixed orientation of a rock's crystals based on the orientation and direction of the Earth's magnetic field at the time of the rock's formation and the study of such phenomena used as indicators of Earth's paleomagnetic history.

The Earth's magnetic field orientation as a dipole is not fixed and is continuously changing by small

increments. This leads to an effect known as polar wander. This continuing process is still active today and forces charts of the earth's magnetic field, known as isomagnetic maps, to be redrawn every 5 years.

The phenomenon of polar wander has been used extensively in geology as an indicator of global position and the geologic age of iron-bearing rocks known as ferromagnetic rocks. Studying paleomagnetics has, in part, established the position and intensity of the Earth's magnetic pole over geologic time. Geologists use this new sagaciousness to determine aspects of global tectonic history. Using paleomagnetic techniques it now becomes possible to determine the past relative positions of two separate continents, provided they were previously conjoined to the same plate. A paleogeographical reconstruction of the earth can then coalesce from global paleomagnetic data endowing geologists with valuable insight into Earth's past.

The ability of geologists to determine past magnetic fields is locked in the chemistry of ferromagnetic rocks. These substances have more electrons spinning in one direction than the other; thus the individual magnetic fields of the atoms in a given region tend to align in the same direction. When an igneous rock is crystallized from lava or magma in the presence of a magnetic field, the magnetic elements leave a magnetic signature frozen in the rock. During the cooling of molten rock, iron-bearing minerals become magnetized in alignment with earth's magnetic field as they descend through a critical temperature known as the Curie Temperature, which occurs at approximately 500°C–600°C. The rock's magnetic properties are retained (thermal remanent magnetism) for geologically long periods unless the rock is again heated to near the Curie temperature. Rock samples have their thermal remanent magnetism determined by magnetometers in a laboratory. Around the world, thousands of formations and outcrops have been paleomagnetically analyzed and documented making accurate paleocontentinal maps of Earth a reality and furthermore giving geologists an almost clairvoyant gaze into the past.

Dramatic alterations to the polarity of the Earth's magnetic field were first noticed on the seafloor of the Atlantic Ocean. Known as the mid-Atlantic spreading ridge, this narrow rift continuously deposits new basalt separating the east coast of North America from the west coast of Europe and Northern Africa. The seafloor in the Atlantic is striped with bands of rocks magnetically trending northward and alternating parallel bands trending southward. Presuming the seafloor at the Mid-Atlantic rift spread similarly in the past as it does today, then as time progressed, the Earth's magnetic field regularly underwent a full reversal in dominant direction. Thus, magnetically, the seafloor in the Atlantic appears as linear anomalous bands. These reversals were recorded in the basalt going back approximately 100 million years. In that time, the rates of reversal have varied considerably from one reversal to the next. These magnetic reversals are recorded not only in basalt, but also in other igneous rocks and sediments. If the reversals themselves represent simultaneous cosmopolitan phenomenon, they then act as unique stratigraphic markers wherever and whenever they occur. These polarity events, therefore, provide a precise tool for chronostratigraphic correlation of marine and terrestrial sediments. Based on seafloor spreading and sediment depositional rates, the reversal process is thought to occur over a period of 1,000 to 10,000 years which includes a 60% to 80% decrease in intensity of the field some 10,000 years preceding the reversal, whereas the actual reversal itself only takes 1,000 to 2,000 years. The field then builds up in intensity returning to normal intensity. The last polar reversal occurred approximately 700,000 years ago. Polar reversals have various durations and are divided into two main groups: chrons (epochs) occur when the polarity is the same for a long period of time, and subchrons (events) occur when the polarity only maintains a single direction for a relatively short period of time.

The use of paleomagnetism as a global chronometer has been extended in many other sciences. In archeology, the pottery and bricks of ancient peoples are aged using carbon 14 dating showing the date of their last cooling. These samples can also give a relative position of the magnetic pole at that time. This has allowed archeomagnetic investigations to reconstruct the recent course of the magnetic pole. The ability to define boundaries between time periods makes paleomagnetism very appealing. Two outstanding examples are the Peking-man site of Zhoukoudian in northern China, and the Trinchera Dolina site, in Atapuerca, Spain. These sites are now considered the oldest unequivocal human occupation sites in Europe thanks to paleomagnetic studies. Neither Zhoukoudian nor the Trinchera Dolina provided material sufficient for isotropic age determination; however, Zhoukoudian

paleomagnetic determinations from fine-grain sediment fill have allowed the Brunhes/Matuyama boundary to be isolated at a level beneath the sediment containing the earliest Peking man fossils. Paleomagnetic analysis of the Trinchera Dolina has placed the Brunhes/Matuyama boundary in sediments that were deposited after any sediments with included artifacts and human fossils. These remains were, therefore, estimated to be approximately 800,000 years old. Nowhere else in Europe have fossils been found that demonstrate human occupation or arrival before 500,000 to 600,000 years ago, implying that only the Trinchera Dolina people were present before then.

The properties of the earth's magnetic field offer scientists inexhaustible opportunities to explore the inner complexities of the earth and the activities of its more recent inhabitants. Using the reversal punctuations decoded from the rocks and sediments of long ago and correlating these to geological and paleontological insights, new and enlightening aspects of ancient and modern history are being brought to life as well as new means to measure that history. Understanding geomagnetism and how it has affected the life history of the earth is in the forefront of geologic research and will continue to be paramount in this discipline.

— Christopher C. Matson

See also **Geomagnetism**

Further Readings

Jacobs, J. A. (1984). *Reversals of the Earth's magnetic field.* Bristol: Adam Hilger Ltd.

McElhinny, M. W., & McFadden, P. L. (2000). *Paleomagnetism: Continents and oceans.* Academic Press.

Tarling, D. H. (1983). Palaeomagnetism: *Principles and applications in geology, geophysics and archaeology.* London: Chapman and Hall.

Paleontology

Paleontology is the study of prehistoric plant and animal life. It is made possible by fossils: the remains and traces of once-living organisms that have become preserved in rock. Fossils enable paleontology to not only measure the shapes and diversity of past life but also to determine the nature of ancient environments, reconstruct paleoecologies, and observe the patterns of evolutionary change. To achieve this, paleontology integrates extensively with other earth, biological, and physical sciences, and more recently with mathematics, planetology, and climatology. Paleontological research has made significant contributions to understanding geological and biological processes, such as global tectonics and organic evolution. Important for human nature, this has enabled us to observe our own evolutionary heritage and relationships with other species through the fossil record. Amid growing concern for the natural health of earth, paleontologists provide valuable data for the study of climate change and extinctions.

Most organic remains and traces of plants and animals have a common fate: to be decomposed and broken down to rejoin the earth from which they originated. But this process is not perfect, and. under certain conditions. the remains and traces of life become trapped and incorporated into rock, becoming preserved for up to billions of years. These remnants are known as fossils, and they are the primary objects of study in paleontology, a word derived from the Greek, meaning "study of ancient life."

Human beings have long been curious about and attracted to the fossil remains of plants and animals, as evidenced by artifacts of fossilized tree resin, shells, and wood found in camps dating back tens of thousands of years. This valuation of fossils as simply objects that are visually appealing would continue for some time. Even during the birth and development of geology as a science, humankind interpreted fossils essentially as strange-looking stones and considered them to be similar in origin to minerals, crystals, and other rocks. The realization that fossils were once living organisms was a profound development that shifted some emphasis away from geological theory and toward a more biological approach.

Fossils are not restricted to the bones of vertebrates. They also may form from the body parts of invertebrates, plants, and microscopic life, collectively called *body fossils.* In addition, the footprints, burrows, borings, and other relics of the behavior of an organism during its lifetime may become fossilized and are known as *trace* or *ichnofossils.* A challenge of paleontology is to deal with the incompleteness of the fossil record due to our planet's limited environments being

able to maintain the conditions suitable to bury and fossilize an organism's remains over time. Not all organisms have the same potential for preservation. The process of fossilization can be arduous, and organisms with hard body parts and robust traces will be preferentially preserved over soft-bodied organisms. These factors mean that not all organisms will leave a fossil record, and, in fact, fossilization is exceptionally rare for any life form. There will be considerable gaps between forms. The lack of abundant fossils in the space between ancestral and descendant species was one of the strongest arguments railed against Charles Darwin's theory of organic evolution. But even the incomplete fossil record provides abundant data at significant points of life's history to answer specific paleontological questions and test evolutionary theories.

By recording life over cycles of geologic time, fossils have captured evidence of many useful concepts such as extinction, organic evolution, and continental drift. We may make interpretations of the nature of ancient environments because a series of environmental parameters such as light, temperature, salinity, and other factors that affect ecological tolerance controlled the distribution, diversity, and abundance of fossil organisms. Such paleoenvironmental analysis allows us to make useful comparisons with today's changes in environment and their impacts on biological diversity.

Other applications of paleontology include determining the relative age of rocks and correlating geological formations via biostratigraphy. This has been of immense benefit in mapping and understanding geology, in guiding the search for economic mineral deposits, and in better understanding the role of fossil life in the genesis of certain ores. In a similar vein, the distribution of fossils contributes much to the discipline of biogeography, showing the pattern of dispersal of organisms with time. As we have developed new techniques in molecular biology and DNA technology, paleontology provides valuable complementary data to enhance accurate conclusions about life's development.

The Fossil Record

The ultimate fate of most living organisms is to be decomposed into their composite elements and cycled back into the biosphere, where they become available for use by other living tissues. Even the traces and structures resulting from an organism's life habits are usually eroded and cycled back into the lithosphere to form new substrates. While these processes are efficient, however, they are not perfect. If some of the organic matter and traces escape this cycle by becoming trapped and consolidated into layers of rock, it may be preserved and fossilized, the evidence of past life that is the building block of paleontology. Such processes have been operating since early in the history of earth, as illustrated in the Apex Chert of Marble Bar, Western Australia, which contains fossil microbes dating back 3.5 billion years.

The study of how ancient life is incorporated into the fossil record is called *taphonomy*, a study of literally everything that happens to an organism from the moment that it dies until it is collected for scientific study. The early stage of taphonomy occurs when an organism's dead remains are affected by various biological and environmental

Gascyone Junction Road, Australia

Source: Photograph courtesy of Mark J. Thompson.

factors before being buried and isolated from them; we call this phase *biostratinomy*. The remains may be affected by weathering, transport, erosion, scavengers, and a host of other factors that act to alter the remains further from their life morphology. Burial then isolates the remains further from biostratinomic factors, and the remains begin their geological alteration to a fossil. We call this stage *diagenesis*, and it encompasses all of the changes to the remains, such as compression, deformation, breakage, and the geochemical process of fossilization. Body fossils such as bones, shells, and woody tissues will cause different minerals to precipitate out of groundwater solutions or other diagenetic effects to replace the organic tissue with minerals or preserve the remains as an imprint.

Fossils that can be studied with the naked eye or with low-powered magnification are called *macrofossils*; generally we call those smaller than 1 millimeter *microfossils* and their study is termed *micropaleontology*. Microfossils are a common feature of the geological record, and we can find them in most marine and terrestrial sediments. Although every kingdom of life is represented in the microfossil record, the most abundant forms are protist skeletons or cysts, together with pollen and spores from vascular plants.

Traditionally, we divide micropaleontology into three areas of study on the basis of microfossil composition: calcareous, siliceous, or organic. We call the study of organic microfossils *palynology*. Micropaleontology is a major component of biostratigraphical studies and is used heavily in petroleum geology, while there is growing use of palynology in forensic investigation for law enforcement.

Because taphonomic processes can severely modify organic remains, paleontologists must carefully consider their impact when assessing fossils and using them for meaningful conclusions. Although it is true that most aspects of taphonomy act to degrade the quality of inherent information, we must also consider that any modifications that occur can, in themselves, be potential sources of information. For example, a fossil bone with characteristic erosions that degrade its pristine morphology at the same time indicate that it has been consumed and partly digested. Thus, the loss of morphological data during biostratinomy is the gain of paleoecological data.

Hard-bodied organisms dominate the fossil record because soft tissues are the first to suffer postmortem decay and very rarely survive the taphonomic path to fossilization. This is but one cause of natural bias in the fossil record for which paleontologists must account. Fortunately, some soft tissue does fossilize and can provide useful data of extinct life forms.

Sparked by my participation in an expedition that discovered a complete Brachylophosaurus dinosaur in the Cretaceous formations of eastern Montana, my own research focuses on the taphonomy and mechanisms of soft-tissue preservation. The Montana specimen has an abundance—90% of the skin and the gut contents—of preserved soft tissue so as to give the appearance of a naturally mummified animal. There are also remarkable, three-dimensional preservations of the right shoulder muscles and neck. Such rarely preserved details of form allow much more accurate reconstructions of functions. This type of preservation must require rapid in situ mineral growth in the

The author at Marble Bar

Source: Photograph courtesy of Mark J. Thompson.

Source: Photograph courtesy of Mark J. Thompson.

presence of significant microbial activity, but we have still to resolve the exact nature of the minerals and processes.

Some organisms leave traces of their existence upon an environment from their behavior rather than from their physical remains. We call this disturbance of a substrate by living organisms *bioturbation*. This occurs in any marine and terrestrial environment where organisms may cause borings, tracks, trails, burrowings, nestings, footprints, and other structures as a result of their life behavior.

Ichnofossils can be of particular value to paleontologists who seek to accurately reconstruct life's history. Because ichnofossils are formed during the organism's life rather than death, they may preserve potent information unavailable through the interpretation of body fossils. This may include evidence of ecological interactivity as illustrated at the Cretaceous age Lark Quarry in Queensland, Australia, where a substantial area of fossilized feet impressions indicates a herd of small bipedal dinosaurs changing direction and speed of motion in apparent response to the appearance of a larger carnivorous theropod. We can interpret the ichnofossil data to show a predator-prey relationship—or at least an interaction between different species—that we could only speculated on through body fossil evidence. A different example of fossilized behavior may be found in the fossilized remains of nests, eggs, and feces (coprolites), which are classified as ichnofossils. Coprolites can provide valuable clues to paleodiets and the ecological relationship between fossil plants and animals, while nests and eggs can offer evidence of reproductive behavior.

Ichnofossils have several other advantages over body fossils. They may be far more abundant than the fossilized remains of the organisms that formed the trace, as an organism, particularly if mobile, can make many traces in its lifetime. This provides a greater likelihood that data from the organism will be preserved into the fossil record. Ichnofossils may record the presence of organisms in strata that is otherwise devoid of fossil remains, including those with soft bodies that otherwise would not be preserved. They are also usually found in situ, providing therefore more reliable evidence of ancient communities compared to body fossils that are more easily transported or reworked. The sum of these features is a vastly more accurate fossil record with which paleontologists can work.

Ichnofossils may provide excellent data to support morphological reconstructions from fragmentary or poorly preserved body fossils. At Laetoli, a Pliocene paleoanthropological site in northern Tanzania, a remarkable track-way of *Australopithecus afarensis* footprint impressions dated to 3.6 million years in age greatly enhances our understanding of hominid morphology at that time. Other ichnofossils at the site help illustrate the ecological settings that shaped early human ancestry and contributed to the development of upright posture and bipedal locomotion in humans, nearly 1 million years before widespread tool use.

Origins and History of Paleontology

Humankind's interest in fossils dates back at least to Mid-Paleolithic times, evidenced by fossil invertebrates such as gastropods and coral found collected

together in the camp of Neandertals in southern France. Much later there is evidence of our own species, *Homo sapiens*, beginning to use the fossil remains of plants and animals. The circular forms of some fossils in particular, such as crinoid segments, were eminently suitable for fashioning into beads, while fossilized resin (amber) and coal (jet) were sometimes carved into ornaments.

Source: Photograph courtesy of Mark J. Thompson.

In some cultures, myths and legends were inspired by observing fossil remains, while others found more practical uses. Ancient Egyptians used fossil tree trunks as logs for making corduroy roads over desert sands, and I have observed a fossilized crocodile tooth among funerary articles placed within a mummy's sarcophagus. At around the same time, the Etruscans beheld a fossilized cycad trunk with some reverence, but if these or any cultures questioned the origin of these attractive and sometimes useful forms, we have no record until the 6th century BC.

Among the Greeks were some who pondered the origins and nature of fossils. Xenophanes of Colophon noticed the presence of seashells on the hills of the island of Paros, as well as leaf imprints and other signs of fossil life in the rocks of Malta. He speculated that periodic floods were responsible for the transport and burial of marine life so high above the sea. Similarly, Herodotus, Pythagoras, and Xanthus concluded from observing fossil marine shells of far inland that the ocean must periodically cover what is dry land. But others developed more fantastic explanations for the origin of fossils, such as Theophrastus, who believed that rocks had a "plastic force" that created fossils. Such mystical interpretations would take root in the European sphere of knowledge, and for nearly ten centuries, there is little record of our relationship with ancient life through fossils.

In the renaissance, a young Leonardo DaVinci (1452–1519) participated in digging a canal in northern Italy. His observance of fossils there and later at other sites would lead him to conclude that fossils were indeed of organic origin, and he outlined how plants and animals may be developed in rocks by the sedimentological processes we know today. But his notes were not published at the time, and without such dissent, human beings continued to think that fossils occurred through juices, forces, ethers, the biblical flood, and even the influence of the stars. The celebrated mineralogist and metallurgist of his day, Agricola (1494–1555) used the origin of the word fossil, *fodere,* to mean literally something that is dug up. His definition thus included not only the remains of once-living creatures but also ancient human artifacts, minerals, crystals, and rocks of all types. He believed that certain fossil forms such as ammonites, belemnites, and sharks teeth were of inorganic origin that precipitated within hard rocks in similar ways to ore forming solutions.

This view began to change when a Danish scientist Niels Stensen (1638–1686) compared fossil shark teeth in Tuscany to the teeth of living sharks and declared that fossils were once living organisms. This profound shift in sentiment laid a foundation for paleontology to be born as a science, but this would take several more centuries. Humankind gradually separated fossils in descriptions to become known as figured stones, and during the late 18th century, the term *fossil* dropped from use for minerals altogether

Source: Photograph courtesy of Mark J. Thompson.

and their study evolved into a distinct branch of geology called oryctology Petrefactenkunde (or Petromatognosis, depending on which part of Europe you frequented). In 1825, French scientist H. M. Ducrotay de Blainville coined the term *paleontology*, which became popularized to reflect the growing zoological aspect of what was then a geological science.

In France in 1796, Georges Cuvier (1769–1832), generally recognized as the founder of the branch of paleontology devoted to the study of vertebrates, published that fossilized bones he observed were not from any animal alive and thus gave rise to the concept of extinction. J. B. Lamarck (1744–1829), known for his studies of invertebrates, connected fossils to living animals and established that many had gone extinct; he also characterized certain geological layers by their fossil contents. Most important, Lamarck elaborated on how animals seem to change with time, providing support for the development of evolutionary theory, although his explanation for the mechanisms that cause evolution were flawed and not accepted at the time. During the course of many journeys across England as an engineer and surveyor, William Smith (1769–1839) realized that each layer of geological strata could be recognized and traced by the fossils found in it. This was the origin of biostratigraphy, using fossils to establish chronology and relatedness of strata, and Smith used it to construct and publish one of the first large-scale geological maps.

The stimulation of new ideas and applications of fossil data continues to grow. Today's paleontologist has embraced new technologies such as scanning electron microscopy that enables the viewing of submicron scale structures. Computers assist in seemingly endless applications, from three-dimensional scanning of fossils to reveal their hidden internal structures to the generation of super realistic life-models for study or entertainment to new mathematical and statistical models that assist in describing and understanding patterns of diversification and phylogenies through time.

Taxonomy

The study of extant life is essential to the study of ancient life, and so biological sciences have always been considered in paleontology. Likewise, the paleontological information of extinct organisms assists in understanding the development and aspects of extant life. At the core of both biology and paleontology is a system to name and classify organisms to form a meaningful and practical hierarchy, the science of which we call *taxonomy*. The system was developed by Carl Linnaeus (1707–1778) and has been greatly modified and extended, but it still retains

the most fundamental unit, that of species. Species are groups of individuals that share a distinctive form and can interbreed with one another. Principles of taxonomy include using binomial principles of nomenclature to assign each species a unique name. Body fossils of animals are often disarticulated, but, due to most elements being readily identifiable, we can gain a more or less complete description and name assigned in the binomial form, genus, and species, as for extant animals.

Source: Photograph courtesy of Mark J. Thompson.

Botanical fossils are also usually found as disarticulated parts, but there is greater difficulty in reconstructing the whole with confidence; we thus assign taxonomic names to the individual parts. In a related fashion, because we cannot link ichnofossils specifically to a particular species and representative behavior rather than actual body remains, we may adopt a unique classification scheme to enable comparison and study. A common method is based on the Linnaean system but is designed to reflect aspects of the behavior that formed the trace rather than morphology: resting (cubichnia), dwelling structures (domichnia), escape (fugichnia), moving (repichnia), grazing (pascichnia), farming systems (agrichnia), and feeding burrows (fodichnia).

Obviously, we cannot detect the habit of breeding in fossils, so we must rely on appearance and measurements of physiological elements—bone length, carapace width, and so on—to enable classification to species level. These measurements are also used to interpret the biology of fossil organisms and their structures in terms of their original functions, a discipline termed *functional morphology*.

This gathering of information within taxonomic frameworks allows the construction of *phylogenies*, models of connections between all groups of organisms as understood by ancestor/descendant relationships. These models can use the temporal dimension of fossil data to endow phylogenies with information about the tempo of evolution as well as the genealogical relationships among the lineages. Paleontologists express the relationships among groups of organisms through diagrams called cladograms. New tools such as molecular biology and the use of DNA are providing alternative ways of comparing and testing relationships of even extinct organisms. Although these newer approaches are of immense value, description will remain a vital component of paleontology to provide a source of enduring physical data.

Biostratigraphy

During the late 18th century, paleontologists realized that some rock formations could be characterized by their unique sets of fossil taxa and that the occurrence of some fossils was independent of the rock's lithology. Because organisms evolve and go extinct at different rates and most types have a geological life of only a few million years, a section of geological strata built up over time will have several fossil species occurring within it, confined to specific parts of the succession that represent the time when that species was living.

This enables our correlation of rock units over vast distances based on their fossil signature rather than their appearance, and we can establish time horizons in strata that could be of worldwide scope. This process is known as *biostratigraphy*, one of the products of paleontology that helps form the basis of many wider-ranging geoscience studies, such as understanding the

Source: Photograph courtesy of Mark J. Thompson.

duration and periodicity of geological events and providing a framework to explore sedimentary basins for petroleum.

Certain fossils are more suitable for use in biostratigraphy than others. The most excellent examples are called index fossils because of their ability to better resolve timescale boundaries. This process is helped if the fossil organism was abundant, common to different environments, fast evolving, geographically widespread, had high fossilization potential, and is readily diagnosable. Alternatively, there are *facies fossils*, those that show little change over long durations and are restricted to very specific environments, that may be of use in qualifying a succession. We can divide the stratigraphic range of fossil species into biozones that form divisions of the geological time scale, a process sometimes referred to as *biochronology*. In any sequence of fossiliferous rocks, the limited stratigraphic range of many fossil taxa is used for correlation, typically by means of biozonation schemes where intervals are characterized by a species or group of species.

Biostratigraphy strives toward better taxonomic understanding because better understanding may result in our constructing biostratigraphic schemes with higher resolution. By integrating this paleontological data with other types of chronostratigraphic techniques, such as stable isotope studies, a more comprehensive and accurate understanding of geologic and life cycles emerge. This becomes even more important in studies of past climates and sea levels where good stratigraphic control permits more accurate prediction of future changes and their magnitude.

Commercially, we use biostratigraphy in the petroleum industry to assist in the location of oil and gas wells by increasing understanding of basin scale geology. In more modern times, the focus has shifted to smaller scale intrabasin geology, where biostratigraphy

can help develop an understanding of reservoir architecture and strategies to maximize production.

Paleobiology

We may view *paleobiology* as a synthesis of paleoecology and paleobiogeography, united in the study of how physical changes of ancient global geography and climate have affected the distribution and evolution of plants and animals, how ecosystems have responded to these changes, and how these responses have affected today's patterns of biodiversity. *Paleobotany*, the study of fossil plant life, can make interesting contributions to paleobiological studies. Because plants are sensitive to climatic changes, their distribution and abundance can illuminate much about ancient environments. Fossil vascular plants may also retain incredibly detailed data of ancient time, either directly by the growth rings in their trunks or indirectly. An example of the latter is in the Cretaceous age mangrove swamps in Egypt that show evidence of Cretaceous tides trapped in finely layered sediments among their roots. We can also use such data to show the difference in the length of a year, between ancient times to present, enabling calculation of the rate of slowing in the rotation of the earth.

Source: Photograph courtesy of Mark J. Thompson.

The distribution of fossils is the domain of *paleobiogeography*. This provides information such as where organisms first evolve, their range, and the timing and extent of their dispersal. Such information can be critical in examining biodiversity of paleoenvironments, to determine factors of evolutionary processes and extinction events. Geologic and geophysical earth sciences have even used paleobiogeographic information in support of one of the most profound discoveries in earth science, plate tectonic theory. The paleontological evidence originated with the observation that some fossil assemblages on either side of the Atlantic Ocean were identical. This could be reasonably explained only by the concept of an ancient single continent having split and drifted apart, separating in fact a single fossil record.

Extinction and Evolution

For naturalists and early earth scientists of the 18th century, the discovery of fossil bones of massive proportions caused a dilemma. Such bones were evidence of clearly monstrous reptiles that must still be roaming the earth, but where were they hiding? The concept of extinction did not exist until Cuvier argued that fossil remains clearly did not come from extant life forms but from those that must have perished in their entire lineage at some earlier time. This was quite a revolutionary thought at the time, but quickly became accepted on the basis of so much

Source: Photograph courtesy of Mark J. Thompson.

fossil evidence. This also caused issue with the prevailing biblical thought that all organisms created were immune to change and would never be allowed to become extinct. By using its vision of life over geological time, paleontology can provide the tools to more closely examine such extinctions and consider the factors and causes. This area becomes of growing concern as we have realized our rather limited understanding of ecological susceptibility to complex change and wish to prevent a similar fate for *Homo sapiens*, among other species.

Paleontology provides data that show that

- life is hierarchically based
- the fossil record is sequential
- organisms have changed over time

The conclusion of these facts is profound and a major contribution to our understanding of the physical world: that all organisms are related and share a common ancestor. Evolution study is a compound of various disciplines—pure biology, comparative anatomy, embryology, genetics, and population biology—and does not require paleontology and fossils to be supported. Paleontology is, however, indelibly linked to evolution because it is the science that holds life against the vastness of geological time, clearly illustrating the patterns that have occurred and the central tenet "descent with modification." Paleontology answers questions regarding not only the morphology of ancient life but also the pattern and timing of its development, thus becoming an invaluable instrument for testing the concepts of evolution.

Paleontological principles have long been important to physical anthropology; indeed, paleoanthropology is also called human paleontology. The disciplines share many approaches such as taxonomy, comparative anatomy, and phylogenetic analysis to address and explore the origins and development of early humans. Fossil evidence has been critical to displaying the evolution of hominids and elucidating the potential factors responsible for bipedalism, social groups, and even language. Although there is a perception that the fossil record of humans is woefully sketchy, there is, in fact, an excellent series of specimens compared to that of many fossil animals. The morphological changes seen in this series contain powerful images of evolution at work. Even small fragments of fossil bone can provide invaluable data of the pathways upon which our direct ancestors moved. A single joint fragment can confirm stance; a single tooth can suggest diet.

We cannot escape the excitement of potential discovery as we look out over the Rift Valley and consider the antiquity of modern human beings lying just out of sight within the sediments of East Africa. But there is, perhaps, a deeper consequence of paleontological study. Fossils allow us to look further back than the prehistory of humans and to see the evolutionary pathways from microbial life to mammals to hominids. This may in some way remind us of our natural relationships with all species, as well of those of our direct lineage.

Infrastructure

The public perception of paleontology seems focused on the discovery of spectacular looking dinosaurs and expeditions to colorful deserts. While this is an extremely limited view, it is not altogether untrue. Of all the earth sciences that engage in field expeditions, paleontology is arguably elevated in human consciousness to one of quintessential excitement and discovery. Partly, this is in anticipation of what life form—unbeknownst before now—might emerge next from a rock layer, but more so because the

evidence we need to use for experiments may lack a natural supply. The ethos, then, of expedition and discovery is deep within paleontology as the only way to provide new evidence for study.

Although new paleontological discoveries may come about as much from the application of taxonomic analysis as to a geopick on an outcrop in a red desert, it is important to develop some insight into how paleontologists go about collecting and examining the objects from which they make meaningful conclusions and significant interpretations about ancient life.

The search for fossils is not haphazard and is usually a focused operation based on previously collected data with specific targets to find and hypotheses to test. Fossils can be located on every continent in a variety of terrains. Once found, as much detail as possible of the position and relationship with strata must be recorded. We must consider and note aspects of the fossil's taphonomy and we must take samples of adjacent sediments for micropaleontological and palynological analysis. We must construct a map and take careful measurements, for once a fossil is removed from its original position, all contextual data will be degraded. Depending on the type and size of fossil, it must be excavated and prepared for transport by wrapping it with plaster bandages or other strengthening techniques. Some large fossils necessitate considerable field engineering feats, such as plaster jackets, frames of tube steel, and cranes and bulldozers for transport. At some localities, paleontologists build display cases or even whole museums over a fossil deposit, such as at the dinosaur-rich Dashanpu Quarry in Zigong, China. The displaying of in situ fossils to the public can provide an exceptionally rich educational experience by representing similar conditions to that of field expeditions and their inherent element of discovery.

Source: Photograph courtesy of Mark J. Thompson.

The removal and transportation of larger specimens from remote terrain and hostile environments can require major field operations. During the quarrying of dinosaur specimens at Tendaguru in Tanzania, 250 tons of fossil bones needed to be transported hundreds of kilometers through roadless jungle and hills to the coast for shipping to Germany. The immense and heavy loads were suspended between poles on the shoulders of lines of porters. Today the challenge of exceptionally remote or difficult terrain may be met by helicopter to lift and remove a large fossil. The obvious downside of this technique is the danger that, under certain conditions, the suspended fossil may start swaying enough to destabilize the craft and cause the pilot to release the precious load. Happily, this is not the outcome of most expeditions.

Different types of paleontological data require different types of fossils to be collected. Most biostratigraphic specimens are now collected from drill holes that can penetrate deep into layers of strata under hundreds of meters of water or ice. The capability to sample such a contiguous sedimentary column would have been unthinkable a century ago, when sampling

Source: Photograph courtesy of Mark J. Thompson.

was restricted to surface exposures of small sections of strata and the occasional surreptitious use of a mine.

Ichnofossils require similar field infrastructure. Footprint tracks may be retrieved for study and display but this is rarely achieved or indeed warranted. Most are recorded by mapping, drawing, photography and computer analysis, and taking latex casts of important or representative tracks.

Preparation

Once a fossil is retrieved from the field and safely deposited at a preparation facility, the remaining matrix can be removed under more controlled conditions than that of the field. A wider range of glues and solvents can strengthen and preserve the remains. The goal of the preparator is to ensure the long-term integrity of the specimen while destroying or removing the surrounding matrix. The challenge is that techniques for the matrix removal are usually deleterious to the specimen itself, requiring a balancing act.

Throughout centuries, human beings have used percussive techniques to better expose fossils for observation and study. In certain rock types, the inclusion of a fossil develops a plane of weakness easily exploited by the experienced collector with well-aimed hammer and chisel. Power tools automate and improve the process, with modern electric or pneumatic pens and chisels now being specially engineered to minimize the vibration while still achieving the required penetration rates.

In certain specimens, the fossil is softer than the surrounding matrix and will be damaged by vibration from mechanical techniques of preparation, so chemical methods may be employed. The nodule or rock is suspended in a vat of dilute acids that are chosen to attack the matrix but not react with the fossil, leaving the fossilized portion to emerge, where it can be soaked with liquid preservants and recovered, sometimes in pristine condition. Chemical methods are also required for the study of some microfossils, such as pollen, that need to be liberated from matrix before being concentrated and mounted on new substrates for further study. Microfossil samples require slightly different preparation paths than macrofossils. Samples are collected from either drill cores or outcrops, and the microfossils they contain are extracted by a variety of physical and chemical laboratory techniques, including sieving, density separation by centrifuge, and chemical digestion of the unwanted fraction. The resulting concentrated sample of microfossils is then mounted on a slide for analysis, usually by light microscope. Taxa are then identified and counted.

Variants of sandblasting machines have become ubiquitously applied to macrofossil preparation. In these, a vibrating pressure vessel fluidizes an abrasive powder that is then propelled onto the specimen and abrades the matrix preferentially from the fossil. This work occurs in an air chamber where the abrasive can be retained and recycled.

Most macrofossils are delicate and require consolidating at the various stages of the removal and preparation process. The choice of consolidant is important as it may affect the fossil chemically for possibly hundreds of years. Some of those used in the past have shown degradation of strength and color over time and also

not proved amenable to removal in later preparation or maintenance. Modern consolidants include polystyrene beads dissolved in solvents such as acetone. The solution is absorbed into the pores of the fossil specimen before the solvent evaporates and leaves behind a supportive coating of plastic, suitably designed to be readily removable by other solvents. Cynoacrylate adhesives (superglues) have become increasingly popular for rapid repair of fractured fossils. Although their bond strength makes for slower reversibility and the long-term curative qualities are still being assessed, their utility and speed of effect has proven to be a boon to modern macro fossil preparation.

An overriding practice necessary to all preparation is the keeping of records. Written descriptions of materials and techniques used at the different stages of treatment assist future curators when a dismembered fossil needs to be reassembled. The advent of digital photography allows a pictorial record to be kept of progress and original form.

We must not underestimate the impact of the development of better techniques for preparing fossils. In some cases, previously described historic specimens have been reprepared to reveal new features of considerable importance. This has changed some phylogenetic relationships and may even lead to reclassification of the specimen to a different taxon. Old but significant specimens suffering increasing degradation with time can be preserved for further study and displayed to new generations of scientists and the public.

Modern Tools

The development of transmission and scanning electron microscopes in the late 1960s has been a significant aid to paleontological studies, providing microscopic images of high resolution, a variety of microscopic applications at a low cost, and a nondestructive practice. Applications in paleontological research include studies of skeletal microstructure and growth, functional morphology, and taphonomy. Quantitative and qualitative analyses of elements can also be undertaken, providing rapid detailed data of biochemical residuals and details of taphonomy such as diagenetic. During the earliest days of x-ray development, the technique was used on rock slabs to observe the fossils within. Modern paleontologists can now use MRI and CAT scanning to observe internal structures of fossil parts such as skulls. A digital three-dimensional model of the skull can be manipulated to remove postburial distortion or it can be used to more accurately reconstruct the life-appearance of the fossil animal for technical studies or entertainment films. The same data can also be used to generate a three-dimensional plastic copy, thereby duplicating objects too delicate for typical casting and molding processes.

Tremendous advances in paleontology now stem from the use of computers. The compilation and analysis of large-scale databases of fossil species have allowed better views of the pattern and size of mass extinction events, the rate at which new species have appeared, and the standing diversity—a measure of the number of species on the planet at the time. By integrating paleontology with other sciences and technologies, paleontologists extend their view from the lithosphere to a more global system, with growing research on biogeochemistry, paleo-oceanography and paleoclimatology. The promise of these disciplines lies in their potential to shed new light on the workings of global systems, and, therefore, the state of our own biosphere.

As we begin to probe our neighboring planets, paleontologists may play a role in deducing the potential for life in extreme environments. With the evidence that liquid water once existed on Mars, it is plausible that the red planet may also contain fossils of life. If so, paleontology will provide the tools and methods to discover it among the red rocks of Mars.

— Mark J. Thompson

Further Readings

Briggs, D., & Crowther, P. R (Eds.). (1993). *Palaeobiology: A synthesis.* Cambridge: Blackwell.

Buffetaut, E. (1987). *A short history of vertebrate palaeontology.* Kent: Croon Helm.

Clark, I. F., & Cook, B. J. (1994). *Perspectives of the earth.* Canberra: Australian Academy of Science.

Doyle, P. (1996). *Understanding fossils: An introduction to invertebrate palaeontology.* Bath: John Wiley & Sons.

Edwards, W. N. (1967). *The early history of palaeontology.* Kettering: British Museum of Natural History.

Raup, D. M., & Stanley, S. M. (1971). *Principles of palaeontology.* San Francisco: Freeman.

Paluxy Footprints

Found in the Cretaceous limestone of the Paluxy River basin in Texas, the Paluxy footprints are tracks—genuine, forged, and imaginary—that a number of creationists have notoriously adduced as evidence for the coexistence of humans and dinosaurs.

After a 1908 flood near Glen Rose, Texas, a number of large (15–18"; 38–46 cm) footprints, superficially and vaguely human in appearance and locally believed to be human in origin, were discovered in a limestone shelf (now dated to the lower Cretaceous period, about 113 million years ago) in the Paluxy River. During the Depression, both dinosaurian and "human" footprints were excavated, and sometimes forged, for the tourist trade. It was such forgeries that in 1938 attracted the attention of paleontologist Roland Bird to the Paluxy River, where he discovered genuine sauropod tracks, previously undocumented in scientific literature, as well as genuine theropod tracks. Articles in *National Geographic* and *Natural History* made the site famous.

Following his visit to the site, creationist Clifford Burdick proclaimed that the "human" footprints (which Bird was unable to identify) were indeed giant human footprints, and John Whitcomb Jr. and Henry M. Morris relied on his work in the founding document of modern young-earth creationism, *The Genesis Flood* (1960). Although there were a number of creationists who were skeptical, organizations such as the Institute for Creation Research and the Bible–Science Association, and a widely circulated film, *Footprints in Stone* (1972), popularized the interpretation of the footprints as human. In *Tracking Those Incredible Dinosaurs* (1980), the ICR's John Morris attempted to provide a definitive creationist treatment along the same lines. In 1982, creationist Carl Baugh began to excavate new areas of the site, claiming to find clear human footprints as well as anomalous fossils and artifacts; although his discoveries were frequently rejected even by fellow creationists as absurd, in 1984 he founded a museum in Glen Rose to display them.

In 1982, a team of scientists—John Cole, Laurie Godfrey, Ronnie Hastings, and Steven Schafersman—calling themselves the "Raiders of the Lost Tracks" visited the site to investigate. They subsequently published the first scientific critique of the creationist interpretation; the Raiders failed, however, to examine the so-called Taylor trail, featured in *Footprints in Stone,* which were thought to be the best tracks for the creationist interpretation. Investigations by Ronnie Hastings and Glen Kuban, who began studying the tracks independently in 1980, established that the Taylor tracks are of dinosaurian origin. The heel-like depressions on the posterior of the tracks, Kuban and Hastings concluded, were formed by bipedal dinosaurs leaving metatarsal impressions. When the traces of their tridactyl digits were obscured, due to infilling, collapse, or erosion, the result superficially and vaguely resembled a giant human footprint.

The results of these scientific investigations were acknowledged, albeit slowly and grudgingly, by the ICR and the producer of *Footprints in Stone.* But the Bible–Science Association continued to defend the creationist interpretation of the tracks as late as 1994, and Carl Baugh's Creation Evidence Museum is still (in 2005) in business.

— *Glenn Branch*

See also **Creationism Versus Geology; Creationism, Beliefs in; Evolution, Disbelief in; Evolution, Human**

Further Readings

Godfrey, L. R., & Cole, J. R. (1986). Blunder in their footsteps. *Natural History, 95*(8), 4–12.

Hastings, R. J. (1987). New observations on Paluxy tracks confirm their Dinosaurian origin. *Journal of Geological Education, 35*, 4–15.

Kuban, G. (1986). A summary of the Taylor Site evidence. *Creation/Evolution, 6*(1), 10–18.

Palynology

Palynology is the study and analysis of microscopic organic material, predominantly pollen and spores, but also a multitude of other organic particles with tough exterior surfaces that defy acid digestion, collectively known as Palynomorphs. Palynologists use the data on distribution and abundance of palynomorphs for a growing range of applications, from geology and archeology to paleoecology and forensic science, providing new insights and knowledge within each field. With the ability to resolve knowledge of ancient ecologies and climates, the application and

importance of palynology to humankind grows coincidentally with our concerns about global climate change and environmental impacts.

Palynomorphs are derived from four of the five taxonomic kingdoms (Protista, Planta, Fungi and Animalia) where organisms have some part of their life cycle that produces a cell, tissue or organ with a type of wall that is highly resistant to organic decay or inorganic degradation.

Throughout time, vast quantities of palynomorphs have been released into the atmosphere, each carrying the unique design of its species. Transported by wind or water, this organic dust occurs on almost every surface in nature and can be ingested by animals, intentionally or not, when they eat, drink, and breathe. But the majority of palynomorphs rain down from the air to accumulate in lakes, bogs and oceans where they are incorporated into sediments and will readily fossilize. As the world's vegetation changes, so, too, does the layered signature of pollen and spores in the geological record, preserving information of the plant assemblage at that point in time.

The predominant focus of palynology has been on spores and pollen grains. Ever since seed plants evolved in the Devonian period and spread across the planet, their reproductive structures evolved tough exteriors, the exine, to aid in dispersal strategies by resisting decay. The exine has walls consisting of chitin, a highly inert material related to cellulose, and sporopollenin, an enigmatic and nearly indestructible compound. This structural and chemical strength ensures that palynomorphs survive the rigors of transportation and sedimentation, making them ideal subjects for fossilization.

To study these microscopic objects, palynologists treat a sample of rock, soil, or other object with strong acids (such as hydrofluoric) to dissolve the constituents and leave an acid-insoluble residue. The tough exterior of palynomorphs protects them from digestion and thus concentrates them in the residue where they can be identified and counted.

However, there are conditions that are unfavorable for palynomorph preservation and subsequent analysis. Palynomorphs will oxidize when exposed to weathering, and they cannot survive in high-alkaline conditions. Because the carbonization of chitin and sporopollenin occurs at temperatures over 200°C, palynomorphs are destroyed in strata cooked by lava flows or igneous intrusions, and do not survive the processes of temperature and pressure into metamorphic or recrystallized rocks. Another challenge is that even in modern times it is difficult to match transported pollen and spores to the species of plant from which it originated, and even harder to match fossilized palynomorphs to a taxon that may not exist anymore.

History

The study of fossil plants dates back to the 6th century B.C. when fossil leaf compressions were noted by the Greek Xenophanes, but the identification and development of microscopic pollen as a scientific tool was to go unrecognized for some time, dependent upon prerequisite advances in magnification technology. Even after pollen was first observed microscopically around 1640, its scientific potential was not realized until the late 19th century when the German geologist Ehrenberg theorized that peat bogs and lake mud would contain pollen records. The commonly accepted date for the establishment of pollen analysis as a study is 1916, when Von Post published material on how to reconstruct ancient vegetation by counting the types of pollen it shed, layer by layer, in the growing peat bogs of Sweden. Then in 1944 Hyde and Williams coined the term *palynology*, from the Greek, meaning "I sprinkle," cognate with the Latin "fine flour" or"dust." Their definition became "the study of pollen and other spores and their dispersal, and applications thereof" but has since been revamped to include other organic microfossils in the range of 5 to 500 microns, not being made of calcium carbonate and resistant to acid digest, thus forming the collective *palynomorphs*.

Examples

The rapid growth and development of palynology in the latter part of the 20th century was in response to its most important economic application, the oil and gas industry. Palynological techniques offer relatively cheap and quick strata dates compared to other methods, providing data during the expensive drilling process and allowing optimization of fieldwork. Palynomorphs' rapid evolutionary changes can help to provide a more accurate chronology of geological sequences and to correlate stratigraphy between exploration wells. In addition, the identification of indicative palynomorphs can lead to the discovery of hydrocarbon deposits in several ways. To produce

useful hydrocarbons, organic-rich sediment needs to undergo a period of "cooking" or maturation. The duration and temperature of this process largely determines the nature of the product, whether it becomes oil, condensate, or gas. By examining and comparing the depth of color in spore exines, an estimate of sediment maturity and prospectivity can be made. It has also been found that palynomorphs can migrate through porous rocks along with the target petroleum products, so their very presence in certain strata can indicate that hydrocarbons are close by.

Palynology has been increasingly used in the field of archaeology and is now applied routinely in many investigations. Pollen and spore analysis can help track the cultivation and domestication of plants as well as the human impact on vegetation, and it can reveal exquisite details of prehistoric life when found associated with artifacts, burial sites and archeological features. In the celebrated discovery of "the ice man," a 5300-year-old human corpse preserved by an Austrian Alp glacier, the colon contents contained 30 different types of pollen, two spore types, and 24 diatom species. Most of the pollen was ingested as swallowed food and showed a diet predominant in legumes and cereals including einkorn, an ancient wheat grain previously thought to be consumed only by livestock. Pollen grains trapped within the man's clothing indicated the path and direction from whence he travelled, and even the season in which he met his demise.

Palynology in the service of paleontology is usually used to date strata in which fossils occur, but can also enhance our understanding of the environments and diets of prehistoric animals. The discovery of a naturally mummified brachylophosaurus with intact stomach contents allowed identification of pollen and spores forming not only the cretaceous flora, but also presumably the diet of this 77-million–year-old dinosaur.

Honey contains abundant pollen that palynologists use in the fields of economic science and archaeology. The plants which bees in the Nile valley visited several thousand years ago can be inferred from pollen in honey found in ancient Egyptian tombs. The pollen residues in old drinking horns would technically allow reconstruction of the Viking recipe for mead. Today, apiarists and the food industry use palynology to examine bees' foraging habits and pollen load variations to assist the development of honey production. It has also been applied as a new tool in the protection of consumers from fraudulent labeling and food "forgery": Palynological analysis of provincially unique foodstuffs can detect the presence of foreign pollen, indicating that the food has been mixed with cheaper substitutes or revealing other deceptive trade practices.

Another recent application of palynology is in the field of forensic science, where it has now emerged as a powerful tool to solve crimes. Particularly in outdoor crimes where palynomorphs can drift unseen on air currents, settling on clothes or adhering to certain objects, the analysis of pollen and spores can provide compelling scientific evidence for a jury. It is often possible to be very specific about when and where a person or object has been from the pollen types that occur together in a sample. In one example, a man went missing near Vienna; although the police held a suspect for murder, the body could not be located. Palynological analysis of soil adhering to the suspect's shoes revealed a mixture of pine and alder pollen, but also traces of older, Oligocene-age pollen. This unique combination pointed to a specific location just south of Vienna where pine and alder trees grow on Oligocene strata. When confronted with this knowledge, the suspect quickly confessed and the missing man's body was recovered.

Palynology is of great importance in describing changes in tree population with time, thereby allowing inference of past climate changes. The prospect of rapid, trace-gas-induced climate change over the next 100 to 150 years has raised scientific and public interest in the rates at which plant species, particularly tree species, can respond to these changes. Because palynomorphs are sensitive to any minor fluctuation in their surroundings, they are highly indicative of the environment in which they are deposited. Any changes brought about by climatic fluctuations or the activities of man are often recorded in bog or lake sediments as changes in the pollen assemblage. For example, in some Pleistocene-age, interglacial sediments, the palynological analysis reveals the major climatic changes reflected in the tree population. During the cool conditions just before the ice sheet retreated, palynomorphs of a pine and birch assemblage with lots of grasses demonstrated the pretemperate climate; then, as the ice receded during the interglacial period, warmth-loving oak, hazel, and alder trees appeared in the sedimentary record, followed by the anticipated return of pine, birch, and grass as the ice sheet

re-advanced in the succeeding glacial period when temperatures dropped.

Although the primary practice of palynological sample collection and preparation has not evolved much since the relatively recent birth of palynology as a science, there has been explosive growth in applications to many fields. Further advances in palynology can only continue to provide a better picture of our planet's history with which to approach our immediate and long-term future.

— Mark James Thompson

Further Readings

Glover, J. (2003). *Geological journeys: From artifacts to zircon.* The Geological Society of Australia.

Jansonius, J. & McGregor, D. C. (Eds). (1996). *Palynology: Principles and applications.* American Association of Stratigraphic Palynologists Foundation.

Moore, P. D., Webb, J. A., & Collinson, M. E. (1991). *Pollen Analysis.* Oxford: Blackwell Scientific Publications.

Stewart, W. N. & Rothwell, G. W. (1993). *Paleobotany and the evolution of plants.* Cambridge: Cambridge University Press.

Thomas, B. (1981). *The evolution of plants and flowers.* Eurobook.

Traverse, A. (1988). *Paleopalynology.* Boston: Unwin Hyman.

Panama

Panama is a central American country, with a population of 2,839,170 (2000). It shares borders with Costa Rica to the west and Colombia to the east. Panama's social, economic, political, and cultural history has been marked by its strategic geopolitical location. Panamanian intellectuals have considered their republic a "place of transit," and have struggled to develop an identity to define a country characterized by large temporary and permanent migrations. During colonial times, (early 16th to mid-19th century) Panama (known then as Castilla de Oro) became a tactical site for the Spanish Empire, as it was a point of connection between the Caribbean and the Pacific, and therefore a communications node between the Viceroyalty of New Granada (with its capital in Mexico City) and the Peruvian Viceroyalty administered from Lima. Slavery (1508–1852) in Panama was not closely linked, as in other regions of America, to plantation life, although some slave labor was used for tobacco and sugar plantations. The economy of colonial Panama rested on six major activities: mining, agriculture, cattle herding, handicraft production, commerce, and domestic work. The most important of these was mining, which used black labor almost entirely. Black labor and, to a lesser degree, indigenous labor were used to build roads and infrastructure to support the Spanish Crown's transportation of wealth. For instance, 60% of the total production of silver in the Viceroyalty of Peru passed through Panama. In addition, Panama served as a major port for transshipment of slave labor to other Spanish colonies.

As a result of this strategic position, Panama's history is marked by a series of important infrastructure projects with consequent transformations for the society. From 1850 to 1855, the Panama Railroad was built as a suitable route to facilitate communication between the West and East of the United States. From 1880 to 1890, the French Company of the Isthmus worked toward the construction of the Panama Canal under the direction of Count Ferdinand de Lesseps (whose major work prior to this was the Suez Canal). By 1884, there were more than 18,000 workers on the project. However, the project was an economic failure that left stranded the thousands of workers brought from the Caribbean, Europe, and China. During the first decade of the 20th century, the United States oversaw the construction of the Panama Canal (1904–1914), and enlisted more than 45,000 workers to continue this monumental task. Most of these workers resided on Barbados and other Caribbean islands. Workers from Colombia, England, France, Germany, India, Austria, and China also worked on the project.

Another element essential to understand Panama is its relationship with Colombia. Panama became a colony of the Spanish Empire in the early 1500s. It became independent from Spain in 1821, and in 1822 it voluntarily allied itself to Colombia, then known as New Grenada, and throughout the 19th century was a neglected province of New Grenada. Some scholars argue that failed negotiations with Colombia for the construction of a transisthmian canal led the United States to support Panama's independence from

Colombia in 1903. Most Panamanian scholars, however, emphasize that a movement toward independence was already in effect, and that the United States did not participate in Panama's process of independence, noting that between the years of 1862 and 1903 there were more than 50 rebellions to establish independence from Colombia. This contentious issue continues to be an important debate in the historical memory of Panamanians.

The Panama Canal was officially finished in 1914. Due to a series of treaties signed by the Panamanian and United States governments, the territory that was christened the Canal Zone became a territory of the United States. From then until the return of the Canal to Panama on December 31, 1999, Panama has struggled to assert its sovereignty over the Canal Zone. As a result of this constant presence, and of Panama's condition of virtual protectorate of the United States, Panamanian intellectuals have emphasized the need to develop a strong national character for the country. This situation has produced a marked yet contradictory nationalism, a blend of xenophilic and xenophobic feelings toward foreign influences and culture.

Panama's condition of "place of transit" has also influenced the country's racial makeup. Panama is a very diverse country, with eight different indigenous groups (Ngöbe, Buglé, Bokotá, Emberá, Wounaan, Bri Bri (recent migrants from Costa Rica), Kuna, and Teribe (or Naso), two distinctive Afro-Panamanian groups (Afro-Colonials and Afro-Antilleans), Mestizo peasant groups, and a Mestizo elite that considers itself white. There are also Asian minorities (Chinese and East Indian in particular), as well as Greek, Italian, and Spanish minorities. Statistical findings establish that 60% of the population identifies as Mestizo, 20% as black and mulatto, 10% as indigenous, 10% as black, and 2% as Asian. As with any other Latin American country, there are distinctive social, political, and economic inequalities in Panama.

Mestizaje became the fundamental founder of this country's cultural identities. Ethnic identity has been shaped by the competition between Britain, the United States, and Central American states. The presence of a variety of ethnic and racial groups has produced the illusion of a country devoid of racism, a true Latin American "melting pot" or, as Panamanians call it, "un crisol de razas." However, racism against black and indigenous populations is a constant reality. When Dr. Arnulfo Arias Madrid, a Harvard-trained Panamanian physician, was elected president in 1940, he developed the idea of "races of prohibited migration" and changed the Panamanian Constitution in 1941 (also known as the *Panameñista* Constitution) to prevent the arrival of persons of African and Chinese descent unless they were able to speak Spanish and had knowledge of Panamanian history. Although these clearly racist attitudes were modified in an amendment to the Constitution in 1946, as of today, the Panamanian Constitution does not consider Panama a pluriethnic or multicultural nation.

Afro-Antillean and indigenous groups have been particularly affected by racism. Afro-Antilleans have migrated to Panama since the 1820s to work on banana plantations, the Panamanian railroad, and the French and United States efforts to build the Panama Canal. Afro-Antilleans were brought to the Isthmus from different islands of the British West Indies such as Grenada, Saint Lucia, and Antigua but mostly from Jamaica and Barbados. They also came from Haiti, Martinique, and Cuba, and they constituted the largest ethnic group to work in the construction of these infrastructure projects. However, since their migration to the country Afro-Antilleans have been one of the ethnic groups at the bottom of the social, political, and economic hierarchy. For long periods, Panamanian Afro-Antilleans perceived themselves, and were perceived by Panamanians of other ethnic groups, as temporary migrants. Because of the isolation that they were forced to endure both inside and outside the Canal Zone, and on the banana plantations in Bocas del Toro Province, Afro-Antilleans were able to maintain many of their distinctive customs and traditions (language, religious traditions, and architecture, among others). This distinctiveness was viewed by mainstream Panamanian society as a problem, particularly since many Afro-Antilleans were determined to maintain their "British" way of life.

Indigenous peoples in Panama represent approximately 10% of the total population. The Ngöbe are the largest indigenous group (169,130 in 2000). Until the end of the 19th century, most Ngöbe were able to have a livelihood exclusively based on slash-and-burn agriculture (maize, beans, bananas, tubers), complemented by hunting, fishing and gathering. From the 1930s, wage labor became an increasingly important supplement to subsistence activities. The Ngöbe complain that they have received little governmental attention to their problems. Currently, two of the most pressing issues faced by this group include their

struggle to establish clear boundaries for their *comarca* (reserve) and their increasing poverty.

Perhaps the best-known indigenous group in Panama is the Kuna (61,707 in 2000). Historically, the Kuna have negotiated from a position of strength in relationship to the Panamanian government, and have been able to achieve some level of recognition by the nation-state. When Panama gained independence, the state led campaigns of Christianization and "civilization," bringing with it western transformations were not welcomed by the Kuna. In 1923, Kuna leaders Nele Kantule and Cimral Colman organized to prevent any non-Kuna person from living in Kuna territory, and later led an uprising against the Panamanian government in 1925. As a result, they were granted the status of a Kuna-run semi-autonomous territory in 1938, becoming the first legally recognized *comarca* in Panama. Since then, the Kuna have become the trademark of Panamanian tourism, particularly because of their culture, their land-base, and the famous *molas* (an artwork of fabric appliqué made by women).

Politically, Panama has had one of the most resilient military periods in Latin America, from 1968 to 1989. One of the most prominent leaders in the history of this period is General Omar Torrijos. Although he was never the formal president of the country, Torrijos was the de facto leader from 1968 to 1981. Torrijos (a Lieutenant Colonel at the time) was part of a military junta that organized a coup d'etat on October 11, 1968 against Dr. Arnulfo Arias during his third presidential period. Colonel José María Pinilla and Colonel Bolivar Urrutia formed this Provisional Junta, with Torrijos being the most prominent figure. This was the first time that there was a successful military uprising against a civil government in the history of the republic. The ideological notions presented by the Junta were the cleaning up of the public administration and the rejection of communism. Engineer Demetrio Basilio Lakas and Arturo Sucre were chosen as the president and vice president, respectively, of the new government. On March 11, 1969, Omar Torrijos was named General of the Republic. A new constitution, replacing the Constitution of 1946, was ratified in 1972. Under this constitution, Torrijos became Maximum Leader of the Panamanian Revolution, which gave him almost unlimited powers during Lakas's six-year presidential period. Torrijos was named coordinator of the public administration and external relations of the Republic.

Torrijos governed the country with a very informal approach and an ideology leaning to the left. Under his leadership, the state became an investor in projects such as sugar cane refineries, food and coffee factories, and cement factories, among others. Part of Torrijos's strategy of modernization was to create industries in both urban and rural areas. Schools, electricity, sewage, and water facilities were built or improved under his regime. Indigenous populations were particularly targeted for assistance during his presidency, not a popular policy in the eyes of non-indigenous groups. Simultaneously, Torrijos implemented policies conducive to maintaining a romanticized peasant past as the dominant representation of Panamanian folklore and national identity. These policies were the result of decades of emphasis by the Latino upper classes upon the connection between Panama and Hispanic America.

In regard to foreign policy, Torrijos supported socialist movements such as the Sandinistas and the Cuban revolution (although his common motto was "Neither with the right nor with the left, with Panama!"). The United States government viewed this support negatively. In addition, Torrijos applied aggressive diplomacy with the goal of bringing the international community to work for Panama's causes and to negotiate the return of the Panama Canal to Panamanian hands. On February 7, 1974, U.S. Secretary of State Henry Kissinger and Juan Antonio Tack signed the Declaration of the Eight Points. This declaration established the basic principles of the new contractual relationship between the two countries, including the elimination of the concept of perpetuity, the end of the U.S. jurisdiction in Panamanian territory, the return of the Canal Zone to Panama, and access by Panama to the benefits derived from the operation of the Canal, among others. After long and complicated negotiations, the United States and Panama signed the new Treaty of the Panama Canal on September 7, 1977, at the OEA in Washington, as well as the Treaty of Permanent Neutrality and Functioning of the Panama Canal, better known as the Torrijos-Carter Treaties. This treaty recognized the sovereignty of Panama over the Canal Zone and established that the United States would return the rights to operate the Canal in its entirety to Panama, along with all lands and facilities still remaining under U.S. control, on December 31, 1999. It also guaranteed that, in the interim, the administration of the Canal was to be conducted

by a U.S. governmental agency whose board was to be composed of United States and Panamanian members. Both nations compromised to protect and defend the Canal, and in terms of economic benefits, they were to revert to Panama 60% of the land and infrastructure of the Canal area. On December 31, 1999, all remaining property was turned over to Panama and administered by the Inter-Oceanic Regional Authority. On December 31, 1999, elected president Mireya Moscoso officially received the Panama Canal from United States President William Clinton.

In 1978, Torrijos was offered the presidency of Panama. He declined and conceded the presidency to Aristides Royo and the vice-presidency to Ricardo de la Espriella. Torrijos's death in a suspicious plane accident on July 31, 1981 produced instability in Royo's government. His presidency lasted for one more year after the death of Torrijos. After this, there was a strong period of instability in the country, which brought to the presidency seven presidents in seven years. The most notorious leader in this period was General Manuel Antonio Noriega who took control of the National Guard and the country in 1983. A period of brutal political and civil repression followed. The Panamanian National Police, instituted in the 1940s and highly militarized, was transformed into the *Guardia Nacional* in 1953. Noriega renamed the guard the Panamanian Defense Forces (PDF) in 1983, and used it to maintain a highly repressive regime. Noriega's policies led to the invasion of Panama by United States military forces in December 1989, and the elimination of the PDF.

Economically, the main revenues for Panama have generally come from the Panama Canal, the Duty Free Zone, and banana production. Since the 1990s, one of the most important (and currently, the most important) income earner for the country has been tourism. Tourism has produced a fundamental turnabout in the political policies of the country. Following the end of the military dictatorship of General Manuel Noriega, Presidents Guillermo Endara (1990–1994) and Ernesto Pérez Balladares (1994–1999) sought to develop tourism (more specifically ethno- and ecotourism) as one of the most important industries of the country. Endara declared tourism a national priority for the country, and Pérez Balladares imposed laws that facilitated foreign investment related to tourism. The most current numbers are available for the year 2003. In that year, tourism generated more earnings for Panama ($805 million) than the Panama Canal ($690.3 million), the Canal Zone ($487.7 million) and banana production. This amount represents a growth in tourism income of 18.6% in relationship to the year 2002 ($678.8 million). As a result of this focus on tourism, marginalized groups (such as Afro-Antilleans and some indigenous groups) have had some access to a more important presence in the national context.

— *Carla Guerrón-Montero*

Further Readings

Guerrón-Montero, C. (2002). Esclavitud y Relaciones Interétnicas entre Afro-panameños Coloniales y Afro-antillanos en Panamá (Siglo XIX). *Revista Cultural Lotería, 442*(3): 79–96.

Howe, J. (1998).*A people who would not kneel: Panama, the United States and the San Blas Kuna.* Washington, DC: Smithsonian Institution Press.

Lewis, L. (1980). *The West Indian in Panama: Black Labor in Panama, 1850–1914.* Washington, DC: University Press of America.

Young, P. D. (1971). *Ngawbe: Tradition and change among the Western Guaymí of Panama, Illinois Studies in Anthropology*, Vol. 7. Urbana: University of Illinois Press.

Pantheism

Pantheism may be defined as the doctrine that God is coextensive with and identical to all things. Clearly distinct from both atheism (the belief that there is no God) and panentheism (the belief that all things are suffused with God's essence, but are distinct from God), pantheism generally arises only in cultures with a fully developed religious life.

Pantheism arises from two related tendencies. The first is a fervent religious spirit that is inclined to see divinity as a universal phenomenon, necessarily infused within all things. The second is an essentially philosophical desire to uncover some sense of unity, a common thread that connects all things and binds them to each other. Both elements must be present in order for pantheism to take firm root.

Vedic Pantheism

Pantheism may be roughly divided into eastern and western varieties. Vedic pantheism takes as its point of

departure a critique of polytheism. The Vedic pantheon of many gods gradually transformed into a single entity, or (more accurately) a single concept: the notion of Brahmin. Brahmin represents that which does not change, is perfectly unified and univocal, without limit, and non-definable. While the world appears to be in a state of constant flux and change, it is the idea of Brahmin that provides a permanent unchanging substrate upon which these appearances depend. Because change implies imperfection—and because there must be some perfect being, entity, or higher order—the twin conclusions are drawn that, first, there must be something above and beyond the material world, and, second, that the material world itself must be an illusion. To claim otherwise would be to admit the possibility that imperfection could have inherent and hence independent reality, and consequently that nothing would be permanent. If Brahmin were divided into the perfect and the imperfect, then it would obviously be no longer permanent, since imperfect things pass away. This is impossible, because Brahmin by its very nature endures and persists through the apparent changes that seem to occur in the world.

It follows, then, that change does not really occur. Change is an illusion. This follows necessarily from the basic premises. If all truly is one, and all is united, and all is perfect, then Brahmin is all and all is Brahmin. Brahmin cannot change, because Brahmin is perfect and change is a sign of imperfection. If change is real, then change is part of Brahmin, since what is real is Brahmin. This would mean that Brahmin is changeable and consequently subject to imperfection. To the Vedic mind, this is anathema. Ordinary sense experience is characterized by illusion, or *maya.* The mystical and contemplative practices prescribed are intended to aid the worshipper in overcoming *maya* and coming to a true understanding of the oneness of *Brahmin.*

Western Pantheism

The sixth-century B.C. philosophical monism of such pre-Socratic philosophers as Parmenides and his pupil Zeno (who illustrated his master's points by means of his eponymous paradoxes) are arguably pantheistic, since they maintained as their fundamental truth that "All is One." Parmenides and Zeno claimed that knowledge could only be of things that do not change; otherwise, one would find oneself in the apparently absurd position of claiming a given standard of knowledge on one day, only to discard it the next in favor of a different standard. Following a line of reasoning that resembles the Vedic, they maintained that since knowledge must be of things that do not change, and knowledge is possible, then there must be something that does not change. Because that which does not change cannot become something other than what it is, it must be One, entire unto itself, without parts, and unknowable on its own terms. Parmenides and Zeno, like the Vedic, deal in appearances whose reality they deny while affirming the ultimate reality of something that is unified, perfect, and One.

Earlier materialist pre-Socratics (like Thales, Anaximander, and his disciple Anaximines) had asserted the primacy of one or another of the four Greek elements (earth, water, fire, and air), but had stopped short of declaring the others illusory. Theirs is more a reductionist philosophy than a pantheism.

The apparent pantheism of certain early Greek monists (like Parmenides and Zeno) stands in stark contrast to that of other pre-Socratics like Heraclitus, the so-called "weeping philosopher," who so despaired of finding anything like a permanent, unchanging substrate that he identified fire as the primary element. Fire, of course, is both ever-changing and something that must destroy in order to keep itself in existence.

The best known and most widely recognized western pantheist is Baruch Spinoza (1632–1677). Spinoza saw the miseries of human existence, and was committed to finding some permanent source of goodness that might serve as a basis for human happiness and flourishing. Spinoza maintained that such a basis would have to be found in something that is capable of completely filling the human mind. He further argued that such a standard could only be met by the recognition that the mind is one with nature (i.e., the world that appears to mind and presents itself as something external and extrinsic to mind). By recognizing its intimate connection with nature, the mind can overcome human misery since it will recognize its place within the totality of creation. Having grasped its place in the grand scheme of things, and come to peace with its limited extent and efficacy, the human mind can come to understand the necessity of the place it occupies, see that things could not be other than they are, and accept its lot in life without complaint or recrimination.

Many other forms and variants of pantheism exist in the western tradition. Indeed, the word "pantheist" was not used until 1705, when it was apparently coined by John Toland. Ironically, it was through the word's use as a term of derision by one of Toland's critics that "pantheist" and later "pantheism" entered into general usage. The 18th century saw a rise in pantheism in Europe as intellectual elites struggled to reconcile matters of faith with what were widely perceived the logically untenable demands of faith. Pantheism offered an attractive middle ground for those reluctant to accept Church doctrine, yet unwilling to embrace atheism.

— *Daniel Horace Fernald*

Further Readings

The Cambridge Dictionary of Philosophy. (1995). Cambridge: Cambridge University Press.

Dictionary of Philosophy and Religion. (1995). London: Humanities Press.

The Encyclopedia of Philosophy. (1967). New York: Collier MacMillan Publishers.

Paralinguistic Communication

Paralanguage refers to verbal communications that have meaning but are not part of the system of words and grammatical rules we call language. Paralanguage includes such elements as pitch, amplitude, rate, and voice quality. Laughter, imitatitive speech, and prosody are also forms of paralanguage. Paralanguage emphasizes the fact that people convey meaning not only in what they say, but also in how they say it.

Paralinguistics is a crucial component in all human communication. In any verbal interaction, we employ sets of culturally constituted codes to make a series of inferential judgments that interpret what is being said. These interpretations occur at several levels, including linguistic and paralinguistic, as well as kinesic, musical, interactional and others.

Paralinguistic communication often operates as a metamessage to alert communicants as to how to interpret a message. For example, in American English, a simple change in tone and stress can determine whether a linguistic statement such as "What a lovely dress" is a compliment or an insult. Paralinguistic elements are also used to initiate and sustain verbal interaction.

Paralanguage is believed by many scientists to be a survival of the gesture-call systems used by other primates to indicate current states of being, such as contentment, hunger, irritability, restlessness, sleepiness, and so forth. Yet, although many paralinguistic elements are universal, the ways they are used are culturally defined. For example, American English speakers use a sing-song rhythm to indicate mockery, but this rhythm is normative in many South Asian languages. Some Mayan Tzeltal speakers use a creaky voice for complaints and commiserations, and falsetto for polite greetings and formal conversation.

Moreover, verbal elements that are used as paralinguistic features in one speech community may be linguistic elements in another. Pitch is primarily a paralinguistic feature for most English speakers, but it is primarily a grammatical feature in many Asian speech communities.

The nature and breadth of paralinguistic communication varies not only across cultures but across modes of communication. The choice of medium used for communication—speaking, writing, photography, motion picture—enables and constrains the capacity of a message to carry paralinguistic cues. Face-to-face communication has the highest paralinguistic density. Telephone and recorded conversation carry verbal paralanguage but miss paralinguistic-kinesic pairings. Written text carries the least paralinguistic information, although there are creative alternatives such as the "emoticons" widely used in e-mail to indicate emotional states.

The significance of how a loss of paralinguistic information can affect meaning has been emphasized in studies of written communication such as court transcription or journalism. Although both forms of writing lay great emphasis on quotation, failure to capture nuances of speech can cause a statement to take on a very different meaning. The classic example is the cry of anger and incredulity by a crime suspect, "*I* did it?" being recorded as a confession: "I did it."

Defining the boundaries of paralinguisitic communication is difficult. Paralanguistic communication is closely related to kinesic communication which includes gesture, body posture, and other nonverbal forms of communication. Often, particular gestures are routinely accompanied by particular sounds;

such pairings may not have the same meanings when separated.

Sometimes it is even difficult to clearly differentiate the paralinguistic from the linguistic. English uses pitch both grammatically (as when we signal a question) and to signal emotional meaning. While many forms of emphasis are outside of the language system, others, like contrastive stress (*This* is the one) and question intonation (Is this the one?) are grammatical in nature. Some verbal expressions intended to indicate natural states—in English, for example, the sounds we indicate by *uh-oh, whew* or *ouch*—are so conventionalized as to be part of the lexicon.

Paralinguistic communication is also sometimes distinguished from extralinguistic communication, which refers to oral noises like teeth chattering or yawning. Such verbal communications are meaningful, because they index physical states, but their meaning is involuntary. Likewise, changes in voice caused by old age or by nasal congestion would be defined as extralinguistic.

One problem with the distinction between paralinguistic and extralinguistic communication is that it relies on the capacity of the observer to determine whether a communicative act is intentional or natural. This is especially tricky because many paralinguistic communications are mimetic—that is, they imitate natural states. An English speaker may be unable to articulate the difference between /p/ and /b/ because she has a cold, or she may be intentionally confusing the two to sound as if she has a cold.

Although paralanguage has never received as much scholarly attention or popular interest as kinesics, the significance of paralanguage has had a far-reaching impact on linguistic anthropology. Among other things, paralinguistic evidence contributed to the rise of the ethnography of communication, which takes speech communities, speech acts, and "ways of speaking"—rather than languages—as its units of analysis. In addition, there have been a series of creative efforts by anthropologists to capture paralinguistic elements in their ethnographic descriptions of speech.

Because paralanguage is so intimately intertwined with linguistic, kinesic, and other levels of communication, it is rarely studied by itself. But paralinguistic phenomena remain of key interest to anthropological linguistics.

— Mark Allen Peterson

Further Readings

Crystal, D. & Quirk, R. (1964). *Systems of prosodic and paralinguistic features in English.* Berlin & New York: Walter de Gruyter.

Key, M. R. (1975). *Paralanguage and kinesics.* Metuchen, NJ: Scarecrow Press.

Poyatos, F. (1993). *Paralanguage: A linguistic and interdisciplinary approach to interactive speech and sound.* Amsterdam: John Benjamins.

Tedlock, D. (1983). *The spoken word and the work of interpretation.* Philadelphia: University of Pennsylvania Press.

PARALANGUAGE

Paralanguage is the use of a certain manner of speech to communicate particular meanings. It goes beyond the spoken word. It consists of vocalizations that are not words. Through paralanguage, people reveal their emotions to one another, either voluntarily or involuntarily. Paralanguage is related to body language, in that it is a way of communicating without using conventional words.

Paralanguage is an important part of human communication. It includes voice quality, which is made up of volume, pitch, and rate of speech. It also includes pauses and non-words such as *uh, er,* and *um.* We can often tell from the sound of a person's voice whether the speaker is sick, sleepy, drunk, or depressed. We have come to know what certain sounds of paralanguage mean, such as *ouch!, huh?* and *hmmm.* However, these sounds vary from culture to culture, so one has to be careful when trying to communicate with those of another culture.

Paralanguage has been determined to be an important part of the communication between infants and their mothers. Of course, babies can't use words, so mothers are prone to communicate with their infants through use of comforting sounds rather than actual words. It's also thought to be an important means of communication between adults in the areas of intimacy and sexuality.

During their study of paralanguage, scientists have used several types of cameras, recording

devices, and other electronic instruments to pick up and record the sounds of paralanguage. Sensitive microphones can pick up differences in voice inflections and tonal qualities of the voice.

Consumer researchers have studied the shopping behavior of customers using paralanguage. Specially designed cameras and other recording instruments have picked up on the interest consumers have shown via paralanguage in certain products in the market place. Radio and television journalists have learned to modulate their voices in appropriate ways when giving a report. They need to appear objective and distant from the story, with the result that they often speak unnaturally.

Communication specialists are able to train people to have control over their paralanguage in order to modify their relations with others. Actors, singers, and public speakers also learn to correct, change, and modify their speech and manner. Thus, they are able to make a better impression on their listeners.

— Pat McCarthy

Park, Robert Ezra (1864–1944)

Born on February 14, 1864, in Harveyville, PA, and raised in Minnesota, Robert Ezra Park graduated from the University of Michigan, where he studied with the philosopher John Dewey. Concerned with social issues of his day, especially racial problems in urban settings, Park became a newspaper reporter, and eventually resided in Chicago. In 1898, he entered Harvard University where he studied with William James. After earning an M.A., he traveled to Germany, where he heard lectures from Georg Simmel on sociology and studied with the philosopher Wilhelm Windelband. After completing his doctoral dissertation, he taught at Harvard before being invited by Booker T. Washington to affiliate with the Tuskegee Institute in order to investigate racial issues in the South. In 1914, Park joined the University of Chicago's Department of Sociology, where he remained until 1936. After retiring, he moved to Fisk University, where he continued teaching until the end of his life. Through his publications and his numerous students, Park became widely known, serving as president of the American Sociology Society, as a member of the Social Science Research Council, and as president of the Chicago Urban League. He died at Nashville, Tennessee on February 7, 1944.

During Park's time in Chicago, the University's Department of Sociology began to focus on the surrounding urban environment as a laboratory for social research. Along with his faculty colleagues, Ernest Burgess, Louis Wirth, Homer Hoyt, and numerous students, Park developed an orientation to urban ecology that became known as the "Chicago School of Sociology."

His essay "The City: Suggestions for the Investigation of Human Behavior in the Urban Environment," originally published in 1915, served as the introductory chapter for the influential essays collected in *The City* (1925). Park's other essays in the volume included "The Natural History of the Newspaper," "Community Organization and Juvenile Delinquency," "Community Organization and the Romantic Temper," "Magic, Mentality, and City Life," and "The Mind of the Hobo: Reflections upon the Relation Between Mentality and Locomotion."

Through his studies in Chicago and his visits to cities around the world, Park developed his concept of "natural areas." For Park, the relationship between individuals and groups within such areas involved mobility among urban spaces and across social classes. Mobility, in turn, often resulted in social disorganization and individualization, as formulated in his famous article "Human Migration and the Marginal Man" (1928). Throughout his career, Park related his theories about assimilation, community structure, and mobility to the plight of ethnic populations.

— *Robert V. Kemper*

Further Readings

Matthews, F. H. (1977). *Quest for an American sociology: Robert E. Park and the Chicago School.* Montreal: McGill-Queen's University Press.

Park, R., E., Burgess, W., & McKenzie, R. D. (1925). *The city.* Chicago, IL: University of Chicago Press.

Park, R. (1952). *Human communities: The city and human ecology.* Glencoe, IL: Free Press.

Persons, S. (1987). *Ethnic studies at Chicago, 1905–1945.* Urbana, IL: University of Illinois Press.

Participant-Observation

Often described as immersion in a culture, participant-observation is the principal methodological component of ethnographic fieldwork. The researcher watches people and their activities in the social situation under study, gradually increasing participation in the culture as a check on observations. In turn, continuing observation allows for greater and more accurate participation. As the process proceeds, the ethnographer is able to write field notes as a cultural participant as well as an observer, fostering richness and complexity in the qualitative and quantitative data collected and analyzed. Participant-observation may occur in projects that range in time from weeks to years with the average as one to two years. Any physical setting can serve as the location for participant-observation. Cultural anthropologists have studied patients in U.S. hospital rooms, multi-ethnic neighborhoods in the Middle East, and Inuit subsistence practices.

As a strategy, participant-observation is particularly useful if the research topics are usually hidden from outsiders such as family life or religious activities, if the interest is in behavior that is observable within daily life, if the group is limited by size and/or location as in a specific case study, and if emphasis is on understanding meaning from the emic or insiders' point of view. Participant-observation is not appropriate for studies with large populations or when precise causal relationships between limited variables are sought. Thus, the approach typically is not deductive in design or based on hypothesis testing models.

Participant-observation helps researchers refine skills in the native language, facilitating appropriate interviewing, which is the other primary ethnographic fieldwork method. Since participant-observation enables ethnographers to understand interview, survey, and observational data, it enhances research validity. It also allows the fieldworker gradually to become part of the cultural scene, thereby minimizing people's attempts to modify behavior from their ordinary routine. Although participant-observation moves a researcher from a position outside a culture to that of an insider, it does not eliminate all cultural barriers. The amount of insider knowledge that can be gained through participant-observation varies from project to project depending on the extent of active complete participation that is possible. During ethnographic fieldwork, the participant-observer also will experience changing emotional states from initial excitement to culture shock and from contentment to despair and back again as the work proceeds. These emotions too are noted in the field diary as part of the data record.

The development of participant-observation in anthropology is usually attributed to the late 19th and early 20th century change from "armchair" research to "fieldwork" and direct data collection by researchers. Bronislaw Malinowski's fieldwork in the Trobriand Islands is recognized as emblematic of this new form of data collection, given his attempt to describe in detail the everyday life of people, rather than reconstructing past culture or fitting them into a preexisting evolutionary framework. The key change was a new paradigm in which empiricism was crucial. There is also a tradition in sociology, dating back to the 1920s and 1930s, which uses the method of participant-observation. Recently, educational researchers, and others in the humanities and social sciences, also have utilized participant-observation.

— *Audrey C. Shalinsky*

Further Readings

Bernard, H. R. (1988). *Research methods in cultural anthropology.* Newbury Park, CA: Sage.

Denzin, N., & Lincoln, L. (Eds.). (1994). *Handbook of qualitative research.* Thousand Oaks, CA: Sage.

Spradley, J. (1980). *Participant observation.* New York: Holt, Rinehart, and Winston.

Pascal, Blaise (1623–1672)

Pascal was a polymath who became a major figure in religious thought and polemics, mathematics, theoretical physics, philosophy, and French literature, along with the design of public transport. There are surprising connections between different parts of his thought. For example, his mathematical ideas on probability are used in a famous "proof' of the existence of God. The status of this proof, known as Pascal's wager, should not be exaggerated. It was probably intended

BLAISE PASCAL
(From the painting by Philippe de Champagne.)

Source: Courtesy of the Library of Congress.

as a way of grounding, or reinforcing faith rather than as the equivalent of a metaphysical-logical deduction of God's existence. In Pascal's wager we should believe in God because it brings us happiness to hope for an eternity of bliss after this life. If the belief is false, we will not lose anything, and if it is correct we make it less likely that we will be punished with an eternity of torment likely to result from failing to accept God.

The argument for God from a form of probability may have survived Enlightenment skepticism better than the intended certainty of metaphysical proofs. What may be more important about the wager is that it expresses the collapse of a metaphysical-theological structure of thought in which God's existence seems tied up with the existence of nature. In this worldview, humanity itself has clearly defined natural and divine purposes.

Pascal is among the key figures in establishing another view of humanity, which underlies the emergence of modern social science. Pascal's questioning of the old commonsense anthropology partly came from the Copernican Revolution in Science, and partly from an insistence on a very austere form of Catholic Christianity known as Jansenism. Jansenism was rooted in commentaries on St. Augustine by the Belgian Bishop Cornelius Jansenius, which came to be regarded as heretical by the Vatican. Jansenius, and his followers, emphasized the elements of pre-destination, the fallen nature of humanity and absolutist moral rigor in Augustine. It seems close to Calvinistic Protestantism, but the Jansenists were keen to deny this (as Pascal does in "Writings on Grace"). The convent and school of Port-Royal, in Paris, became a center of Jansenist religious thought, as well as a great center of education (Jean Racine was a student there) and philosophy (Pierre Nicole and others). Pascal had family connections with Port-Royal and became a Jansenist himself. He joined in a battle against the Jesuits, whom the Jansenists considered lax in application of principles, in the polemical-literary work, *Letters Written to a Provincial.*

The Jansenists were operating in a political environment where at first the French monarchy found them useful in combating the influence of the Jesuits and the Papacy in France, but they were later repressed when the conflict with Rome started to threaten the monarchy.

The currents of Pascal's life and work come together in his central achievement *Pensées* ("Thoughts," but translations always leave the French title). Pascal's Wager appears there in a series of fragments that mix biblical interpretation with compressed meditations on philosophy and the condition of humanity. Pascal's Wager itself rests on Pascal's view of humanity as lost without God, and as marked by the loss of God, since God is absent from nature and the universe. After Copernicus, the universe lacks a center. It has become an eternal sphere without a center. In comparison to the infinite spaces of the universe of modern science, humans can be no more than thinking reeds. Humans have grandeur, but it is lost grandeur because of their fallen nature. We belong with God, but original sin separates us from the happiness of union. Not only are we weak in relation to physical nature, our lives lack substance. Someone who spends half his life dreaming that he is a king is as happy as that king, who might be dreaming that he is one of his lowly subjects.

The idea that life may be no more than a dream and that God is absent from the natural universe can be found in Pascal's predecessor René Descartes, but

Pascal attacked Descartes's philosophy as useless and ineffective. Descartes's search for pure foundations to knowledge, in order to overcome skepticism, was considered contradictory by Pascal. Reason cannot justify itself, because we can always keep asking, what is the reason for this reason? According to Pascal, there must be "reasons of the heart" at the origins of all knowledge. There may be an element of religious mysticism here, but less than the phrase suggests. "Reasons of the heart" refers to our capacity to create first principles, such as mathematical axioms. There is no absolute justification for such principles, but we must assume them in order to have knowledge or science of any kind. The skeptical and hypothetical-intuitive spirit is expressed in thoughts on politics and society. The dream of being king already hints at the unreality of legal sovereignty. Pascal regarded all human laws, including those upholding state sovereignty, as fictional. Their only foundation is in force, so we cannot regard them as expressions of natural-theological right. The arbitrariness of law, its lack of intrinsic injustice, is shown in the great variations of law on either side of a changeable border, between humans living in one state and humans living in another state. We cannot regard human societies as conditioned by the ethics and justice of a system of natural right. Our laws themselves emerge from the vanity and self-interest of humans who are driven by the constant urge to have more grandeur than other humans. The search for grandeur is an expression of the lost grandeur of fallen humanity. The consequence is that societies are grounded on the drive for status, prestige, and recognition. These thoughts evidently parallel those of Niccolò Machiavelli and Thomas Hobbes on the tendency for humans to seek self-advantage rather than virtue, and anticipate political economy. They made a deep impression on Alexis de Tocqueville to the extent that they are essential to understanding his political and social thought. Pascal's thought also clearly anticipates Jean-Jacques Rousseau's views of the natural, substituting for God, and the social. This can be seen in *Pensées,* but also the "Writings on Grace," where Pascal establishes the general will of God, in which God wishes to save all humans. Evidently this general will cannot be applied absolutely since all humans are fallen, but it provides grounds for saving an elect few. More recently the cultural and social thought of Slavoj Žižek and Jacques Derrida has included significant considerations on Pascal; his influence must be recognized wherever Rousseau and de Tocqueville have left a mark. He is at the origin of modern anthropology in the broadest sense.

— *Barry Stocker*

Further Readings

Pascal, B. (1997). *The provincial letters.* Eugene, OR: Wipf and Stock Publishers.

Pascal, B. (1999). *Pensees and other writings.* Oxford: Oxford University Press.

Pascal, B. (2004). *Blaise Pascal: Thoughts, letters and minor works.* Whitefish, MT: Kessinger Publishing.

Patriarchy

Patriarchy is a theory about social organization that refers to a system of male authority that is seen to oppress women through its social, political, and economic institutions. In a patriarchal society, power rests in the hands of men, who have a greater access to, and control of, resources and rewards both in the domestic and non-domestic spheres. Wives and children depend on the men and inheritance is through the male line.

Patriarchy is to be distinguished from patrilineality, a system in which one belongs to the father's lineage, and patrilocality, a social practice in which newlyweds live with or near the family of the husband. Many feminist writers view patriarchy as the root of the formation of most modern society.

Second Wave feminists (a stage in feminism which started in the late 1960s) were united by the theory of patriarchy. Patriarchal relations were assumed to be structural and operating at an institutional level. Different schools of feminist thought defined patriarchy in various ways. Perhaps the radical view is the one that has received the most publicity: patriarchy is a medium that oppresses women and has operated through the family across history. Society is based on a hierarchy that privileges masculinity and devalues femininity.

Matriarchy has often been presented as the "real answer" to patriarchy. The earliest study of matriarchy was published by Johann Jakob Bachofen in

1861 (*Das Mutterrecht,* The Mother Right), and he viewed matriarchy as an inferior form of societal organization. However, no matriarchies exist in the present, and primary sources recounting them are lacking, and thus the idea of female-dominated societies is generally discounted. In the same year that *Das Mutterrecht* was published, Henry Summer Maine published *Ancient Law,* which sought to show that originally all human groups were organized on the patriarchal model. Patriarchal societies exist in practice as well as in theory.

It should be noted that societies previously described as matriarchal (for example, the Iroquois) turned out to be matrilineal, even if Iroquois women wielded substantial power. There have been many attempts to label past societies as matriarchal, most notably work by Marija Gimbutas. She hypothesized that much of what she calls "Old Europe" was blissfully matriarchal until the arrival of patriarchal societies in the Bronze Age (the Kurgan hypothesis). Various archaeological investigations have not confirmed this hypothesis and available evidence has so far failed to support an ancient matriarchal society.

In contrast, archaeology has unearthed various examples of patriarchal societies, for example, the Romans. Evidence clearly shows that the *pater familias,* the head of the family, enjoyed absolute authority and had the power of life and death over children and slaves. Women passed on their dowry under the authority of the *pater familias* of the husband's family.

Patriarchy is generally accompanied by notions of a strict binary gender system. However, the situation is often more fluid, for example, the Tuareg people, although patriarchal in structure, still practice descent through the female line, and females enjoy a certain degree of respect and freedom, although under the supervision of men.

— *Isabelle Vella Gregory*

Further Readings

Bamberger, J. (1974). The myth of matriarchy: Why men rule in primitive society. In M. Z. Rosaldo & L. Lamphere (Eds.), *Woman, culture and society.* Stanford: Stanford University Press.

Gimbutas, M. (1982). *The goddesses and gods of Old Europe: 6500–3500 BC: Myths and Cult Images.* Berkeley: University of California Press.

Smith, A. (1992). *Pastoralism in Africa: Origins and development ecology.* London: Hurst and Company.

Patterson, Francine G.

The art of communication has been practiced by many people in many different ways. However, one individual by the name of Francine Patterson has focused on a unique study that has received national and international attention. Patterson has chosen to make her professional life a study of communicating with gorillas and doing what she can to prevent their extinction in this world. Her interest in this activity began as a graduate student at Stanford University, where she received her Ph.D. degree in Developmental Psychology. It has continued since her university days at Stanford, and resulted in the longest study of interspecies communication that exists so far.

Patterson's philosophy suggests that we can learn much from communicating with gorillas, and that it will be beneficial to them, and to ourselves as well, if such efforts are made. Her work is especially beneficial to linguistic scholars who are attempting to study the links between species. However, in addition to studying communications with gorillas she is also interested in preserving their presence in the world for all to enjoy and to study. Patterson's efforts to study and to maintain the existence of the gorillas have received recognition. She has been able to publish a number of books dealing with gorillas and has received various noteworthy awards. In 1997 she was chosen as a Kilby Foundation Laureate by the Gorilla Foundation in honor of her long and continuous efforts regarding primate linguistic abilities.

Today, she continues her work by serving as Chairman of the Board for the Gorilla Foundation and is working toward the accomplishment of a preserve in Hawaii for gorillas. She is also a Board member of ApeNet, which is a group of foundations interested in studying communication regarding these animals. Patterson has also found time to serve as Editor in Chief of "Gorilla," a Foundation journal. As you would

Source: © Bettmann/CORBIS.

expect, she is the author of a number of books that provide useful information about her specialty.

— *William E. Kelly*

Further Readings

Patterson, F. (1981). *The Education of Koko.* New York: Holt, Rinehart, and Winston.
Patterson, F. (1985). *Koko's kitten.* New York: Scholastic.
Patterson, F. (1987). *Koko's Story.* New York: Scholastic.
Patterson, F. (1999). *Koko-Love! Conversations with a signing gorilla.* New York: Dutton Children's Books.

Peasants

In his seminal book, *Peasants,* Eric Wolf explains that peasants are "those large segments of mankind which stand midway between the primitive tribe and industrial society." Wolf's book is a tour-de-force explanation of who peasants are, as well as a 1960s state-of-the-art statement about what had become one of the more important classificatory categories in anthropology.

Peasants are generally considered to be farmers who sell their surplus in the market. How this surplus enters the market, conceived of broadly, can be in the form of hard goods directed at a marketplace, the payment of rent to a landlord, the payment of taxes to the government, or various combinations of these. Peasants are semi-self-sufficient, meaning they reproduce most but not all of their subsistence needs. In order to fulfill their basic needs they enter the marketplace, where they sell their surplus agricultural products and other crafts produced by members of the household. Peasants are members of states that, through various forms of coercion, also draw them into capitalist markets. However, as Wolf notes, peasants tend to be conservative and resist proletarianization.

From the beginning, anthropological studies of peasants have been concerned with the description of peasants—their life-ways and economic practices—and with the utility of the category itself. Since Redfield's description of peasant life in Tepoztlán, Mexico, the concept has undergone numerous changes and continues to prompt new theoretical debates. Redfield's ethnographic work in central Mexico and later in Yucatan awkwardly identifies his subjects not as peasants but as tribal people. He locates them on a primitive-civilized continuum that often overlooks their relationship to the state and to the capitalist economy. His student, Sol Tax, was one of the first anthropologists to correct this perception of indigenous people in Mexico and Guatemala by making the argument that they were not tribal people but farmers and members of states. Moreover, he recognized that the basic unit of production is at the level of household, not individual. Such observations anticipated the later theoretical and analytical work of anthropologists, such as Enrique Mayer, June Nash, James Scott, and Eric Wolf.

Peasants did not become a major focus of anthropological study until after World War II, when it was apparent that "primitive" and "tribal" were inadequate classificatory terms for many peoples around the globe. The interest in peasants related to the emerging crisis that the primary object of anthropological study, the primitive, was disappearing, and to the direction anthropological research had turned in order to explain this cultural change and the relationship of the state to "traditional" peoples. After the war, there was greater awareness on the part of anthropologists to conceive of all people as part of states and global economic systems, not as isolated groups.

As long as states have existed, so have peasants. Most anthropological research on peasant economics and on peasants as members of states has been influenced by Marxist theoretical perspectives, namely, that of Lenin and Chayanov. For Marx and his later followers, peasants are problematic. Because of their conservative tendencies to preserve their lifestyle, it was not clear with whom they would ally themselves—the bourgeoisie or the proletariat. Marx believed that eventually capitalism would destroy the peasant lifestyle, since it is incompatible with industrialization, and that most peasants would become proletarians.

Lenin postulated that industrialization could come from within an agrarian-based society though labor surpluses within the rural population and through market surpluses, which were necessary to feed the growing proletariat. As land became scarcer—something the state could control by encouraging privatization of land and altering traditional land tenancy systems—more peasants would be forced into the labor market. However, as the proletariat increased, the demand for food products would increase, which could only happen with the further capitalization of agriculture. Hence, while a few rich peasants transformed into landowners who hired wage-laborers, most peasants would become the laborers who worked for wages. Effectively, the household-based economic unit of peasants would be replaced by a class-based industrial system, where individuals sold their labor.

What Lenin did not recognize was that such transitions to capitalistic industrial farms were not compatible to all political and economic contexts. In Latin America, states have given concessions to peasants—land itself, support of communal land tenure systems, price protection of subsistence crops—which allowed them to maintain their lifestyle, in order to gain their political support. Even though land ownership continued to consolidate in places like Mexico and Southeast Asia, landlords still provided their workers with plots of land for them to cultivate. This inhibited the complete proletarianization of the peasantry. In Asia and Korea, for example, the landlord class, which had the potential to transform the peasant economy into a wage-based one, was destroyed by their Japanese occupiers, allowing peasants to maintain their household-based economic system.

Chayanov challenged Lenin's perspectives on peasants. He believed that Lenin missed the true nature of peasants. For example, he contended that peasants were not per se opposed to or incompatible with capitalism. They provided surplus labor at times and sold their surplus products in the market. Lenin's theory is flawed because it disregarded the ways in which peasants economically maintained their households. According to Chayanov, the peasant household was not capitalistic, but based exchange on use value. Families work to provide for a basic livelihood, which did not mean they maximized production or were profit oriented. Because of this, individual peasants and peasant households do not behave like proletarians and capitalistic firms. Instead, they balance labor with consumption. Household members work to fulfill needs, but because of the drudgery of the work, they do not strive to increase surplus much beyond basic needs. Fewer working members of the household in relation to non-able-bodied workers meant that they work more than those in households where the worker to nonworker ratio was less. Furthermore, this household-based unit of production is incompatible with capitalism, because in order to maintain their basic minimum subsistence level, members in a peasant household will produce more, even if doing so results in lower prices. In contrast, this practice would ruin the capitalist firm.

Chayanov's theories depend on the relative scarcity of land and lack of other employment options to absorb surplus labor. Also, they fail to take into consideration local cultural conditions about what constitutes appropriate consumption needs, nor do they consider the broader coercive mechanism of states and capitalistic markets. His theories, however, have inspired anthropologists. Marshall Sahlins began to think about domestic modes of production, and Eric Wolf began to think about the cultural conditions in which peasants replace those things necessary to their production and subsistence. June Nash has used Chayanovian theory to look at how capitalism has challenged domestic production in peasant households and contributed to gender conflicts.

Both Lenin and Chayanov challenged anthropologists to think about peasants' relationship to the state. After World War II, a concern of First-World countries such as the United States was to help Third-World countries in Latin America, Asia, and Africa to develop into comparable First-World countries. Anthropologists not only described the composition, and economic and cultural conditions, of peasant households, they were also concerned with how economic developments would positively and negatively

affect peasants. When anthropologists observed that in societies with large peasant populations, the economic conditions did not improve—in fact, often worsened—they questioned the utility of development policies directed at these populations. They identified that peasants were drawn into exploitative systems, which undermined their traditional economic and cultural bases, while simultaneously incorporating them into a larger, global capitalist system in which their labor was further devalued and resulting in a greater market dependence.

Because such dire structural—economic and political—conditions have contributed to peasant revolts, peasant-supported revolutions, and other forms of resistance, anthropologists have studied what makes peasants engage in various forms of resistance, and why, more often than not, this resistance has not led to social and political change. Eric Wolf's 1969 book, *Peasant Wars of the Twentieth Century,* outlines peasant participation in the main revolutions of the 20th century—Mexico, Russia, and others—to illustrate the conservativeness of peasants and the difficulty for peasant-based revolutions to lead toward meaningful social change. Peasants revolted, but usually in order to restore the status quo. In places where revolution led to real social change, Wolf notes that it is not the peasantry, but the proletariat, intellectual, and surviving bourgeoisie classes that guide the new direction that a country takes. Even so, this does not mean that peasants are passive and have no agency to resist. James Scott has contributed most to this line of research. Drawing on theories of hegemony and power, Scott's ethnographic work highlights the everyday forms of resistance of peasants in Southeast Asia. His influential research shows how peasants find the means to resist the state and landlords, from foot-dragging to sabotaging harvests, and construct critical counter-discourses that evade repressive policies and mechanisms of control.

Contemporary anthropological studies of peasants have gone in three primary directions: the continued existence of peasants, the demise of peasants, and the emergence of the term peasant as a category of self-identification and political identity. Enrique Mayer is the leading proponent of the belief that peasants persist and are able to reproduce their ways of life, despite the effects of late-capitalism and neoliberal policies. He argues that theoretical models and ideal typologies of peasants can be misleading, and are not reflected in the lived realities of those people. Instead of arguing that recent and current economic and political conditions have undermined peasants and caused them to disappear, he shows how Peruvian peasants since pre-Columbian times have adapted to Inca, Spanish Colonial, and Peruvian national political changes, as well as accompanying economic changes like the development of commodity markets and neoliberalism.

Michael Kearney takes the opposite perspective, arguing that late-capitalist economic conditions have contributed to the end of the peasant lifestyle. Based on his research in Oaxaca and in California with Zapotec and Mixtec transnational migrants, he contends that, as a classificatory term for contemporary people, the term *peasant* has little utility. He offers evidence that former Mexican peasants are changing into wage-earning laborers who crisscross international borders in search of work. No longer can peasants sustain themselves in this period of late-Capitalism. It has ruptured the basic unit of peasant production—the household, taking former peasants away from agricultural-based subsistence strategies in which they strived for self-sufficiency, and thrusting these people into a global commodity and labor market that can alienate them from their home, community, and cultural traditions. Even when they maintain cultural traditions and stay connected to their communities of origin, the context in which they do so is profoundly altered from when they were peasants.

Marc Edelman, in contrast, does not engage so much in debates about the empirical existence of peasants or the categorical significance or insignificance of peasants. In his research on Costa Rican coffee growers and workers, Edelman observes that his subjects use the term peasant as a type of political identity. It becomes an important way for these growers and workers to politically position themselves against large transnational coffee companies and the government, to oppose international trade agreements and unfair purchasing practices, and to attract the support of non-governmental aid organizations. What is significant is that these growers and workers call themselves peasants.

Although peasant studies do not figure prominently in anthropological research in the early 21st century, peasants and the very concept of "peasant" continue to attract anthropological inquiry and stimulate theoretical debates about classificatory terms, agency, political identity, and even modernity.

— *Walter E. Little*

Further Readings

Chayanov, A. V. (1966). *The theory of peasant economy.* D. Thorner, B. Kerblay, & R. E. F. Smith (Eds.). Homewood, IL: Irwin.

Cook, S. (2004). *Understanding commodity cultures: Explorations in economic anthropology with case studies from Mexico.* Lanham: Rowman & Littlefield Publishers.

Durrenberger, E. P. (Ed.). (1984). *Chayanov, peasants, and economic anthropology.* Orlando, FL: Academic Press.

Edelman, M. (1999). *Peasants against globalization: Rural social movements in Costa Rica.* Stanford: Stanford University Press.

Kearney, M. (1996). *Reconceptualizing the peasantry: Anthropology in global perspective.* Boulder, CO: Westview Press.

Mayer, E. (2002). *The articulated peasant: Household economies in the Andes.* Boulder, CO: Westview Press.

Scott, J. (1985). *Weapons of the weak: Everyday forms of peasant resistance.* New Haven, CT: Yale University Press.

Wolf, E. (1966). *Peasants.* Englewood Cliffs, NJ: Prentice Hall.

Pentecostalism

Pentecostalism is a global religious movement that focuses on the immediate experience and empowerment of the Holy Spirit. It is arguably the most important development in Christianity of the 20th century. Some see it as the third stage in the history of Christianity, from Catholicism to Protestantism to Pentecostalism. It may also be the fastest growing religion in the world today. The anthropological significance of Pentecostalism is that it is global and strongest in Latin America, Asia, and Africa, the traditional locales of most anthropological research. Anthropologists are involved in the flourishing, interdisciplinary field of Pentecostal studies, and have produced several ethnographic case studies.

Origins

According to "Acts 2," in *The Bible*, the apostles of Jesus gathered in Jerusalem to mark the Jewish holiday of Pentecost, " . . . and they were all filled with the Holy Spirit, and began to speak with other tongues, as the Spirit gave them utterance." For centuries, Christians prayed for a New Pentecost, which many believed would herald the return of Christ and the beginning of a millennial kingdom of God on Earth, and there were occasional short-lived movements involving "speaking in tongues" and miraculous "gifts of the Spirit" such as prophecy and healing.

The Pentecostal movement of today is believed to be the product of a synthesis of the principally Methodist Holiness movement of the late 1800s, which was concerned with personal purity and piety, and more ecstatic African American spirituality. It is generally said to have its immediate genesis in two events. First, Charles Fox Parham, a white Holiness preacher, taught that the Holy Spirit could enable a true believer to speak in another language, and several of his students did speak in "tongues," in the Topeka Revival of 1901. Second, William Seymour, an itinerant African American preacher who had studied with Parham, initiated the Azusa Street Revival of 1906–1909 in Los Angeles. The revival was a sensational event, drawing crowds of people and inspiring ecstatic behavior, particularly speaking in tongues, which became the defining characteristic of Pentecostalism and was understood to be the sign that a convert had experienced a "baptism in the Spirit" as well as a water baptism.

Originally, those who received the "gift of tongues" believed it was a natural language that would enable them to serve as missionaries to other peoples. In addition, they saw it as a sign of the imminent return of Christ, lending urgency to their missions. Almost immediately, converts fanned out across the world, establishing Pentecostal missions in approximately fifty countries in the first 2 years. They quickly, and of course disappointingly, discovered they could not actually speak other natural languages, although that did not prevent them from spreading a new Christianity, founded on an ecstatic engagement with the Holy Spirit, to the sick, the weak, the poor, and the disenfranchised in particular. Today, Pentecostals understand "tongues" as a "heavenly language," not a natural one.

Growth

The Azusa Street Revival collapsed in 1909, as principal figures quarreled and separated, generating the first of a rapidly and endlessly proliferating number

of Pentecostal churches, movements, sects, and denominations. Pentecostalism grew exponentially throughout the 20th century, tripling in adherents from 1970 to 1990. Today, estimates of the number of Pentecostals in the world range from 250 to 523 million people, accounting for at least 1 in 8, and possibly 1 in 4, Christians, and at least 1 in 25 people in the world. It is predicted that Pentecostals will outnumber Catholics and become the main form of Christianity in the 21st century. As two of three Pentecostals live in the nonwestern world, and over 70% are nonwhite, the rise of Pentecostalism is changing the global face of Christianity. Latin America has the largest number of Pentecostals, followed closely by Asia and Africa, then North America; Europe has by far the lowest number. Catholic Brazil has the largest number of Pentecostals of any country in the world.

Types

Pentecostalism is often confused with two related movements, Fundamentalist Christianity and Evangelical Christianity. Fundamentalists believe in the inerrancy of scripture and reject the idea of supernatural gifts or charismata in this day and age, and Evangelicals believe that salvation requires a conversion experience of spiritual rebirth. Pentecostalism goes beyond them in emphasizing charismata or spiritual gifts, particularly speaking in tongues, as signs of conversion and it relies on divine inspiration and guidance in addition to scripture.

There are thousands of Pentecostal denominations. All scholars recognize two "waves." First, Classical Pentecostalism refers to 660 denominations that developed in the West from the Azusa Street Revival. Second, Charismatic Pentecostalism refers to a Pentecostal movement in the mainline Protestant and Catholic churches, beginning in the 1960s. Some scholars refer to a "third wave" of newer, independent, Pentecostal-like churches that place less emphasis on tongues and generally do not call themselves Pentecostal or Charismatic. Some focus on "spiritual warfare," believing that demonic spirits control the world. Others promote a "health and wealth" or "prosperity gospel." Some scholars also include the huge number of independent, indigenous, Pentecostal-like churches of Africa and Asia in this third wave, creating a "catch-all" category called Neo-charismatics, the largest of the three types.

Theology

Pentecostalism focuses on religious experience and praxis rather than belief and doctrine. Pentecostals follow the "fourfold" or "four square" gospel of Christ as Savior, Sanctifier or Spirit-Baptizer, Healer, and Soon-coming King. They believe that a Christian is a person who has experienced salvation from sin and eternal damnation through a conversion experience that culminates in a baptism in the Spirit. The convert is a changed person, developing a personal relationship with Jesus and rejecting the satanic world of sin and suffering. Speaking in tongues is a sign of salvation, which often also leads to other "gifts of the Spirit" such as healing and prophecy. Pentecostals look to the Holy Spirit for divine guidance and assistance in their lives. They believe that problems may be due to demons, and rely on faith, prayer, and sometimes exorcism for deliverance from evil. Pentecostals are formidable proselytizers and take great pride in church growth. They also hold an apocalyptic, pre-millennial eschatology, believing in the imminent Second Coming of Christ when a godly kingdom called the Millennium will be established.

Sociology and Anthropology

The Azusa Street converts were largely poor, uneducated laborers who did not feel welcome in mainstream Christianity. Likewise, the movement has typically appealed principally to marginalized and displaced persons around the world, particularly migrants to rapidly growing cities. Classical Pentecostalism in the United States, however, gradually became middle class and is moving closer to Fundamentalist and Evangelical Christianity. Adherents in the Third World are still overwhelmingly poor and working class, but middle class support is growing there too.

Social scientists have been trying to explain the incredible growth and appeal of Pentecostalism, and the functions it serves. One simple factor is that Pentecostal services are typically exciting, energetic, cathartic, entertaining events. Pentecostals make very effective use of music and technology, and services in the larger congregations are often elaborate staged performances. Pentecostals are also incredibly effective at "harvesting" new souls for the church. Every member is expected to bring more to the fold. Each new convert is hailed as a victory for Christ. This

aggressive evangelism, some have suggested, is a good training ground for the world of business.

Pentecostals are also said to have an organizational genius. It is generally a decentralized religion. Congregations typically enjoy much autonomy but also participate in an extensive network of voluntary fellowship with other congregations. Pentecostals around the world are increasingly linked by a transnational network of electronic communications, publications, missions, crusades, and globetrotting evangelists, drawing adherents everywhere into the globalization process. Pentecostal congregations enjoy a high degree of lay participation and control, which may promote democratic attitudes. The idea of the priesthood of all believers—that every Christian is capable of inspiration and has the right to interpret scripture—encourages an egalitarian attitude. Leadership, even at the national level, is usually indigenous rather than under the direction of foreign missionaries. Women are particularly prominent in the movement and may be attracted by the opportunities it offers for leadership and power.

Many scholars see Pentecostalism as a response to material and social deprivation and anomie. They argue that the movement helps adherents cope with radical changes generally associated with modernization or globalization, including rural-to-urban migration, the growth of mega-cities, bureaucratization, the expansion of capitalism, and urban poverty. The Pentecostal congregation is typically close-knit and very supportive, helping its members respond to daily needs and crises. The importance of healing, in the broad sense of solving individual problems, seems to be a major attraction for the poor. The strict discipline of Pentecostal morality produces sober, hard-working, honest, trustworthy, and dependable employees. Pentecostalism also seems to promote stronger and more stable marriages and families.

One of the most interesting facets of Pentecostalism, for the anthropologist, is that it adapts easily to any culture, absorbing much of the culture while at the same time demonizing indigenous religions. It is paradoxically both global and local. The Pentecostal movement is clearly a force to be reckoned with in the 21st century. It began as an otherworldly religion and has been largely apolitical, but there are signs of increasing politicization, which can only increase its influence on the local and worldwide scene.

— *William Wedenoja*

Further Readings

Anderson, A. (2004). *An introduction to Pentecostalism.* Cambridge, UK: Cambridge University Press.

Burgess, S. M., & Van Der Maas, E. M. (Eds). (2002). *The new international dictionary of Pentecostal and charismatic movements,* (Rev. Ed.). Grand Rapids, MI: Zondervan.

Cox, H. (1995). *Fire from Heaven: The rise of Pentecostal spirituality and the reshaping of religion in the twenty-first century.* Reading, MA: Addison-Wesley.

Martin, D. (2002). *Pentecostalism: The world their parish.* Oxford, UK: Blackwell.

Robbins, J. (2004). The Globalization of Pentecostal and Charismatic Christianity. *Annual Review of Anthropology,33,* 117–143.

People's Republic of China And Taiwan

Any consideration of cultural diversity in the world, past and present, cannot ignore the People's Republic of China and Taiwan. The modern political units in this part of East Asia changed significantly during the 20th century. In 1949 Mao Zedong (Mao Tse-tung) established the People's Republic of China (PRC) on the Chinese mainland after defeating the Nationalist Party or Guomingdang (Kuomingtang) troops led by Jiang Jieshi (Chiang Kaishek). At that time, Jiang established the Republic of China in the islands that constitute Taiwan. In 1997 Great Britain returned the islands in the territory of Hong Kong to the PRC, and in 1999, Portugal returned the territory of Macau to the PRC. Although publications tend to treat Chinese culture throughout these modern political units as homogeneous, there is significant regional variation in language, subsistence practices, housing, crafts, social organization, and ritual life. In addition there are numerous officially recognized ethnic groups living in these regions of East Asia. There is no doubt that such regional cultural variation first developed during the prehistoric period.

In addition, the total area cannot be ignored by virtue of its large size and huge population. At present the PRC has the largest population on earth, with over 1 billion people. There also is great physical

diversity. The PRC is somewhat larger in size than the United States, with climatic zones spanning from cold temperate in the north to subtropical in the south. In the south, the favorable climate and beaches have made Hainan island a major tourist destination. Historically, northern China is often referred to as including those areas north of the Yangzi River (or Yangtze, also known as Chang Jiang). The largest river in northern China is the Yellow River (Huang He). Another major river in southern China is the Zhu (Pearl) River. Western and southwestern areas of the PRC are mountainous, while there are many fertile plains in the central and eastern portions. The Himalayan mountains, which include portions of Tibet, are the highest on earth. The striking limestone mountainous areas of the southwestern Chinese mainland are known for their beauty. There are several famous mountains in the PRC that were revered throughout history and in modern times by poets, painters, devout Buddhists and Daoists (Taoists), and lovers of nature.

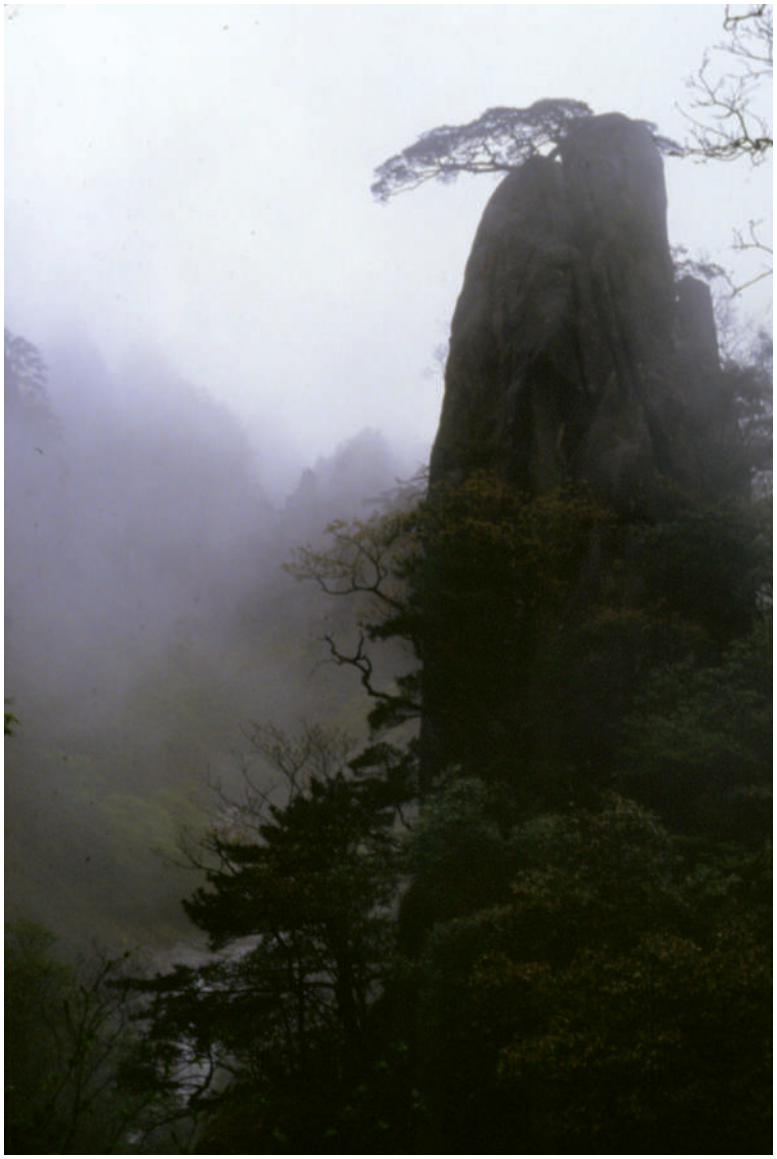
The People's Republic of China and Taiwan

Source: © Jill Seagard.

The mountainous islands of Taiwan lie in a subtropical zone. Early European explorers named these lush, beautiful islands Formosa, but the name is no longer used. Taibei (Taipei), situated in the north area of the main island, is densely populated. The east coast of the main island is known for its stunning views of the ocean. Typhoons, or large tropical storms, are common during the summer months in Taiwan and on the southern Chinese mainland.

The time depth of human cultures in this large area of East Asia is of a scope that is rarely matched in other parts of the globe, including the Pleistocene period, later prehistoric periods with Neolithic cultures, up to a long historic period (including several dynasties). There is evidence for numerous turning points in human development, such as the transition to physically modern humans, the establishment of farming, the development of urbanism, the rise of early states, the invention of bronze metallurgy, and the invention of writing. Archaeological research, involving the study of material remains, is complemented by interpretation of rich and diverse early historical texts from the area. Many writers have noted that Chinese civilization is one of the oldest and most enduring civilizations in the world. Some cultural practices that developed early have continued to the present day, such as belief in the importance of ancestors and rituals involving food offerings.

During the 20th century, and through the onset of the 21st, there has been significant cultural change in China, especially in relation to economic development. For example, explosive economic development during the past two decades in the PRC has integrated formerly isolated areas with others and attracted labor from rural to urban settings. Differences in wealth between individuals have increased dramatically. Some traditional life-ways in rural areas are being abandoned in favor of urban customs. For example, traditional craft production (textiles,



The Huang Shan mountains, Anhui province

Source: Photograph courtesy of Anne P. Underhill.

pottery, wooden implements) is declining. As economic development and cultural change takes place, however, people in the PRC and Taiwan remain justifiably proud of their rich cultural heritage.

Historic and Modern Cultural Diversity in the PRC and Taiwan

In the PRC, there are 56 officially recognized ethnic groups (*minzu*). The largest of these is called the Han. The 55 ethnic minorities are often referred to as "nationalities," emphasizing their different histories from that of the Han people. Ethnic identity here, as elsewhere, however, is a complex and changing phenomenon. Many ethnic minority peoples live in western and southwestern China, including areas bordering other modern countries. Modern political borders make it difficult to realize that peoples with similar cultural traditions live in neighboring countries of southeast Asia and other areas. Several provinces in the PRC have autonomous zones where one or more ethnic minority groups of people are concentrated. Ethnologists who specialize in ethnic minority cultures and languages tend to work at research institutes for that purpose, rather than in departments of anthropology.

In Taiwan there are several historically known aboriginal peoples who lived in the islands before the major migration of mainlanders in the first half of the 20th century. Most historical accounts identify nine ethnic groups, and today they comprise a small percentage of the population. Many aboriginal peoples adopted urban lifestyles at relatively early dates, given the rapid industrialization process in Taiwan. These indigenous peoples of Taiwan all once spoke languages belonging to the large Austronesian language family. There are linguistic similarities over a broad region, from tropical Asia to the Pacific islands. In Taiwan many professionals who research ethnic minority cultures regard themselves as anthropologists. A department of anthropology was established at a relatively early date at Taiwan National University in Taibei. It should be noted that there also were historically significant earlier migrations of Han mainlanders to Taiwan, especially during the 17th century. Many migrants came from Fujian province, directly across the Taiwan Straits.

In addition to cultural diversity in the area that comprises the PRC and Taiwan, there is tremendous linguistic diversity. For example, the official language in the PRC is Mandarin Chinese. Children from all ethnic backgrounds throughout the country learn the same Chinese characters. For many characters there are both simplified and complicated forms. In an

effort to increase the literacy rate after 1949, the government of the PRC simplified many Chinese characters (an act that later generations of foreign students were grateful for). In Taiwan, however, people use the more complicated traditional characters. Throughout the PRC there is marked variation in spoken Chinese. There are several distinct dialects that generally vary by geographic area. The most marked is the difference between Mandarin Chinese and Cantonese, spoken by people in southernmost China, especially Hong Kong. Most northerners cannot understand Cantonese at all. Cantonese is the dominant form of spoken Chinese in many China towns in North America, since adventurous, early immigrants came primarily from southern, coastal areas. Within one single province, also, there can be several regional dialects. Many individuals have the ability to converse in their own dialect, or the national common dialect (referred to as *putong hua*), depending on the context.

Temple of Heaven (Ming Dynasty, 1368-1644), Beijing

Source: Photograph courtesy of Anne P. Underhill.

Learning the Chinese language is a challenge for everyone. Educated people tend to recognize up to 5,000 characters. In addition, Chinese is a tonal language. Students must learn the proper tone (one of four) for a given sound in order to convey the proper meaning. In an effort to help foreign business people, tourists, and students know how to recognize and pronounce key words, the government of the PRC is providing increasingly more signs with the romanization of Chinese characters. The first romanization system widely used in North America is called Wade-Giles, and this system continues to be used in Taiwan. The PRC adopted the pinyin system of romanization. The difference can be seen in the spellings for the capital of the PRC, once referred to as Peking, and now more commonly referred to as Beijing.

In many areas of the PRC where ethnic minority peoples live, children learn standard Chinese as well as their own languages. For example, in the northwestern province of Xinjiang, many children of the Uighur (or Uygur) minority group speak and write the Uighur language, a Turkic language. The Naxi people of Yunnan province had their own traditional written language using pictographs. Another distinct language within the PRC is Tibetan, spoken not only by people within Tibet but also in communities in neighboring areas. The Manchu language became more widely used during the Qing (Ching) dynasty (1644 to 1911 A.D.), when the emperors came from the Manchu ethnic group of northeast China.

In these areas of East Asia there is substantial regional variation in subsistence practices, housing, social organization, and ritual life. Subsistence

Uighur boys, Xinjiang province

Source: Photograph courtesy of Anne P. Underhill.

systems in the eastern areas of the northern Chinese mainland were historically based on millet agriculture. Later rice became the preferred grain, and it has been grown in some relatively warm areas of northern China such as southern Shandong province. Relatively recent staple foods in northern China based on wheat and other grains include several varieties of noodles and steamed breads. A characteristic of the Central Plain (particularly in Henan province) and adjacent areas in the lower and middle Yellow River valley is loess, a type of fine, silty soil. In upland areas of the middle Yellow River valley, deposits of loess can be several meters thick. In parts of modern Shaanxi province, for example, cave homes are carved out of the deposits. For countless generations, farmers in several areas of the Yellow River valley have had to cope with extensive flooding caused by the extensive silt deposits.

Some inhabitants of northern and western areas of the Chinese mainland have had nomadic lifestyles. People of the Kazak ethnic group in Xinjiang have traditionally lived in yurts, moving seasonally to care for herds, commonly sheep and cows. Similarly, in Tibet, people have moved with the seasons to care for herds of animals such as sheep and yaks. They rely extensively on yaks for transporting goods as well as meat, milk and butter. There are also some Tibetan communities of settled agriculturalists. Arable land here is scarce, and barley is the main crop. Uighur farming families living in lowland areas of Xinjiang are also known for their beautiful embroidered and other colorful textiles.

In lowland areas of the south, paddy rice has been the dominant crop. The labor-intensive method of transplanting seems to have been in use since the Han dynasty, roughly two thousand years ago. House styles and craft production are adapted to the warmer, more aquatic environments of the area. Many varieties of bamboo are found here and are used for a variety of household items, as well as food. Fishing and travel by boat, on rivers as well as the sea, are important activities. Water buffalo are commonly used as draft animals in farming. In the southernmost, subtropical areas, there are several varieties of domesticated and wild plants that cannot grow in the north. In Taiwan, for example, the root crop taro is grown, and tropical fruits thrive such as mango and star fruit.

Two southerly areas of the PRC with exceptional cultural diversity are Yunnan and Guizhou provinces. Although ethnic minority peoples in these provinces tend to share similar customs with their Han neighbors with respect to subsistence practices and housing, there are marked differences in traditional clothing. A physical symbol of one's social identity in many areas is the nature of textiles worn (materials, styles, designs), as well as ornaments. For instance the Miao people in Yunnan and Guizhou are known for the stunning silver headdresses and ornaments that women traditionally wear during festivals.

Similarly, several ethnic minority groups in Taiwan, such as the Ami in the scenic east coast area, have equally beautiful traditional textiles and ornaments. In addition the Yami people of Lan Yu (Orchid Island; once known as Botel Tobago) are famous for their brightly painted boats. These people enjoy chewing

Yami fishing boats, Orchid Island (Lan Yu), Taiwan

Source: Photograph courtesy of Anne P. Underhill.

betel nut, a mild stimulant also popular in the Pacific region. Traditional Yami houses of wood are raised on wooden posts. In more than one southerly area traditional customs are being retained, in part for a growing tourism industry. Several museums are devoted to showcasing the rich ethnic minority cultures in many regions of the Chinese mainland and Taiwan.

There also has been considerable regional diversity with regard to social organization and ritual life. These aspects of culture do not neatly correspond with ethnic identity. Significant characteristics of historic and modern Han culture, and some ethnic minority cultures, in both northern and southern areas include the importance of extended family relations and tracing lineal descent through male ancestors. Traditional Confucian values that remain include respect for elders and authority figures. Confucius (551–479 B.C.) and his students also believed in the superiority of men over women, but attitudes about this issue have changed greatly since then. For many years, for example, women have run their own businesses, have had important positions in government, and have conducted important scientific research. Similarly, during the Warring States period (481–221 B.C.), an era of social upheaval and change, Daoist (Taoist) and other philosophers contemplated the social roles and responsibilities of individuals. There are Daoist temples on the Chinese mainland, Hong Kong, and Taiwan from several eras devoted to various deities and immortals.

Many rituals among the Han and some ethnic minority groups are associated with ancestral veneration. During certain times of the year, which vary by region, families burn incense in honor of the deceased and place offerings of food and drink by graves. For the Han Chinese, white is the traditional color of clothing worn as a sign of mourning during funerals. Paper items such as symbolic money may be burnt as offerings for the deceased to use in the next world. In southern areas, temples have been

particularly important loci of periodic rituals for lineage members.

Another form of ritual practice that seems to have a long antiquity in the Chinese mainland and insular areas is shamanism. There are practicing female shamans among the Puyuma of Taiwan, who aim to address spirits in order to cure people. Such research specialists have been known in other parts of East Asia as well, such as Korea.

Buddhism was first introduced to the Chinese mainland sometime during the Han dynasty (206 B.C.–220 A.D). The Han empire was of a scale comparable to the Roman empire. The Han state expanded to westerly regions for purposes of trade and defense. Over time, Buddhism was embraced by emperors and ordinary people alike. Buddhist temples and pagodas from several historical eras are common in the PRC and Taiwan. In the PRC, there are several stunning cave temples, some built on a massive scale. In the Chinese mainland, Hong Kong, and Taiwan, there also are many temples devoted to local Buddhist deities. Patrons may engage in certain rituals to seek information about their futures.

Diverse forms of social organization and ritual life are historically known among many ethnic minority peoples in both northerly and southerly areas. In traditional Tibetan societies for example, a practical adaptation in the past to the challenging natural environment (with limited agricultural land and the need for animal husbandry as well) was fraternal polyandry (brothers sharing a wife). Buddhism is the traditional religion of Tibet.

Northern areas of the PRC in particular also contain significant populations of Hui, or Muslim people. Islam was introduced to China during the Tang dynasty (618–907 A.D). Some of these people choose to wear distinctive headgear, while the beliefs of others can mainly be recognized by their avoidance of pork. Several cities throughout the PRC have active mosques. They are especially common in Xinjiang province, in areas where Uighur, Kazak, and other peoples live.

In the southwestern Chinese mainland there is great diversity in social organization and ritual life. Here, some ethnic minority groups have been known that are traditionally matrilineal, meaning that descent is traced through females. Women are the managers of these household economies, and the institution of marriage, as known among the Han people, does not exist.

During the 19th century, Christian missionaries from North America and Europe traveled throughout the Chinese mainland, Hong Kong, and Taiwan. Some ethnic minority and Han peoples have continued to practice Christianity since then, and there are active churches in a number of areas.

Archaeology in the PRC and Taiwan

The field of archaeology is well developed in the PRC and Taiwan. There are numerous professional archaeologists conducting both rescue and research excavations in every region as well as graduate programs for training future generations of archaeologists. The practice of archaeology has deep personal meaning for these professionals, since there is great pride in uncovering evidence for the development of Chinese civilization. To many professionals, archaeology is a means of tracing evidence about one's personal ancestors. At many universities in the PRC, archaeology is taught in departments of history. In Taiwan, many professionals regard archaeology as a subset of the field of anthropology. In both the PRC and Taiwan there are research institutes for archaeology as well. Archaeologists in all areas share common goals of using material remains to research issues such as change in technology, subsistence practices, social organization, and ritual life. Many also employ the rich and diverse texts from various eras of Chinese history to inform them about life in the past. There are numerous professional journals at the regional and national levels. Professional archaeologists devote considerable time to sharing their findings with the public, by writing books for the public and conducting interviews for television shows and newspaper articles. Archaeology is a priority for government officials; considerable funding is devoted to the construction and maintenance of new museums at the local, regional, and national levels.

Residents of the Chinese mainland and foreigners alike have long been fascinated with Chinese antiquity. At least as early as the Han dynasty (206 B.C.–220 A.D.), scholars recorded information about the past. During the Song dynasty (960–1279 A.D.), scholars wrote catalogues describing ancient bronze ritual vessels. In the late 1800s and early 1900s, European travelers conveyed information to their fellow citizens about fascinating ancient sites that they had seen. Certain individuals, such as Aurel Stein,

from Britain discovered key sites and inspired sinologists to conduct important research on historical texts and other materials. An established method for collecting and interpreting data about life in the past, including the crucial context of objects, not just the objects themselves, began to develop after the establishment of the field of geology in China. The creation of the Geological Survey of China was a turning point, and it also fostered an atmosphere of scientific collaboration among Chinese and foreign specialists.

Soon a series of excavations took place, revealing a number of important ancient cultures. The first excavation in 1921 was directed by the Swedish geologist-turned-archaeologist Johan Gunnar Andersson, with an international team, at a Neolithic (farming subsistence base) site called Yangshao in Henan province. Scholars later determined that the Yangshao culture spanned from ca. 5000–2800 B.C., with a wide distribution area in the middle Yellow River valley. Another extremely important series of early excavations took place at the late Shang period (ca. 1200–1046 B.C.) site of Anyang in northern Henan. Li Ji (Li Chi) directed a team of professional Chinese archaeologists that recovered not only important remains from the early Bronze Age capital site, but also large quantities of oracle bones, the earliest known writing in China. Subsequent teams of archaeologists discovered evidence for a late Neolithic culture in Shandong province called Longshan (ca. 2600–2000 B.C), on the basis of excavations at Chengziyai from 1930–1931 and at Liangchengzhen in 1936.

Shortly before the PRC was founded in 1949, Li Ji (Li Chi) and some other archaeologists went to Taiwan and established the field of archaeology there. Some of the excavated remains from Anyang and

Major archaeological sites

Key: 1, Yangshao; 2, Anyang; 3, Chengziyai; 4, Liangchengzhen; 5, Nihewan; 6, Zhoukoudian; 7, Dingcun; 8, Xiachuan; 9, Changpin; 10, Cishan; 11, Bashidang; 12, Jiangzhai; 13, Hemudu; 14, Dapenkeng; 15, Niuheliang; 16, Dawenkou; 17, Fuquanshan; 18, Fengbitou; 19, Beinan; 20, Taosi; 21, Wangchenggang; 22, Shijiahe; 23, Erlitou; 24, Yanshi; 25, Zhengzhou; 26, Daxinzhuang; 27, Sanxindui; 28, Lu; 29, early Dian.

Source: © Jill Seagard.

Neolithic sites were moved to Taiwan. These scholars trained a new generation for archaeological research. Research in Taiwan has continued to focus on mainland sites as well as key sites in Taiwan. Meanwhile, the new government on the mainland began to establish research institutes for archaeology, departments within universities, museums, and professional journals.

Previously, Marxism was the dominant theoretical approach to interpreting archaeological remains in the PRC. For the last two decades especially, archaeologists have employed a variety of theoretical and methodological approaches. Since the early 1990s, the government of the PRC has allowed collaborative fieldwork projects with foreign archaeologists. These projects have included several systematic, regional survey projects and excavations at Paleolithic, Neolithic, and early Bronze Age sites. Chinese archaeologists have worked with numerous other professionals from Japan, Korea, Europe, Australia, Canada, the United States, and other areas. Archaeological fieldwork is taking place in every province of the PRC, and increasing numbers of local people from diverse backgrounds are participating. In addition there are Bureaus for the Management of Cultural Relics at the local, provincial, and national levels to monitor the research and protect sites.

The archaeologist who introduced ancient China to English speakers in North America and elsewhere is Zhang Guangzhi (Chang Kwang-Chih), known as K.C. Chang. Chang was widely admired by archaeologists in the PRC, Taiwan, and the West. His monumental syntheses and innovative, anthropological interpretations about the rise of civilization in ancient China, as well as description of his archaeological methods will remain as required reading for everyone. His voluminous articles and books, in both Chinese and English, span a period from 1953 to 1999.

Findings From the Paleolithic, Neolithic, and Early Bronze Age Periods

After the initial focus of archaeological fieldwork in the northern Chinese mainland, excavations and surveys have taken place in every region of the PRC and Taiwan. The extensive fieldwork and publications demonstrate that investigating the rise of Chinese civilization requires consideration of the diverse cultures from many areas. Also, archaeologists who wish to consider cross-cultural evidence for different kinds of social change in the past cannot ignore the rich data from the PRC and Taiwan.

Hundreds of Paleolithic sites have been discovered in several regions. These sites are providing information about topics such as the physical development of modern humans, adaptations to different kinds of environments during the Pleistocene period, and regional variation in stone tool technology. There are many challenges in interpreting sites on the Chinese mainland attributed to the Early Pleistocene period, over ca. 700,000 B.P. (before present, or years ago). There have been controversies about dating of remains, integrity of the stratigraphic deposits (i.e., whether there has been disturbance), and identification of artifacts (versus objects formed by natural processes). Currently it appears that some of the earliest stages in the physical and cultural development of hominids took place on the Chinese mainland in addition to Africa. A handful of sites appear to have dates older than 1 million years ago, including more than one locality in the Nihewan Basin in northwestern Hebei province.

In contrast there are numerous sites from the Middle Pleistocene period on the Chinese mainland. The most famous is Zhoukoudian (Chou-k'ou-tien), near Beijing, discovered in 1922 by Johan Andersson, with the main deposits dating ca. 500,000 B.P. Subsequent excavations by Pei Wenzhong and others yielded abundant remains of Homo erectus that were referred to as "Peking Man." Tragically, these remains were lost during World War II. Important new research continues to take place at the site, where caves yielding skeletal remains, remains of animals such as hyenas and saber-toothed tigers, and stone tools indicative of a Lower Paleolithic technology have been found. Zhoukoudian is one of the richest Paleolithic sites in the world, with evidence for over 200,000 years of occupation. The key institution conducting excavations at Paleolithic sites in the PRC is called the Institute of Vertebrate Paleontology and Physical Anthropology (IVPP). Other comparable sites yielding Homo erectus remains and/or stone tools exhibiting a Lower Paleolithic technology have been found in Shaanxi, Shanxi, Liaoning, Guizhou, Yunnan, and other provinces. It is clear that Homo

erectus populations were able to adapt to a wide variety of environmental regions in both northern and southern China.

Late Pleistocene sites, both open air and cave sites, have been found in an equally wide area. These include sites (ca. 200,000–40,000 B.P.) with early Homo sapien's skeletal remains and stone tools exhibiting a Middle Paleolithic technology. One key site where archaic Homo sapiens remains and stone tools were recovered is Dingcun in southern Shanxi. Later sites, after ca. 40,000 B.P., have remains of fully modern humans (Homo sapiens) and an Upper Paleolithic stone tool technology.

A clear trend evident from sites on the Chinese mainland, as elsewhere, is diversification of stone tool technology. There was increasingly more specialization of tool forms and more efficient use of stone. Microlithic tools have been found in several sites. Sites such as Xiachuan in southwestern Shanxi yielded a variety of blades, scrapers, and points. Current research focuses on delineating regional variation in subsistence practices (hunting, gathering, shelter) and tool technology. The Upper Cave at Zhoukoudian (ca. 15,000 B.P.) is important for what may be the earliest evidence for mortuary rites in China. It appears that mourners spread hematite over the bodies. Archaeologists also found a variety of bone and antler tools at Late Pleistocene sites, and ornamental items of both stone and bone. The Changpin (Ch'ang-pin) site on the east coast of Taiwan probably dates to ca. 15,000–20,000 B.P. Preliminary scientific analyses indicate that the earliest human remains here date to ca. 20,000 B.P.

Numerous prehistoric cultures from the Holocene period after ca. 7000 B.C. have been identified all over the Chinese mainland and Taiwan. There is evidence for diversity in regional cultural traditions, but unity as well. Research shows that northern China was a locus of early millet cultivation. Sites from the Peilgang culture such as Cishan in southern Hebei yielded domesticated millet ca. 6200–5000 B.C. More research has taken place in the south, where early sites with wet rice cultivation have been found in the central and lower Yangzi river valley. At Pengtoushan culture sites, ca. 7000–5200 B.C., such as Bashidang in Hunan, large quantities of rice and pile dwellings were discovered.

Later Neolithic cultures based on farming (ca. 5500–4000 B.C.) become more diversified, with more distinct traditions of subsistence practices, craft production, and mortuary practices. Some Yangshao sites, such as Jiangzhai in Shaanxi, reveal community planning and more than one house style. In the Yellow River valley at this time, multiple burials were more common. Waterlogged deposits at the Hemudu site in the lower Yangzi river valley revealed a wide variety of craft goods, including a lacquer container, a boat oar, reed mats, finely incised bone artifacts, and bone whistles. Meanwhile, people in subtropical Taiwan from the Dapenkeng (Ta-p'en-k'eng) culture, after ca. 5000 B.C., may have grown taro like their descendants.

Significant social changes took place during the late Neolithic period in more than one area of the Chinese mainland and Taiwan. Differentiation in housing and burials indicate that social ranking emerged during the period ca. 4000–2600 B.C. Greater quantities of prestige goods, such as jade items and labor-intensive pottery vessels, were produced. On a regional scale, archaeological surveys reveal the emergence of settlement hierarchies. Public rituals occurred on several large sites, most notably at the Hongshan culture site of Niuheliang in western Liaoning province. A minority of large, rich graves is a characteristic of several sites, such as Dawenkou (Dawenkou culture, Shandong province) and Fuquanshan (Liangzhu culture, near Shanghai).

Travel by boat must have been common on the open seas in addition to rivers and lakes. The Penghu (P'eng-hu) islands between Taiwan and Fujian were first occupied as early as ca. 3000–2500 B.C. On the southeast mainland and on Taiwan, successful ways of life continued for hundreds of years; there were similar late Neolithic cultures, ca. 2000 B.C. and later. Another important Neolithic culture of Taiwan is the Fengbitou (Feng-p'i-t'ou) culture, dating ca. 1500–500 B.C. The Beinan (Pei-nan) slate burials of the east coast (ca. 2500–800 B.C.) have fine jade ornaments and dental evidence for chewing betel nuts, like later peoples in southern Taiwan.

In several areas of the Yellow River and Yangzi River valleys, regional systems of social organization became larger and more structurally complex during the Longshan period (ca. 2600–1900 B.C). Large settlements, some surrounded by earthen walls, appear to have been regional centers. This pattern, coupled with increased nucleation of regional populations, indicates the beginnings of the process of

The Great Wall

Source: Photograph courtesy of Anne P. Underhill.

urbanization. Key sites from this period include Taosi, Wangchenggang, Liangchengzhen, and Shijiahe. Even more labor-intensive forms of prestige goods were produced, and relatively few people had access to them. The most striking example is the famous "eggshell" black pottery stemmed cups, literally the thickness of an eggshell. More research on the economic bases of these regional polities should provide evidence for loci of production and intercommunity exchange of goods, as well as the nature of leadership.

The earliest known state period represented at the Erlitou site in west-central Henan dates to ca. 1800–1600 B.C. During the Erlitou period, metallurgy was mastered. At this time elites preferred to bury bronze drinking and eating vessels with the deceased, rather than fine ceramic wares as previously. During later phases of the early Bronze Age, a number of states developed. The early Shang state became powerful ca. 1600 B.C., and the state expanded over time, with major centers at Yanshi and Zhengzhou in west-central Henan, Daxinzhuang in western Shandong, and the late Shang site of Anyang after ca. 1200 B.C. in northern Henan.

The presence of powerful rulers at these Erlitou and Shang period sites is clear, from abundant skeletal evidence for human sacrifice, bronze weapons, foundations of large palaces, and graves containing hundreds of prestige goods (especially bronze vessels and jades). The most notable is the tomb of Fu Hao, the consort of a late Shang king, known from the oracle bone inscriptions as a military leader in her own right. During the late Shang period, ritual duties,

such as making sacrifices of humans and animals to powerful ancestors, formed a key component of leadership.

Meanwhile, powerful states had emerged in other parts of the Chinese mainland. At Sanxingdui in Sichuan, archaeologists were stunned to find evidence of an independent, and very different, tradition of metallurgy. They excavated ritual pits containing huge bronze heads and entire figures, along with numerous elephant ivory tusks. Archaeologists also found a walled settlement area, indicating a regional center of a state contemporary with the earlier Shang period in Henan province.

The late Shang oracle bone records indicate that warfare was a major concern of kings. Eventually the Shang state was conquered by peoples from further west in the Yellow River valley, establishing the Western Zhou dynasty. The Western Zhou state (1046–771 B.C.) controlled a wide area of the Yellow River valley by means of strong local administrative units. Several Western Zhou sites have been found in southern Shaanxi. Many of the ritual elements of kingship were continued from the Shang, such as burying large quantities of goods with deceased elites who were about to become powerful ancestors. There also is abundant archaeological evidence for smaller, independent states during the Western Zhou period, such as the Yan state located near Beijing.

Eventually, the large Western Zhou state centered in Shaanxi began to disintegrate. During the subsequent Eastern Zhou period (including the Spring and Autumn and Warring States phases, 771–221 B.C.), different states in both north and south China vied for power. Warfare increased in intensity and scale as well as frequency. The period also is known for its technological innovation (including the more widespread use of iron), as different states competed to produce new forms of weapons and prestige goods. During these later phases of the early Bronze Age, increasingly diverse forms of written records were employed. Philosophers and teachers, such as Confucius from the state of Lu in modern Qufu, contemplated the tumultuous era in which they lived, advocating virtuous behavior and social harmony. Contemporary sites from the Chu state in Hubei and Hunan provinces have yielded exquisite wooden and lacquer artifacts.

Meanwhile, an independent Bronze Age culture emerged in Yunnan province. The earliest phases of the Dian culture in western Yunnan developed during the 11th century B.C., and spread to central Yunnan during later phases until the 1st century A.D.

Eventually in 221 B.C., the Qin state conquered all the other warring states, and China's first empire was born. The emperor Qin Shihuangdi attempted to maintain his power by beginning the construction of the Great Wall. Later generations of rulers would order the construction of new sections of the wall. The empire did not last long, as the emperor died in 206 B.C. Parts of his astonishing mausoleum near Xian city have been excavated, yielding the famous pits where hundreds of life-sized terracotta soldiers were discovered—evidently modeled after real people who served the emperor. The location of his tomb is known but remains unexcavated.

For consistency, this essay first cites Chinese names using the pinyin romanization system established in the PRC. In parentheses it provides some equivalent words using the Wade-Giles romanization system that was formerly more common in North America and that has been used in Taiwan. It presents surnames first (such as "Mao"), the convention in both the PRC and Taiwan. References at the end of this essay are listed according to the North American system.

— *Anne P. Underhill*

Further Readings

Cauquelin, J. (2003). *The Aborigines of Taiwan.* London: Routledge/Curzon.

Chang, K. C. (1986). *The archaeology of ancient China.* New Haven, CT: Yale University Press.

Cheng-hwa, T. (1992). *Archaeology of the P'eng-hu Islands.* Institute of History and Philology, Academia Sinica, Special Publications, No. 95. Taipei: Taiwan, R.O.C.

Debaine-Francfort, C. (1999). *The search for ancient China.* New York: Harry N. Abrams, Inc.

Goldstein, M. (1992). When brothers share a wife. In E. Angeloni (Ed.), *Anthropology 92/93 Fifteenth Edition* (pp. 109–112). Guilford, CT: Dushkin.

Harrell, S. (Ed.) (2001). *Ways of being ethnic in southwest China.* Seattle: University of Washington Press.

Liu, L., & Chen, X. (2003). *Early state formation in China.* London: Duckworth Press.

Murowchick, R. (Ed.) (1994). *Cradles of civilization. China. Ancient culture, modern land.* Norman: University of Oklahoma Press.
Stark, M. (Ed.) (in press). *Archaeology of Asia.* Blackwell Publishers.
Underhill, A. (2002). *Craft Production and Social Change in Northern China.* New York: Kluwer Academic Press.

ASIA

On Sunday, December 26, 2004, in the wake of an earthquake in the Indian Ocean ranking 9.0 on the Richter scale, immense tidal waves known as *tsunami* ravaged large sections of Asia and a small area of Africa with little or no prior warning, destroying whole areas and devastating populations. Countries most directly affected by the tidal waves included Indonesia, Thailand, India, Malaysia, the Maldives, Sri Lanka, and Myanmar in Asia and Somalia in Africa. Tourists and visitors from around the globe also lost their lives when the tsunamis swamped beaches, hotels, and tourist attractions in the affected areas. Almost 300,000 people were reportedly killed by the tsunamis, and another 3 million suffered from the destruction of their families, their health, and their livelihoods. A number of individuals and businesses that survived the direct attack by the tsunamis were severely affected by its aftermath. Studying the implications of the tsunamis of 2004 will occupy anthropologists and other scholars for decades.

One of the most interesting anthropological aspects of the 2004 tsunamis will be the examination of the impact of globalization on relief efforts as nations, groups, and individuals around the world complied with the call to help raise the $10 billion needed for relief efforts, as estimated by the United Nations. By March 2005, the United States had committed $350 million to tsunami relief, with plans for an additional $6 million to supplement the initial commitment. The European Commission announced that it had created a reconstruction package for Asia valued at 350 million euro, with 100 million euro targeted for relief in Sri Lanka. New Zealand directed the equivalent of $1.08 million for relief and restoration toward the Maldives. China pledged the equivalent of $153.4 million.

While it might be expected that foreign governments and international aid agencies like the International Red Cross and the United Nations would rise to the call for financial and physical assistance, responses from developing nations, individuals, and groups large and small have also demonstrated the strength of globalization in the 21st century. For instance, Nigerians held a fundraiser for tsunami victims on March 3, 2005, with a goal of raising $20 million. Representatives at the Sri Lankan embassy in China sold jewels to raise money for children orphaned by the tsunamis. In the Netherlands, a group of organizations contributed the equivalent of $240 million to Asian tsunami relief. In the Canadian city of Vancouver, members of a Buddhist congregation planned to sell their temple to raise $1 million for tsunami relief.

Those who assisted tsunami victims spanned all nationalities, races, ethnicities, ages, social classes, and religions. Churches of all faiths donated to tsunami victims without asking the faith of those who would receive assistance. Celebrities around the world staged benefits, and schoolchildren sold lemonade, held bake sales, and broke open piggy banks to assist in tsunami relief. Teams of doctors, nurses, and other trained personnel traveled to the area to assist survivors, while teams of volunteers worked tirelessly to identify remains of those who did not survive.

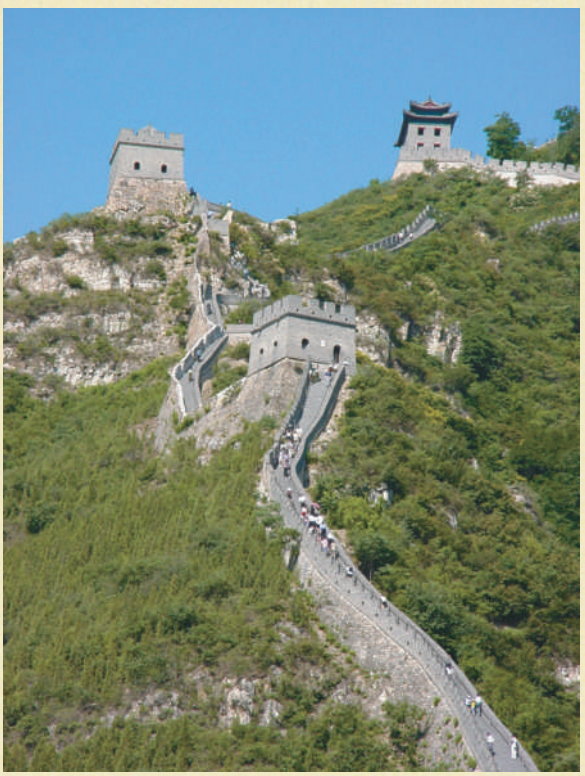
In addition to the body of research that cultural anthropologists are expected to contribute on issues arising from the 2004 tsunamis, archaeologists are involved in examination and analysis of new discoveries uncovered by tsunami waves. For instance, the Archaeological Survey of India undertook efforts to locate ancient temples after residents observed these relics before they were again covered by water. Archaeologists subsequently discovered an ancient temple on the southern coast of India that is thought to be part of Mahabalipuram, a mythical Hindu city. Other relics have also been discovered on the coast of Tamil Nadu. The tsunami discoveries were presented at an international seminar on maritime archaeology in March 2005, in New Delhi, India.

— Elizabeth Purdy

GREAT WALL OF CHINA

The Great Wall of China has been described as being like a giant dragon snaking its way across northern China. From east to west it runs across mountains, valleys, and bodies of water for approximately 4,163 miles (6,700 kilometers). Although there are roads that are longer, the Great Wall is the longest structure ever built by humans. It is visible to astronauts from earth orbit.

The Great Wall starts on China's east coast at Shanhaiguan, which is a town near the city of Qinhuangdao. It ends in western China close to the town of Jiayugun. It was built to defend China from invasions by tribes from Mongolia and Siberia.



Anthropologists include the Great Wall in the study of ancient cultures, or prehistorical human life, because the date and place for the beginning of its construction are unknown. Probably, it was begun at least 2,400 years ago during the Spring, Autumn, or Warring States periods of Chinese history. Successive dynasties built, expanded, or ignored it until around 400 years ago.

At first, parts of the Great Wall were built in different Chinese states. After northern China was unified, parts of the wall were tied together. Later dynasties extended and expanded the wall.

The main part of the Great Wall is about 2,150 miles (3,460 kilometers) long. In addition, the side branches total another 1,800 miles (2,900 kilometers). On average the wall is 25 feet (7.6 meters) high. The bottom of the Great Wall is usually 25 feet (7.6 meters) wide. The top is a road paved with brick or stone usually 15 feet (4.6 meters) wide, where soldiers would stand to fight. Its watchtowers are usually 100 to 200 yards apart (90 to 180 meters).

The Great Wall is a testimony to human abilities to build and to wage war. The human cost for building the Great Wall was very high. Men from many families were drafted to work on the wall. Many died during their labors and were buried inside the wall. Today, parts of the Great Wall have been lost to erosion. Some sections have been rebuilt by the current government. The bulk of it was rebuilt and expanded during the Ming Dynasty and is now serving as a major tourist attraction. In 1987 it was listed as a World Heritage site by the United Nations agency, UNESCO.

— Andrew J. Waskey

PERU

Archaeology in the South American country of Peru has an extensive history that has uncovered the development of the largest native state to evolve in the Western Hemisphere, the Inca. The material representations of the Inca include monumental architecture, and ceramics and metallurgy craftwork from nearly a dozen separate and distinct cultures, each with their own history in half a dozen countries, all of which eventually came to be ruled by the Inca.

To uncover the prehistoric development of Peru, extensive cultural and archaeological research has been undertaken. The father of archaeology in South America is Max Uhle. Uhle has more time and research devoted to South American archaeology than any of his counterparts and was the first archaeologist

to embark on significant excavations in Peru. Contributions by other pioneering archaeologists like John H. Rowe, Walter Alva, and Julio Tello have helped to decipher the chronology of the region. They have also contributed to a prevailing attitude of cultural pride and patrimony, which has further enabled the exploration and interpretation of the rich history of Peruvian culture. This movement has led to native peoples' retention and retrieval of many of the collected artifacts. Today there is an international moratorium on the sale of pre-Columbia art that, if violated, can include incarceration and financial penalties.

Despite the renowned accomplishments of the Incas, they were not the first complex civilization of the region as their creation myth suggests. For example, on the shores of Lake Titicaca, the Tiwanaku culture flourished before the Inca found their capital in ruins. An obvious predecessor in specialized craftwork, Tiwanaku was home to monumental *stelae* or carved stone. Pachacamac at the mouth of the Rio Lurin and Chan, and the Chimor capital at the mouth of the Rio Moche, were also great cities the Incas could not claim. However, they all have cultural beginnings that reach back to the initial peopling of the continent. The oldest archaeological site in the region is Monte Verde. It is dated to 12,500 RC (14,800 BP). However, these dates are highly contested. If they are correct it would mean the human occupation of South America is pre-Clovis. There are more than a dozen dates from this site and evidence of a successful hunter-gatherer lifestyle. Though Monte Verde is not fully accepted by the scientific community, there is a well-established chronology for development after the initial inhabitation of the continent.

Lithic Period: 10,500 B.C.–3500 B.C.

The Lithic Period (10,500–3500 B.C.) is characterized by hunting and gathering in the highlands and fishing on the coast. Sea levels had stabilized at this point and climatic conditions were similar to the present. Four distinct traditions typified the life-ways of Peru's inhabitants and their material developments.

The Northwest Tradition extended south to the Rio Piura and Chira. Rock was scarce in the region, so bone was used to make fishing implements. Some stone tools, such as axes, were found at the site of Las Vegas, where there is evidence of long-term settlement. The site had more than 30 camps and a trash midden that was 1 meter deep. The midden was later used as a cemetery and contained 192 secondary burials. Use of land animals, such as deer, is apparent, as is the evidence for bottle gourd cultivation. Las Vegas is 3 kilometers from the coast, but fish and mangrove mollusks from the sea have been found there.

The Paijan Tradition stretched along the coast from Rio Omo and Santa, and was defined by long, slender projectile points, which were likely mounted on the hollow shafts of cultivated reeds and used as fishing spears. More than 4,500 artifacts were recovered from La Cumbre located on the north side of the Moche valley. This site included the typical foliate bifaced projectile points and side scrapers that were notched or denticulated.

The Central Andean Tradition persisted from the region of the Rio Santa to Chile and Argentina. It consisted of adaptations to deal with the diversity of the puna, the sierra and the coast. Sites of this tradition often contain willow-shaped projectile points. Pachamachay Cave,

Source: © iStockphoto/Dan Brandenburg.

which is located 10 kilometers from Lake Junin, at an elevation of 4,300 miles above sea level, has a faunal assemblage that is 97% camelids, likely vicuna. Vicunas are the wild ancestors of llama. This site included two phases. The first phase consisted of mobile hunter-gatherers and the second phase showed evidence of a longer, year-round occupation.

The Atacama-Maritime Tradition consisted of coastal fisher-folk with some leaf-shaped projectile points and stubby harpoon points. The south coast Ring site, located near the Rio Moquegua, shows evidence of year-round occupation. It contained a central plaza with a midden of shellfish that is 2 meters deep. Farther south, skeletal remains were recovered at the Asia site. Chemical analysis of these remains indicated a diet of 90% seafood.

The Chinchirro mummies are also found in this region. Dating from 8000 BP–3600 BP, 250 mummies in a life-like state of preservation were recovered. Removing the skin to reinforce the joints with reeds and fill the bodily cavities with grasses and wool created the Chinchirro mummies. Then the skin was replaced and sewn together. The mummy was fitted with a clay-modeled facemask and a wig. There is evidence, by way of repairs to parts of outer wrappings, that mummies were taken out and paraded during special ceremonies. Ancestor veneration is believed to be important during this time.

Preceramic Period: 3500 B.C.–1800 B.C.

Following the Lithic Period, Peruvian culture ventured into organized labor and agricultural development. The Preceramic Period (3500 B.C.–1800 B.C.) was characterized by increased sedentism, monument building and the tending of cultigens, especially industrial botanicals. There are four building traditions found in this period.

Complexes constructed in the Plaza Hundida Tradition had sunken courts that were large, flat-bottomed pits lined with masonry. Stairways in and out, on opposing sides, suggest that they were employed for ritual processions. Early in the period, these sunken courts were circular in form, but evolved into rectangular construction. They were often placed in front of larger platform mounds. Sites that have this style of architecture include La Galgada, Salinas de Chao, Piedra Parada, and Caral.

The Kotosh Tradition was sometimes combined with the Plaza Hundida Tradition. The detached, one-room sanctuaries of the Kotosh Tradition were meant to accommodate a small congregation of people and were probably employed by religious leaders for private ceremonies. They contained central hearths from which burnt offerings have been recovered, and only one entrance. Many of these structures had carefully plastered floors, wall friezes, and ornamental niches, which were built into the walls. At the site of Kotosh, two of these structures flanked two large platform mounds, which reflect the dual moiety religious tradition of the region.

The Supe Tradition was responsible for the largest pre-pottery monuments located along the coast from Rio Chicama to Rio Chillion. At sites such as Huaca Prieta and El Pariso, flat-topped mounds were constructed as stages for ritual display. It is clear by their placement that large audiences attended events there. Several communities linked by religious or fictive kin organizations built some of these platform mounds. The Aspero site had 11 small mounds, two large mounds, and six major platforms. The two large mounds are called Huaca de los Idolos, where a cache of broken ceramic figurines was discovered, and Huaca de los Sacrificios, where two burials were discovered.

El Pariso is the type-site for the Paraiso Tradition with the largest pre-pottery masonry monument. Over 100,000 tons of stone had to be quarried to build nine complexes over an area of 58 hectare in the Chillion Valley. Dates from this site suggest that construction began around 200 B.C. and was continuous until 1800 B.C. At El Pariso, there were two elongated mounds that form a u-shape, with a central plaza. The central plaza had a sunken floor and was surrounded by a bench structure. There were also four circular pits with food remains that included seafood, jicima, fruits, achira, squash, and industrial cultigens.

Initial Period: 1800 B.C.–600 B.C.

The Initial Period (1800–600 B.C.) was characterized by an increase in monument building, settlement, farming and canal building for irrigation. On the coast, the Pariso Tradition of u-shaped monuments continued with an initial increase in the size of the constructions. However, around 900 B.C., a drought caused many of the coastal sites to be abandoned. The dual moiety organizations of Pacha Mama and Father Apus seems to heighten the importance of familial ties at this time.

Monument construction also increased in the highlands, although the ceremonial centers were on a much smaller scale. The domestication of camelids allowed the higher elevations of the Andes to be occupied, and herding replaced hunting. This period marked the beginning of production for utilitarian and painted ceramics.

Early Horizon: 600 B.C.–200 B.C.

The Early Horizon (600 B.C.–200 B.C.) was dominated by development at Chavin de Huantar and the Yaya-mama culture of the Lake Titicaca region. The Chavin site began around 800 B.C. and consisted of a large residential area located at an elevation of 3,177 meters above sea level, at the confluence of the Mosna and Wacheska streams. From 500 to 400 B.C. the prosperity of the city allowed the population of Chavin to double. It doubled again from 400 to 200 B.C., and consisted of up to 3,000 residents.

Chavin had far-reaching influence evident by the spread of iconography of anthropomorphic animals, which smiled and snarled, as well as dual staff god motifs. Other accomplishments during the florescence of Chavin included the innovation of heddle-weaving textiles of cotton and wool, as well as tie-dye and batik designs. Metallurgy was revolutionized at Chavin when gold was alloyed with copper and silver. The strength of this metal allowed for three-dimensional sculptures. This practice excelled in northern Peru.

From 400 to 200 B.C. there was a drought, and evidence suggests that people who lived closer to the ceremonial centers suffered less and ate better. This caused a separation of the social classes and the *kuraka* elites began to emerge. This is also evident from elaborate burials found on the coast and dated to this horizon.

Early Intermediate Period: 200 B.C.–600 A.D.

The Early Intermediate Period (200 B.C.–600 A.D.) is characterized by developments in farming and herding, as well as the rise of the politically complex culture of the Moche. Fortified villages emerged, and ceremonial centers outnumbered residential areas. The kuraka elites controlled governance and claimed special descent from founding figures. This system required extensive ancestor veneration practices. Gallinazo pottery marked the beginning of this period and gave rise to the Moche styles.

During this period, the Moche practiced central governance from the capital of Cerro Blanco. Two enormous platform mounds were erected 500 meters apart. Huaca de la Luna and Huaca del Sol contained very rich burials. Residential and special craft production buildings were constructed between the monuments. Moche life is well depicted in their polychrome and variously molded pottery styles. Stirrup spout portrait pottery vessels are so numerous that full storerooms in Peruvian museums are filled with the unique examples of realistic facial replications, even of the sick and disfigured.

The richness of Moche craftsmanship is exemplified by a monument found near the village of Sipan, which is 420 meters (680 kilometers) northwest of Lima. Walter Alva was able to excavate three royal tombs here, which had not been looted. One of the burials, the Lord of Sipan, was a warrior-priest, and he was found fully clad in his formal regalia of gold, silver, and turquoise. Ceremonial knives, goblets, and pottery filled the tomb and led to a more extensive understanding of the Moche elite.

Middle Horizon: 600–1000 A.D.

The Middle Horizon (600–1000 A.D.) is characterized by the fall of the Moche and the rise of the Huari and Tiwanaku. This horizon had weather extremes of flooding and drought. El Nino patterns debilitated the Moche irrigation systems and moved massive sand dunes across many of the farming fields. The Moche capital was abandoned, and iconography at the huacas was replaced with staff god motifs. Sites that were still occupied showed evidence of a new obsession with storing food. A new strain of maize was present. There were rows of storage facilities at Pampa Grande, in the north, which became a new capital.

The cultures of the Tiwanaku and the Huari continued to evolve during this period. The site of Tiwanaku still has pieces of the elaborate gateways that were constructed there. The "Gateway of the Sun" has incised frieze decorations of the "Gateway God," which is holding staffs of obvious Chavin influence. Tiwanaku culture appeared to be more conservative than the Moche. However, they excelled at ridge field agriculture and long distance trade. Great llama caravans moved textiles and ceramics beyond the Tiwanaku political sphere.

The Huari bordered Tiwanaku territory, but relations appeared to be peaceful. The Huari even erected a colony on top of the mountain Cerro Baul, which is in Tiwanaku's region. The Huari excelled at terrace farming and building irrigation systems. They were able to export their political ideas, as well as their iconography, by sending materials to build irrigation systems in other communities. The Huari staff god held ears of corn for his staffs due to the extreme importance of maize agriculture at this time.

Late Intermediate Period: 1000–1476 A.D.

The Late Intermediate Period (1000–1476 A.D.) is characterized by a decline in precipitation and another drought that lasted until A.D. 1500. Pastoralism increased at this time, and desert farmers began digging sunken gardens. Continued El Nino events devastated farming communities and contributed to a population decline. The beginning of the Inca culture is seen in the Killke culture of the northwest Cuzco Basin and in the Lucre culture of the southwest. The spread of corporate style ceramics from these regions is evidence of Inca hegemony starting to flourish.

The central and north sierra populations tried to resist Inca control. However, on the central and south coast, the Ichma allied with the Inca to defeat the Chimor. The Chimor capital of Chan Chan controlled 1,000 kilometers of coastal territory and aggressively contested Inca encroachment.

Late Horizon: 1476–1532 A.D.

The Late Horizon (1476–1532 A.D.) began with the rise of the Inca and ended with the arrival of Francisco Pizarro and his conquistadors in 1532. Before the Spanish arrived, the Inca had successfully controlled most of the region with statecraft unrivaled in South American history. The Inca only consisted of approximately 40,000 elites, but they conquered and controlled regions of the Peruvian Andes and Pacific coast for over 5,500 kilometers.

The Inca organized a cargo system, and annual ritual events were held. Ancestor veneration continued as the central religious organization. This incorporated a list of revered deities to be worshipped, such as Inti, the sun god.

The Inca instated a three-way tax system to control the people of the region. They employed *mit'a* labor, or labor tax to continually erect and repair their monuments. On the agricultural front, they allotted farming families three separate plots of land to be tended, one each for the gods, the government, and family. Inca subjects were also made to pay tribute with fine textiles. Colors and decorations on textiles denoted their origins. Considered the navel of the universe, 40,000 people populated the capital city of Cuzco, but over 200,000 people lived outside of the city and supported it with their labor and taxes.

The region from Ecuador to Chile was known as Tahuantinsuyu to the Inca, or the Land of Four Quarters. Unfortunately, when Francisco Pizarro and the Spanish arrived in 1532, the Inca world was already in a state of upheaval. Millions of Inca and their subjects had succumbed to Old World diseases, especially smallpox. The death of the last Pre-Hispanic Inca emperor, Wayna Capac, had initiated a quarrel over the rightful inheritance of his position, and a civil war between Tumibamba, in the north, and Cuzco was under way. Medical historians have traced the first appearance of smallpox in the New World to Mexico in 1520. The disease traveled faster than the conquistadors that carried it.

This was the main contributing factor to Pizarro's victory. Despite the fact that he commanded only a few hundred men, he was able to dominate the Inca in very little time. Pizarro and his conquistadors kidnapped, ransomed, and finally murdered Atahualpa, one of the rulers that claimed kingship. This enflamed the Tumibamba-Cuzco civil war, and temporarily allied the Spanish with the Tumibamba.

Metallurgy, the extraction and mixing of natural metal ores, was so well-developed in the Inca state that when the Spanish reached Cuzco, conquistadors recording the events were in disbelief at the magnitude of riches, gold, silver, and precious stone that were encountered. Cuzco was said to be the home of the Inca sun god, Inti. The elaborate rooms of gold with rows of metallic maize, llamas, and shepards dedicated to Inti were so incredible that the conquistadors believed their homeland would think their accounts false. The riches that were taken after Cuzco was captured allowed for more conquistadors to come to Peru. Imported plants and animals brought diseases and took land from native resources. The degradation of the native people, land, and animals ensued.

— Jackie L. Orcholl

Further Readings

Bahn, Paul G. (Ed.) 1999 The Cambridge Illustrated History of Archaeology. Cambridge: Cambridge University Press.

Burger, Richard 1995 Chavin and the Origins of Andean Civilization. London: Thames and Hudson.

Fagan, Brian M. 1998 People of the Earth, 9th Edition. New York: Longman.

Keatinge, R. W. (Ed.). (1998). *Peruvian prehistory: An overview of Pre-Inca and Inca Society*. Cambridge: Cambridge University Press.

Kirkpatrick, S. (1992). *Lord of Sipan: A true story of Pre-Inca tombs, Archaeology, and Crime*. New York: William Morrow & Co.

Mosley, M. E. (2001). *The Incas and their ancestors*. London: Thames and Hudson.

Quilter, J. (1989). *Life and death at Paloma: Society and mortuary practices in a preceramic Peruvian village*. Iowa City: University of Iowa Press.

Tainter, J., Renfrew, C., Ashmore, W., Gamble, C., & O'Shea, J. (Eds.). (1990). *The collapse of complex societies (new studies in archaeology)*. Cambridge: Cambridge University Press.

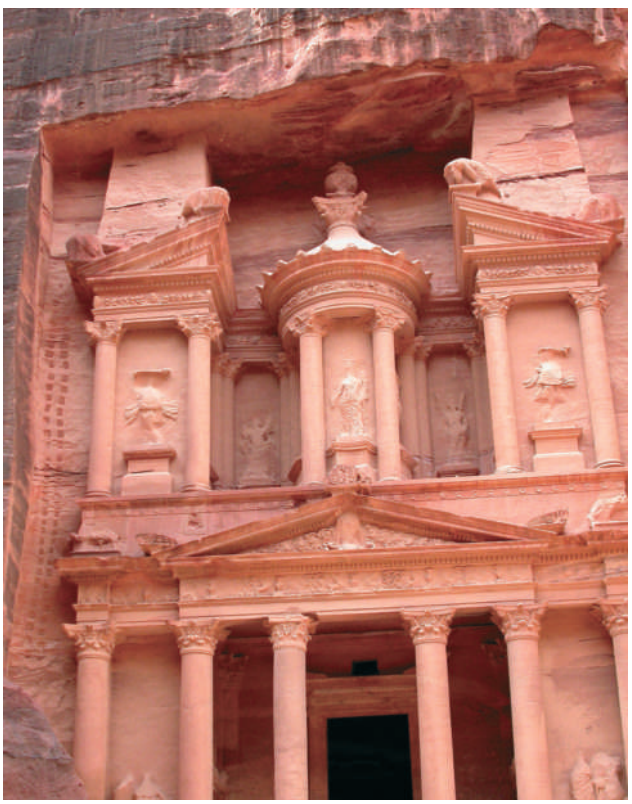
Petra

Ancient Petra (Greek: "rock"), located in the southeast corner of modern Jordan, was the capital of the Nabataeans, and later, a provincial capital of the Roman and Byzantine Empires. Today, Petra is one of the most popular tourist destinations in the Middle East.

Petra is situated in a valley bordered by mountain ridges on its east and west sides. The Siq, a narrow channel through the eastern mountain, forms the site's traditional entrance and is today the gateway tourists use to visit the site. Because water is always a scarce resource in Jordan, Petra's inhabitants managed the city's water supply using a sophisticated system of channels and cisterns to deliver water from two nearby springs to the city's cisterns.

Archaeological evidence and Classical period historical sources help reconstruct Petra's 9,000-year history. Small Neolithic settlements, such as Beidha, dot the region and attest to the region's early agricultural history. Starting around 800 B.C.E. in the late Iron Age, the Edomites of Biblical fame established a village (Umm al-Biyara) on one of the high plateaus that guard the site. Petra saw a dramatic increase in settlement with the arrival of the Nabataeans from south Arabia in the late 4th century B.C.E. As the Nabataean capital, Petra was the center for an extensive spice trade that began in Arabia and stretched west to Palestine and north to Syria. Despite Pompey's success in conquering Petra in 63 B.C.E., the Romans permitted the Nabataeans limited autonomy in their political affairs. Many of Petra's architectural splendors were constructed at this time, namely, the tomb facades that line the city's cliff faces such as al-Khazneh (the Treasury) and ad-Deir (the Monastery).

In 131 C.E., the emperor Trajan annexed Nabataea onto the Roman Empire, making Petra the capital of a new province, Arabia Petraea. Under the empire, Petra continued to flourish: a colonnaded street, a theater, and other civic and religious institutions were installed. The Empire's conversion to Christianity occurred in 313, and the religion's popularity soon spread to Petra, where multiple churches were established. Under the Byzantine Empire, Petra thrived as the seat of a bishopric, despite a devastating earthquake in 363 that destroyed half the city. A shift in



Source: © iStockphoto/Mary Lane.

trade routes and a second, even more devastating earthquake (in 551), led to a commercial decline and a dwindling population. Petra was eventually abandoned soon after Islam's introduction into the region in the 7th century. Aside from a Crusader fortress on the city's edge, settlement was limited to seasonal encampments of pastoral nomads until the early 20th century.

Petra was lost to Western visitors until 1812 when the Swiss explorer J. L. Burckhardt reintroduced the site to European audiences. Western explorers with more in-depth investigations of the ancient site followed Burckhardt. Scientific investigations of Petra began slowly after World War I, and increased rapidly after World War II, when Jordanian and foreign archaeological teams established projects throughout Petra. Sites were excavated not only to better understand the societies of their original architects, but also to rehabilitate buildings for presentation to public visitors. As a result, Petra attracts more than 1 million tourists a year, making it among the most visited antiquity sites in the Middle East.

— Benjamin W. Porter

Further Readings

Joukowsky, M. S. (Ed.) (2002). Petra: A royal city unearthed. *Near Eastern Archaeology, 65*(4).

Markoe, G., et al. (2003). *Petra rediscovered: Lost city of the Nabataeans.* New York: Harry N. Abrams.

McKenzie, J. (1990). *The architecture of Petra.* London: Oxford University Press.

Petroglyphs

Petroglyphs are a subset of the general category of rock art or rock graphics, which also includes pictographs and geoglyphs. Petroglyphs (petro-rock, glyph-carving) are man-made images or a series of geometric patterns that are carved, pecked, chipped, or abraded into stone using crude hand-held implements such as rocks, bones, antlers, and a wide variety of other objects as a chisel. Pictographs are created by painting on a rock using pigment materials such as charcoal, ash, lime, iron oxides, and ocher. The minerals were ground into fine powders and mixed with a variety of locally available substances such as animal blood, resins, fats from animals, or seed to form a binder. Evidence of pictographs in open areas has disappeared due to weathering and erosion, but some have survived in protected areas such as caves, overhanging cliffs, and shelters. Geoglyphs are large surface images made by arranging rock debris or scraping away the surface area to reveal the underlying subsoil or rock surface to form the outlines of animals and human-like figures.

Found all around the world on a wide variety of surfaces from the desert varnish of basalts of the American Southwest to the glacier polished sandstones of the Alps, the common method of chipping on petroglyphs is to remove the outer weathered patina of the rock to reveal the usually lighter colored surface beneath. Rock that is very hard or contains an abundance of quartz is less suitable than softer limestones and other sedimentary rocks.

The images created on the petroglyphs vary from abstract combinations of straight, parallel, and wavy lines, crosshatches, diamonds, circles, dots, and zigzags, to anthropomorphs displaying human representations of stick figures and others with elaborately outfitted clothing and headdresses. Other graphics are zoomorphs, or animal figures. Like anthropomorphs, they vary from simple stick figures to complex scenes, and stylized figures with much detail. They differ depending on the location and animal life peculiar to the local environment, and from continent to continent.

Unlike hieroglyphics, petroglyphs are generally not a language but are images that record events, serve as historical markers, depict people and their tools and weapons, label geological formations such as springs, represent spiritual being and other mythical or magical beliefs, or serve some ritualistic purpose. Interpretation of many are yet to be categorized and their meanings to be determined.

Petroglyph sites provide a method of dating by a process of association with artifacts found in the surrounding area, for example, artifacts in campsites, villages, and hunting and food processing areas. On the petroglyph itself, dating can be accomplished by identification of the subjects, weapons, tools, style analysis, and any other objects depicted.

Petroglyphs are found worldwide with images peculiar to each region. Major concentrations appear on all the continents, but in particular in the American Southwest, Hawaii, Easter Island, South

Source: © iStockphoto/Jenni Morgan.

Africa, Middle and South America, England and Scotland, Europe in the Alps, France and Italy, and in Asia (China and Pakistan).

From early times to the present, petroglyphs present evidence that human beings utilized their surroundings to draw symbols and pictures to express their need to communicate ideas to their fellow man.

— *Paul A. Young*

Further Readings

Arnold, C. (1996). *Stories in stone: Rock art pictures of early Americans.* Boston, MA: Clarion Books.

Moore, S. (1999). *Petroglyphs: Ancient language/sacred art.* Santa Fe, NM: Clearer Light.

Whitley, D. S. (Ed.) (2001). *Handbook of rock art research.* New York: AltaMira Press.

Peyote Rituals

Peyote (*Lophophora williamsii*) Cactaceae is a spineless cactus that is native to central and northern Mexico and to the Rio Grande Valley of the southwestern United States, and that is used in ceremony among participants of the Native American Church. When prepared correctly, peyote is a hallucinogenic drug, or a chemical substance that distorts the senses and produces perceptions of experiences that depart from reality. The top portion of the root of this greenish/gray cactus is cut and sun dried into "buttons" for consumption during a peyote ceremony. The dried button is ingested by mouth by being dampened with saliva and then swallowed. Mescaline and other biologically active compounds or alkaloids give peyote its hallucinogenic properties. Doses range from four to 30 peyote buttons consumed during a peyote ritual, followed by hallucinations that grow in intensity three hours after ingestion. People report experiencing auditory, olfactory, and tactile hallucinations, an altered perception of time, and weightlessness. Historically, this plant was used as early as 2,000 years ago and early accounts from Spanish conquistadors reported their amazement at the powerful magic this plant possessed in inducing visions and for visioning of the future. During the 16th century the Chichimeca of Mexico consumed it before going into battle for courage and to have strength to fight their enemies. The Spanish sought to eliminate the use of peyote in an attempt to "civilize" the native populations; these efforts drove the use of peyote, along with its spiritual beliefs and practices, underground. Many of the specifics of peyote ceremonialism are strongly protected by the native people who continue to practice it today.

Among the practicing Peyotists or individuals who "follow the peyote road" are the Tarahumara Indians of the Sierra Madre Occidental of Mexico, who collect the peyote buttons for use and distribution to tribes in neighboring regions. The peyote religion spread in the United States in the 1900s around the turn of the century during the decline of the Ghost Dance, and subsequently became popular in the Southwest and Midwestern regions. The members of the Native American Church combine traditional ritual practices

with the belief in the Holy Trinity. The major precept of the religion is that God is a Great Spirit and Jesus a guardian spirit; however, beliefs vary considerably from tribe to tribe. Some see Jesus as a Native American culture hero while others believe in Peyote personified as God. The quarter of a million members value brotherly love, honor, trust, and the golden rule. They also incorporate some of the Ten Commandments, such as no adultery and divorce, and are especially adamant about abstinence from alcoholic beverages.

While these convictions are similar Christian doctrines, the ritual is uniquely Native American. Normally, the ritual begins at 8:00 p.m. on a Saturday and continues throughout the night and ends with a communal breakfast on Sunday morning. The belief is that the consumption of peyote allows for communion with the gods and the deceased, as well as giving power, guidance, and healing. The Ritual Chief, or Roadman, administers peyote to the congregation while peyote music, which often deals with subjects from the Bible, is sung in the background. The cult incorporates the use of feathers and rattles, bone whistles, and drumming as part of the ceremonial custom.

In the late 20th century, two Native Americans were dismissed from state employment because of their participation in the "drug cult." The Supreme Court ruled against the right to use a controlled substance regardless of the religious context. However, Baptist, Catholic, Episcopalian, Jewish, Mormon, Methodist, and Muslim religious groups, as well as the American Civil Liberties Union, joined together to lobby Congress to pass the Religious Freedom Restoration Act. This was passed in 1993 and limits the government from intruding upon religious practices, which subsequently allowed the Native American Church to practice without interference.

— *Luci Fernandes*

See also **Religious Rituals**

Further Readings

Balick M. J., & Cox, P. A. (1996). *Plants, people, and culture: The science of ethnobotany.* New York: The Scientific American Library.

Davis, W. (1988). Hallucinogenic plants and their uses in traditional societies. In A. Podolefsky & P. J. Brown (Eds.), *Applying anthropology*. CA: Mayfield Publishing Company.

Farlax Inc. (2004). *Native American Church.* TheFreeDictionary.com. Retrieved May 19, 2005 from http://encyclopedia.thefreedictionary.com

Garbarino, M. S., & Sasso, R. F. (1994). *Native American heritage.* IL: Waveland Press.

Oswalt, W. H. (2002). *This land was theirs: A study of Native Americans.* New York: McGraw Hill.

Philosophy, Dynamic

Throughout the history of Western thought there have been key thinkers who have approached the world through a *process view*. The idea is that the world is constantly changing, both on its own and as people interact within it. These changing interactions and our understanding of reality and knowledge can collectively be called *dynamic philosophy*. Philosophy covers a range of subjects from metaphysics (the study of what exists) to epistemology (the study of knowledge) to ethics (the study of what is right). The reach extends to nearly every academic discipline, with specialized fields like psychology, natural science, and even comparative literature being rooted in philosophy. The dynamic aspect emphasizes the way the world evolves: how people affect and are affected by the world, how societies develop, how nature itself never stands still but is a continuing series of births and deaths—as Darwin identified, evolution. Anthropology has been influenced profoundly by this dynamic, or process, approach.

Ancient

The ancient Greek philosopher Heraclitus (6th century B.C.) is known for the saying, "You can't step into the same river twice." Change, he felt, was the one constant in life, the one guarantee. As a moment in time passes, a river is no longer the same, the water moving as it does in a flowing current from one place to another. People change as well, aging imperceptively from one moment to the next. Stepping into a river may not seem to be a life-altering event but the person is different nonetheless, because his experience has been enriched from the first step. Other pre-Socratic philosophers (the ancient Greeks prior to the time of Socrates, 469–399 B.C.) believed that such

elements as water (Thales of Miletus, 620–546 B.C.) and air (Anaximenes, 585–524 B.C.) were the underlying forces behind all life. Heraclitus lauded change, however, with the understanding of an underlying *logos,* or steadfast principle of reality that directs all things. The world in this view is in constant motion, but it is not chaotic; there is an order to the universe, even in strife, struggle, and what appear to be opposing forces or tensions.

The Roman poet Lucretius (99–55 B.C.) was a follower of Greek philosopher Epicurus (340–270 B.C.). The two men believed that change was essential to existence and that reality consists of an eternal collection of tiny atoms that move and change form to create the worlds, beings, and objects we recognize. Gods are not necessary and if they exist, they have little to do with the goings-on of humanity. When people die their atoms dissipate and return to the earth in a different form. Lucretius expressed these and other views in his epic Latin poem, *On the Nature of Things.* Unsurprisingly, he was influenced by tumultuous political times. He saw humans as being ruled by passions and hungers, but felt that they could control these urges through knowledge and cooperation. People could determine how to live their lives in a changing, adaptable way, rather than being locked into whatever was dictated by divine command.

Early Modern

Such theories fell out of fashion for several centuries during the Middle Ages and the spread of Christianity across Europe. Gottfried Wilhelm von Leibniz (1646–1716) was a German mathematician and philosopher who posed a different view of God than the anthropomorphized, omniscient, omnipotent God envisioned by the Roman Catholic Church. Like the atomists, Leibniz proposed that all existence was contained in individually moving, microscopic beings, or monads, and he saw God as the harmony that exists between their movements. This idea is different from that of his contemporary, Baruch Spinoza (1632–1677), who claimed that one underlying substance presented itself in individual beings by accident. For Leibniz the arrangement was no accident, but rather the harmonious effort of the independent monads, each empowered with its own intelligence.

There is debate as to whether Leibniz or Isaac Newton (1642–1727) was the first to develop modern calculus, but Leibniz's influence on the sciences can be witnessed unquestionably in the concept of feedback. In engineering, for example, feedback is information that is collected as input and programmed into a device to generate a consequent output. Rather than a static flow of information in one direction, feedback allows the cycle to continue in what could be described as a dynamic process. Similar implications are felt in anthropology, such as economic systems and biological evolution that responds and shifts direction according to an interactive flow of information. In a lay sense, feedback can inform the decisions made by individuals and groups of people—and ultimately the development of societies. Leibniz's monadic system of independently functioning, intelligent units contains this element of interaction at its core.

19th Century

The capacity for reaction was central to the philosophy of G.W.F. Hegel (1770–1831), who saw world history as a continuous series of unfolding events, each responding to recent actions in an attempt to improve upon the flaws. Politically, the implications of this theory would explain reactionary movements in which an extreme approach to social policy inspires an extreme swing toward the opposite direction by the next generation. Totalitarianism prompts a desire to protect individual freedoms; an extremely liberal society is met with a return to traditionalist values. In a complicated and challenging application to metaphysics, Hegel proposed that existence requires an infinite interaction between the extremes of abstract idea and individual will, like an eternal pendulum swinging between thesis and antithesis in search of balance and pure harmony, or the synthesis of ideas. This dialectic approach influenced generations to come, including fellow Germans: Ludwig Feuerbach (1804–1872), who emphasized the connection between human needs and a desire to believe in God; Bruno Bauer (1809–1882), who interestingly abandoned his early "right" political thought for a later "left" movement; and Karl Marx (1818–1883) in the beginning of his paradigmatic political career.

Marx is known for his economic theories and his famous call to working men to unite in revolt against the wealthy, opportunistic *bourgeoisie* (the capitalists who, by definition, exploit and abuse the working class). His is a dynamic philosophy particularly because of the emphasis on struggle, but also because

he was not satisfied merely with studying the world; he wanted to change it. Marx accepted the dialectic Hegel proposed but rejected the idealist application of intellectually moving toward the abstract "real." Life is material, and Marx's application confronted materialism head-on, seeing human choices and confrontations as a result of the world rather than the world as a construction of the human mind. Marx believed that humans are not merely products of a pre-established biological blueprint, but rather, they adapt and respond to the events and circumstances of their world.

Friedrich Nietzsche (1844–1900) saw the world as founded on a type of creative energy in all matter and all living things, which he called "the will to power." This will is beyond the desire to survive and preserve one's own life; rather, it is the underlying influence that Nietzsche believed could explain all behavior and events in nature. Nietzsche detested what he called "slave morality" and the constraints imposed by the Christian view that God (and the afterlife) should be the human focus. In his series of parables in the collection *Thus Spake Zarathustra* (1885), Neitzsche showed how the *Übermensch* or "overman" could free himself from his chains by overcoming traditionalist strongholds by denouncing the old-world ideas of God and focusing on his own life, in the present, to construct his own set of morals and ideals (thus the often-misunderstood phrase, "God is dead"). Again, like Hegel's dialectic, there is a dynamic exchange as the slave becomes his own master, harnessing the power of his will. Nietzsche presented the overman as the ultimate state from which early "human" apes were transitioning as a spiritual journey with implications for ethics, politics, and religion.

A literal evolution from ape to human was proposed decades earlier by Charles Darwin (1809–1882), who in *The Origin of the Species* (1859) presented the concepts that would forever change science, philosophy, and every field in between. Having observed fossil patterns that indicated change across generations in both plant and animal species, Darwin proposed his theory of biological evolution whereby modern humans could be traced as descendants of other animals. This undermined the authority of the Church which for centuries had taught that man and woman were direct creations of God in God's image. If humans evolved from apes, then the implication was that God's image was that of an ape or earlier animal—amphibian, fish, or even insect. If an ape is clearly inferior to humans, then evolution seemed to propose God's image as a creature less developed than *homo sapiens.* Darwin's theory of evolution was met with exactly the reactionary social dynamics Hegel and others had identified. Darwin began his studies as a natural scientist observing sea life and South American vegetation. Perhaps due to sensitivity toward the impact such claims would make, Darwin took years to expand his observations to the point of including humans within this potential to evolve. Nevertheless, change was integral to life, Darwin argued, both in common descent through evolution and the concept of natural selection. Because nature is dynamic, certain traits can prevail or be repressed. Weaker species eventually die out or become stronger through adaptation. Darwin's theory makes use of Leibniz's concept of feedback as the world and the beings within it constantly interact, compete, learn, and evolve.

Darwinism often is reduced to "survival of the fittest," a phrase actually termed by English philosopher Herbert Spencer (1820–1903). Spencer's work established evolutionary change as the foundation of the social sciences, applied specifically to sociology and psychology. Human interactions, like genetic biological traits, work in such a manner as to ensure a type of natural selection within social groups, Spencer claimed. Some people are better equipped to deal with life's misfortunes; some human societies will naturally conquer others by superiority or force of might. Spencer's theories developed into "social Darwinism" which, although belied by the name, was not specifically endorsed by Darwin himself. Social Darwinism extended evolution to the study of human culture and toward a controversial justification for abandoning the poor and the members of society most prone to disease. Weak people could contaminate the gene pool, so in its most extreme form, social Darwinism maintained that only the strongest of the species should be allowed to reproduce. The distinction between descriptive theory and prescriptive plan for ethics became blurred. If it was natural for the strong to overpower the weak, then it would be unnatural to resist the domination that was inevitable.

20th Century

The American philosophical movement of pragmatism emerged around the same time Spencer's theories were being integrated into social policy, and

pragmatism emphasized the involvement of the human intellect in developing a better society. This is where the similarities end. Pragmatist John Dewey (1859–1952), known for his educational philosophy, felt that the attainment of knowledge was an ongoing process, not something that children would learn once according to permanent and absolute principles of reality. Rote memorization does not engage the learner; for an experience to be truly valuable and consequential it should involve active participants who direct their attention toward improvement and toward recognizing their roles as individuals within the larger society. Dewey was not afraid of committing to an idea such as atheism, but he emphasized the continual search for truth through the process of refined experimentation. Earlier pragmatists Charles Sanders Pierce (1839–1914) and William James (1842–1910) directed this active approach to scientific inquiry toward the disciplines of mathematical logic and psychology, respectively.

The French philosopher Henri-Louis Bergson (1859–1941) exchanged ideas about consciousness with James, and both were interested in the intuitive energy that drives the functions of the mind. This interest informed the rejection of intellectualism as well as the mind-body dualistic separation that perplexed such philosophers as René Descartes (1596–1650). Experience, rather than pure logic, is the appropriate means for seeking the truth about the world. The spiritual element, however, the *élan vital* or vital force of the mind, is what Bergson saw as responsible for the evolution of living things. Like Nietzsche and Marx, Bergson proposed conflict as being inherent to life: inorganic matter in a battle against creativity, or, more specifically, the way in which beings are able to persist across time while continuing to evolve. Intelligence is a unique phenomenon among humans because of a decreased capacity to respond to the environment purely according to instinct, as is sufficient for other animals. It is by returning to this instinct that humans can overcome the emphasis on intellectual pursuits which only further remove the living being from his recognition of true knowledge and existence. Bergson's theories oppose the empirical versus pure intuition model proposed by Immanuel Kant (1724–1804) as an irreconcilable rift between perception and true reality. Rather, through intuition Bergson saw a means of explaining the simultaneous change and apparent persistence of life.

Alfred North Whitehead (1861–1947) also rejected Cartesian mind-body dualism and developed the concept known as *process philosophy*. Like Bergson, Whitehead recognized reality as a succession of events maintained by experience, rather than as individual apprehension of existing material objects. Interestingly, this view allows for the possibility of God as the creator of the possibilities of experience; it is individual will, however, that determines direction and choices. The world is constantly evolving and cannot be contained within a static understanding of what exists. Whitehead's metaphysical conception led to the development of process theology, whereby God contains all other existence, and necessarily changes as free will determines new paths of experience. There are essential elements of God, such as goodness, that remain eternally steadfast, but the world as it is experienced is subject to change by its nature and by the experiences of the beings within it. Immortality is through God, but God as the perfect being must allow for the possibility of change, rather than imposing an infallible view of perfect existence created by force.

Pierre Teilhard de Chardin (1881–1955) was both a theologian and a paleontologist who embraced the marriage of biology to spirituality found in Bergson's *l'Evolution Créatrice* (*Creative Evolution*, 1907). Teilhard's conviction was that evolution was orthogenetic and teleological in nature; that is, human life was part of a larger and linear progression of life encompassing the whole universe and moving toward perfection. Unlike modern evolutionary synthesis or neo-Darwinism, Teilhard did not believe that the changes across generations were mere accidents. He acknowledged the interaction of the beings in nature and their potential for affecting the environment, but believed this movement was in a positive direction, toward improving overall species and the world. This is not unlike the underlying harmony Leibniz proposed as the collection of movements among the monads. Teilhard's geological excavations in China were more warmly received by the Roman Catholic Church than were his religious lectures (Teilhard was an ordained Jesuit priest); his theological writings were barred from publication, he was relieved of his lecture privileges, and he was banished from his homeland of France for philosophical differences with the Vatican. Teilhard was part of the 1929 group that discovered the Peking Man, *homo erectus* fossilized remains from the Pleistocene era. Paleontology ultimately exposed the weakness of the orthogenetic

theory when no mechanism could be determined to fully explain the inconsistencies that appeared among different groups of fossils; there was no clear, single, linear plan to explain the evolution of all life forms. The 1950s discovery of DNA genetic structure further emphasized that the direction of evolution was subject to modification between generations and not exclusively committed to a single goal. Nevertheless, Teilhard's approach was to unite science and theology by emphasizing the ways in which spirituality can be found in the material world, because both are part of the common totality of existence in the universe.

—Elisa Ruhl

See also **Bergson, Henri; Darwin, Charles; Dewey, John; Lucretius; Nietzsche, Friedrich; Spencer, Herbert; Teilhard de Chardin, Pierre; Whitehead, Alfred North**

Further Readings

Bergson, H.-L. (1998/1907). *Creative evolution.* New York: Dover Publications.

Darwin, C. (1964/1859). *On the origin of the species.* Cambridge, MA: Harvard University Press.

Dewey, J. (1958/1925). *Experience and nature.* New York: Dover Publications.

Lucretius. (2001/1969). *On the nature of things.* M. F. Smith (Trans.). Indianapolis, IN: Hackett.

Nietzsche, F. (1999/1885). *Thus Spake Zarathustra.* New York: Dover Publications.

Spencer, H. (1967). *The evolution of society: Selections from Herbert Spencer's principles of sociology.* R. L. Carneiro (Ed.). Chicago: University of Chicago Press.

Teilhard de Chardin, P. (1975/1959). *The phenomenon of man.* B. Wall (Trans.). New York: HarperCollins.

Whitehead, A. N. (1978/1929). *Process and reality: An essay in cosmology.* D. R. Griffin & D. W. Sherburne (Eds.). New York: Free Press.

Phonetics

Phonetics is the scientific study of speech sounds. Unlike phonemics (the study of the organization of speech sounds into a linguistic system), phonetic studies can be carried out without necessary regard for the language system within which they may be found. That is, researchers making a phonetic inventory of the sounds of a language, say English, will note that speakers of English produce sounds such as [t] and [t^h]; they may not be concerned with whether these sounds are contrastive in English (they are not).

Traditionally, researchers have used three approaches defined by the types of problem under investigation. Auditory phonetics is the study of the perception and processing of speech sounds. This branch of phonetics often makes use of highly specialized equipment that tests people's ability to hear or to distinguish between particular speech sounds. Acoustic phonetics is the branch of phonetics that deals with the physical properties of sound waves moving through the air, as recorded by instruments such as a sound spectrometer. Articulatory phonetics is the study of the gestures, made in the vocal tract, that result in the production of speech sounds. Traditionally, anthropologists have been most interested in this branch because it enables them to inventory the sounds of a previously unwritten language, in preparation for making a phonemic study of the language, and also to facilitate the recording of linguistic data.

Speech sounds are produced by moving air through the vocal tract, which extends from the larynx to the lips and includes the nasal cavity. Speech sounds are divided into two natural classes: vowels and consonants. Vowels are produced by passing air through the tract without obstruction; vowel quality depends on the positioning and tension of the tongue muscle, and by presence or absence of lip rounding. For example, [u] (the vowel in *boot*) is high, back, tense, and rounded; [a] (*cot*) is low, back, lax, and unrounded.

Consonants are produced by obstructing the air in some way as it passes out of the throat. Consonants are usually described in terms of the state of the larynx (voiced or voiceless); the place of articulation (bilabial, labiodental, etc.); and the manner of articulation (stop, fricative, nasal, etc.). For example [b] is a voiced bilabial stop; [f] is a voiceless bilabial fricative.

Lieberman and Crelin attempted to determine the speech sounds that Neandertal hominids were capable of making by making a computer-generated model of their vocal tract, and then using this to determine the sounds they could have produced. Although they probably underestimated the Neandertals' speech ability, this was an innovative and important use of acoustic phonetics.

The term phonetic is sometimes used by English speakers, especially those in the educational community, to refer to spelling which is based on sound rather

Source: © iStockphoto/Vasiliki Varvaki.

than on traditional orthography. This usage is erroneous; the proper term is phonemic or phonological spelling (see phonology).

Phonetics has probably gained its widest currency in contemporary anthropology as the source for the term *etics*.

— *Ronald Kephart*

See also **Emics; Etics; Language; Phonology**

Further Readings

Ladefoged, P. (1975). *A course in phonetics*. New York: Harcourt Brace Jovanovich.

Lieberman, P. (1984). *The biology and evolution of language*. Cambridge, MA: Harvard University Press.

Pike, K. (1976). *Phonemics: A technique for reducing languages to writing*. Ann Arbor: University of Michigan Press.

Smalley, W. A. (1973). *Manual of articulatory phonetics*. South Pasadena, CA: William Carey Library.

Phonology

Phonology, also called phonemics, is the study of the organization of speech sounds into a linguistic system of contrasting elements called phonemes. Unlike phonetics, phonology must account for native-speaker judgments as to what is contrastive and what is not. There are two broad approaches to this study: ones regards phonology as a level of structural organization of a language; the other, developed more recently, considers phonology a component within the generative grammar of a language.

Any two sounds of a language contrast if they can be found in a minimal pair, such as the [f] and [v] of English fat and vat. Such sounds belong to separate phonemes, usually represented between forward slashes (/f/ and /v/) to distinguish them from their phonetic representations between square brackets. The word phoneme is from the Russian *fonema* via French *phonème* as used by Ferdinand de Saussure.

Phonological analysis organizes sounds that do not contrast into phonemes. For example, in standard Spanish [s] and [z] are allophones of a single phoneme /s/; the phoneme is predictably pronounced [z] before voiced consonants (*mismo* = [mizmo], *desde* = [dezde]) and [s] elsewhere. In this case the allophones are said to be in complementary distribution. This relationship between [s] and [z] can be captured in a phonological rule:

/s/ → [z] /__ [consonant +voice]; [s] elsewhere

The rule, expressed in words, reads: The alveolar fricative phoneme is pronounced voiced, preceding a voiced consonant, and voiceless in all other environments. The use of /s/ rather then /z/ to represent the phoneme is determined by the fact that [s] is the principal or default allophone.

Sounds may be allophones of a single phoneme, but not be predictable by a phonological rule; the allophones are then said to be in free variation. For example, in some varieties of Creole English, as spoken in the West Indies, the vowels [i] and [ɪ] (the vowels of standard English *sheep* and *ship*) are allophones of one phoneme /i/ in free variation, making *sheep* and *ship* unpredictable homophones in those language varieties.

It is important to emphasize that a phoneme, like Spanish /s/, is not a sound; it is a mental "concept"

that is pronounced as one of its allophones when it goes through whatever phonological rules apply. The "concept," however, is semantically empty, meaning that just as bricks can be combined to build any number of kinds of useful structures, phonemes can be combined and recombined to form any number of meaningful constructions (morphemes, words). This is expressed by Charles Hockett's dual patterning design feature.

In addition to vowels and consonants, sometimes referred to as segments, suprasegmental features such as length, stress, nasalization, tone or pitch, and intonation may also be contrastive. For example, in Latin a contrast exists between short and long vowels resulting in pairs such as /os/ "bone" and /o:s/ "mouth."

Learning and recording data in previously unwritten languages has been an important component of anthropological fieldwork. To this end, phonology (together with phonetics) has given anthropologists an analytic procedure for, in Kenneth Pike's words, "reducing languages to writing." This procedure has provided a model for scientific analysis of human cultural patterns.

— Ronald Kephart

See also **Emics; Generative Grammar; Language; Phonetics**

Further Readings

Chomsky, N., & Halle, M. (1968). *The sound pattern of English.* New York: Harper & Row.

Hyman, L. (1975). *Phonology: Theory and analysis.* New York: Holt, Rinehart and Winston.

Pike, K. (1976). *Phonemics: A technique for reducing languages to writing.* Ann Arbor: University of Michigan Press.

Robins, R. H. (1997). *A short history of linguistics* (4th Ed.). London: Longman.

Pictographs

Pictographs, sometimes referred to as pictograms or pictoglyphs, are written, painted, or engraved signs that express ideas or meaning in the form of pictures. In a pictograph, the sign takes the form of the object it is supposed to represent. These physical resemblances can be highly iconic—such as a picture of a specific animal—or more abstract—as in a wavy line representing a river, or some inverted v-shapes standing for mountains. Even in modern cultures pictographs are ubiquitous, as seen, for example, on the doors of most restrooms indicating gender.

It is likely that writing developed out of the earliest drawings made by humans. For example, we can "read" the famous pictures found in the caves of France and Spain, which date back to the Upper Paleolithic, some being perhaps 20,000 or 30,000 years old. But it is unknown whether the intent of these illustrations was to convey information or narrative, express artistic emotion, or to be used in acts of sympathetic magic. Over time, we find signs that obviously *are* being used iconically—but not aesthetically—to express concrete things or incidents (in other words, true *pictographs* as opposed to *pictures*). These pictographs are usually more frequent and less complex than the more elaborate paintings, and some regularity might be noted in how the signs are formed or repeated. Pictographs exist throughout the world, both old and new, and on every continent. Some of the most famous are found etched in stone in the American Southwest, where they are usually called petroglyphs (Greek for "rock carving").

Pictographs are sometimes called a system of picture-writing, but this is actually a misnomer. If we define a writing system as something that captures spoken language on some medium (like paper or stone), pictographs would not fit this definition. This is because pictographs represent objects in the world and *not* the spoken names for these objects. Thus, in using a pictographic system, we are not actually *writing down* a language, but representing data directly. However, what was occurring was idea-transmission, which was a necessary pre-condition for a writing system to develop.

Presumably, pictograms may have developed into ideographs, or ideograms, as they became more stylized and abstract. For example, the sign for "sun" in ancient China was a circle with light rays coming out of the middle. Over time, the circle became oval, and then a rectangle, and the rays became a single horizon line. Thus, this is today's Sino-Japanese character for sun. Ideographs differ from pictographs in that they lack—due to stylization—the usual obvious iconic connections to external reality. Ideograms have been thought to be transitional between pictograms and logograms. (Logograms are written signs that *do* represent words or morphemes in a language, but give no indication as to how they are to be pronounced, such

as everyday numbers or mathematical equations which will be read in different ways depending on the language one speaks.) However, most scholars agree that no writing system has ever really been ideographic, though many contain ideographic elements. Last, while many believe in a pictographic origin of writing, work on Sumarian cuneiforms suggests that signs using abstract shapes might also have led to the development of writing.

— *James Stanlaw*

Further Readings

Castleton, K. (1987). *Petroglyphs and pictographs of Utah,* Vols. 1 and 2. Salt Lake City: University of Utah Press.

Coulmas, F. (1999). *The Blackwell encyclopedia of writing systems.* London: Blackwell Publishers.

Gaur, A. (1992). *A history of writing.* New York: Cross River Press.

Gelb, I. J. (1963). *A study of writing.* Chicago, IL: University of Chicago Press.

Jean, G. (1992). *Writing: The story of alphabets and scripts.* London: Thames and Hudson.

Wang, H. (1993). *The origins of Chinese characters.* Beijing: Sinolingua.

Source: © iStockphoto/Henry Lucenius.

Pike, Kenneth L. (1912–2000)

Dr. Kenneth Lee Pike was born in Woodstock, CT, in 1912. He earned his B.A. in theology from Gordon College in 1933. After being denied missionary work in China, he joined the Summer Institute of Languages to study Amerindian languages in Mexico in 1935. There he learned to speak Mixtec directly from Mixtec speakers without the aid of an interpreter. In 1937, Pike began his doctoral study of linguistics at the University of Michigan where he studied under Edward Sapir in the Boasian cultural relativism tradition. While engaging in his doctoral research, Pike, and his wife Evelyn, lived among the Mixtec. Together they developed an alphabet for the purpose of translating Mixtec language into literary forms. In 1942, Pike earned a Ph.D. in linguistics and became president of the Summer Institute of Languages. He published the *Mixtec New Testament Bible* in 1951.

Pike divided his time between the Summer Institute for Languages at the University of Oklahoma, where he was its director, and the University of Michigan where he served on the faculty for 30 years in various capacities including professor of linguistics, chairman of the department of linguistics, and the director of the English Language Institute. Pike was also a pioneer in the field of English as a second language, more commonly known by its ESL acronym.

In 1954, Pike introduced the theoretical orientation of emic and etic contrasts in understanding linguistics and culture. The terms are used by the social and behavioral sciences to examine two kinds of data concerning human behavior. Linguistically, emic is analogous with phonemics and etic is analogous with phonetics. Phonemics is the subjective study of the meaning in linguistic sounds. Phonetics is the objective scientific study of linguistic sounds. According to Pike, native members of a culture are the exclusive judges of the precision of an emic description. They can identify psychologically distinct units of sound not recognized by

outsiders. Only insiders can provide the data for examination of language at the level of meaning.

Conversely, phonetics is the objective point of view of language. It is the view of the outsider or investigator, who controls the legitimacy of an etic explanation through empirical investigation and the production of generalizations. Etic methods can be verified and replicated. They provide understanding that is meaningful from a scientific perspective. Pike was known for his studies of aboriginal languages in Mexico, Peru, Ecuador, Bolivia, Java, New Guinea, Ghana, Nigeria, Australia, Nepal, and the Philippines.

The etic and emic cognitive framework is also useful when applied to cognitive anthropological field research. It views culture as mental processes. In participant-observation, anthropologists obtain the etic view by remaining objective and detached. The emic perspective is learned by involvement. Emic models of culture reveal how natives understand their society. Pike argued that seeing the emic perspective challenged ethnocentrism and promoted cross-cultural understanding and respect.

Pike was internationally respected for his linguistic theories, research into language development, contributions to poetics, and creation of tagmemics. The theory of tagmemics makes the distinction between phone and phoneme in phonetics and phonology at higher levels of linguistic analysis. Pike developed this concept to aid in the analysis of Central and South American languages. It identifies strings of language units that can fulfill several functions. Both semantic and the syntactic functions are used to identify tagmemes. He also applied the concept to field theory.

Pike incorporated his strong Christian faith into the Summer Institute of Languages (SIL). SIL was a non-profit organization that focused on the translation of the Bible into preliterate languages. Pike was the President of SIL International from 1942–1979, and President Emeritus from 1979–2000. At the time of his death, Pike was involved in many professional organizations including the National Academy of Science, the Linguistic Society of America, and the American Anthropological Association. He was also President Emeritus of the University of Michigan. Because of Kenneth Pike's large impact in the field of linguistics, he was nominated for the Nobel Peace Prize for the 15 consecutive year, ending in 1966. He died on December 31, 2000.

— *Emily A. Denning*

Further Readings

Pike, K. L. (1943). *Phonetics, a critical analysis of phonetic theory and a technique for the practical description of sounds.* Ann Arbor: University of Michigan Press.

Pike, K. L. (1967). Language in relation to a unified theory of the structure of human behavior. The Hague: Mouton.

Young, R. E., Becker, A. L., & Pike, K. L. (1970). *Rhetoric: discovery and change.* New York: Harcourt, Brace & World.

Pinker, Steven (1954–)

Steven Pinker is an experimental psychologist who has argued that human capacities for speech and abstract thought are based on evolved components of our brain that are not shared by other primates, and that much of human behavior results from evolutionary adaptations. Pinker was born in 1954 in Montreal, Canada. He earned his doctorate at Harvard in 1979, and spent most of his career at the Massachusetts Institute of Technology. He is currently a professor in the Department of Psychology at Harvard University. His experimental research has focused on language acquisition by children. He has also succeeded in making psycholinguistics and evolutionary psychology accessible to non-specialists by writing and speaking for general audiences.

In reaction to behaviorists like Burrhus F. Skinner, who insisted that the human mind was "a blank slate" at birth and that psychology was unrelated to biology, evolutionary biologists such as Edward O. Wilson and Richard Dawkins argued that many human behavioral tendencies are a product of natural selection. Evolutionary psychologists subsequently proposed that emotions such as guilt, anger, sympathy, and love all have a biological basis. In 1998, Pinker argued in his book, *How the Mind Works,* that biology partially explains our moral tendencies. The evolutionist Stephen Jay Gould firmly rejected this approach, calling it "biological determinism," arguing that selection operates on individuals not genes.

Pinker's arguments are based on the notion that most human cognitive tasks evolved as distinct modules, especially the components of language. This

was based on Noam Chomsky's view that humans are genetically predisposed to learn language, and thus languages are fundamentally similar. In particular, phonology and syntax are produced by distinctly evolved modules, are similar across cultures, and are missing in other primates. Evidence for modularity includes the innate and rapid acquisition of specific language skills by children, the tendency for brain lesions and genetic mutations to selectively impair cognitive functions, and brain imaging that revealed areas dedicated to specific tasks.

Terrence W. Deacon, Phillip Lieberman, John R. Anderson, and others argue against modularity, claiming there was not enough evolutionary time for individual modular selection, genetic differences between humans and other primates are insufficient for explaining different brain structures, and there is no evidence for a central processor required to coordinate modules. Lieberman, Merlin Donald, Kathleen Gibson, Stephen Jessee, and others argue that brain mechanisms used for speech result from evolutionary changes to preexisting devices. For example, syntax may derive from precise hand gesture and motor control common to higher primates. Pinker's ideas place him in the larger debate between discontinuous language evolution (language is qualitatively different from other primate abilities and must require special devices) and continuous evolution (humans possess expanded versions of the same devices that other primates have).

Pinker's contention that language and behavior are mostly genetically controlled contradicts the theory of linguistic relativity proposed by Edward Sapir and Benjamin Wharf. His work also impacts philosophical and ethical debates regarding human free will. Future experimental research and rapid advances in brain imaging technologies may help identify unique anatomical structures dedicated to specific cognitive tasks as predicted by Pinker.

— David G. Casagrande

Further Readings

Pinker, S. (1994). *The language instinct: How the mind creates language.* New York: W. Morrow and Company.

Pinker, S. (1999). *How the mind works.* New York: W.W. Norton & Company.

Pinker, S. (2002). *The blank slate: The modern denial of human nature.* New York: Viking.

Political Anthropology

The major thesis of political anthropology is that politics cannot be isolated from other subsystems of a society. Political anthropology has defined its interest in how power is put to use in a social and cultural environment. Power is defined as political influence to accomplish certain aims. Through cultural interpretation, the political culture defines certain goals as acceptable. Political systems operate within a historical setting. The ability to make and enforce decisions is the basis of power, and power is what political anthropologists study. Political anthropology investigates the everyday experiences of people as they are shaped by their economic position in a particular society, and the world economy that molds most political issues.

Political Theory and Structural Functionalism

Structural functionalism is the study of how the separate parts of a society interact to form a cooperating whole; this is called synchronic. Synchronic theory characterizes the most important goal of any cultural element as the harmony of the society as a whole. The political anthropologist studies the complex interaction of mutually interrelating parts. History is not the focus in these studies. The society is studied from a holistic viewpoint. The interaction of the subsystems or institutions to maintain the equilibrium of the whole becomes the focal point of research. The political institution interacts with kinship, family, religion, and the economy as a single mutually supporting system. The major theme of each institution is the adjustment to long-term equilibrium.

Political culture is comprised of the core values of a society. Political action happens through the use of symbols, and these are defined by the political culture. Manifest functions are the stated utility; the latent function is the hidden, and more real, reason for any observable fact occurring in a social situation.

The heyday of structural functionalism was pre-World War II British anthropology. Fine examples include E. E. Evans-Pritchard's *The Nuer,* and *African Political Systems.*

Pluralism

In the United States a theory closely related to structural functionalism was pluralism. Pluralism asserts that democratic state societies are made up of a collection of competitive interest groups in conflict with one another. The state balances these groups through compromise. The government is the neutral referee. Each group has about equal influence on public policy.

Process Theory

How are the public goals accomplished? What are the quantity and the style of power used by various competing groups in determining public policy? To answer these two questions, the study of competition between rival groups is central.

Societies are studied in their historical context, i.e., *diachronic.* Change is a constant in all social settings. *Parties* (teams that compete) vie for power in order to define public goals and determine public policy. In this it is assumed that conflict is constant. Process Theory studies take place in a *political field.* A political field is any area in which a political contest takes place. The competition is over political power. *Power* is the ability to influence public policy in the face of opposition. Power can be *independent* or *dependent.*

Independent power is the direct power of an individual or group. In *egalitarian societies* this power is based upon either personal charisma or specialized knowledge. In *centralized societies* power is vested in individuals that occupy particular offices. *Dependent power* is defined as the transfer of powers by one individual or group to another individual or group.

Legitimacy is a support coming from the political culture. There is consensual power within the political culture even if a large group of people disagrees with certain aspects of the leadership or their policies, if the greater essential quality of the political structure is still seen as valid. The other source of power is *coercion,* in which the authority of the office holder is supported by force or the threat of force. In state societies, legitimacy is always backed by coercion. Only in nonstate societies is it possible to have legitimacy without coercion. Both sources of power can be used in the conflict over power.

Action Theory

Action theory is an expansion of the Process approach. There are, in most societies, teams called political parties that compete for power. Each team has its leadership, which manipulates symbols of the political culture to gain and maintain power.

This competition occurs in the political arena in which rules govern the contest. These rules are interpreted, explained, and then rearranged according to a specific agenda. Political core values are used to explain these rules in order to strengthen one or another team's claim to power.

All equilibrium is unstable and temporary. Continual readjustment is necessary while the tournament continues. Teams mobilize their political capital for a showdown, followed by the reestablishment of an unstable equilibrium. In this game normative rules represent the core values of political culture. These rules are always vague and abstract. The pragmatic rules are the real rules with which the game is really won.

The top leaders become symbols of their party. Leaders can either be *moral* leaders or *contract* leaders. A moral leader represents the shared normative ethics of the group. Moral leaders tend to be dogmatic and rigid, whereas the contract leader leads an alliance of diverse individuals that hopes to profit personally from victory.

Over the long run, teams in a stable society are about even in strength. Most parties encapsulate smaller parties within them. Within parties, conflicts also exist and are resolved in broadly similar ways. Even in a one-party state there are political contests. Political change often is repetitive as power is passed back and forth between the teams. At times, normative rules are reinterpreted and pragmatic rules change; the teams appear to stay the same as they adapt to a changing social environment. Only in an all-out revolution does change require a replacing of both sets of rules.

Elite Theory

Classical elite theory asserts that all societies are in fact ruled and controlled by a small ruling elite. The state, or even tribe, is the political tool of this elite. The Elite Theory states that the majority of people are incapable of self-rule. The leaders govern because the masses need them to.

Vilfredo Pareto (1848–1923) claimed the ruling elite was in fact made up of superior individuals, with the will to power. History is the "circulation of elites." The elites incorporate a small number of superior individuals from the masses in order to continuously maintain the vitality of the ruling class. Periodically, there is a breakdown of social equilibrium. When this happens, the old ruling elite is overthrown, and replaced by a new elite.

Gaetano Mosca (1858–1941) stated that the superiority of the political elite is that they have the virtues needed to rule. Elites have the extensive contacts, which determine their type of society with its political structure and culture. Elite is not a closed class; they continually incorporate the best from the masses.

Robert Michels (1876–1936) wrote that the bureaucratic organization results in the arrangement of elite command. The bureaucratic organization requires a specialized staff with skills that are difficult to replace. Both leaders and staff members require a specialized education. This complex organization requires highly structured authority to orchestrate its successful operation.

C. Wright Mills (1916–1962) stated that the power elite is composed of those who command the leading hierarchies of U.S. society. This includes top managers in big corporations, the top government officials, and the leaders in the military. It is in the reciprocal collaboration between these three elite groups that the power in American society rests. Power in U.S. society is derived from these linkages. Often the same individuals are leaders in several hierarchies. Business is the first in importance, while the strength of the military is growing rapidly.

William G. Domhoff, still very active today, writes that, in the United States, the upper class dominates the government. They form a close-knit group based upon control of corporate stocks, trust funds, government, and academic institutions. They organize themselves through marriage selections, private schools, exclusive clubs, summer resorts, debutante events, and corporate boards. They form a select group of intermarrying kinfolk, whose power is based upon control of business and political institutions of society.

Instrumentalist/Structuralism Debate

The *Instrumentalists* assert that the ruling class of capitalist society is able to dominate the apparatus of domination of society because it controls the economy. On the other hand, *Structuralism* contends that the state power is independently operated in a way that benefits the capitalists, or any upper class. The function of the state and the dominant class coincides by necessity.

Albert Szymanski (1942–1985) writes that the state is an instrument of exploitation of the economically subordinate classes, and is secured for the benefit of the dominant class. The political, ideological, and economic environment insures that economic social relations and ideological hegemony are preserved. State managers have very limited options. The state is controlled by the upper class by both direct and indirect means. The logic of capitalist economic relations, reinforced by capital's ideological hegemony, dictate the policies that the state must follow.

The institution of the state is always a political tool of a certain class or classes. Under capitalism the class that owns and controls corporate capital clearly dominates the state either directly by providing leadership, or indirectly by defining the issues. Within capitalism the state is central to stabilizing all of society for the capitalist by insuring the profit-making process is the main economic issue, and by increasing economic productivity of the labor force and the growth of the economy overall.

Postmodernism openly questions the legitimacy of the modernism of progress, rationalism, science, and technological progress. Science, objectivity, and grand theory are all seen as a privileged narrative that misses the point that reality is subjective, relative, and socially constructed.

Social Organization

The physical environment and the type and level of technology influence social organization. When a people, through their culture, adapt to their environment they change that environment. Population pressure, technology, physical environment, social environment, and political and ideological culture interact in a mutually self-reproducing way. This interaction implies a structure and a relationship of change. This is a system, which means that if we know elements of the system, alternative elements can be suggested. The environment and technology as related to subsistence seem to be the most important. However, the parts are interrelated and measurable with statistical probability.

Nonstate Society

Bands are small communities usually consisting of between 25 to 150 individuals. The nuclear family is the primary social organization. Bilateral kinship is the most common form found in band society. The size of the bands in band society changes through time, depending on the type of resources that are being exploited. Leadership within the bands is, for the most part, temporary and situational. For most, political equality is the major social organization. Coercion, laws, and restriction to major economic resources are very rare among band members. There is little specialization of skills that would lead to a permanent division of labor. This means there is usually no religious priesthood or permanent political leader. The division of labor is based upon gender and age. Custom is the ideological glue that holds the society together. The economy is primarily foraging from the local environment. Trade is very minor. However, reciprocity is the major form of distribution. A typical example is the Shoshone and Paiute tribes of the Great Basin of North America before contact with other tribes or Europeans.

Tribal society is based upon the village or clan. They are horticultural or pastoral based on their means of subsistence. Communal ownership of land or herds is the most common form of economic control. Distribution is based upon reciprocity. Trade is minor, but more developed than among band societies. Tribes are egalitarian communities in which power is decentralized through a lacework of personal and group relations. Leadership is charismatic without coercive authority to enforce decisions over group opposition. The right to use force is kept within the lineage as a communal claim. The groups depend on domesticated food supply more than wild crops. There is very little political, religious, or economic specialization. Tribes are generally egalitarian. Clans are of a unilineal kinship organization, either matrilineal or patrilineal. Pan-tribal sodalities unite clans into larger organizations. These include voluntary societies, age grades, and segmentary lineage systems. Examples are the Nuer of 1940, or the Iroquois of the 18th century.

A *chiefdom* has a centralized authority. The office of the chief is moving closer to a continuous position. Generally only members of a certain clan or lineage in the larger kin group are eligible to obtain, by succession, the office of chief. Membership in any clan or lineage of the ethnic group is unilineal. While no real class divisions exist, this is a ranked society. Clans and individuals are both ranked, some earned and some inherited. The authority is one of minimum power; the amount of coercion a chief can use is small. Economically, the chief is the great provider. The chief is in charge of a system of redistribution. Taxes are collected in some sort of desired goods to be returned in a ceremonial "give away," maintaining the group solidarity and uniting the clans under the chief of the kinship group. An example of a Chiefdom includes the Ashanti of Africa before British colonization.

A *state society* is a society that is sharply divided into social and economic classes. Membership of the state is defined by residence within a territory. Within these borders all residents are subject to a single authority, which consists of a small elite monopolized political power. There is a formal body of laws and courts, and a monopoly by the state officials on the legitimate use of force. How and why states first emerged is debated openly.

The *Internal Conflict* theory (Lewis Henry Morgan) of the state begins with studies of how ancient people lived in small and egalitarian communities. Resources were equally shared; then technological innovations developed. This allowed a surplus to develop. A class of non-producers appeared, along with private property. Access to resources became more restricted. The elite then created the state to protect themselves from the producers who created the wealth.

According to the *External Conflict* theory (Herbert Spencer), the groups with the strongest military survived. The stronger army conquered the weaker one. This external threat required a coercive body, called government, to arise to meet this outside peril.

In the *Environmental Circumscription* theory (Robert Carniero), the State Societies developed in areas that were circumscribed by their environment. Because of the fact that, since war is nearly universal, it is more likely to lead to population dispersal than the formation of the state, Carniero asserts that State Societies could only arise in areas in which mountains, deserts, or seas surrounded good agricultural lands, making dispersion of the population nearly impossible.

In the *Hydraulic Civilization* theory, Karl Wittfogel claimed that, to increase farm production in river valleys, large complex irrigation systems were developed, requiring several villages to cooperate in maintaining a controlled water supply, supporting

multiple harvests and a large dense population. The complicated irrigation system required a group of specialists who ran the system, who in turn became powerful leaders of the state.

In the Mode of Production theory, Eric Robert Wolf, in "Europe and the People Without History," classified historical cultures into three basic modes of production: *kin-ordered, tributary,* and *capitalist.* Kin-ordered relates band and tribal societies or stateless societies. In tributary modes of production, the direct producers possess the means of production. The elite expropriate the surplus product by political or other types of non-economic means. He states that all pre-capitalist states were tributary. *Asiatic* is an example of a strong (centralized) tributary state, while *feudal* is a weaker (decentralized) one; these two replace one another over time. Europe, from the 16th through the 18th centuries, was not capitalist but a mercantile tributary (centralized) state. Capitalism emerged in England in the late 18th century. The capitalist enlisted labor under capitalism through the buying of labor power, leaving the workers with nothing left to sell but this labor power. Liberal political revolution, the industrial revolution, and free trade came together in England partly because of its unique history and its geography. England then became the homeland of capitalism, which divided the world to meet the interests of the British capitalist.

Political anthropology is a sub-specialization within cultural anthropology. Like political sociology, it is a study of how political power is used within a larger social and cultural context. Also, like political sociology, it examines how political cultures and the political institutions change historically. Political anthropology adds a cross-cultural comparison to understand how widely different cultures have generally dissimilar political cultures and political institutions.

— *Michael Joseph Francisconi*

Further Readings

Bailey, F. G. (1969). *State gems and spoils.* New York: Schocken Books.

Bereroglu, B. (2001). *Political sociology: A comparative/historical approach* (2nd Ed.). Dix Hills, NY: General Hall.

Carniero, R. L. (1970). A theory of the origins of the state. *Science*, *169*, 733–738.

Fortes, M., & E. E. Evans-Pritchard. (1940). *African political systems.* Oxford: Oxford University Press.

Harris, M. (1977). *Cannibals and kings: The origins of culture.* New York: Vintage.

Kurtz, D. V. (2001). *Political anthropology: Paradigms and power.* Boulder, CO: Westview.

Lewellen, T. C. (1983). *Political anthropology: An introduction* (1st Ed.). South Hadley, MA: Bergin and Garvey.

Lewellen, T. C. (2003). *Political Anthropology: An Introduction* (3rd Ed.). Westport, CT: Praeger.

Swartz, M. J., Turner, V., & Tuden, A. (Eds.). (1966). *Political anthropology* Chicago, IL: Aldine.

Szymanski, A. (1978). *The capitalist state and the politics of class.* Cambridge, MA: Winthrop.

Turner V. W. (1996). *Schism and continuity in an African Society: A study of Ndembu Village Life.* Oxford: Berg.

Wittfogel, K. (1957). *Oriental despotism: A comparative study of total power.* New Haven: Yale University Press.

Wolf, E. R.(1982). *Europe and the people without history.* Los Angeles: University of California Press.

Political Economy

The field of political economy is defined by a set of questions surrounding economic modes of production and their subsequent interactions with both the social and political realm. As such, its research mandate is among the broadest in the social sciences. It impacts questions not just in the disciplines of economics and political science, but in anthropology, sociology, history, geography, and the environmental sciences as well. In their widely read introduction to the topic Balaam and Veseth declare:

> International political economy is both the past and future of the social sciences. It is the past because it represents a return to the origins of the social sciences, before the study of human social behavior became fragmented into the discrete fields of economics, politics, science, sociology, history and philosophy. It is the future because, in today's complex world, most important social problems clearly have an international or multinational aspect that is best understood through an integrated study drawing on a variety of tools and perspectives.

Indeed, until the later half of the 19th century no differentiation was made between the economic and political or social modes of analysis. The term "political economy" first gained widespread acceptance following the publication of James Steuart's *Inquiry into the Principles of Political Economy* (1767). Historically three main schools of thought have in turn dominated this field of inquiry, and all remain important to this day.

The first modern approach to the topic was advanced by the mercantilist thinkers of the 17th century. The main object of these writers was to defend the national interest by building up economic resources and reserves of precious metals. Neo-mercantilist thought, which sees economic success as an important national power resource, is still present today, and is most closely linked to certain realist writers within the field of political science. Robert Gilpin's "power transition theory" (1981), or Stephen Krasner's "hegemonic stability theory" (1976) represent important examples of this tendency.

In the 18th century mercantilist ideas increasingly gave way to what is now often called classic economic liberalism. This school emerged from the Scottish Enlightenment, with its best-known students being David Hume and Adam Smith, who, in 1776, produced the seminal work, *Wealth of Nations.* Smith argued that, contrary to the claims of the mercantilists, the unregulated functioning of the markets would best promote the welfare of both the individual and the larger national community as a whole. Further, competing individual interests could be harmonized through the "invisible hand" of the market, yielding efficient social outcomes. While Smith was far from disinterested in questions of national power, it is clear that his approach assigns a much more nominal role to the government in the oversight of economic and social life. These essential insights, and the body of theory that has emerged from them, are today most closely associated with the field of economics, and its specific contributions to this multi-disciplinary research program.

The third classic approach to political economy is found in Marxism. Marx advanced his own theory of history, which allowed his students and him to assert that, far from being a basic unit of analysis, markets are, in reality, an artifact of the historic forces of production. Since the ultimate locus of change and progression in his theory of history is economic materialism, Marx was able to deny that society and the market really existed or functioned as unique, isolated spheres. Rather than free mutual exchange in perfect markets (which the liberal school claimed guaranteed efficient and beneficial outcomes), real economic life was characterized by the use of socially and materially derived power. The harmonization of interests that the classical economist predicted could not emerge, and instead the economy would be characterized by class conflict pitting workers against the capitalist class.

Marxism has traditionally been one of the most important modes for viewing and understanding political economy. The 1960s and 1970s saw a resurgence in Marxist thought as "dependency theorists" in Latin America (Dos Santos) and "word systems theorists in Europe" (Wallerstein) attempted to expand this basic theoretical framework to deal with the shifting vagaries of chronic underdevelopment in the Third World and the expanding role of transnational corporations in the global political arena.

These general approaches are sometimes referred to as "structuralism," and are often a preferred mode of analysis for sociologists working in the area. It should also be noted that when anthropologists and geographers use the term "political economy" they are frequently referring specifically to these neo-Marxist approaches to underdevelopment and globalization.

Since the division of economics, political science, and history in the late 19th century, the study of political economy (while still a radically interdisciplinary effort) has increasingly been championed and developed within political science departments. The subfield of comparative politics has tended to focus on detailed investigations of patterns of difference between national systems in its attempt to come to terms with many of the basic problems posed by political economy.

Within the subfield of international relations another approach has been developed, often referred to as international political economy (IPE). While there is substantial overlap with the efforts of comparativists, IPE tends to focus more on systemic problems that transcend national and market boundaries, and thus call for broader methods of study, both in terms of the areas of the world that are examined and the methods that are employed. Anthropologists interested in the interaction of international economic and political forces with local social systems may find much of interest in this literature. Likewise,

detailed and specific studies of the impact of global forces on local communities continue to be needed if the political economy research program is to progress.

— *Benjamin N. Judkins*

Further Readings

Balaam, D. N., & Veseth, M. (2005). *Introduction to international political economy* (3rd Ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Baldwin, D. (1985). *Economic statecraft.* Princeton, NJ: Princeton University Press.

Bates, R. H. (1981). *Markets and states in tropical Africa.* Los Angeles: University of California Press.

Dos Santos, T. (1970). The structure of dependence. *American Economic Review, 60*(May), 231–236.

Gilpin, R. (1981). *War and change in world politics.* New York: Cambridge University Press.

Krasner, S. (1976). State power and the structure of the international trading system. *World Politics, 28*(April), 317–344.

Marx, K. (1992). *Capital: A critique of political economy.* Harmondsworth: Penguin.

Rogowski, R. (1989). *Commerce and coalitions: How trade affects domestic political alignments.* Princeton: Princeton University Press.

Smith, A. (2003). *The wealth of nations.* New York: Bantam Classic.

Steuart, J. (1966). *Inquiry into the principles of political economy.* Chicago, IL: Chicago University Press.

Wallerstein, I. (1974). The rise and future demise of the world capitalist system: Concepts for comparative analysis. *Comparative Studies in Society and History, 16*(Sept.), 387–415.

Political Organizations

Political scientists have delineated five "crises" that nations seem to undergo, in sequence, in their political development.

Identity: People develop a national identity over and above their tribal, regional, or local identities. Bretons came to think of themselves as French and Bavarians as Germans. We see now that Uzbeks and Latvians never considered themselves "Soviets," and because of this the Soviet Union collapsed with astonishing speed. Some countries are still caught up in an identity crisis.

Legitimacy: People develop the feeling that the regime's rule is rightful and should be obeyed. A system without legitimacy requires massive amounts of coercion to keep it together and functioning.

Penetration: As the government's writ expands through the country, starting usually with the capital city, it encounters resistance, for many people dislike paying taxes to, and obeying the laws of, a distant authority. Local rebellions are crushed and police are brought in to enforce national authority.

Participation: Once the other crises are solved, people start wanting to participate in some way in their nation's governance. There is usually a struggle to expand the electoral franchise. Parties are formed and attempt to control parliament. Mass participation in politics is usually granted only grudgingly by traditional elites, but once it's institutionalized, the country is usually more stable and peaceful. Withholding participatory rights can lead to a buildup of a revolutionary anger.

Distribution: The last great crisis, probably a permanent one, is over the division of the nation's economic pie. Once the masses are participating in politics, their parties (for example,the Labour Party in Britain, the Social Democrats in Germany) demand that government use its considerable powers to distribute wealth and income in a more equitable fashion. In order to fund a welfare state, taxes grow. Better off people generally fight this trend.

This is a "sequential crises" model of political development; in some countries it seems to fit well, in others poorly. Some nations' histories are just too complicated to make the model fit at all.

Britain

In Britain, as in most democratic countries, the relationship between people and political parties is complex, a two way street in which both influence the other. The parties project a "party image," that is, a view of how people regard the party's policies, leaders, and ideology. Conversely, most voters maintain a party identification, a long-term tendency to regard themselves as, for example, "Tory" or "Democrat." The strategy of intelligent party leadership is to project a party image that will win the loyalty of large numbers

of voters and get them to identify permanently with that party. If successful, the party becomes powerful and enjoys many electoral successes.

Both party image and party identification are reasonably clear in Britain: Most British citizens recognize the philosophies of the three main parties in general terms, and a large portion of British voters identify with a party. The situation is never static, however; the parties constantly change the images they project, while some voters lose their party identification and shift their votes.

For the deeply confirmed Labour or Conservative voters, those whose party identification closely matches the image of their preferred party, there is little doubt as to whom should be elected.

Until recently, most British voters were reliably Labour or Conservative. The element that changes from one election to another, because either their party identification is not strong or their perception of the parties' images shifts or both, is called the "swing" vote. A swing of a few percentage points can determine who will form the next government, for if each constituency shifts a little one way (for example, toward Labour), the Labour candidate will win in many constituencies. Single-member districts often exaggerate percentage trends and turn them into a large majority of seats. A "swing" of only one percentage point nationwide usually translates into a dozen or more parliamentary seats changing hands, sometimes changing the majority in Commons, and therefore, the government.

Germany

In Germany, as in most advanced countries, personality has become more important than ideology in the mind of many voters. With the decline of the Welanschauung parties (a view of the world), and the move of most large parties to the center of the political spectrum, the personality of candidates is often what persuades voters. This has long been the case in the United States and is now becoming the European norm as well. Some call it the Americanization of European politics, but it is less a matter of copying than it is reflecting the rise of catchall parties; throughout Europe, election posters now feature the picture of the top party leader, the person who would become prime minister. Although voting may be by party list, citizens know that in choosing a party they are actually electing a prime minister.

German (and British) campaigns are conducted almost as if they were for the direct election of a president, as in the United States and France. Officially there is no "candidate for the chancellor-ship," but in practice the leading figures of the two majority parties are clearly identified as such in the press and in the public mind so that much of the campaign revolves around the personalities of the two leading candidates.

A German candidate for chancellor must project strength and levelheadedness. In a country obsessed with fear of inflation, the candidate's economic background plays a bigger role than in most nations. Two of Germany's postwar chancellors have been economists. The candidate's adherence to democratic rules also plays a role, and Franz Josef Strauss's authoritarian streak contributed to his defeat in the 1980 race.

Personality contributed to the results of the 1990s elections, too. The Christian Liberal coalition had the steady, optimistic image of Helmut Kohl. The Social Liberal coalition candidates of the 1990s came across as radical intellectuals; they needed an attractive moderate like Tony Blair. Much of postwar German politics can be described as parties groping for the right leader to bring them to power in the Bundestag (parliament), and chancellor's office. When they found the right one, such as Adenauer, and Kohl of the Christian Liberal coalition, they stuck with them all the way to electoral success.

Russia

The trouble with Russia is that there are few rules or institutions to regulate and moderate political clashes. Without experience in multiparty competition, a free press, voluntary associations, tolerance, and simple politeness, the new forces freed by the ending of Party control started to play a new game without knowing the rules. Their clashes were bound to be chaotic, and they were made worse by bureaucrats who had every interest in sabotaging the reform process. Fearful of losing their power and comfortable livings, they fought change, trying to reverse it.

Many of the reformers who rallied under Gorbachev and then transferred their loyalties to Yeltsin have resigned or been dismissed from high office. In many respects they hearken back to the Russian Westernizers of the 19th century who wanted to import Western ways nearly wholesale: a market economy, free democracy, and individualistic philosophy. This led them to attempt the economic "shock

therapy" recommended by Harvard economist Jeffrey Sachs, which earlier worked in Bolivia and Poland. The initial stages of such therapy are terribly painful, and Russia's economy plunged downward.

The term "conservatives" covers a broad swath from moderates to extremists. Conservatives' common link is their opposition to shock therapy and similar methodologies. Russia may need reforms, some concede, but the reforms must be ours and must be tailored to our conditions. Some old-line party types would go all or much of the way back to a centralized command economy. Like the old Russophiles of the 19th century, they reject Western models and would turn inward, to Russia's roots; accordingly, they are nationalistic, some rabidly so.

These two general camps are halves of the Russian political spectrum that contain several graduations and combinations. The extreme end of the conservative side is sometimes called the "red brown" coalition, a combination of old Party supporters plus extreme nationalists. (Brown, from Hitler's brown-shirted Storm Troopers, connotes fascist.) Zhirinovsky headed the largest party in this movement, but former General Lebed is seen as its likeliest leader.

More moderate conservatives cluster around Zyuganov's Communist party.

Under the label "centrist," another group seeks a middle ground of moderate reforms cushioned by continued state subsidies and ownership. The "Our Home Is Russia" party of Yeltsin's prime minister, Chernomyrdin, and, indeed, Yeltsin himself are described by some as centrists, cautious reformers. Thoroughgoing reformers, such as Gaidar and his Democratic Choice party, are a weak force in parliament, and no longer a part of Yeltsin's government. Russia's parties come and go quickly, splitting, combining, and changing names, but the main distinction to look for is between those who want reform and those who do not.

China

Following the end of the Maoist reign, a new conflict appeared in Chinese politics, a split between liberal and conservative forces, similar to what the Soviets went through before their system collapsed. The Chinese moderates who opposed the extremism of the Cultural Revolution wanted to essentially go back to their preupheaval society. They earned the nickname the "17-years-before people," because they thought the 17-year period (1949–1966) before the Cultural Revolution had been good. These tended to be older people, with secure positions in the party, army, and bureaucracy, very much like Soviet conservatives. They wanted socialism on the Soviet model, with centralized control over the economy, politics, and cultural life.

Opposed to the moderates were the liberalizers, usually younger people, who saw the unfairness and inefficiency of central control. They pointed to the amazing growth in output that came with the introduction of private and cooperative enterprises, like in the Special Economic Zones, where industrial growth set world records.

The Chinese conservatives, just like their old Soviet counterparts, feared that such a system would no longer be Communist and, even worse, that their jobs would be scrapped.

This split caused Deng Xaioping much grief. He was prepared to liberalize cautiously, hoping to confine it to the economic sector, but demands came

Source: © iStockphoto/Pierre Janssen.

bubbling up to go farther and faster. In the spring of 1989, tens of thousands of Chinese university students staged giant protests and hunger strikes in favor of democracy. Deng fired his hand-picked and liberal-minded successor, Zhao Ziyang, and had the PLA execute the students in Tienanmen Square. Several hundred died, and approximately 10,000 were imprisoned. A chill settled over Chinese life. Conservatives also launched anti-Western campaigns. The conservatives had one serious drawback: many were elderly. Time seemed to be on the side of the liberalizers, but not without rear-guard conservative actions.

Brazil

Politics in Brazil have been and continue to be largely a game for elites: big landowners, bankers, and industrialists, top bureaucrats, and military people. The stakes of the game are political power and the patronage jobs that come with it. The rules of the game are that none of the players gets seriously hurt or threatened and that nobody mobilizes the Brazilian masses in an angry way, for that would destroy the game's fragile balance and hurt them all. Accordingly, Vargas, himself a wealthy rancher, was an acceptable player when he supported fair coffee prices for the growers, but when he started to mobilize poor Brazilians he had to be ousted. Kubitschek was a good player who looked after his elite friends and deflected potential discontent with his grandiose plans to open Brazil's interior. Goulart, also a wealthy rancher, was a very bad player: He threatened all the elites and mobilized the masses at a furious rate. Lula (the current President), then an anti-elite labor-union radical, mobilized Brazil's poverty-stricken masses in a way that frightened most of Brazil's elites and increased the chances of a coup.

Brazil's entire political history has been the same elite game: Dom Pedro with his fazendeiro friends, the Old Republic with its Paulista-Mineiro alternation, and the military technocracy with its industrial and bureaucratic clientele. Since Vargas, however, the political mobilization of the masses has been a recurring threat to the game. Periodically, a politician who doesn't like the elite's fixed rules is tempted to reach out to Brazil's masses, both to secure his own power and to help the downtrodden. Seeing the threat, Brazil's elites, through the military, remove it and try to demobilize the masses. Mobilization and demobilization can be seen as cyclical.

South Africa

South Africa's party system is more complicated than most European party systems. In South Africa, there exists both a left-to-right axis and a black-and-non-black axis as well.

The areas where black and non-black parties touch (for example,between Inkatha and the Conservatives) enables dialogue, although not necessarily agreement. Between the Conservatives and PAC, or between the ANC and the AWB, a dialogue is impossible. The crucial area is where the parties are able to conduct a dialogue between them.

South Africa's emerging party system does not look promising. First, no party currently links Africans and non-blacks in a serious way. Ironically, only the Nationalist party appears to cut across the color line, with its white, black, and Indian supporters. Second, the black political spectrum is further left than the non-black spectrum, making a policy consensus difficult. Third, both the ANC and the Nationalists face "bilateral opposition," with forces tugging them both leftward and rightward. The ANC has Inkatha on its right and PAC on its left. The small Communist party is not, in fact, the most-left element working within the ANC, but is actually rather moderate in its views. The Nationalists have the Democrats on their left and the Conservatives on their right. Both of the two large parties could be pulled apart.

The Nationalist party system could collapse. Its salvation may depend upon the emergence of a large, moderate multiracial party; a decrease in the number of parties; and a weakening of both black and white extremist parties.

For over 5 decades, constructive dialogue between South Africa's blacks and whites did not exist. The regime simply governed by coercion and repression. Avenues of legal protest were systematically closed off; black and brown protests were automatically illegal and brutally stopped by the police. It was a virtual prescription for violence: plenty of injustice that could not legally be protested. Riot police used dogs, whips, tear gas, clubs, shotguns, and automatic rifles to disperse crowds of Africans. Secret police and army "hit squads" assassinated dozens of regime opponents.

When some of the worst police state restrictions eased in 1990 and black movements became legal, there were still few constructive interactions between

blacks and whites. Instead of building bridges between the two groups, the Nationalists had deliberately, over the decades, destroyed them. Few whites had contact with Africans outside of a master-servant or boss-employee relationship. For decades there had been no church, club, university, sports association, or political party to serve as a meeting ground. Today, most whites desire a constructive dialogue with blacks. This has proven difficult but is improving. After decades of abuse, many blacks are angry; some are revolutionary. When Nelson Mandela became President of South Africa, the apartheid program ended. Blacks and whites are now forging a reconciliation and working toward a common destiny.

— *John A. Xanthopoulos*

Further Readings

Kramer, J. (1996). *The politics of memory: Looking for Germany in the new Germany*. New York: Random House.

Page, J. (1995). *The Brazilians*. New York: Addison-Wesley.

Studlar, D. T. (1996). *Britain: Decline or renewal?* Boulder, CO: Westview.

Sun, Y. (1995). *The Chinese reassessment of socialism, 1976–1992*. Princeton, NJ: Princeton University Press.

Tishkov, V. (1996). *Ethnicity, nationalism and conflict in and after the Soviet Union*. Thousand Oaks, CA: Sage.

Waldmeir, P. (1997). *Anatomy of a Miracle*. New York: Norton.

Political Science

In its most basic form, political science can be defined as the study of both the institutions that form states and governments, and the political processes that animate them. The project of systematically examining both normative and positive theories of government and social relationships is an ancient one, dating back at least 3,000 years. Plato, Aristotle, Thucydides, and Machiavelli are all claimed as foundation figures within the discipline of political science. Early political thinkers both inquired as to what ideal political relationships should be (Plato), and sought to describe these relationships as they actually existed (Thucydides and Machiavelli). Both of these lines of questioning can still be found in the discipline today.

While the roots of political inquiry may be old, the modern field is much more recent. Political science as a distinct area of study is only known from the end of the 19th century onwards. Before that the examination of politics was often folded into history. Historian Herbert Baxter Adams (1850-1901) is credited with coining the phrase "political science" in 1880. Adams later founded the *Johns Hopkins Studies in Historical and Political Science* series. However, it was John William Burgess (1844–1931) who was responsible for founding the first school and graduate faculty of political science at Columbia University, also in 1880. Columbia would dominate this field of study throughout the remainder of the 19th and early 20th centuries.

Structure of the Discipline

In the current era the discipline of political science is divided into a number of loosely defined, often overlapping, subfields based primarily on area of inquiry. The most common of these in American departments are: political theory, comparative politics, international politics and American politics. In the last decade many departments have also added "methodologists" who are tasked with developing formal tools that can be used in any of the areas of the discipline. Departments outside of the United States often substitute the study of their own national politics for the "American" field, (which is then often seen as a highly developed branch of comparative politics). Public policy and public administration are often viewed as applied areas of the discipline.

Of the four main fields, American, comparative, and international relations generally adopt a relatively empirical view of the world, and often seek to construct theories based on the logic of scientific inquiry. Americanists tend to be interested in how a certain set of institutions and social processes (democracy) affect political outcomes in the American context. While this is in some senses the most bounded field in the discipline, it is probably also the most richly developed. Comparativists seek to examine different institutional and social structures and ask how those specific differences condition outcomes. Practitioners of international relations are primarily concerned with the principles that order both political and

economic affairs between states and other actors in the international system.

Political theory, in contrast, seeks to construct and interrogate a historical canon of political thought and to more closely investigate ethical and moral questions involving politics, governance, and power. As such, political theory firmly anchors the normative aspect of the discipline. It is also responsible for providing many of the foundational ideas and concepts that are used in other areas' fields.

Methods and Content

One of the most pressing problems facing political scientists is how to circumscribe, or provide some sense of attachment to, their research when the political process is by definition closely connected to so many other social spheres. Several basic approaches to this problem have arisen, all of which are currently seen in the field. The first of these is to start by examining the basic institutions and structures that control governance and ask how these sets of shared rules impact outcomes.

This was the first systematic approach adopted in the field when the German school of *Staatslehre* was imported to the United States by Burgess in the late 19th century. *Staatslehre* was dedicated to studying the differences between state institutions and often adopted a highly legalistic framework for analyzing their impact. However, the institutional criteria for defining the bounds of the field ultimately proved unsuccessful as so much of what goes on in politics is not institutionalized in a way that it is readily accessible to legal theory. As early as 1885 Woodrow Wilson (also a political scientist), in his seminal work *Congressional Government,* argued that in order to understand how real legislative power is wielded we must leave behind "literary" theories of the constitution and instead focus on the emergence of the committee system and how power is actually wielded in the course of the decision-making process.

This then led to the emergence of new ways of conceptualizing the field based on functions, rather than structures. Thus politics were regarded as not so much a set of deterministic legal institutions as an activity in which individuals engaged. In essence, politics became a set of functioning relationships characterized by an exchange of power to allocate both policy and scarce resources. This move allows for a substantial broadening of the field as basic functional mechanisms, rather than narrowly defined institutional arenas, emerge as key elements of how research areas are selected. The degree of this broadening varies by subfield, but the discipline as a whole has moved well beyond a simple investigation of the structures of states and governments.

Following the ultimate decline of the legalism movement and the trend away from *Staatslehre,* the field moved into an era that is often described as "realism." As Wilson, a proponent of the movement, demonstrated, its main concern was with more accurately capturing the processes by which real political outcomes were achieved. This necessitated a change in methodologies as it was realized that important non-state groups were having a substantial impact on the political process, groups which had previously been overlooked. As new and important social groups were described, specialized areas within the field were created to deal with them.

This paved the way for the behavioral revolution, which affected many fields in the 1950s and 1960s including political science. Increasingly, political scientists decided that it was necessary to describe the behaviors that led to group formation in the first place. This required focusing more attention on individuals to understand the ultimate economic, social, and psychological motivations that contributed to their behavior. Methodological innovation, including an increased formalism, both in terms of an acceptance of the scientific method as a guide for inquiry, and the reliance on formal empirical techniques, characterized much of the work completed in this movement.

Behavioralism became increasingly vocal and skeptical in its criticisms of the older descriptive research tools. Several specific research areas within the discipline (especially American politics and some areas of international relations) have continued to develop this more formalized and empirical approach. Political theory and comparative politics, while still profoundly impacted by the behavioralist revolution, were not as fully penetrated.

This new approach was scrutinized in the early 1970s as a number of criticisms were launched. The most widely debated of these was a movement to bring the state, as a distinct actor with unique interests, back into the investigation of the political process. Second, while behavioralism offered a number of systematic accounts for how a certain set of values or attributes would impact outcomes, it was never concerned with the more basic issue of how

those values were generated in the first place. Last, despite its formal rigor, the research program failed to generate any substantial new, non-trivial, findings that could lead to reliably predictive results.

More recently, rational choice theory has sought to reintroduce formal theory to political science by drawing on insights from microeconomics and game theory. Rational choice theory as a research program is also methodologically individualistic and concentrates on how actors choose between alternative options. While certain scholars working within this tradition attempt to account for issues like cultural change, systemic behavior, and value formation, opinion in the field has been mixed as to their success.

While rational choice theory continues to expand in certain areas of the discipline, it too has come under concerted criticism from the more historical, theoretical, and qualitatively minded branches of the field. Again these scholars point to the lack of new insights or predictive hypotheses as evidence of the bankruptcy of the research program. Further, its formal and mathematic nature makes its arguments relatively opaque to those who are not trained in its traditions. A more recent round of challenges has been posed by a diverse group of scholars grounded in critical theory, constructivism, and to a lesser extent postmodern theory. This debate will likely continue.

Political Science and Anthropology

The last 4 decades have seen increased interest in politics among anthropologists, both as their subjects were increasingly impacted by the turbulent events of the 20th century, and as they have concluded that politics, too, can only be understood in terms of symbols and processes embedded in unique social and cultural frameworks. Introductory textbooks on political anthropology appear with some regularity, and the American Anthropological Association has a section dedicated to the subject. Like political science, political anthropology is interested in the structure and functioning of political systems, but is more likely to see the process as being driven by social and cultural factors. The two fields share a related interest in many of the same research questions, including nationalism, development, establishing of social norms, identity politics, fundamentalism, and political violence.

Of course a pervasive interest in many of these same questions predates the 1960s and is deeply rooted in ethnographic, and particularly British, social anthropological analysis of non-Western societies. An early landmark work that reviews how social anthropologists perceived politics prior to World War II is M. Fortes and E.E. Evans-Pritchard's *African Political Systems* (see especially the introductory essays). Social, economic, and political analysis have been firmly welded together in works such as E.E. Evans-Pritchard's *The Nuer,* E.R. Leach's *Political Systems of Highland Burma,* Fredrik Barth's *Political Leadership among Swat Pathans,* or Max Gluckman's seminal essay "Peace in the Feud." For the field of political science in general, and international relations in particular, an important insight to emerge from many of these works is the detailed study of the emergence of a clear order in social systems that might be characterized as anarchic or acephalous.

While acknowledging the essential insight of political anthropology that politics is also a cultural system, political scientists can still make substantial contributions to these research efforts, both in terms of basic theorizing about nature and effects of power exchanges, and by laying out a more global overview of large-scale events and trends in which individual, intensive, studies can be placed and contextualized. Much room exists for interdisciplinary cooperation in each of the topics outlined above, and it is clear that both political science and political anthropology could benefit from increased dialogue and collaboration.

— Benjamin N. Judkins

Further Readings

Almond, G., Powell, B., Strøm, K., & Dalton, R. J. (2004). *Comparative politics: A theoretical framework.* Lexington, MA: Addison Wesley Longman, Inc.

Easton, D., Gunnell, J. C., & Graziano, L. (Eds.). (1991). *The development of political science: A comparative survey.* New York: Routledge.

Farr, J., & Seidelman, R. (Eds.). (1993). *Discipline and history: Political science in the United States.* Ann Arbour, MI: University of Michigan Press.

Geertz, C. (2004). What is a state if it is not a sovereign? Reflections on politics in complicated places. *Current Anthropology, 45*(5).

Lewellen, T. C. (2003). *Political anthropology: An introduction* (3rd Ed.). Westport: Greenwood Publishing Group.

Rawls, J. (1999). *Theory of justice* (Rev. Ed.). Cambridge: Belknap Press of Harvard University Press.
Roskin, M. G., Cord, R. L., Medeiros, J. A. & Jones, W. S. (2002). *Political science: An introduction.* Upper Saddle River, NJ: Prentice Hall.
Vincent, J. (2002). *The anthropology of politics: A reader in ethnography, theory, and critique.* Oxford: Blackwell Publishers.

Polyandry

Anthropologists have long recognized that marriage, while widely variable in meaning and form, is cross-cultural. One way that marriage varies pertains to the cultural norms dictating the appropriate number of spouses in the marriage. Monogamy is a marriage pattern where a person may only have a single spouse at a time. Polygamy is a marriage pattern that allows for multiple spouses. Polygamy comes in two main forms, polygyny and polyandry. In polygynous marriages a man is married to more than one woman at the same time. Polyandrous marriages, which occur in fewer than 5% of societies, involve the marriage of one woman concurrently to several men. Polyandry is the rarest form of marriage, having generally been found only in areas of Nepal, Tibet, India, and Sri Lanka. Each of the groups that practice polyandry differs somewhat regarding the relationship of the husbands to one another, paternity classifications, and socio-economic benefits of the marriage.

In some polyandrous societies, as with the Sinhalese of Sri Lanka, a woman marries men who are unrelated to each other. However, the most common form of polyandry, known as fraternal polyandry, involves the marriage of a woman to two or more brothers. For example, many ethnic Tibetans and the Toda of southern India have wedding ceremonies for a woman and the oldest of a group of brothers, but all of the brothers, even those not yet born, will be considered married to the bride. All will live together to form a family unit.

Another important consideration is sexual access to the wife and recognition of resulting paternity. Most ethnic Tibetans in Tibet and Nepal share sexual access to the wife. Jealousy seems diminished due to solidarity of the brothers. For the Tibetan Ladog people of Nepal, for example, equality of sexual and procreative rights of all brothers is stressed. For the Tibetan Gyaling people of Nepal, the elder brother is the primary husband and father, and the wife is only obliged to have sex with him. While she, nonetheless, typically engages in sexual relationships with the other brothers, they are not formally recognized as the genitors of any of their children. In contrast, for the Sinhalese of Sri Lanka, while the first husband remains the principal husband, all brothers share the status of father equally, regardless of actual paternity. For the Toda pastoralists of India, the oldest brother claims paternity rights of all children but shares social fatherhood, and associated rights and obligations, to the children.

We may ask what purpose such a rare form of marriage serves. It seems likely that polyandry prevents the division of scarce resources and land while limiting population growth. Successive generations of brothers will hold the land in common, taking a single wife, rather than dividing the land among several new nuclear families. The political and economic position of the household increases as the resources are concentrated and husbands can specialize in diverse forms of economic production (for example, herding, agriculture, and trade) or combine their efforts at a single form.

The future of polyandry is uncertain. A sharp decline of this marital practice has followed modernization and participation in a global economy. As men increasingly work for cash wages, it seems no longer practical to share resources, land, and a wife.

— *Catherine Mitchell Fuentes*

Further Readings

Cassidy, M. L., & Lee, G. R. (1989). The study of polyandry: A critique and synthesis. *Journal of Comparative Families Studies, 20,* 1–11.
Goldstein, M. C. When brothers share a wife. *Natural History, 96,* 38–49.
Hiatt, L. R. (1980). Polyandry in Sri Lanka: A test case for parental investment theory. *Man, 15,* 583–598.
Levine, N. (1987). Fathers and sons: Kinship, value and validation in Tibetan Polyandry. *Man, 22*(2), 267–286.
Levine, N. (1988). *Dynamics of polyandry: Kinship, domesticity, and population on the Tibetan Border.* Chicago, IL: Chicago UP.
Levine, N. (1997). Why polyandry fails: Sources of instability in polyandrous marriages. *Current Anthropology, 38*(3), 375–399.

Polygamy

Polygamy allows marriage to more than one person at the same time. The practice of polygamy, or plural marriage, includes polygyny and polyandry. Polygyny allows men to marry more than one woman simultaneously. It is much more common than polyandry, which allows women to take multiple husbands. Polyandry is practiced in only a few cultural groups in Nepal, India, and Tibet.

Polygamy appears once to have been widely practiced, but is less common today, yet it is practiced still in some Muslim countries and parts of Africa. In most of the world's contemporary societies, especially where divorce is common and easy to achieve, polygamy is illegal. Although some cultures legally allow polygyny, most North Americans practice serial monogamy where one may have more than one spouse in a lifetime, but never more than one legal spouse at a time. In polygynous societies, such as the Mormon Latter Day Saints or Arabic-speaking Muslim societies, polygyny is indicative of a man's wealth or heightened social status.

Jealousy is a serious threat to the polygynous lifestyle. In sororal polygyny, sisters become cowives because society believes that since they have grown up together, sororal cowives will get along and cooperate better. In societies where the cowives are nonsororal, cowives often establish their own living quarters or households. Additionally, customs which include clearly defined economic, sexual, and familial rights also help reduce jealous feelings. For example, senior wives most commonly maintain special prestige in the polygynous family.

Polygyny was advantageous in societies where pregnancy dictated sexual abstinence. Where postpartum sex taboos existed, new mothers were required to abstain until the child was weaned from the mother's breast. Polygyny was also seen in cultures with an abundance of marriageable women. For example, in postwar societies where many men have died in battle, excess populations of women remain who seek husbands. Other times, men simply choose to marry later in life, again leaving an abundance of women available for marriage.

The other form of polygamy is polyandry. This much less prevalent practice allows women to have multiple husbands. If the cohusbands are brothers, it is called fraternal polyandry. When a woman becomes the wife of some or all the brothers in a family, the biological paternity of her children are of no particular concern. For example, Tibetans who practice fraternal polyandry do not attempt to indicate any one brother as a biological father. All children are treated the same, and they consider all the cohusbands to be "father."

The reasons that a society practices polyandry are similar to those for polygyny. In some societies, there may have been a shortage of women, which may be linked to female infanticide. Polyandry might also be a response to severely limited resources. For example, to avoid the division of a family farm, brothers will share a wife and preserve the family farm. Polyandry also helps minimize population growth so that standard of living in a polyandrous family would be better than in a non-polyandrous family, or in a family run by an unmarried woman.

— Debra M. Lucas

Further Readings

Bartholomew, R. (1995). *Audacious women.* Salt Lake City, UT: Signature Books.

Broude, G. (1994). *Marriage, family and relationships: A cross-cultural encyclopedia.* Santa Barbara, CA: ABC-CLIO.

Fox, R. (1987). *Kinship and marriage: An anthropological perspective.* New York: Cambridge University Press.

Ogden, D. (1999). *Polygamy, prostitutes and death: The Hellenistic dynasties.* London: Duckworth and the Classical Press of Wales.

Tracy, K. (2002). *The secret story of polygamy.* Naperville, IL.: Sourcebooks.

Polygyny

Polygyny is defined as marriage between one man and two or more wives concurrently. It is one form of polygamy, the marriage of a male or female to two or more spouses concurrently. It contrasts with polyandry, the marriage of a woman to two or more husbands at the same time, which is rare, and with monogamy, the marriage of a man or woman to just one spouse. Serial monogamy is the marriage of a person to two or more spouses in sequence, and can have consequences not unlike those of polygamy.

The concept of polygyny presupposes the universal applicability of the category of "marriage," which is not in fact a straightforward matter; during the period when anthropologists were trying to agree on the definition of terms of art, it proved difficult to arrive at criteria for marriage that were universally, or even very generally applicable. Consequently, what one anthropologist describes as polygyny another may describe as concubinage. Polygyny entails inequalities in the ability of men to reproduce sexually, but the political and economic consequences of polygyny vary greatly with the bases of social organization.

The Distribution of Polygyny

Polygyny has been widely distributed in human societies through prehistory and recorded history. Ireänus Eibl-Eibesfelt found that it occurred in 83.5% of a large sample of modern societies, although monogamous unions were 2.5 times more frequent than polygynous unions. Its occurrence has been reported in many recent and contemporary hunter-gatherer and horticultural societies, in precolonial South America, Africa, Polynesia, and Australia, for example. Polygyny was practiced in ancient Hebrew society, and with the exception of certain liberal Islamic movements, is accepted in Islamic societies. It was not officially permitted, however, in ancient Greece and Rome, or in Christian societies, with the exception of early Mormonism.

Perspectives From Sociobiology and Evolutionary Psychology

Sociobiologists and evolutionary psychologists have sought to explain the incidence of polygyny in terms of natural selection. Trivers's theory of sexual selection and parental investment has been influential. Sociobiologists have explained the widespread institution of polygyny in terms of the differences in male and female reproductive strategies. Pregnancy, it has been argued, involves a much greater investment than male insemination. Men have evolved a desire for sexual access to a large number of women and will compete for access to women, whereas natural selection predisposes women to assess men as potential providers, and for the quality of their genes, as indicated by various markers such as symmetry.

Sexual strategies theory attempts to explain why men tend to adopt short-term mating tactics to a greater extent than women, but recent studies emphasize that both men and women have evolved mixed strategies, and that strategies are conditional in particular circumstances. Depending on environmental conditions, women ought to make a trade-off between male genetic quality and parental investment. For example, with latitude and geographical regions held constant it has been shown that polygyny is more common in societies where pathogens are more prevalent. This has been explained as resulting from women's favoring indicators of good genes (and hence, resistance to pathogens) as against indicators of exclusive parental investment. Polygyny has also been found to be more prevalent where women have more control over resources. This has been explained by their decreased dependence on male parental investment.

Polygyny in Evolution

Biologists use the term "polygyny" to indicate differences in access to mates, whether or not associated among humans with the institution of marriage. DNA studies have found that lineages associated with the Y-chromosome are fewer than lineages associated with mitochondrial DNA, suggesting that until recently a small proportion of men contributed a large fraction of the Y-chromosome pool at every generation. Dupanloup and colleagues have argued that humans have been "polygynous" through most of their history, but the number of breeding males may have increased and the variance of their reproductive success may have decreased through a recent shift from (institutional) polygyny to monogamy.

Polygyny in Egalitarian Societies

In relatively egalitarian societies polygyny is technically possible where there is an unequal sex ratio, due perhaps to warfare, or where men marry later than women. The latter is the condition that prevailed among Australian Aboriginal people such as the Yolngu and the Yanomamö of the Orinoco basin.

In assertively egalitarian societies such as the G/wi people of the Kalahari Desert, where marriage is by mutual consent, but subject to parental approval, polygyny occurs by mutual consent and is uncommon. In Australian Aboriginal societies polygyny was highly institutionalized, and associated with systems

of marriage bestowal (including infant bestowal) in which marriage choices were limited by kinship, and arranged between potential husband and wife's kin. A female was first bestowed as an infant, or even before her birth, but usually took up residence with the husband around puberty. Marriage was an exchange either in kind (as in brother-sister exchange) or for a prolonged series of gifts and services. Combined with bestowal, leviratic marriage increased the possibility of polygynous marriage. Polygyny in most regions reached levels of two to three women among some older men, but reached very high levels in some regions in the north of the continent.

Polygyny in these societies provided a route to power and influence. Combined with patrilineal groups it was a strategy for increasing group size and political support, and spreading alliances. In some pastoral societies, such as the Turkana, the requirement for bride wealth, together with the control of stock by older men, delayed the marriages of younger men, and was associated with an age grade of bachelor warriors. In other pastoral societies such as the Samburu, an age-set system together with elaborate initiation rites delayed young men's marriages.

Polygyny in Hierarchical Societies

In the hunter-gatherer societies of the Northwest Coast of North America, which were unusual among such societies in having marked inequalities of status, wealth, and power, polygynous marriage was undertaken to establish alliances between families, because it increased household size and labor power, and because it enhanced the ability of high-ranking heads of households to organize potlatch exchanges, and increased the size and competitive advantage of the descent group.

Polygyny was also a feature of African farming chiefdoms, where marriage was associated with bride wealth in the form of cattle and other stock, as well as money. For example, among the Kgatla of what is now Botswana in southern Africa, most commoner men in the precolonial past had only one wife at a time, sometimes two, and rarely three or four. Households with four or more wives were found among members of the royal family or other prominent or wealthy individuals. Chief Kgagamanye, who was chief of the Kgatla from 1848–1875, had 46 wives. Comaroff found that Tswana men had later substituted serial monogamy for polygyny to make strategic alliances.

Turning to an example of a state system, some authors have depicted concubinage in China as polygyny. Patricia Ebrey argues, however, that in traditional China it was illegal and socially disreputable for a man to have more than one wife at a time, but he could have as many concubines as he could afford. During the Song dynasty, concubines, like servants, were most common in wealthy families. The status of concubines differed from that of wives in that no wedding ceremony was prescribed, there was a market for concubines, and they were ranked lower than wives. Rules of incest and exogamy applied to concubines, however, and children of concubines had the same status as children of wives. In the Qing dynasty it became permissible to promote a concubine to a wife under certain conditions.

— Ian Keen

Further Readings

Chagnon, N. (1979). Is reproductive success equal in egalitarian societies? In N. Chagnon & W. Irons (Eds.), *Evolutionary biology and human social behavior.* North Scituate, MA: Duxbury.

Dupanloup, I., Pereira, L., Bertorelle, G., Calafe, F., Prata, M. J., Amorim, A., et al. (2003). A recent shift from polygyny to monogamy in humans is suggested by the analysis of worldwide Y-chromosome diversity. *Journal of Molecular Evolution, 57*, 85–97.

Goody, J. (1976). *Production and reproduction: A comparative study of the domestic domain.* Cambridge: Cambridge University Press.

Polynesians

Polynesia ("many islands") is one of the three major cultural areas or regions in the Pacific Ocean, the others being Micronesia ("small islands") and Melanesia (dark or "black islands"). It was Dumont d'Urville who first subdivided Oceanic peoples into these groups based primarily on cultural traits, but these regions also have geographical boundaries, some of which overlap culturally, biologically, and linguistically.

Polynesian societies are generally found within the "Polynesian Triangle" whose points are New Zealand,

Source: © Peter Guttman/CORBIS.

Hawai'i, and Easter Island (Rapa Nui); however, this is not a clear distinction: Numerous societies that speak Polynesian languages or have similar cultural traits are found west of the triangle in Melanesia and Micronesia and are known as Polynesian Outliers. These outliers include Tikopia, Anuta, Nukuoro, and Kapingamarangi, among others.

Lapita, the First Polynesians

Scholars generally agree now that the ancestors of Polynesian people, who made a distinctive type of pottery called Lapita, migrated from insular Melanesia around 3500–3400 B. C. eastward into New Caledonia, Vanuatu, Fiji, Tonga, and Samoa. This ancestral Polynesian society seems to have begun in the latter three of the archipelagoes and eventually moved further eastward into the far corners of the triangle, occupying many of the islands in between.

Archaeologists still debate, however, whether Lapita derives from an indigenous population in Melanesia or represents a completely new group of seafarers who moved southward from Taiwan through the Philippines on their way into Near Oceania around 2500 B.C. Some archaeologists, such as Patrick Vinton Kirch at the University of California–Berkeley, have been strong proponents of the view that Lapita represented an intrusive development deriving from an expansion of peoples who spoke languages related to the Austronesian family. The earliest pottery from Lapita deposits in the Bismarck Archipelago appears to be related to sites found on islands such as Sulawesi and the Philippines, but the Lapita style of pottery decoration seems to be something unique that may represent a melding of both Austronesian-speaking and Papuan cultures in Near Oceania. Nonetheless, it is clear that Lapita disperses southward and eastward, bringing along a host of new plants and animals as well as a distinctive cultural kit with which to exploit these new island environments.

Archaeology in Polynesia

As archaeological research in Polynesia increased in the 1950s and 1960s, it became clearer to archaeologists such as Jack Golson (Australian National University)

and Roger Green (University of Auckland), that Lapita pottery-producing peoples successfully crossed the nearly 900-kilometer ocean gap between Vanuatu and/or the Solomons into Fiji by 1200–1000 B.C. Other nearby island groups, such as Samoa, were colonized by around 1000 B.C. as evidenced by the spread of early Lapita pottery as well as artifacts made from chert, obsidian, basalt, and other stone. The introduction and cultivation of various plants (including taro) and animals (like the dog, pig, and chicken) also testifies to a new human (and Lapita) presence on these islands.

The continuing social and economic interaction of human groups living in the newer environments of Fiji, Tonga, and Samoa, along with their relative isolation from the Near Oceanic homeland, led to the development of this unique Polynesian culture. Over the course of the first millenium B. C, these cultural traits changed as the highly decorated, dentate-designed pottery characteristic of early Lapita became plainer and thicker. Some tool forms changed in response to the discovery of new stone resources (for example, the adz), while others remained fairly consistent over time (for example, fishing gear). The cultural characteristics that evolved from the first Lapita settlers into ancestral Polynesian cultures included not only plain ware, but adzes made from *Tridacna* (giant clam) shell and basalt; *Conus* shell beads and rings; one-piece *Turbo* shell fishhooks; abraders made from sea urchin spine, coral, or pumice; and a myriad of other tools produced from basalt, obsidian, and various stone types. One can assume that an even wider range of artifacts and other cultural remains made from perishable materials were not preserved in the archaeological record.

Polynesian Seafaring and Colonization

Determining the origin of Polynesians and the method by which they settled islands in the Pacific has been the focus of much research and debate. When Europeans arrived in the Pacific and encountered a mosaic of different cultures, it was evident that many Polynesian groups were fully capable of traveling both long and short distances across the ocean using double-hulled and outrigger canoes, and that they did so freely. Many early explorers commented on how the highly skilled Polynesian seafarers traveled easily over the ocean, and they noted that long-distance round trips between islands were more an exercise in endurance than an exceptionally difficult navigational exercise. Native groups used the stars for navigation; fixed their location using mental maps of the sea; effectively harnessed the wind; and paid close attention to cloud formations, sea bird behavior, currents, and winds that would reveal an island's location.

Despite these early observations, many of the seafaring and boat-building skills were lost over time, and some scholars began to suggest that Polynesians could have only settled the islands accidentally by going with the prevailing winds and currents from east to west. In the 1930s, Sir Peter Buck (also known as Te Rangi Hiroa) proposed that Polynesians had originated from somewhere in Asia, passing through Micronesia on their way to Samoa and eventually the Society Islands. An alternative and controversial hypothesis was proposed by Thor Heyerdahl in the early 1950s; Heyerdahl suggested that Polynesians had Native American roots, and had instead migrated from the Americas. Although this theory was not taken seriously by most scholars, his famous *Kon-Tiki* voyage from South America into the Pacific using an indigenous form of a Peruvian reed boat indicated that a drift voyage like this could be done. A contrasting theory, but one also based on the idea of drifting, was proposed (also in the 1950s) by Andrew Sharp, who suggested that Polynesians were incapable of purposefully reaching islands by sailing, and that drift voyaging was the norm; in other words, the islands were settled by chance encounter.

These possibilities have been disproven by many lines of evidence. Archaeological, linguistic, and ethnographic research conducted during the last 50 years definitely points to a western migration route. Not only do similarities in artifacts, language, and cultural traits within Polynesia indicate that people purposefully sailed to these islands by going against, across, and down the wind in a general easterly direction, but sophisticated computer models (using historical and modern oceanographic data and experimental voyages) also indicate this to be the case. In 1976 a replica of a Polynesian canoe called *Hokule'a* successfully made the trip between Hawai'i and Tahiti; in 1999 it traveled to Easter Island. Other, similar voyages using experimental craft—many without the help of modern navigation technologies—have crossed the ocean gaps between islands hundreds of kilometers apart.

The ability of Polynesians to settle some of the most remote places on earth is undisputed, and archaeologyl

is now providing evidence of increased interaction between island groups. Polynesian peoples referred to *Havaiki,* a place called the "immediate Polynesian homeland," in the archipelagoes of Tonga and Samoa. Beginning perhaps as early as 200 B.C., but with more credible evidence dating to ca. A. D. 600, Polynesians began venturing out of Tonga-Samoa and migrating eastward into the more remote fringes of the Polynesian triangle. When these migrations occurred is debatable largely because of a lack of reliable radiocarbon chronologies in places like the Marquesas, and lack of field research in the Society and Austral Islands. If the settlement of Fiji-Tonga-Samoa was fairly contemporaneous, but proceeded no further until the first millenium A. D., there would have been what Pacific archaeologists call a long pause of human expansion. Some archaeologists, including Atholl Anderson (Australian National University), have argued that, in order to prove human existence on these islands, artifactual evidence and reliable radiocarbon dates must be found together at primary occupation sites. Others, including Patrick Kirch, instead argue that environmental or "proxy" evidence (such as pollen from plants introduced by humans, increased charcoal counts from forest clearance, or the appearance of non-native animals like the rat or garden snails) are proof enough that humans occupied the landscape without needing to have the artifacts themselves.

Source: Photograph from the Bishop Museum, Honolulu, Hawaii.

If proxy evidence is accepted, the Cook Islands, for example, may have been occupied somewhere between 500 B. C. and A. D. 0. Several archaeological sites in the Marquesas (for example, Hane, Hanatekua) suggest a human presence from 200 B. C. to A. D. 300, but dates from the same stratigraphic layers have been inconsistent, which leaves questions as to the validity of the archipelago's chronology at this time. Good evidence points to islands such as the Australs, Cooks, Rapa Nui, and Pitcairn as being settled by at least A. D. 900–or 1000; Hawai'i by A. D. 800 (and perhaps earlier ca. A. D. 300); and New Zealand, shortly thereafter, around A. D. 1000.

Despite these chronological issues, some early sites have been excavated in East Polynesia that lend great insight into human movement across the seascape, traditional navigation and seafaring strategies, human adaptation in increasingly remote (and sometimes partially or completely isolated) environments, settlement patterns, and the rise of sociopolitical complexity.

Polynesian Settlement and Lifeways

Early Polynesian settlements are characterized by smaller villages located on or near coastal areas. Many communities on these islands, not unlike peoples living in other tropical or subtropical island regions, chose to settle along coastlines that were close to freshwater, lagoonal, and/or reef resources. In East Polynesia, dune or beach terrace sites are common during the earlier periods of settlement. Archaeological

evidence suggests that some residential structures were placed on stone pavement, while others had gravel floors. It is thought that the prototypical *marae* temple may have started at or close to this same time.

Early Polynesians were horticulturalists whose Lapita ancestors brought with them over two dozen species of plants, fifteen of which are known from archaeobotanical remains and the remaining from linguistic or other lines of evidence. These cultigens include two major staples for Pacific peoples—taro and yams—as well as coconuts, bananas, breadfruit, tree fruits, and nuts which were transported into the Pacific Islands by Austronesian speakers. Settlers probably had small garden plots and actively implemented a slash-and-burn or swidden strategy of cultivating plants, in which small sections of forest are cut down and burned, thereby clearing the area and providing essential nutrients to the soil. Perennial tree crops were likely scattered in or around the villages, while root and tuber crops like taro were annually cultivated in the forest.

One domestic plant that was extremely important to many islands in East Polynesia (especially Hawai'i, New Zealand, and Easter Island) was the sweet potato, which is indigenous to South America. The issue of whether the sweet potato, as well as the non-native *Lagneria* gourd, was introduced by Polynesians or Europeans was debated for years until research indicated that both were introduced prior to European contact. The fact that the sweet potato was found in places like Easter Island had seemed to support Thor Heyerdahl's westward migration hypothesis; however, it now seems more likely that, given the advanced seafaring capabilities of Polynesians, the Polynesians instead reached South America and brought the sweet potato into the Pacific Islands. As these societies became more technologically proficient at growing these and other crops, intensive forms of agriculture were developed that used large-scale valleys and implemented hillside irrigation systems, sometimes with dire environmental consequences as erosion increased and habitats for native plant and animal populations decreased. One of the largest impacts was to native birds—dozens of which became extinct in Hawai'i and other Pacific Islands after Polynesian arrival.

Although the cultivation of plants was central to Polynesian society, the basic diet was supplemented with foods from the sea. Polynesians exploited a wide range of marine resources including mollusks, crabs and other shellfish, birds, turtles, and both nearshore and offshore fish. Based on the presence of fish bones found in archaeological sites, it is apparent that the resource-rich, nearshore fisheries were more heavily exploited, although offshore fishing was practiced using watercraft and trolling lure technology, as shown by the artifacts and the fish bones from tuna and other offshore species. Many of these marine resources were used for making tools as well as for food. A plethora of artifacts made from mollusk shell, sea urchin, and bone attest to the importance of rich lagoonal and reef habitats.

The introduction of domesticated animals—namely the pig, the dog, and the chicken—was also a trademark of Polynesians and their ancestors. All three animals originate from Southeast Asia and were brought to the farthest reaches of the Pacific (though not all are found on every island or thought to be equally important within every Polynesian society) as part of the "transported landscape," representing a major effort by Pacific Islanders to adapt to and transform their environment to suit their needs.

Although marine and introduced foods were critical components in the diets of Polynesians, terrestrial resources were also plentiful. Sea and land bird remains are often found in archaeological sites, as are various species of land crabs. On some islands like Fiji and Tonga, lizards were also exploited for food.

Polynesian Exchange and Social Complexity

Another characteristic of Polynesian societies was the interisland movement and exchange of prized goods and resources that effectively linked communities together. The transport of shell and stone, and the artifacts made from these materials, are a testament to the importance they had to native Pacific Islanders and the prehistoric linkages that long-distance overseas voyaging provided. Through techniques that test the chemical composition of artifacts, it is known, for example, that basalt found at archaeological sites in Mangaia (Cook Islands) originated from the island of Tutuila in American Samoa over 1,600 kilometers away; another study showed that stone for adze-making found in Mo'orea (Society Islands) came from the Marquesas. The remarkable distances covered provide further evidence that sailing was indeed an important skill that was harnessed to purposefully voyage between islands in Polynesia.

As each of the major island groups in Polynesia was settled, the societies developing within became increasingly complex. At the time of European contact, social structure was typified by what has come to be known as chiefdoms, in which societies are hierarchically ranked and led by a chief who inherits the position through kin affiliations (i.e., determined by genealogy). There was great variation in how these chiefdoms were organized, as well as in the size of their populations. Some simpler forms of the chiefdom were found on smaller atolls and had only minor distinctions between social classes, while others, like Hawai'i, were rigidly stratified. Over time these chiefdoms grew in population, became increasingly complex in social and religious behaviors, and made a concentrated shift to agriculture and animal domestication, thereby becoming less focused on smaller game and some marine animals; fishing, however, generally remained an important part of the subsistence.

As populations increased and social hierarchies developed, greater levels of conflict also developed, as is evident from fortifications such as the hilltop villages, or *pa,* in New Zealand, which enclosed residences, storage pits, and other domestic-activity areas in highly defensible positions. The emergence of stratified chiefdoms in Polynesia and the rise of what many have even called an "archaic state" in Hawai'i demonstrate that these island societies and their economies intensified, became more specialized, and transformed their environments to suit the changing needs of a growing population. Continued research will surely lend greater insight into the movement of Polynesians across the vast Pacific Ocean and their magnificent cultural traditions.

— *Scott M. Fitzpatrick*

See also **Aotearoa; Heyerdahl, Thor; Marqueses; Rapa Nui; Rarotonga; Samoa; Tahiti**

Further Readings

Allen, J. & White, J. P. (1989). The Lapita homeland: Some new data and an interpretation. *Journal of the Polynesian Society, 98*, 129–146.

Anderson, A. (1991). The chronology of colonization in New Zealand. *Antiquity, 65*, 767–795.

Bellwood, P. (1979). *Man's conquest of the Pacific: The prehistory of Southeast Asia and Oceania.* New York: Oxford University Press.

Irwin, G. (1992). *The prehistoric exploration and colonization of the Pacific.* Cambridge: Cambridge University Press.

Kirch, P. V. (2000). *On the road of the winds: An archaeological history of the Pacific Islands before European contact.* Berkeley: University of California Press.

Sharp, A. (1956). *Ancient voyagers of the Pacific.* Wellington: Polynesian Society.

Steadman, D. (1989). Extinction of birds in Eastern Polynesia: A review of the record and comparisons with other Pacific Island groups. *Journal of Archaeological Science, 16*, 177–205.

Terrell, J. E. (1986). *Prehistory in the Pacific Islands.* Cambridge: Cambridge University Press.

Polytheism

Polytheism (from the Greek *polutheos,* "many gods") denotes a theological system involving a belief in, and worship of, multiple divinities. The term was first popularized in the writings of 18th century European ethnographers as they sought to identify and label the religious beliefs of "primitive" peoples they studied and contrast them to Judeo-Christian monotheism, or the belief in a solitary divinity. Over time, polytheism has been used to refer to various belief systems in which multiple beings are worshipped or propitiated. These may include gods, goddesses, semi-divine beings, good or evil spirits, or the spirits of departed ancestors. Depending upon the tradition, there may be an established and recognized hierarchy of worshipped beings or they may be seen to act independently. They may work in conjunction with one another or occasionally at cross-purposes. There are several significant characteristics typically found in polytheistic traditions, including:

- Each divinity or spirit being is typically believed to have a specific function (such as healing, protection in travel, etc.), to control a particular realm (material or nonmaterial), or to possess a specific power or range of powers. The latter can include forces of nature—such as rain, thunder, a celestial body, the seasons—or it may involve dominion over characteristics of human personality, like love, devotion, compassion, jealousy, revenge, and so forth.

- Each being is generally believed to either possess or adopt a specific human or animal form, aspect of nature, or a combination thereof, as his or her primary vehicle for the purpose of communicating with humans. Thus, a particular animal or natural phenomenon may be viewed as the manifestation of a particular deity, or even as an ancestor spirit. An eagle may signal the presence of a guardian spirit, or an erupting volcano may be seen as the manifestation of an angry goddess. As a result, reverence toward, and worship of, nonanthropomorphic forms, including animals, plant life, objects in nature, and natural forces, are commonplace.

- Singular devotion to one specific divinity is not necessary. Thus, simultaneous propitiation of several deities is common and accepted. In some cases, it is seen as practical and necessary, since different spirits control different realms or powers.

In one manner or another, polytheism is found as a feature of most indigenous religious cultures throughout the world. Of the variety of theistic views that have been grouped into this category, some have also been identified with their own specific terminology. These include henotheism, kathenotheism, and monolatrism.

Polytheism is rooted in a desire to perceive, contact, and influence unseen powers and forces that affect human existence. It can be found among the earliest religious cultures of the world, in both the East and the West. Various ancient mythological records and tales reveal beliefs in spirit beings that were propitiated, worshipped, and/or feared. These divinities often existed at the center of the cosmological worldviews of the cultures in which they were found. Prayers, rituals, and offerings to them were seen as fundamental to the maintenance of the known world of the believers. Catastrophes were often viewed as the results of angered spirits. Thus, regular appeasement of such divinities has also been integral in many cultures.

The powers possessed by, or the responsibilities of, the divinities may be inherent, such as in the case of a Sun goddess or storm god, or they may be assigned to them by a higher divinity. Over time, the hierarchy of divinities in various cultures can change, with some beings either falling into disfavor or coming to be seen as powerless, while others rise in prominence and power. Thus, the hierarchy and composition of a polytheistic tradition is not necessarily static. Moreover, even within a tradition itself, different individuals may give preference or deference to a particular divinity over another. On occasion, the divinity connected with a ruling individual, family, or clan can come to dominate the attention and affection of a people. This can result in its elevation to the top of the hierarchy, and it also may lead to the banning and rejection of other divinities being worshipped at the time, resulting in a monotheistic view. The early histories of both Judaism and Islam suggest this pattern.

Although monotheism is viewed by most Western-educated people as being a more evolved theological view, this is primarily a Judeo-Christian perspective, although it is integral to Hinduism as well. Thus, polytheism continues to be a persistent and prevalent belief system. Moreover, with the exception of Judaism, Christianity, and Islam, polytheistic beliefs are integral in most of the world's religious cultures and traditions. The reasons for this are several. First, human conceptualization of divinity typically endows it with human-like characteristics, in both form and function. Images tend to be anthropomorphic and typically endowed with personality traits ranging from loving and compassionate to jealous and revengeful. In this manner, humans tend to conceive of the divine in their own image and likeness. Most of us experience power, knowledge, and authority as being possessed by many, not one. Whether it be in family, village, community, or nation, power tends to be in the hands of various individuals, and each tends to have a specific power and function. Within such a system, there can be various avenues to gaining assistance from one or more of those who possess these powers. Polytheism reflects this world experience in formulating its depiction of, and approach to, the realm of the divine.

Conversely, if one looks at the monotheistic concept of a solitary omnipotent divinity and at social and political systems in which ultimate power is in the hands of a single being, one typically finds absolute patriarchies, monarchies, and dictatorships. While such systems may be comforting to some, a solitary all-powerful ruler tends to be viewed as more distant from the individual and less available to provide personalized and individual assistance. Moreover, if supplicants unsuccessfully seek assistance from a singular authority, they remain helpless. Thus, the vast majority of individuals in such systems tend to remain weak and powerless. Alternatively, if there are a variety of beings to whom one can seek aid and comfort, the opportunity for success is greater.

Theologically, then, a multiplicity of deities to propitiate can provide comfort in the belief that if one

is not successful in acquiring the aid of a particular divinity, then that person can seek out the assistance of another deity. As a result, it tends to be emotionally and psychologically more assuring to have a variety of possible divine beings to which one can appeal for help. The manifestation of this can be seen in the belief found in many traditions of individuals or families having a special connection with a particular spirit. Examples of this include the Hawaiian concept of *aumakua,* the Hindu concept of *ishtadev,* and even the Christian concept of saints and guardian angels.

Polytheism, therefore, mirrors the common human experience of family, village, and state. It is frequently found in cultures with a clearly stratified social and/or political hierarchy, in which power is held in the hands of different individuals, based on their position within the hierarchy. Different divinities, like different bureaucrats, have different powers. One then approaches and propitiates the being with the requisite power to fulfill the needs or desires of the supplicant. Further, one can focus on a divinity that appeals to the personality of the supplicant. In many ways, then, polytheism is a more pragmatic theological view than is monotheism.

— *Ramdas Lamb*

See also **Hinduism**

Further Readings

Daniélou, A. (1964). *Hindu polytheism.* New York: Bollingen Foundation.

James, E. O. (1999). *The ancient gods.* London: Orion Publishing Group.

Kirsch, J. (2004). *God against the gods: The history of the war between monotheism and polytheism.* New York: The Penguin Group.

Porter, B. N. (2000). *One God or many? Concepts of divinity in the ancient world.* Chebeague, ME: Casco Bay Assyriological Institute.

Van Der Leeuw, G. (1986). *Religion in essence and manifestation.* Princeton, NJ: Princeton University Press.

Pongids

The pongids are the four great apes: orangutan, gorilla, chimpanzee, and bonobo. Rigorous primate-behavior field research during the last fifty years has clearly demonstrated that these apes are closer to the human species than Thomas Huxley, Ernst Haeckel, or even Charles Darwin had anticipated in the nineteenth century. Today, scientific evidence, ranging from biochemistry and genetics to morphology and psychology, confirms those striking similarities between these wild pongids and the human species in terms of organic evolution.

The wild orangutan or "man of the woods" *(Pongo pygmaeus)* is the only great ape of Asia; like the two lesser apes or hylobates (gibbon and siamang), this elusive pongid now faces extinction. This rare but fascinating red ape of Indonesia is found only on the islands of Borneo and Sumatra. Most orangutans live in the upper tropical rain-forest canopy; adult females and juveniles swing among the vines and creepers of this arboreal world, while huge adult males may leisurely forage on the damp jungle floor below.

The wild mountain gorilla of central East Africa *(Gorilla gorilla beringei)* is the largest of the four great apes. It is an introverted but intelligent and powerful pongid. In remote highlands, scattered groups of gorillas freely roam through the lush, wet forests. A social unit is dominated by the magnificent adult silverback male: Such a mature gorilla may reach a height of six feet and weigh up to 600 pounds. Yet, this gentle giant of the primate world is shy and acts somewhat like a recluse.

The gorilla and chimpanzee (as well as the bonobo) are found in Africa. Their striking similarities to the human animal led Darwin to write that the origin and early evolution of humankind had taken place on the so-called "Dark Continent," a hypothesis that is now supported by both molecular and paleontological evidence. The common chimpanzee *(Pan troglodytes)* is the most curious, intelligent, and extroverted of the four pongids inhabiting the earth today. In the forests and on the woodlands, the African chimpanzees generally exhibit a free-ranging and harmonious existence. Whether in the trees or on the ground, small groups of these apes spend much time searching for food when not playing, grooming, or merely resting in their nests.

The bonobo *(Pan paniscus)* also inhabits Central Africa, but it has remained elusive to anthropologists until the last twenty years. Both in terms of biology and behavior, it remarkably resembles the human species. Unfortunately, this pongid is also an endangered species threatened with extinction.

Source: © Lynn Kilgore.

Each of the four great apes has no tail, and is both larger and more intelligent than any monkey. The pongid adult dental formula is 2–1–2–3 (also shared by all of the Old World monkeys and humankind). With arms longer than their legs, these apes brachiate through the trees but usually take a quadruped position when terrestrial. Their thumbs and big toes, both opposable, are favorable adaptations for an arboreal life. However, because of their large size, adult great apes spend considerable time on the ground during the day.

Today, these four wild pongids need to be both saved by and protected from the human species, the most dangerous animal of all. To do so, since the middle of the twentieth century, there has been a concerted effort by primatologists to study the great apes in their natural habitats. Such close-range, long-term pongid research supplements those scientific findings as a result of research in laboratories and zoos.

The Orangutan

In prehistoric times, giant orangutans probably inhabited much of Southeast Asia (the hominoid fossils *Ramapithecus* and *Gigantopithecus* are now considered to be ancestral to this red ape). Today, the orangutan is the largest of the three Asian apes but it is restricted to the dense tropical jungles on the islands of Borneo and Sumatra. In the nineteenth century, the naturalist and evolutionist Alfred Russel Wallace spent several years investigating the flora and fauna of Indonesia. In his 1869 book *The Malay Archipelago*, dedicated to Charles Darwin, Wallace related his encounters with the wild orangutan in the swampy dense forests of Borneo. It is now very disconcerting to read how casually this biologist hunted and killed this very rare pongid in order to obtain specimens for scientific study; nevertheless, Wallace was one of the first naturalists to observe the orangutan's general habits in its natural environment. His report includes physical descriptions of this ape as well as information on its diet, nest-building activity, and arboreal locomotion. Apparently, the orangutan's only past enemies were the leopard, the cobra, the python, and the crocodile; yet, it is now an endangered species because of the encroachment of human civilization, with the resultant destruction of its habitat and disruption of its activity.

In the twentieth century, zoologist John MacKinnon presented a popular account of his three-year behavior study of the elusive orangutan in both Borneo and Sumatra. In his 1974 book, *In Search of the Red Ape*, MacKinnon gives a vivid picture of this wild pongid's general environment: the endless and inhospitable green jungles of these two islands in which only deep grunts, smacking lips, and crashing branches betray the presence of the shy orangutan. He describes this ape's typical day of feeding, traveling leisurely, and resting in tree nests.

Since 1971, anthropologist Biruté Mary F. Galdikas has rigorously undertaken the first intensive, long-range study of the wild orangutan *(Pongo pygmaeus)* of interior Borneo in its own environment. The late anthropologist Louis S.B. Leakey had inspired her to study this red ape of Indonesia, a project never before attempted by a female scientist. This "man of the woods" is the rarest and least social of the four great apes. Its natural habitat is now restricted to diminishing forests on the islands of Borneo and Sumatra. At present, there are fewer than 4,000 free-ranging orangutans existing in their own ecological niche. Operating from three research campsites within the lowland jungle of the Tanjung Puting Nature Reserve (Indonesian Borneo), Galdikas has devoted herself to two major objectives: the rehabilitation of orphaned orangutans and the ethological study of this great ape in its own environment.

Young, orphaned orangutans usually die from neglect, disease, or malnutrition. At her remote rehabilitation center in Kalimantan, Galdikas prepares these tame animals so that they may eventually adjust to the wild woods. After camp life, the successfully rehabilitated juveniles are returned to their natural habitat to be free and magnificent in the trees. Hopefully, this undertaking will help to increase the number of wild orangutans in their own environment.

The wild orangutan is now an endangered species for two major reasons: Hunters needlessly slaughter many adult pongids in order to obtain infants and juveniles for the "black market" sale to zoos, circuses, museums, or individuals (illegally held apes are confiscated), while farmers continue to destroy this pongid's natural habitat by cutting timber and clearing cropland, thereby depriving the red ape of forest area, food supply, natural protection, and normal social activity (including sexual behavior). Obviously, there is an urgent need to understand and appreciate the wild orangutan if this unique primate is to be protected from human encroachment and saved from imminent extinction.

Since 1974, Galdikas has followed an adult male orangutan through the Borneo jungle to observe his behavior in the wild. This task has required her venturing through swamps with leeches, mosquitoes, crocodiles, and poisonous snakes. She discovered that this large ape spends much of its time walking on the ground. However, most orangutans are generally arboreal; they move slowly and deliberately through the trees by using their hook-like hands and prehensile feet. The adult orangutan is essentially asocial: There are no problems to be solved in a day-to-day life that demands little cooperation, other than mating and minimal infant care by a mother. Adult males and females are usually solitary or found in loose social organizations. The only temporary social unit is an adult female with her infant or juvenile.

Adult social interaction is infrequent. Two males may engage in combat over a female at mating time; however, there is only sporadic male/female companionship for sexual purposes. Females prefer the larger males as partners in consort relationships. Since orangutans are usually arboreal, there is no group structure or social discipline. They build simple nests in the forest trees or on the jungle ground; during heavy rain, they make a "roof" of leaves. Orangutans rarely groom each other. Their diet is primarily frugivorous and includes buds; shoots; seeds; young leaves; wild, unripe and ripe fruits; flowers; soft bark; wood pith; honey; termites; birds' eggs; and insects. In fact, the orangutan uses a stick to extract honey from a tree.

Caged in zoos, the shaggy red ape is lethargic and very prone to both obesity and erotic behavior. It suffers the same diseases humans do, from malaria to the common cold. This pongid may even identify with humans (thereby contributing to problems of sexual reproduction in captivity).

At about the age of 12, an adult male orangutan will exhibit these characteristics: a large-domed head, pronounced cheek pads (flares of tissue), a throat sack (gular pouch), and a beard, as well as at times the making of a long, shrill call. There is marked sexual dimorphism, with the adult male being about twice as large as the adult female. The male may reach a height of nearly five feet, weigh over 200 pounds, and have a cranial capacity of about 200 cc.

The wild orangutan is an independent and gentle creature, living a rather lonely existence and acting viciously only when provoked. Leaving the primeval rain-forest canopy during the day, an adult male spends time on the ground and may even venture out of the tropical jungle. Such an isolated ape may forage for as long as six hours while walking awkwardly for long distances through the rain forest on all fours, and perhaps even nap on the damp, humus-covered floor of the jungle. Although free-ranging, adult females never leave their home area throughout their lives. As there is clearly an urgent need to protect and preserve the wild orangutan, which is sometimes referred to as a "missing link," the serious research of Galdikas (among others) is a major step to understanding and appreciating this endangered great ape of Borneo and Sumatra.

The Gorilla

The wild gorilla of central East Africa is the largest of the four great apes; this mountain subspecies was discovered in 1847. Until recently, this primate was thought to be a vicious animal of the jungle; in sharp contrast to this view, however, field studies have revealed that this huge pongid is actually shy, gentle and basically introverted, but curious, intelligent, and very powerful.

In prehistoric times, wild gorillas were abundant and ranged freely throughout central Africa. Today this great ape is represented by only three geographically

isolated subspecies: the lowland or valley gorilla of central West Africa *(Gorilla gorilla gorilla)*, the highland or mountain gorilla of central East Africa *(Gorilla gorilla beringei)*, and a third subspecies also found in central East Africa *(Gorilla gorilla gmveri)*. The differences among these three subspecies are minor: the mountain gorilla is larger and has thicker hair (an adaptive advantage), shorter arms, a narrower skull, a longer palate, and does not share its forest with wild chimpanzees.

Now an endangered species, the vanishing wild gorilla needs to be understood and appreciated in order to ensure both its protection and survival in captivity as well as in its natural environment. It is estimated that only about 240 mountain gorillas now inhabit the lush, wet, tropical jungle areas of central East Africa. Their ecological niche is gravely threatened by hunters, farmers, and poachers; thus the desperate plight of this mountain pongid.

George B. Schaller, a zoologist, was the first scientist to seriously study the wild mountain gorillas *(Gorilla gorilla beringei)* in their own habitat. His pioneering, twenty-month research project (1959–1960) remains a classic contribution to primate ethology. He presented his important findings in two books: *The Mountain Gorilla* and *The Year of the Gorilla*

Gorillas are primarily quadrupedal and terrestrial, living in the humid rain forests of Africa. In his extensive study of the mountain subspecies, Schaller concentrated on the ecology and general behavior of this remarkable great ape. His 466 hours of direct observation were made from the viewing advantage and safety of trees. He was able to watch free-living gorillas wander through the dense jungle, forage on succulent herbs and vines (they prefer young, secondary forest growth), groom and play, defend territory, and build nests in the trees or on the ground. The zoologist observed no tool use, no meat eating, and no drinking of water; furthermore, gorillas do not like to get wet. Both vocalizations and sexual behavior are infrequent. Of particular interest, however, is the wild gorilla's chest-slapping behavior, an elaborate sequence of nine distinct acts to relieve frustration.

Despite his dedicated study of this great ape for nearly two years, Schaller never made physical contact with the mountain gorilla; this incredible feat was first accomplished by a remarkable primatologist, Dian Fossey (to date, the other two gorilla subspecies have not been seriously studied in their own habitats).

In 1967, the late anthropologist Dian Fossey began living among the wild highland gorillas of the Virunga Volcanoes in central East Africa. Her research—camp, Karisoke, is located in the ancient rain forest of Mt. Vasokie; it is a tropical jungle world of fog and mist in Rwanda near Zaire.

Encouraged by the late Louis S.B. Leakey and following in the footsteps of Schaller, Fossey undertook to investigate the mountain gorilla in its natural habitat with only notebook, camera, and binoculars. Her courageous and intensive years of observations between 1967 and 1985 in the ancient rain forests resulted in an invaluable scientific as well as compassionate contribution to the understanding of and appreciation for this giant of the primate world. Like the orangutan, chimpanzee, and bonobo, the free-living mountain gorilla is an endangered species. Because of the ongoing encroachment of human beings with civilization, this largest of the four great apes is now a vanishing animal threatened with extinction.

In 1984, Fossey published *Gorillas in the Mist*, in which she gave a personal account of her thirteen-year study of four family groups of this rare pongid among the dense and remote rain forests of those dormant Virunga Volcanoes in central East Africa (Rwanda, Uganda, and Zaire). She followed gorilla groups on the ground in order to observe them at close range during their leisurely day-long search for food and shelter. Fossey was very successful in establishing a rapport with the mountain gorillas. Habituation required her patiently learning to imitate their feeding methods, general sounds, basic gestures, submissive postures, and vocalizations of contentment. This led to her being gradually accepted by these wild pongids, which are usually timid despite their size and power. Her book focused on various group dynamics and behavioral patterns: social range, kinship bonds, nest building, group structure, play and grooming, sexual habits, ritual displays, inter-group and intra-group interactions, cannibalism, and even infanticide. Fossey also wrote about the gorilla's vegetarian diet, mountainous ecosystem, territoriality, and diseases.

As a result of Fossey's relentless efforts, she was able to examine the uninhibited behavior of mountain gorillas under normal conditions in their natural range. Her close-range, long-term, intimate study of this highland pongid was a rich and rewarding experience for science. Unlike Schaller, and only after

a long period of slow habituation, Fossey was able to actually make physical contact with several of these apes; the first time a scientist has touched this primate in its own habitat.

In the glorious rain forests, this magnificent great ape is primarily a ground-dweller and usually a peaceful vegetarian. Yet a nervous adult gorilla will hoot, mouth a stick or leaf, rise bipedally, thrash branches and vegetation, slap its chest, kick its legs, run sideways, and finally thump the ground with its palms. It may even bluff a roaring "charge" as protective action if necessary, doing so only when provoked (this fierce-looking and very powerful ape will try to avoid physical contact with intruders). In truth, this pongid's alleged savagery toward human beings is grossly exaggerated. However, gorilla brutality does exist. This ape is capable of aggressive behavior and even murder, including infanticide.

A mountain gorilla's staple diet consists of fruit, bark, roots, thistles, nettles, wild celery, blackberry leaves, galium vines, and other such succulents. Primarily folivorous, this ape has never been observed eating meat, insects, or even birds' eggs in its natural environment (the lowland gorilla is both frugivorous and folivorous).

Most gorillas live in small, scattered groups which usually consist of about ten individuals (there are even both peripheral and loner blackbacks as well as silverbacks). These stable social units roam through the rain forests of central West Africa and wander on and below the slopes of the Virunga Volcanoes. A social group is dominated by the adult, alpha silverback male. Other members include a hierarchy of subordinate blackback males, adult females, juveniles, and infants.

The fearsome adult silverback male gorilla is characterized by nuchal and sagittal crests, a prominent supraorbital torus, marked prognathism, long arms and powerful shoulders for modified arboreal brachiation, and a quadrupedal stance on the ground with the weight of the body supported on clenched knuckles and plantigrade feet (the presence of silvery grey hair on his back, rump, and hind legs clearly indicates a dominant adult male). Fossey discovered adult males to be unusually protective and tolerant toward the young; she once saw an old male tickle an infant with a flower, as might a kindly grandfather. Protected by the dense jungle foliage and with the advantage of its huge size, an adult, male mountain gorilla may even live as a loner (apparently the leopard, buffalo, and elephant are no serious threat to this great ape).

Each gorilla has a unique personality as well as a distinct nose print and voice print. These gorillas communicate by using at least twenty-two distinct sounds.

The gorilla is an intelligent animal; in the rain and bamboo forests of mountainous central East Africa, more fully developed mental capabilities would not have increased its fitness. In the safety of the tropical jungle, there is no need for this ape to tax its brain (this had resulted in an early underestimation of this pongid's true intelligence when compared to the extroverted behavior of the chimpanzee and bonobo). Because of its awesome size as well as brute strength and placid nature, it is extremely difficult for a human being to train and manage the mountain gorilla in captivity.

Until recently, captive gorillas were displayed as prisoners in small, sterile cages which cruelly removed them from their normal biome and essential troop behavior. Fortunately, growing numbers of concerned biologists and anthropologists are becoming involved with the survival of this great ape in captivity. In zoos, the gorilla is prone to fatal pneumonia and tuberculosis; therefore, all artificial environments must be carefully watched and controlled. Unfortunately, it is also very difficult to mate this huge pongid in captivity; gorillas require privacy and conditions similar to their natural habitat for successful sexual activity (in fact, a gorilla may even identify itself with a human being).

The mountain gorilla is in grave danger of extinction. This pongid's precarious existence is threatened by human encroachment and ongoing neglect. Civilization is slowly engulfing the shrinking domain of this magnificent ape. If serious measures are not taken immediately, this unique, giant anthropoid of the natural primate world will soon vanish from the earth forever.

Concerning extinction, several factors are determined by the evolutionary history of a particular primate and its own genetic information, for example, such species-specific factors as: size of the original geographic range, natural habitat requirements (ecosystem), population density limits, body size and weight, and behavioral traits. Other contributing factors include habitat alteration or destruction and human predation (i.e., hunting, collecting, and killing). Of course, humankind still remains the greatest danger to the survival of the wild gorilla in

its own environment (and to the survival of other threatened primates). One alarming point: for the survival of this impressive animal, prompt and strict conservation measures are necessary, or else the impressive mountain gorilla will soon disappear. There is an urgent need for both the short-term preservation and the long-range conservation of this giant ape so that future generations may benefit from understanding and appreciating this remarkable pongid.

The gorilla is a key species in the scientific study of primate evolution, biology, psychology, and behavior. Fossey's pioneering research was both an intimate portrait of and an accurate report about this imperiled mountain pongid, dispelling legends and myths surrounding this majestic rare ape while bringing its plight to the consciousness of both naturalists and general readers. Her steadfast dedication to, and deep concern for, these precarious creatures represented primate ethology at its best.

Ongoing research in Gabon, central West Africa, is providing needed information on the ecology and behavior of both lowland gorillas and chimpanzees (sympatric apes in the lush, tropical rain forest of Lope).

The Chimpanzee

Since 1960, anthropologist Jane Goodall has been studying the wild chimpanzee *(Pan troglodytes schweinfurthi)* in its natural environment. She has lived among chimpanzees in the tropical rain forests and woodlands of central East Africa; her patient, sustained, and courageous efforts for over forty years have resulted in remarkable discoveries about the behavior of this great ape. Goodall had been inspired to observe the wild chimpanzee in its own habitat by Louis S. B. Leakey. Her dedicated and pioneering research is now recognized as a milestone in primate ethology. Her two books, *In the Shadow of Man* and *The Chimpanzees of Gombe: Patterns of Behavior*, are major contributions to the scientific literature on pongid behavior.

Among the primates, as well as in terms of biological evolution, the chimpanzee is closest to the human species. Goodall has studied this wild ape at close range in the Gombe Stream Research Center on the shore of Lake Tanganyika in Tanzania. Established in 1943, this natural park remains a sanctuary for approximately 100 chimpanzees. With only her camera and binoculars, Goodall followed these trusting pongids into their own habitat. This unique, long-term, scientific study of a wild chimpanzee community yielded incredible new findings of inestimable value about this human-like ape of Africa. As a direct result of her impressive field research, she is now the preeminent authority on this endangered species.

The chimpanzee is found throughout tropical Africa and is both arboreal and terrestrial. When in the trees, it is capable of modified brachiation, but while on the ground it will walk quadrupedally on the knuckles of its hands and on the outsides of its feet. Occasionally, it does stand erect in order to move about in bipedal locomotion for short distances.

Unlike the orangutan and gorilla, the chimpanzee is an extroverted pongid (like the bonobo). In captivity, chimpanzees are easily trained for circuses and zoos. In the wild, they live in open, poorly defined, temporary, and unstable nomadic groups. A shifting band of 60–80 members consists of a hierarchy: adult males with a temporary male leader, young males, females with babies, and females without babies. There is no nuclear family unit; the only temporary bonding relationship is the parental care of an adult female for her infant or juvenile. Play and mutual grooming seem to ensure a state of well-being among the members of this pongid society.

Chimpanzee sexual behavior is grounded in biochemistry. Mating habits are normatively promiscuous, but only when the adult female is in estrus. Presenting and mounting are typical social behavior patterns among the adult males, representing subordinate and dominant actions, respectively.

In nature, chimpanzees live a casual life within constantly shifting groups (these societies meander within a home range). They may even defend their territory against other intruding chimpanzee units.

Chimpanzees build nests and dislike getting wet. Whether living in dense trees or on the jungle ground, these apes apparently fear only large cats (especially the lion and leopard) and the human species. In fact, human civilization is the major threat to this pongid's existence in the wild. Chimpanzees show much individuality, differing in their facial expressions and mannerisms. They are very intelligent and highly emotional; their temperament ranges from violent aggression to gentle playfulness. Actually, one may even speak of chimpanzee personalities.

Chimpanzees communicate and control behavior through a variety of calls as well as by touch, gesture, and cooperative behavior patterns (especially play and grooming). A chimpanzee group is dominated by

the top-ranking or alpha male, and each sex has its own fluctuating dominance hierarchy.

The bulk of chimpanzee food consists of fruits, leaves, and blossoms, as well as seeds, stems, bark, and nuts. Occasionally, this ape will add ants and termites to an otherwise basically frugivorous and vegetarian diet. Goodall's major discovery is that wild chimpanzees make, use, and transport simple tools. They deliberately modify stems, twigs, sticks, or blades of grass for the specific purpose of probing insect mounds at certain times in order to extract and eat ants or termites (thereby challenging our species as the only tool-making animal). They seem to consider such insects as delectable morsels. Chimpanzees also crumple and chew leaves to make a "sponge" for obtaining water from notches in trees or for sopping up the soft brains from inside a monkey's skull cavity. They even use large leaves as containers for carrying water, and also use sticks and stones as weapons. These activities clearly demonstrate intelligent, learned behavior in a social environment. In short, wild chimpanzees have a technology—albeit a very simple one. Wild chimpanzees are not only toolmakers, but also meat-eaters, occasionally adding raw flesh to their general diet. They will hunt, kill, and eat small red colobus, redtail, and blue monkeys (including infant baboons), as well as young bushbucks and young bushpigs.

Goodall was the first primatologist to observe the frenzied "rain dance" ritual of this great ape, a stylized display of apparent nervous behavior. During a thunder-and-lightning storm, excited male chimpanzees stage a unique pattern of activity: They leap to the jungle floor and careen through the grass, then charge downhill while bellowing and brandishing boughs; this activity is followed by the act of slapping the ground or swatting at trees. This activity may last up to thirty minutes. Females and their young are merely arboreal spectators.

Goodall also discovered that wild chimpanzees can display aggressive behavior and extreme brutality; they are capable of murderous violence and primitive warfare. At times, these apes are savage killers and ruthless cannibals. Between 1974 and 1977, she observed the clash between two neighboring chimpanzee groups that resulted in the gradual extermination of the small southern Kahama society by the apes of the northern Kasakela region. It had not been known previously that wild chimpanzees would systematically and deliberately attack and kill one another. Slaughterous behavior may be grounded in territoriality, as one ape group defends its home range against unwanted intruders. Goodall also witnessed adult chimpanzees killing and eating their infants. Perhaps such primate aggression is biologically inherited, an innate aspect independent of social and environmental forces.

Goodall's pioneering research has resulted in original information on wild chimpanzee vocal communication, sexual activity, social hierarchies, facial expressions, greeting gestures, parental care, nest building, diseases, diet, grooming, and play. In general, chimpanzee behavior bears uncanny similarities to human behavior.

Since the publications of Huxley, Haeckel, and Darwin in the nineteenth century, naturalists have become increasingly convinced that the human species does share a common prehistoric ancestor with both the chimpanzee and the gorilla. Fossil and genetic evidence suggests that a momentous split in primate evolution occurred about five million years ago, resulting in one route leading to the three living apes of Africa and another to the human animal itself.

The anthropologist Adrienne Zihlman argues that the common ancestor shared by the chimpanzee, bonobo, and the human species was probably a hominoid that looked and behaved very much like the contemporary pygmy chimpanzee *(Pan paniscus)*, that rare and intriguing great ape of equatorial Africa. If her hypothesis should prove to be true, the pygmy chimpanzee of today represents a living link with our remote evolutionary past.

Chimpanzees are fascinating creatures with advanced brains and complex behavior. They demonstrate mental capacity for foresight, learning, symbolizing, problem-solving, and even self-awareness. As a result of rigorous research in biochemistry and ethology, one fact has been clearly established: The human animal is closer to the chimpanzee and bonobo than to any other living species. Jane Goodall's impressive field work supports this conclusion and contributes to those efforts in preventing the extinction of wild chimpanzees.

The Bonobo

The wild bonobo *(Pan paniscus)* is found only in the forests of the Democratic Republic of the Congo, Central Africa, where about 15,000 members of this species now live. Although known as the pygmy

chimpanzee, this great ape differs from the common chimpanzee. Compared to the chimpanzee, the bonobo has a smaller head, a darker face with tufts of hair on each side, and is taller with a more slender build (narrower shoulders, and legs longer relative to arms). It is a peaceful and gentle pongid.

Bonobos have been scientifically studied only during the last two decades. They are more arboreal than chimpanzees, but less aggressive and less excitable, with violent behavior being very infrequent. Bonobos live in female-dominated, fluid social groups that are headed by an adult alpha female. Their sexual behavior is frequent, promiscuous, and inventive (bonobos literally "make love, not war" in order to reduce tension and resolve conflict).

Bonobos use objects (for example, stones and branches) as tools, stand erect, and walk upright for short distances more often than chimpanzees and gorillas, and they display a range of emotions and activities that suggest an eerie resemblance to how our remote ancestors probably looked and behaved. One bonobo has even figured out, by himself, how to make a simple stone implement like those made by our own remote hominid ancestors in Africa 2.5 million years ago.

Significant bonobo research is being done by Frans B. M. de Waal, whose unique book, *Bonobo: The Forgotten Ape,* which released in 1997, is particularly important to understanding and appreciating this pongid. Ongoing field studies of the wild bonobos by biologists and anthropologists will shed more light on the bio-social origin and evolution of the human species.

The gap between modern humans and the four great apes is very narrow, indeed (demonstrating how remarkable were the original insights of Huxley, Haeckel, and finally Darwin himself). Even so, only the human species is capable of sustained bipedality, using symbolic language as articulate speech (not to mention the complexity of its abstract thoughts and intricate behaviors), and creating an extraordinarily multifaceted socio-cultural milieu in which simple implements are used for the manufacturing of far more complex tools, weapons, and other objects.

If the human species journeys to other planets and beyond, then it will carry with it those indelible bio-social marks of its primate origin and evolution on earth. Even as the future cosmic ape, humankind will always remain akin to the four living pongids on earth.

— *H. James Birx*

See also **Apes, Greater; Apes, Lesser; Bonobos; Chimpanzees; Chimpanzees and Bonobos, Differences; de Waal, Frans B. M.; Fossey, Dian; Galdikas, Biruté Mary F.; Goodall, Jane; Gorillas; Koko (lowland gorilla); Orangutans; Schaller , George B.; Wallace, Alfred Russell**

Further Readings

Caravan, J. M. (1999). *Gorillas: A portrait of the animal world.* New York: Todtri.

Galdikas, B. M. F. (1995). *Reflections of Eden: My years with the orangutans of Borneo.* Boston: Little/Brown.

Galdikas, B.M.F., et al. (2000). *Orangutan odyssey.* New York: Harry N. Abrams.

Galdikas, B.M.F. (2005). *Great ape odyssey.* New York: Harry N. Abrams.

Lindsey, J. (1999). *The great apes.* New York: Friedman/Fairfax.

Montgomery, S. (1991). *Walking with the great apes: Jane Goodall, Dian Fossey, Biruté Galdikas.* Boston: Houghton Mifflin.

Prince-Hughes, D. (2001). *Gorillas among us: A primate ethnographer's book of days.* Tucson: University of Arizona Press.

de Waal, F. B. M. (1997). *Bonobo: The forgotten ape.* Berkeley: University of California Press.

de Waal, F. B. M. (2001). *Tree of origin: What primate behavior can tell us about human social evolution.* Cambridge: Harvard University Press.

Weber, B., & Vedder, A. (2001). *In the kingdom of gorillas: Fragile species in a dangerous land.* New York: Simon & Schuster.

Wrangham, R. W., et al. (Eds.). (1996). *Chimpanzee cultures.* Cambridge: Harvard University Press.

APE CULTURE

Anthropologists and other scientists have discovered that nonhuman primates convey specific behaviors associated with demonstrating power. Within ape culture, the bonobo and the chimpanzee exhibit opposing approaches to the concept of power. As the least aggressive species within the great ape family, bonobos are rarely interested in displays of power. The bonobo society is matriarchal, and sex replaces aggression as the means of resolving conflicts.

Despite their intense interest in sexual activity, bonobos do not engage in the showy display common to dominant male chimpanzees, which may be consumed with the need to demonstrate power over females and subordinate males.

A male chimpanzee, with hair raised, may display with loud noises and excessive use of force, snatching up and throwing surrounding objects such as trees, rocks, and vegetation. The displaying chimpanzee stands erect, exhibiting fierce facial expressions and may engage in hooting, swaying, slapping, flailing, drumming, raking, or chest beating. In zoos, dominant male chimpanzees tend to be less showy but still impressive. Such chimpanzees stand tall to appear ferocious and may also drag or throw trees and other objects. In captivity, the chimpanzee may run downhill screaming, or may bang and kick the walls of the cage.

The attention-getting behavior of the displaying chimpanzee is generally designed to solidify the male chimpanzee's leadership position within the chimpanzee community. Chimpanzee displays are rarely violent because other males tend to subjugate themselves rather than fight the acknowledged leader. Violence can, however, occur among chimpanzees. At least one case has been reported where a group of male chimpanzees attacked and killed a lone male chimpanzee that was not part of the group. Male chimpanzees have also been known to kill the offspring of unknown female chimpanzees.

Japanese primatologist Toshisada Nishida recently observed what well may be one of the most impressive displays of male chimpanzee behavior. In the Mahale Mountains National Park in Tanzania, Nishida observed a high-ranking male chimpanzee displaying near a riverbed. On a regular basis, the chimpanzee picked up huge rocks, which he then rolled downhill. The thunderous noise cowed and impressed all other male chimpanzees in the group, making it less likely that they would challenge the displaying chimpanzee for dominance.

Unlike the male chimpanzee, the male bonobo may display simply by engaging in a brief run while dragging a branch behind him. Bonobo males are also unlikely to form coalitions of supporters to challenge opposing leaders as chimpanzees do. The bonobo is inclined toward one-on-one interaction. In the chimpanzee community, however, coalitions frequently result in an entire society waging war against one another until one group gains dominance. During the battle, chimpanzees, like members of opposing political parties, may attempt to convince other members to switch sides. If cajolery does not work, the male chimpanzee may resort to force. When a male chimpanzee concedes dominance to another member of the group, the loser literally grovels in the dust in front of the dominant chimpanzee as the leader engages in a moderate-display exercise.

Anthropologist Jane Goodall discovered a unique form of chimpanzee display among the chimpanzees of the Gombe Game Reserve in Africa. In the Kakombe Valley along the Gombe stream, Goodall witnessed groups of both male and female chimpanzees approaching the waterfall, in what she considered to be awe. Goodall noted that for several minutes, the chimpanzees displayed in a slow, rhythmic motion, sometimes heaving large rocks or branches into the stream. Some chimpanzees swung out over the stream to get a closer look at the waterfall. While display among female chimpanzees is not unheard of, it is rare.

— Elizabeth Purdy

Popper, Karl (1902–1994)

Karl Popper was one of the greatest political philosophers and philosophers of science of the mid-20th century. Born in Vienna in 1902, he was educated there and allied himself with the political left. Intellectually, he positioned himself in opposition to the "Vienna Circle," who advocated logical positivism. During the triumph of fascism in the late 1930s, Popper left Europe for New Zealand, and then in 1946 immigrated to England, where he spend the rest of his life, teaching for 23 years at the London School of Economics, ultimately as Professor of Logic and Scientific Method.

Popper's vision of science, published initially in *Logik der Forschung* in Vienna in 1934, and as *The Logic of Scientific Discovery* in 1959, stressed "conjecture and refutation," to borrow the title of a later book of his. Popper did not believe that ideas in science developed

by inferring from facts to more general understanding. Rather he believed that scientists drew on their insights to make a conjecture, a hypothesis. The next step was not to find all supporting evidence, but to seek any evidence that went counter to the hypothesis, and which, if found, would refute it.

For Popper, the most essential feature of a scientific theory was its refutability. That is, for a theory to be scientific, it has to specify that under certain conditions some things would happen, and—this is the crucial point—other things would not happen. In other words, a scientific theory had to forbid certain results. This quality allows scientific theories to be tested, and supported or refuted by the findings. Popper believed that a theory could never be proven; only its supporting evidence could be increased. However, a theory could be refuted decisively with contradictory evidence.

Here is a simplistic anthropological example: Let us assume that after studying a number of hunting peoples, we hypothesize that "all hunters and gatherers are nomadic." Once we have defined "hunters and gatherers" and "nomadic," so that we are clear about what we are talking about, each new case of hunting peoples that we encounter is a test of the hypothesis. Many such peoples are nomadic, and thus support the hypothesis. But once we discover the peoples of the Northwest Coast of North America, peoples who lived by hunting and gathering but who lived in permanent villages and could in no way be considered nomadic, we must conclude that our hypothesis has been refuted and must be considered incorrect.

Popper believed that several of the most popular theories of his day, Marxism and Freudianism, were unscientific, because they were used to explain everything and forbade nothing. That is, whatever happened could somehow be explained: for example, in Marxism, if the working class rebelled, it was seeking to protect its interests; if it did not rebel, it had a "false consciousness." In Freudianism, an overprotected child was expected to be timid; a bold overprotected child was the result of a "reaction formation" and expected. Thus, theories that purport to explain everything really explain nothing; they are little more than totalistic ideologies.

Popper's political philosophy followed seamlessly from his philosophy of science. He was in favor of open debate and democracy, and opposed both fascism and communism as closed, totalitarian systems that violently suppressed legitimate disagreement. Popper's main work in this vein, *The Open Society and Its Enemies* (1945), offered a major critique of both Plato and Marx. Popper opposed closed societies because they were not susceptible to evidence, and he opposed revolution and radical change, because they were based on general models and did not allow correction of the many complex unintended consequences of change.

Popper's emphasis on an "open society" that is friendly to debate and diverse views is informed by his conception of evolution as a process of problem solving, set out in his *Objective Knowledge: An Evolutionary Approach.* Once language evolved in humans, environments expanded to three: World I, which is the objective, natural, and material world; World II, the human subjective mental world; and World III, the results of human mental work, including languages, social and moral codes, law, technology, the arts, philosophy, the sciences, education, and related institutions. World III then produces artifacts, such as buildings, settlements, machines, and recordings of cultural knowledge, which exist in World I.

In the first phase of human invention, cultural patterns institutionalized in World III were regarded as immutable and closed to legitimate change. This unchallengeable orthodoxy, commonly justified by religion, limited experimentation and the search for superior solutions. The next great revolution in human culture came with the acceptance of criticism, which, according to Popper was the foundation of science. Thus open societies encouraging criticism are necessary for progress. Popper's approach to the evolution of society has been taken up in Ernest Gellner's *Plough, Sword, and Book: The Structure of Human History* (1988).

— Philip Carl Salzman

Further Readings

Gellner, E. (1988). *Plough, sword, and book: The structure of human history.* Chicago, IL: University of Chicago Press.

Magee, B. (1973). *Popper.* Glasgow: Fontana/Collins.

Magee, B. (1985). *Philosophy and the real world: An introduction to Karl Popper.* Chicago, IL: Open Court Publishing.

Popper, K. (1945). *The open society and its enemies.* London: Routledge and Kegan Paul.

Popper, K. (1959). *The logic of scientific discovery.* New York: Basic Books.

Popper, K. (1972). *Objective knowledge: An evolutionary approach.* Oxford: Clarendon Press.

Population Explosion

The term *population* is commonly used in the realm of statistics. For a statistician, the term refers to a collection of items. Demographers use the term similarly to refer to the collections of persons alive at specified points in time that meet certain criteria. This definition of the term population connotes the specification of various conditions when referring to a population of a given nation including the specific date or year, place, and the types of individuals who are legal residents, or any person who resides within the boundaries of the nation. At a different level of understanding, the term population is also used to mean a different kind of collectivity, one that persists through time even though its members are continuously changing. From this perspective, the collectivity of an aggregate of persons, those who have ever lived, and those who are not yet even born to live, within a boundary of a given nation represent the concept and notion of a population.

Since the second half of the 20th century, and at the advent of the third millennium, the expression "population explosion" has been associated with the state of the unprecedented rate of growth of the number of humans inhabiting the Earth. A high rate of growth that was witnessed during the 19th century in Europe was considered as an opportunity in terms of a larger labor force and a wider market for commerce. A similar rate of population growth toward the end of the 20th century, however, is viewed as problematic with the rise of consciousness of the limits of the benefits of growth. The optimists, however, challenge this view with the notion that population growth, rather than problematic, has been a condition for the economic development humankind has witnessed.

Historical Accounts and Trends

The population size of approximately 300 million has been fairly consistent and stable during the first millennium. Since the middle of the second millennium, however, population began to rise significantly as the result of new developments and inventions, ranging from the printing press and scientific practices all the way up to the Industrial Revolution. By the middle of the 20th century, the world population counted 2.5 billion. Increased yield from harvest, good health services, transportation, and increased availability of clean drinking water have led to the improvement of life for humankind while also contributing to the growth of its population. The world is growing in its population by more that 76 million people per year. The world population has doubled in the last 40 years, growing from 5 billion to 6 billion in only the last 12 years. Within a range of a century, from 1900 to 2000, the world has witnessed a growth of population from 1.7 billion to an estimated 6 billion. Fertility rate is declining, but so is the death rate. Population decline is a phenomenon of only a smaller percentage of the nations of the world, whereas it is an increasingly alarming social phenomenon in most of the developing world. The poorer regions hold the majority of the Earth's inhabitants.

The world population, which reached 6 billion in 1999, is projected to approach 9 billion by 2050. And much of the growth in 2050 will be mainly in Africa, Asia, and Latin America. The population of the developed world will remain stable at its present size while even declining in some nations. Thus, in the projected time of 50 years, Sub-Saharan Africa's share of the world's population will increase from 10% to 17%. To the contrary, the share of the population in Europe will decline from 13% to 7%. The population of the developed world is outnumbered now 4 to 1 by the population in developing nations. This proportion will change to 7 to 1 in 2050.

Several factors explain the state of the high rate of population growth across the world. The major reasons for the growing rate of population explosion include a high rate of fertility that is above the level required for replacement of generations, low mortality due to the rise of high life expectancy, migration that raises population among some nations, and favorable age distribution in which there is a high ratio of young people, capable of giving birth, to older adults. In particular, growth in the youthful age, a group capable of reproduction, which is referred as population momentum, would account for more than half of the population boom projected by 2050.

The growth rate of population has been interpreted differently at different periods of time. The interpretation has also varied depending on where the rate of growth is happening. During the 19th century, rapid population growth that took place in Europe and North America was favorably associated with economic prosperity in relation to a larger workforce and expanded market. In the 20th century,

Source: © iStockphoto/Mika Makkonen.

however, the perception about rapid population growth changed as the new phenomenon of population explosion began to take place in Africa, Asia, and Latin America. This latter development brought about a new experience in that high population growth rate took place without the corresponding economic dynamism in the developing world. This is an unintended outcome of the impacts of western influence shared by the developing world. The introduction of health services, instead of creating economic boom, contributed to the fall of the death rate, in turn, leading to an increase in population growth rate in the developing world.

The birth rate that had risen in the first half of the 20th century continued to do so in the 1950s and 1960s. In 1950, a woman gave birth to six children on average in Africa, Asia, and Latin America. Declines of fertility have been witnessed since the late 1960s in many developing countries. From 1990 to 1995, total fertility rate stood at 3.3 children in all developing countries taken together. However, the range is so wide across regions. For instance, the rate of fertility for Sub-Saharan Africa, which includes Ethiopia, is higher, standing at 5.9 compared to the drastic fall for East Asia, which is 1.9.

The decline of population that is a typical phenomenon of the developed world, and in some parts of Asia including Japan and elsewhere, has some explanations. Reasons for fertility decline include behavioral mechanisms that involve changes in reproductive habits such as the use of contraceptives, induced abortion, and postponement of marriage and motherhood. The other reasons for fertility decline are mortality decline and improved survival—thus no demand for another child, changing demand for children due to the state of the transition of children from being an economic asset to liabilities (mainly in developing countries), and the diffusion of new ideas. Despite the observed tendency of a decline of fertility, however, the world population will continue to grow, and for the most part this will be the case in the developing world.

The historical account of human population reveals that the size that had been stable to about 300 million during the first millennium had changed beginning from the Renaissance period, and showed a significant increase by the 19th century that was positively associated with economic prosperity. During the 20th century, population growth continued to be witnessed, and toward the end of the century, the steady unprecedented rate of growth of population that had become a social phenomenon of the developing world was viewed as a societal problem, calling for intervention programs. Sub-Saharan Africa is in the lead for the highest rate of population boom. To the contrary, now, at the onset of the 21st century, the developed world is characterized by a decline of its population compared to its counterpart in the Southern hemisphere. The projection indicates the continuation of this trend into the next decades.

Impacts of Population Explosion

The population of a nation is a human asset that is vital to its survival. But, when it gets enlarged beyond what the available resources can support, then the size of the population becomes a problem. In the context

of the developing countries, in particular, the trend of an alarming population growth rate brings about impediments to economic prosperity as it constrains the improvement in the provision of basic services such as education, health, land for food production, and other services. This is mainly due to the reason that the greater the number of the people, the higher will be the demand for food, water, education, health care, sanitary infrastructure, and jobs, as well as a greater pressure on the environment.

Specifically, the concern about population explosion is associated with the following: the worsening of water scarcity, respiratory health complications in cities, a growing malnourishment worldwide, failing economies where the poor are getting poorer, the depletion of oceans due to over-fishing, the inundation of the wild habitats of animals and plants by human activities, the spread of diseases accelerated by crowding, migration pressures, and civil conflicts over meager resources that lead to instabilities and political turmoil.

By being overpopulated, humans unfairly share the resources of the Earth vis-à-vis other species, and destabilize the ecosystem. The exponential rate of growth of population is putting tantamount pressure on the natural resources of the planet. In return, the depletion of the support system in the ecology such as water, soil, plants, and animals constitutes one of the direst challenges to the existence of humanity itself. In some parts of the world, specifically in Sub-Saharan Africa, millions of children are born into starvation. The ecosystem that has been disturbed by humans is leading to factors of further calamity—deforestation, desertification, decreased rain, soil erosion, and little or no yield of food for survival.

The impact of the rapid growth rate of population is viewed as having severe consequences on the environment. There is a gloomy scenario where population growth is taking place: An ever-increasing but poor peasantry depends on the declining natural resources while having a tremendous impact on the ecosystem.

Adjin-Tettey argues that while it is resulting in unwanted consequences for humans themselves, overpopulation is also linked to the reduction in number, and even possibly the tendency of extinction, of some species of plants and animals. Underlining that the growth in population of humans is posing serious problems on the ecosystem, Adjin-Tettey notes that the poor deplete the surrounding supplies, and that this accelerates the depletion of the world's forest cover that aggravates the rate of deforestation.

The rapid rate of population and its severe consequences is typical in the developing world. The situation is even more pervasive in Sub-Saharan Africa. African population growth rate is less compatible and proportionate to the available services for food, health, and education, and the region's ability to cope with the cycle of poverty. Thus, it is evident that there is a scenario of poor health, low educational achievement, and shortage of food there. Africa's development efforts are dependent upon its measures to overcome its high rate of population growth. African nations suffer from population explosion and, under such conditions, any positive economic growth will not be of great significance as it is divided over an increasing denominator. According to Brown, countries like Ethiopia and Nigeria will double or even triple their population within the next 50 years, and these countries will be in demographic crises.

The projection that African population is likely to double in 2030 is a gloomy scenario unless measures are taken to manage the challenge. Among others, intervention strategies should involve sex education for adolescents and family planning support systems in society at large. The problem requires the political resolve of governments to take all the necessary steps to mitigate the growing risks of population explosion.

Bengtsson and Saito reviewed the historical developments of economic thoughts with regard to the relationship between demography and development. In their review, the authors outline that, following the World War II, the United Nations, politicians, and scholars began to pay attention to population expansion in the developing world. Since then, there has been the belief that because of population expansion, the larger share of production is used for consumption, leaving little for saving. As the result, there will be no capital to develop machinery and infrastructure, which leads to a halt to economic development that brings about poverty. This analysis, according to Bengtsson and Saito, was based on the work of Ansley Coale and E.M. Hoover who studied the development of India. Accordingly, the conclusion was that population expansion provided the work force, and the absence of capital made economic development less possible. Bengtsson and Saito indicate that this pattern of analysis of population expansion in relation to economic growth has influenced the policies of the

UN on population in developing countries to date in its programs such as family planning and investment loans.

Bengtsson and Saito have further outlined the review of the pessimistic view of population expansion. In this regard, they cite the publications of Paul Ehrlich's *The Population Bomb* and Dennis Meadows' *The Limits to Growth.* Both authors, Bengtsson and Saito argue, were convinced that the availability of the Earth's resources is limited to support the increasing global population. In fact, in their later works, Bengtsson and Saito present Meadows and Ehrlich with their continuing optimistic view of population expansion, contending that the catastrophe is taking place as the result of the explosion of the population bomb. Their argument includes an authors' note stating that the population expansion has exceeded the limit in the face of the scarce resources, the proofs of which are hunger, reduction of biological diversity, and the hole in the ozone layer.

Meadows, Randers, and Meadows have recently updated their decades of work in the book entitled *Limits to Growth: The 30 Year Update.* The authors, who have been so influential for many years, maintain their argument and note that there is an occasional catastrophic overshoot that confronts humanity, and the growth in the globe's population is such a case.

The literature on population as a problem has been shifting its focus and framework of argument over the last decades. Prior to World War II, the Social Darwinian and Eugenics schools of thoughts considered the problem of population explosion from the point of view of competitive fertility among various groups of peoples or races leading to the prevalence of fear of being outnumbered by others. In the aftermath of the war, the paradigm was linked to the issues of development. Thus, population explosion in the Southern hemisphere was associated with shortage of food, famine, and failing economy. As the shift of paradigm continued, the environment became the most outspoken rational for curbing population growth during the 1980s. The issue of population explosion once again came to be associated with gender issues in the 1990s. This has been evident in the debates and arguments observed in the 1994 Cairo Conference. Thus, it is argued, women should be granted the authority and freedom of right to limit birth, and, thereby, contribute to a control on population growth. Curbing global migration and defending international stability are also among the rationales discussed during the last decades for population policies.

Alternative View

Contrary to the position that population expansion is a problem for economic progress, the optimistic line of argument holds the view that population growth is not an obstacle to economic development. One of the earliest challenges to the belief that population expansion is a cause for stagnation of economic growth and poverty came from the work of Simon Kunzets. The work of Kunzets revealed that there is no correlation between population expansion and economic development. Likewise, the work of Ester Boserup provided a strong foundation for the argument that population expansion does not create problems. In fact, Boserup argued that a certain level of population size was an important condition for development to occur in agriculture, and advancements in new techniques and practices were not beneficial until the population had reached a certain level of size and density. According to Bengtsson and Saito, the finding of Kunzets made a remarkable impact and was overwhelmingly popular, whereas Boserup's position on population growth opposed the earlier idea that population expansion is a cause for underdevelopment and poverty.

Similar to the above optimistic view of population, some proposed the perspective that population expansion in Africa is not a problem by itself. To the contrary, the current state of population size can be a compelling reason to look for other ways and means of overcoming the challenge such as creating more markets and technological developments. In this regard, Julian Simon contends that population growth in Africa is a blessing and recommends Africans cope with the situation by creating jobs, marketable skills, and products that would meet demands at an international level. Simon argues that more people induce more demand for goods and services, and that that would initiate more production, which leads to better income for many, and improved standards of living.

This alternative argument upholds the thesis that population by itself is not a dreadful human phenomenon. Furedi takes this position strongly. According to Furedi, the rapid growth rate of population in 19th century Europe, which was linked to economic prosperity, used to be viewed positively. Since the late 20th century, he notes, population expansion in the developing world, which is associated with famine and poverty, is viewed with pessimism as a big social

problem. Furedi notes, therefore, views about population are the functions of the prevailing socio-economic realities of the period. He justifies this argument as he mentions the case of the 1930s where many thinkers related the crises of the Great Depression in the U.S. with a stagnant rate of population growth. During the same time, Furedi indicates, poverty was considered as the outcome of a slow rate of population growth. In conclusion, Furedi remarks that the causal factor of population growth to economic trend is indeterminate. He attests that the economic stagnation and slow population growth rate of the 1930s was just a coincidence as it is true for today's population expansion and the prevalence of poverty in the developing world. Furthermore, Furedi refers to the case of Europe where millions of unemployed exist at a time when its population growth is below replacement. Population policies in this context are clearly irrelevant to the situation.

For Furedi, population is not number; instead it is communities expressed in the forms of social organizations, political institutions, and technology. Humans are not mere consumers, he remarks, but also producers, and not just as so many mouths, but also as pairs of hands that can produce more foods and enhance the standards of life in their communities. Furedi argues that people encounter poverty not because of numbers, but rather due to lack of influence on their conditions. Famine and poverty facing Africa are not the outcomes of population number, Furedi contends, but the failure of the social system and political institutions. Criticizing the advocates of population policies, Furedi notes that contraceptives can help reduce the rate of fertility, but they do not increase the yield of food; thus, he continues to contend that social and economic changes and progress are more important than the reduction or control of population. In the case of Africa, Furedi notes that economic crises and a high rate of population growth is just that—a coincidence. Africa has plenty of land to engage the energies of its people, what it lacks are the capital and effective political institutions to bring this about. As he continues to elaborate his position, Furedi indicates that what matters most is improvement in the efficiency of institutions, and an emphasis on mere population numbers is, therefore, misguiding. He remarks that a decrease in the size of the population is not the solution.

Furedi extends the argument that issues and positions, with reference to population, are political in nature. He contends that pronouncements on population are rarely neutral statements about numbers. They are usually based on an agenda, which involves issues of resources, power, and national interest. Specifically, Furedi argues that the West has viewed population explosion as problematic. According to Furedi, the central focus of contemporary strategic demography is the contrast between falling birth rates in the North and rising birth rates in the South.

Julian Simon, the renowned optimist, argues that the rapid process of modernization, and changes in the economic systems of India and China at the end of the 20th century, demonstrate that population explosion is not a problem by itself. He notes, instead greater population size promotes progress. Simon writes, ". . . the size of the human population . . . together with the technology these people produced—is the root cause of the speed of progress." For Simon, this is the basis of advancement.

The pressure on resources due to population expansion, the optimists note, is temporary and invites human creativity and problem-solving ability to devise coping strategies. In fact, they argue the problems can lead to the discovery of better ways of handling and managing the encounters of day-to-day life. Explaining the positions of the optimists, Leisinger, Schmitt, and Pandya-Lorch write that the problem of scarcity in society is momentary. In the long term, the impact is positive, as people continue to be inventive and respond intelligently to new demands and circumstances.

In conclusion to their review, Bengtsson and Saito show that in the past, populations have been vulnerable to economic crises, and various methods of easing the pressure on resources were employed, including postponement of marriages and births, and out-migration. The writers, however, underline that it is a rare phenomenon to find a population that expanded beyond the capacity of its resources. While accepting the possibility for population-related problems in the future, the authors nevertheless pointed to the flaw in the Malthusian notion of population as they conclude, ". . . only that human responses to stress so far have been more varied and flexible than ever Malthus anticipated."

Optimists reject the pessimists' consciousness of limits to growth. The position of the optimists adheres to the accounts of the advancement of human civilizations, in the face of the countless challenges, that led up to the contemporary remarkable age of technology.

Despite the harshness of nature since the time of life in a cave, the ingenuity of humankind has overcome those difficulties so much so that the Internet brought about the realization of the global village. The attained prosperity of the long past and the continuation of its trend into the future adds up to the optimism in which the human race shares the fruits of accumulated wisdom as well as the burdens of difficult times from possible pressures from the expansion of populations.

The Case of Ethiopia

Since the late 20th century the concern over a rapid rate of population growth is being seen as most alarming, among all regions of the world, in Sub-Saharan Africa, which includes Ethiopia. Ethiopia's population is growing fast, and is estimated at the moment to be over 70 million. Though there has been a sign of decline, fertility rate during the 1990s has been above 7.5 children per woman with a growth rate of 3% annually. It is projected that the population will at least double by the year 2030. With such a trend, the state of population expansion in Ethiopia will pose a burden on the environment and food production. Agriculture is the mainstay of the country's economy.

Cognizant of the situation, the Ethiopian government formulated a National Population Policy in 1993. The policy outlines that demographic and development factors reinforce each other. High fertility and rapid population growth exert negative influences on economic and social development and low levels of economic and social development provide the climate favoring high fertility and hence rapid population growth.

The goal is, the general objectives of the policy states, to close the gap between high population growth (total fertility rate of 4.0 by 2015) and low economic productivity through planned reduction of population growth and increased economic returns. This national policy is further reinforced by the expectations on the part of the United Nations that the implementation of family planning is considered crucial to promote depopulation so that Ethiopia will become less dependent on foreign food aid.

However, a decade after the launching of the national policy, the growth of the Ethiopian population is still high. It is believed it could lead to massive deforestation, soil erosion, and additional burden on the agricultural land, which all together lead to the aggravation of the problem of food security. Basic services of education, health, and a supply of clean water will also be undermined under the circumstances of unchecked population growth amidst a recurrent drought and famine that have aggravated poverty in the country over the last decades.

Others, however, argue that the cause for famine in Ethiopia is not population, but rather subsistence and a fragile economy. Ghelawdewos Araia, though he believes that it aggravates other multivariate factors, notes that population explosion is not the main cause for, it is rather the absence of development that leads to, the Ethiopian famine. Ghelawdeows Araia agrees with the notion of the impact of overpopulation on the environment and the need for family planning to check high fertility rates. However, he underlines that unless sound development programs are in place, a reduction in fertility rates by itself will not prevent famine. Underdevelopment and poverty, Araia underscores, have led to the depletion of the environment in Ethiopia as the peasants cut trees for fuel wood as their main source of energy. Aria concludes by stating that the problem of population can be handled through development efforts that target human resource and sustainable economic growth.

The stress posed on land distribution, and on food yield, due to a rapid growth rate of population, is indisputable. The land distribution, which sustained the food supply for decades, is now dwindling with the rise of the number of family members among which that piece of land must be shared. Today the land holding is less than one hectare per family in Ethiopia. The government has taken the step of formulating a national policy on population issues. But, the implementation of the policy is subject to the initiatives and commitment taken at all levels and among various sectors. Success of population policy in Ethiopia is also partly a function of dependency on foreign aid to run programs such as family planning.

In conclusion, irrespective of the strengths or limitations in their methodological framework or otherwise, both optimist and pessimist arguments about population growth share in common the concern for the good of humanity. In any case, concerted efforts directed at health and population education, sound policies of integrated sustainable development,

expansion of the private investment sector, peace and stability, efficiency of institutions, and financial and technical assistances, would ultimately contribute to the attainment of food security and self-sufficiency in Ethiopia and elsewhere. To that end, the successful implementation of the integrated poverty reduction and development program the government is launching at the moment is among the promising interventions.

— *Belete K. Mebratu*

Further Readings

Bengtsson, T., & Saito, O. (Eds.). (2000). *Population and economy: From hunger to modern economic growth.* New York: Oxford University Press.

Bongaarts, J. (1997). The role of family planning programs in contemporary fertility transitions. In G. W. Jones, J. C. Caldwall, R. M. Douglas, & D'Souza (Eds.), *The continuing demographic transition.* Oxford: Oxford University Press.

Bongaarts, J., & Bulatao, R. (2000). *Beyond six billion: Forecasting the world's population.* Washington, DC: National Academic Press.

Bouvier, L., & Bertrand, J. (1999). *World population: Challenges for the 21st century.* Santa Ana, CA: Seven Locks Press.

Coward, H. (1995). *Population, consumption, and the environment: Religious and secular responses.* Albany: State University of New York Press.

Ehrlich, P., & A. Ehrlich. (1990). *The population explosion.* New York: Simon & Schuster.

Furedi, F. (1997). *Population and development: A critical introduction.* New York: St. Martin's.

Leisinger, K., Schmitt, K., & Pandya-Lorch, R. (2002). *Six Billion and counting: Population growth and food security in the 21st century.* Washington, DC: International Food Policy Research Institute.

Lutz, W., Sanderson, W., & Scherbov, S. (Eds.). (2004). *The end of world population growth in the 21st century. New challenges for human capital formation and sustainable development.* Sterling, VA: Earthscam.

Meadows, D., Randers, J., & Meadows, D. (2004). *Limits to growth: The 30-year update.* White River Junction, VT: Chelsea Breen.

Simon, J. (1981). *The ultimate resource.* Princeton, NJ: Princeton University Press.

Simon, J. (2000). *The great breakthrough and its cause.* Ann Arbor: University of Michigan Press.

Positivism

Positivism is a philosophical movement and a system of ideas that includes a broad methodological approach and a theory of knowledge, in particular of a scientific knowledge, based on radical empiricism that confines knowledge to observable and verifiable data. It has emerged as a fundamentally new, non-metaphysical ("positive," in a sense of a quality or state characterized by certainty, acceptance and affirmation) philosophy, especially philosophy of science and social science. This conception must have declared as false and senseless all traditional problems, concepts, and propositions of philosophy inasmuch being of abstract nature and unsolvable by experience. It must have rejected as unscientific and meaningless also any type of theoretical scientific thought, not to say any intuition or revelation, considering it a pure and empty speculation.

Human thought, legitimately represented only by logic and mathematics, must strictly and firmly stick to what has been, or in principle can be, experienced and evidenced by given "positive" facts. Such a thought would encompass "positive" information derived from observable experience. Thus, even though the French philosopher and social theorist Isidore-Auguste-Marie-François-Xavier Comte (1798–1857), who coined the term, is generally recognized as the founder of positivism, its roots can be traced back to the epistemology of British empiricism as contained in the works of F. Bacon, G. Berkeley, and D. Hume, according to whom knowledge should be fully grounded in experience, that is, we should not take as knowledge what has not been perceived or cannot be perceptible by senses. In such a way positivism pretends to express the true spirit of science. It represents an attempt at exact methodology of science and true scientific philosophy. Science, especially natural science, is regarded as the paradigm model of a true knowledge and a model for philosophy as well. Even philosophy itself must become a "positive philosophy," (that is, a philosophical science based on experience and "positive" science). Comte's monumental six-volume *Cours de philosophie positive (Course in Positive Philosophy)* was an encyclopedic project comparable to that of the *Enlightenment Encyclopedists*, in which he developed a complete system of philosophy to provide the foundations for the social order he envisaged.

The story of positivism has embraced a wide variety of ideas not fully endorsed by all of its proponents. Historically, there have been three phases in the development of positivism, each of which has provided a special form of the positivist doctrine. The classical positivism of Comte represents the first phase, which in a sense is still the outcome of the Enlightenment. It can be labeled as the "social P.," since its originator intended via his conception of a "positive knowledge" not only to provide a true scientific knowledge but also to put this knowledge in the service of human social progress. Comte contended, together with Claude Henri de Saint-Simon (1760–1825), for whom he worked as a secretary for a couple of years, that the social evolution could be achieved through education and enlightenment, i.e., knowledge and science. The social reconstruction presupposes the reconstruction of sciences first. Classifying the sciences according to their degree of increasing complexity, Comte reduces them to six in the following order: mathematics, astronomy, physics, chemistry, biology, and sociology. Thus Comte had conceived the idea of a new science of society, sociology—or "social physics" in his terms—since he thought that there should not be any substantial difference between this and other natural sciences. As the basis for such a positive knowledge of human society and history, Comte considered laws. He divided the social physics into the "social statics" providing social facts associated in the social order with laws, and "social dynamics," providing the laws of social evolution resulting in the social progress. Thereby such a science would provide the foundation for social reconstruction. Comte believed in the spirit of the enlightenment: that political problems should be subject to the same procedures that scientists use in order to resolve scientific questions, i.e., that politics should become a sort of "social engineering," or "social technology," or perhaps applied social science, which is to be implemented by experts and technicians, who fully understand its subject. In a sense, Comte shared with F. Bacon not only his empiricism but also his pragmatism. He worked diligently to see his ideas be useful in practice. In order to persuade himself and others that his theory is also a part of the social process, he developed the quasi-Hegelian evolutionary scheme of the history of human civilization, according to which the human mind, knowledge, and society have passed through the following three stages, as he put it in his work, *The Discours surl'ensemble du positivisme (A General View of Positivism)* published in 1848: "[T]he *Theological stage,* in which free play is given to spontaneous fictions admitting of no proof, the *Metaphysical stage,* characterized by the prevalence of personified abstractions or entities, and lastly, the *Positive stage,* based upon an exact view of the real facts of the case." That is, the Theological stage was dominated by religion and explanations of natural phenomena by theology; the Metaphysical stage was dominated by obscure abstract concepts and explanations of natural phenomena by philosophy, and the Positive stage shall be dominated by positive knowledge and explanations of natural phenomena by positive science. The first stage represents the "infantile" stage with the primitive, supernatural worldview; the second stage represents the "adolescent" stage with the reference to invisible natural essences, and the third stage represents the "mature" stage, corresponding to the present time, in which the world is conceived as a whole and as an ordered organism governed by necessary laws. Strangely enough but true, Comte, in the later period of his life, and substantially due to a 1-year-long personal affair with Clotilde de Vaux (1815–1846), switched from his hard-nosed scientism toward the recognition of the emotional side of human life, including love, friendship, and altruism (of the latter term he is said to be the originator). He founded a "positive religion," which he named the "Religion of Humanity" in order to establish even an emotional and spiritual foundation for his philosophy—something he formerly would have strongly dismissed. However, this was in line with the development of his thought, since subsequently he placed ethics on the highest step in his hierarchy of sciences. He suggested that altruism combined with rationality may bring the highest stage of social evolution, and thus he aimed to top his project not only with general social ethics, but perhaps also with general social anthropology, as he mentioned in the popular introduction of his system of 1844 *Discours sur l'esprit positif (A Discourse on the Positive Spirit).* Humanity has now become the "God" of positivism and the object of worship. Humanity with the world-space and the earth has formed the positivist trinity. Comte even strived to make his secular religion complete with the temple, pontiff, priesthood and its calendar of saints. After the death of Comte, a split occurred in the school of positivism, and in France two groups had been formed: an orthodox one led by Pierre Laffitte (1823–1903), and

a dissident one led by Émile Littré (1801–1881). Other important proponents of the first phase of positivism were John Stuart Mill (1806–1873), Herbert Spencer (1820–1903), and Alexander Bain (1818–1903) in England. They focused on the theory of scientific knowledge and theory of society. The principles and spirit of classical positivism no doubt pervaded the scientific and philosophical thought in the 19th century and exercised a broad influence in many spheres.

The second phase of positivism, "Neo-positivism," which can be labeled as "critical P." (sometimes as "empirio-criticism"), focused on an immediate experience and its inception dates back to the 1860s-1870s. It is associated mainly with the Austrian philosopher and scientist Ernst Mach (1838–1916)), according to whom it is also called "Machism," and some of his Austrian colleagues such as Richard Avenarius (1843–1896), but also with J. H. Poincaré (1854–1912) in France, and others. These thinkers have not so much in common with the classical Comtean positivists; nevertheless, there are some features in their works that allow one to describe them as participants in the same movement. Thus they were also basically motivated with issues of scientific knowledge and methodology. However, their extreme empiricism brought them to psychologism of the type of J. S. Mill, and even more radically to subjectivism of the type of G. Berkeley. Rather than general sociology, they were interested in a general theory of economics.

The most recent and third stage of P., sometimes also called "Neo-positivism" by those commentators who simply decide to ignore the former Machian stage, also has its several labels such as "logical positivism" (most often) or "logical empiricism," or "logical atomism" as its special variant. Its origins are firmly linked up with the so-called Vienna Circle (at its beginnings were also influenced by the home "gurus" such as Mach and Avenarius), which started to work as early as in 1907, but was made complete in the 1920s by assembling a whole range of natural and social scientists who gathered to discuss the typical positivist agenda of the philosophy of science, and who have marked substantially the developments in this area for the long decades of the first half of the 20th century to come. The group included such important figures as Moritz Schlick (1882–1936), Otto Neurath (1882–1945), Rudolf Carnap (1891–1970), Philipp Frank (1884–1966), Hans Reichenbach (1891–1953), Herbert Feigl (1902–1988), Kurt Gödel (1906–1978), Hans Hahn (1879–1934), Carl Gustav Hempel (1905–1997), Friedrich Waismann (1896–1959), and others, including loosely also Ludwig Wittgenstein (1889– 1953), Alfred J. Ayer (1910–1989), Karl R. Popper (1902–1994), and Willard V. O. Quine (1908–2000), as their partner-discussants and successors, respectively. In due course these thinkers have concentrated on the philosophical problems of language, symbolic logic, the structure of scientific investigations, and so on. They came to oppose psychologism, which they replaced by their logicism, and finally gave rise to another important philosophical movement of the 20th century, with which they have been intertwined, i.e. the analytic philosophy in the broad sense. In comparison to both previous stages of positivism, this one has put emphasis also on logic, whose role they understood as the formulation of a priori rules of valid inference in science, and explication of basic scientific concepts (which they called "the logical analysis of scientific language"). Philosophically, the crucial intention of these positivists was the elimination of metaphysics, a task they intended to accomplish via applying scientific methods to the analysis of language of science and philosophy. As the main instrument for this purpose they selected their self-invented "Verification Principle." According to this principle, there are just two types of meaningful propositions: tautologies (true by definition), and those verified and/or verifiable by empirical methods of science. All other statements must be pseudostatements lacking a meaning. Such, for instance, are metaphysical and/or theological statements, being neither true nor false, but "nonsense." The fatal trouble, however, has appeared for the logical positivists with the Verification Principle itself: it is the statement, which cannot be verified by using its own criteria. The suggestion provided by K. R. Popper to replace the principle of verification for the fallibilist principle of falsification has brought better results. After the tragic assassination of M. Schlick, the leader of the Circle, and the rise of Nazism in Germany, the final phase of this movement continued in the United States, prevailingly under the title of logical empiricism. One of the main ideas they took over from Europe, and attempted to maintain during and after World War II, was the idea of a unified science that they were developing within the project of the multivolume *International Encyclopedia of Unified Science*. This was based on

the doctrine that there is a universal scientific method, which can unite all science, natural and social, and that all real science must conform to this methodological model. Thus, particularly in the fields of social science, including humanities and anthropology, such approaches as naturalism, reductionism, behaviorism, operationalism, methodological individualism, and formal and statistic methods have been supported at the expense of, and directly in the opposition to, interpretive and hermeneutic approaches. The focus on explanation versus interpretation has long prevailed, as well as the idea of value-neutral science among the logical empiricists.

Despite the considerable legacy of all phases of positivism, in particular in sociology, methodology, and philosophy of science, the second half of the 20th century has witnessed its final stage and the gradual replacement by what now is called "post-positivism." Its rise is associated mainly with such figures, formerly members of the logical positivist group, as Thomas Kuhn (1922–1996), among others. Traditional methodological dualisms of analytic and synthetic theory and observation seem to have been explained as untenable by W. V. O. Quine. Such an approach attempts to embrace and preserve the scientific values and norms of rationality, while describing them in a new, non-dogmatic, historical, contextual, conventional, communicative, and more creative mode. The post-positivists do not ignore as scientifically irrelevant such factors as historical, anthropological, and cognitive factors, including psychological ones that influence the whole science, not merely the social science. The traditional specters of positivism, such as values, meanings, and interpretations, seem to be thus no more haunting, which may be read as a good message for anthropology from the part of this current, and seemingly the "fourth," stage of positivism.

— *Emil Visnovsky*

Further Readings

Giere, R. N., & Richardson, A. W. (Ed.). (1997). *Origins of logical empiricism.* Minneapolis: University of Minnesota Press.

Kremer-Marietti, A. (1987). "Positivist Anthropology." *Encylopedia of Library and Information Science.* New York: Marcel Dekker.

Kremer-Marietti, A. (1992). Measurement and principles. The structure of physical theories. *Revue Internationale de Philosophie, 3(182)*, 361–375.

Pickering, M. (1993). *Auguste Comte: An intellectual biography,* Vol. 1. Cambridge: Cambridge University Press.

Popper, K. (1958). *The logic of scientific discovery.* London: Hutchinson.

Sarkar, S. (Ed.). (1996). *Logical empiricism at its peak: Schlick, Carnap, and Neurath,* New York: Garland.

Scharff, R. (1995). *Comte after positivism.* Cambridge: Cambridge University Press.

Uebel, T. (1992). *Overcoming logical positivism from within.* Amsterdam: Rodopi.

POSTCOLONIALISM

One of the basic principles of postcolonial thinking is that you really should not say, "one of the basic principles of 'X' is 'Y.'" Postcolonialism, in its epistemological orientation, stands against what it labels "essentialism," the identification of central or core characteristics, particularly of peoples, societies, and cultures. However, adhering to this prohibition makes it difficult to identify and discuss anything, including postcolonialism.

In postcolonial thought, there is good reason to reject essentialist characterizations of peoples, societies, and cultures. The reason is that, according to postcolonial thought, "knowledge is power," but not in the traditional sense of knowledge giving one real understanding of the world, gives one power in the world. Rather, the postcolonial view, following Michel Foucault, is that "knowledge is power" in the sense that what we call "knowledge" is really constructed ideology with no grounds in reality, which is designed to justify the imposition of power over others, to repress and exploit others for fun and profit. Of course, this other postcolonial epistemological principle, that true knowledge does not exist, raises the same kind of awkward question that arises with all relativist theories: must postcolonial doctrines and assertions, like those to which it directs its critical attention, be considered "constructed ideology

with no grounds in reality which is designed to justify the imposition of power over others?"

Postcolonial thought has developed in the context of the confrontation of cultures. Its stance is critical toward imperialism and colonialism, especially European imperialism and colonialism. For example, according to Abdul Jan Mohammed, "Motivated by his desire to conquer and dominate, the imperialist configures the colonial realm as a confrontation based on differences in race, language, social customs, cultural values, and modes of production." Essentialism is used to define imperial and colonial subjects as different, as "the Other" (as the postcolonialists would say), and to contrast the culture, economy, politics, science, and so on of Europe favorably in comparison.

Postcolonial thought manifests itself in many contexts and is applied in many fields. As Stephen Slemon explains, postcolonialism has been used as a way of ordering a critique of totalizing forms of Western historicism, as a portmanteau term for a retooled notion of "class," as a subset of both postmodernism and poststructuralism (and conversely, as the condition from which these two structures of cultural logic and cultural critique themselves are seen to emerge), as the name for a condition of nativist longing in postindependence national groupings, as a cultural marker for nonresidency for a third-world intellectual cadre, as the inevitable underside of a fractured and ambivalent discourse of colonialist power, as an oppositional form of "reading practice," and, as the name for a category of "literary" activity which sprang from a new and welcome political energy going on within what used to be called "Commonwealth" literary studies.

In anthropology more specifically, postcolonialism has two main thrusts: First, again at the epistemological level, it challenges anthropological research in "other" cultures, attacking both the authority of anthropologists to speak for other cultures and essentialist descriptions of those cultures. Postcolonial preferences in reporting on other cultures would be for an emphasis on "voices" of the subjects themselves; that is, instead of commentary and analysis by the anthropologist, ethnographic reports would consist of comments and commentaries by the "natives."

Second, at the level of social and historical analysis, anthropologists of postcolonial bent would de-emphasize focus on characteristics of the local or regional indigenous culture, and instead analyze the ways in which European imperial and colonial power distorted and corrupted indigenous culture, and exploited and oppressed imperial and colonial "subjects." In postcolonial analysis, culture and social organization that may at first appear to be indigenous, and above all social and cultural problems, whether in economics, politics, human relations, gender relations, human rights, and so on, can be traced to externally imposed imperial and colonial impositions.

Perhaps the most important postcolonialist influence on anthropology has been Edward Said's *Orientalism.* Said, a professor of English at Columbia University, argued that Oriental Studies, the field of historical, literary, and cultural examination of the Middle East, consisted not so much of dispassionate, reasoned, objective understandings of the Middle East, but rather a set of fantasy projections, distorted disparagements, and demeaning misrepresentations, the real purpose of which was not to understand the Middle East, but to justify and encourage European conquest, oppression, and exploitation of the Middle East and its peoples. From this perspective, any critical comment directed toward the Middle East can thus be dismissed as "Orientalism." Said's critics argue that Said violated his own strictures in his account of Oriental Studies, and accuse him of "Occidentalism." Said, from a privileged family of Palestinian origin residing in Egypt, presented himself as a Palestinian refugee and adopted the Palestinian cause as his heartfelt political commitment, influencing many in academia to side with Palestine.

Two important intellectual streams converge in postcolonialism. One is Marxism, and particularly Leninism. Marxism was a great political influence in the second half of the 19th century and the 20th century, and became a major academic influence as well. Popular in Europe throughout the 20th century, Marxism became influential in North American academia during and after the 1960s. But with the decline and fall of the Soviet Union and communism in the late 1980s, Marxism lost some of its luster. Lenin's *Imperialism,* which updated Marx by applying his theory to the wider imperial and colonial fields, has continued to be an inspiration. Postcolonialism, without acknowledging its debt too explicitly, has drawn on Marxism and Leninism, although, like Foucault, a more modern and direct influence on postcolonialism, stressing power more than the economics emphasized by orthodox Marxism.

The other stream converging in postcolonialism is postmodernism, arising in anthropology from cultural and symbolic anthropology; it takes the epistemological stand that everyone is "positioned" and can only see a particular point of view, rendering all opinions "relative" and "subjective." There is, thus, no objective knowledge, and one view (or custom, practice, culture, or society) is as good as the next. Postcolonialism applies this precept to Third-World societies.

For postcolonialists, anthropology cannot fulfill its "modernist" or "realist" objective of discovery and accurate representation. According to the postcolonial vision, Western anthropologists—epistemologically hampered by cultural blinders, and guilty of colonialist crimes—can legitimately only advocate on behalf of the colonial oppressed, the subaltern, the disadvantaged, while at the same time condemning their oppressors, European and American imperialists and advocates of capitalist globalization. Indeed, under the influence of postcolonialism, much academic anthropology has discarded aspirations of a scientific nature and taken on the character of political advocacy.

— Philip Carl Salzman

Further Readings

Appadurai. A. (1996). *Modernity at large: Cultural dimensions of globalization.* Minneapolis: University of Minnesota Press.

Ashcroft, B., Griffiths, G., & Tiffin, H. (Eds.) (1995). *The post-colonial studies reader.* London: Routledge.

Gupta, A., & Ferguson, J. (Eds). (1997). *Culture power place: Explorations in critical anthropology.* Durham, NC: Duke University Press.

Niezen, R. (2004). *A world beyond difference: Cultural identity in the age of globalization.* Oxford: Blackwell.

Spivak, G. (1999). *A critique of postcolonial reason.* Cambridge, MA: Harvard University Press.

POSTMODERNISM

In few areas is it more problematic to arrive at a clean definition than it is for postmodernism. Not the least of the problem is the resistance among postmodernists themselves to be defined, or, in many cases, to admit the authority or even the possibility of definition as an activity. Before attempting a definition, a series of useful distinctions can be drawn.

Postmodernity and Postmodernism

The first important distinction to be made is that between postmodernity and postmodernism. Postmodernity is a name given to a period of history, and postmodernism is the body of theory that has developed to explain that period. Opinions differ about when postmodernity is supposed to have begun, with dates varying between 1968 and 1973. All agree that conditions in the world have changed since then. In international politics, the sites of authority have fractured from the relatively straightforward conflict of the Cold War to the multi-polar, less predictable, and more confusing international situation of today. Other fundamental changes have been made to our styles of work, with entirely new industries, work hours and arrangements than was the case before. The assumption underlying the notion of postmodernity is that the world has seen not simply changes in style, but also a fundamental shift in the way the world operates, a shift which has been to the disadvantage of predictability, order, and rationality.

Those who argue for 1968 as a convenient date for the onset of postmodernity point to the student riots of that year, when the baby boomer generation, the best-fed, best-educated generation in world history, spurned the cultural conventions they grew up with, and demanded change. These revolts did not demand a specific set of political, social, and economic changes; they demanded *change,* as a general rejection of the old.

The impact of the baby boomer generation is very significant, but even it was swept along by the broader transformation occurring after the events of 1973. This was the year of permanent international economic change resulting from the oil shocks triggered by a newly radicalized Organization of Petroleum Exporting Countries (OPEC). The oil shocks were provoked by the oil-producing countries, most of which were from the Muslim world, wanting to express anger at the continued support by the West for Israel, which had been decisive in the recent Yom Kippur war. This marked a fundamental change in the balance of economic and political power marked by a dramatic shifting in priorities in global politics and economics. The widespread social changes that

have occurred in the West are largely a product of these developments. Postmodernity can best be dated, therefore, from 1973.

It is important to note that "postmodernity," as discussed here, is nothing more than a title given to a period by historians, like "Renaissance" or "Dark Ages." Others have called this period Late Capitalism. Still others have rejected the idea that the events of 1973 mean we can no longer speak of "modernity." This debate becomes a question about the periodizing of history, and the usefulness of such a procedure.

Postmodernism as a Series of Reactions to Postmodernity

We have seen, then, that postmodernity and postmodernism are not related. Postmodernism is, as the suffix implies, an "ism," a series of reactions that have arisen to explain the times known to some as postmodernity. It is quite consistent to see value in postmodernity as a historical term while also rejecting the postmodernism that has arisen as a series of reactions to explain postmodernity.

Most introductory essays to postmodernism begin with the insistence that any attempt at a comprehensive delineation and understanding of postmodernism is inherently contradictory and bound to fail. To overcome this problem, most characterizations of postmodernism portray it as a less coherent body of doctrine as a general mood, or, as described in the previous paragraph, a series of reactions. The series of reactions are often expressed in negative terms.

Postmodernism is almost entirely confined to universities and literary circles. And within universities, some faculties are more likely to be favorable to postmodernism than others. Most branches of the sciences are hostile, whereas departments of English or French literature, architecture, visual arts, and occasionally anthropology and sociology are more likely to react favorably. Opposition to postmodernism in Philosophy departments, particularly in English-speaking countries, has grown since the mid-1990s.

As well as these divisions between faculties, there is also a division based on geography. We have already noted this division among philosophy departments at universities. There are two general strands to the postmodernist reactions to postmodernity. One strand of postmodernism is content to *acknowledge* the changes that have occurred since 1973 and to try to understand them. The other, more radical strand is more willing to *celebrate* those changes. Broadly speaking, this fissure divides postmodernists in the Anglo-American academic community from those from the Continental (mainly French) academic community.

This is made more complicated when we note that this division is by no means exclusively geographical. The two styles of postmodernism, while having a geographical dimension, are principally divided by a series of contrasting emphases with regard to some important questions. The first of these dividing points centers around attitudes toward philosophical analysis. Anglo-American postmodernists may be cautious about analysis as a tool, but still acknowledge its value. Postmodernists of the Continental variety, by contrast, are more inclined to view analysis as part of the problem they are looking to overcome, rather than as a useful tool to gather new and better understandings.

A second major area of divergence can be seen in the attitudes toward metanarratives. Most postmodernists, whether Anglo-American or Continental, see postmodernity as a time when traditional metanarratives dissolved. A metanarrative is a general intellectual framework through which we view history. For example, the communist metanarrative is of a progressive, and inevitable, succession from feudalism, through capitalism to socialism, and, in the future, on to communism. A Christian metanarrative, by contrast, proceeds from a primitive innocence in Eden, followed by the Fall and the condition of sin and death among humans, relieved by the redemption of Jesus Christ, and which will be brought to an end when Christ returns to reward the faithful and judge the damned. The most oft-quoted definition of postmodernism comes from the French thinker Jean-François Lyotard, who defined it in terms of incredulity toward metanarratives.

The differences lie in their contrasting attitudes to the end of metanarratives. As noted above, most postmodernists from the Continental tradition are likely to celebrate the end of metanarratives. They claim that not only are metanarratives no longer needed, they are no longer welcome. The end of metanarratives brings the end of the tyranny of history, and, more particularly, the end of the presumption of scholars to be chroniclers of historical fact. Instead, postmodernists argue, we have a mass of assertions and claims, which can all compete for our attention as best they may, with little difference in the outcome of one being chosen over another.

Underlying this hostility to metanarratives is the postmodernist hostility to what they see as the dominating and bullying nature of science and reason. The central claim of postmodernists of the Anglo-American strand is that rationality is a historically conditioned faculty, which means that different historical epochs will produce different notions of rationality. This is a point few opponents of rationality would dispute. Indeed, many of the people derided by postmodernists, such as Bertrand Russell, made these points long before postmodernism was an intellectual force.

Others, usually of the Continental strand of postmodernism, are more extreme, and seek to condemn what some call "legislative reason" as being inherently domineering and oppressive. In contrast to this, they regard postmodernism as a liberation from rationality because it is a liberation from all socially constructed bounds and norms. As one prominent postmodernist stated in 1992, postmodernism is about splitting the truth, the standards, and the ideal into what has been deconstructed and into what is about to be deconstructed, and denying in advance the right of any new doctrine, theory, or revelation to take the place of the discarded rules of the past. David Harvey, from an influential postmodernist work from 1991, enthused that postmodernism wallows in the fragmentary and chaotic currents of change as if that is all there is. In a similar vein, Gregory Bruce Smith identified postmodernism as fundamentally a sign of disintegration, transition, and waning faith in what he called the Enlightenment project.

In defining postmodernism, then, we need to take account of these two strands of interpretation. The more moderate version of postmodernism is the assertion that we cannot *know* anything, but can only interpret, and that any interpretation we make can only express our partial and narrow perspectives. The more radical version of postmodernism is the assertion that not only can we not know anything, but that also any claims to knowledge are bound to be hegemonic and impatient of dissent, which means that our ability only to interpret from our partial and narrow perspectives constitutes a liberation from that tendency toward hegemony, which is particularly evident in science and rationality.

Behind the differences of emphasis and geography, there is a common political heritage for much of postmodernism. This is because postmodernism is a phenomenon of the political left. The reason why postmodernists are anxious to write the obituary of metanarratives is because many of them were, earlier in their lives, proponents of variations of socialism and communism, which, as we have seen, have strong metanarrative components. This can be traced back to the disillusionment of German socialists after the failure of the Spartacist revolt in Berlin in 1919. Not only did the socialist revolution fail, but also the parties of the left were then seen to fail as well, as they showed themselves incapable of resisting the rise of Nazism. By their slavish following of the dictates of Moscow, the parties of the left had betrayed their purpose. The school of Marxist-inspired criticism, known as the Frankfurt School, traced the progressive failures of each institution that had once been a source of hope.

After the World War II, the Soviet Union joined the ranks of gods that failed. Between the Soviet invasions of Hungary in 1956 and Czechoslovakia in 1968, the promise of communism as a metanarrative of progressive liberation from alienation became ever more difficult to sustain. The choices of the left after 1968 were stark: acknowledge that capitalism and the metanarratives that sustain it had triumphed, or create a system of criticism that denied the legitimacy of any metanarratives at all. Postmodernism adopted the latter approach.

The differences of emphasis between the Continental and Anglo-American styles of postmodernism were most pronounced on the question of the degree to which Western culture could be salvaged. Critics like Theodor Adorno (1903–1969) and Max Horkheimer (1895–1973) were among the more pronounced cultural pessimists. In *Dialectics of Enlightenment*, Adorno and Horkheimer saw modernity as inherently self-destructive, carrying the germs of its own dissolution and decay. There was a straight line, they argued, from the Enlightenment to Nazism and Stalinism. Later heirs of this high level of pessimism included the Polish born sociologist Zygmunt Bauman (1925–), who argued that modernity is a long road to prison, and Michel Foucault (1926–1984), who saw all society as engaged in a war against people to impose on them a sterile understanding of what it is to be human.

The more moderate postmodernists in the Anglo-American schools, however, were not prepared to go this far. Their general argument was to see value in the humanist tradition of the Enlightenment, merely wanting to excise it of the faults and excesses they perceived it brought with it. Advocates of this approach

include the English philosopher Michael Luntley and the New Zealand sociologist Barry Smart.

Postmodernists agree on their suspicion of metanarratives, diverging only on the degree of opposition they are prepared to express. Another area of general agreement is in their attitudes toward science. Anglo-American and Continental postmodernists agree that science involves a metanarrative, which they question. The metanarrative of science speaks of cumulative knowledge over time, leading to ever-clearer understandings of the universe. Just as importantly, postmodernists question the claim of science that it is grounded in objective truth. But the attitudes toward science reveal the greatest splits between the Anglo-American and the Continental styles of postmodernism. The Anglo-American attitudes are best articulated in the works of Richard Rorty (1931–) whose critique has been directed against foundationalism, the practice of claiming that one's theories rest on objective foundations of truth.

The Continental branch of postmodernism, once again, has wandered much further afield on its attitudes to science. Indeed, it is in this area that it has provoked the strongest opposition. Working from an epistemic relativism, many Continental postmodernists have pressed the claims that science is a metanarrative like any other, with no special claims to authority, and indeed, meriting extra levels of criticism precisely because of those claims of authority they perceive scientists making.

The Decline of Postmodernism

Postmodernism began to attract some significant critical attention after about 1994. Much of the criticism was led by scientists and by philosophers who take science seriously. Leading the way was a devastating critique by Norman Levitt and Paul Gross titled, *Higher Superstition: The Academic Left and Its Quarrels with Science* (1994). Other significant milestones included *Derrida and Wittgenstein* (1994) by Newton Garver and Seung-Chong Lee, *The Poverty of Postmodernism* (1995) by John O'Neill, and *The Flight from Science and Reason* (1996) edited by Paul Gross, Norman Levitt, and Martin W Lewis.

The decline of postmodernism was publicized by what has become known as the Sokal Hoax. In 1996 Alan Sokal, a professor of physics at New York University, submitted a paper to the postmodernist journal, *Social Text*. The paper, titled "Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity" supposedly demonstrated that the laws of science are nothing more than social constructs—one of the central points of Continental postmodernism. The *Social Text* editors made the mistake of not submitting the article to the usual process of peer review, and on the day the article appeared, Sokal announced in the journal *Lingua Franca* that the article was a hoax.

The hoax, and the controversy that followed, was a major embarrassment for the editors of *Social Text,* and for the wider claims of postmodernism to academic credibility. Sokal followed up his hoax with a scorching attack, coauthored with the Belgian physicist Jean Bricmont, on French postmodernism and published in the United States under the title *Fashionable Nonsense: Postmodern Intellectuals' Abuse of Science* (1998).

Alongside this counterattack, some of the more moderate Anglo-American thinkers who formerly expressed support for elements of postmodernism have since stepped back. In Britain, Christopher Norris, a prominent defender of the works of Jacques Derrida, has more recently launched important critiques against the relativism inherent in postmodernist thinking. And in the United States, Richard Rorty, without having changed his position, has expressed his regret at ever having used the term "postmodernist." Most recently a newer movement known as critical realism has arisen as the successor to postmodernism. The intellectual initiative has clearly now passed to the critics of postmodernism.

— Bill Cooke

Further Readings

Bauman, Z. (1993). *Intimations of postmodernity.* New York: Routledge.

Berry, P., & Wernick, A. (Eds.). (1992). *Shadow of spirit: Postmodernism and religion,* New York: Routledge.

Gross, P., & Levitt, N. (1994). *Higher superstition: The academic left and its quarrels with science.* Baltimore, MD: Johns Hopkins University Press.

Lopéz, J., & Potter, G. (Eds.). (2001). *After postmodernism: An introduction to critical realism.* New York: Athlone.

O'Neill, J. (1995). *The poverty of postmodernism.* New York: Routledge.

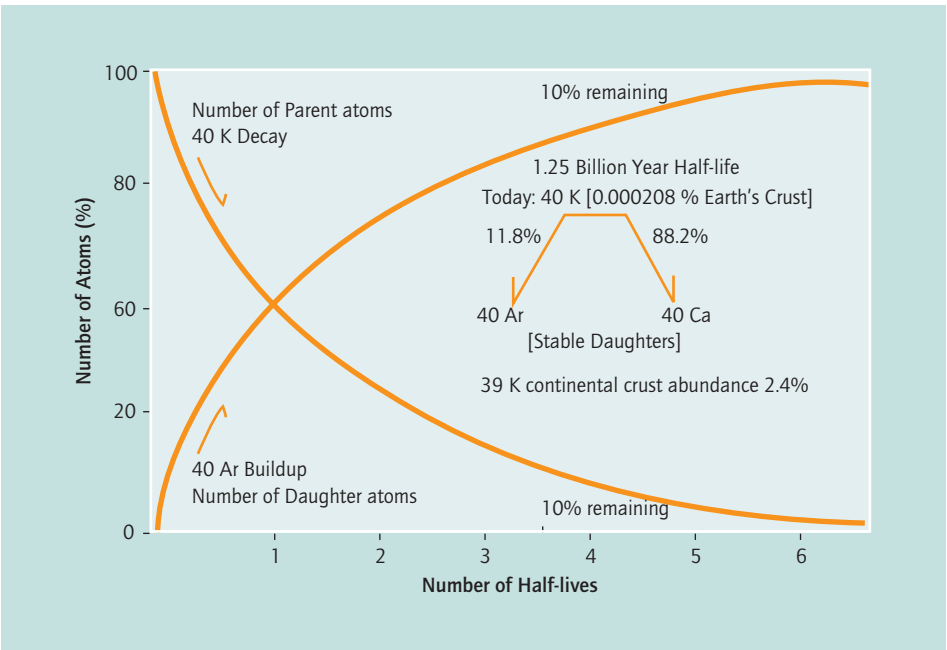
Waugh, P. (Ed.). (1994). *Postmodernism: A reader,* London: Edward Arnold.

Potassium Argon Dating

Potassium argon [K/AR] dating is a radiometric technique that can be applied throughout the time span of the Earth from 4.5 billion years ago down to a few tens of thousands of years ago. Thus, K/Ar is the method that has been most useful in unraveling the history of the earth, the development of life, and most importantly, the history of human development. The method is based on the properties of potassium, which is one of the most abundant elements of the continental Earth's crust comprising 2.4 weight percent. There are three naturally occurring isotopes of the element potassium: ^{39}K (93.258%), ^{40}K (0.0117%), and ^{41}K (6.73%). The dating technique is based on the radioactive decay of the isotope ^{40}K, which has a half-life of 1.28×10^9 years. Primordial ^{40}K, which at formation would have had an abundance of about 14%, has diminished by a factor of over a thousand in the 10 half-lives since the Big Bang approximately 13 billion years ago, and over a factor 10 because the three half-lives that have occurred since the origin of life on Earth 3.8 billion years ago.

Unlike the radiocarbon dating, where the amount of the cosmogenically produced radioactive carbon isotope remaining need only be compared to its original concentration, K/Ar dating determinations are based on the binary decay of ^{40}K to either ^{40}Ca (88.2%) or ^{40}Ar (11.8%). It is the steady buildup of the daughter isotope ^{40}Ar that represents the atomic clock and its ticking. The clock starts when a molten rock cools and solidifies, having liberated any former ^{40}Ar, and is read by comparing the amount of ^{40}K present when formed to the amount of ^{40}Ar present (see figure). This comparison is possible because the ratio of ^{39}K to the decaying ^{40}K is known, and ^{39}K is the most abundant stable isotope that can be measured. This technique requires that the ^{40}K, ^{39}K and ^{40}Ar, ^{36}Ar be analyzed separately to produce the data required to calculate an age. The obvious complication of this technique is the fact that ^{40}Ar is an inert gas that makes up 1% of the atmosphere and can diffuse into samples biasing the calculated results. Furthermore, the gas can escape from samples, thus producing apparent younger ages. The modern ratio of ^{40}Ar to ^{36}Ar is 295.5, which permits the analyst to subtract the atmospheric ^{40}Ar from the radiogenic ^{40}Ar in a sample to arrive at the amount produced by ^{40}K decay.

A new approach has been adopted in recent years in which the ^{40}Ar and ^{40}K are measured simultaneously by irradiating the sample and converting some of the ^{39}K into ^{39}Ar, which does not occur naturally. The ^{39}Ar half-life of 269 years is long enough to cause no problems in the age calculations. This approach permits the ^{39}K and the ^{40}K to be directly determined along with the ^{40}Ar and eliminating the need to separately analyze for potassium. The addition of lasers in place of induction heating technology has permitted more precise analyses to be made. This approach permits the analyses of single grains, and the use of a more refined step-heating approach that greatly improves the reliability of the result and eliminates the need to do an independent analysis for the potassium.



The figure shows the parent-daughter relationship between the radioactive ^{40}K and the stable ^{40}Ar. Only 11.8% of ^{40}K atoms decay to ^{40}Ar.

— L. A. Pavlish

Further Readings

Dalrymple, G. B., & Lanphere, M. A. (1969). *Potassium argon dating*. San Francisco, CA: W. H. Freeman.

Smith, P. (2003). ^{40}K–^{40}Ar Dating in Archaeology. In L. A. Pavlish & A. E. Litherland (Eds.), "Physics and Archaeometry." Special issue of *Physics in Canada, 59*(5), 257–262.

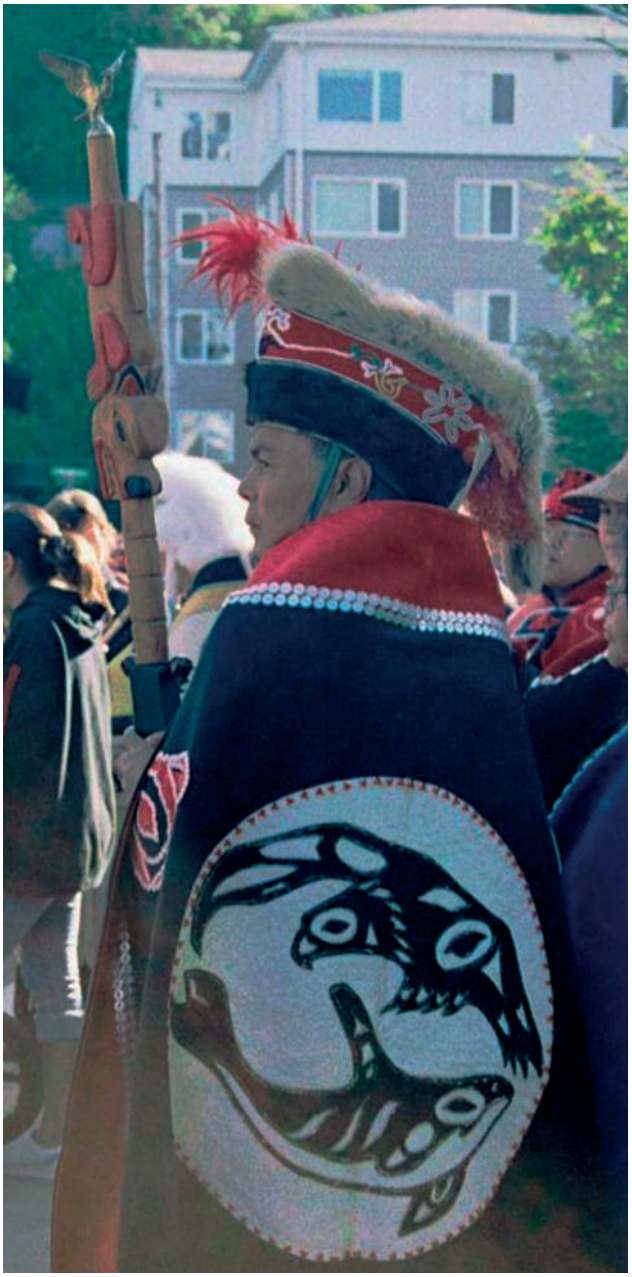
York, D., & Farquhar, R. M. (1973). *The Earth's age and geochronology*. Toronto: Pergamon Press.

Potlatch

The potlatch is a winter festival, with ceremonial feasts, where gifts and property are distributed to obtain or reassert a status, where prominent high caste families display crests, where names are given, where solidarity for war was made (in the past), and peace declared, where memorials are given and ancestors are honored. It was a place where "people played stick games in the evening" recounts Elizabeth Woody in her essay, "Tradition with a big 'T.'" Over time the potlatch evolved through external influences, such as a new supernatural encounter, or introductions from surrounding and distant tribes, with European contact being the most dramatic change in ascendancy.

With the introduction of the European culture, a new wealth and merchandise system was instituted, which transformed the very format of the potlatch. Competitive potlatches rose to new heights of property distribution with most tribes, and more dramatically with the Southern Kwakiutl. This drew concern from the settlers and church leaders, leading to local governments petitioning for a ban to all potlatch activities in Canada.

Potlatch is a word derived from the "Chinook" trade jargon, meaning, "to give." The potlatch existed prior to trade with the Chinooks. It existed in a clandestine manner in Canada while outlawed, and is growing in popularity even today. Will future potlatches only be faint echoes of those of the past? Will today's potlatches be the foundation for evolutionary growth in taking this festive occasion into a new modern realm? These are the questions to be answered by present and future generations.



Klawock, Chief Roy Williams III

Source: Photograph by Pamela Rae Huteson.

The Potlatch Prior to European Contact

Potlatches were a way of life among the Northwest First People, and were carried on along the Pacific Coast of Alaska to Oregon. They created the impetus for daily activity; they were the economy, the basis for the flow of wealth, and the standard of the class system. Etiquette was not only observed in the

potlatch, but in everyday life, as Stanley Walens reveals in *Feasting with Cannibals,* and was strictly enforced. This ceremony is more famously known through the First People from Southeast Alaska to British Columbia; in particular among the Tlingit, Haida, Bella Bella, Tsimshian, and Kwakiutl. Potlatching was also practiced in the Washington and Oregon coastal villages of the Chinooks, Nootka, Salish, Lummi, and other surrounding tribal neighbors, as well as on the Bering Sea, along the Aleutian Islands and interior of Alaska, by the Aleuts, Athabascans, and Inupiat. These are the peoples who would congregate, feast, and dance, while royally attired in regalia displaying their crests, which were passed down to them from their mother's clan (for those of matriarchal societies) from time immemorial. This took the form of dancing and singing of

19th century bentwood boxes

Source: Photo courtesy of www.fluryco.com

ancient encounters, as in Pamela Rae Huteson's *Legends in Wood: Stories of the Totems,* which give examples of encounters of transforming beings of the air and land, which could take off their coat of feathers or fur, and appear as human as any of "The People." Culture bearers also brought these accounts through speeches, and even through puppetry during the weeklong celebrations. Secret Societies of Dog Eaters and Hamatsa Cannibal Dancers became infamous for their rituals. Those with higher rank utilized the potlatch to keep their standing, since castes were fluid, and it was easier to move down in rank than up.

Potlatch Preparation

The potlatch was a complex feast, even a symbolic feast such as a marriage or funeral, and could have underlying intentions or ambitions for the individual or clan sponsoring the celebration. There were five steps to take in preparing for a potlatch.

1. Alliance would be made within the clan itself. Labor was required for the amassing of the great amounts of food required to feed large numbers of people for several days, and to choreograph the uses of the houses where distinct feasts would be held. Canoes, Chilkat blankets, bentwood boxes, and baskets were often commissioned and produced for the occasion.

2. Alliances could come from other clans for labor and contributions. In tribes with two main clans, the opposite clan, George Thornton Emmons found, would "take over" the funeral processes and longhouse

The late Thlawaa Thlingit Nation Council Elder, Eleanor Peratrovich, wearing tradition regalia during the entrance song of the Shinaku dancers

Source: Photograph courtesy of Georgiana Peratrovich.

building for instance. They would also be paid for this service with gifts during the potlatch.

3. Consideration would be made for invited guests. The larger the audience gathered to witness the event, the more direct was the reflection of the status and prestige of the sponsor and verification, to witness, the claims of property. Guests would be paid with gifts to witness the payment for the services rendered by the the opposite clan, and of status and property claims.

4. The production of gifts, and the procurement of food (which also served as part of the gifts), was also very important. It could take years to accumulate presents to be distributed. The entire clan would participate in some aspect of gathering and producing. Totem poles and longhouses required forest materials of specific dimensions, and so these had to be sought out and retrieved.

5. Regalia, including masks and/or other attire, had to be constructed for the performances, and the accompanying songs and dances had to be rehearsed. Dancers who performed incorrectly were regarded with great shame.

Drums sounded to announce the commencement of the potlatch. When the guests entered the longhouse, at times paddles would appear first through the doorway opening. "The men folk came through first with the paddles. Others hid knives in their blankets, when they came in the house dancing. They did this to protect the women and babies," explained Eleanor Peratrovich, Thlingit elder from Klawock, AK. Although a potlatch was a festive occasion, it could also be staged for revenge of an ancient wrong.

A formal speech would be made from the sponsor of the feast, usually the Chief. A declaration for the reason of the potlatch, as well as the history and rights of the clan would be made. Seating arrangements were strictly adhered to; placing a high caste person in a lower position was considered an insult. Several masters of ceremony could administer over the feast, ensuring the rank of speakers and performers. Food was served in bowls belonging to the clan, intricately carved with representations of stories, images, and property; the Tlingits called these precious items "at.óow." Some bowls could be as long as a canoe, as in the case of the Wild Woman of the Woods bowls and the Woodworm dish of Klukwan. The feast alone could last half a day, requiring those in charge of the needs of the guests to provide special services of hospitality and attention. An extreme display of wealth in a competitive potlatch could involve eulachon oil dripping from the smoke hole into the fire, breaking copper shields or throwing them into the water (called drowning a copper), burning canoes, and even the killing of slaves.

Ban of the Potlatch

Inflation hit the Northwest Cultures as villagers obtained an easier source of prosperity, enabling them to access all ranks. For example, a traditional Chilkat or Raven's Tail Blanket entailed a considerable amount of time to gather materials and weave, while a Hudson Bay Blanket was comparatively inexpensive, and became a new way to assign value to objects (for example, copper shields). One Kwakiutl Copper called "Making-the-House-Empty-of-Blankets"

Tsimshian potlatch in Seattle, Washington

Source: Photograph by Pamela Rae Huteson.

Two Haida-style carved paddles: plain red cedar paddle carved by Haida "Richie" Carle, and yellow cedar paddle carved by Haida Tom Morrison, with a Wolf design carved into it by Thlingit carver/artist Odin Lonning

Source: Photograph by Pamela Rae Huteson.

Sheet'ka Kwaan Naa Kahadi Tribal Community House Performers at Sitka, Alaska

Source: Photograph by Pamela Rae Huteson.

commanded 75,000 Hudson Bay Blankets as a purchase price. Prosperity increased as villages declined in numbers due to the ravages of European diseases, making it possible for new elite positions to open to those who previously were denied the opportunity to progress in class standing. Chiefs scrambled to prove their rights and position with abundant property displays (e.g., a successful sealing season could create enough wealth for a person to buy a coveted social position), as a breakdown of their socioeconomic cultural system encroached on their society's power and control.

Competitive potlatches in Kwakiutl Country infuriated Canadian European settlers and church leaders like the Reverend and Mrs. A.J. Hall, who actively sought to quash the potlatch altogether. Additional misunderstanding of the "cannibal" performances, and other aspects of the potlatch process, culminated in the 1885 Canadian Law banning the potlatch. The enforcement of this law further contributed to the cultural genocide of the Canadian First Nations People. Aldona Jonaitis posits the following reasons for the decline of the potlatch: 1) Alterations in the structure of the fishing industry, 2) The depression, 3) Anglican persuasion, 4) Pentecostal evangelization, and 5) Lack of interest among young people.

Zealous arrests were made after potlatches, and the confiscated potlatch paraphernalia were sold to museums; which made William H. Halliday, Canadian government agent, consider the potlatch "dead." The Elders lamented over this ban, while at the same time some Christian villages, like the Kispiox on the upper Skeena River, banned the potlatch and even posted their own Potlatch Prohibition Warning Notices.

This was the darkest period in potlatch history. Many Kwakiutls went underground with their potlatches, and incorporated giving with other celebrations.

Klawock Heenya Dancers performing at "Celebration 2004" in Juneau, Alaska.

Photograph by Pamela Rae Huteson

The Potlatch Today

In 1951 the Potlatch Prohibition Law was lifted. Memorial and wedding potlatches were the first to resume in the villages; some had not held a potlatch for nearly a century. It was necessary to call on the Elders' wisdom and memories for guidance to revive the singing and dancing of these ancient songs and dances. A revival of the Northwest culture had spread throughout the villages from Alaska to Washington as carvers and other new Northwest artists studied Bill Holm's *Northwest Coast Indian Art: an Analysis of Form* to recapture an art form that was nearly extinct. Holm photographed and studied the old pieces; some may have even been used in potlatches, of the Tlingit, Haida, Bella Bella, and Tsimshian art that was in museums all over the world. The popularity of Northwest Coastal art is increasing as well as totem pole restoration and replacement in the West Coast communities, such as Queen Charlotte Island in Canada and Prince of Wales Island in Alaska, where they now hold elaborate totem-pole-raising ceremonies and accompanying potlatches. The ceremonies that once lasted a week are now scheduled for 1 to 3 days, usually capping a weekend, thus accommodating the modern villager's work schedule.

The potlatch is a festival tradition that has evolved from the special feast of the humble hunting/gathering tribes of the northwest, to the non-equalitarian tribes structuring castes, to the competitive potlatch wars. The potlatch may continue to evolve and birth new traditions; an example of this is "Celebration," initiated by Sealaska in Juneau. This festival is a celebration of the Tlingit, Haida, and Tsimshian Cultures. Although not a potlatch per se, the potlatch dances and songs, native languages, and art come alive during this burgeoning festival held in Southeast Alaska since 1981. With more Northwest natives seeking to express their culture in ever expanding ways, the potlatch is thriving, and becoming a stronger influence in the lives of the new generations that are here, and those yet to come. "Gunulsh-Cheesh, Hoho" (Tlingit—Thank you, very much)

— *Pamela Rae Huteson*

Further Readings

Colbert, M. (1942). *Kutkos Chinook Tyee.* Boston, MA: D.C. Heath and Company.

Cole, D., & Chaikin, I. (1990). *An iron hand upon the people: The law against the potlatch on the northwest coast.* Vancouver/Toronto: Douglas & McIntyre; Seattle, WA: University of Washington Press.

Dauenhouer, N. & Marks, R. (1990). *Haa Tuwunaagu Yis, for Healing Our Spirit Tlingit Oratory.* Seattle, WA: University of Washington Press.

Emmons, G. T. (1991). *The Tlingit Indians.* F. de Laguna (Ed.). London and Seattle, WA: University of Washington Press.

Holm, B. (1965). *Northwest Coast Indian Art: An analysis of form.* Seattle, WA: University of Washington Press.

Huteson, P. R. (2002). *Legends in wood, stories of the totems.* Tigard, OR: Greatland Classic Sales.

Jonaitis, A. (Ed.). (1991). *Chiefly feasts: The enduring Kwakiutl Potlatch*. Seattle, WA: University of Washington; New York: American Museum of Natural History.
Thornton, M. V. (2003). *Potlatch people: Indian lives and legends of British Columbia*. Surrey: Hancock House Publisher LTD.; Blaine, WA: Hancock House Publishers.
Walens, S. (1981). *Feasting with cannibals: An essay on Kwakiutl cosmology*. Princeton, NJ: Princeton University Press.

Pottery and Ceramics

Pottery is clay that has been manipulated into a particular form and heated to harden and maintain its shape and durability. Clay is found on much of the Earth's surface. Depending on the area in which it is found, clay may have many characteristics. Clay may be found finer in texture, smoother and purer in some areas; in other areas the clay may be coarse with several foreign particles. Clay may also be found to be more flexible and pliable in some areas as compared to others. The characteristics and traits of the clay will determine the outcome and quality of the pottery that is produced. Clay is formed from two types of decomposed rock. Primary clay involves decomposed rock found among other rocks from which it originated. Secondary clay is made by decomposed rock, which has been washed down hills by means of waterways, and relocated from its place of origin. The outcomes will be determined by which material is used and in what quantities the ingredients are used as well. In its preparation, three materials are essential for the creation of pottery. Simply put, clay, water, and fuel to fire the objects are the ingredients needed to make pottery. Different types of pottery include materials such as brick, terra cotta, earthenware, stoneware, bone china, and porcelain. Primary clay is used in constructing porcelain, bone china, and earthenware, where as secondary clay is used in forming coarse earthenware and brick.

The Preparation of Pottery

The construction of pottery involves the collection of clay and the addition of water. The clay that is to be used in the process of pottery making must first be prepared in a specific manner. Foreign objects and particles must be removed from the clay. Next, the potter constructs the form he desires by wedging the clay until it forms into the proper texture and consistency that is needed to form the object. Then it must be evenly proportioned in order to form the object properly. The object usually rests upon a wheel that spins while the potter manipulates the shape, allowing for an even distribution of the clay. This wheel was often referred to as the thrower's wheel or potter's wheel. This technique is used for vessels such as bowls, pots, or other circular objects. The invention of the wheel allowed for more pots to be made in a fraction of the previous time. Before the wheel was discovered, hand building and other techniques were used to manipulate and distribute clay. Clay was pinched, rolled, and pressed to form pots.

Larger pots were created by pressing and scraping together coils or clay rings. Pots were also molded from placing the clay over or inside existing objects such as baskets and or gourds. Pots could also be formed by pinching out clay from large lumps that were found. Once the object is in its correct form, it may be decorated. Incising, scraffito, and color can be added at this time. Afterward, it is left to dry and then plunged into intense heat (a process known as firing). In order for the clay to harden into a durable and hardwearing object, it must be subjected to temperatures above 600°C. Some clay is more resilient to heat and therefore must remain in higher temperatures or longer periods of time. One technique of adding color to clay is the use of chemical reactions caused by heat and metals or minerals such as: cobalt to produce blue, manganese for purple, antimony for yellow, and iron for brick red. Other types of clay may not be able to withstand such intense heat, and therefore need to be covered by a glaze. Glazing is used to create watertight products. Glazes are used for color and design and provide a glossy finish that is easier to clean.

History of Pottery

As archaeologists continue to uncover and find new ancient sites of past civilizations, they continue to discover more information and traces of the technology that were used during that time, such as pottery. Clay is thought to have been developed independently by various cultures throughout history. The history of

pottery begins with the use of clay in prehistoric times around the Indus Valley and Mesopotamia. Pottery may not have been the primary use of clay. Clay was used in relation to magic and religion. Clay figures were created in shapes of humans and animals. These figures symbolized and represented different aspects within a culture. Certain sculpted figures were believed to facilitate the fertility of women. It is also suggested that these clay items could have been used for trade. The earliest forms of pottery were found from Anatolia. Cave dwellers were associated with this society around the Mesolithic period of 6500 B.C. Most of the pottery that was produced was of symbolic figurines, simplistic in design and decoration, and useful and functional objects. Early representation of pottery appears to be underdeveloped due to the lower temperatures used in the firing process. This caused the finished product to be porous and fragile.

The Far East

Areas within the Far East, such as Korea, Indo-China, and Japan, have been greatly influenced by China and the changes that took place within China during the archaic period. Chinese techniques and pottery designs were integrated into neighboring cultures and societies. They developed high temperature kiln-firing techniques. They also created stoneware with high-quality glazes that would later be used in a major step toward the development of porcelain. Eventually they developed white, translucent porcelains superior to those already invented. By the 18th century, with the increase of international trade, Chinese pottery and porcelain were often shaped and decorated to fit the needs of other societies (for example, European populations). The Far East brought significant progress and advancements in the techniques used on pottery and ceramics. These developments and refinements elevated pottery to the level of an art form.

The Middle East

Islamic artisans applied many of the pottery techniques used by Near Eastern potters, such as the production of glazed quartz fritwares and alkaline-based pottery. Arabian mosques and other structures were decorated and built using stucco, colorful mosaics, sculptures, and paintings. These were created with the aid of artists from Syria, Egypt, Iran, and Mesopotamia. There are three main periods that constitute the history of Islamic pottery: the early period, 9th and 11th centuries, which produced T'ang white porcelains and stonewares; the medieval period, 12th to 14th centuries, with its concentration on Sung white wares; and the later period, 15th to 19th centuries, known for the blue and white wares of Ming China.

Europe

Lead-glaze was quite popular in the production of pottery and ceramics in Europe. Near the end of the 18th century, lead had proven to be quite harmful to health; therefore, its use and production was mostly associated with peasants. Tin-glazed pottery became popular in Europe. It had previously been produced in the ancient Near East and established in Mesopotamia in the 9th century. Tin-glazed pottery gave way to more artistic possibilities due to its dense white surface that allowed the artist to paint more freely upon its surface.

Pottery and the Industrial Age

This period represents a stage where the art and production of ceramics became more complex. The Industrial Revolution brought great influence over Britain's style of pottery. Transfer-printed pottery had begun with pictorial images. There was interest in the Early Victorian style of printed ware and cream wares. Emphasis soon shifted toward the use of scenes (for example, rustic, fantasy) to decorate pottery in the 1830s. Although this trend diminished in the third quarter of the century, decorating pottery with floral designs continued. By the mid-19th century, the production and manufacturing of jugs became popular in England, followed by teapots. Naturalistic scenes began to appear at this time. In France, the development of salt-glazed stoneware began to produce printed patterns. Due to the discovery of color glazes and new technologies, the decorative arts took precedence over sculpture and painting during the early industrial revolution. Classical and Renaissance styles emerged by the mid-19th century.

Pottery in the Modern Day

Heightened interest in the artistic aspect of pottery and ceramics is the result of changes to the process

of pottery making, such as heating pottery in a stable environment and new glazing technologies. A variety of objects have been created from pottery and ceramics by manipulating shapes and colors. Pottery-making and ceramics have been more functional, (e.g., wall tiles for kitchens and bathrooms, sculptures, vases, and everyday items, all expressed in many styles). Ceramic painting and graphics became a focus of the Pop-art movement in the United States in 1960s, particularly with artists Andy Warhol and Robert Indiana. The ancient art of pottery continues to have a profound impact on cultures, inspiring each generation of artists.

— *Karen Hodge Russell and Jenny Etmanskie*

Further Readings

Cooper, E. (1972). *A history of pottery.* New York: St. Martin's Press.

Coutts, H. (2001). *Art of ceramic.* New Haven: Yale University Press.

Haggar, R. G. (1959). *Pottery through the ages.* Edinburgh: W. & J. Mackay & Co. Ltd.

Pragmatism

Pragmatism is a philosophical school of American origin, generally and internationally acknowledged as a genuine American contribution to the world philosophical heritage (the word "pragmatism" has its origin in the Greek "pragma"—"action," "affair"). It reflects the broader American social experience and cultural context with its roots in Puritan theology, with Calvinistic ethics of hard work in the precariousness of frontier life, with a desire for success in the New World experiment, with the encouragement of inventiveness, and a practical sense of making the ideal of good life work, and so on, having provided the necessary, though not sufficient, background for emerging such a philosophy. The first tenets of pragmatist thought sprang from seminal discussions of the *Metaphysical Club* in the academic milieu of Cambridge, MA, in the 1870s. This narrow circle of various scholars included polymath Charles Sanders Peirce (1839–1914), psychologist William James (1842–1910), mathematician Chauncey Wright (1830–1875), historian John Fiske (1842–1901), Justice Oliver Wendell Holmes, Jr. (1841–1935), philosopher Francis Ellingwood Abbot (1836–1903), and Nicholas St. John Green (1830–1876). However, Peirce and James as renowned progenitors of pragmatism were modest enough to mention several non-American predecessors (such as the Greek schools of Sophists and Skeptics, F. Bacon, G. Berkeley, A. Schopenhauer, J. S. Mill, A. Bain, Ch. Darwin, and, notably, I. Kant.), who provided similar ideas and attitudes, such as an evolutionary approach to nature, life, and reason, theory of the practical and inferential nature of knowledge, the purposive character of belief, and the role of will and desire in forming belief. Based on the integration of these concepts, Peirce established the principle of pragmatism in his 1878 paper, "How to Make Our Ideas Clear," as follows: "Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then our conception of these effects is the whole of our conception of the object." This principle was intended to serve as the method of finding the meaning and testing the truth and value of scientific concepts and theories and as providing an objective criterion for an empirical (experimental and observational) scientific practice (owing to which pragmatism is, improperly, identified with positivism). Twenty years later Pierce's colleague, James, in a lecture titled "Philosophical Conceptions and Practical Results," and delivered at the University of California in 1898, modified and subsequently popularized this principle, while crediting Peirce as the father of pragmatism, as follows: "The ultimate test for us of what a truth means is indeed the conduct it dictates or inspires." Pragmatism, according to James, is not only a "a new name for some old ways of thinking" but much more a "temper of mind, an attitude; it is also a theory of the nature of ideas and truth; and finally, it is a theory about reality." To this extending of the principle to human practical life and action in general, Peirce reacted with disgust and suggested rather to label his conception as "pragmatism," a "term ugly enough to be safe from kidnappers." The move, made by James, had meant for Peirce the departure from objectivity to subjectivity and from science to religion. Whereas Peirce felt it important to find a method of true science, James believed that human happiness was important. James's project was to show that truth is a much broader concept that extends the lines of science and relates to human life and action not only as an epistemological ideal but also as a practical value and need. Thus, science and

religion are both legitimate endeavors in human life, while both have different purposes. Pragmatism appreciates science but is by no means a scientism. It makes substantial room for human values, ethics, education, and social life. Roughly at the same time, in the late 1890s, John Dewey (1859–1952), who was partially inspired by both Peirce and James and partially influenced by Hegel and Darwin, accomplished definitely the move in the same direction by forming his experimental school at Chicago and formulating his "instrumentalism." Dewey regarded science as important but only a fraction of the human process of inquiry. He believed that science is being developed and corrected in the name of human happiness. The value of science is subordinated to the values of life, which are of a communal nature. By collaborating with Dewey, the trio of the founding fathers of pragmatism had been completed and the three versions of classical pragmatism formed: scientific/methodological, which incorporates logic and semiotics as the theory of signs and language (Peirce); psychological/humanistic, which incorporates ethic and religious belief (James); and social/political, which incorporates culture and education (Dewey). Thus pragmatism provides and develops the relationship of philosophy to these three important areas: science and knowledge, life and action, community and democracy.

The philosophy of pragmatism in general is multifaceted. However, it can be characterized by several key attitudes. It never has been, nor was it intended to be, a unified doctrine (while critics have accused it, improperly, of eclecticism). Rather it has been searching for the sort of "third" way in philosophy: between materialism and idealism in ontology and rationalism and empiricism in epistemology. This has brought up the pragmatist opposition to traditional theory of knowledge and truth, now labeled as anti-representationalism and anti-foundationalism. The concept of the world in itself for us is not valid; there is just the world as we see it through our needs and goals. Humans, both within and without philosophy, provide the descriptions of the world that suit our intentions one way or another. Therefore, the pragmatist fundamental philosophical intention from the onset has been the "reconstruction in philosophy," as Dewey called it, directed against the main European streams of thought such as Platonism, Cartesianism, and Kantianism. However, it may best be described, in a sense, as "Anti-Philosophy," I (i.e., anti-dualism comprising the reworking of all substantial traditional philosophical oppositions such as subject-object, mind-world, theory-practice, morality-prudence, individual-society, science-religion, etc.) into a coherent and contextual conception formed from the viewpoint of philosophical anthropology based on the sense of, and orientation to, the gradual betterment of human practical life (owing to which interpreters have identified it, falsely, with Marxism). Simply, philosophy should change its topics and orientations in order to be renewed and keep itself alive and relevant within the culture. Because the platonic quests for absolutes, certainty and eternal principles are as self-deceptive as futile; philosophy should be the critical public discourse aimed at, as Dewey stated, solving the "problems of men and women" and, as Rorty added, an edifying conversation.

Pragmatism is an open, anti-dogmatic, pluralistic, and practice-oriented philosophy (while critics have accused it, improperly again, of typically American success-oriented and pay-off doctrine). The idea that the practical consequences pay (owing to which interpreters have identified it, falsely again, with utilitarianism) has become the pragmatist standard for evaluating the truth, meaning, and value—these are taken as equivalent to the practical, empirical consequences derivable from them and should be judged according to what they mean practically for humans and their lives. By "practical," pragmatism does not understand the "bread and butter" consequences, but the empirical, experiential, particular, and concrete, and includes also such considerations as logical consistency, intellectual satisfaction, and harmony of mental content. If these do not affect human life, experience, and action, they are supposed to bear only a very restricted and dubious meaning. The idea "works," if its consequences fulfill our expectations and goals, i.e., if it brings satisfaction to us. The function of the mental (thought, inquiry, experience) is not theoretical but practical—it consists not in providing knowledge as such, but knowledge, thought, and feeling as a presupposition to better action. Pragmatism has emphasized the "plastic" nature of reality and the practical function of knowledge as an instrument for adapting to reality and controlling it. Pragmatism stresses live, dynamic experience over fixed principles. To think as a pragmatist is to consider the consequences, to imagine the definite differences that follow from each alternative, and to decide in that way which of the two "works" better. The alternative, which works better, is true.

The most contested aspect of pragmatist philosophy has been its conception of truth. In opposition to traditional epistemologies, which take truth as a representation of reality in our cognition "as it is in itself" and regard it as an epistemic goal "for itself," the pragmatist approach to truth is Darwinian, or "functional," or "instrumentalist." Truth is a non-epistemological, practical value, and a means rather than an end. First, it is highly dubious that humans have a privileged capacity to attain such a representation of reality that corresponds to it as a true copy; second, humans make use of their representations of reality they dub as truth—and even of all representations—in order to achieve their practical ends. The human mind works in a truly Darwinian mode: it is permanently providing the selections of all representations of its content so that it is able to select those that can best serve all various kinds of purposes that human beings can pursue. Such a selection is naturally fallible and corrigible; as such, the concept of a truth that is applicable to all kinds of human condition and situation cannot be. Thus there is no static truth, much less absolute truth; there are truths, and these are constantly being made true. There are no necessary truths or axioms; there are only postulates. Truth has no metaphysical or transcendental essence; it is fully the outcome of human inquiry, which includes both thought and experience, and is a critical, self-corrective social process. There is no other warrant of truth apart from this inquiry.

The significance of pragmatist philosophy for anthropology in particular can be seen to consist in several specific ways of answering the question: "What does it mean to be human?" First, being human is regarded as the self-image of humanity based on naturalism, evolutionism, and holism. By taking Darwinism seriously, pragmatism asserts the continuity of nature with culture, of natural and cultural evolution in the sense that humans practice the same as animals do, only in a different way and on a different level. Even if the purposes of both kinds of evolution are the same, to adapt to environment, humans maintain their lives via thought and intelligent action. Even such a unique phenomenon as human language is primarily a tool for coping with the world and coordinating human action. Due to this, human adaptations are much more dynamic and creative in comparison to all other nature. Humans adapt nature to their needs rather than simply adapting *to* it. The limits of human adaptive/transformational power seem to be almost unrestricted; the pragmatist conception of "meliorism" stems from this power (i.e., the idea that humans are able to cope, despite the fact that it is sometimes difficult, with the problems of their existence). It is also the self-image of humanity based on socio-cultural constructionism. Certain human creations have not and could not have preexisted culture and society, (e.g., according to James and Dewey this is the human *self*). Human power is self-transformational and via creating culture we create ourselves. Individual and social developments cannot be in any way separated from each other. The task, however, is not only to attempt self-creation of an individual, but at the same time attempt creation of a democratic and communicative cultural community. The creation of such a community means the most we humans can accomplish; it is the creation of our truly intelligent and social home environment. However, the creation of such a community is not to be taken as "the goal of human history." It is the result of our free choice rather than of any kind of inner or outer necessity, and it can be achieved only thanks to our intelligent efforts. This amounts to the assertion that there hardly can be such concepts as the universal and stable human nature. From the broadest ethical and political points of view, humans are bequeathed to ourselves, and we are the only agents responsible for what we have, and shall become. There is no other authority residing above us to direct our human evolution and destiny. Humanity must form its values and decide to act on behalf of them. Thus, if we are to speak of any kind of "human nature," according to pragmatism, this should consist in the intelligent and democratic creation of opportunities for better human action and satisfaction in life.

The pragmatist school has exerted influence, which has shown its peak in the first two decades of the 20th century even across the border of the United States, and is impacting the fields of law, education, political and social theory, art, and religion. Apart from resolute critics such as B. Russell and G. E. Moore from Cambridge, England, one of the most original followers of pragmatist thought is Oxford's Ferdinand C. S. Schiller (1864–1937), who titled his own version of pragmatism "humanism." Pragmatist philosophy had also been spread over such countries as France and Italy and even China and Japan, with protagonists including Ch. Renouvier, H. Poincaré, M. Blondel, É. Le Roy, H. Bergson, G. Papini, G. Vailati, and M. Calderoni. However, with the demise of both James

and Peirce, the movement slowed a gradual decline, and it was Dewey who had remained its almost single recognized spokesman in the first half of the 20th century. On the American side it was replaced by logical positivism and analytic philosophy of language. Nonetheless, it can be proved that pragmatism has never completely faded out and in American universities there always have been academics representing it (for example, J. Royce, C. S. Morris, C. I. Lewis, S. Hook). In the 1950s even the leading logical positivists such as Rudolph Carnap (1891–1970) and Willard V. O. Quine (1908–2000) started to recognize pragmatism's importance, which has been featured in their own doctrines. Similarly, the progenitor of analytic philosophy, Ludwig Wittgenstein (1889–1953), in the whole later stage of his career had espoused ideas and attitudes similar to those of pragmatism. Thus the soil could have been prepared during the 1960s and 1970s for the "pragmatist turn" in Western philosophy, strongly inaugurated by Richard Rorty (1931–) with his salvo in *Philosophy and the Mirror of Nature* (1979) and later confirmed in *The Consequences of Pragmatism* (1982) and other writings. This revived version of pragmatism (neo-pragmatism) has also been enriched by some influences of Nietzsche, Wittgenstein, Heidegger, Gadamer, Sartre, and Derrida. Thus, toward the turn of the millennia, we have witnessed the resurgence of pragmatism represented not only by Rortian "post-analytic neo-pragmatists," but also by many versions of "neoclassical pragmatism," such as "Neo-Percean," "Neo-Jamesian," and "Neo-Deweyan" associated with the whole range of contemporary American philosophers. Moreover, pragmatism has become a broader international philosophical movement, which includes, apart from such important figures as Jurgen Habermas (1929–) and Karl-Otto Apel (1922), many more followers and students worldwide.

— *Emil Visnovsky*

Further Readings

Dickstein, M., (Ed.) (1998). *The revival of pragmatism.* Durham, NC: Duke University Press.

Diggins, J. P. (1994). *The promise of pragmatism: Modernism and the crisis of knowledge and authority.* Chicago, IL: University of Chicago Press.

James, W. (1979). *Pragmatism and the meaning of truth.* Cambridge, MA: Harvard University Press.

Menand, L. (2002). *The metaphysical club.* London: Flamingo.

Murphy, J. P. (1990). *Pragmatism from Peirce to Davidson.* Boulder, CO: Westview.

Peirce, C. S. (1934). Pragmatism and pragmaticism. C. Hartshorne & P. Weiss (Eds.), Collected Papers (Vol. 5). Cambridge, MA: Harvard University Press.

Putnam, H. (1987). *The many faces of pragmatism.* La Salle, IL: Open Court.

Rorty, R. (1982). *Consequences of pragmatism.* Minneapolis: Minnesota University Press.

Smith, J. E. (1984). *Purpose and thought: The meaning of pragmatism.* Chicago, IL: University of Chicago Press.

West, C. (1989). *The American evasion of philosophy: A genealogy of pragmatism.* Madison: University of Wisconsin Press.

Prehistory

The earliest period of world human history, which is often regarded also as constituent part of cultural and/or social anthropology, prehistory is aimed at reconstruction of world diversity of forms, and ways of human being's and human society's development since their origin until the formation of early political structures. The perspective purpose of prehistoric studies is the detection of general and particular regularities in anthropological, social, ethnic, economic, and mental evolution of humankind at the early stages of its existence.

The subject field of prehistory in its contemporary comprehension covers series of global theoretic issues; among them:

problem of genus Homo and modern human beings' origins and physical anthropological evolution;

formation of human community, family, kinship, and sociality;

rise of ideology, mythology, arts, speech, and rational knowledge;

origin and evolution of production, livelihood systems, household activities, economic systems, products distribution, exchange, and property;

shaping of self-identification in different forms, ethnic and gender including:

formation of leadership, hierarchy, power, and administration;

origin of private property, exploitation, and classes.

Chronology and periodization. Prehistory appears to be the longest period of human history, which covers approximately 5 million years. Chronological frameworks of prehistory traditionally are referred with special events in social history and are considered relative as far as the irregularity of social progress of humankind, which displays itself already at this earliest stage of human history.

The beginning of prehistory could be referred with the origin of the earliest representatives of genus Homo, which currently is dated between 5–2 million years B.P. in Africa, approximately 1 million years ago in Europe and Asia, an estimated 40,000 years B.P. in Australia, and even less in America.

Formation of the earliest states in the Near East and Egypt (border of 4,000–3,000 years B.C.) traditionally is regarded as the upper frame of prehistory in its world global context. At the same time in Europe and America the prehistoric phase of human history lasts over first millennium A.D., and in particular, in the communities of Africa, Australia, and America, the prehistoric phase is still in progress.

Three main epochs could be distinguished in the frameworks of the prehistoric period of human society, body, and cultural evolution:

- period of anthroposociogenesis (i.e., time of formation of Homo sapiens and human society);
- period of primitive community, or epoch of classic prehistory, with its two phases: phase of Early Prehistoric Society (hunter-gatherers community), and phase of Late Prehistoric Community (time of early farmers and cattle-breeders);
- period of formation of political structures (states), private property, and exploitation.

Source base. Unlike other fields of historical knowledge, prehistory has no primary written sources for its reconstruction as far as it has to deal with the preliterary period of human society. The source base of prehistory consists of data of many natural and humanitarian sciences, which gives the possibility to learn about the human body, human activity, society, and the natural environment, in which prehistoric processes, events, and phenomena occur. Most fruitful among these sciences are archaeology, ethnography, and physical anthropology. Additional information about early phases of human history could be provided by primatology, paleontology, paleogeography, geology, palinology, archaeobotanic, archaeozoology, palaeoclimatology, petrology, genetics, linguistics, art criticism, sociology, demography, physics, chemistry, statistics, information technology, mathematics, and others providing scientific data and the peculiar methods and approaches of their processes. As a result prehistory tends to be an interdisciplinary synthetic field of historic and anthropological knowledge whose reliability and cognitive potential deeply depend on the complexity of the source base used in a particular case study, and on the diversity of approaches and methods that were explored during this source base evaluation and interpretation.

History of prehistoric studies. Traditionally the beginning of prehistoric societies studies is referred with the middle of the 19th century, when early evolutionists in biology (Charles Darwin), cultural anthropology (L.H. Morgan, E.B. Tylor), and other fields of knowledge put forward a necessity to revise traditional creationists' postulates about the place of human beings and human society in the Universe. First attempts of knowledge generalization regarding a pre-state period of human history have been made during the second half of the 19th to the beginning of 20th century.

The first half of the 20th century has become the period of database intensive accumulation. The necessity of its theoretical conceptualization has caused the origin of a wide spectrum of approaches, directions, and schools of prehistoric studies. Ideas of cultural anthropology, ethnography, and sociology created grounds of diffusionistic, functional, cultural, sociological, structural, and Marxist interpretations of prehistoric processes and phenomena.

Deep integration of prehistoric studies with natural sciences (geography, biology, climatology, etc.) at the second half of the 20th century has caused specific ecological interpretation of prehistoric culture, livelihood systems, and productive activity in Western Europe, the United States, and the Soviet Union.

The formation of a post-industrial society from the end of the 20th to the beginning of the 21st century has caused the propagation of postmodern forms of prehistory comprehension as image or text.

In West European understanding, prehistory sometimes is contrasted to proto-history, which concentrates on prehistoric communities studies on the basis of written sources of neighboring civilizations.

Significance of prehistory in contemporary world. Today prehistoric reconstruction seems to be acute with regard to the general theoretic comprehension of many processes and phenomena that occur in the contemporary world. At the border of the third millennium, postsocialist societies face the process of private property and economic hierarchy formation; traditional societies of Central Africa as well as communities of inner parts of Southern America experience social inequality, power struggle, and the shaping of political administration. Our knowledge about the peculiarities of these processes' realizations many thousands of years ago could help us to model and settle many problems that inevitably arise in this context.

Existence at the beginning of the 21st century of many societies whose culture, livelihood systems, and mode of life correspond to hunter-gatherers or early farmers and cattle-breeders' phases of historical evolution causes the deep moral significance of prehistory. It helps to comprehend the uniqueness of these contemporary prehistoric societies, evaluate their importance for our past understanding, realize their potential for further inner development, and exclude racial, cultural, moral, or other types of discrimination.

Theoretical conceptualization of many global philosophic issues (for example, the origin of human beings and the sense of their lives on Earth, the genesis of ideology and its historical evolution, the appearance of art, the formation of different forms of identification and self-realization, the origin of sociality and culture, the development of speech) shapes the worldview and philosophic significance of prehistory as special field of knowledge.

— *Olena V. Smyntyna*

Primate Behavioral Ecology

Taxonomy

Primates belong to the order Primates. Members of this order include prosimians, monkeys, apes, and humans. The primates are divided into two suborders: Prosimii and Anthropoidea. Prosimians are the more primitive members of our order, i.e., they more closely resemble the earliest primates, whereas members of Anthropoidea (i.e., monkeys, apes, and humans) are more derived, that is, they exhibit evolved characteristics not present in the ancestral primates.

Geographic Range

The majority of primates are found within 20 degrees north and south latitude of the equator. They primarily inhabit the continents and surrounding islands of Africa, Asia, and South America. One species of monkey, the Barbary macaque, is native to Gibraltar; however, it is believed to have been introduced by the Romans and, in modern times, restocked by the English. Primates, while largely confined to the tropics, also inhabit more temperate regions.

Primate Habitats

Forest-Living Primates

Forests can be divided and categorized according to their stage of development and/or regeneration (e.g., primary forest, secondary forest, forest edge, disturbed areas). While primates have specific habitat requirements, some species' requirements are more stringent than others. For example, those species that locomote via brachiation (i.e., swinging by their arms) typically require primary forest. Other species are more adaptable and can inhabit a variety of forest types and possibly even disturbed areas. In the area of Costa Rica where I conduct research on howler monkey-feeding ecology, spider monkeys are found only in areas where the forest is continuous. Howler monkeys, conversely, can be seen in trees alongside roads in beach communities and traveling along electrical wires. Other species that do well in disturbed areas include species of langurs, macaques, and marmosets.

Tropical Forest

Most of the world's primates inhabit tropical forests. Primarily, forest-dwelling species are arboreal in nature. Tropical forests can be classified by the amount of rainfall they receive, ranging from rain forests to dry forests. Rain forests experience little seasonal variability and rain falls year round. There is high species diversity but low species density. Thus, in a given unit of land, for example, many tree species

will be present but at low numbers. Tropical forests that are not categorized as rain forests exhibit a greater degree of seasonal variability, in having both wet and dry seasons, and have lower species diversity but higher species density.

Primates are, to varying degrees, insectivorous and/or herbivorous. The degree of seasonality in a given area thus affects what is available as food at any point in time, since the life cycles of many insect and plant species are correlated with climatic conditions. Even in rain forests, where conditions are more stable, plant production cycles and the patchy nature of food resources affect food abundance and availability for primates.

Tropical forests contain a variety of habitats where primates are found. Some species have very specific habitat requirements. For example, Allen's swamp monkey inhabits swamp forests of central Africa; proboscis monkeys are found adjacent to water on the island of Borneo; mountain gorillas inhabit cloud forest areas of central Africa; and certain genera of sakis and uakaris are found only in the seasonally flooded Amazonian forests.

Temperate Forest

There are several genera of primates that are found in temperate regions (e.g., areas of China, Japan, India, and Argentina). A few species are even found in high altitude/latitude areas where it snows seasonally. Several species of macaques live in regions that experience relatively high amounts of snow (for example, the snow monkeys of Japan, the Tibetan macaques of China, and the rhesus macaques of northern India). The Yunnan snub-nosed monkeys (genus: *Pygathrix*) of the Himalayan Mountains of China endure the coldest temperatures and longest winters of any nonhuman primate. At certain times of the year, their diet consists primarily of hanging lichens.

Mixed Woodland

Primates found in more open areas tend to be semiterrestrial quadrupeds, for the obvious reason that the forest is not continuous. Several species of primates inhabit open woodland/scrub areas of sub-Saharan Africa (for example, savanna baboons, vervet monkeys, patas monkeys, and chimps). Some of these species are also found in more heavily forested regions, e.g., baboons and chimps. Two of these open-habitat species (the baboons and patas monkeys) exhibit cursory adaptations due to the greater risk of predation in an open environment. While most species sleep in trees, baboons in open, dry areas sleep in large congregations on "sleeping" cliffs.

Dry Environments

Two species of primate live in very dry habitats. The Hamadryas baboons inhabit the dry plains of Ethiopia, the driest habitat of any nonhuman primate. Gelada baboons are also grassland animals of Ethiopia. They are found on the high Ethiopian plateaus. They are adapted to eating a diet that consists, primarily, of grass. They creep along in a sitting position, picking grass blades, seeds, and corms. Both of these species rely on cliffs and gorges for sleeping sites.

Home Range

Primate species vary in the size of the home range they occupy. For example the smallest of the primates, the mouse lemurs, are reported to have home ranges as small as 50 meters in diameter, whereas chimps can have home ranges of up to 40 kilometers. This variability is due to body and group size or to diet. Small animals tend not to range as far, and hence have smaller home ranges as compared with larger animals. Solitary foragers may not have to range as far as group-living primates because they do not have to compete with other group members for access to food. Finally, the dietary pattern of a species affects how large a supplying area, or home range, it needs. Thus, when comparing two group-living species that ingest a high quantity of leaves (which are relatively more abundant than fruit), gorillas with their larger body size would need larger home ranges than howler monkeys. When comparing ripe fruit specialists with more folivorous species, it is apparent that due to the patchy nature of fruit sources, the more frugivorous species need larger home ranges. Chimps and spider monkeys are considered to be ripe fruit specialists. They are closely related to gorillas and howler monkeys, respectively. Chimps have much larger home ranges than do gorillas, and, likewise, spider monkeys have much larger home ranges than howler monkeys. In the dry forest in Costa Rica, a spider monkey group's home range includes howler monkeys' home range as well as multiple other howler groups' home ranges.

Some species defend their home range from conspecifics (i.e., other members of their species) and are thus termed territorial. They actively ward off

intruders, either individuals or groups of conspecifics, from their home range and especially from their core area. The core area is that area of a group's home range that is used and defended more intensively. Even those species that are considered to be nonterritorial will often defend their core area, whereas there may be a degree of overlap with surrounding groups of conspecifics in more peripheral areas of their home range.

While the distance traveled in a day, termed day range or daily path length, is often correlated with home range size, it is variable, and it too is often related to diet. Once again, those species that ingest a relatively higher percentage of fruit in their diet tend to range farther in search of fruit. For example, chimps can range up to 15 kilometers in a day. In addition, both chimps and spider monkeys fission into smaller foraging parties to avoid competing with other group members for this highly ephemeral resource.

Activity Cycles

Many researchers have recorded data on how primate species spend their time during the day and night as engaged in the following activity categories:

Feed: time spent actively engaged in feeding and foraging activities.

Rest: time spent resting during the day or, in the case of nocturnal species, at night.

Move: time spent moving through the home range.

Social: time spent engaged in social activities with family/group members (for example, grooming, playing, sexual behavior).

Species vary in the amount of time they spend in these various activities. In addition, activity cycles may vary both within and between seasons. For example, some species spend more time moving during the wet versus the dry season. Likewise, during the wet season, when rain is intense, or during the dry season, when sun and heat are intense, animals may move less. During the six-month dry season at one Costa Rican study site, the howler monkeys ranged from 7 to 10 hours resting time per day in 11 hours of observation. As you can imagine, this varies considerably from usual human patterns.

Diet, social organization, and group size and composition influence activity cycles. Because primate species can be categorized by their diet as well as type of social organization, and, to a lesser extent, by group size and composition, species tend to exhibit less within-species variability than between-species variability in activity cycles. Thus, activity cycles can be thought of as characterizing a species or being species-specific. Howler monkey activity cycles are thus skewed toward resting and less so toward social activity. My study group spent less than 1% of its time engaged in social activities. Conversely, the rhesus macaques I observed on the island of Cayo Santiago, Puerto Rico, were highly social and spent much less time resting than my howler subjects.

Research demonstrates the role that reproductive condition plays in female rhesus macaque activity cycles on the island of Cayo Santiago, Puerto Rica. The time that females spent in the various activity categories did not differ before or after an infant was born. However, as the infant increased in size, lactational demands increased to the point that females were spending almost no time resting or involved in social activities. This is especially surprising because subjects were provisioned, meaning that they were supplied with food. They supplemented their intake of monkey chow with plant parts. As the infants began to feed on their own, the females spent less time feeding/moving and more time in rest and social activities.

Feeding Ecology

The following general definitions pertain to dietary categories that are relevant to the primates:

Herbivory: consumption of plant matter. The following are sub-categories of herbivory:

Frugivory: consumption of fruits.

Folivory: consumption of leaves.

Gramnivory: consumption of grass.

Nectivory: consumption of nectar.

Gumnivory: consumption of plant exudates (for example, sap, latex).

Faunivory: consumption of animal matter. The following is a sub-category of faunivory:

Insectivory: consumption of insects.

Omnivory: consumption of a combination of plant and animal matter.

Source: © iStockphoto/Kevin Tate.

All but one species of primate (the tarsier) are herbivorous to some degree. Most species consume fruit for carbohydrates, with the remainder of the diet made up of either leaves or insects to fill their protein requirements. Smaller primates usually consume a combination of fruits and insects (*frugivore-insectivores*), whereas larger species usually consume a combination of fruit, flowers, and leaves (*frugivore-folivores*). This size differential is due to the fact that large animals are not able to meet their dietary needs by foraging for insects. This is not to say that larger animals never consume insects. The largest primates—chimps, orangs, and some gorillas—consume tiny ants and termites.

Some of the primates are relatively unique in terms of their diet and foraging strategies. The tarsier is the only extant primate that is completely faunivorous, ingesting a variety of insects and small animals (for example, snakes, birds). The smallest of the New World monkeys (i.e., the marmosets and tamarins) are partly gumnivorous. These animals have modified nails that resemble claws. They are used to cling to upright trunks/branches to consume exudates. The marmosets have specialized front teeth that are used for gouging holes in trees to access exudates. Exudates are a very important aspect of their diet, and they defend those trees that are used for their consumption from neighboring monkey groups. The tamarins do not rely as extensively on exudates, and they lack the dental specializations seen in the marmosets. Some of the Madagascar lemurs are nectivorous and serve as important pollination agents. Bamboo lemurs feed primarily on bamboo shoots, which contain cyanogenic compounds that are highly toxic to most mammals. The gelada is the only primate that is considered to be gramnivorous, with as much as 90% of their diet coming from grass consumption. They occupy the high treeless plains of Ethiopia. While several species of primate are known to hunt small- to medium-sized mammals (for example, capuchins, baboons, orangutans, and chimps), only the chimps are known to hunt cooperatively. However, Strum observed her savanna baboon subjects to change their hunting strategy to more of a relay style, so that when one male was tiring, another male would take up the chase. This is the only non-chimp case that I know of that suggests a modicum of cooperation.

As mentioned, most primates consume fruit to varying degrees. In general, these fruits are ripe. However, some species can consume unripe fruit, and thus avoid competition with other species. I have often observed howler monkey subjects feeding in fig trees (figs are a preferred fruit of primates) for 1 week or more before the other two resident species (spider and capuchin monkeys) began to feed on them.

Because primate olfactory capabilities are reduced relative to other mammals, there is speculation that some groups of primates have derived visual capabilities for detecting when fruit is ripe. All of the Old World anthropoid primates possess trichromatic color vision, which allows us to distinguish the red-green hues of the spectrum. Two species of New World monkeys—the howler and capuchin monkeys—also possess this adaptation, but it evolved independently from the Old World species. All of the remaining species possess dichromatic vision. An alternate hypothesis to the ripe fruit scenario is that trichromacy may have evolved in response to leaf consumption. Young leaves are preferred over mature leaves in most species of primates. They are higher in water and lower in structural carbohydrates, and, in some cases, may be higher in protein and lower in chemical defenses. Some plant species produce red pigments, termed anthocyanins, in their young leaves. These anthocyanins act to "disguise" the leaves from those animals possessing dichromatic vision because they perceive them as being dark and hence mature.

Trichromatic individuals can discern the color red and can possibly even be attracted to the leaves or at least be able to "see past" the red streaking and detect the underlying yellow-green color that is characteristic of young leaves.

While the majority of larger primates are frugivore-folivores that prefer fruit to leaves, the degree to which they depend on fruit varies. As mentioned, some species are ripe fruit specialists and they range far and wide in their search for fruit sources. Alternatively, though, are those species that rely on leaves to a greater extent, especially when fruit is unavailable. Three groups of primates exhibit this strategy: (1) members of the Old World monkey subfamily Colobinae, (2) gorillas, and (3) two species of New World monkeys, the howler monkeys and the muriquis. The Colobinae (i.e., the colobus monkeys of Africa and the langurs and leaf monkeys of Asia), have specialized stomachs for digesting leaves. The microflora in their foregut are capable of breaking down a larger proportion of the plant structural carbohydrates, hemicellulose and cellulose, relative to the other large anthropoid primates. This is termed foregut fermentation. They can thus derive energy from this more ubiquitous food source. The other two groups—the gorillas and the two species of New World monkeys—are hindgut fermenters. They lack the gastrointestinal specializations seen in the colobines but are still capable of deriving energy from leaves via an elongated large intestine and slower throughput time (i.e., the time food takes to pass through the gut). These primate groups minimize energy expenditure because their gut activities are costly and leaves are a poorer source of energy relative to fruit.

Social Organization in Relation to Ecology

Social organization refers to the grouping patterns and inherent "rules" that determine group membership and conduct in social animals. Before a discussion of social organization can be attempted, however, several terms need to be clarified. There are several mating patterns that are relevant to primate social organization. They are as follows:

Monogamy: an individual having only one mate, often for life.

Serial monogamy: an individual having only one mate at a time. This is the mating pattern seen in humans and will not be discussed herein.

Promiscuous: an individual with multiple mating partners, especially females during a single estrus period.

Polygamy: an individual having more than one mate, regardless of the sex of the individual.

Polygyny: a male with more than one mate.

Polyandry: a female with more than one mate.

In addition, there are relevant membership patterns, especially those involved with who comes and goes within groups. They are:

Natal group: group into which an individual is born.

Female-philopatric: females stay in their natal group, also termed matrilineal.

Male-philopatric: males stay in their natal group, also termed patrilineal.

Emigration: an individual leaves its group, natal or otherwise.

Immigration: an individual enters a new group.

Solitary Foragers

There are several genera of primates that are categorized as solitary foragers. For the most part, these animals are small nocturnal foragers that rely on crypsis (camouflage) to avoid detection by animal prey and predators (for example, the nocturnal prosimians of the families), Cheirogaleidae (mouse and dwarf lemurs), Galagonidae (galagos or bush babies), and Loridae (pottos and lorises). Females leave their young in nests or park them on branches while they are out foraging. Some of the Loridae have evolved a unique form of locomotion, termed slow climbing, that allows them to move very slowly and freeze for long periods of time so as to avoid detection.

In the past, these animals were categorized as having a solitary social organization wherein the largest grouping consisted of a female and her dependent young. Males and females came together for mating purposes. However, as more research has been conducted with these species, it has become apparent that their social organization is more complex. In many cases, it is now realized that male home ranges are large, relative to females', and they overlap multiple female home ranges. This discovery has prompted a revised category of social organization for these species, termed *dispersed polygyny* since the male has

multiple mates. In addition, females may house their young communally in tree holes or leaf tangles (for example, mouse lemurs), and these females may be related, i.e., matrilineal (for example, galagos).

The exception to the solitary forager as nocturnal frugivore-insectivore is the case of the orangutan. While orangs are also an example of dispersed polygyny, it is not nocturnal insectivory that prompts their solitary ways, but rather that they are large arboreal frugivore-folivores that need a lot of food to satisfy their needs. Females cannot "afford" to share their home ranges with other females. They do depend on the resident polygynous male to protect them from non-resident males (often sub-adults) that may attempt to "rape" them. Orangs are the only nonhuman primates wherein rape has been reported. It is thought that forced copulation is a strategy whereby males may sire offspring before acquiring a home range and females of their own. It can thus be seen that this is a good example of an evolutionarily stable strategy that could have been selected for. Resident males respond to female screams and chase these "unwanted" males away.

Monogamy

Monogamy is seen in three primate families (Indriidae, Tarsiidae, Hylobatidae) and three genera of Atelidae (owl, titi, and saki monkeys). In addition, one species of the Colobinae, the Mentawai leaf monkey, is monogamous. This type of mating pattern is also termed "territorial pair," in that bonded pairs defend their home ranges from other conspecifics. Because there is no male-male competition for females once pairs have become established, monogamous species are monomorphic (i.e., males and females do not differ in morphology, especially size). It is an exceptional type of mating pattern because male mammals are not reproductively limited as are females. It is thus a bit of a conundrum how this mating pattern could have been selected for since natural selection works to maximize reproductive success. There are, however, ecological characteristics that correlate with monogamy and hence are used to explain its occurrence. They are (1) the nature of the resource base, i.e., patchy distribution in time and space, and (2) the need for resource defense from conspecifics. These factors necessitate the partner's cooperation in home range defense. Thus a lone female cannot be expected to defend a suitable supplying area to guarantee the successful rearing of her young. Those males that cooperated with females to defend resources and raise young had a reproductive advantage given these environmental constraints and, thus, the trait(s) was/were selected.

Two genera–the indris (genus: *Indri*) and the gibbons and siamangs (genus: *Hylobates*)—practice duetting to aid in territorial defense. This involves the male and female "singing" coordinated duets to demonstrate to surrounding conspecifics that the home range is under bonded pair occupation. This behavior is believed to have evolved as a spacing mechanism, relieving pairs from constantly having to monitor all areas of their home range. In at least one species of primates—the owl monkey—pairs do not exhibit overt bonding behaviors of duetting and grooming. Yet, they are truly monogamous in that they do not practice extra-pair copulations whereas, for example, gibbons and siamangs do opportunistically mate with outside conspecifics.

Polyandry

Only one subfamily of primate—the Callitrichinae (i.e., tamarins and marmosets)—exhibits this extremely rare form of social organization. As with monogamy, it does not make adaptive sense for a male to limit his reproductive success by staying with, or in this case, sharing one female. Once again, however, there are extenuating circumstances that make this form of social organization adaptive for these primates. In addition, it may not always be the case that two males are sharing a female but rather that one male is "biding his time" awaiting the opportunity to mate with the resident female. In these species, the norm is for the female to birth twins. The newborns can weigh up to 24% of the female's weight. The males are primarily responsible for carrying and caring for the twins. Independent offspring may also help care for their young siblings. The female's primary role is nursing the offspring and she spends much of her time foraging to fulfill lactational demands. It is usually the case that only the dominant female breeds in the majority of these species due to reproductive suppression of subordinate females. The mechanism by which this occurs is either through pheromonal production by the dominant female or aggression toward the subordinates resulting in them being anovulatory, i.e., they do not ovulate.

Garber has shown that those groups with two resident males are more likely to successfully rear both offspring, thus demonstrating the adaptive

significance of the "helper male" phenomenon. It is thought that a male (heretofore referred to as the primary male) mates with the female and that the other male (secondary male) is demonstrating his alloparental (care given to offspring by someone other than the parents) skills in the hopes that the female will mate with him when the primary male leaves. Transfer between groups is common in these species. Thus, the secondary male can move into position as the breeding male when the primary male leaves. Of interest is the fact that male hormone profiles change when they are actively caring for infants. They exhibit higher levels of prolactin, which is implicated as having a key role in maternal behavior.

One-Male–Multi-Female

Traditionally, this type of social system was referred to as a harem, implying that one male had control over a group of females. Once again, however, as more research has been conducted with free-ranging groups of primates, the picture has changed. Only one species of primate exhibits a true harem social organization. The basic unit of Hamadryas baboon social organization is a male and his small group of females. The male maintains control of his females by herding and punishing them for straying, especially if they move too close to other males. The other species that live in one-male groups do not have the same degree of male control over the females, and the male's tenure in the group is often of short duration. For example, in the gelada baboon, the male relies on the support of the females in order to remain in residence. If an outside male attempts to take over the group, he may very well do so if the resident females do not ally with the current male. In the case of the patas monkeys, the resident male does not even have exclusive reproductive rights to the resident females. During the mating season, outsider males mate with some of the females. While this seems not to be in the male's best interest, the resident male, on average, impregnates a higher percentage of resident females than outsider males, and it is possible that those males that are associated with a group of females have differential access to resources such as food and water relative to bachelor males.

While some species of primates exhibiting this type of social organization are matrilineal (for example, Hanuman langurs), others, such as gorillas, are not. In addition, because male tenure may be short due to male takeovers, infanticide by the new males is seen in some species. This practice is interpreted as an evolutionarily stable strategy on the part of the males. Relative to females, males have a much lower probability of reproducing. Their options are limited because not all males are successful in acquiring a group of females and, as mentioned, tenure in a group is short due to the constant pressure from outside males. When a nursing infant dies, the mother ceases to lactate and becomes sexually receptive (i.e., "in estrus"). By killing off dependent offspring, the male has a greater probability of passing on his genes. While it may seem strange that a female would mate with a male that has killed her infant, it may be in her best interest, reproductively speaking. First, it would not be adaptive to delay becoming pregnant again. Second, if infanticide is under genetic control, a female may increase her own reproductive fitness by producing infanticidal sons that will have a better chance of reproducing.

The one-male grouping pattern is believed to have evolved where the resource base is insufficient to support larger groupings. In effect, females' reproductive success would suffer beyond a given threshold of individuals.

Multi-Male–Multi-Female

Many species of New and Old World monkeys are multi-male, as are some of the lemurs of the Madagascar. There is a tendency for multi-male groups to be matrilineal. It is theorized that where resources are defensible, females have evolved the pattern whereby they remain in their natal group and cooperate with kin (i.e., matrilineal). With regard to spider monkeys and chimps, the males remain in their natal group and defend an area; this attracts females emigrating from other groups and is termed resource defense polygyny. Because both of these species are ripe fruit specialists and fruit is patchy in time and space, the group fissions into small foraging parties. While the group is comprised of multiple males and females and, hence, multi-male–multi-female, these species are categorized as having a fission-fusion or community type of social organization because of their unique pattern of intermittently fissioning and later, reuniting. In the case of the chimps, the core of the group is composed of groups of related males. These males actively defend the home range. Within this home range, females inhabit smaller individual home ranges. Thus it can

be seen how the term community is appropriate for this species.

— *Barbara J. Welker*

Further Readings

Falk, D. (2000). *Primate diversity.* New York: W. W. Norton.

Garber, P. (1997). One for all and breeding for one: cooperation and competition as a tamarin reproductive strategy. *Evolutionary Anthropology, 5,* 187–199.

Lucas, P. W., Darvell, B. W., Lee, P. K. D., Yuen, T. D. B., & Choong, M. F. (1998). Colour cues for leaf food selection by long-tailed macaques (*Macaca fascicularis*) with a new suggestion for the evolution of trichromatic colour vision. *Folia primatologica, 69,* 139–152.

Nowak, R. M. (1999). *Walker's primates of the world.* Baltimore, MD: Johns Hopkins University Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Strum, S. C. (1987). *Almost human.* New York: W. W. Norton.

Primate Extinction

Several causative factors contribute to the drastic reduction of primate populations in the world. The major contributors are the destruction of habitat due to deforestation, the illegal pet trade, and the bushmeat trade: all due to the expansion of humans into primate habitat.

The overpopulation of the Earth by *Homo sapiens* is the dominant force driving primate extinction. The world population in 2004 was estimated at 6,390,147,200 individuals. The United Nations (U.N.) projects a lower fertility rate and increased mortality risks due to HIV/AIDS for the global community. During the next 47 years, the population of the world is conservatively expected to increase by 2.6 billion people. According to the 2002 U.N. population estimates, if fertility were to remain constant in all countries at current levels, the global population could more than double by 2050, reaching 12.8 billion.

The human population is increasing with momentum; our increasing population's survival needs will place escalating strain on the Earth's natural resources.

The human race depends on the Earth's natural resources to sustain itself. Food, income, fuel, water, shelter, medicine, and electricity are obtained from the environment. When local human populations deplete nearby resources, the populations must expand outward to fulfill their survival needs. With the creation of roads, dams, and infrastructure intended to support the human race, the expansion weakens the environment. This development takes thriving forests and grasslands and renders them environmentally unproductive, resulting in an increase in resource utilization and further perpetuating the cycle of unsustainable development. It is estimated that approximately 1% of the world's remaining tropical forests, and 0.4% of the Earth's total forests, are being destroyed every year.

Roads and other man-made infrastructure impact primates by modifying their behavior and species distribution. Primates are impacted directly by the noise, movement, and destruction of the physical environment caused by humans. Primates tend to avoid the fragmented and developed areas created by humans. The disappearance of ancestral habitat, and degradation of existing habitat, results in the reduction of primate breeding success, and overall decreases in primate populations.

Although world food production is still increasing, human population growth is beginning to overwhelm farmers' production ability. The reduction in undernourished people is still only 27% of the goals set by the U.N. More than 800 million people were undernourished in the year 2000. The explosion of the human species places an ever-increasing strain on the food resources supplied by the environment that sustains humankind.

In Africa, as in many parts of the world, the growth of the logging industry has facilitated access to the forest. Alternatively, increasing urban populations are heightening the need for food sources. The result is an explosion in the trade of bushmeat: forest animals killed for sale as food. This trade provides a relatively quick income to people living in an area with few options for income generation. Hunters remove more than 1 million metric tons of bushmeat from the Congo Basin forests each year. The rising demand for bushmeat, the opening of old-growth forests, the lack of alternative options for income generation, the absence of protein substitutes, and the lack of capacity to enforce existing laws, are the driving factors that threaten primate conservation across West and Central Africa.

If current trends continue, primate extinction on a global level will be a grim reality, one in which the only way left to experience primates will be at zoos and in laboratory settings.

— *Gregory Scott Hamilton*

Further Readings

GLOBIO: Global Methodology for Mapping Human Impacts on the Biosphere. (2001). *United Nations environmental program*. Retrieved May 21, 2005 from http://www.globio.info/index.cfm.

United Nations; Department of Economic and Social Affairs; Population Division. (2002). *Population estimates and projections: 2002 revised highlights*. New York: Author.

PRIMATE CONSERVATION

Presently between 33% and 50% of all primate species are endangered. Primates by definition are the most highly developed order of mammals and include humans, apes, lemurs, and monkeys. Over 100 species of primates are either threatened or endangered, mainly due to loss of tropical forest habitat.

Conserving primates is a difficult job for several reasons. First, most primates live in Third-World countries. People in these nations have trouble just eking out an existence, and there is little money available for conservation of animals. Another factor is the low reproductive rate of primates. For example, chimpanzees only have one baby every 5 to 6 years, and 50% of baby chimps die during their first 2 years. This means it takes a long time to build up the population.

Over the years, many of the primates have been killed. Bonobos and cebids have been hunted for food. Rugs are made for tourists from the skins of the black and white colobus. Farmers shoot primates that raid their crops. Baboons and macaques are especially known as crop raiders. Some primates are caught in traps set for other species including deer.

Primates, being similar to humans, are captured and used in medical research. Chimps are used for AIDS research, and research with rhesus monkeys led to the discovery of different blood types.

Some primates are caught and sold as pets. Apes are popular pets in parts of Asia. When baby animals are captured and sold as pets, the mother is typically killed. Nearly 90% of captured baby primates die during transport.

Habitat destruction is another serious problem that endangers primates. Tropical forests are disappearing quickly, and this is a prime habitat for many primates. Logging has made big inroads into the rain forest, as wood is needed for heat and cooking. Trees are being destroyed to make room for planting crops. What can be done to save primates? The Convention on International Trade in Endangered Species (CITES) agreement was signed by most countries in the 1970s. It limits trade in endangered species, both for the pet trade and for medical research. This has reduced the number of primates being captured.

Habitat destruction is a more difficult problem to solve. Much of the solution lies in educating people about habitat conservation. Organizations such as Primate Conservation, Inc. work to protect primate species.

— Pat McCarthy

PRIMATE EXTINCTION

Scientists fear that the extinction of one species of monkey may herald the beginning of an "extinction spasm." The Miss Waldron's red colobus monkey was declared extinct in 2000, making it the first extinction of a primate since the late 1700s. Scientists believe it won't be the last this century, though.

The red colobus monkey, discovered in 1933 by naturalist Willoughby Lowe, was named after his companion on that trip, Miss F. Waldron. The monkey has not been seen in its natural habitat in Ghana and the Ivory Coast since 1978. In 1993,

suspecting that the monkey might be extinct, scientists launched a series of searches through the area on the west coast of Africa. A 6-year survey of 19 different forested areas ensued and local residents were interviewed; however, scientists were unable to find a trace of the primate. Because the monkey was large, colorful, and noisy, and had a distinctive loud call, it seems reasonable to conclude there were none in the area. The researchers also consulted hunters, park rangers, and forest department personnel, before declaring the monkey extinct.

The fact that its habitat covered such a restricted area probably contributed to the animal's extinction. Heavy hunting contributed to the loss of the colobus monkey, as did loss of habitat. Over 90% of West Africa's original rain forest has been destroyed, mostly by logging. The red colobus monkey was extremely sensitive to habitat alteration and could only survive in a high canopy forest. Scientists who attempted to breed the monkeys in captivity were unsuccessful. They were also unable to replicate the monkey's diet.

Because of loss of rain forest habitat, other primate extinctions can be expected during the next century. Studies have shown that animals can become extinct up to 100 years after a forest is destroyed. Rain forest loss is expected to proceed at a high rate. Scientists predict that by 2040, West Africa will lose 70% of its remaining forests. The scientists who conducted the search for the colobus monkey noted that other large monkeys were also becoming rare in the area.

It is possible to save the primates in the area, but doing so requires much education and cooperation. Poaching is a big problem, and the park rangers are poorly equipped, trained, and supervised. There are too few rangers to deal with the armed hunters. Educating locals about ecology and appreciation of their natural heritage is a long-term goal. Another problem is the human population growth. For example, the population of Ghana is expected to double within the next 20 years, which will lead to a greater loss of habitat. Scientists believe programs to limit population growth are also crucial to the survival of primates in the area.

— Pat McCarthy

Primate Locomotion

Primate locomotor habits can be divided into several major categories, each characterized by different patterns of limb use and body positions. These categories are quadrupedal running and climbing, vertical clinging and leaping, arm suspension, and bipedal walking. A primate chiefly uses one of the four types, but may use other types at least some of the time. Primate locomotor characteristics evolved in small quadrupedal mammals with a body weight of less than 100 grams. Contrary to other tree-living small mammals, such as squirrels or tree shrews, primate ancestors inhabited the small branches of the forest canopy, where the diameters of supporting branches are often smaller than the diameter of the animal's trunk. The evolution of prehensile autopodia, combined with the use of a diagonal foot-fall pattern, provides stability and balance on such unstable supports.

Primates walk along branches with flexed limbs to keep the trunk close to the support. Thus, primates are able to avoid strong vertical oscillations of the trunk by accommodating to uneven substrates. Independent of their anatomical length differences, the fore- and hind limbs undergo equal angular excursions, and their proximal pivots are on the same level. The longer hind limbs are much more flexed than the shorter forelimbs; this allows the animal to accelerate immediately powered by the hind limbs without losing time in flexing the joints.

Arboreal quadrupedalism is the ancestral and most common locomotor mode among primates, and it was the basis for the evolution of specialized locomotor behaviors (for example, slow climbing, terrestrial quadrupedalism, and arm suspension).

Slow quadrupedal walking and climbing is a distinctive mode of quadrupedalism in the Loridae family (lorises and pottos). Members of this group are known for their rather stereotypical, stealthy locomotor behavior, practiced in any direction in space, on the branch or underneath. Loridae do not leap or perform any other fast gait, but they use large step lengths produced by great limb angular excursions. They have a very powerful grasp, because their first digits are more abducted against the other digits. The high oxidative capacity of their limb muscles enables these primates to hold tightly to a branch for hours without fatigue.

Unlike arboreal quadrupeds, the locomotive apparatus of Old World cercopithecine monkeys shows functional and morphological adaptations to terrestrial running on broad, flat surfaces. These adaptations are seen even in secondary arboreal cercopithecine monkeys. Old World monkeys have a narrow, deep trunk, and parasagittally oriented, more-extended limbs. The fore- and hind-limb length of terrestrial quadruped monkeys is nearly identical.

Primates of all sizes can cross gaps in the three-dimensional meshwork of their arboreal habitat by leaping. The necessary speed for take-off is attained by a rapid extension of the hind limbs from a deep crouched posture. Larger primates gain additional momentum by swinging their long arms. At the end of the leap, primates use their strong, long hind limbs as shock absorbers during the landing.

Vertical clinging and leaping is a highly specialized type of leaping between vertical supports. Vertical clingers and leapers are members of the prosimian families Galagidae, Tarsiidae, Indriidae, and Lepilemuridae. Because they are performed backwards, leaps between vertical supports are more complex than those between horizontal supports. From a clinging-squatted position on a vertical trunk, the thrust of the feet launches the body up in the air, with a rotatory momentum that twists the trunk around its longitudinal axis. The animal rotates to face the target in a symmetrical position. Then, a rotation around the transverse axis shifts the feet to a position suitable for landing. Tarsiers and galagines use their tails to correct their rotatory momentum during the flight phase.

Many primates can hang below arboreal supports by various combinations of arm and leg support. A more specialized mode of suspensory locomotion is brachiation. Brachiation represents slow to moderate pendular arm swinging, where the trunk undergoes rotation under the supporting forelimb. It differs from ricochetal brachiation by the speed and by the absence of an aerial phase. Brachiation is used in its most stereotypical and finest style by hylobatids and atelines. Atelines frequently use their prehensile tail to maintain an additional hold when they brachiate. Brachiating primates have long forelimbs. Their trunks are relatively short and have a broad thorax with a short lumbar region. The shoulder joint has the greatest range of movement of the whole locomotor apparatus. The thorax of apes and atelines is broad, and the scapula has been repositioned dorsally changing the orientation of the glenoid fossa to a more lateral and cranial position. Redirection of the glenoid sockets increases the span of the arms and their range of circumduction. Brachiation and arm suspension in the stem lineage of the Hominoidea explain many of the morphological peculiarities of the upper limb and thorax shared by living apes and humans.

Great apes are generally capable of vertical and horizontal climbing and suspensory arm swinging as well as quadrupedal fist or knuckle walking, and bipedalism. Knuckle walking is a type of terrestrial quadrupedalism, which is unique to the African great apes pan and gorilla. The knuckles are used to carry the weight of the upper body.

Human beings are the only primate species that habitually walk bipedally. Human beings walk with a fairly extended knee and hip joint. They use their legs in a pendular-like fashion in contrast to the spring-like manner of quadruped mammals. Additionally, human bipedality differs from the facultative bipedality of apes in the systematic use of a torsional twisting of the trunk, and the contralateral symmetry of leg- and arm-swinging.

Vertical climbing is considered to be a biomechanical link between brachiation and bipedalism. To date, this hypothesis is the most popular and generally accepted explanation of humans' evolution to bipedalism. However, shared features of the wrist in African apes and humans, features which are functionally related to stabilizing the wrist during knuckle-walking, support the idea of a terrestrial quadrupedal phase in hominid evolution.

— *Manuela Schmidt*

Further Readings

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego, CA: Academic Press.

Gebo, D. L. (1996). Climbing, brachiation, and terrestrial quadrupedalism: Historical precursors of hominid bipedalism. *American Journal of Physical Anthropology, 101*, 55–92.

Jenkins, F. A., Jr. (Ed.) (1974). *Primate locomotion.* New York: Academic Press.

Primate Morphology and Evolution

Taxonomy

Primates belong to the order primates. Members of this order include prosimians, monkeys, apes, and humans. The primates are divided into two suborders, Prosimii and Anthropoidea. Prosimians are the more primitive members of our order (i.e., they more closely resemble the earliest primates), whereas members of Anthropoidea (i.e., monkeys [New and Old World], apes, and humans) are more derived, that is, they exhibit evolved characteristics not present in the ancestral primates.

Evolutionary Trends

Primates are distinguished from other mammals by a variety of physical and life history characteristics, termed evolutionary trends. The term "trend" is used because they are either 1) not present in all species (for example,the lack of an opposable thumb in prosimians and New World monkeys) or 2) vary in the degree to which they are present (for example, prosimians retain a claw on the second digit of their feet and have smaller brains and shorter developmental periods as compared with higher primates).

Primate Evolutionary Trends

- Relatively large complex brain, especially cerebral cortex.
- Decreased reliance on olfaction and corresponding reduction of snout and brain area associated with smell.
- Increased reliance on vision and corresponding enlarged visual cortex and adaptations that increase visual acuity and color and depth perception.
- Generalized diet and dentition.
- Tendency toward upright posture.
- Prehensile (grasping) hands and feet with opposability (big toe and thumb can touch other digits of foot and hand, respectively).
- Nails instead of claws.
- Increase in efficiency of placental nourishment to developing fetus.
- Long pre- and postnatal periods with greater reliance on learning.
- Tendency toward diurnality.

Primate Groups

Prosimians vs. Anthropoid Primates

Prosimians exhibit skeletal characteristics that distinguish them from anthropoid primates. Two joints of the craniofacial region differ between prosimian and anthropoid primates. When growth ceases in anthropoids, the mandibular symphysis (midline lower jaw joint) and the frontal suture (midline forehead joint) fuse. In prosimians, these joints remain open throughout life. The prosimian dental formula, that is, the numbers of the various types of teeth (for example, incisors, canines, premolars, molars) in each half of each of the jaws differs from all but some of the New World monkeys, in that they have an extra premolar. Thus, they have 36 rather than 32 teeth. They exhibit procumbent, or forward-oriented, lower incisors. They use this "dental comb" to comb through and groom their fur. The retention of a claw on the second digit of the feet of most species also serves a grooming function. Anthropoid primates are distinguished by the presence of extra bone in the back of the eye sockets/orbits so that their eyes are encased in bone. Prosimians lack this postorbital closure.

Prosimian Characteristics

Unfused metopic suture and mandibular symphysis.

Dental formula 2–1–3–3.

Dental comb.

Grooming claw.

Lack of postorbital closure.

Nocturnality with corresponding visual adaptations: enlarged eyes with rite mirabile.

Greater dependence on hearing and mobile external ear flaps.

Greater reliance on olfaction: relatively long muzzle with moist rhinarium.

Upper lip is split and fused to the upper jaw.

Lack of facial musculature result in inexpressive face.

Digits act together (powerful grip).

Tendency toward vertical clinging and leaping as locomotor pattern.

Multiple births and corresponding pairs of teats.

Most of the extant prosimians are nocturnal and, with the exception of the tarsier, which is intermediate in many physical characteristics between the prosimians and anthropoids, they possess an adaptation for increased visual acuity in low light conditions, termed a *tapetum lucidum*. They have relatively more acute auditory abilities as well, and have mobile external ear flaps, as seen in other mammals. They also rely on olfaction more than most anthropoid primates and, thus, retain the primitive mammalian characteristic of a moist fleshy pad (rhinarium) at the tip of their relatively elongated muzzle. They practice scent marking and possess scent glands on various parts of their body. Their upper lip is split and fused and they lack the facial musculature seen in the higher primates, resulting in a lack of facial expression capabilities.

Prosimians, as well as New World monkeys, lack opposable thumbs and, therefore, lack the degree of manual dexterity seen in the Old World anthropoid primates. Prosimian digits instead act together, giving them a powerful grip. They have a tendency to locomote by a pattern termed vertical clinging and leaping (see "Locomotor Categories").

There is a tendency among the prosimians for multiple births per birthing event, and thus most species have multiple pairs of teats. Within the anthropoid primates, the norm is for single births (except for the New World tamarin and marmoset monkeys) and two teats.

New World Monkeys

New World monkeys are characterized by a suite of characteristics. Of interest is the fact that tail prehensility evolved independently in the atelids and the capuchins. Squirrel monkeys, which are closely related to capuchin monkeys, have prehensile tails only in infancy.

New World Monkey Characteristics

All species:

- Arboreal.
- Platyrrhine nasal morphology (i.e., rounded and laterally placed nostrils vs. Catarrhine nasal morphology, which consists of narrow, downward-oriented nostrils as seen in the Old World monkeys and apes).
- Long tails in most species.

Callitrichines: tamarins and marmosets:

- Dental formula 2-1-3-2 (all other species have 2-1-3-3 formula).
- Modified claw-like nails on all digits except big toe (which has a nail).
- Twins are the norm.

Some atelids (for example,spider monkeys, howler monkeys, muriquis, and wooly monkeys) as well as capuchins have prehensile tails.

One species, the owl monkey, is secondarily nocturnal, meaning that it is derived from a diurnal ancestor.

Old World Monkeys

The Old World monkeys also have several characteristics that distinguish them from the other anthropoid primates. There are important differences between the two sub-families of Old World monkeys. The members of the subfamily, cercopithecinae, are commonly referred to as the cheek-pouch monkeys. These monkeys have a cavity inside their cheeks wherein they temporarily store food. It is hypothesized that once they encounter a food source, they can quickly stuff their cheek pouches and mouths and move to a safe location to chew and eat. This could be potentially important in the case of semiterrestrial species encountering food on the ground whereby they might avoid predators and/or conspecifics (i.e., members of their own species). Enzymatic digestion also begins in these pouches. The colobinae are also distinguished by a dietary-related adaptation. Colobines have complex sacculated stomachs and benefit from foregut fermentation processes. Stomach microflora separate the structural components of plant material, particularly leaf cell walls. The process yields volatile fatty acids that provide energy to the animals. Thus, colobine monkeys can ingest comparatively large amounts of leaf matter relative to the other anthropoid primates. In addition, they have higher capabilities for breaking down the secondary compounds plants produce as deterrents to animals and microorganisms (for example, fungi). Additional differences between the two subfamilies can be seen in the following list.

Old World Monkey Characteristics

Tendency for arboreality but a relatively large number of species are semi-terrestrial.

Larger body and brain size, in general.

Tendency for ischial callosities (i.e., bare-calloused sitting pads).

Sexual swellings in many species.

Characteristics That Distinguish the Two Subfamilies of Old World Monkeys

Colobinae	*Cercopithecinae*
Complex stomachs	Cheek pouches
High folivory	High frugivory and omnivory
Dental specializations for leaf consumption	More generalized dentition
Primarily arboreal	Arboreal and semi-terrestrial species
Elongated hind limbs with good leaping abilities	Limbs more equal in length
Long tails	Variable tail length

Source: From Falk, D., *Primate Diversity*, copyright ©2000 by W. W. Norton & Company, Inc. Used by permission of W. W. Norton & Company, Inc.

Apes

Apes are distinguished by a suite of characteristics related to their ability to hang and swing by their arms, termed a suspensory hanging adaptation (see "Locomotor Categories"). Various aspects of their shoulder girdle, upper limb, and hand morphology reflect this capability. In addition, they have relatively larger brains and longer life stages relative to the other primates. The apes are divided based upon their body size into the small bodied "lesser apes" (gibbons and siamangs) and the larger bodied "great apes" (gorillas, orangs, and chimps). Except for the gorillas, the other species of apes are opportunistic omnivores, and their dentition reflects this fact. The lesser apes are monomorphic, that is, the sexes do not differ in size or morphology (except for genitalia). This is related to the fact that they have a monogamous social organization. The great apes, in contrast, are sexually dimorphic. This is taken to the extreme in the gorillas and orangs. Extreme sexual dimorphism is related to male-male competition for mates. The male gorillas and orangs defend their females from infanticidal and "raping" males respectively. The pronounced "fighting teeth" seen in male apes are also the result of male-male competition, but certainly also serve the chimps in their hunting activities.

Primate Evolution

The first primates are believed to have evolved during the Paleocene epoch (i.e., more than 55 million years ago). These early primates were likely descended from small nocturnal insectivorous mammals. The tree shrew is commonly viewed as an extant model for what these earliest primates or primate predecessors would have been like. The earliest fossil primates are from North America and Europe. They are divided into two super-families, adapoidea and omomyoidea. In general, the adapoids were lemur-like diurnal frugivores with some insectivory and folivory likely, whereas the omomyoids were small nocturnal insectivore-frugivores. It was during the Eocene epoch (~55–35 million years ago) that these early prosimians speciated on a grand scale, termed an adaptive radiation, expanding into numerous niches over a wide geographic area. They spread into Asia and mainland Africa. The ancestors of the Madagascar primates are believed to have rafted from the mainland on floating mats of vegetation. Eventually, due to global cooling, the ancestral primates of North America and Europe became extinct.

By the late Eocene, the first anthropoid primates had evolved and remains are found in Africa and possibly Asia. The richest location for early anthropoid fossils is the Fayum Beds of Egypt.

These ancestors of the monkeys and apes are believed to have descended from an omomyoid ancestry but there are numerous debates on the subject. It was during the oligocene epoch (~23–35 million years ago) that the anthropoid primates experienced a great adaptive radiation. Oligocene anthropoids are divided into three families, parapithecidae, oligopithecidae, and propliopithecidae. The New World monkeys are believed to have descended from the most primitive of the early anthropoids, the parapithecids. New World monkeys are more primitive than their Old World counterparts, and they share some characteristics seen in the Parapithecidae. How the ancestors of the New World monkeys migrated to the New World is unknown, but, once again, a rafting hypothesis is proposed. There is no evidence of a North American origin for New World monkeys as there have been no discoveries of anthropoid fossils. In addition, even if anthropoid primates evolved in parallel in the Old and New Worlds, the ancestral New World monkeys would still have had to raft from North to South America because their appearance in South America precedes a land bridge between the two continents. Thus, the most parsimonious explanation is an Old World origin.

The ancestors of the Old World monkeys and the apes branched off from the family propliopithecidae, during the oligocene. *Aegyptopithecus zeuxis* is believed by some to be a possible propliopithecid contender for a member of the ape lineage and possibly the Old World monkey lineage as well. While the earliest anthropoids were more monkey- than ape-like, it is the apes (or hominoids) that were the first to successfully adapt to changing environmental conditions in Africa. It is during the Miocene epoch (~23–25 million years ago) that the adaptive radiation of the hominoids can be observed in the fossil record. There were approximately 20 genera evident during the Miocene. This is surprising considering that there are only four nonhuman genera today. These early apes exhibited a wide range of body size (3.5–50 kilograms) and foraging strategies. While the ancestry of the lesser apes (gibbons and siamangs) is difficult, the extant great apes can be traced to the genus *Proconsul* at approximately 18 million years ago. After that point, the ancestors of the orangutans, genus: *Sivapithecus,* left Africa and moved into western Asia. Apes also moved from Africa into Europe. It is difficult to trace the origins of humans and the modern African apes during the mid-Miocene as there are many conflicting viewpoints. However, suffice it to say that the ancestry of the hominids (i.e., the bipedal primates) branched off during this time and, along with the Old World monkeys, experienced an adaptive radiation into the Pliocene (1.6–5 million years ago) and Pleistocene (10,000 to 1.6 million years ago) epochs. In response to the success of the anthropoid lineage in Africa and Asia, the only surviving members of the suborder Prosimii in those areas are nocturnal. A nocturnal niche allowed them to survive alongside the larger and more cognitively superior anthropoid primates in that they could avoid competition for resources.

Locomotor Categories

While primates (1) exhibit a generalized skeleton, (2) are capable of locomoting using a variety of means, and (3) can, essentially, walk bipedally for at least short periods of time, they tend to habitually practice one form of locomotion and can, thus, be categorized as such. Primate skeletons exhibit some specializations to their particular mode of locomotion. The locomotor categories seen in the primates are slow climbing, vertical clinging and leaping, arboreal quadrupedalism (also termed branch-running), semi-terrestrial quadrupedalism (also termed ground-running), brachiation, knuckle walking, and fist walking.

Slow Climbers

The only species that practice this form of locomotion are the pottos and the slow loris. These animals are solitary nocturnal foragers that rely on crypsis, or camouflage, to avoid detection by predators and prey. They are drab in color, move slowly through the trees, and can freeze in place for long periods of time due to a vascular specialization in their extremities, termed "rite mirabile." They lift one limb at a time and move forward in a slow mechanical fashion. They can also move on the underside of branches.

Vertical Clingers and Leapers

The earliest primates are believed to have practiced this mode of locomotion based upon fossilized skeletal evidence. It is, thus, not surprising that many of the living prosimians are either categorized as vertical clingers and leapers (VCLs) or have the capability to do so. VCL involves leaping from a vertical substrate by powerfully extending the elongated hind limbs, arcing up and out, and landing on another vertical substrate, usually feet first. The most specialized of the VCLs are the tarsier. Galagos/bush-babies and the indriids (indris, avahis, and sifakas) are also primarily VCLs. Many other species are capable of VCL in varying degrees (for example, most of the remaining Madagascar prosimians as well as the tamarins and marmosets of the New World). Due to their elongated legs, the true VCLs hop or gallop when on the ground.

Arboreal Quadrupeds/Branch-Runners

The majority of primates are arboreal quadrupeds. All of the New World monkeys are categorized as such, along with the majority of Old World monkeys and many species of prosimians. The name of this locomotor category reflects the activity, e.g., walking/running through the trees, on a variety of substrates. Arboreal quadrupeds tend to have longer legs than arms and, thus, have good leaping capabilities.

Semi-Terrestrial Quadrupeds/Ground-Runners

All but one species of Old World monkeys (the Hanuman langurs of Asia) are members of the subfamily cercopithecinae (the cheek pouch monkeys).

Several species of Old World monkeys (the baboon, patas, vervet, certain guenon and mangabey monkeys of Africa, and the macaques, predominately of Asia) spend much of their time on the ground and are, thus, categorized as semi-terrestrial quadrupeds. Their arms tend to be longer than their legs, and the general morphology of their shoulder and hip regions more closely resembles other terrestrial mammals (for example, cats and dogs). Some species have specialized adaptations for speed, termed cursorial adaptations. The baboons, and especially the patas monkeys, can run very fast. They walk/run on the tips of their digits and have relatively long limbs. Macaques walk on the palms of their hands and, accordingly, most species spend much of their time in trees.

Brachiators

Brachiation is a unique mode of locomotion that involves swinging by the arms on the underside of branches. One hand grasps onto a branch, pulling the body forward, and the other hand then reaches out for the next branch. Two groups of primates have evolved the ability to brachiate, independently of one another—the apes and spider monkeys. All of the apes (including ourselves) exhibit what is termed a "suspensory hanging adaptation." This adaptation involves a very mobile shoulder girdle that allows a 360-degree range of motion. Thus, we can hang and swing by our arms and hands.

The lesser apes such as gibbons and siamangs are sometimes known as "true" brachiators due to their enhanced brachiating capabilities that are the result of a suite of derived characteristics, relative to the other apes. Their trunks are shorter, their arms and fingers are longer, and their thumbs are reduced so that their hands resemble hooks. They swing fluidly through the forest, but must walk or run on the ground with their arms in the air, due to their length. Brachiating is not the primary mode of locomotion in the great apes, and they are not as adept. Adults are seldom observed to brachiate due to their large size, but young animals are often seen to hang and swing by their arms, especially when playing.

Spider monkeys are sometimes referred to as "semibrachiators" due to the incorporation of their prehensile tails when brachiating. Like the rest of the New World monkeys, they are also fully capable of traveling along branches quadrupedally and leaping between trees.

Knuckle- and Fist-Walkers

The primary mode of locomotion for chimps and gorillas is walking on the knuckles of their hands and the soles of their feet. The middle phalanges (finger bones) are placed flat on the ground and the metacarpo-phalangeal joints (joint between the metacarpals [bones of the body of the hand] and the first phalanges) are hyper-extended. Orangs, in contrast, ball up their hands into fists when they locomote quadrupedally. When in the trees, however, they use their hands and feet to climb through the branches. This is referred to as quadrumanous, or four-handed, locomotion. In order to move from tree to tree, they often use their weight to sway/bend the tree until it is closer to another tree. Male orangs are so large that they often have to drop down to the ground to move from place to place. Male gorillas are primarily terrestrial due to their large size.

— Barbara J. Welker

Further Readings

Falk, D. (2000). *Primate diversity.* New York: W. W. Norton.

Fleagle, J. G. (1999). *Primate adaptation and evolution* (2nd Ed.). San Diego, CA: Academic Press.

Le Gros Clark, W. E. (1959). *The antecedents of man.* Edinburgh: Edinburgh University Press.

Martin, R. D. (1990). *Primate origins and evolution: A phylogenetic reconstruction.* Princeton, NJ: Princeton University Press.

Napier, J. R., & Napier, P. H. (1967). *A handbook of the living primates.* London: Academic Press.

Nowak, R. M. (1999). *Walker's primates of the world.* Baltimore, MD: Johns Hopkins University Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Primate Taxonomy

The Animal Kingdom is divided into 25 to 30 major groups called phyla (singular, phylum): the Arthropoda (insects and spiders), Mollusca, Coelenterata (sea "anemones and jellyfish"), Echinodermata (starfish and sea urchins), and many other phyla that most people would recognize only as "worms." The phyla are divided into subordinate groups called Classes,

the classes again into subordinate groups called Orders, the orders into Families, the families into Genera (singular, genus), the genera into Species. Within each category, subordinate categories can be inserted: thus, families can be divided into subfamilies where needed (another way of looking at this is to say that the genera of a family can be grouped into subfamilies). Super-families (groups of closely related families) can also be instituted. With finer and finer divisions we may well "run out of ranks," and unranked groups are perfectly feasible, provided it is widely understood where they belong in the main classification.

The phylum to which Primates belong is called Chordata (crudely speaking, animals with backbones). The phylum Chordata is divided into approximately eight classes, one of them being Mammalia—the mammals, distinguished by having hair and mammary glands. The 20 or so orders of mammals include Carnivora (cats and dogs), Proboscidea (elephants), Chiroptera (bats)—and Primates.

The living groups of Primates are lemurs, lorises, tarsiers, New World (i.e., American) monkeys, Old World (i.e., African and Asian) monkeys, apes, and humans. Linnaeus, the originator of biological taxonomy, in 1758, did not adopt the rank of Family, but divided the order Primates directly into four genera: *Homo* (humans), *Simia* (apes and monkeys), *Lemur,* and *Vespertilio* (the latter being bats—Linnaeus's successors expelled bats from the Primates). Although he thus separated humans from apes, it is very noteworthy that he did classify humans as Primates; unfortunately most of his successors removed humans and, instead of Primates, recognized two different orders—Bimana (humans) and Quadrumana (other Primates). It was not until a century later that the order Primates was definitively re-instituted (by Mivart, in 1863).

For nearly another century there was dispute regarding what should be the major subdivisions of the order Primates. Most authors tended to regard tarsiers as being related to lemurs and lorises, but Pocock, in 1918, showed that they have more in common with monkeys, apes, and humans, and divided the Primates into suborders Strepsirhini (lemurs and lorises) and Haplorhini (tarsiers, monkeys, apes, and humans). A few taxonomists adopted his classification, but most adopted the one formalized by Simpson in 1945, in which the suborders were Prosimii (lemurs, lorises and tarsiers) and Anthropoidea (monkeys, apes, and humans).

The reason why this matters is because these two competing schemes reflect different philosophies of what the function of taxonomy actually is. The tarsier shares with lemurs and lorises characteristics such as a small brain—a primitive retention from the common ancestor of all Primates. This certainly makes it look superficially more like a lemur than like a monkey—but it has never been clear why it should be important to classify animals together simply because, in certain selected characters, they are "primitive." Since the 1960s, the tendency has been more and more to classify animals together because they share an exclusive common ancestor (phylogenetic systematics: originating with Hennig in 1952, and especially with the translation into English of his book *Phylogenetic Systematics* in 1966). It is now clear to most primatologists that the tarsier shares a common ancestor with monkeys, apes, and humans that is more recent than the one they all shared with lemurs and lorises—hence Pocock's classification is now overwhelmingly preferred.

A still more important example of a change in a prevailing taxonomic scheme is how great apes (orangutan, gorilla, and chimpanzee) are classified. In most of the 20th century the great apes were classified as the family Pongidae, while humans alone were placed in a different family, Hominidae. As the phylogeny became clearer, starting with Goodman's 1963 immunological work, and the philosophy of phylogenetic systematics spread, doubts began to be expressed about the correctness of recognizing the family Pongidae. It was the orangutan, not humans, whose ancestor separated first among the great ape and human group, so it should be the orangutan that should be classified separately. The growing tendency now is to recognize only a single family, Hominidae, with two subfamilies: Ponginae for the orangutan, and Homininae for gorilla, chimpanzee, and human.

This illustrates one of the ways in which new thinking has gradually been pervading taxonomy. A family is a monophyletic group (descended from an exclusive common ancestor), but why is this group to be ranked as a family, rather than, say, a super-family, or a subfamily, or a genus? Why would we want to recognize a separate family (Hylobatidae) for the lesser apes or gibbons, rather than incorporating them, too, in the Hominidae? Within the Hylobatidae, should we recognize just one genus (*Hylobates*) or four (one each for the concolor, siamang, hoolock, and lar-group gibbons)? There is no consistent thinking about this, but in 1977 Goodman and colleagues proposed that taxonomic rank should be dependant on time depth: a genus should have separated from its closest relatives at least

by the Miocene-Pliocene boundary, and a family should have diverged at least by the Oligocene-Miocene boundary. There is no agreement about this yet, but it is approximately consistent with customary usage.

The Biggest Question of All: What Is a Species?

In 1963 Simpson noted that a species is a unit that evolves separately from others and has "its own evolutionary role and tendencies." There are different ways in which taxonomists have tried to represent this important insight operationally.

In the 1940s Dobzhansky and Mayr formulated the Biological Species Concept (BSC): species are reproductively isolated from each other. This is often misunderstood to mean that two different species are incapable of interbreeding, or that, if they do interbreed, their hybrids are sterile. Actually, as Mayr insisted time and again, it means that they do not normally interbreed in the wild. (Among Primates, baboons and macaques interbred to give fertile hybrids in captivity; it would be meaningless to classify them all as one species.) It is interesting that, 20 years before Simpson, these authors were already attempting to express an aspect of his evolutionary conception.

There are many reasons why the BSC is not universally applicable. Perhaps the most cogent one is that many species are allopatric to (geographically isolated from) each other, so the question of reproductive isolation is simply inapplicable. An increasing number of taxonomists therefore feel that a more objective, falsifiable, and repeatable criterion must be adopted, and the use of the Phylogenetic Species Concept (PSC), first articulated by Cracraft in 1983, is now widely accepted. Under this concept, a species is a diagnosable entity, meaning that it has fixed heritable differences from other species. The nearest thing to a textbook in the field, Groves's *Primate Taxonomy* (2001), adopted this concept and, under it, recognized over 300 living species of Primates.

An outline classification of living Primates, down to genus level, is shown in the following outline:

Order Primates
- Suborder Strepsirrhini
  - Infraorder Lemuriformes
    - Family Cheirogaleidae
      - Subfamily Cheirogaleinae
        - *Cheirogaleus*
        - *Microcebus*
        - *Mirza*
        - *Allocebus*
      - Subfamily Phanerinae
        - *Phaner*
    - Family Lemuridae
      - *Lemur*
      - *Hapalemur*
      - *Prolemur*
      - *Eulemur*
      - *Varecia*
    - Family Lepilemuridae
      - *Lepilemur*
    - Family Indriidae
      - *Indri*
      - *Propithecus*
      - *Avahi*
  - Infraorder Chiromyiformes
    - Family Daubentoniidae
      - *Daubentonia*
  - Infraorder Lorisiformes
    - Family Lorisidae
      - Subfamily Lorisinae
        - *Loris*
        - *Nycticebus*
      - Subfamily Arctocebinae
        - *Arctocebus*
        - *Perodicticus*
        - *Pseudopotto*
    - Family Galagidae
      - *Galago*
      - *Euoticus*
      - *Galagoides*
      - *Sciurocheirus*
      - *Otolemur*
- Suborder Haplorrhini
  - Infraorder Tarsiiformes
    - Family Tarsiidae
      - *Tarsius*
  - Infraorder Simiiformes
    - Platyrrhini
      - Family Cebidae
        - Subfamily Cebinae
          - *Cebus*
        - Subfamily Saimiriinae
          - *Saimiri*
        - Subfamily Callitrichinae
          - *Callithrix*

Callimico
Leontopithecus
Saguinus
Family Aotidae
Aotus
Family Pitheciidae
Subfamily Pitheciinae
Pithecia
Chiropotes
Cacajao
Subfamily Callicebinae
Callicebus
Family Atelidae
Subfamily Atelinae
Ateles
Lagothrix
Brachyteles
Oreonax
Subfamily Alouattinae
Alouatta
Catarrhini
Superfamily Cercopithecoidea
Family Cercopithecidae
Subfamily Cercopithecinae
Tribe Cercopithecini
Cercopithecus
Erythrocebus
Chlorocebus
Miopithecus
Allenopithecus
Tribe Papionini
Macaca
Papio
Lophocebus
Theropithecus
Cercocebus
Mandrillus
Subfamily Colobinae
Tribe Colobini
Colobus
Procolobus
Piliocolobus
Tribe Presbytini
Presbytis
Trachypithecus
Semnopithecus
Nasalis
Simias
Pygathrix
Rhinopithecus
Superfamily Hominoidea
Family Hylobatidae
Hylobates
Symphalangus
Hoolock
Nomascus
Family Hominidae
Subfamily Ponginae
Pongo
Subfamily Homininae
Homo
Pan
Gorilla

Fossil taxa can be slotted into this scheme where they are required. In the Homininae, there are several fossil genera that are closely related to *Homo: Australopithecus, Paranthropus, Kenyanthropus, and Ardipithecus.* If they are valid, this would require that the three genera of Homininae each be given its own tribe (Gorillini, Panini, Hominini), and the other fossils would then be inserted into the Hominini alongside *Homo.* An isolated fossil genus, sister to a whole suborder or family, can be placed, unranked, as a "plesion" of that group.

Notice several distinctions about the classification. First, a few of the old names have been modified: Strepsirrhini rather than Strepsirhini (because it conforms better to the Greek from which it is derived). Notice, too, the use of several standard endings: -oidea for super-families, -idea for families, -inae for subfamilies, -ini for tribes (if even finer division is wanted, subtribes, with the ending–ina, can be inserted below tribes). These are standard throughout the animal kingdom. Suborders, infraorders, and so on have no standard endings (though they are, nonetheless, given them within most orders). Notice, too, that they all begin with an uppercase; and, finally, that generic names are written in italics.

A classification should not be thought of as a "given"; it is a scientific hypothesis, like any other, and should be expected to change as further evidence accumulates.

Species, finally, have two names. First is the name of the genus, followed by the name special to that species: *Homo sapiens, Pan troglodytes, Pan paniscus, Saimiri sciurea, Saimiri boliviensis, Saimiri oerstedi.* The specific name always begins with a lowercase letter, even though it denotes a country (Bolivia) or a person (Örsted). Also, if subspecies are needed (in completely differentiated geographic segments of a species), a third word is added on at the end (for

example, *Saimiri sciurea sciurea* [the squirrel monkey that occurs in the region where squirrel monkeys were first discovered], *Saimiri sciurea cassiquiarensis* [the squirrel monkey from the Rio Cassiquiaré]).

If handled properly, a classification reveals the following: first, it clarifies what the species are (the units), and second, it explains what the monophyletic groups (clades) are; in other words, it tracks the course of evolution. It is still disputed whether it should also to give the reader an idea of the timing of separation of two groups (i.e., what makes a well-thought-out classification an indispensable basis for all other studies in primatology: ecology, behavior, conservation, biogeography, genetics, and pharmacology).

— *Colin Groves*

Primates, Quadrupedalism

The study of locomotor adaptations is fundamental to the study of primate evolution and ecology. The primates are particularly interesting because they manifest a remarkable diversity of locomotor styles. While workers have often focused on masticatory morphology, data on patterns of locomotion also provide information on the niches occupied by recent and fossil species. While some other mammalian orders contain arboreal, semiterrestrial, and terrestrial representatives, few show the diversity of locomotor modes that are exhibited in the primates. Arboreal primates include various types of quadrupeds, brachiators, "quadrumanus" climbers, and vertical clingers and leapers. Terrestrial primates include quadrupedal forms and the unique striding bipedal hominins.

While considerable attention has been devoted to the unique and spectacular forms of primate locomotion, such as brachiation and vertical clinging and leaping, the most common locomotor mode received comparatively little attention until recently. Most primate species are quadrupedal, and the quadrupedal species often bridge the gap between locomotion on the ground and in the arboreal milieu. The assumption that all primate quadrupeds are basically the same in their anatomy and behavior is inaccurate because of both phylogenetic and ecological considerations. In a phylogenetic sense, quadrupeds are represented in a variety of infraorders, including Lemuriformes, Chiromyiformes, Loriformes, and Simiiformes. Within the Simiiformes, the Platyrrhini include clawed forms and other species with prehensile tails. In contrast, there are no known catarrhines with either claws or prehensile tails. Within the various primate families, a diversity of ecological niches are occupied.

John and Prue Napier characterize quadrupedal primates as using fore- and hindlimbs together during walking and running. They have differentiated generalized quadrupeds and "semibrachiators": In the former, arms and legs contribute about equally to locomotion; in the latter, the forelimbs are supportive, and the hind limbs are propulsive. Michael D. Rose points out that the term *quadrupedalism* can be used in two ways. It can be used to describe locomotor activity in which the animal stands and moves on all four limbs, locomotion is on horizontal or almost horizontal supports, and locomotion occurs above the support surface (in distinction to suspension). Rose also states that the term is used in a broader sense—to refer to a locomotor repertoire that has a major element of quadrupedal behavior in it.

Cercopithecoids as Models to Study Quadrupedalism

Because of focus on the evolution of extant hominoids from a Miocene stock, much of the detailed anatomical work and naturalistic study has focused on those species that have been characterized as brachiators or semibrachiators: apes and certain New World monkeys and Old World colobines.

The most taxonomically diverse and numerically successful nonhuman catarrhines are Old World monkeys. It is unfortunate that Adoph Schultz's generalization, that all cerecopithecoids are similar in their postcranial morphology, has had considerable influence. Cercopithecoids have been considered to be a monolithic block of pronograde quadrupeds, not showing the adaptations that distinguish certain species of New World monkeys and basically similar in their locomotor behavior and postcranial structure. Because of the fundamental assumption of similarity in the postcrania of cercopithecoids, with the exception of studies that contrast colobines with cercopithecines, there has been a tendency to emphasize or assume similarities of fossil cercopithecoids to their closest living relatives. An example of this is the reconstruction of *Theropithecus oswaldi* as a digitigrade baboon without specific study of the hand or wrist bones. In addition, data from derived from experimental research on

quadrupedal representatives of other orders (such as opossums and cats) have been uncritically applied to quadrupedal cercopithecoids.

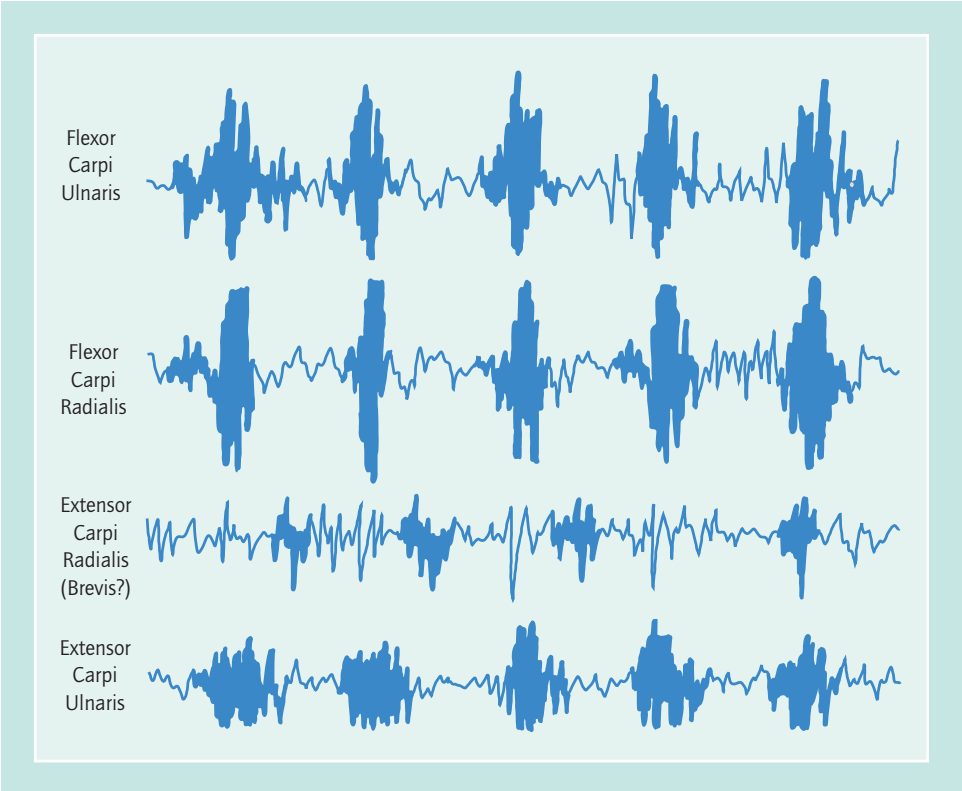
These approaches mask the variation that exists within and between cercopithecoid species. One comparison that has been made is between colobines and cercopithecines, in part because of the leaf-eating habits of colobines, the reduction of the thumb in African species, and the discovery of fossil forms such as *Paracolobus;* with the exception of "semi-terrestrial" forms such as langurs and the unusual fossil *Cercopithecoides*, the assumption has been that colobines should show features that are adapted to a more arboreal set of niches than the cercopithecines. While the comparison is useful, the taxonomic emphasis conceals fundamental differences between monkeys within the colobines and cercopithecines: that is, between palmigrade versus digitigrade types and between the more arboreal versus more terrestrial forms.

Since 1980, I have been engaged in a project that focuses on the locomotion of African cercopithecoids, especially extant *Cercopithecus aethiops* and extinct *Theropithecus oswaldi,* to answer questions of proximate and ultimate causation of quadrupedal behavior and anatomy. Cercopithecoids are ideal subjects because they are more "generalized" in their quadrupedal behavior than are species with specializations such as prehensile tails.

Contrary to the recent statement by Alan Turner and Mauricio Anton, in *Evolving Eden: An Illustrated Guide to the Evolution of the African Large-Mammal Fauna,* that vervet monkeys are always palmigrade in their locomotion, my own observation of vervets in the field and captivity demonstrates that some individuals are digitigrade while others are palmigrade; the precise distribution of this behavioral difference in the field has not yet been determined. The dichotomy would be considered unusual intraspecifically, because most species appear to manifest one hand posture or the other, but not both. It is an especially important

Quadrupedal locomotion in vervet monkeys on Lake Naivasha, Kenya. Field observation demonstrated that individuals were consistently palmigrade in hand posture. They actively foraged on the ground (left) and in the trees. In the terrestrial context, foodplants such as Amaranthus hybridus, Oxygonum sinuatum, Sida cuneifolia, Cynodon dactylon, and Opuntia were routinely consumed. In the arboreal context, the fruit of Ficus praetoriae and F. wakefieldii were eaten. Acacia xanthophloea provided gum, leaf buds, young leaves, flowers, seeds, and thorn bases; most of these items were consumed in the terminal branch setting but gum and red mites were eaten from the trunk and boughs (middle). The terminal branch setting provided extensive lateral contact between crowns, producing virtually continuous arboreal pathways for the monkeys (right) in their core area. There was seasonal variation in the consumption of some foods (e.g., Acacia flowers), which affected the amount of time spent terrestrially versus arboreally, while other foods (e.g., Opuntia pears and Acacia gum) are consumed during all seasons. While the Naivasha vervets ate at least 40 different species of plants, they were able to consume various items from yellow fever trees throughout the year.

Source: Copyright © and courtesy of Paul F. Whitehead.



Comparison of two long flexors and two extensors of the wrist in the male palmigrade-digitigrade hybrid. Note in-phase activity of the flexors and extensor *carpi ulnaris* during the support phase of quadrupedal walking. There is a discrete burst of activity of *extensor carpi radialis* (brevis?) that is generally out-of-phase with the other muscles.

Source: Copyright © and courtesy of Paul F. Whitehead.

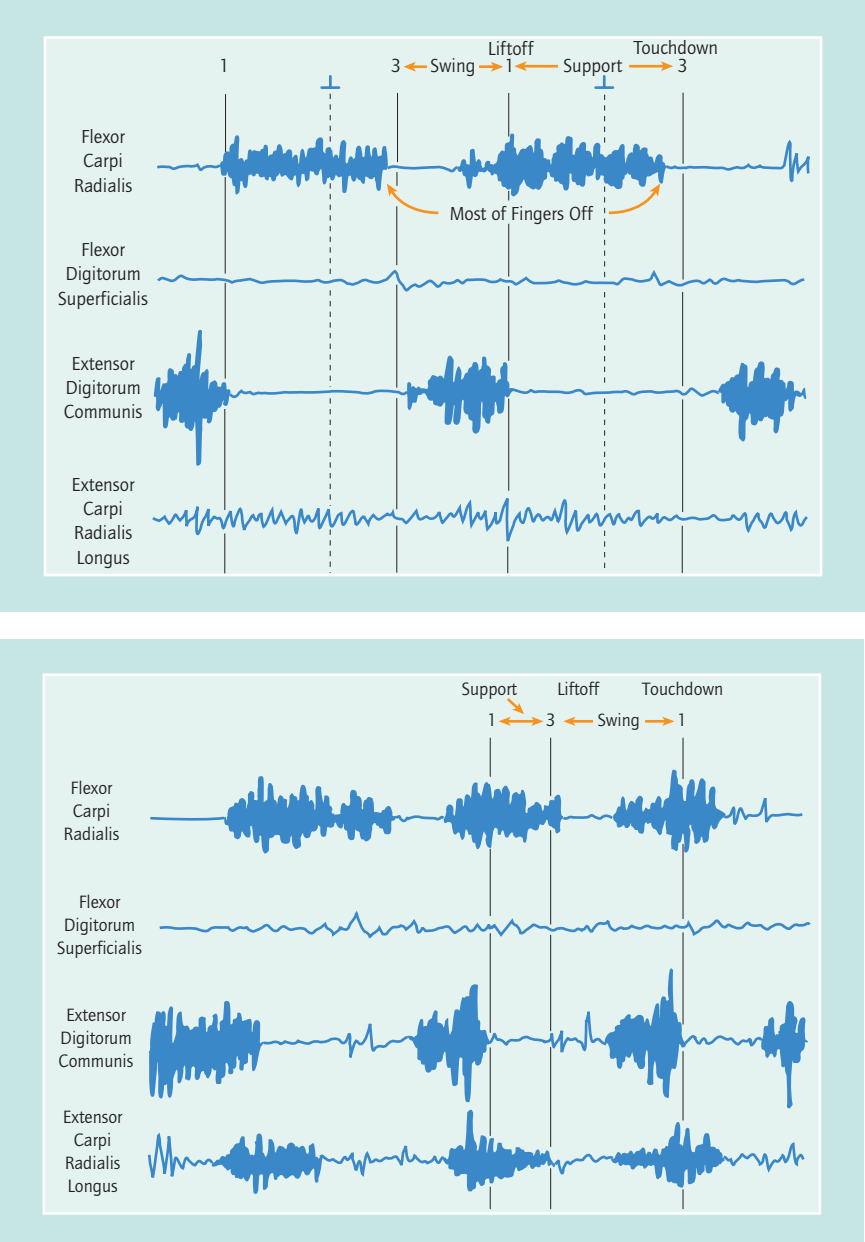
control because behavioralists and morphologists are concerned with the effects of phylogenetic constraints and fabricational factors. In any study employing interspecific or intergeneric comparisons, there is an element of doubt whether the observed differences reflect differences in ways of life (niche) or whether they are due to phylogenetic or fabricational factors. One way of increasing the likelihood of correlating differences in form with differences in function is to perform intraspecific comparisons of populations in different habitats. Examples of this approach include K. A. Monk's study of grasshoppers, B. D. Patterson's work on chipmunks, S. L. Linsay's research on Douglas squirrels, and R. F. Johnston's classic investigation of European sparrows. In the research on vervets, the problem of phylogeny is controlled to a great degree because much of the work is done with representatives of different local groups of the same species.

The aim of the research has been to correlate variations in hand-posture behavior (digitigrady versus palmigrady) and in underlying morphology, with variations in local troop habitat structure and substrate preference. The proposition that is being tested is that digitigrady is correlated with habitual terrestriality and open habitat, while palmigrady is correlated with habitual arboreality and more closed habitat. I am therefore seeking to determine (1) whether there is a predictable relationship between behavior, morphology, and ecology; (2) whether certain kinds of African environments impose constraints on the adaptations of monkeys; and (3) whether these are represented simultaneously in their ecology and morphology. Study of forelimb anatomy of fossil *Theropithecus oswaldi* provides a perspective as to whether some characters may be size related in their expression.

My research has a number of components (1) field study of the locomotor behavior and habitat of a palmigrade group on Lake Naivasha, Kenya, for comparison to a later study of digitigrade vervets; (2) trapping of individuals from the group that was studied in the field for electromyographic and cineradiographic comparison of palmigrady with digitigrady; and (3) osteological comparison of the forelimbs of species of African cercopithecoids, which have been described in the literature as either habitually palmigrade or digitigrade, examination of the range of variability within *C. aethiops*, and relation of intraspecific to interspecific differences between palmigrade and digitigrade forms. The results of all of these approaches would be too extensive to enumerate here, but some results of the electromyographic and cineradiographic in vivo experiments on primate quadrupedalism are presented below.

Experimental Study of Digitigrady and Palmigrady During Quadrupedal Locomotion

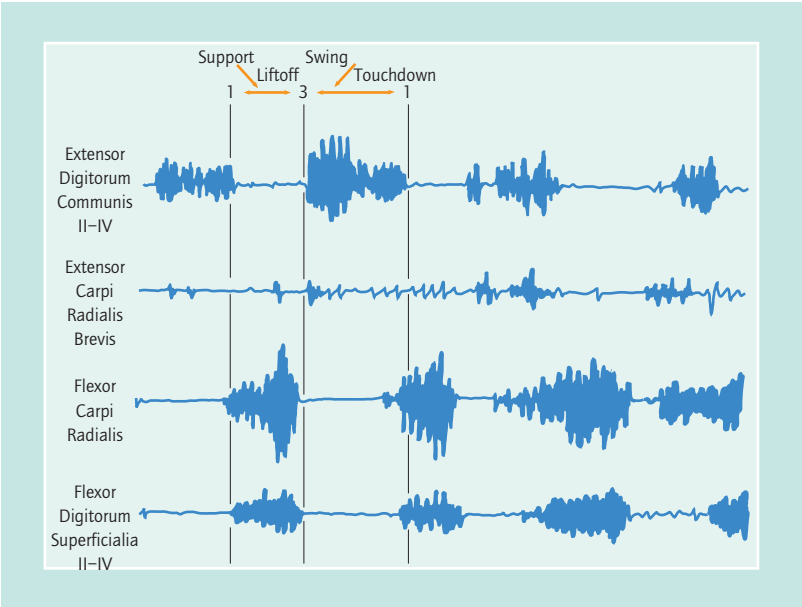
Electromyography was accomplished on two vervet monkeys and an anubis baboon. One vervet was a palmigrade adult female from Lake Naivasha. The second was a subadult male, born at the Institute for Primate Research, National Museums of Kenya. The male was a product of a cross between a digitigrade male vervet and a palmigrade female. The baboon was a late infant-early juvenile, trapped in the wild but obtained from a commercial primate importer, and was consistently digitigrade in hand posture. The research was accomplished in the facility of the Department of Anatomical Sciences, State University of New York at Stony Brook, with the kind permission and cooperation of Jack T. Stern, William Jungers, and Susan Larson. The muscles that were investigated were *flexor carpi ulnaris, flexor carpi radialis, extensor carpi radialis* (*brevis* in the vervet and *longus* in the baboon), *extensor carpi ulnaris, extensor digitorum communis, flexor digitorum superficialis* (mainly to the third and fourth rays), and *flexor digitorum profundus* (mainly to the third and fourth rays). Eight experiments produced useful results. Two main questions were addressed: (1) Are the patterns of muscular activity different during support in habitually palmigrade monkeys versus habitually digitigrade monkeys? and (2) are the patterns of muscle activity similar to those documented in knuckle-walking apes?



Two sequences of quadrupedal walking in a young male Papio anubis: digitigrade walking (with thumb intermittently contacting surface) on a horizontal branch (top) and fast digitigrade walking on the ground (bottom). *Flexor carpi* radialis is active during most of support and starts activity prior to touchdown. In the terrestrial sequence, activity of *extensor carpi radialis longus* coincided with *flexor carpi radialis.* There was a period of overlap between *extensor digitorum longus* prior to touchdown with the other two muscles but its activity ended at or just before touchdown. Adequate recordings were not obtained from *flexor digitorum superficialis* in this experiment.

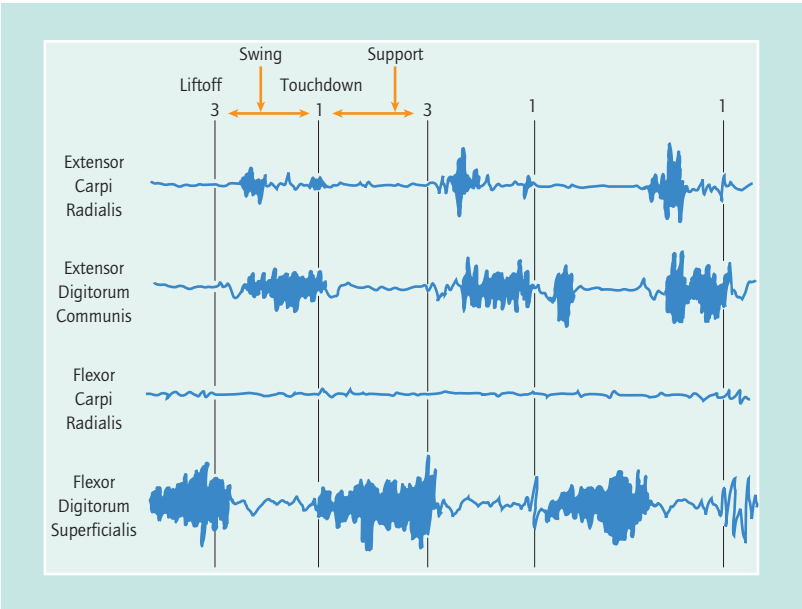
Source: Copyright © and courtesy of Paul F. Whitehead.

In experiments in which the flexors and extensors of the wrist were simultaneously recorded, there was in-phase activity of *flexor carpi ulnaris, flexor carpi radialis,* and *extensor carpi ulnaris.* Activity would



Quadrupedal walking in the hybrid male vervet. *Extensor digitorum communis* was active only during swing phase and was out of phase with the activity of the two flexors; its activity stopped at touchdown as in the baboon. The activity of *extensor carpi radialis brevis* was low, sporadic, and difficult to interpret: It may be serving to adjust the position of the hand rather than as a prime mover. Activity of *flexor carpi radialis* and *flexor digitorum superficialis* were simultaneous during support.

Source: Copyright © and courtesy of Paul F. Whitehead.



Activity of muscles in the palmigrade female vervet. As in the hybrid male, *extensor digitorum communis* and *flexor digitorum superficialis* were active during different phases of the step cycle. *Extensor carpi radialis* appeared to show two discrete bursts of low activity: one during swing phase and a smaller one at touchdown. Adequate recordings of *flexor carpi radialis* were not obtained in this sequence.

Source: Copyright © and courtesy of Paul F. Whitehead.

commence immediately prior to touchdown and continue during the major weight-bearing portion of support phase (see Figure 2).

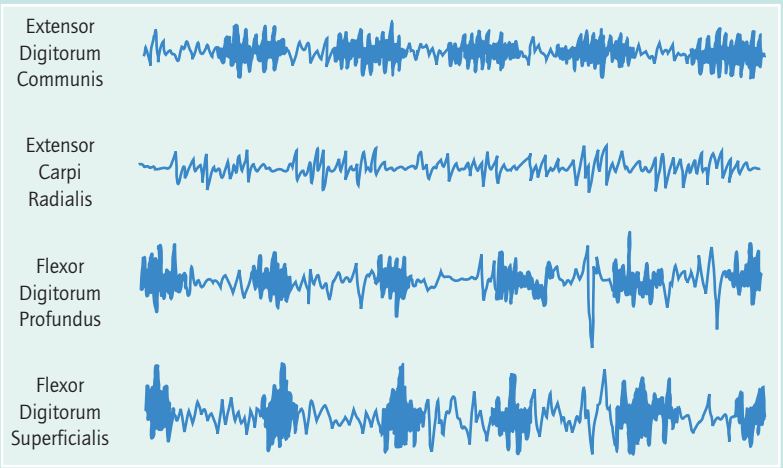
During trot in the male and female vervets, there were distinct bursts of activity in these muscles. At the start of activity, the hand is roughly parallel to the substrate and the fingers rectilinear to the palm. The major activity of *flexor carpi ulnaris* and *radialis* end when the proximal phalanges begin to be lifted from the substrate; at this point, the metacarpals have just passed the perpendicular in support. Activity of *extensor carpi ulnaris* may continue for a slightly longer period; its burst of activity appears to end when the tips of the distal phalanges are about to leave the substrate.

Activity of *flexor carpi ulnaris* in the baboon is initiated while the hand is outstretched during swing phase: The fingers are rectilinear to the long axis of the antebrachium. The hand and antebrachium are moving cranially as a unit, and the hand is about to begin descent toward the substrate. Muscular activity begins at this point during both fast digitigrade walking on the ground and moderate digitigrade walking on a branch. Activity of *flexor carpi radialis* is similar.

In the baboon, the activity pattern of *extensor carpi ulnaris* often appeared to consist of two bursts separated by a short interval. These bursts occurred just at the beginning of, and near the end of, support. Major activity of the second burst stops abruptly as the metacarpals assume a perpendicular orientation relative to the substrate, rectilinear to the antebrachium. Subsequent to this, the proximal phalanges are lifted from the substrate, and *flexor carpi ulnaris* stops its activity. Generally, there is no activity of either *extensor carpi ulnaris* or *flexor carpi ulnaris* as the hand is lifted off the substrate and begins cranial swing.

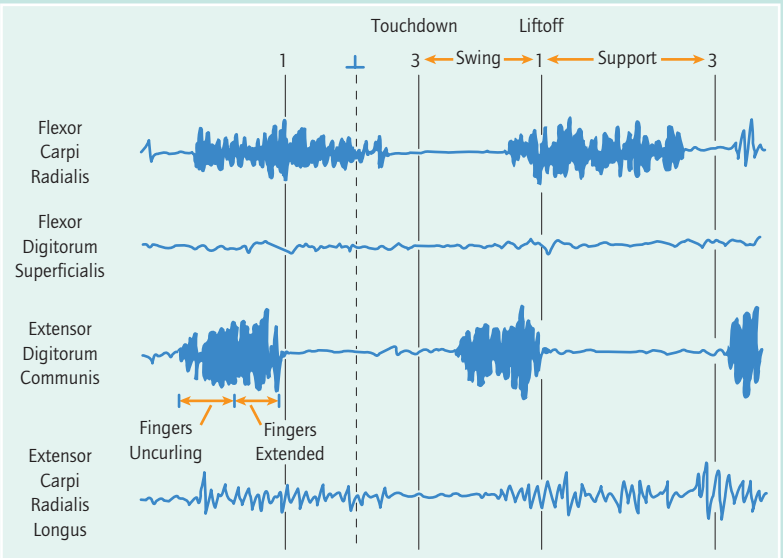
Extensor digitorum communis is out of phase with the wrist flexors in all three animals and is active throughout most of swing. It stops its activity at touchdown, when there is a burst of activity of *extensor carpi ulnaris*. Full extension of the fingers in humans is produced by a combination of *extensor digitorum* and the lumbricals; the latter resist the tendency to flex at the interphalangeal joints during extension at the metacarpophalangeal joints. Unfortunately, clear results for the long digital flexors were not obtained in the baboon. However, good recordings for both vervets clearly demonstrate that *flexor digitorum superficialis* and *flexor digitorum profundus* are in phase in their activity and are active at the same time as the wrist flexors. Both digital flexors are active during support until the basal phalanges begin to be lifted from the substrate. The muscle that is the most difficult to interpret is *extensor carpi radialis*. Several experiments examined this muscle in the baboon and vervets. Activity was often low and irregular. These experiments did not elucidate its function (Figures 4, 5, 6, and 7)

Russell Tuttle and John Basmajian conclude that *flexor carpi radialis* prevents extreme ulnar deviation of the wrist during knuckle-walking in apes. This muscle seems to have this function in the examined cercopithecoids: both *extensor carpi ulnaris* and *flexor carpi ulnaris* are active during support, and both would be effective ulnar deviators. It is also certainly flexing the wrist, although it is



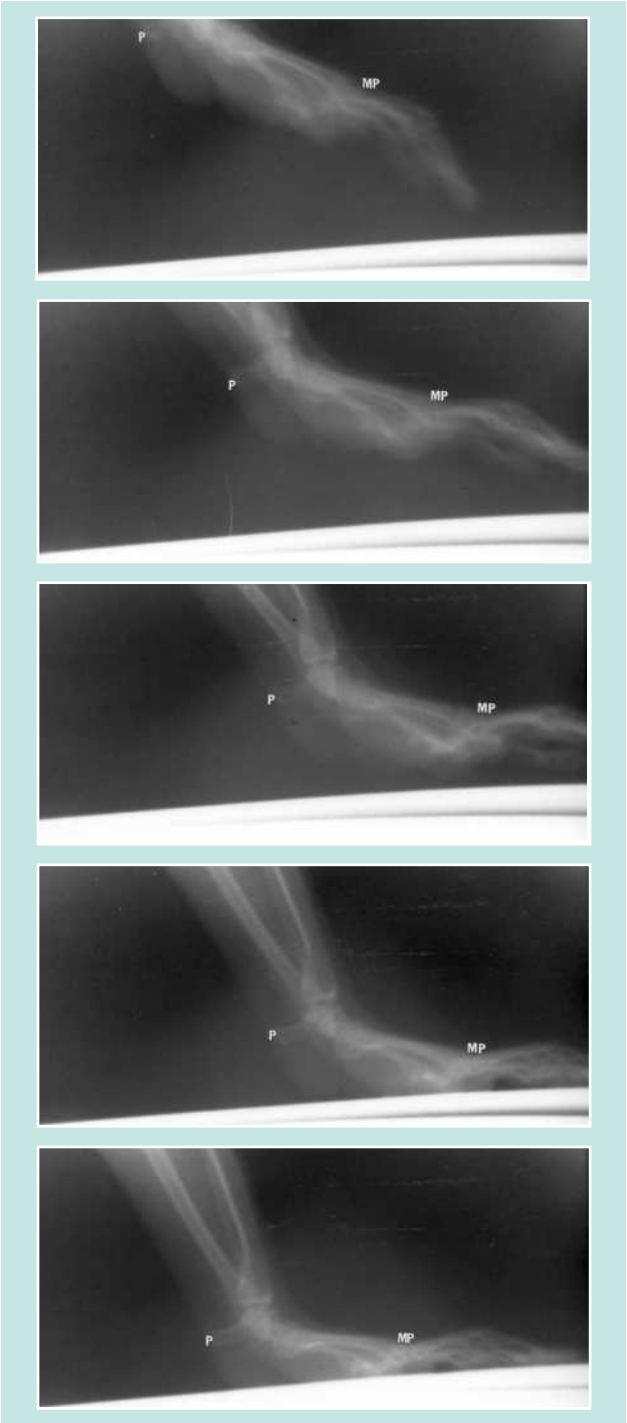
Simultaneous activity of *flexor digitorum profundus* and *flexor digitorum superficialis* during support in a terrestrial trot in the female vervet. Adequate recordings of *extensor carpi radialis* were not obtained in the experiment. *Extensor digitorum* coincided with the two flexors during a portion of its activity.

Source: Copyright © and courtesy of Paul F. Whitehead.



Digitigrade walk on the ground in the young male baboon. *Flexor carpi radialis* began its activity during the end of swing phase as the manus began its descent toward the substrate, and continued throughout most of support, ending after the antebrachium was perpendicular to the orientation of the phalanges on the substrate and the proximal phanges had begun to be lifted from the ground. *Extensor digitorum communis* was active only during swing phase, ending its activity at touchdown. It both extended the digits from a flexed position and maintained them in the extended state until touchdown. Adequate recordings were not obtained from the other two muscles during the experiment.

Source: Copyright © and courtesy of Paul F. Whitehead.



Touchdown of the hand in a palmigrade male vervet studied by cineradiography during quadruepdal walking on a treadmill. The pisiform (P) maintains a horizontal orientation throughout the sequence and is nonweight-bearing. The metacarpo-phalangeal joints (MP) are closer to the substrate prior to and at touchdown than are the proximal ends of the metacarpals. In this regard, palmigrade touchdown is more similar to digitigrade touchdown than it is to human pedal plantigrady.

Source: Copyright © and courtesy of Paul F. Whitehead.

not clear how effective it is in resisting dorsiflexion because the palmigrade female vervet manifests significant activity in this muscle. Unlike results in the knuckle-walking gorilla, activity of *flexor carpi ulnaris* did not decrease while *flexor carpi radialis* remained active. Instead, *flexor carpi ulnaris* showed consistent activity. The result, together with my cineradiographic data on the orientation of the pisiform in digitigrade and palmigrade monkeys, suggests that *flexor carpi ulnaris* acts as the in-force for a first-class lever, because the muscle tendon continues as the pisohamate and pisometacarpal ligaments. Tuttle and Basmajian report little activity in *extensor carpi ulnaris* during knuckle-walking. In contrast, this muscle is consistently active during support in cercopithecoids. Studies by Tuttle and Basmajian and also Randall Susman and Jack Stern report relatively little activity of *flexor digitorum superficialis* and *flexor digitorum profundus* during knuckle-walking. In contrast, activity was recorded during support in both vervets. In the monkeys, *extensor digitorum communis* is not active during support and does not help to maintain the integrity of the joints during digitigrady in the baboon.

Finally, while there are still some gaps in our knowledge, there is a noticeable similarity in the muscular activity patterns of digitigrade and palmigrade cercopithecoids. This finding is explained by cineradiographic evidence that demonstrates that the phalanges are actually inclined downward toward the substrate prior to touchdown in vervet palmigrady: This gives the hand movements greater similarity to digitigrade touchdown than had been expected. In addition, the proximal metacarpals are always higher than are the distal metacarpals during support: this is another similarity to digitigrady and a significant difference from plantigrady in bipedal humans. (See Figure 8.) The extent to which similarity in hand movement between digitigrady and palmigrady may support the hypothesis of a semiterrestrial origin of the cercopithecoids is dependent on the relative genetic conservatism of the neurological bases of hand movement.

— Paul F. Whitehead

See also **Brachiation; Cercopithecines; Colobines; Primate Locomotion**

Further Readings

Rose, M. D. (1994). Quadrupedalism in some Miocene catarrhines. *Journal of Human Evolution 26,* 387–411.

Tuttle, R. H., & Basmajian, J. V. (1974). Electromyography of forearm musculature in *Gorilla* and problems related to knuckle-walking. In F. A. Jenkins Jr. (Ed.), *Primate locomotion* (pp. 293–347). New York: Academic Press.

Whitehead, P. F. (1993). Aspects of the anthropoid wrist and hand. In D. L. Gebo (Ed.), *Postcranial adaptation in nonhuman primates* (pp. 96–120). DeKalb, IL: Northern Illinois University Press.

Whitehead, P. F., & Larson, S. G. (1994). Shoulder motion during quadrupedal walking in *Cercopithecus aethiops:* Integration of cineradiographic and electromyographic data. *Journal of Human Evolution 26,* 525–544.

Primatology

Primatology is the study of nonhuman primates (NHP) or, as sometimes identified, the alloprimates, meaning primates other than us. The order Primates includes the prosimians, Old and New World monkeys, apes, and humans. The study of humans is relegated to the social sciences (that is, anthropology, geography, psychology, and sociology) and, although humans are primates, the study of humans is not included as part of primatology. Primatology, in contrast, is generally viewed as part of the life sciences. Nonhuman primates have been studied by psychologists, zoologists, and biological anthropologists in both the laboratory and in their natural habitats. In general, biological anthropologists study NHP under semi-natural conditions or in their natural habitat.

Primates are eutherian (that is, placental) mammals having, for example, hair, mammary glands for nursing their offspring, a physiology for maintaining a constant body temperature, and different types of teeth identified as incisors, canines, premolars, and molars. The traits unique to primates include an increase in brain size and a lengthening of all stages of the life cycle, stereoscopic vision with the eyes encircled by bones, color vision, sensitive ridged pads with nails at the end of the digits instead of the typical mammalian claws, opposable digits, and hands and feet in place of paws. Primates also have a generalized skeleton and variable locomotor patterns and feeding postures.

The prosimians belong to the suborder Prosimii that includes the lemurs, sifakas, indris, and aye-ayes of Madagascar, the galagos of Africa, the loris of Africa and Asia, and the tarsier of Asia. Prosimians have more retained (that is, primitive mammal-like traits) than the other suborder of primates, the Anthropoidea. These retained traits of the prosimians include a rhinarium or wet-nose, some claws, eyes not completely enclosed in bone, smaller brain size, and less control of individual fingers than seen in the anthropoid primates. The anthropoid primates, the monkeys, apes, and humans, lack the wet-nose, and have eyes completely encased in bone, relatively large brains, and nails on all of their digits. Some primatologists, particularly those who study early primate evolution, prefer to divide the order Primates into two suborders designated as the Strepsirhini, the wet-nosed prosimians, and the dry-nosed Haplorhini, which includes the tarsier, New and Old World monkeys, apes, and humans.

Primatology began in the 1800s as mainly a study of primate anatomy and an attempt to understand where primates, including humans, fall within the classification system constructed by Linnaeus in the mid-1750s. The first attempts to send researchers into the field to observe NHP in their natural habitat was initiated in the early 1930s by psychologist Robert Yerkes who sent N. W. Nissen and H. C. Bingham to observe chimpanzee (*Pan troglodytes*) and gorillas (*Gorilla gorilla*), respectively. Another psychologist supported by Yerkes was Clarence R. Carpenter who studied howler monkeys (genus *Alouatta*) and spider monkeys (genus *Ateles*) on Barro Colorado Island in the Panama Canal and arranged for 500 Indian rhesus monkeys (*Macaca mulatta*) to be moved to Cayo Santiago, an island off the coast of Puerto Rico. Carpenter was also part of the 1937 Asian research project to study gibbons (genus *Hylobates*) initiated by Harold Coolidge, Jr. Sherwood L. Washburn, who would play a major role in the development of primatology following WWII, was also part of the Coolidge expedition.

Following the aftermath of World War II the study of alloprimates in their natural habitat began again. In the 1950s Japanese biologists started to study Japanese macaques (*Macaca fuscata*), but this work was not translated into English until 1957. The work of the

Source: © iStockphoto/Michael Roginkin.

Japanese primatologists is now accepted in the West, and Japanese primatologists publish in English language journals. In the late1950s, Irven DeVore, under Washburn, studied baboons (*Papio anubis*) in Kenya. Subsequently Washburn sent a series of University of California, Berkeley, graduate students, recruited from among those studying cultural anthropology, to observe a wide range of NHP. Washburn was mainly interested in what NHP might tell us about human evolution. Soon, however, anthropologists were studying NHP because the NHP are interesting for their own sake, and anthropologists have the best methods for studying the social lives of the alloprimates. Pioneering studies were conducted by Phyllis (Jay) Dolhinow (*Semnopithecus entellus* in India), Jane Lancaster (*Cercopithecus aethiops* in Africa), Donald Linburg (*Macaca mulatta* in India), and John Ellefson (*Hylobates lar,* Southeast Asia) among others. Beginning in the early 1960s, Louis Leakey, the great paleoanthropologist, sent researchers to conduct long-term studies of the great apes. Leakey sent Jane Goodall to study chimpanzees (*Pan troglodytes*), Dian Fossey to study gorillas (*Gorilla gorilla*), and Biruté Galdikas to study orangutans (*Pongo pygmaeus*). For the next 30 years, most studies of NHP in their natural habitat were carried out by students of Washburn or students of students of Washburn. Other early primatologists of note include Charles Southwick (*Macaca mulatta* in India), Stuart Altmann, (*Macaca mulatta* on Cayo Santiago), George Schaller (*Gorilla gorilla* in Zaire), and in Africa Thelma Rowell (*Papio anubis*), Han Kummer (*Papio hamadryas*), and Robert Hall (*Erythrocebus patas*).

The turning point in the development of the systematic collection of data on NHP was the 1974 article by Jean Altmann concerning sampling methods. Prior to 1974, data were collected *ad libitum,* that is, behaviors were recorded that were most easily observed. This method of observation resulted in an unsystematic data set not amenable to statistical analysis. After 1974, *ad libitum* methods gave way to more systematic observations that could be more competently analyzed by statistical techniques.

The first steps in the study of a group of primates is to habituate them to the presence of the researcher, and for the researcher to learn to recognize individual group members. The process of habituation can take a short or long period of time depending on many factors including the skills and endurance of the primatologist, the nature of the habitat, the prior experience of the primate group with people, and so forth. Once habituation is proceeding, data collection can begin. Successful data collection involves a stated problem or hypothesis, systematic methods of observations and recording, the use of an ethogram (or a defined list of behaviors that relate to the problem or hypothesis being tested), the identification of individual members of the group under study, and careful analysis of the data.

Fifty years of the study of the alloprimates resulted in many surprising and controversial discoveries. For example:

- Mating patterns do not necessarily follow from social systems. For example, a female (such as the patas monkey, Erythrocebus patas) may live in a polygamous social group but mate promiscuously.

- A species can have multiple social systems. Howler monkeys (genus Aloutta) and gray langurs

(genus Semnopithecus), for example, may live in uni-male groups or multi-male/multi-female troops.

- Multiple social systems may be adaptive to the same habitat. White-faced capuchins (Cebus capucinus) that live in multi-male/multi-female troops are sympatric in Central America with spider monkeys (genus Ateles) that have a fission-fusion social system.
- Among Old World monkeys, the fruit and insect eaters (subfamily Cercopithcinae) have larger brains for body size than the leaf eaters (subfamily Colobinae).
- Tool use has been observed among chimpanzees (genus Pan), orangutan (genus Pongo), and capuchins (genus Capucinus).
- For anthropoids, individual troop members recognize the vocalizations of other individual troop members, and vocalizations can have environmental referents such as bird or terrestrial predators.
- Social skills are more important in attaining and maintaining rank than body size or fighting ability.
- For anthropoids, but not prosimians, sexual intercourse may occur outside the female's fertile period.
- For anthropoid primates, but not prosimians, both heterosexual and homosexual behavior has been observed.

— Linda D. Wolfe

Further Readings

Cheney, D. L., &Seyfarth, R. M. (1990). *How monkeys see the world.* Chicago, IL: University of Chicago Press.

Falk, D. (2000). *Primate diversity.* New York: W. W. Norton.

Fleagle, J. G. (1999). *Primate adaptation and evolution* (2nd Ed.). New York: Academic Press.

Haraway, D. (1989). *Primate visions: Gender, race and nature in the world of modern science.* London: Routledge.

Lehner, P. N. (1996). *Handbook of ethological methods* (2nd Ed.). Cambridge, UK: Cambridge University Press.

Richard, A. F. (1985). *Primates in nature.* New York: W. H. Freeman.

Setchell, J. M., & Curtis, D. J. (2003). *Field and laboratory methods in primatology.* Cambridge, UK: Cambridge University Press.

Shumaker, R. W., Beck, B. B., & Ellis, G. (2003). *Primates in question.* Washington, DC: Smithsonian Books.

Strier, K. B. (2003). *Primate behavioral ecology* (2nd Ed.). Boston, MA: Allyn and Bacon.

Prosimians

Often used as models for early primate anatomy and behavior, prosimians include a rich diversity of species exhibiting a complex range of social behavior, dietary specializations, and locomotor habits. Although more geographically widespread in the past, today these generally small primates are restricted to the Old World. Five of the eight major prosimian groups are known exclusively from Madagascar, while other species are found in Africa and Asia. While prosimians are only distantly related to humans, this group has allowed scientists to identify common anatomical and behavioral traits that link all primates.

Traditionally, the order Primates is divided into two major suborders, Prosimii and Anthropoidea. The latter group includes monkeys, apes, and humans, while prosimians are comprised of eight distinct families, including the cheirogaleids, lemurids, lepilemurids (megaladapids), daubentoniids, indriids, galagids, lorisids, and tarsiids. However, this Linnaean taxonomic arrangement has proven controversial, as several recent studies have shown that Prosimii isn't a natural, monophyletic group comprised of a single common ancestor and all of its descendants. Instead, this suborder is a basal grade of primates, linked by primitive characteristics, that includes those species more primitive than Anthropoidea. Modern primatologists have thus advocated a system that divides Primates into two large, monophyletic clades: Haplorhini, which consists of Anthropoidea and tarsiids, and Strepsirhini, which includes all of the traditional prosimian families with the exception of tarsiids. Although based on phylogenetic analyses that have found tarsiids to be closer to anthropoids than to the other traditional prosimians, this nomenclature is still not universally accepted. Thus, this entry will consider all eight of the traditional prosimian families, as well as a handful of fossil groups whose relationships are poorly resolved.

Source: © iStockphoto/Derek Dammann.

Depending on which classification scheme one follows, there exist between 24 and 31 genera of living prosimians, which are further divided into 54 to 68 species. All prosimians share with other primates several basic characteristics, including grasping hands with opposable thumbs, the primitive mammalian claw modified into a flat nail, forward facing eyes that result in binocular vision, large brains, small litter size, and slow growth. The clade Strepsirhini is united by three distinct features: an unusual dental "comb," a grooming claw on the second digit of the foot, and a laterally flaring talus (ankle bone). The clade Haplorhini, which includes anthropoids and tarsiers, is linked by several features of the soft anatomy, mostly relating to the nose and lips. Overall, the traditional Prosimii (including tarsiers) exhibits a relatively primitive anatomy compared to later primates, including a small brain. As a result, prosimians—especially cheirogaleids and lorisids—have often been used by primatologists as models for the primitive primate condition. However, despite their retention of primitive features, prosimians are a successful group that exhibits a wide range of behavior.

Cheirogaleids

One of five prosimian families found exclusively on Madagascar, cheirogaleids are small-bodied, nocturnal, nest-building primates. Their reproductive system is unique among primates, with females possessing three pairs of nipples and often birthing twins. Five extant genera are included in this group, all of which have a mass of less than 500 grams. The mouse lemurs (*Microcebus*) are arboreal quadrupeds that move by running along small branches and leaping between terminal twigs. Mouse lemurs are faunivorous and occupy overlapping home ranges. It has been observed that the sex ratio of individual litters is influenced by the presence or absence of females other than the mother. Coquerel's mouse lemur (*Mirza*) constructs large, circular nests of leaves for daytime resting, but spends the night feeding and socializing with conspecifics. The dwarf lemurs (*Cheirogaleus*) hibernate for long periods during the dry season, while the fork-marked lemur (*Phaner*) is characterized by a suite of features related to its diet of gum, including large hands and feet with expanded digit pads, keeled fingernails, and procumbent incisors. Unlike other cheirogaleids, *Phaner* lives in permanent groups, many of which contain one male and one female.

Lemurids

Likely the most well known of the prosimians, the lemurids contain the signature Malagasy lemurs, most of which are medium-sized (1–4 kilograms) and live in groups. The ring-tailed lemur (*Lemur catta*), marked by a long, striped tail, is the most terrestrial of the living strepsirhines, spending approximately 65% of its traveling time on the ground. *Lemur* has also been observed to live in large social groups of approximately 20, containing roughly equal numbers of males and females, which are dominant. The closely related *Hapalemur* feeds almost exclusively on bamboo, with the three recognized species each specializing on a separate part of the plant. The

mongoose lemur (*Eulemer mongoz*) exhibits variability in its activity pattern, diet, and social organization, with most populations consisting of monogamous family units.

Lepilemurids (Megaladapids)

Often grouped with the lemurids, the genus *Lepilemur* (the sportive lemur) is regarded by certain researchers as distinctive enough to warrant its own family, which also includes the extinct genus *Megaladapis. Lepilemur* is characterized by its small size and lack of permanent upper incisors, and is signified by one of the lowest basal metabolic rates of any primate. Sportive lemurs are solitary and extremely territorial, and males have often been observed to fight over their small home ranges.

Indriids

Characterized by long hind limbs used for leaping, the three extant indriid genera share many cranial features, but differ in size and activity patterns. The woolly lemur (*Avahi*), the only nocturnal indriid, lives in monogamous family units and is known to huddle in groups while feeding. The familiar sifaka (*Propithecus*) is a large, diurnal primate known from three species. Although the sifaka is primarily a vertical leaper while in the trees, it can hop bipedally on the ground. The sifaka normally lives in groups of three to nine, which often include multiple breeding females. Males regularly change groups, which results in strong male-male competition during the breeding season. The third indriid genus, the indri (*Indri*), is marked by long hands and feet, slender arms, and the absence of a tail. This genus is extremely vocal, and congregates in small family groups that defend large territories.

Daubentoniids

The single genus included in the daubentoniid family, the aye-aye (*Daubentonia madagascariensis*), is perhaps the most bizarre living primate. This moderate sized (3 kilogram) animal is differentiated by a suite of extreme anatomical characteristics, including a set of ever-growing incisors and a long, slender third digit of the hand. Captive studies have indicated that the aye-aye uses its unique third digit to tap logs, which can reveal the presence of insect prey. If insects are located, the aye-aye will then gnaw at the log with its incisors and use its finger as a probe. The aye-aye is also known to be a non-seasonal breeder.

Galagids and Lorisids

United by a host of cranial features, the galagids and lorisids constitute a limited radiation of mainland prosimians. The African galagids (bushbabies) are represented by four genera, including *Otolemur, Galago, Euoticus,* and *Galagoides.* Among the best-studied galagids is the South African lesser bushbaby (*Galago moholi*), which has been observed to form social hierarchies related to age and weight. The needle-clawed galago (*Euoticus elegantulus*) is a specialized gum feeder, and has evolved procumbent upper incisors and claw-like nails to assist in food procurement. The lorisids, found in Africa and Asia, are characterized by their slow locomotion. The potto (*Perodicticus*) is the most widespread of the African lorisids, and specializes in olfactory foraging. The slender loris (*Loris*), which inhabits Sri Lanka and southern India, is a small, slim primate, while the slow loris (*Nycticebus*) is larger and moves by slow, quadrupedal climbing.

Tarsiids

Although of debated phylogenetic position, the tarsiids constitute the eighth and final living prosimian family. This group includes one genus, *Tarsius,* which is known from five species, all of which inhabit Southeast Asia. Sharing many soft-tissue characters with anthropoids, tarsiids are small primates characterized by extremely large eyes, which are larger than the brain. The hands and feet of tarsiids are proportionally large, and the living species show several adaptations for leaping, including a fused tibia and fibula and a long ankle region.

Adapoids and Omomyoids

Two diverse groups of extinct primates are also often included in Prosimii. The Adapoidea, which date from the early Eocene (55 million years ago), and became extinct approximately 8 million years ago, are traditionally described as "lemur-like," although this description has been chided for being too simplistic. Primatologists recognize at least 30 genera and 80 adapoid species, and commonly this group is

placed in the Strepsirhini. The Omomyoidea also date back to the Eocene, and include some 40 genera and 90 species. Often described as "tarsier-like," omomyoids are now classified in the Haplorhini. Based on phylogenetic analyses, it has been deduced that adapoids and omomyoids likely evolved in the Paleocene and, thus, are among the oldest known primates.

Prosimian Evolution and Significance

The question of primate origins has proven controversial, but it is widely accepted that primates are closely related to Scandentia (tree shrews), Chiroptera (bats), Dermoptera (colugos), and a diverse extinct group called Plesiadapiformes. The early fossil record of primates is patchy, but genetic and paleontological evidence indicate that the Strepsirhini-Haplorhini split occurred in the Paleocene (65–57 million years ago), and the anthropoid radiation was well under way by the late Eocene (40 million years ago). While adapoids and omomyoids are well known from fossils, the fossil record of other prosimians is poor. *Tarsius eoceanus* and *Xanthorhysis tabrumi* from the middle Eocene of China indicate that tarsiids diverged from other haplorhines before this time, but most other prosimian groups are known from only a handful of fossil specimens. Despite these drawbacks, it has been suggested that, among the strepsirhines, lorisids and galagids form a monophyletic group. Additionally, there is support for a grouping of lemurids, indriids, and lepilemurids. The phylogenetic relationships of cheirogaleids and daubentoniids are still widely debated.

Historically, it was argued that a prosimian (most likely a tarsiid) directly gave rise to the anthropoid line. The modern advent of cladistic analyses has frowned on such a notion, and now sees tarsiids and anthropoids as sister groups constituting the monophyletic Haplorhini. Regardless of the validity of a direct evolutionary connection, anthropologists can learn much by studying prosimians. Although only distantly related to humans, this diverse and successful group of generally small, primitive primates sheds light on the early evolutionary history of the human lineage, and showcases characteristics that link all primates.

— *Stephen L. Brusatte*

Further Readings

Alterman, L., Doyle, G. A., & Izard, M. K. (1995). *Creatures of the dark: The nocturnal prosimians.* New York: Plenum Press.

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego, CA: Academic Press.

Hartwig, W. C. (Ed.). (2002). *The primate fossil record.* Cambridge: Cambridge University Press.

Kay, R. F., Ross, C., & Williams, B. A. (1997). Anthropoid origins. *Science, 275*, 797–804.

Martin, R. D., Doyle, G. A., & Walker, A. C. (1974). *Prosimian biology.* London: Duckworth.

PROTOLANGUAGE

Protolanguage is a term from historical linguistics that refers to the hypothetical, reconstructed ancestor from which a set of known languages is descended. The proto-ancestor is reconstructed using the comparative method, by which existing and/or historically attested forms are compared, and ancestral forms are reconstructed, which can yield the attested forms via regular sound and other changes. For example, the Proto-Indo-European form *mater* yields, by regular sound changes, forms as apparently distinct as English *mother,* Spanish *madre,* Sanskrit *matar,* Greek *mitir,* and Pashto *mor.*

Sir William Jones (1746–1794), a British colonial administrator stationed in India, was the first person to recognize the relatedness among the far-flung members of the Indo-European family. Since then, linguists and anthropologists have worked on reconstructions of several language families, including Proto-Jaqi (South America), Proto-Bantu (Africa), Proto-Austronesian (Southeast Asia), and Proto-Algonquian (North America).

The reconstruction of protolanguages has potentially important implications for anthropological research on prehistoric peoples. For example, if a word (for example, *birch tree*) can be reconstructed, it is at least plausible that the speakers of the protolanguage used the word in a sense related to contemporary senses, and, in this case, that birch trees were present in their environment. The reconstructed terms may provide clues to the geographical origin, material, and nonmaterial culture of its users.

Archeologist Colin Renfrew has carried this research farther than most.

Another important, and more recently introduced, use of the term protolanguage is in the sense of a prior stage in the evolution of human language. Bickerton and others have suggested that early hominins, such as *Homo erectus,* may have been capable of a form of language that lacked various design features of modern human language. It may have had a reduced grammar, especially in the realm of structure dependency and other syntactic principles, that made the language somewhat like the "telegraphic speech" of children around the age of 2 years; in fact, Bickerton has called the children's two-word stage, as well as pidgin languages and the "sign language" learned by some apes, "fossils" of protolanguage. Bickerton has suggested that the crucial property lacking in these examples is hierarchical syntax.

It is important not to mix these two uses of protolanguage, and also not to confuse the evolution of language as a human species property with the language change documented by historical linguists between a reconstructed proto-language and its descendants. For example, the language changes that occurred between Proto-Indo-European and its descendants (for example, Greek, Hindi, and Gaelic), were not examples of language evolution, because no new design features or elements of universal grammar were added.

— *Ronald Kephart*

See also **Language**

Further Readings

Bickerton, D. (1990). *Language and species.* Chicago, IL: University of Chicago press.

Bickerton, D., & Calvin, W. (2000). *Lingua ex machina: Reconciling Darwin and Chomsky with the human brain.* Cambridge, MA: MIT Press.

Campbell, L. (2004). *Historical linguistics: An introduction* (2nd Ed.). Cambridge, MA: MIT Press.

Friedrich, P. (1970). *Proto-Indo-European trees.* Chicago, IL: University of Chicago Press.

Renfrew, C. (1988). *Archaeology and language: The puzzle of Indo-European origins.* New York: Cambridge University Press.

Psychiatry, Transcultural

Psychiatry is the branch of medicine that is concerned with the study, prevention, and treatment of mental disorder (aka mental illness and psychopathology). *Transcultural psychiatry* is an increasingly important specialty of psychiatry that focuses on cultural aspects of mental disorder and psychiatric practice. It has also been referred to as *comparative psychiatry, cross-cultural psychiatry* and, perhaps most commonly now, *cultural psychiatry.* Anthropologists, too, have engaged in the study of mental disorder, sometimes referring to their research as *psychiatric anthropology* but more commonly as *ethnopsychiatry.*

History

Emil Kraepelin, the founder of modern psychiatry, is also regarded as the first psychiatrist to make cross-cultural comparisons, which he did while working in a mental hospital in 1903–1904 in Java, where he conceived the idea of a comparative psychiatry. In general, however, transcultural psychiatry began with the establishment of mental hospitals in European colonies in the late 19th and early 20th centuries, leading Europeans to encounter and write about symptoms and syndromes that were exotic to them. One of the most important steps in the development of the field was the 1955 creation of a center for transcultural psychiatric research at McGill University in Canada. The center, founded by Eric Wittkower and Jack Fried, began to publish a newsletter that subsequently became the *Transcultural Psychiatric Research Review.* Anthropologists were regular readers of and contributors to the *Review,* which was replaced by the journal *Transcultural Psychiatry* in 1997. Transcultural psychiatry was at the margins of psychiatry for many years and is not quite mainstream even today. The American Psychiatric Association officially recognized it as a specialized field in 1969. In 1971 a Transcultural Section of the World Psychiatric Association was created through the efforts of H. B. M. Murphy, and the Society for the Study of Psychiatry and Culture was founded in 1979. National associations and university centers for transcultural psychiatry have appeared in England, Germany, Italy, China, and Japan in recent decades, attesting to the growing importance of the specialty in this era of globalization.

In the 1920s, American anthropologists began to develop psychological approaches to the study of culture, drawing on psychoanalytic theory in particular, in the "culture and personality" movement that eventually gave rise to psychological anthropology in the 1970s. One of the main issues of the movement, first raised by Ruth Benedict in her 1934 article "Anthropology and the Abnormaland" in her popular book, *Patterns of Culture*, was the cultural relativity of normal and abnormal behavior. Between 1933 and 1946, Abram Kardiner, a psychoanalyst, collaborated with Ralph Linton, an anthropologist, in a famous and long-standing seminar in New York on applications of psychoanalysis to the study of culture. In the process, Kardiner and Linton developed a psychocultural model of society that included the concept of a basic personality structure and encouraged a generation of anthropologists to study topics such as personality structure, the self, identity, ego strength, socialization, and mental disorders in a wide variety of cultures. Another important development, conceived by the Haitian psychiatrist Louis Mars in 1946 and popularized fifteen years later by the anthropologist George Devereaux in *Mohave Ethnopsychiatry*, was the study of indigenous conceptions of mental disorder, their causes and treatment. Since 1977, the main forum for anthropological studies of mental disorder has been the journal *Culture, Medicine and Psychiatry.*

There is a long history of engagement and collaboration between psychiatrists and anthropologists in the cross-cultural study of mental disorders, but there are also significant differences between the two disciplines—perhaps even more today than in the past.

Anthropology and Psychiatry

Psychiatry is a branch of medicine, western in origin, and focusing on the biology of disease. The western mind/body dualism is reflected in the division between mental and physical illnesses. American psychiatry employs a *Diagnostic and Statistical Manual of Mental Disorders* that was developed to identify disorders in western society but is, however, assumed to be a universally applicable or *etic* system. In response to criticisms from anthropologists and transcultural psychiatrists, an attempt was made to address cultural variation in the latest version, *DSM-IV*.

Cultural anthropology or ethnology is the scientific *and* humanistic study of the ways in which people construct a common framework of meaning, discourse, and institutions to guide their lives. Anthropologists seek to understand a society first of all from the perspective of its cultural knowledge, that is, from the *emic* perspective, and try to avoid imposing concepts that can distort cultural realities. Anthropologists offer a "thick description" of local knowledge that is essential to understanding a group of people, but the emic approach can make it difficult—some say impossible—to compare cultures and test theories. The methodology of anthropology is based largely on participant-observation and interviewing, whereas psychiatry relies on assessment instruments, experiments, epidemiological research, and statistical analysis.

There are obviously several fundamental points of contrast, if not conflict, between the psychiatric and the anthropological approaches–biological vs. cultural, etic vs. emic, universalist vs. relativist, quantitative vs. qualitative—and it remains to be seen if they can be bridged. Psychiatry is, however, becoming an increasingly diverse and international profession, with a growing number of nonwestern practitioners and centers. Some nonwestern practitioners are finding western psychiatry inapplicable, inappropriate, ineffective, or incomplete in their cultural settings and are seeking more culturally sensitive concepts and practices.

Topics and Questions

Transcultural psychiatry investigates a fascinating and important range of often controversial questions, issues, and subjects that can give us unique insights into being human, as well as meeting human needs. One of the most basic questions is how to distinguish normal from abnormal behavior—by a universal standard or according to the norms of a culture? Another issue is the classification of disorders; in particular, is the American *DSM* adequate for use in all cultures?

One of the first major subjects of research in this field was cross-cultural variations in the rate of mental disorders, which gave rise to numerous epidemiological studies. The rate of disorder among immigrant, minority, and refugee groups has also been examined extensively. Cultural influences on symptoms are another important topic. Depression, for example, is typically experienced as psychological or existential and associated with feelings of guilt and

suicidal ideation in western societies, whereas it is more commonly somatized as a physical condition in nonwestern cultures.

A major cross-cultural study on schizophrenia was conducted by the World Health Organization in the 1970s. The main conclusions were that core symptoms of the disease are identifiable cross-culturally, and that there is little cross-cultural variation in the incidence of the disorder. On the other hand, the study determined—perhaps surprisingly—that the outcome of schizophrenia is more favorable in less developed countries than in more developed countries.

Abnormal thoughts, feelings, and behaviors that correspond to mental disorder are probably recognized in most, if not all cultures, but there are many different ways of conceptualizing and explaining them. The largely anthropological study of ethnopsychiatry focuses on folk or indigenous nomenclature and classifications of disorders, recognized symptoms, beliefs about etiology or cause, and expectations about the course of a disorder. Indigenous explanations may include biological or physical factors such as hard work or fright and psychological explanations such as envy or excessive worrying, as well as moral, social and supernatural causes such as infractions of norms, conflicts in social relationships, soul-loss, demonic possession, witchcraft and sorcery. Ethnopsychiatric conceptions provide the framework for the subjective experience of an *illness*, which should be distinguished from the clinician's biomedical knowledge of *disease*.

Another important topic is how mental disorders are treated in nonwestern societies. Are shamans, priests, and traditional healers "folk psychiatrists," as E. Fuller Torrey suggested in his 1986 *Witchdoctors and Psychiatrists*? How does traditional healing differ from psychiatry? What do they have in common? How do they compare in efficacy? What can psychiatry learn from traditional healing? In addition, is participation in some cultural practices, customs, and institutions—such as trance and possession, shamanism, and other altered states of consciousness—cathartic, protective, or therapeutic, as many have suggested?

Much of the research in transcultural psychiatry has been primarily theoretical, but more attention is now being paid to clinical applications. Does successful therapy require a shared worldview, as Jerome D. Frank argued in *Persuasion and Healing* in 1974? If so, then can western psychiatry be effective in nonwestern settings? How much cultural knowledge does one need to know and use to properly diagnose and treat a patient?

Another prominent topic of interest in the field is the so-called Culture-Bound Syndromes: over 186 mental disorders that are believed to be unique to particular cultures. They include *susto* in Central America, *amok* in Indonesia, *ataque de nervios* among Hispanics in the U.S., *latah* in Malaya, *pibloktoq* or Arctic hysteria among the Inuit, *koro* in China, and *anorexia nervosa* in the U.S. Opinion is divided on whether they are truly unique or whether they are culturally elaborated forms of universal diseases. In any case, they demonstrate that culture can and does significantly shape the appearance of mental disorders, if it does not cause them.

Anthropologists are particularly interested in how communities respond to mental disorder. Does mental disorder carry a stigma in all cultures? How common is ostracism or abuse? Are some cultures more tolerant or supportive than others? How do individuals with mental disorders seek help? To what extent is illness behavior, including mental disorders, a social role that follows a cultural script that has been learned, once a person has been assigned a label? Does a disorder follow a particular course because of the disease process or because of cultural expectations?

Many topics of research in transcultural psychiatry require expertise in psychiatry, but there are at least three subjects where anthropological expertise is more important. Two of the subjects are ethnopsychiatry and traditional healing practices, as discussed above; the third is the ethnographic study of psychiatry itself as a subculture and as a social institution, which was pioneered in 1958 by William Caudill in *The Psychiatric Hospital as a Small Society*. Anthropologists have also conducted participant-observation studies of a suicide ward and a psychiatric out-patient clinic in the U.S. Roland Littlewood and Maurice Lipsedge explored racism in the practice of psychiatry in Britain in *Aliens and Alienists*, published in 1997, and in 2000, T. L. Luhrmann offered an ethnographic examination of American psychiatry based on participant-observation in *Of Two Minds*.

Transcultural psychiatry began as the study of mental disorders in "other" cultures—namely, nonwestern and often colonial societies—from the perspective of western psychiatry. The fact that the western psychiatrist and the western patient also have a culture was largely ignored, perhaps because it is harder to perceive your own culture than another.

However, western patients and doctors also think and act according to the schemas of their cultures; they learn to feel and express their thoughts and emotions in culturally constituted ways, and these ways of thinking and feeling are often institutionalized, even in science and medicine. Studying the cultural context of mental disorders in *all* societies can give us new perspectives on mental disorder as well as the culture and practice of psychiatry, possibly leading to a truly global psychiatry.

—*William Wedenoja*

See also **Benedict, Ruth; Linton, Ralph**

Further Readings

Kirmayer, L. J. & Minas, H. (2000). The future of cultural psychiatry: An international perspective. *Canadian Journal of Psychiatry*, *45*, 438–446.

Kleinman, A. *Rethinking psychiatry: From cultural category to personal experience.* (1988). New York: Free Press.

Kleinman, A. & Good, B. (Eds.).(1985). *Culture and depression: Studies in the anthropology and cross-cultural psychiatry of affect and disorder.* Berkeley: University of California Press.

Simons, R. C. & Hughes, C. C. (Eds.). (1985). *The culture-bound syndromes: Folk illnesses of psychiatric and anthropological interest.* Dordrecht: D. Redel Publishing.

Tseng, W.-S. (2001). *Handbook of cultural psychiatry.* San Diego, CA: Academic Press.

Psychology and Genetics

Psychology and socialization research examine the workings of the human mind and human behavior; genetics, as a branch of biology, examines the way in which traits and predispositions are transmitted from parents to their children as a result of genetic recombination.

The relationship between psychology, in contrast, and biology and genetics, has never been easy. But what makes it so difficult? It is not simply that the past still casts a long shadow on the relationship; there are other, conflicting explanations. Both psychology and genetics claim they can explain human development and behavior; a basis common to both disciplines is their acceptance of the intergenerational transmission of knowledge and skills, attitudes and behavioral predispositions. Psychology and socialization research, however, regard such transmission primarily in terms of social learning theories, while research with a biological and social orientation addresses culture's biological and cultural transmission. Psychologists find it difficult to accept that higher cognitive functions (for example, free will, conscience, and religious attitudes) can be subject to genetic control. Geneticists accuse psychologists of simply describing human behavior while failing to explain it. From the psychologist perspective, genetic explanations are suspected of being deterministic. Must these positions remain irreconcilable for all time?

For approximately 20 years it has been possible to observe a gradual increase in willingness in psychologists to consider biological and genetic approaches when explaining human development and behavior. Key words, such as *sociobiology, neurobiological science, human behavioral genetics, evolutionary psychology, life history theory,* and *evolutionary socialization theory,* are increasingly encountered. In the United States, especially, this willingness is seen in the context of the revival of Darwinist theories in the social sciences. Several fundamental questions in biological and evolutionary behavioral sciences have a long history.

While the term genetics (coined by William Bateson in 1906) is of much more recent origin than psychology, the debate about whether nature or culture is the stronger force has a far-longer pedigree. The Latin poet Horace (65–8 B.C.) wrote "Naturam expellas furca, tamen usque recurret" (you may drive nature out with a pitchfork, yet she'll be constantly running back). Nature and nurture as a pair of concepts can be found in Shakespeare's *The Tempest* (first performed in 1611), which also deals with the opposition of nature and culture. As Prospero remarks of Caliban: "A devil, a born devil, on whose nature / Nurture can never stick; on whom my pains, / Humanely taken, all, all lost, quite lost." Approximately 250 years later, a fellow Englishman, Francis Galton (1822–1911), introduced the nature and nurture concepts into scientific language in his work *English Men of Science. Their Nature and Nurture* (1874). Galton, a cousin to Charles Darwin, believed that mental qualities and success in the sciences, the arts, and public life were far more strongly determined by hereditary factors

than was generally assumed. He conducted studies of families and established the basis of twin and adoption research—its methodology and use of correlation statistics. Galton and his followers were the first behavioral geneticists (biometricians), and in relevant specialist literature today Galton is acknowledged as having been the father of human behavioral genetics long before the term even existed. This line of research is now referred to as *quantitative behavioral genetics.*

In *The Expressions of Emotions in Man and Animals* (1872) Darwin developed the theory that held that reflex actions and the ability to express emotions such as anger and embarrassment must have been learned in evolutionary prehistoric times because very young children display them. As Darwin humorously observed, sneezing and coughing were inherited reflex actions, but children had to learn to use a handkerchief when blowing their noses. Darwin's study is a forerunner of present-day *evolutionary psychology.*

Although Darwin and Galton were convinced that both physical and mental traits were transmitted from generation to generation, they knew little about the function of heredity. It was not until Gregor Mendel (1822–1884) and August Weismann (1834–1914) each published their findings that the science of heredity took its current direction. *Modern Synthesis,* a movement in the 1930s and 1940s led by biologists T. Dobzhansky, J. S. Huxley, E. Mayr, and G. G. Simpson, sought to combine Darwin's theory of evolution by natural selection with Mendel's theory of heredity (genes as heritable elements). In so doing, Lamarck's theory of the transmission of qualities acquired over a lifetime was finally disproved and Darwin's theory of natural selection was provided with a firm genetic basis.

The forerunners of present-day *molecular genetics* also date back to more than a century. In particular, the school founded by the American zoologist and Nobel prizewinner, Thomas Hunt Morgan (1866–1945), initiated a line of research that was likewise linked to the term behavioral genetics. Even if Hunt was an advocate of what is now referred to as classical genetics (Mendelism), several of his followers investigated chromosomes to discover the loci of the genes responsible for the development of certain gene expressions; thus, by association, Hunt was also responsible for the development of behavior in the widest sense of the term. Consequently, in order to distinguish it from classical genetics, this is referred to as developmental genetics. For many years quantitative genetics and molecular genetics found little common ground, and they developed independently of one another; however, over the last 2 decades there has been an increasing amount of cooperation in which great hopes have been invested.

In 1883 Galton coined the term *eugenics.* In so doing, he combined a long-term research program to clarify genetic processes over successive generations and a program concerned with family policy, in a bid to replace weakening natural selection by artificial selection. In the years before World War I a worldwide eugenics movement was launched, and national eugenics societies were founded in many countries, including Germany, England, and the United States. The political implementation of the eugenicists' demands subsequently led to the introduction of legislation permitting compulsory sterilization on eugenic grounds. It should, however, be noted that such compulsory measures were never seriously contemplated in Great Britain, the birthplace of eugenics.

The scientific basis of old eugenics was behavioral genetics and population genetics. In contrast to their successors today, the proponents of old eugenics, moving in the direction of genetic determinism, tended to vastly overinterpret the findings of the science of heredity, and to dramatize the rate at which hereditary predispositions with undesirable phenotypic traits—such as feeble-mindednes—spread. Mendel's genetic laws were applied equally to physical traits and to mental strengths and weaknesses. The American anthropologist and eugenicist Charles Davenport (1866–1944) attempted to prove that nomadism was genetically determined in Mediterranean peoples, and, similarly, that thalassophilia—love of the sea—was genetically determined in American naval officers. In the 1920s, following the preparatory work undertaken by Galton and his follower Karl Pearson (1857–1936), twin research based on correlation statistics was developed, and to this day it remains the methodical core of quantitative behavioral genetics.

The abuse of biology and genetics perpetrated in the service of social Darwinism and eugenically motivated compulsory sterilization meant that after World War II environmental and learning theoreticians dominated psychology and socialization theory. Today a confused belief persists that the battle against discrimination and racialism can be justified by advancing the argument that mankind is genetically

equal. Ideologically loaded, biased research has constantly provided new sustenance for this confusion, as was the case in 1994 when the psychologist Richard J. Herrnstein and the political scientist Charles Murray attempted to prove that differences in intelligence existed between different human races. For fear of being accused of racialism, many psychologists and other social scientists chose to defend politically correct environmental attitudes even when the evidence pointed in the opposite direction. However, an increasing number of scientists began to realize that a politically correct rejection of academic evidence offers no protection against racialism. Racialists could not be discouraged from being racialist simply by advancing the argument that mankind was genetically uniform, regardless of the argument's accuracy. The renowned behavioral geneticist, Robert Plomin, has stressed that the principle of equality enshrined in the U.S. Constitution referred not to genetic uniformity but to equality before the law. In all democratic societies everyone should be treated equally—despite genetic differences. Psychologists have increasingly sought to overcome the problem presented by the traditional nature/nurture argument. Critical of the fact that, for far too long, psychology had played the claims of nurture against those of nature, they demanded the establishment of a modern synthesis of biological and socio-scientific theories, a synthesis that considered cultural, social, and biological factors equally and provided a better explanation of human development and behavior than either biological or socio-scientific theories alone could offer. Three major research areas with genetic implications are significant for psychology today: quantitative behavioral genetics, molecular genetics, and evolutionary behavioral science.

Quantitative behavioral genetics. As was true of biological sciences in general, quantitative behavioral genetics remained for many years anathema to psychology, because of its involvement with eugenics. J. L. Fuller & W. R. Thompson's 1960 *Behavior Genetics* was the first publication to use the term in its title. It was followed in 1970 by the foundation of the *Behavioral Genetics Association* and the specialist journal *Behavior Genetics;* despite this, the discipline retained its outsider status in psychology. This changed in the course of the 1980s and, in particular, in the 1990s. At its centenary annual conference in 1992, the American Psychological Association recognized genetics as a research area that would be of major significance in the future of psychology.

Quantitative behavior genetics regards itself as an interdisciplinary subject-area situated between life sciences and psychology. Behavioral geneticists use statistical methods to disentangle the contribution made by genes and environments to personality differences. Personality traits are behavioral traits inasmuch as they show up in test scores. Behavioral traits measurable by specific test procedures include IQ, shyness, and religious attitudes, or the traits listed in the *Five-Factor Model of Personality,* also known as "the big five" (extraversion-introversion, agreeableness, conscientiousness, neuroticism-anxiety, and intellectual openness). The genetic factor is controlled using a classical research model that examines monozygotic and dizygotic twins, sibling children, and adoptive children; the environmental factor is controlled by examining twins who have grown up either apart or together. The term *behavioral genetics* is misleading in the sense that it can imply that, as a line of research, it is concerned primarily with the effectiveness of genetic influences; this is a misconception. To establish the contribution of genetic factors involved in shaping personality traits, a calculation of the contribution of environmental factors is an essential precondition. Heritability is the assessment of relationship between genetic variance and variance of behavior. The statistical value for heritability lies between 0.00 (where the total variance is attributable to environmental factors) and 1.00 (where the total variance is attributable to genetic influences). The more behavioral genetics learns about genetic predispositions the more it will also learn about the environments in which these predispositions acquire their phenotypic form. The findings of behavioral genetics also imply, however, that the influence of environments—the family environment, for example—is smaller than assumed by psychology and socialization theory, neither of which is informed by behavioral genetics.

The relationship between genetic predisposition and the environment is dynamic. The concept *genotype × environment correlation* implies that human beings undergo three developmental stages before reaching adult age: passive, reactive, and active genotypes × environment correlations. The passive stage occurs when children passively inherit family environments from their parents, environments that correlate to the children's genetic predispositions.

Reactive genotype × environment correlations describe the elicitation of responses from other individuals, based on the individuals' own genetically based personalities. The active stage occurs when individuals choose, change, construct, or reconstruct environments that correlate to their genetic predispositions. The interaction of genome and environment depends on an individual's age, in the sense that the influence of genetic predisposition does not simply stabilize with increasing age but actually increases. The earlier in their lives individuals can choose and actively shape their environments, the stronger the effect of genetic predispositions will be.

Molecular genetics. In the last 2 decades quantitative behavioral genetics and molecular genetics have moved closer to one another. Currently, there are high hopes of an increase in the amount of cooperation. Behavioral genetics works solely on a statistical level with genetic predispositions for behavior while molecular genetics looks for genetic loci in the genetic material (DNA molecule); these are known as *quantitative trait loci* (QTLs) and are connected to behavioral traits. This development was preceded in the 1980s by the discovery made in molecular genetics of how to use *DNA markers for gene mapping.* Molecular geneticist Lee M. Silver has recently predicted that, as their knowledge continues to grow, molecular geneticists will one day be in a position to establish connections between genetic profiles and those mental traits that we normally refer to as one's innate talents.

Behavioral genetics hopes that the identification of QTLs will provide direct proof of the existence of genetic predispositions for behavior. But genes are not directly involved in the regulation of behavior; rather, genes regulate the production of proteins. Between the genetic basis and behavior are morphological, neurophysiological, metabolic, and other levels of control. Bidirectional connections exist between all of these with the result that genetic activity exerts an indirect influence on behavior, and, conversely, behavior exerts an indirect influence on gene activity. This means that of all interacting levels the behavior level is furthest away from the genetic basis. Thus, the protein products of the QTLs must be investigated in order to demonstrate how the product of a QTL influences a particular measurable aspect of behavior between the various levels.

But what does molecular genetics know about behavior? In this respect molecular genetics is dependent on behavioral genetics for information about what precisely constitutes measurable behavior in order to know which QTLs and protein products it should be seeking. This may be relatively simple, as in the case of Huntington's disease (in 1993 the causal gene was discovered on chromosome 4), for example, but it is a different matter with complex personality traits such as shyness or sociability. Thus, it is not surprising that several skeptics can be found among biologists, such as Richard C. Lewontin, for example.

Evolutionary behavioral science. Present-day evolutionary behavioral sciences are rooted in European *human ethology* and in American *sociobiology*. Edward Osborn Wilson's 1975 study *Sociobiology: The New Synthesis,* a highly contentious book at the time it was first published, was significant first and foremost in that it introduced the term sociobiology; however, it contributed little to the understanding of the evolutionary biology of human beings. The final chapter in this bulky work is devoted to human beings, but is only 29 pages in length.

Evolutionary approaches have meanwhile become so numerous that one can talk in terms of the evolution of evolutionary perspectives. They all assume that species-typical behavior has been genetically acquired in an *environment of evolutionary adaptedness* (EEA). Seen from this perspective, personality traits have distal and ultimate causes, but they are triggered, influenced, and modified by proximal internal and external stimuli. An ever-increasing number of publications in this field may be classified according to three different approaches in evolutionary behavioral sciences: *evolutionary psychology, evolutionary ecology,* and *evolutionary cultural anthropology.* Evolutionary theory is seen as a broad integrating framework for embracing almost all subdisciplines of psychology, including behavioral genetics.

It would be almost impossible to conceive of this revolution in evolutionary behavioral sciences without William D. Hamilton's 1964 doctoral thesis, *The Genetical Evolution of Social Behavior*. In this work Hamilton demonstrates that the classical concept of fitness, which ascribes genetic reproductive success to an individual, fails to provide an adequate explanation of evolution by selection. In brief, Hamilton's *inclusive fitness theory* holds that an individual will also promote the reproduction of his genes by behaving altruistically toward his genetic relatives because these relatives carry copies of his own genes in varying

amounts, according to the degree of relationship. Inclusive fitness has two components: the reproductive success of an individual (*classic fitness*), and the reproductive success of his genetic relatives (*kin selection*). Before Hamilton's work was published, altruistic behavior was considered to be an alien element in evolution theory, but he succeeded in making it functionally explicable within the framework of his inclusive fitness theory. Three pioneering works by Robert Trivers, published in the early 1970s, were also of immense significance: *The Evolution of Reciprocal Altruism* (1971), *Parental Investment and Sexual Selection* (1972), *Parent-Offspring Conflict* (1974). These works, and the many studies based on them, provide the basis for the late 1990s new model of psychology: *Evolutionary Psychology*.

Below the theoretical level of inclusive fitness theory, one research concept has emerged that, in the opinion of certain researchers, is the most dynamic among all the evolutionary approaches to human behavior: *Life History Theory*. This theory examines the strategies of optimal generative reproduction in the life cycle. Clearly, generative reproduction is of direct relevance only to each generation of parents, but it is also active in generations that have not yet begun to reproduce (childhood/youth), or that no longer reproduce (old age); thus, the entire life cycle is regarded in terms of *reproductive strategy*. This means that each individual must perform a series of *developmental and judgment tasks* specific to his or her relevant age and dependent on his/her environment. In so doing, the individual must choose between different functional equivalences of inclusive fitness—such as age, survival resources, growth, development, information, and generative reproduction—because these equivalences are mostly limited and must be employed differently in different environments: survival versus growth, development versus reproduction, growth versus reproduction. In evolutionary life history theory, the judgment problem that dominates all others is the problem connected with current and future reproduction. With regard to parents, this implies *mating, parenting,* and *parental investment.* Mating denotes the act of reproduction (i.e., progeny in the quantitative sense); parenting and parental investment denote future reproduction (i.e., progeny in the qualitative sense). The surprising assumption is that within the specific conditions of scarce resources and insecurity about the future it can be functional for inclusive fitness for an individual to generate a larger number of offspring whereas conditions of plentiful resources and security about the future can lead to the generation of fewer offspring. In the first case, the emphasis of reproduction strategy falls on mating in an attempt to increase the likelihood that *some* offspring will survive and to reduce the danger of elimination from the gene pool; in the second case, both parenting and parental investment will increase the reproductive value of a smaller number of offspring (health, longer period of development, mating prospects) and, thus, the inclusive fitness of future generations will be enhanced.

A traditional problem of personality psychology is currently being addressed anew, from the perspective of evolution: What makes one human being like other human beings, and what makes him or her unique? Psychology experiences difficulties in establishing a clear theoretical position between universal statements about man in general and statements about individuals. Until now the answer to the problem has been that human nature is equipped with uniform psychological mechanisms, which, as a result of distinct individual experiences, lead to individual differences. However, this answer fails to consider the problem of individuals' genetic differences, differences that challenge the concept of a universal human nature. The tension between individual uniqueness and the concept of a universal human nature has a parallel in evolutionary biology. Here theories about species-typical behavioral adaptations conflict with the discovery of major genetic variability (i.e., every individual has a unique combination of alleles [different forms of genes]). Evolutionary psychologists attempt to solve the problem by applying evolutionary logic to both the psychological universals that constitute human nature and the genetic differences that contribute to individual variation. Evolutionary psychologists John Tooby and Leda Cosmides believe that every personality phenomenon can be analyzed either as an adaptation, an incident byproduct of an adaptation, or the product of noise in the system, or as some combination of these three.

The problem of psychological universals versus genetic difference concerns the relationship between evolutionary psychology and quantitative behavioral genetics because behavioral geneticists are interested primarily in individual differences and less in human universality. It remains to be seen whether these two lines of research can complement and enrich one another for, despite the obvious thematic proximity

of the two, they have long since been regarded as independent disciplines, each concerned with different problems and methods. While it has long been claimed that each can benefit from the other and that in matters of central concern to both they are interdependent, only in the last few years has a rapprochement of the two been evident. In the view of the American psychologist Sandra Scarr, psychology will be truly evolutionary when the discipline includes behavioral genetics.

Behavioral genetics and evolutionary behavioral sciences share the belief that behavior and its development cannot be explained solely by reference to conditions here and now. Behavior geneticist Thomas Bouchard (Minnesota Twin Project) remarked that genes sing a prehistoric song. But what song do genes sing? The general direction of cross-fertilization between these two fields is this: evolutionary theories offer a broader framework within which the results of behavioral genetics may be interpreted while development genetics provides first and foremost the methods required to test hypotheses produced in the context of evolutionary theory.

The first revolution in life sciences, Darwinism, led ultimately to eugenics, a program for the genetic advancement of mankind. Many leading biologists in the 20th century, including Thomas Hunt Morgan and Ernst Mayr rejected eugenics whereas other leading biologists, like Hermann Joseph Muller and Joshua Lederberg, welcomed it. The early promise of the program pursued by old eugenics ended in contempt for human rights and in countless acts of compulsory sterilization.

In the course of the revolution in gene technology and medical fertility treatment, new eugenics has been a topic for debate since the 1980s. Initially, critics of gene technology and reproduction medicine primarily spoke in terms of new eugenics. Conspiracy theories abounded. Businesses, insurance companies, and those responsible for health care policy are undeniably interested in genetic services. But it is unreasonable to place all science under suspicion, as if the driving force behind scientific interest was the intention to apply it in the service of eugenics. There is another alarming and perplexing development: unintentionally, even unwittingly, various branches of research in life sciences and reproduction medicine are now providing the scientific and technical potential to "rectify" the biological constitution of human beings.

In view of the steady growth of technical possibilities and of the resulting options for genetic screening programs (backdoor-eugenics) the debate conducted in the 1990s became more sophisticated, raising the question of the ethical position of so-called *liberal eugenics.* Liberal eugenicists maintain it is no longer enough to simply issue warnings about the dangers of playing God. They recognize the need for ethical regulation in order to avoid having to undertake a future battle about the equitable distribution of genes. Buchanan and others have written a detailed work entitled *From Chance to Choice* with the significant subtitle *Genetics and Justice* in which they ask several highly pertinent questions: Do we have the ethical resources to use our genetic powers wisely and humanly? Or are we like hapless space travelers embarking on an interstellar voyage equipped only with a pocket compass?

A central argument proposed by liberal eugenicists is that they derive the ethical basis for the genetic advancements of human nature from the individual's right to *reproductive freedom.* A further central argument classifies genetic investment in children as being on the same ethical plane as educational investment. If one believes it to be self-evident that wealthy parents in democratic societies can buy environmental advantages for their children, how can one justify preventing parents from buying genetic advantages, given that both serve the same aim (i.e., to improve the child's chances of a good life)?

Amazingly, in all the discussions of new and liberal eugenics the questions on which everything else depends is rarely articulated: What exactly is improvement of human nature? What should improved human beings look like, and how should they behave? Perhaps the simplest answer is that it is still too early to discuss the questions in detail. But when the time arrives, psychology will certainly be called upon to make its contribution even if, at this stage, it does not or will not recognize the fact. Psychology, given its access to the theory of evolution, biology, and genetics, is already playing the role of a participant who is not taking part. If scientific advance is not simply looking toward conducting genetic surgery (as in the case of Huntington's disease and other genetically caused diseases), but is really moving toward "improving" human behavior—engineering the human germ line—it will prove difficult for psychology, as an expert in behavior, to remain aloof.

Psychology and genetics have developed separately from one another for decades. During almost all of that period of time, quantitative behavioral genetics, which could have provided an integrating link, has had a divisive effect; the last 20 years can, however, be seen as a period in which perspectives have grown closer. Quantitative behavioral genetics, molecular genetics, and evolutionary theory, are all steering a course that will ultimately lead to convergence and cooperation. A new conceptual framework, evolutionary psychology, has been established. It would be wrong to assume that this is merely a passing fashion. There will, of course, be periods of stagnation, and, while the environmentalists' ramparts may have been weakened, they have not yet been stormed. In the short term, those who would like to see the various research areas in psychology united beneath the umbrella of the theory of evolution may be disappointed. But, as is all too evident, the ideological zeal that once established the traditional divisions—between nature and nurture, mind and body, natural sciences and the humanities—is no longer the force it once was. Beyond these divisions are very promising discoveries to be made. Many regard human identity as being lost in the process. But who would dare to argue that this identity is better preserved by maintaining these divisions? Identity does not exist once and for all time; rather, we must constantly strive to acquire a new understanding of it, time and again. The history of mankind is the history of striving to acquire an understanding of human identity repeatedly. It is vital that all men and women on Earth should share in this identity, and that genetics should not be misused in order to create new inequalities.

— *Jürgen Reyer*

Further Readings

Barkow, J., Cosmides, L., & Tooby, J. (Eds.). (1992). *The adapted mind. Evolutionary psychology and the generation of culture.* New York: Oxford University Press.

Buchanan, A., Brock, D. W., Daniels, N., & Wikler, D. (2000). *From chance to choice. Genetics and justice.* Cambridge: Cambridge University Press.

Buss, D. M. (1999). *Evolutionary psychology. The new science of the mind.* Boston, MA: Allyn & Bacon.

Degler, C. N. (1991). *In search of human nature. The decline and revival of Darwinism in American social thought.* New York: Oxford University Press.

Keller, H., Poortinga, Y. H., & Schölmerich, A. (Eds.). (2002). *Between culture and biology. Perspectives on ontogenetic development.* Cambridge: Cambridge University Press.

Mayr, E. (1998). *This is biology. The science of the living world.* (6th Ed.). Cambridge, MA: Harvard University Press.

Paul, D. B. (1995). *Controlling human heredity: 1865 to the present.* Atlantic Highlands, NJ: Humanities Press.

Plomin, R., DeFries, J. C., McClearn, G. E., & Rutter, M. (1997). *Behavioral genetics.* (3rd ended.). New York: Freeman.

Rowe, D. C. (1994). *The limits of family influence. Genes, experience, and behavior.* New York: Guilford.

Stearns, S. C. (1992). *The evolution of life histories.* Oxford: Oxford University Press.

FORENSIC PSYCHOLOGISTS

One of the most grim areas that comes to the attention of forensic psychologists is juvenile suicide, those tragic events involving people under the age of 18. A March 2004 report in the *Youth Violence Research Bulletin,* a joint project of the Centers for Disease Control and Prevention and the Office of Juvenile Justice and Delinquency Prevention, reveals the startling dimensions of this national juvenile health epidemic."Between 1981 and 1998, 20,775 juveniles ages 7–17 committed suicide in the United States—nearly as many as were killed by homicide or were cancer victims. Males were the victims in 78 percent of these juvenile suicides. Over the same period, the suicide rate for American Indian juveniles was far higher than for any other race."

The statistical analysis of such a tragic loss of life is conducted by forensic psychologists to determine the cause of the loss of life. According to the report, "The number of youth ages 13–14 who committed suicide in the United States equaled the number who were murdered.

"Of the juveniles who committed suicide, 66 percent of the males and 62 percent of the females

were 17 years old. Sixty-two percent of juvenile suicides were committed with a firearm, 24 percent resulted from suffocation (primarily hanging), and 10 percent were caused by poisoning.

"While more than half of both boys (65 percent) and girls (51 percent) committed suicide with a firearm, girls were far more likely than boys to use poison (25 percent versus 6 percent, respectively)."

An alarming new public health crisis has directly impacted forensic psychology in the field of juvenile suicide. Besides many other factors, there is a suspected involvement of antidepressant medications as a cause—or contributing factor—in American youth taking their own lives. According to the Federal Food and Drug Administration, the organization now "asks manufacturers of all antidepressant drugs to include in their labeling a boxed warning and expanded warning statements that alert health care providers to an increased risk of suicidality (suicidal thinking and behavior) in children and adolescents being treated with these agents, and additional information about the results of pediatric studies."

— John F. Murphy Jr.

Pu'uhonua o Honaunau

Pu'uhonua o Honaunau National Historical Park is a culturally and historically significant site located on the West Coast of the Island of Hawai'i. The 182-acre preserve contains a *pu'uhonua* (place of refuge) that, until the early 19th century, served as a safe haven for defeated warriors, noncombatants, and individuals accused of breaking a *kapu* (taboo). A strict set of taboos often carried penalty of death, but offenders who reached the refuge were protected and absolved after a series of ritual procedures administered by the *kahuna pule* (priest). The *kapu* system was a set of regulations and prohibitions governing human behavior, the most ancient and fundamental *kapu* being the separation of sexes for eating. Other *kapu* were designed to protect the land, conserve resources, and pertained to farming, fishing, water usage, and waste disposal. Several such sanctuaries were located on each of the Hawaiian Islands and the concept of *pu'uhonua* was more fully developed in Hawai'i than in any other Polynesian island group. The site at Honaunau was the most continuously active refuge and dates approximately from 1550 A.D. The traditional practices of the *kapu* system were abolished by Kamehameha II in 1819 and many temples were destroyed. However, because the bones of the Kamehameha dynasty were kept there, the site continued to be revered.

The park is situated on a lava slice that stretches along the coastline of three bays: Honaunau, Alahaka, and Ki'ilae. Flanking the park inland is the Keanae'e *pali* (cliff), which parallels the shore. The 100-foot high escarpment is 1,000 feet long and the numerous cave openings and lava tubes in the cliff face served as residences and burial chambers. The site is located four miles south of Kealakekua Bay where Captain Cook's ships, the Resolution and the Discovery, anchored in 1778.

The refuge is partially enclosed by a massive, well-preserved wall containing no mortar. The 10-foot high, seven–foot thick wall extends southwesterly for more than 600 feet before turning west and extending another 400 feet toward the sea. Within the enclosure are three *heiau* (temple) platforms. The most recent structure, *Hale o Keawe,* dating from approximately 1650 A.D., has been restored with a thatched *hale* (house), carved *ki'i* (images), and a wooden *lele* (altar) for offerings. This structure served as a mausoleum, housing the bones of at least 23 *ali'i* (royal chiefs), and it was believed that the *mana* (spiritual power) of the royal bones gave special protection to the *pu'uhonua.* However, in 1829, Queen Ka'ahumanu ordered the ancestral bones removed and the temple was dismantled. The area outside the enclosure includes the remains of royal residences, a fishpond, and canoe landing.

After lying in ruins for nearly a century, the *pu'uhonua* was designated a county park in 1920. In 1961, 180 acres were donated to the U.S. government by Bishop Estate (administrators of the estate of Princess Bernice Pauahi Bishop who died in 1884). Pu'uhonua o Honaunau became a National Historical Park in 1978 and is managed and interpreted by the U.S. National Park Service, which conducts cultural events, provides self-guided tours, and maintains a visitor center. More than 600,000 people tour the park annually and it is popularly referred to as City of Refuge.

— Linda Mohr Iwamoto

Further Readings

Bryan, E. H. Jr., & Emory, K. P. (1986). *The natural and cultural history of Honaunau, Kona, Hawai'i.* Honolulu, HI: Bernice Pauahi Bishop Museum.

James, V. (1995). *Ancient sites of Hawai'i.* Honolulu, HI: Mutual Publishing.

National Park Service, Department of the Interior (1975). *Master plan for City of Refuge National Historical Park, Hawaii.* San Francisco, CA: Author.

National Park Service. (2005). *Pu'uhonua O Honaunau National Historical Park.* Retrieved May 21, 2005 from ww.nps.gov.

Pyramids

Pyramids can be found in many parts of the world in a wide variety of contexts and functions (for example, tombs, temples), from remains in Egypt and Central America to modern reconstructions. When we think of pyramids, however, no better examples exist than those from ancient Egypt, especially the pyramids at Giza. The term pyramid is derived from the Greek *pyramis*, meaning "wheaten cake." Although the ancient Egyptians knew pyramids as *mer*, they also referred to a pyramid capstone or the tip of an obelisk as *ben-ben*, which alternatively refers to a conical loaf of bread. The main age of the royal pyramid building occurred mainly from Dynasties 3–13, and as late as the early 18th dynasty (circa 2686–1550 B.C.), after which Egyptian royal tombs became mainly subterranean, rock-cut galleries, while many 18th- to 30th dynasty (circa1550–332 B.C.) elite private tombs adopted pyramidal chapels above subterranean burial chambers. An estimated 100 Old Kingdom to Middle Kingdom pyramids concentrate in an area focusing near present-day Cairo, while northern Sudan contains Egyptian-derived pyramids at Meroe and Napata, built by the Dynasty 25 Kushite and later Meroitic kings and royal families to the south of Egypt.

The classic Old Kingdom pyramids represent the personification of the deceased kings (and late Old Kingdom queens), along with their creation, rebirth, and connections with the daily rising and setting of the sun. The four sloping sides of the pyramid reflect the concept of the rising solar deity and the ascension of the king to the heavens using the sun's rays as a ladder or stairway. The pyramid existed as the eternal house of Pharaoh for his daily journey to and from the gods in the cosmos; it reflected aspects of creation by resembling the primeval mound rising from the waters of creation; the alignment of the entry passage with the circumpolar "imperishable" stars assisted the king's ascent to one of the potential destinations for his spirit in the afterlife.

Though Ancient Egyptian pyramids differ widely in their size, form, and construction techniques, they share many similarities. Pyramids contain subterranean tombs (sometimes associated with galleries), superstructures containing a mortuary temple, satellite pyramid for the king's spirit double (*ka*), an enclosure wall, a causeway, and a valley temple, where offerings could be made. The associated temples bore royal cult statues, scenes of offerings, storage magazines, and facilities for the royal funerary cult.

Archaeologists of the Pyramids

The first true archaeologist of the pyramids was the pharaoh Thutmose IV (circa1401–1391 B.C.), who restored the Sphinx 1,100 years after the reign of Chephren. In the Roman period, the pyramids were a popular tourist attraction though many suffered extensive damage due to stone quarrying. Even in the 12th century A.D., the casing of the pyramids at Giza was still intact. The first modern visitor to record the pyramids was John Greaves (1602–1652), an Oxford astronomy professor. In the early 1800s, the Napoleonic survey scientifically described the pyramids. R. Howard Vysejn investigated five stress-relieving chambers in the great pyramid in 1831.

Other well-known archaeologists whose work at the pyramid complexes greatly influenced modern investigations include G. Belzoni (1816), K. Lepsius (1840s), A. Marriette (1850s), W. M. F. Petrie (1887–1888), and G. Reisner (1920s). Recent and current investigations include work by M. Lehner (workman's village at Giza), Z. Hawass (pyramids of Giza), D. Arnold (El-Lisht), and M.Verner (Abu Sir).

Development of Pyramid Complex

The origins of the pyramids can be traced to pit graves of the predynastic period and mud brick tombs Dynasty 1 (circa 3050–2890 B.C.). Its origins lie in the concept of the primeval mound, one of the creation myths of ancient Egypt, in which the world

began by rising out of floodwaters. Slightly raised mounds (tumuli) covering early graves gave way to mud brick structures (mastabas) that grew in size and complexity over time. For the Dynasties 1–2 royal tombs at Abydos (in southern Egypt), the appearance of twin stelae and separate funerary enclosures anticipate the subsequent, unified pyramid complexes with linked pyramidal tombs and temples.

Following in the traditions of Khasekhemwy's late Dynasty 2 burial mound and separate funerary enclosure at Abydos (Shunet el-Zabib), King Djoser (circa 2630–2611 B.C.) commissioned his architect, Imhotep, to build a funerary complex at Saqqara (near Cairo). Djoser's burial superstructure began as a simple square mound of stone blocks, but evolved rapidly into a four-stepped and ultimately a six-stepped limestone pyramid. It was inside a large enclosure wall, measuring 278 meters x 595 meters and 62.5 meters tall, and contained a red granite-lined underground burial chamber. A series of adjacent underground galleries contain 11 burial shafts and blue-tiled chambers, representing a subterranean palace. The step-pyramid enclosure wall symbolized the walled capital at nearby Memphis and the land of Egypt, containing multiple components oriented north-south, such as twin northern and southern tomb chambers, twin palaces or chapels, twin courtyards, and a series of two types of cult shrines representing deities of southern and northern Egypt, associated with the royal jubilee festivals (the heb-sed festival of rejuvenation and kingship).

Source: © iStockphoto/Ekkehard Domning.

The Main Pyramid-Building Period

In the Dynasties 4–6 (circa 2575–2150 B.C.), Egypt's pharaohs built pyramids in a 42-kilometer span extending from Giza southward to Abusir, Saqqara, and Dashur. Dynasty 4 saw the advancement of the stepped form to sloped sides while Dynasties 5–6 had smaller pyramids, but larger and more elaborately decorated temples. Egyptian pyramid complexes had various features in common: a pyramid with a burial chamber, a satellite pyramid for the king's spirit-double (*ka*), a mortuary temple, an enclosure wall around these components, and a causeway leading to a temple (a focus for embalming and the royal mortuary cult) and harbor in the Nile Valley. Although the mortuary temple's orientation changes from north-south to east-west from Dynasty 3 to Dynasties 4–6, the Old Kingdom's pyramid entrance remains aligned to the north to the circumpolar stars. At the advent of Dynasty 4, King Sneferu (circa 2575–2551 B.C.) built a transitional pyramid at Medium, which was first stepped, but soon became a true pyramid with flat sides. At Dashur, he also built the Bent and Red Pyramids, the former of which has a curious shape due to its angle being changed midway though construction. The Dynasty 4 necropolis at Giza contains the single surviving ancient Seven Wonders of the World; it represented a new royal cemetery and symbolized the consolidation of state power. The Great Pyramid, built by Khufu (circa 2551–2528 B.C.), rises to 146.50 meters, with sides measuring 230.35 meters each. Its core contains massive stone masonry and chambers filled with sand for stability in earthquakes. The interior contains a series of three, superimposed

chambers, beginning with an incomplete chamber (30 meters below ground), connected to a northern entrance emerging in the lower face of Khufu's pyramid. Khufu's sarcophagus remains inside the uppermost "king's chamber," which is accessed via the "great ascending gallery" lined with red granite. The "king's chamber" and the "queen's chamber" yield a pair of incomplete "ventilation" shafts that may have allowed the nightly departure and return of the pharaoh's soul. The southern side of the pyramid yielded pits for five funerary boats, of which two remain intact (one boat has been reassembled beside the Great Pyramid).

Khafre's (circa 2520–2494 B.C.) pyramid looks bigger than a great pyramid, being built on a more elevated area, but is actually 10 meters shorter. His complex includes a valley and mortuary temple, beside the Sphinx, which represents either Khafre or Khufu, who guarded the entrance to the underworld and was worshipped as Horemakhet, or Horus with the horizon. Khafre's beautifully constructed valley temple contains limestone, red granite, and alabaster. Menkaure's (circa 2490–2472 B.C.) pyramid, the smallest of the three Giza pyramids, has a complicated substructure, a red-granite-cased superstructure and a causeway flanked by three small pyramids for queens. Dynasty 5 saw changes in the mortuary temple, containing more relief decoration. Pyramids became smaller, the substructure was standardized, and the pharaohs built sun temples linking the solar cult with the royal mortuary cult. King Userkaf (circa 2465–2458 B.C.) built the first solar temple at Abusir. Sahure's (circa 2458–2446 B.C.) pyramid complex at Abusir has historically significant relief decoration, displaying international trade with Syria-Palestine, while his pyramid causeway depicts scenes showing aspects of the transportation and building of his complex, and ceremonial festivals linked to its completion. The pyramid of King Unas (circa 2356–2323 B.C.) is especially significant, bearing the first written texts ("Pyramid Texts") in his burial chamber and associated interior chambers and passages.

Later Pyramid Complexes

The Old Kingdom pyramids terminate with King Ibi's tomb in Dynasty 8 (circa 2150–2134 B.C.). The succeeding First Intermediate Period (circa 2134–2040 B.C.) contained different types of tombs for provincial rulers, some of who may have used small pyramidal superstructures (for example, Kings Intef I-III in early Dynasty 11). The advent of the Middle Kingdom (mid-Dynasty 11 through Dynasty 12, circa 2040–1991 B.C.) saw the construction of Montohotep I's terraced tomb chapel and rock-cut tomb at Deir el-Bahri. The terraced mortuary temple may have had a small pyramid representing a primeval mound. Dynasty 12 witnessed the revival of large pyramid construction, albeit much smaller in scale than the Giza pyramids and built with mud brick cores and stone casings. These pyramids were located farther south, in Dashur, and Illahun and Hawara in the Fayoum. Kings Amenemhet I and Senwosret I tried to revive the pyramid-building traditions of the Memphite region to the north, but after their reigns, royal pyramid construction was limited. Dynasty 12–13 pyramid complexes are variously excavated, while the tombs of Dynasties 14–16 remain mostly unlocated. In the succeeding Second Intermediate Period, the pyramids of Dra Abu el-Naga in Thebes (modern Luxor) contain rows of small pyramids associated with the royal tombs of the Dynasty 17(ending in circa 1532 B.C.). The neighboring mountain peak of el-Qurn at Thebes represented a natural pyramid for the royal tombs of Dynasties 18–20 (circa 1550–1070 B.C.), located mostly in the Valley of the Kings. The last royal pyramids were built in northern Sudan (ancient Nubia, circa 720 B.C.–350 A.D.) for the Napatan and Meroitic rulers. Of note, several Roman emperors adopted small pyramid-shaped tombs in Italy, adopting Egyptian designs.

Pyramids and Ancient Egyptian Religion

Pyramids had many connections with ancient Egyptian religion. The living pharaoh was the earthly form of the god Horus, and when he died he became associated with the god Osiris. The pyramids existed as a temple to the Horus-Osiris union and the sun god, allowing the ba (representing the life force), ka (representing individual qualities), and the body of pharaoh to unite, unifying life with death, and light with darkness. The mummification of the king probably occurred within the valley temple or in lighter structures in the pyramid complex. The Pyramid Texts, first found in the pyramid of Unas, are the oldest religious literature of ancient Egypt, and have allowed the pyramid complex to be interpreted more accurately.

How Were the Pyramids Built?

Although there is no specific, standard method for constructing pyramids, archaeological investigations have revealed different building methods for various pyramids. Although remnants of roadways with logs, sleds for pulling blocks, simple machines using ropes and pulleys, and simple mud brick ramps reveal the means for building pyramids, while corvée labor represented the most important element in the quarrying, transportation, and construction work for pyramids. The pyramids at Giza, for example, used 20,000- to 25,000-person crews. Graffiti reveal that the workforce contained crews of 2,000, who were further divided into groups of 1,000 that competed with one another. Tools included set squares and plumb bobs; copper drills and saws were used to cut stone using a slurry of water, gypsum, and quartz. Limestone is the primary stone used in building pyramids, with granite used on the casings. The Nile flowed closer to the pyramids in antiquity, making it easier to transport materials to the work site, such as limestone from Tura and the basic fuel, food, and animals needed for feeding and supplying the workforce. Blocks were moved using laborers pulling sleds over timber-paved roadways and lubricated alluvial mud to reduce friction in the movement of heavy loads.

The complex and massive level of organization required for building pyramids helped to unify and consolidate state power during the Old Kingdom. Individual pyramids were endowed with people, land, and produce to support each royal mortuary cult in perpetuity, while many new towns and farms were funded through pyramid construction, making them a principal economic driving force in Ancient Egypt. The brilliance of the pyramids, reflecting the sun off their limestone casing, symbolized more than simply the necropolis for dead kings and facets of ancient Egyptian religion. The wonder associated with the pyramids has inspired subsequent visitors, from New Kingdom Egyptians, Greek and Roman travelers, and more recent tourists, giving rise to diverse theories concerning their origins and functions, including such unfounded theories as otherworldly origins. This subsequent fascination with Egypt (Egyptomania) has also given rise to modern reconstructions, such as at the Luxor casino in Las Vegas and the entrance pyramid at the Louvre. It is partly the man-made nature of the pyramids, their immense size, and the implied unity of the Egyptian state and purpose behind them, that continues to inspires visitors.

— *Sarah Parcak*

Further Readings

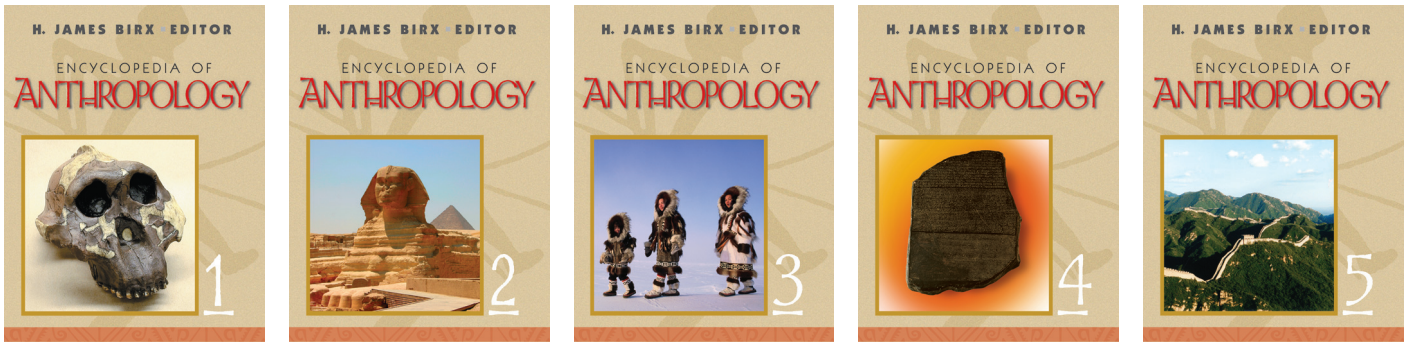
Davids, R. (1996). *The pyramid builders of Ancient Egypt.* London: Routledge.

Edwards, E. S. (1961). *The pyramids of Egypt.* London.

Faulkner, R. O. (1998). *The ancient Egyptian pyramid texts.* Oxford: Oxford University Press.

Lehner, M. (1997). *The complete pyramids.* Thames and Hudson: London.

Miroslav, B. & Krejcí, J. (Eds.). (2001). *Abusir and Saqqara in the year 2000, supplement of Archív orientální.* Prague: Oriental Institute ASCR.



ENCYCLOPEDIA OF ANTHROPOLOGY

H. JAMES BIRX ▪ EDITOR
Canisius College, SUNY Geneseo

5

A SAGE Reference Publication

SAGE Publications
Thousand Oaks ▪ London ▪ New Delhi

Copyright © 2006 by Sage Publications, Inc.

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

For information:

Sage Publications, Inc.
2455 Teller Road
Thousand Oaks, California 91320
E-mail: order@sagepub.com

Sage Publications Ltd.
1 Oliver's Yard
55 City Road
London EC1Y 1SP
United Kingdom

Sage Publications India Pvt. Ltd.
B-42, Panchsheel Enclave
Post Box 4109
New Delhi 110 017 India

Printed in China.

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Encyclopedia of anthropology / H. James Birx, editor.
p. cm.
Includes bibliographical references and index.
ISBN 0-7619-3029-9 (cloth)
1. Anthropology—Encyclopedias. I. Birx, H. James.

GN11.E63 2005
301′.030—dc22
2005013953

05 06 07 08 09 10 9 8 7 6 5 4 3 2 1

Sage Reference:	Rolf Janke, Sara Tauber
Production:	Claudia A. Hoffman
Permissions and Image Research:	Karen Wiley
Typesetting:	C&M Digitals (P) Ltd.
Indexing:	Will Ragsdale
Cover Designers:	Ravi Balasuriya and Michelle Lee Kenny

CONTENTS

5

List of Entries
ix

Reader's Guide
xvii

Editorial Board
xxix

Entries Q–Z
1977–1980

Master Bibliography
B-1–B-86

Index
I-1–I-96

Qing, the Last Dynasty of China

The Jurchens ("Nuzhen" in Chinese pinyin romanization) were a Tungusic people who inhabited parts of northeast China and North Korea. Around the 11th century, part of the Jurchens migrated to the Yellow River basin. Those who remained were made up of three divisions: Haixi, Jianzhou, and Yeren. In the early 17th century, the remaining Jurchen tribes were unified under the leadership of Nurhachi (1559–1626). He organized them into "Eight Flags," which were at once both an administrative system and a military confederacy. In times of war, then, the men readily and easily formed companies and battalions. Otherwise, they lived as trans-humans, engaged in pastoralism and small-scale gardening. Nurhachi was their leader and the supreme commander of the confederacy.

In 1616, Nurhachi founded an empire at Mukden (Shenyang) and proclaimed himself emperor. In one sense, this was the birth of the Qing Dynasty, though not yet in name. At the same time, the ruling class of the Ming Dynasty (1368–1644) grew increasingly corrupted. Nurhachi seized this opportunity to cut ties with his former liege, the Ming emperor. Active preparations were made for invading the Ming territories by Nurhachi and his Eight Flags, and a full-scale assault was launched in 1618.

In 1626, Nurhachi died of a serious wound inflicted in the battlefield. His son Huang Taiji (1592–1643) succeeded to the throne and continued the military operation relentlessly. By then the Jurchen army had grown into 24 "Flags," thanks to the addition of eight Mongol Flags and eight Han Flags. It scored significant military successes against the Ming troops during the following decade. In 1636, Huang Taiji renamed his empire "Qing," which went down in history as "Manchu Qing." Subsequently the Jurchens came to be known as the Manchus, of the Qing Dynasty.

At the time of Manchus' aggression, the Ming Dynasty was also under siege from within, especially from the peasant uprisings led by Gao Yingxiang (?–1636), Li Zicheng (1606–1645), and Zhang Xianzhong (1606–1647). To deal with the imminent threat of peasant uprisings, the Ming government had to withdraw its troops from the north. But other than leaving the borders more vulnerable, this measure did little to stop the drive of the peasant uprisings. The Ming Dynasty collapsed on March 19, 1644, when the peasant troops of Li Zicheng stormed into Beijing, and the Ming emperor hanged himself.

Soon, however, the Manchus army overpowered the peasant armies and took possession of Beijing. Emperor Shunzhi (1644–1661), who had succeeded Huang Taiji as leader of the Manchus, moved his court to Beijing from Mukden (Shenyang). With this, a new dynasty was born in Chinese history—the Qing Empire (1644–1911). But it took the Qing rulers several more decades to subjugate the resistance movements put up by the remnants of the Ming loyalists who remained in the south and in Taiwan.

Although most of the country was conquered by now, there were still serious challenges for the Manchu rulers. The Manchus were greatly outnumbered by the Hans, and the empire was vast. For the purpose of maintaining internal cohesion and political stability, many Han administrative and military talents were employed. A number of Chinese ways and customs were adopted, and communication between the Hans and Manchus was encouraged, even though intermarriages were forbidden.

The reign of the Qing Dynasty involved a total of 12 emperors, some of whom were very able. Under

Emperor Shunzhi, for example, the Qing Dynasty was swiftly consolidated. While he was effective, a number of his successors were extraordinary. Among them was Emperor Kangxi (1661–1722), a great ruler who is remembered for his visionary policies. Kangxi managed to recruit many noted Han scholars into his service, a feat that positively changed the sentiment and attitude of the majority of the Hans toward the Qing rulers.

Emperor Qianlong, (1736–1795), the grandson of Emperor Kangxi, was another great ruler. During his reign, the Qing Dynasty reached its zenith in terms of power and wealth. A series of military conquests brought the territorial expanses of China to a historical high. Moreover, he was a man of letters. After a reign of 60 years he retired in 1795, leaving the throne to his son. Approximately 150 years later, the Qing monarchy had come to be regarded as a legitimate possessor of the Mandate of Heaven, or at least one that was ruling on a divine commission.

Peace at last prevailed. As long as the economy was thriving, people seemed to be contented. Literary traditions flourished and culminated in the composition of great novels and dramas. However, the peace proved to be the calm before a tumultuous storm. A population explosion ensued. Increasingly, it led the carrying capacities of land to be overtaxed, and the people grew restless. A revolt led by the religious sect called the White Lotus Order erupted in 1796. The insurrection spread like wild fire among the discontented poor and lasted into the beginning of the next century. The suppression was bloody and effective, but there was no end to the trouble in sight.

The 19th century was a time of continual unrest, during which the Qing Dynasty started to deteriorate. First there was the Opium War (1840–1842), which exemplified a collision of cultures and philosophies. On one hand, there was the deep-rooted Confucian tradition that had reigned supreme in Chinese thought and life for over 2,000 years. On the other hand, there was the European ideology of progress and liberty. This initial conflict between the two civilizations was to last for more than a century.

The immediate issue of the conflict was trade. Large quantities of opium were shipped and smuggled into China through the southern port of Guangzhou (Canton). It was extremely lucrative to the British but did great harm to the Chinese society. Seriously alarmed by the debilitating effects of this drug, the Chinese authorities decided to ban opium trade in 1838. A high government official named Lin Zexu (1785–1850) was sent to Guangdong with the authorization to prohibit the bootlegging of opium on the penalty of death. In June 1839, a great amount of opium was seized from British merchants and then burned. Approximately 4,000 British troops appeared off the shore of Macao in June 1840, and the Opium War commenced.

The war eventually ended in 1842, when the Qing government was forced into signing the Nanjing Treaty. In addition to the payment of a huge indemnity, Hong Kong was ceded to the British for 99 years, five coastal ports were opened to foreign trade, and extra-territorial rights were granted to the British in China. Soon, other Western powers followed suit and demanded similar treaties and concessions.

Not only was China bogged down in the quagmire of humiliation and deprivation caused by a series of treaties with Western powers, but rebellions mushroomed as well. The one with the greatest momentum was known as the Taiping (Heavenly Peace) Movement. It was headed by Hong Xiuquan (1812–1864), a scholar-priest whose theology combined Christian notions with traditional Chinese values. By 1851, the movement had spread far and wide, drawing into its rank and file millions of poverty-stricken peasants and craftsmen who were suffering in the wake of the Opium Wars. The rebellion army sent the government troops fleeing in southern and central China. After Nanjing was captured, Hong set up the "Heavenly Peace Kingdom" (1853–1864).

As the cornerstone of the Chinese ruling elite, the scholar-gentry looked askance at the Taiping Movement. Many of its members proceeded to organize militia units in the name of local security and self-defense. Their military tactics and maneuvers were so successful that official recognition soon followed, elevating the militia forces to the spearhead of the Qing army against the rebels. The most prominent of the gentry-militia leaders was Zeng Guofan (1811–1872), a graduate of the civil service examinations who commanded a large following of scholarly and military talents, talent such as Li Hongzhang (1823–1901) and Zuo Zongtang (1812–1885). Zeng played a pivotal role in suppressing the Taiping Movement and other rebellions of the time.

Zeng Guofan and Li Hongzhang reasoned that the European countries were strong because they had modern science and technology. A number of measures were initiated in order to salvage the traditional

social system and institutions by emulating the Western approach to modernization while discarding its ideology of democracy and individualism. These self-contradictory efforts were doomed from the very beginning, and the country continued its downward spiral. Between 1894 and 1895, China lost its war with Japan over Korea. As a result, Taiwan was ceded to Japan, whereas Korea, once a protectorate of China, was declared to be independent. In 1910, an emboldened Japan reduced Korea to one of its colonies, in defiance of its agreement with China.

The dramatic decline of China led its intellectuals to search for ways of reinvigorating the nation. In a historic memorial to the imperial court, Kang Youwei (1858–1927), Liang Qichao (1873–1929), and others vehemently called for reforms. The reformists found an ally in the young emperor, who granted an audience to Kang Youwei in 1898 and was persuaded by him to introduce sweeping changes. Before long, however, the conservative force led by Empress Dowager Cixi (1835–1908) stepped in to nip the reformist agenda in the bud. The young emperor was stripped of power, and some reformists were ruthlessly executed. The Reformist Movement, which had lasted only a hundred days, was put to rest.

The 1900 Boxer Movement grew out of the local militia in Shandong and Shanxi, whose creed was to help the Qing government fight whatever was foreign. The Boxers were primarily peasants who saw foreign aggressions and influences as the root cause of China's deepening crisis. Their activities received tacit sanction from the authorities, but there were times when the xenophobic sentiments of the Boxers went beyond control, hence the government's ambiguous attitude toward them. The high point of the rebellion occurred in 1900, when the Boxers were summoned to besiege the foreign legations in Beijing. It triggered the invasion of an international contingent of troops from Britain, America, Japan, Russia, Germany, France, Italy, and Austria. The siege was lifted, but in the heat of the moment, some of the imperial palaces were looted and burned by the allied troops, inflicting great losses on China's cultural treasures and artifacts.

Entering into the 20th century, the Qing Dynasty was the ghost of what it used to be: corrupted, demoralized, servile to foreign extortions, out of touch with reality, and detested by its own people. A revolution was in the air, drawing its inspiration primarily from the teachings of Sun Yat-sen (1866–1925), a prominent leader who called on the Chinese to overthrow the Qing monarchy and institute a political system that advocated "nationalism, democracy, and livelihood of the people," known as the "Three Principles of the People." On October 10, 1911, an armed revolt in Wuhan set off the revolution that quickly toppled the Qing rule, the last dynasty of China. Sun Yat-sen was elected the first president of the Republic of China.

— *Jintang Zheng*

Further Readings

Garraty, J. A. (1990). *The Columbia history of the world.* New York: Columbia University Press.

Jian, B., Xunzheng, S., & Hua, H. (2001). *A concise history of China.* Oxford: University Press of the Pacific.

Palmer, R. R., Colton, J., & Kramer, L. (2002). *A history of the modern world* (9th ed.). New York: Knopf.

Pye, L. W. (1984). *China: An introduction* (4th ed.). Boston, MA: Little, Brown, and Company.

Quechua

The Quechua are the most widespread indigenous group of the Americas, with some ten million spread across Peru, Bolivia, and Ecuador (there known as *Quichua*), and smaller numbers in Argentina, Chile, and Colombia (there known as *Ingano*). Quechua speakers outnumber speakers of all other indigenous languages in South America combined, due in part to Quechua's status as the administrative language of the Inca Empire (*Tawantisuyu*), which at the turn of the 16th century covered much of western South America. Various Quechua dialects were quite widespread even before the Inca expansion, which was itself relatively short lived (c. 1438–1532); many Quechua-speaking communities are probably the descendants of peoples conquered by the Incas, rather than of the Incas themselves. Although the Inca Empire was toppled, and the indigenous population decimated by the European invasion and subsequent epidemics, the Spanish conquerors, rather than using their own language, also found Quechua to be a useful administrative language in their Andean colonies, and extended its use even beyond the boundaries of

the Inca Empire. Nevertheless, modern-day Quechuas are strongly ideologically associated with the Incas, and this link is often stressed in ethnic revitalization movements and other forms of political discourse.

The Incas are famed for their achievements in astronomy, architecture, resource management, medicine, and statecraft. A network of over 20,000 km of stone-paved roads connected their empire, and their agriculture was based on an extensive system of terraces and irrigation works. The masonry of their cities and ceremonial centers, of which Machu Picchu is the best-known example, is extraordinary even by modern standards; granite blocks weighing several tons are fitted so closely that a knife blade cannot enter between them. Although they knew neither writing nor the wheel, they were one of the most technologically advanced societies of their time. A complex system based on colored and knotted strings, known as *quipus,* was used by the Incas for record keeping.

As colonial subjects, the Quechua were dispossessed of their lands, enslaved, and frequently massacred during (or in retaliation for) indigenous uprisings. Although the Andean countries gained independence from Spain in the early 19th century, this did little to improve the lot of the indigenous majority, whose new masters—European-descended *criollos* born in the New World—were often even harsher than the old. Not until the 20th century were indigenous Andeans granted citizenship in their own lands, and even today they constitute the most impoverished and marginalized sectors of their respective nations. Although today there are small but significant numbers of self-identified Quechuas in academia, business, and government, social mobility has tended to be accompanied by cultural assimilation.

It is difficult to characterize the modern-day Quechua as an ethnic group, because the term covers several different peoples and languages spanning several countries. By no means do these constitute a single organized polity, despite significant cultural similarities and a shared historical trajectory. Many Quechuas have left their ancestral homelands in search of wage labor in the cities; Lima, Peru's coastal capital, now contains one of the largest demographic concentrations of Quechua speakers, and there are significant numbers in Argentina, Europe, and the United States as well. Within their home countries, Quechuas have sometimes achieved sufficient political organization to challenge state power, as in Ecuador's popular uprising of January 2000. Pan-Quechua unification is held out as a goal by some indigenous activists, but is unlikely given the current political reality of the region.

— *Aurolyn Luykx*

Further Readings

Allen, C. J. (1988). *The hold life has: Coca and Cultural Identity in an Andean community.* Washington, D.C.: Smithsonian Institution Press.

Daltroy, T. N. (2002). *The Incas.* Oxford: Blackwell.

de la Cadena, M. (2000). *Indigenous Mestizos: The politics of race and culture in Cuzco, Peru, 1919–1991.* Durham, N.C.: Duke University Press.

Harrison, R. (1989). *Signs, songs, and memory in the Andes: Translating Quechua language and culture.* Austin, TX: University of Texas Press.

Salomon, F., & Urioste, G. L. (1991). *The Huarochiri Manuscript: A testament of ancient and colonial Andean religion.* Austin, TX: University of Texas Press.

Radcliffe-Brown, A. R. (1881–1955)

Alfred Reginald Radcliffe-Brown was a British social anthropologist who was responsible for developing the school of thought known as structural-functionalism. Born near Birmingham in England on January 17, 1881, Radcliffe-Brown's childhood was marred by a long battle with tuberculosis. Radcliffe-Brown enrolled in Trinity College in 1901 where he met and studied under anthropologists W. H. R. Rivers and Alfred Haddon. Both anthropologists instilled ideas about the importance of field research and its necessity for carrying out cross-cultural comparisons. These ideas would eventually become the hallmark of Radcliffe-Brown's research.

Radcliffe-Brown conducted fieldwork in the Pacific among the Andaman Islanders from 1906 to 1908 as part of his thesis research. While completing his fieldwork, Radcliffe-Brown began to read the work of French sociologist Émile Durkheim. Durkheim's ideas about the structure of social relationships would have a profound effect on Radcliffe-Brown and would influence his development of structural-functionalist ideology.

From 1910 to 1912, Radcliffe-Brown carried out fieldwork among various aboriginal tribes of Australia. A distinct focus of this research was kinship and its relationship to social structure. Two important volumes resulted from this fieldwork: *The Social Organization of Australian Tribes* (1931) and *Structure and Function in Primitive Society* (1935).

In addition to being a meticulous field researcher, Radcliffe-Brown was a distinguished lecturer at the University of Capetown (1920–1925), the University of Sidney (1925–1931), the University of Chicago (1931–1937), and Oxford University (1937). At Oxford University, he also served as the first president of the Association of Anthropologists.

Throughout the latter part of his life, Radcliffe-Brown continued to pursue research on the social structure of primitive groups. Following World War II, Radcliffe-Brown set up research projects in Africa and Australia. He also conducted field research in South America. Radcliffe-Brown died in England in 1955 after suffering from pneumonia.

Radcliffe-Brown's major contribution to the field of anthropology was his development of the school of thought known as structural-functionalism. Drawing heavily from the work of Émile Durkheim, structural-functionalism teaches that the primary function of society is to maintain social structure. As a result, a complex system of social relations and social institutions develop that have primacy over culture. Within the society's social structure, the individual has little or no importance—rather, it is the society that dictates the structure and organization of the group.

Structural-functionalism focused on the interrelatedness of different institutions (i.e., economic, kinship, religious, political, etc.) to explain the social norms. Questions asked of individuals during fieldwork were structured to determine the interrelatedness of the various aspects of society and the extent to which different aspects of society influenced each other.

— *Christina B. Rieth*

See also **Andaman Islanders; Anthropology and Sociology; Durkheim, David Émile; Haddon, A. C.; Rivers, W. H. R.; Social Structures**

Further Readings

Radcliffe-Brown, A. R. (1952). *Structure and function in primitive society.* New York: The Free Press.

Radcliffe-Brown, A. R. (1977). *The social anthropology of Radcliffe-Brown* (A. Kuper, Ed.). Boston: Routledge and Kegan.

Radin, Paul (1883–1959)

Paul Radin worked as an anthropologist in North America and specialized in Native American groups. His field was the ethnology of religion and mythology, as well as the ethnography of Native Americans.

Radin spent his early childhood in New York City, but was born in Poland on April 2, 1883. In 1902, he graduated from City College with his bachelor's degree and then went abroad briefly. After returning to the United States, he studied under Franz Boas at Columbia University. In 1911, he graduated with a PhD in history and anthropology.

An accomplished linguist, Radin described multiple Native American languages and attempted to demonstrate their unity. He advanced culture-personality studies and a historical model of society that synthesized many facets of social studies including religion, philosophy, economics, psychology, and social structure.

Radin's career was varied. He worked on the geological survey of Canada as a field anthropologist and took several teaching positions; California (Berkeley), Chicago, and Cambridge stand out among the list, but there were several more. His last teaching post was at Brandeis University, where eventually he was made head of the anthropology department. Radin advocated viewing primitive cultures as different from their modern counterparts not in kind, but in degree; that is to say, primitive human responses to the difficulties of life were complex but appropriate and comprehensible. He was not convinced that moral awareness was capable of progress, or that the moral awareness of primitive humans was all that different from that of modern humans. He studied intensively the religions, languages, and folklore of Native American cultures.

Radin began his fieldwork with the Winnebago (starting sometime in 1908) and also studied the Ojibwa and the Wappo, among others. It would be the Winnebago, however, that would captivate Radin throughout his career. He wrote *The Winnebago Tribe* (1915–1916) and went on to publish texts detailing and analyzing nearly every facet of Winnebago culture. Radin made extensive use of autobiographical documents and reports in his studies, which is apparent in several of his publications, especially *The Autobiography of a Winnebago Indian* (1920; retitled *Crashing Thunder,* 1926) and *The Culture of the Winnebago: As Described by Themselves* (1949). He focused often on the individuals of a culture rather than the culture as a whole; for example, in *Primitive Religion* (1938), he proposes that the religiosity of any individual is directly related to the inclination and intelligence of that individual—ranging from indifferent to profound—in any given culture. Religiosity, then, is not a product of culture but the natural predisposition of the individual.

Radin's work attracted attention from various prominent intellectuals such as Swiss psychoanalyst C. G. Jung and the famous philosopher of education John Dewey. Radin published a number of important works during his career including *The Genetic Relationship of the North American Indian Languages* (1919), *Primitive Man as Philosopher* (1927), *Method and Theory of Ethnology* (1933), *Primitive Religion* (1938), and *The Road of Life and Death* (1945). Radin died on February 21, 1959.

— *Daniel Horace Fernald*

See also **Anthropology, Cultural; Boas, Franz; Dewey, John; Ethnology; Native North American Religions; Native Peoples of the United States; Ojibwa**

Further Readings

Diamond, Stanley, (Ed.). (1978). *Culture in history: Essays in honor of Paul Radin.* New York: Octagon Books.

Ramses II

Ramses II, also called Ramses the Great, was the third king of the 19th Dynasty of Egypt. He reigned for 67 years, from approximately 1290 BCE to 1223 BCE.

Ramses II brought Egypt to its height of prosperity and power. He was the son of Seti I (Sethos I) and Queen Tuya. Ramses acted as prince-regent during Seti's reign and succeeded the throne after his father, even though he was Seti's second son. Ramses was a charismatic leader who is most reknowned for his many building projects, which include the temples of Abu Simbel with their colossal statues, the completed hypostyle hall at Karnak, and the Ramesseum, a mortuary temple at Thebes. He also completed his father's temples at Abydos and Luxor. During his reign, he moved the capital from Thebes to Piramesses ("House of Ramses"), which he built in the eastern delta of the Nile to expedite his campaigns against the Hittites in Syria. Piramesses possessed what was probably the largest stable in existence at the time. His military exploits ranged from Nubia and Libya to Syria, maintaining Egyptian borders to their greatest extent.

The Egypto-Hittite conflict over territory in Syria began during the reign of Seti I. The stalemate that existed between the forces of Seti I and Muwatillis of Anatolia was extended to Ramses. Muwatillis met the armies of Ramses at the famed battle of Qadesh, which was considered the turning point in the conflict with the Hittites. Ramses's armies were nearly overwhelmed, but through his brilliant leadership and innovative strategy, he was able to turn the battle and escape defeat. Losses were great on both sides. It was not a decisive victory in the true sense of that word, as Ramses did not actually take Qadesh. The battle of Qadesh is documented on the walls of temples at Abydos, Karnak, Luxor, Abu Simbel, and the Ramesseum. There are at least 13 surviving accounts of the battle, making it probably the earliest detailed account of a battle in ancient history. Tensions between the Hittites and Egyptians continued for another 16 years. Mursilis III succeeded Muwatillis briefly, but it was with Hattusilis III that peace was eventually established between the two countries through what is the earliest known surviving state-to-state peace treaty in recorded history. Originally engraved on a silver tablet, copies were made and kept in each country. The treaty was also recorded on stelae at the Karnak temple of Amun and the Ramesseum. Peace endured between the Egyptians and the Hittites of Anatolia throughout the rest of Ramses's reign. The two royal families exchanged letters and presents. Later, Ramses II married two Hittite princesses, in his 33rd and 37th regnal years.

Ramses II had a very large family, with over 100 children. His primary wives were the famed Nefertari, who was his first and favorite, and Isisnofret, who bore Ramses's successor, Merneptah, his 13th son. Ramses outlived many of his sons, including Sethirkhepeshef and Khaemwaset.

— Ellen Eschwege

See also **Egypt, Ancient**

Further Readings

Abdallatif, T. F., Mousa, S. E., & Elbassiony, A. (2003). Geophysical investigation for mapping the archaeological features at Qantir, Sharquiya, Egypt. *Archaeological Prospection 10*, 27–42.

Grimal, N. (1992). *A history of Ancient Egypt.* Oxford: Blackwell.

Kitchen, K. A. (1982). *Pharaoh triumphant: The life and times of Ramesses II, King of Egypt.* Warminster, UK: Aris & Phillips.

White, J. E. M. (1970). *Ancient Egypt.* New York: Dover.

RAMSES II

Ramses II, known to Egyptians as simply Ramses the Great, was probably the most powerful of the Egyptian pharaohs. His reign covered two-thirds of the 13th century BCE and marks the peak of Egypt's power. Among his many accomplishments were the building of many temples, fathering 100 children, and bringing peace to Egypt. He is credited with negotiating the first recorded peace treaty in history, between Egypt and its perennial rivals, the Hittites. Ramses first married a Hittite princess, then negotiated the peace treaty.

However, Ramses II's most significant effect on anthropology may have come to light when tobacco was discovered in the bandages of his mummy. In 1976, Dr. Michelle Lescot of the Natural History Museum in Paris found a plant fragment within the fibers of the bandages. Examining it under a microscope, she was amazed to find it was tobacco.

She repeated the tests over and over, with the same result. The significance of the discovery lies in the fact that there was thought to have been no contact between Egypt and the New World at the time of Ramses. However, tobacco grew only in America and was supposedly unknown in the eastern hemisphere until it was imported into Europe after Christopher Columbus was introduced to it during one of his voyages.

The chief curator at the Cairo Museum, Nasri Iskander, believed the tobacco had been dropped from the pipe of an archaeologist who had examined the mummy. Dr. Lescot extracted new samples from the abdomen of Ramses II while others photographed the process. These samples also contained tobacco. For a number of years, this evidence was ignored. However, in 1992, Dr. Svetla Balabanova, of the Institute of Forensic Medicine in Ulm, Germany, tested the mummy of Henut-Tawy. Nicotine and cocaine were found. After her findings were confirmed by three other labs, she published a paper on the phenomena. To her surprise, scientists responded with rage and she was condemned as a fraud. Balabanova then tested tissue from 124 mummies. A third of them tested positive for nicotine and cocaine.

Dr. Rosalie David, Keeper of Egyptology of the Manchester Museum in England, believed the test results were quite impossible and decided to do her own tests. She tested the German mummies, then the ones in her own museum. To her amazement, they contained traces of tobacco. So Dr. Balabanova's work had been validated.

Scientists are still trying to determine whether there was trans-Pacific trade in the days of the Egyptian pharaohs, or if perhaps there were once some sorts of tobacco and coca plants that grew in Egypt, then later became extinct.

— Pat McCarthy

Rank and Status

The most common use of the term "rank" in anthropology is to designate one type of society among three (the others being egalitarian and class) regarding the people's access to economic resources, sociocultural power, and status. As stated in *Cultural Anthropology* (2004), "Rank societies do not have very unequal access to economic resources or to power, but they do contain social groups with unequal access to prestige. Rank societies, then, are partly stratified." The most complex ranking systems are found in Polynesia.

Status (or prestige) refers to a social position with a distinction usually made between "ascribed" and "achieved." Ascribed status is assigned, often on the basis of birth, with age and sex being important markers and with some societies using perceived "race" and ethnicity to assign status. Achieved status is attained through the behavior of an individual, often in terms of occupation and skills and actions. The king of England is an ascribed status; a professor of anthropology is an achieved status. These types of statuses may, however, intermix; we now have third-generation anthropologists, and the line of succession in some royal families is in question.

Membership in social groups can also be ascribed or achieved. In ascribed groups, membership is acquired at birth and is non-voluntary. Assembling people into multipurpose groups on the basis of ascribed categories is one of the chief principles of group formation in nonindustrial societies. The most common types of ascriptive multipurpose groups are also based on age, sex, ethnicity, and kinship. Groups based on achievement are usually called voluntary groups or special-purpose groups. These voluntary associations are found less often in nonindustrial societies, and when they are found, such as hunting groups, they are quite temporary.

Typically, social groups are ranked, not individuals, though the literature often uses the position of chief as an example. More accurately, the chief belongs to a social group that is ranked high in status. And the position of chief is at least partially hereditary. Typically, each kin group has its own unique rank in relation to the other kin groups, and within each kin group, individuals are ranked by genealogical seniority. In any case, the chief is treated with deference, as has been noted in most ethnographies from Oceania, such as Raymond Firth's excellent study in the 1920s of the Tikopia. People may have to keep their head lower than that of the chief, and chiefs may receive gifts and have substantial storehouses, but these surpluses are usually given away in public feasts. And the chief cannot order people to work or to give him gifts.

Citing a study of Ifaluk by Laura Betzig (1988), which found that the chiefs seem to be economically better off than the commoners, Carol R. Ember and Melvin Ember caution, "Is this true in other societies conventionally considered to be rank societies? We do not know. . . . But rank societies may not have had as much economic equality as we used to think."

— *Robert Lawless*

See also **Anthropology, Social; Firth, Raymond; Polynesians; Societies, Class; Societies, Egalitarian; Societies, Rank**

Further Readings

Ember, C. R., & Ember, M. (2004). *Cultural anthropology* (11th ed.). New Jersey: Pearson Prentice Hall.

Rapa Nui

Rapa Nui is a small (160 km) remote subtropical island in the South Pacific Ocean, 3600 km west of Chile, the nation of which it forms a part, and 1900 km east-southeast of Pitcairn Island, the nearest inhabited island. It is known to outsiders as Easter Island (Isla de Pascua in Spanish), so named by Dutch navigator Jacob Roggeveen after his visit to the island on Easter in 1722. Rapa Nui is the locally preferred name, used since the 19th century, which also refers to the people and their language. Although its large monolithic *moai* stone statues are widely recognized, substantial mystery still surrounds the origins and development of the people who erected these monuments. Reconstructing the history of migration, adaptation, innovation, contact, and survival has been the focus of studies to which archaeology, linguistics, biological anthropology, ethnology, ecology, and related disciplines have all contributed.

Oral histories tell of an original settlement of people arriving from the west from a land called Marae Rega or Marae Toe Hau, led by Hotu Matu'a—Great Parent—the first *ariki* (chief) of the island. The Rapa Nui have been considered culturally and linguistically Polynesian since their first contacts with European visitors. In the 1940s, however, Norwegian explorer Thor Heyerdahl hypothesized that the island was first settled from South America, before Polynesians arrived. As evidence, he pointed to the sophisticated and large-scale stone work of the *ahu* (ceremonial platforms), the presence of sweet potato (*Ipomoea batatas*) and other native South American plants, the path of ocean currents, and other ethnological and linguistic evidence. His much publicized Kon-Tiki raft expedition of 1947 attempted to demonstrate the plausibility of this theory. Most experts today tend to discount the South American origins of the stonework, but many acknowledge the possibility of contact.

Early studies relying primarily on linguistic and archaeological data estimated that the island was likely settled from Eastern Polynesia before AD 600 or as early as AD 400. More recent research based on further analyses in archaeology, linguistics, biological anthropology, and experimental voyaging has, however, led researchers to propose later settlement dates around AD 600–1000. Earlier hypotheses regarding a direct settlement originating from the Marquesas have also been revised to favor settlement(s) from the Mangareva-Pitcairn-Henderson area. Yet another hypothesis postulates that settlers may have arrived from the Marquesas via South America, and may have brought back the sweet potato.

The Rapa Nui are a testament to the remarkable achievements and migrations of the descendants of proto-Austronesian speakers originating from southern China, who over the last 5,000 years—including 3,000 years in Oceania—migrated and settled an area spanning 28,000 km on an east-west axis, with Madagascar off the east coast of Africa at its western end and Rapa Nui at the eastern end. The successful colonization of new Pacific islands and the subsequent development of complex societies depended not only on their skills as navigators but also on subsistence strategies, especially regarding food production in the sometimes limited physical environment of their new homes. Hotu Matu'a is said to have brought food crops and introduced them to the island, including pigs, chicken, bananas, taro, yams, sugar cane, ti, and even sweet potatoes. While most researchers disagree with Heyerdahl, contact with South America is considered a possible factor in the cultural development of this island society. For example, the introduction of the sweet potato is considered a major factor in agricultural intensification, which the archaeological evidence shows to have been widely adopted on the island after AD 1200.

occupying all of the island, organized into two political confederacies: the *Tu'u 'Aro* (or *Ko Tu'u 'Aro Ko Te Mata Nui,* "the Greater Mata"), who occupied the northeastern half and were named after Hotu Matu'a's eldest son Tu'u Maheke, and the *Tu'u Hotu 'Iti* (or *Ko Tu'u Hotu 'Iti Ko Te Mata 'Iti,* "the Lesser Mata"), named after his youngest but favorite son Hotu 'Iti. Comparative works on prehistoric Polynesian societies consider Rapa Nui to be similar to that of Mangaia, and less stratified than those of Hawaii, Tonga, and Tahiti, but more stratified than Tikopia, Pukapuka, Ontong Java, and Tokelau. The high levels of segmentation, stratification, division of labor, and the ability to mobilize pan-island cooperation and exchange networks are evident in the approximately 300 *ahu* and 900 *moai* left on the island, which involved the construction and transportation of large stone figures from Rano Raraku quarry and their erection on top of the platforms. Competition between local groups is believed to have led to a race to create ever-larger platforms and statues. The largest *moai* to be erected on *ahu* weighs an impressive 80 tons and measures 10 m in height; 12 m once the red scoria topknots (*pukao*) had been placed on top. The population is believed to have grown to between 7,000 to 10,000 by the 16th century. The period of great constructions, rising prosperity, and population growth was followed by a period of warfare and decline. Oral traditions tell of the outbreak of internal strife and endemic warfare among the descent groups, leading to the collapse of the process of *moai* making in the two centuries before European contact. When Captain James Cook visited the island briefly in 1774, he found that many of the statues had been overturned, and he noted that the islanders seemed rather impoverished for a people who had once erected such impressive monuments. He also noted the terrible condition of their canoes and the island's lack of forest. Pollen analysis indicates that the island had been initially well forested, but forest pollen declined to its lowest measured

Some time after the initial settlement, the islanders began to build sacred sites with stones and to carve statues to represent their ancestors. The natural forest woods they found on the island would have been important for their construction and transportation. Beginning around the 11th century, the construction of *moai* intensified greatly, and the scale of constructions grew and became more complex. According to legend, as he lay dying, blind and ill, Hotu Matu'a divided the island among his six sons. Social organization then followed a conical clan (or ramage) system, a typical pattern in Polynesian chiefdoms with hierarchically ranked unilineal descent groups. In each descent group, a paramount chief (*ariki mau*), the senior male in direct line of patrilineal succession from Hotu Matu'a, possessed power (*mana*) derived from gods. Each patrilocal segmentary descent group (*mata*) occupied a specific estate (*kāinga*), which included both coastal and interior zones demarcated by stone cairns (*pipihoreko)* and protected by local estate spirits (*akuaku)*. Local descent groups built *ahu,* usually by the coast, and erected *moai* above them with their backs to the ocean and overlooking the villages they faced. Each *moai* represented an eponymous ancestor of a local segment of the descent group. Patrilocal extended families (*paenga*) formed the basic economic units and were engaged in reciprocal and hierarchical economic and social networks with others in the lineage (*ivi*). By the 15th and 16th centuries, the island was subdivided into 10 or 11 polities

values circa AD 1400. Sometime after the 15th century, the island had become largely or completely deforested.

What led to the abrupt collapse of a once prosperous society? Human activities and competition for resources between descent groups were likely the major cause of the decline of the forest and the overexploitation of other natural resources. This, in turn, led to the decline of monumental constructions, increasing warfare, and, in Malthusian fashion, to population decline. This interpretation has led researchers to view the history of Easter Island as a warning of the perils of natural resource overexploitation.

Source: © iStockphoto/Brendan O'Boyle.

In the 15th century, a new politico-religious subsystem emerged from this period of turbulence. The new system, referred to as the Birdman (*tangata manu*) Cult, emerged with Orongo (the southwest rim of the caldera Rano Kao) as a pan-island site of annual competitions and ceremonies. Each descent group chose a representative (*hopu manu*) each spring who would have to swim in dangerous waters to the nearby islet of Motu Nui and return with an undamaged egg of *manu-tara* birds (sooty tern). The chief of the winning competitor's descent group was conferred the status of *tangata manu,* or the ruler of the island, for one year, as empowered by the creator god *Make Make.* The Orongo ceremonial village is today still full of rock art depicting *tangata manu* and other figures, and its stone structures were built to mirror the two political confederacies. The emergence and development of the Birdman Cult reflects a transition in the prehistoric Rapa Nui society, where the traditional hereditary, sacred power of the *ariki mau* diminished, yielding increasingly to achieved status competition and a political system ultimately dominated by a warrior class (*matato'a*). Although the importance of the *moai* and *ahu* for the islanders had declined before their contact with Europeans, the island seemed to have preserved some aspects of traditional social organization surrounding the *ariki* nobility system into the mid-19th century.

Another of the so-called "mysteries" of Rapa Nui is *rongorongo,* the only indigenous script known to have been used in Oceania before the 20th century. Today there are 25 known surviving wood tablets bearing *rongorongo* inscriptions scattered in museums and institutions around the world, and numerous researchers have been working to decipher them. Oral histories tell of *rongorongo* specialists (*tangata rongorongo*) who chanted as they read the inscription on the tablets during the annual birdman competitions and ceremonies. One hypothesis locates the development of *rongorongo* after 1770, when a Spanish expedition briefly stopped at the island and ceremoniously proclaimed the island to be Spanish by presenting an official deed signed by Spanish officers. While this suggests that writing may not have been invented on the island, the *rongorongo* system was clearly created by the Rapa Nui as an indigenous elaboration.

In the mid-1860s, Blackbirders, or slave raiders, abducted or recruited an estimated 3,000 Polynesians

and a few hundred Micronesians to work in the state-run guano export plantations on the Chincha Islands off the coast of Peru. As many as 1,500 Easter Islanders were carried away in a dozen or so ships between 1862 and 1863. Many died under the harsh and unfamiliar conditions they encountered in Peru, and, tragically, the very few who were able to return to the island alive brought with them a smallpox epidemic that killed many more. From an estimated pre-raid size of 3,000 to 5,000, the island's population collapsed to scarcely 110 survivors in 1877. The population crash led to a disintegration of existing social organization, and a great loss of cultural knowledge of the island's traditions and rituals occurred as many elders and specialists perished. Further contact with outsiders had a significant role in further cultural changes for this devastated community. For example, the Catholic missionaries who stayed on the island shortly after the slave raid until 1871 led the community-wide conversion to Christianity and led the Rapa Nui to abandon the use of *rongorongo* and the Birdman Cult and other rituals. European planters who arrived in 1866 collaborated with the missionaries to have the Rapa Nui resettled near the Hanga Roa mission in order to develop the island commercially as a sheep ranch.

In 1888, Chile annexed the island in a naval mission led by Captain Policarpo Toro. During the first half of the 20th century, Chile established its authority over its colony primarily by delegating control to the fittingly named "Easter Island Exploitation Company," which leased the entire island as a private sheep ranch from 1895–1955 and forcibly confined the Rapa Nui to live and remain in Hanga Roa village, using the rest of the island for sheep grazing. Ethnological work by Katherine Routledge, the first anthropologist to reside on the island (for 16 months in 1914–15), recounts the living conditions of the Rapa Nui under company rule and the memory of the elders who had witnessed the functioning of society before the population crash. She was also witness to a short-lived 1914 rebellion against the company led by the prophet Maria Angata Veri Tahi a Pengo Hare Kohou, who had been trained as a catechist in Mangareva. Spanish-speaking administrators of the company—and, after 1935, the Catholic priest—acted as state representatives and mediators between the Rapa Nui and the colonial government.

Except for the attention of anthropologists and archaeologists, such as the 1934–35 Franco-Belgian expedition led by Alfred Métraux and Henri Lavachery and the 1955–56 Norwegian expedition with Heyerdahl and William Mulloy, Rapa Nui remained largely isolated from the world until the mid-1960s. Until then, an annual cargo ship had been the primary form of communication and transportation. In the 1960s, a campaign of civil disobedience led by Alfonso Rapu, a young teacher who had been trained in Chile, finally brought about the end of Navy rule, which had controlled the island since 1955. Responding to this movement, Chile established a local civil administration in 1966 and opened regular air travel from the capital of Santiago shortly after. The Rapa Nui were then, for the first time, granted rights to travel freely within and outside the island and to participate in electoral political processes, leading to the election of the first Rapa Nui mayor. The rapid integration of this community into the national and global economy in the years that followed has led to accelerated acculturation, intermarriage, and language shift from Rapa Nui to Spanish. At the same time, however, the Rapa Nui community has become actively involved in the development of heritage tourism and restoration projects of the archaeological patrimony, and have led a largely successful cultural revival movement.

The Rapa Nui's efforts to increase their local political and economic control over island resources was greatly enhanced by national democratization and decentralization initiatives that followed the 1989 end of Pinochet's military dictatorship. This has led to successful political campaigns to press the government for increased land rights and a transfer of decision-making power to islanders. Today the Chilean Congress is debating proposals to grant the island, with its current population of 3,800, a new form of administrative autonomy. Despite their often tragic history of contact with outsiders, the Rapa Nui represent a rather remarkable case of language and culture maintenance. If there has been one constant in the dramatic and eventful history of this small and remote island, it is the Rapa Nui people's amazing adaptability in the face of great odds.

— Miki Makihara

See also **Anthropology, Biological; Ethnology; Heyerdahl, Thor; Marquesas; Migrations; Polynesians**

Further Readings

Bahn, P., & Flenley, J. (2003). *The enigmas of Easter Island: Island on the edge.* New York: Oxford University Press.

Green, R. C. (1998). Rapanui origins prior to European contact: The view from Eastern Polynesia. In P. Vargas (Ed.), *Easter Island and East Polynesian prehistory* (pp. 87–110). Santiago: Universidad de Chile.

Lee, G. (1992). *The rock art of Easter Island: Symbols of power, prayers to the gods.* Los Angeles: Institute of Archaeology, University of California.

Makihara, M. (2004). Linguistic syncretism and language ideologies: Transforming sociolinguistic hierarchy on Rapa Nui (Easter Island). *American Anthropologist, 106*(3), 529–540.

RAPA NUI

Rapa Nui is a classic example of a society that brought about its own downfall by unsound ecological practices. Several practices of the inhabitants of the island contributed to this downfall. Anthropologists have determined that the island was once heavily forested, mainly with palm trees. As the population of the island grew, more and more trees were cut down to make room for fields, where the people could cultivate crops to feed their growing numbers. Scientists speculate that the statues were moved from the quarry where they were carved to the coast by rolling them on huge palm tree logs. As they carved more statues, deforestation increased. Eventually all the trees were gone. Due to the fragile ecology of the island, they did not grow back.

The demise of the forest had more important consequences than rendering the people incapable of moving statues. They also had no wood with which to build canoes and were then restricted to the island. This made fishing difficult. Wind and rain washed away the soil, causing crops to fail. Many people starved, and scientists believe lack of food led to cannibalism on the island. The population of Rapa Nui had used up their most important resource, one which could have been a renewable resource. If they had practiced reforestation, some of the devastation that occurred could have been prevented. Certainly the story of Rapa Nui's demise has implications for modern society.

— Pat McCarthy

Rappaport, Roy (1926–1997)

Roy Rappaport, one of the leading ecological anthropologists of the 20th century, was born in New York City. He earned his undergraduate degree from Cornell University. In 1959 (at the age of 33), Rappaport enrolled at Columbia University where he studied anthropology under Marvin Harris, Harold Conklin, Margaret Mead, Conrad Arensberg, and Andrew P. Vayda. He claimed that the anthropologist who most influenced him was Gregory Bateson, whom he first met in 1968. It was Bateson who introduced Rappaport to systems theory and encouraged him to look at evolution and adaptation as informational processes.

Between 1962 and 1964, Rappaport conducted fieldwork among the Maring of Papua, New Guinea, primarily among the Tsembaga clan. His greatest contributions to ecological anthropology stem from his precise measurements of the activities of 204 Maring speakers during the summer of 1963. In 1964, Rappaport presented a paper, "Ritual Regulations of Environmental Relations among a New Guinea People," at the American Anthropological Association. The 1964 paper was published in the journal *Ethnography* and has been widely reprinted. This paper contains almost all of the ideas that were to occupy Rappaport's thought for the rest of his life. In 1965, Rappaport joined the anthropology faculty at the University of Michigan, where he taught for over 30 years.

Rappaport's 1966 doctoral dissertation was published as *Pigs for the Ancestors.* His goal in *Pigs for the Ancestors* was to go beyond the arguments of cultural materialism and functionalism to focus on the adaptive value of rituals in maintaining carrying capacity, the persistence of species, human nutritional well-being, and the frequency of warfare within small-scale

societies. *Pigs for the Ancestors* contains Rappaport's key ideas in human ecology and religion; most notably, what he saw as the occasional contradiction between "operational" and "cognized" environments. Rappaport emphasized that the "operational" environment—governed by the immutable laws of the physical universe—and the "cognized" environment—which he defined as "the sum of the phenomena ordered into meaningful categories by a population"—differed due to the fact that "cognized" environments are less bound by physical laws.

According to Rappaport, there are two universal aspects of ritual: (1) it constitutes an invariant sequence of acts and utterances (form), and (2) its participants must actually perform according to these invariant sequences. Rituals impose a standard of conduct that goes beyond the will of individual participants and constitutes the foundation of all convention. Ritual is the basic "social act." Ellen Messer has suggested that Rappaport spent the earlier part of his academic career documenting his ideas on human ecology and *how* ritual regulates environmental relations and the rest of his life trying to understand *why* ritual should order ecosystems and human life.

Always active professionally, Roy Rappaport served as chair of the Department of Anthropology at the University of Michigan and was president of the American Anthropological Association from 1987 to 1989. He was also elected to membership in the American Academy of Arts and Sciences. A highly committed, ethical, and engaged scholar, Rappaport advocated bringing anthropological findings to bear on social issues of the day. He served as a consultant for the state of Nevada on the advisability of storing nuclear waste at Yucca Mountain and was a member of the National Academy of Sciences Task Force dealing with the leasing of offshore oil rights. From 1991 until his death, Rappaport served as head of the Program on Studies in Religion PSIR) at the University of Michigan. He regularly offered the course Anthropology 448/Religion 452: "Anthropology of Religion: Ritual, Sanctity, and Adaptation."

While heading the PSIR, Rappaport embarked on what was to become his last major study, published posthumously as *Ritual and Religion in the Making of Humanity*. *Ritual and Religion* is one of the most comprehensive anthropological studies of religion ever published. In it, Rappaport attempted to establish a new set of categories for the study of religion and makes a strong case for what he saw as religion's central role in human evolution.

— *Stephen D. Glazier*

See also **Functionalism; Materialism, Cultural; Religion and Anthropology**

Further Readings

Messer, E. & Lambek, M. (Eds.). (1999). *Ecology and the sacred: Engaging the anthropology of Roy A. Rappaport.* Ann Arbor: University of Michigan Press.

Rappaport, R. A. (1968). *Pigs for the ancestors: Ritual and ecology of a New Guinea people.* New Haven: Yale University Press.

Rappaport, R. A. (1979). *Ecology, meaning, and religion.* Richmond, CA: North Atlantic Books.

Rappaport, R. A. (1999). *Ritual and religion in the making of humanity.* New York: Cambridge University Press.

RAROTONGA

Polynesia is a geographical triangle in the Pacific Ocean with Hawaii, New Zealand, and Rapa Nui (Easter Island) as its three points. Starting about 65 million years ago, ongoing volcanic activity began forming the Cook Islands of Polynesia between Fiji and Tahiti. The resultant archipelago consists of 15 major islands, six of which are the worn emergent peaks of now-extinct volcanoes (Mauke, Atiu, Mangaia, Mitiaro, Rarotonga, and Aitutaki); islets, or Hotus; sand-cays on coral reefs; and atolls. Rarotonga is the largest and youngest of those volcanoes forming the Cook Islands. It is located almost 3,000 statute miles directly south of Kauai, the oldest major island of the Hawaiian archipelago. Radiometric dates of lavas indicate that Rarotonga started emerging during the Plio-Pleistocene Age, about 2.8 million years ago. Today, this dormant and eroded volcano has a core surrounded by Pleistocene sands and gravels.

Rarotonga is an elliptical island whose impressive prehistoric-like landscape consists of towering razor-back volcanic ridges of central mountains covered with rich tropical vegetation (sea winds keep Rarotonga

Source: © iStockphoto/Brent Hatcher.

cool). This mountainous area is deeply dissected by steep valleys and numerous streams. The rich lowlands are studded with coconut and banana plantations. White beaches stretch along the southern shore of this pristine and peaceful island, but the distant roar of ocean breakers is a constant reminder of both the creative and destructive forces of nature.

One of the geological landmarks of Rarotonga is The Needle (Te Rua Manga), although this unique 300-foot rock outcrop is dwarfed by the higher igneous horizon of this volcanic island landscape. A short, pleasant hike inland along the Avatiu stream, with butterflies and ubiquitous mynah birds as companions, and then a long, strenuous climb up a steep, root-covered mud path will take the adventurous intruder through breathtaking forests of tropical greenery and, finally, to a close-up sight of The Needle in all its primeval splendor.

During the past few thousand years, Rarotonga may have welcomed to its shores many brave migrating peoples who came first from the Tongan Islands and then from all over the Pacific Ocean. Not surprisingly, the first discoverers of this island are remembered only through legends and myths.

Centuries ago, seafaring Māori warriors from the islands of Tahiti, Samoa, New Zealand, and elsewhere navigated the ocean on rafts or in outrigger canoes. Using a canopy of stars as their compass, they voyaged throughout Polynesia, eventually discovering the Cook Islands and then the Hawaiian archipelago. No doubt these migrations helped to limit the detrimental kin intermarriages within small communities on these isolated islands.

After waves of early arrivals, the lofty mountains and fertile shores of Rarotonga welcomed their final and definitive visitors from Tahiti during the 13th century. These fierce but cunning Māori warrior clans settled in over 20 tribes, or *Iwi,* scattered throughout three geographical districts of the island. The Māori of Rarotonga are tall and robust, with black hair, dark eyes, and medium-brown skin. They have a friendly disposition, living close to the land and enjoying music and dance. For hundreds of years, Rarotonga was inhabited only by these nonliterate settlers, who explained their origin and interpreted this world in terms of magico-religious beliefs and an oral tradition.

Rarotonga legend has it that in 1350 CE, seven canoes full of Māori warriors from the Takitumu village set sail from the eastern Ngatangiia Harbor for New Zealand. Actually, they would have had to finally depart from the southwest coast at the mouth of the Maungaroa Valley. Their goal, which they achieved,

was to colonize New Zealand. This historic site at Takitumu is now marked by seven symbolic stones.

Those ancient inhabitants of Rarotonga spoke a distinct Māori dialect that had evolved out of a prehistoric Eastern Oceanic language. Nevertheless, this dialect linked them to the other cultures of Polynesia. Today, however, this original Māori language is becoming lost to a modern dialect.

Mixing facts with myths and values, Cook Islands legends reflect both the social history and cultural heritage of the early Māori inhabitants. Unfortunately, the oral tradition that preserved these stories is on the decline. To date, only a few of those numerous tales have been recorded for posterity; many such legends may be lost forever.

Nevertheless, one can now read about the evil hag Katikatia, who enticed children into her Rarotonga cave and then ate them; the giant Tamangori of Mangaia, who also loved to eat human beings; those mighty warriors who stole Maru, the highest Rarotongan mountain, and sailed with it back to their flat island of Aitutaki; and the magical origin of the first Polynesian wild hibiscus tree from the grave of the old sage Papa Manu (and, consequently, the discovery of making fire by rubbing together two sticks from this ʻ*au* plant).

The ancient Māori of Rarotonga built an inland road (Ara Metua of Toi) around most of the island so that their dwellings, fields, human burials, and sacred places were protected from hurricanes and cyclones. Even so, periodic famines and frequent intertribal wars threatened their existence.

Māori communities had a sociopolitical hierarchy, with the warrior class positioned just below the royal family but above the common workers and slaves, who were taken prisoner in hand-to-hand warfare. Tribal members practiced exogamy and polygamy while acknowledging patrilineal descent. Land was the property of the tribe. Māori implements were made of stone, bone, or wood. Typical of tools from volcanic islands, adzes made from island basalt were used for cutting wood, for example, in the making of canoes. On Rarotonga, such tools were used more than 1,000 years ago. Weapons were made only of stone or wood, as these people never discovered metallurgy.

Food is of great value to the Māori, who practice terrace farming. As horticulturists, they plant yam, taro, kava, and the sweet potato, or *Kumara.* They also enjoy an island of beautiful flowering plants: hibiscus, gardenia, bougainvillea, poinsettia, and the mountain orchid. Pigs and fish figure prominently in the Rarotongan diet. Swimmers in the bountiful ocean must beware of stone fish, reef shark, and the deadly cone shell *Conus geographus.*

The animistic Māori ancestors worshipped many gods. They believed that these gods took temporary residence in material emblems during magico-religious ceremonies, thus demonstrating the significant relationship between their artworks and their beliefs. Furthermore, both gods and human spirits could reside in fish, birds, insects, reptiles, and other life forms. Each god had magical power, or *Mana,* to adjudicate over particular things.

In this pantheon of spiritual beings, Tangaroa was the supreme god of all creation. As such, he was the lord of plants, fish, fertility, human behavior, and the weather. His image was present throughout most of the Polynesian islands, although in various forms. In fact, his carved statue was even secured to the front of fishing canoes for good luck. Today, the image of Tangaroa appears on the dollar coin of the Cook Islands.

At Rarotonga, both infanticide and cannibalism were customary until the introduction of Christianity in 1823. Revenge in times of war was the major motive for Māori cannibalism. Usually black-tattooed warriors partook of such sacrificial feasts, but the tribal high chief never ate human flesh and workers did so infrequently, for example, during times of famine.

These early Māori believed that after death, a person's immortal soul, or *Wairua,* went to reside in Te Reinga, a heaven located under the sea. All brave warriors could look forward to an enviable afterlife in the House of Tiki.

Interestingly enough, explorer James Cook never discovered Rarotonga. In 1789, mutineers from HMS *Bounty* were the first Europeans known to have seen this island. Twenty-four years later, Captain Theodore Walker merely sighted Rarotonga while sailing from Tahiti to Australia. But the following year, skipper Philip Goodenough went ashore to Avarua. In 1823, with his friend Papehia, the English missionary John Williams from Raiatea brought Christianity to Rarotonga. The Gospel was preached, Māori hymns were composed, churches and schools were built, and the first complete edition of the Holy Bible in Rarotongan Māori reached the island from England in 1852.

Some missionaries used fear, force, and unethical means to convert the Māori to Christianity; they also provoked wars and brought foreign diseases to the island. Nevertheless, most of the Rarotongans quickly replaced Tangaroa with Jesus and were even happy to abandon cannibalism. A former cannibal, the Rarotongan tribal high chief Tepou became one of the earliest converts to Christianity. In a relatively short period of time, Christianity took a firm hold. Today, the Takamoa Theological College at Avarua, founded in 1837, still prepares missionaries for religious work throughout the South Seas.

The coming of Christianity also resulted in the almost total loss of Māori beliefs and customs. The converts burned their wooden idols, discarded their weaponry, and forgot their oral tradition. However, more than 200 different archaeological sites have now been discovered, including over 70 *Marae* (special gathering places of magico-religious and sociopolitical significance to the early Māori) found on the southern slope of flat-topped Mt. Raemaru, in Maungaroa Valley. These numerous inland sites indicate that a much larger Māori population once existed on this island before the coming of Christianity. Today, Raymond Pirangi (himself a descendant of a tribal high chief, or *Ariki*) is painstakingly clearing the entrance to the lower Maungaroa Valley so that tourists and scholars may visit its archaeological sites and learn more about the ancient Māori culture.

Along the ancient inner road is the coral and lime palace of Pa, a high chief of the Takitumu tribe. Built above road level, this royal structure indicated the central place of this Māori settlement. The villagers themselves lived in rectangular coconut-palm-thatched houses that kept their occupants both cool and dry. Like early communities, these Takitumu people lived safely inland until the missionaries arrived and built a church on the outer road near the harbor. Only then did the converted natives abandon their own site and move to the coast.

Also of archaeological importance is the *Arai-Te-Tonga Marae,* which is located inland from Muri Beach and is over 200 years old. This special site of stones designates a place where worshipping Māori held feasts with offerings and rituals for the ancient gods. The largest stone is a basalt pillar from the island of Raiatea, linking the Cook Islands to Tahiti. Likewise, this site functioned as a royal court, or *Koutu,* where the investiture of a tribal high chief, or *Ariki,* took place. A community of huts and fields once surrounded this sacred spot. About 10,000 people now inhabit Rarotonga, and its harbor town of Avarua welcomes tourists from all over the world. On Sunday, devout Rarotongans attend Mass or other religious services. Men wear white shirts and ties, while women dress in their finest black-and-white outfits with elaborate straw hats. The religious ceremonies include both thunderous songs of the Māori past and beautiful Christian hymns of today in an intense mixture of two cultures.

— H. James Birx

See also **Animism; Exogamy; Māori; Polygamy; Polynesians; Tahiti**

Further Readings

Tara'are, T. A. (2000). *History and traditions of Rarotonga* (R. Walter & R. Moeka'a, Eds.). Auckland, NZ: Polynesian Society.

Reciprocity

Reciprocity is the state of mutually addressing the same attitudes or feelings as another. It indicates an equal exchange. This implies intersubjectivity and interaction not only between individuals, but also between groups. It may, therefore, be applied to many fields of social activity and has acquired special importance in psychology, education, ethics, politics, and law.

Although the quality of the reciprocal attitudes or feelings is neutral (there may be a positive or a negative mutual exchange), the term is most commonly used for sharing something considered to be positive.

Reciprocity is one of the first elements that contributes to a child's psychological, physical, and social development by the spontaneous imitation of the parents' attitudes, expressions, and movements. The feeling of reciprocal love between parent and child is one of the most important factors for the creation of an equilibrated individual personality. Besides the emotional flourishing it creates, it establishes a psychic environment of security and confidence, which is vital for young human beings and of crucial weight for their future evolution. On this basis of reciprocal confidence and goodwill is founded any other

successful educative relationship in the following years of the human life.

The "reciprocity of consciences" consists of sharing the same ideas, values, or points of view. It facilitates mutual empathy, the capacity of "putting oneself in the other's place," integrating the other's sentiments and positions, and may thus create a sense of harmonious unity between individuals. In this sense, the Other becomes like "another Self," an *alter ego,* who is felt at the same time as a distinct person and as a part of ourselves.

This kind of reciprocity is notably present between friends. Aristotle (384–322 BC) was one of the first thinkers who insisted on this point. In his ethical works, he considers the best kind of friendship to be the one that is founded on mutual affection, due to the virtuous character of both persons. Many centuries later, Michel de Montaigne (1533–1592) omitted the notion of moral value of the character from reciprocity in friendship—a human relationship for which he had a high consideration—putting it beyond any social conventions. He believes that true friends realize equality by the purest of all the different kinds of love. They love each other just because they are who they are, and this engenders all the pleasure of sharing. The reciprocity of feelings of love, accompanied this time by desire, is also the basis of the amorous relationship. Eros without response results in frustration and distress, which have too often been the subject of literature. The contemporary philosopher who has particularly valorized reciprocity as a central notion of his thought is Paul Ricoeur (1913–). Considering that the previous theories on self-definition and self-conscience, as well as on the foundation of ethical behavior, have stayed within the limits of egocentrism, he insisted on the definition of the self as a structure derived from "being together." Self-esteem and respect of the Other manifest themselves in a reciprocity that may be conceived as a "symmetrical" relationship, as it doesn't accentuate the role of the "I," as opposed to "the Other." Ricoeur proposes to replace the "I" with the "self" in our way of thinking, as a means of reestablishing the fundamental resemblance among persons: the other is a "self" as much as "myself," and can also say "I." Only a relation of reciprocity may establish the feeling of "being the same" as the other and create the sense of equality and friendliness among people. Even for each one of us separately, the maintenance of a stable identity (the continuous "similarity to oneself") is achieved, according to this thinker, thanks to a kind of "promise" given to someone who counts for us. Ethical behavior is therefore more than an "obligation"; it is a free mutual affectionate consent.

Reciprocity becomes extremely important for the ethical and legal relations among all members of a society. If the moral and social rights and obligations that guarantee the harmonious functioning of any human society aren't mutually recognized and applied, the society can't continue to exist.

The ethical attitude founded on the principle of reciprocity is expressed negatively in the Hebraïc Talmud of Babylon (Shabbat): "Don't do to your fellow man what you would detest he did to you," and positively in the Christian New Testament (Luke 6:31; Matthew 7:12): "Do to others what you would have them do to you." The Koran (Sura 109:1–6) also presents a mutual recognition of the right of everyone to have his own faith.

Just ethical behavior, according to the theories of Immanuel Kant (1724–1804), demands mutual "respect" for the Other, being seen as an end *in se,* that is, for what he is himself and not as a means to acquire something else.

The Declaration of Human and Citizen's Rights, a product of the French Revolution (1789), advances that all men are born free and equal by nature and defines "liberty" as doing whatever doesn't harm others: "the exercise of the natural rights of each man has no other limits than the ones which assure to the other members of the society the enjoyment of the same rights. These limits can only be determined by the law" (Article IV).

Reciprocity in the recognition of human rights, founded on the natural equality of all human beings, becomes then the decisive factor for the limitation of personal liberty.

The Universal Declaration of Human Rights, adopted by the United Nations in 1948, starts with the following article: "All human beings are born free and equal in dignity and in rights. They possess reason and conscience and should act towards each other in a spirit of fraternity."

The notion of "fraternity" already accompanied those of "liberty" and "equality" in the well-known declaration of the French Revolution. Reciprocity in social life should, according to this point of view, not only refer to mutual respect but also be extended to a true "solidarity," a kind of support like the one found among brothers and sisters.

There have been many different opinions concerning the reciprocity necessary for the proper functioning of human societies and the reasons why reciprocity is chosen.

Humans being by nature "social animals," as Aristotle pointed out, some thinkers considered that it is by reasonable necessity that human beings, when they come to live together in a society, conclude a kind of "social contract," a common agreement on what they will consider as "just" and "unjust," on which the rights and obligations, as well as the whole legislation of their particular society, will be founded (see, for example, the theories of John Locke, Jean-Jacques Rousseau, and Immanuel Kant).

Others thought that it's only by the inevitable submission to a power higher than their own that people accept the least possible limits on their innate egoism, expressed in the simplest way as the essential instincts for survival and for the continuation of the species (for example, Sigmund Freud considered all culture to be founded on the obligatory "sublimation" of the libido), or as a will for absolute power, for the most extreme positions (like the one advanced by Friedrich Nietzsche).

Thomas Hobbes (1588–1679) declared also that "men in a state of nature, that is a state without civil government, are in a war of all against all." This philosopher believed, however, that under these conditions, "life is hardly worth living." "The way out of this desperate state is to make a social contract and establish the state to keep peace and order." The need to preserve peace as a means to assure personal security is considered then as the "first law of nature." The second one is to accept reciprocity in the limitation of personal liberty: "that a man be willing, when others are so too, as far forth as for peace and defence of himself he shall think it necessary, to lay down this right to all things; and be contented with so much liberty against other men as he would allow other men against himself." Given the importance of the issue, Hobbes supports an extremely authoritative version of the "social contract."

The utilitarian believes that a "rational egoism," where everyone cares for his or her own interests and pleasure, although without causing any damage to others, is the only point on which members of a society need to agree to be able to have the best possible common life.

This kind of necessary "reciprocity" in the recognition of each person's freedom and rights doesn't always imply a sense of true unity in a society. We may go even further, saying that not even equality among all members of a society could be founded on this elementary conception of "reciprocity." Indeed, if there is common recognition of a certain hierarchy in the distribution of rights or power within a state (every social class recognizing the other classes' position), reciprocity might very well contribute to the creation and the maintenance of a society of inequalities. Revolutionary movements are based on a "withdrawal" of reciprocity for the acceptance of the status quo, at a certain historical moment, arising usually from the parts of the society who don't enjoy the same privileges as the others.

Reciprocity is, as we see, particularly linked to the idea of "justice." John Rawls (1921–2002) tried to moderate the negative impressions given by the utilitarian individualistic view by establishing his concept of "justice as fairness" as a basis for the reciprocally accepted "social contract": "a society satisfying the principles of justice as fairness comes as close as a society can to being a voluntary scheme, for it meets the principles which free and equal persons would assent to under circumstances that are fair. In this sense, its members are autonomous and the obligations they recognize self-imposed." The persons participating in this hypothetical "initial" establishment of what is just in a society are considered here as "rational and mutually disinterested." This means that "they are conceived as not taking an interest in one another's interests," but Rawls thinks that the pursuit of each one's welfare separately will finally result in the fairest and most profitable common life for all.

There have been various reactions to this and other similar positions, on which a "liberal" conception of the best social organization is founded. Let us note here only two major ones.

The "communitarian" theories—of which one of the most well-known representatives is Charles Taylor (1931–)—accentuate the importance of the interrelation with others within a particular community for the realization of the best life for the individual. For these thinkers, the individual is essentially constituted through the sense of unity with others. There is no universal "natural" conception of ethical values, the stabilizers of a society, nor any abstract notion of justice, which might guarantee a successful political structure; only the empirical aspects of "socialization" can play this role. Communitarians particularly insist

on the importance of the reciprocal recognition of the "right to be different," concerning especially cultural minorities.

The "ethics of discussion," introduced by Jürgen Habermas (1929–) and Karl-Otto Apel (1924-), valorize more than any other theory the notion of reciprocity. "Communicational rationality" defines the ethical foundations of human societies according to these philosophers. As language is the means for the actions' coordination, social life is essentially constructed on "reciprocal recognition," that is, on the intersubjectivity of interlocutors who recognize reciprocally their rational competences of communication.

The sense given to reciprocity as the crucial factor of social equilibrium (we might indeed call it the "cement" of a society) doesn't imply any other community than the one accorded by the human rational faculties, and the only necessary background for any agreement of social import is the possibility of arriving at common definitions.

It is perhaps an ingenious way to respect the liberty of thought and the equality of all, as well as to leave the door open for various definitions of reciprocity at the sociopolitical level as a result of discussion among the members of each society.

— *Aikaterini Lefka*

Further Readings

Apel, K. (1998). *Aueinandersetzungen* (*Debates*). Frankfurt-am-Main: Suhrkamp.

Habermas, J. (1981). *Theorie des kommunikativen handelns* (*Theory of Communicative Activity*). Frankfurt-am-Main: Suhrkamp.

Hobbes, T. (1998). *Leviathan* (J. C. A. Gaskin, Ed.). Oxford: Oxford University Press. (Original work published 1651)

Rawls, J. (1971). *A theory of justice.* Cambridge, MA: Belknap Press.

Ricoeur, P. (1992). *Oneself as another* (K. Blamey, Trans.). Chicago: University of Chicago Press.

Redfield, Robert (1897–1958)

Robert Redfield, prominent anthropologist and Dean of the Social Sciences at the University of Chicago from 1934 to 1936, applied a functionalist anthropological perspective to his comparative studies of Mexican communities at different stages of modernization.

Born in Chicago, Illinois on December 4, 1897, Redfield was the son of a prominent corporate lawyer, and his mother was the daughter of the Danish consul in Chicago. Redfield received his bachelor's degree (1920), law degree (1921), and doctoral degree in anthropology (1928). Following his marriage to Margaret Lucy Park (1920), he visited Mexico where he became interested in ethnology. Upon his return to Chicago, Redfield was encouraged by his father-in-law, Robert Park of the Chicago School of Sociology, to study anthropology. The Chicago School was composed of distinguished sociologists who developed a social psychological perspective to view social change and social life. Among them, William I. Thomas, John Dewey, and George Herbert Mead dramatically influenced Park and the study of urban society and social change. In 1927, Redfield began teaching at the University of Chicago, and later became professor and dean (1934). He became a close friend of the university president, Robert Maynard Hutchins, and organized the Atomic Energy Control Conference (September, 1945) designed to help America adapt to the consequences of atomic weaponry through "world government." In 1953, he became the Robert Maynard Hutchins distinguished service professor.

Redfield became interested in the modernization of small scale or primitive societies, focusing on communities in Mexico during his field research projects of the 1940s and 1950s. His comparative studies of four Yucatan communities were published as *Tepoztlan: A Mexican Village* (1930), *Chan Kom: A Maya Village* (1934), *The Folk Culture of Yucatan* (1941), and *A Village That Chose Progress* (1950). He became the most influential anthropologist to focus on the process of social and cultural change in the development of folk-to-urban societies and, together with the University of Chicago sociologists (the Chicago School), had an immeasurable influence on anthropology and sociology, especially social anthropology and the process of acculturation.

Influenced by the work of Milton Singer, he later expanded the focus of his studies to include cultural change as an historical study of civilization in *The Primitive World and Its Transformation* (1953), *The Little Community* (1955), and *Peasant Society and Culture* (1956). These works reflected his multidisciplinary approach to anthropological inquiry,

emphasizing a diversity of anthropological method and a universal perspective to examine human culture.

In 1930, Redfield was appointed a research associate at the Carnegie Institute of Washington. During his tenure he conducted field research in Yucatan and Guatemala while developing a historical paradigm of folk society and urban society including relative size, isolation, and homogeneity. He applied the paradigm in a controlled comparative study of the four Mexican communities—Merida, the capital city; a provincial railroad town; a peasant village; and a tribal forest community.

Redfield's works, especially *The Primitive World and its Transformation,* are required reading in social anthropology. Influenced by the social change theories of sociologists Ferdinand Tonnies and Émile Durkheim, his theory of cultural transformation from folk to urban ("civilized") society with resultant secularization, individualization, cultural disorganization, and anomie was widely accepted by sociologists and later social anthropologists. In the 1950s, he articulated his theory to other anthropologists via a series of lectures at universities in China, Europe, India, Puerto Rico, and the United States, later published in articles in the two-volume *Papers* (1962–63), which was edited by his daughter, Margaret P. Redfield. The articles capture his evolutionary conception of cultural history with progressions of heterogeneity and differentiation in social life as well as his universal perspective of anthropology and the humanities to research the reality of human experience.

Above all, Redfield was a humanist committed to freedom of thought and expression who inspired a generation of anthropologists and sociologists. His theory of cultural transformation, a historical timeline of dynamic social change in sociocultural evolution—from undifferentiated small-scale society featuring rural-agricultural social life with hegemony and cohesiveness to differentiated large-scale society featuring urban-industrial social life with heterogeneity and individuation—is a major contribution to the theory of social change embraced by scholars of today. His typological analyses of orthogenetic cities, wherein a moral normative order of folk culture pervades institutionalized social life in religion and customs, and heterogenetic cities, wherein folk culture disintegrates resulting in social disorganization of the old social patterns and development of new ideas and institutions, supported sociocultural evolutionary theory of progression in technology, the division of labor and social roles, institutionalized patterns of social action, and self conceptions. Redfield advocated this theory in the classic tradition of social change, a synergy of theories developed by the European sociologists Tonnies and Durkheim and the Chicago School sociologists Thomas and Mead. The theory helped influence the early works of social anthropology and urban anthropology and sociology.

— Stewart B. Whitney

See also **Acculturation; Anthropology, Social; Anthropology, Urban; Ethnology; Folk Culture; Mexico; Sociology**

Further Readings

Redfield, R. (1941). *The folk culture of Yucatan.* Chicago: University of Chicago Press.

Redfield, R. (1953). *The primitive world and its transformations.* Ithaca, NY: Cornell University Press.

Redfield, R. (1956). *Peasant society and culture: An anthropological approach to civilization.* Chicago: University of Chicago Press.

Reichard, Gladys (1893–1955)

Gladys Reichard was born in Bangor, Pennsylvania on July 17, 1893. Her family was of Pennsylvania Dutch heritage and she was raised in a Quaker household. After graduating from high school, she taught in the public schools for six years. In 1915 she enrolled in Swarthmore College where, in 1919, she received her AB in classics. She received a fellowship for graduate study and entered Columbia University in the fall of 1919. There she joined a large group of women who worked with Franz Boas. She received an MA in 1920 and began assisting Boas in his classes at Barnard College in the 1920–1921 academic year. In 1925, after receiving her PhD in anthropology, she began teaching full-time at Barnard College, where she remained on the faculty until her death in 1955.

She is widely considered an exceptional linguist and an extraordinary ethnologist. While her main scholarly focus was on Navajo people and culture, she

also studied Coeur d'Alene grammar and Melanesian design. Early in her career, she won a New York Academy of Sciences Prize for her monograph *Melanesian Design* (1932). But it was her work with the Navajo that would give her recognition as the most important female anthropologist to have studied with the Navajo, the largest Native American population in the United States.

She experimented with new forms of ethnographic writing, producing three descriptive accounts of Navajo weaving, family life, and ritual. The first, *Spider Woman* (1934), is a narrative ethnography centering on the trials of learning to weave, interspersed with descriptions of sheep dipping and a healing ceremony. The second, *Navajo Shepherd and Weaver* (1936), is a more technical monograph about Navajo weaving, while her third book, *Dezba: Woman of the Desert* (1939), is a novelistic account of Navajo life centering on the female head of an extended family. In this work she reveals that for the Navajo, there is an intimate connection between religious belief and physical health.

Beginning in the mid 1930s and continuing throughout the 1940s into the 1950s, she focused on the study of Navajo language and religion. She lived in the home of a Navajo curer and, together with the artist Franc Newcomb, published *Sandpaintings of the Navajo Shooting Chant* (1937), which includes a translation of the Shooting Way myth and a symbolic analysis of the sandpaintings. These paintings were reproduced in both line art and color in the book. Two years later, she published a sequel, *Navajo Medicine Man: Sandpaintings and Legends of Miguelito* (1939), in which she included a fuller discussion of the relationship between these paintings and the myth.

By the 1940s, she undertook a broader analysis of Navajo language, belief system, and religious practice. In her monograph *Prayer: The Compulsive Word* (1944), she outlined the content and structure of Navajo prayers. But her most important work, *Navaho Religion* (1950), is a two-volume study. In the first volume, she discusses Navajo ritual and symbolism, while the second contains a concordance of Navajo supernaturals, ritualistic ideas, and rites.

— *Barbara Tedlock*

See also **Boas, Franz; Navajo**

Further Readings

Lamphere, L. (1993). Gladys Reichard among the Navajo. In N. Parezo (Ed.), *Hidden scholars: Women anthropologists and the Native American southwest* (pp. 157–181). Albuquerque: University of New Mexico Press.

Reichard, G. (1950). *Navaho religion: A study of symbolism.* New York: Bollingen Foundation.

Religion

religion *(Fr. religion, It. religione, Ger. Religion)*

Hardly any term of the intellectual life seems to have such multifarious meanings as *religion.* Religion is of great importance for the development of mankind and its history, as it represents the human reaction to an extrahuman holy, transcendent, and divine object. The term religion has its etymologic and historical roots in the Roman world, unlike the term *faith,* which has its origin in the New Testament Paulinic word *pístis* (Greek), or *fides* (Latin). The Latin noun *religio* originates from the verb *re-legere,* which has the various meanings *to do sth. diligently, to do sth. again, to re-read sth.,* as M. T. Cicero has also uttered. The prefix *re-* could even be translated as *to do sth. diligently again and again.* That includes the careful execution of cults prescribed by law cults, which were valid only with exact observance of all these prescriptions. The Latin term *religio*, therefore, expresses in classical Roman culture the meticulous observance of cults and the consequent respect of man for their gods. Friedrich Heiler correctly puts the verb *re-legere* opposite to the verb *neg-legere* (to neglect). The derivation of the noun *religio* from *religare* (to connect, to reconnect) is in general to deny as one can see in it a feeling of an inner attachment to something transcendent, which was strange to classical beliefs. *Religio* in its character is in Roman antiquity more a virtue than a state of feeling. The diligent performance of rites was connected with a kind of *pious awe* that did not necessarily assume that the person who did the religious acts was inwardly moved:

> Even after a precise analysis we will not be able to understand the feelings of a Roman when saying the word *religio:* the peculiar connection of awe and

> diligence towards the gods that did not request an inner attachment. It is impossible for us to feel and comprehend this Roman *religio* and it will consequently always be strange to us. (Feil, 1986)

Just this matter makes the Roman *religio* incomprehensible for us, the adjective *religiosus,* which, according to Friedrich Heiler "initially marked a place or day as sacred," is now applied to characterize people and means "pious" and having "fear of God."

In another, later development, *homo religiosus* means "member of an order," a person who lives according to the "evangelical vows" (poverty, chastity, obedience), and wants to be a good example to others in his religious life. From this meaning, maybe especially from the word *pious,* the noun *religion,* which may not be equated with the Latin noun *religio,* came into the Christian-shaped, Western culture.

The definition of religion as "devoutness or expression of devoutness" shows only inaccurately the full meaning of the word. The *fides quaerens intellectum* ("faith that searches for insight") is also included in the concept of religion. In Christian antiquity, with St. Augustine, and in the Middle Ages, with St. Thomas Aquinas, *religio* means Christianity, the Christian religion alone. Non-Christian religions could only be called *lex, secta,* or *fides.* The term *lex* has a universal meaning, according to our expression "denomination or total structure of life." There is also a *lex Christianorum,* which means "doctrine and law of the Christian religion." The development of the term religion is by no means steady or logical. With the help of historical development, beginning with classical antiquity up to the *Augsburger Religionsfrieden* in 1555, which is characterized by the motto *cuius regio, eius religio* ("whose region, whose religion"), Ernst Feil was not able to find a continuous development to the modern term religion. Religio cannot be translated by or equated with religion in today's meaning.

Leaving aside the Christian context of the word religion, one can define it as a relationship of man to a personal or impersonal transcendent, in whatever shape (be it a divine *persona* or *impersona*) of *the Real.* In other European and non-European languages, the meaning of the Western-Christian term religion changes from *sth., which is owed to the transcendence* to *law/doctrine* and *eternal, never-ending structure.* Apart from the more subjective *faith,* the term religion has a more objective meaning, similar to the distinction between *belief* (personal belief, conviction) and *faith* (universal faith, religion).

After this short etymological and historical study, we will now go on to describing the paradigmatical development of the modern term religion. According to Rudolf Otto (1925), a religion that believes in a deity of imaginable terms, is "rational." He goes

Source: © iStockphoto/Simon Droscher.

further on the objectivity of a religion but in the same context emphasizes the "contrast between Rationalism and profounder religion." Gustav Mensching also sees *the Sacred* as united with religion. He calls "religion" an "experienceable encounter of man with the Sacred" and an "answering act of man who is lead by the Sacred." With the rationality of terms only, one cannot do justice to the term religion. Typical traits of religion are, according to Otto, the *tremendum,* the "awefulness," that shakes man in awe of God, the mysterious, completely different being. But one has to differentiate this form of fear from the "natural, ordinary fear" of man, the "general world-fear." The *tremendum* derives from a "numinouse dread," that at the same time terrifies and fascinates man. Religion thus is simultaneously the *fascinans:*

> The qualitative *content* of the numinous experience, to which "the mysterious" stands as a *form,* is in one of its aspects the element of daunting "awefulness" and "majesty," which has already been dealt with in detail; but it is clear that it has at the same time another aspect, in which it shows itself as something uniquely attractive and *fascinating.* (Otto, 1925)

At the beginning of his book *The Sacred and the Profane* (1957), in which he focuses on the nature of religion, Mircea Eliade deals with Rudolf Otto's reflections. Eliade describes in his book the manifestations of religion and *the religious* in view of a world that dissociates itself more and more from religious dimensions. But even in a secular world, there is something sacred that is characterized as the opposite of the profane. It is always the same mysterious process: the *completely different,* a reality that is not of our world, manifests itself in things that are components of our natural, profane world.

The religious man Eliade speaks of several times, *Homo religious*, wants to live as long as possible in the sacred universe. The word *sacred* describes the dimension of the religious. This dimension surrounds and in some ways carries and holds the religious man. The secular man, who can live without any religious feeling, has a completely different experience, a secular experience of his environment. He lives in a desacralized world. The religious feeling has to find its way in another, maybe hidden, way. So he, the secular man, is differentiated from the *Homo religious.*

A good century and a half before Eliade, Friedrich E. D. Schleiermacher spoke of religion as a "feeling," and before him, Jean-Jacques Rousseau did so. In his speeches *On Religion* (1799), Schleiermacher spoke of religion as a "feeling of infinity" and in *The Christian Faith* (1821/1822) in Section 4 as *Gefühl schlechthinniger Abhängigkeit* ("feeling of quintessential dependence"). *Quintessentially dependent* means here "to be conscious of a relation to God." *Quintessential* means "absolute," to "be free of all things." According to Schleiermacher, everyone is shaped by two basic feelings: the feeling of dependence, which makes us the way we are through someone/something else, and the feeling of freedom, which makes something/someone else the way it/he is. The feeling of the *quintessential dependence* is related to the being of man in a specific way through the transcendent and is related to the fact that man is held and carried by the transcendent.

A quintessential feeling of freedom or a quintessential freedom cannot exist, for the transcendent in its nature cannot be created as a matter of our self-acting, which would be the condition for a quintessential feeling of freedom. This definition of the feeling of freedom shows in itself that we can only be dependent. The reason for this is that we can only shape these things with our human feelings of freedom, which are in their nature not transcendent. The transcendent does thus not come from human creativity. The transcendent is more the origin of the things that we can shape. Schleiermacher calls this transcendent "God," outlined by the feeling of quintessential dependence.

If a man feels this quintessential, absolute dependence, then he also feels the relationship to God. In God only can one have the feeling of freedom, because He gives humans the possibility to create things the way they are through human will. Only in quintessential, absolute dependence in the relationship with God, does man get his feeling of freedom. So the basic stage of man, which is shaped through the quintessential dependence and the feeling of freedom, is made possible. In Goethe's *Faust* (1808), religion is characterized as a feeling, too. Faust's answer to the *Gretchen-Frage* is: "Call it, as you like: Call it luck! Heart! Love! God! I do not have a name for it. Feeling is everything; the names mean nothing."

Immanuel Kant's work is in strong contrast to the definition of religion as feeling: There is no way that

one could conclude the certain feature of direct divine influence by a feeling, as is shown by Kant's work *Die Religion innerhalb der Grenzen der bloßen Vernunft* (*Religion Within the Limits of Mere Reason*) (1793). Furthermore, religion must be based on reason alone in order to be universal. The religion has to be a *reine Vernunftreligion* (pure religion of reason). However opposing these two definitions of religion may be, the "feeling," as Schleiermacher calls it, and Kant's "pure religion of reason" coincide, though, in the fact that religion is something inward. In this way, at about 1800, a concept of internal religion developed, which proved to be effective up to the 20th century. This is portrayed especially by the statements on religion by Ernst Troeltsch, in 1895: Religion "is fluent and vivid at any time, depending on the direct touch of God, it is internal, personal, individually and abruptly in the highest degree."

Source: © FreeStockPhotos.com.

We can regard Paul Tillich's works as examples of the effective power of the concept of religion. He goes away from feeling as a determination of religion, in a different way than Immanuel Kant, as religion stays in this connection to the pure subjectivity of emotion; and thus declines, as religion loses its seriousness, its truth and its highest sense, and stays empty without a highest content. In his essay *Religion als eine Funktion des menschlichen Geistes? (Religion as a Function of the Human Mind?)* (1955/1956), Tillich defines religion as "something that concerns us immediately," in the deepest sense of the word. *What concerns us immediately* becomes tangible in all creative functions of the human mind. But this does not mean that religion is a fiction of the human mind that is created by man himself.

Similar to Schleiermacher, Tillich claims that man's mind was able to be creative in relation to himself and his world, but he could not be that in his relationship to God. It is more likely that it is meant that religion contains all areas of the life of the human mind, as it is the substance, the basis, and the depth of the human intellectual life. In this, however, religion is not based in any kind of function of the mind; it is universal. Religion is consequently *das Unbedingte* (the unconditioned component) in every situation. At a different part, Tillich characterizes religion in 1928/1929 as follows:

> In every religious conscience, the first and basic thing that carries everything, is a conscious of the unconditioned, the inevitability of what is given in the religious reality, an awareness of what concerns me concretely and absolutely, the decision between life and death in a way which goes beyond the physical being or not being. . . . If every man, if all parts of our lives are concerned by what is meant with the concept of religion, this concept grows to be universal in its being unconditioned. It grows to something that fits for all parts of reality and for everyone in reality. (Tillich, 1964)

According to Tillich, being moved by religion is always related to a *religious object:* "It may be expressed as the inexpressible but it is expressed; and in being expressed, it includes a community, to hear, to perceive and to transmit." In this statement, Tillich expresses two things: On one hand, he wants to show that religion is always related to a content that is inexpressible in the end, and on the other hand, he portrays the social dimension of religion. The objectivity of religion is acquired by this social dimension;

nobody is on his own in feeling any kind of religious emotion, in being religiously moved. According to Tillich, religion is consequently situated in the human, who is touched by a *offenbarten Unbedingtheit* (revealed unconditioned being). This can generally be applied to everyone. The feeling of being touched is always related to a religious object. In the *religious reality,* however, things are always mentioned that go along with a secret consciousness: "*tua res agitur* [Horaz, *Epistulae.* I, 18, v. 84]: You, your issues, are concerned!"

Two definitions of the concept of religion Tillich gives differ crucially from the traditional one: First he speaks of the *autonomous religion,* which does not know a representational God and consequently no form of prayer either. Despite this, religion is not ungodly or impious. It just knows no kind of ecclesiastical objectification of God. With mysticism, it is different again; mysticism elevates itself beyond the objectification of God. Second, in his essay *Christianity and the Encounter of the World Religions* (1961/1963), he mentions "quasi-religions" that are similar to a religion and have some features in common with a religion, but they are only related to secular things and are consequently secular institutions. Tillich speaks of fascism and communism as "most extreme examples of quasi-religions today" because "they are radicalizations and transformations of nationalism and socialism, respectively, both of which have a potential, though not always an actual religious character." Tillich here differentiates between *quasi-religions* and *pseudo-religions* that pretend intentionally to be similar to religion. Due to Tillich's considerations, especially, the expansion that the concept of religion underwent since the beginning of the 19th century becomes clear.

Quasi-religions and pseudo-religions must be strictly distinguished from the traditional religion, by others (such as Eric Voegelin and Raymond Aron), seen as a *political religion* in another concept. So, an explosive nature is exhibited in the relationship between religion and politics, as it is expressed in the concept of political religion, and furthermore in the concepts of *state religion* or *civil religion.* The roots of the term political religion as *religio politica* go back to the early 17th century. Since the 1930s, it served to classify the political totalitarian mass movements of this time in a critical attitude toward ideology. But this modern political religion must be clearly distinguished from the political religion in classical antiquity and the later concepts of state religion and civil religion that tried to institutionalize the relationship between religion and politics.

All in all, it is possible to denote religion as something that is situated in man and must be defined as a relationship and interchange between man and a transcendent reality that is relevant for him. The regard to transcendence, however, is not only for religion a

decisive criterion. Religions are, rather, connected by a kind of *Familienähnlichkeit* (family resemblance), as defined by Ludwig Wittgenstein, and thus partly determine each other. They demonstrate similarities that connect them. But these similarities must not necessarily be alike in all religions. Regarding those similarities, the reference to transcendence plays an important role, as well. According to John Hick, another fundamental family resemblance, in addition to the reference to transcendence, is the soteriological content of religion, which describes the ability of a religion to redeem and give salvation. This quality is a feature that all religions have in common in various manners, however different their contents and traditions may be. Hick states that the validity of religious traditions is also measured accordingly.

The modern concept of religion is carefully defined as *generic term* by Ernst Feil, as a marking that slowly has grown in importance in modern age and in no way portrays the original meaning of the word religion, as its meaning does first describe all imaginations, attitudes, and actions concerning this reality, which humans accept as and call powers or power, spirits or demons, deities or God, the Sacred or the Absolute, or just transcendence. In the end of the first part of his study, however, Feil makes clear that religio/religion was not used as a collective name for each belief and as a generic term, in which various beliefs are summed up. From antiquity up to the *Augsburger Religionsfrieden* in 1555, the term religio was only used in a very narrow sense: in the beginning with reference to the exercising of the cult prescribed by law, and later with regard to the Christian denomination. It was long after this that religio/religion underwent an extension of its meaning that led to the modern understanding of religion.

Religion is more than the mere name of a belief; it expresses that man is concerned about something that is beyond him. Summing up, one could characterize religion as follows: First, there is no generic term for all religions of mankind. Second, there is no term that can include all aspects of what is nowadays meant by "religion"; even all these terms together cannot cover everything. Third, in contrast to the modern meaning of religion, earlier terms put the emphasis on the external practice of religion, on the observance of ritual instructions and regulations, and obedience to religious law. These terms, however, are neither unambiguously classified nor do they appear in an outstanding function. It is this final characterization that portrays the broad conceptual frame of the modern concept of religion.

— *Hans Otto Seitschek*

See also **Religion and Anthropology**

Further Readings

Eliade, M. (1959). *The sacred and the profane: The nature of religion.* New York: Harcourt, Brace.

Feil, E. (1986). *Religio: die Geschichte eines neuzeitlichen Grundbegriffs vom Frühchristentum bis zur Reformation.* Göttingen, Germany: Vandenhoeck & Ruprecht.

Hick, J. (2005). *An interpretation of religion: Human responses to the transcendent* (2nd ed.). New Haven, CT: Yale University Press.

Mensching, G. (1959). *Die Religion: Erscheinungsformen, Strukturtypen und Lebensgesetze.* Stuttgart, Germany: Schwab.

Otto, R. (1925). *The idea of the holy: An inquiry into the non-rational factor in the idea of the divine and its relation to the rational.* London, New York: Milford, Oxford University Press.

Tillich, P. (1964). *Gesammelte Werke* [Collected works], *Vol. 5: Die Frage nach dem Unbedingten* [The question of the absolute]. Stuttgart, Germany: Evangelisches Verlags-Werk.

Tillich, P. (1988). *Hauptwerke* [Main works], *Vol. 5: Religiöse Schriften* [Writings on religions]. Berlin, New York: de Gruyter et al.

Troeltsch, E. (1962). Religion and church (1895). In *Gesammelte Schriften* [Collected works], *Vol. 2: Zur religiösen Lage, Religionsphilosophie und Ethik.* Aalen: Scientia.

Religion and Anthropology

In the late 19th century, anthropology emerged as an academic discipline against a background of intellectual foment and rapid advances in the sciences. During this formative time, religion was the subject of many travelogues, popular books, and scholarly studies. Nineteenth-century European colonial expansion, and the scholarship it engendered, exposed the Western world to a large number of different religious belief systems, which challenged many Western assumptions about religion, and which would

Source: © iStockphoto/Martin de Wit.

eventually contribute to significant changes in Western Christianity. New approaches to Biblical studies, such as Higher Criticism, embraced this new scientific and cultural knowledge, but there were religious reactions against the social and intellectual changes taking place as a result of this new knowledge. The Holiness/Pentecostal movement and the rise of fundamentalist Christianity in the late 19th and early 20th centuries were types of revitalization movements that developed strong anti-intellectual traditions that resisted the objective, scholarly study of religion, the theory of evolution, and the materialistic naturalism of the scientific worldview.

A number of 19th-century scholarly studies about religion were concerned with understanding the origin of religion and concerned with the development of religious practices, which paralleled a similar concern in the biological sciences with the origin of life and with evolutionary change. Later, more anthropological studies would lose interest in the question of origins and become more concerned with social aspects of religion, or with the symbolic nature of religious systems.

In the mid-19th century, F. Max Müller, who studied Indian religions, proposed that religion began when people personified the forces of nature. From his perspective, such personifications were a mistake, or "disease," of language, which meant that religion was little more than a cognitive mistake or delusion. He called this view *naturism.* All human beings have had to deal with forces of nature that terrified them, such as tornadoes, hurricanes, earthquakes, floods, and so on, and all human beings in primitive societies have been subject to the same mistakes of language. So, naturism provided an explanation for the universal presence of religion in all human societies.

Edward Tylor, in *Primitive Culture,* suggested that it was a belief in spirits that led to the origin of religion. Death is a universal human experience, and, according to Tylor, the belief in spirits began when people, faced with explaining the difference between "living" and "dead," hypothesized the existence of a "spirit" that was present in life and absent in death. He called this idea *animism.* Once human spirits were hypothesized, it was only a short intuitive leap to hypothesize other spiritual beings. For Tylor, elaboration on the belief in spirits explains the origin of religion.

Another scholar, R. R. Marett, in *The Threshold of Religion,* proposed that a belief in a powerful impersonal force, which pervaded the entire universe, preceded animism, and was, therefore, the beginning of the development of religion. He called this belief in a powerful, impersonal force, *animatism.*

Émile Durkheim offered a more sociological perspective on the origin of religion in *The Elementary Forms of the Religious Life.* He saw religion as a collective behavior that began when people categorized themselves after the patterns of nature, and then abstracted those categories into symbols, and, finally, worshipped those symbols with specific rites. Essentially, a society worshipped an abstraction of itself. He believed this system to be the earliest form of religion and called it *totemism.*

Cultural anthropology eventually moved away from trying to explain the origin of religion in human societies but has retained the concepts of naturism, animism, animatism, and totemism to describe various aspects of religious belief systems. The underlying assumption of those four concepts, however, that disturbed religious people in the Western world during the late 19th century was that the supernatural did not exist and that only the natural world was real. Many religious leaders and scholars during that time

saw the rise of materialistic naturalism in the sciences, humanities, and in popular thinking as an assault on faith, and as an attack on the institutional legitimacy of religion.

Cultural anthropologists have since developed a number of explanations of religion that have avoided the question of origins, but all have retained some form of materialistic naturalism as a foundational assumption. Marxist explanations depicted religion and religious belief as fictions that supported the *status quo* and that maintained class differences. Functionalists, like Bronislaw Malinowski, A. R. Radcliffe-Brown, and E. E. Evans-Pritchard, explained religion as providing explanations that satisfied human needs or maintained social structure. Cultural material explanations, like those of Marvin Harris and Roy A. Rappaport, saw religion as doctrine and ritual that supported cultural adaptations to the environment and acted as feedback mechanisms to keep complex ecological systems stable over time. Finally, symbolic anthropologists, such as Clifford Geertz, viewed religion as a system of symbols that ascribe meaning to the universe and to existence.

Because of the naturalistic assumption of these theories, the intellectual divide between anthropologists who study religion and religionists who study religion is at least as great today as it has ever been. This situation presents many epistemological and practical problems for the ethnographer doing research.

Anthropologists doing fieldwork frequently encounter explanations and views that differ markedly from the materialist explanations and views characteristic of a Western scientific perspective. This creates a representational dilemma for the researcher. Robert Shanafelt points out that we cannot simply ignore the truth value of what our informants tell us, as if it did not concern us, because whether or not our informants are correct determines whether or not our explanations of their beliefs and behaviors make sense. Consequently, he says that it should be an anthropological concern whether or not the supernatural exists. So, while anthropologists may accurately depict their informant's claims and experiences concerning the supernatural as true within the informant's own religious system, that depiction is simultaneously, either implicitly or explicitly, painted as false by the naturalistic assumptions in anthropology. Thus, the anthropologist's work becomes a negative judgment of the informant's worldview. Also, invoking cultural relativism in our approach does little to help; either we suspend our value judgments, or we do not. We cannot have it both ways.

There is no easy resolution to this difficulty. Clearly, the naturalistic assumption in anthropology and in the sciences is supported by an incredible amount of empirical data. Equally clear is the fact that many religious people reject that assumption in favor of some supernatural explanation. So, how does the anthropologist respect and value perspectives that he or she believes to be false?

On December 4, 1998, at the 97th meeting of the American Anthropological Association in Philadelphia, there was a session titled, "The Spirit Hypothesis: Scientific and Participant Validation." Papers were presented by Antonia C. Mills, David J. Hufford, Michael J. Harner, and Yves Marton, who was the session organizer. Helmut Wautischer chaired the session, and Edith Turner was the discussant. Mills' paper argued that anthropology, and other disciplines, knew too little about "soul-stuff . . . to discount nonwestern conceptions as invalid." Hufford discussed the "spirit hypothesis" and why it was desirable to systematically investigate it in anthropology, regardless of whether or not the spirit hypothesis was true, false, or indeterminate. Harner pointed out that the spirit hypothesis was not falsifiable, in the Popperian sense, and that the scientific view—that spirits do not exist—was also not a falsifiable position. Harner also argued that spirit encounters are empirical facts to shamans, based on their own experiences, and not just matters of faith. Finally, Marton explored how religious leaders and spiritual leaders, compared to anthropologists, differently interpret evidence.

That session was so well attended that every square foot of floor space had someone occupying it. After the chairs filled up, people sat on the floor and overflowed into the hallway, and so many questions followed the discussion that the session ran over its allotted time.

A number of questions and discussion also concerned "people of faith" in anthropology. The importance of this session is that it has generated much subsequent discussion and research. This session highlighted what remains an important problem in anthropology.

In spite of the materialistic and naturalistic assumption that divides anthropology and religion, some aspects of anthropological research have proven useful in religious studies. Anthropological archaeology, linguistic anthropology, and cultural anthropology have all made contributions to studies of the

world's sacred texts. Likewise, cultural and linguistic studies have produced many missionaries that are more sensitive to the cultural differences of the people they proselytize. Also, courses whose content is largely anthropological can be found in religion departments at a lot of faith-based colleges and universities. Such courses are offered to a number of different majors: intercultural studies, missiology, pastoral ministry, theology, and Bible majors, to name a few. Apparently, in many areas not directly associated with the supernatural, there is plenty of room for anthropology to inform religious studies.

The study of religion will continue to be important to anthropology, and, no doubt, the results will also continue to be of interest to religious and spiritual leaders, whether or not they accept the anthropological view.

— *Richard R. Jones*

See also **Animatism; Animism; Anthropology of Religion; Anthropology, Cultural; Functionalism; Marxism; Materialism, Cultural; Naturalism; Totemism**

Further Readings

Durkheim, E. (1915). *The elementary forms of the religious life* (J. W. Swain, Trans.). London: George Allen & Unwin.

Harner, M. J. (1998, December). *Science, shamanism, and spirits.* Paper presented at the 97th Annual Meeting of the American Anthropological Association, Philadelphia, PA.

Hufford, D. J. (1998, December). *The priority of local observation and local interpretation in evaluating "the spirit hypothesis."* Paper presented at the 97th Annual Meeting of the American Anthropological Association, Philadelphia, PA.

Tylor, E. (1873). *Primitive culture: Researches into the development of mythology, philosophy, religion, language, art, and custom* (2nd ed.). London: John Murray.

Religion and Environment

Spiritual ecology may be defined as a complex and diverse arena of religious, spiritual, intellectual, and practical activities at the interface of religions and spiritualities on the one hand, and on the other of ecologies, environments, and environmentalisms. The term is applied as a parallel to other primary components of contemporary ecological anthropology like primate ecology, cultural ecology, historical ecology, and political ecology. The word spiritual is used, rather than religion, because it is more inclusive. While spirituality is part of religion, there are also individuals who pursue spiritual beliefs, values, and actions independently of any organization of adherents to a particular religion. Also, other labels for this subject, such as religion and environment, religion and ecology, religion and nature, ecotheology, and the like, are awkward and problematic in other ways. Moreover, the qualifier spiritual is used to be provocative; that is, to shake people out of their mental and social complacency for the simple reason that business as usual is a major obstacle to reducing, let alone resolving, the eco-crisis. Instead, it is increasingly recognized that a radical rethinking, refeeling, and revisioning of many human-environment relationships is imperative for the survival of humanity and the biosphere.

Since the first Earth Day on April 22, 1970, an increasing number of diverse individuals and organizations worldwide have recognized the gravity and urgency of the ongoing environmental crisis. Nevertheless, in spite of the development of numerous and varied environmental initiatives, the crisis has not subsided. Indeed, it has been getting far worse. For instance, there are many indicators that global warming is a reality. This is affirmed not only by an overwhelming consensus of the international community of scientific experts on global climatic and environmental changes, but even through personal experiences with weather and climate by the public in many parts of the world. Obviously the various secular initiatives, including the development of environmental aspects of the sciences, technology, education, philosophy, ethics, history, politics, government, law, economics, and the like, have not reduced, let alone resolved, the eco-crisis. Certainly they are necessary, but just as certainly they are not sufficient. The environmental crisis will only turn around for the better when a sufficient percentage of humanity thinks deeply enough and acts radically enough to profoundly change their detrimental impact on nature. Spiritual ecology may be the last hope for helping to trigger such a turnaround by humanity.

Since the 1990s, an accelerating number of diverse individuals and organizations have been seriously

Source: © FreeStockPhotos.com.

exploring religion as a last resort for resolving the eco-crisis. However, this movement is not offered instead of previous secular approaches, but in addition to them as a complement, with the hope of finally turning things around for the better. No particular religion is designated as the sole solution. Instead, scientists, scholars, educators, clerics, adherents, politicians, and others are probing deeply into their own religion or spirituality for elements to construct more viable environmental worldviews, attitudes, values, and practices for themselves and others. Mary Evelyn Tucker optimistically refers to this worldwide movement as religions entering their ecological phase in a second axial age.

This arena of spiritual ecology has grown exponentially throughout the 1990s to this day. Perhaps the most outstanding illustration of this phenomenon is the Web site of the Forum on Religion and Ecology (FORE) in the Center for the Environment at Harvard University. This site surveys the major religions of the world, including indigenous traditions, in relation to ecology. It is in eight languages and receives as many as 60,000 visitors monthly. The site lists ten books, developed by the FORE, each on a different religion in relation to nature. There is a summary and table of contents for each book. The religions covered in these impressive volumes are Buddhism, Christianity, Confucianism, Daoism, Hinduism, Indigenous, Islam, Jainism, Judaism, and Shinto. These books are the most visible major result of ten international conferences held from 1996 to 1998 at Harvard University. In total, they involved more than 700 participants. The books each have substantial bibliographies, as does the FORE site. In addition, culminating conferences were held at the American Academy of Arts and Sciences, American Museum of Natural History, and the United Nations. The principal catalysts in the Harvard and FORE initiatives are Mary Evelyn Tucker and John Grim of Bucknell University.

A second major academic initiative is the two-volume *Encyclopedia of Religion and Environment* with Bron Taylor as Editor-in-Chief. It includes over 1,000 entries written by 518 authors. The project was developed from 1997 to 2005. Based at the University of Florida, Taylor is on the faculty for a special graduate concentration on religion and nature established in the Department of Religion in 2003. That same year a Spiritual Ecology Concentration was implemented in the Ecological Anthropology Program at the University of Hawai'i that operates at the undergraduate and graduate levels. These two unprecedented academic developments reflect the growth and maturation of the subject with the first textbook by David Kinsley in 1995 and the first major anthology edited by Roger S. Gottlieb in 1996. The following year the first academic journal devoted to the subject was launched, *Worldviews: Environment, Culture, and Religion.*

Spiritual ecology, however, is not merely an academic matter. Proponents are serious about the ultimate cause of the ongoing and worsening environmental crisis, which they view as a moral crisis. A multitude of various practical activities beyond academia are underway. For instance, in 1995 the Alliance for Religions and Conservation was established in association with the World Wide Fund for Nature in the United Kingdom. They have developed thousands of projects throughout the world linking sacred places with biodiversity conservation. Another practical example is the United Nations Environmental Program resource volume of over 800 pages, edited by anthropologist Darrell Posey and others in 1999.

Also impressive is the UNEP book edited by Libby Bassett and others in 2000. Secular nongovernmental environmental organizations that have become interested in spiritual ecology include the Worldwatch Institute in Washington, D.C., which published an assessment of the mutual relevance between religions and environmental conservation in 2002.

Spiritual ecology is a most exciting and promising new frontier for research as well as teaching in anthropology and beyond. Of course, there are pioneers from decades ago to the present, even if they wouldn't necessarily identify themselves as spiritual ecologists. They include anthropologists Kelly D. Alley, Eugene Anderson, Susan M. Darlington, Philippe Descola, Stephen J. Lansing, Kay Milton, Richard K. Nelson, Darrell Posey, Roy A. Rappaport, Gerardo Reichel-Dolmatoff, and Leslie E. Sponsel who have authored field-based case studies on the relationships between religion and environment.

In this arena, anthropologists can apply appropriate theories and methods encompassing their traditional framework of holism, culture, ethnographic fieldwork, and cross-cultural comparisons. In particular, there is a dire need to go beyond scholarly analyses of the relevance of points in sacred texts and other literature for spiritual ecology to what anthropologists themselves do best; namely, fieldwork in communities through participant observation, interviewing, surveys, and other methods and techniques. In other words, research on spiritual ecology needs to encompass context as well as text, and actions as well as ideals. Most of all, fieldwork is needed to systematically, empirically, and critically explore the environmental consequences of religious or spiritual behaviors in specific ecosystems. Sacred places in nature provide an especially useful focus conducive to such research.

Of course, as in anything, there are skeptics, critics, and opponents. Among these are individuals who ascribe to scientism, the myopic and reductionistic pursuit of science as if it were the exclusive route to knowledge, understanding, and truth about all of reality. Other opponents include extremists ascribing to rationalism, humanism, secularism, Marxism, materialism, nihilism, atheism, and agnosticism.

Certainly not everyone needs to join the spiritual ecology movement; there are many other valid and useful ways to pursue human ecology and environmentalism. Diversity is the key to adaptive success, and that principle applies to science and scholarship as well. However, for many of those who combine intellectual curiosity with an open mind and who have a deep concern about the health of the planet that is our only home, spiritual ecology provides some hope for a better environmental future.

This is not to say that religion is an unmixed blessing by any means. Religion can be used by humans for better or worse, but for that matter, so can science, technology, medicine, education, government, politics, and law. For instance, modern science and technology can cure some horrible cancers, but they also provided the carcinogenic chemicals that permeate our air, soils, water, and food, as Rachel Carson warned in her classic book *Silent Spring* more than four decades ago.

One of the most striking positive attributes of spiritual ecology is that it has proven to be a very special arena in which individuals and organizations from quite diverse religious persuasions can actually find common ground to engage in constructive dialogue and collaborative initiatives, unlike most sociopolitical issues regarding life and death, such as abortion, capital punishment, euthanasia, terrorism, and war. Likewise, spiritual ecology is conducive to such cooperative initiatives between representatives from science and religion, this after several centuries of antagonism, and in contrast to the situation of recent controversies such as cloning, stem cell research, and other biotechnologies.

In terms of theory, one of the potential contributions of spiritual ecology is to challenge a number of binary oppositions that have persisted throughout Western intellectual history, including science/religion, rational/irrational, objectivity/subjectivity, fact/myth, nature/culture, natural/supernatural, and profane/sacred. The time is long overdue to transcend such simplistic, reductionistic, and dualistic thinking, albeit without denying the occasional validity and utility of some analytical contrasts.

In conclusion, spiritual ecology has already made a significant contribution in academia and beyond, and it still holds the promise of much greater achievements in coming decades. It complements secular approaches to dealing with the ecocrisis. As in the case of the secular approaches, spiritual ecology is not sufficient, but it is necessary. Moreover, perhaps it will finally help turn things around for a better future, one which is more sustainable, greener, just, and peaceful. Anthropology has a distinctive contribution to make in this enterprise, and spiritual ecology also

has a contribution to make to both teaching and research in anthropology.

— *Leslie E. Sponsel*

See also **Cultural Ecology; Ecology and Anthropology; Religion**

Further Readings

Foltz, R. C. (Ed.). (2003). *Worldviews, religion, and the environment.* Belmont, CA: Wadsworth/Thomson Learning.

Gottlieb, R. S. (Ed.). (2004). *This sacred Earth: Religion, nature, environment* (2nd ed.). New York: Routledge.

Palmer, M., & Finlay, V. (2003). *Faith in conservation: New approaches to religions and the environment.* Washington, DC: World Bank.

Taylor, B., (Ed.). (2005). *Encyclopedia of religion and nature.* New York: Continuum Press.

Tucker, M. E. (2003). *Worldly wonder: Religions enter their ecological phase.* La Salle, IL: Open Court.

Religion, Liberal

Liberal religion is distinct from the liberal wings of particular religions such as liberal Catholics, liberal Baptists, liberal Hindus, and the like who seek a liberal way through their own particular religious traditions. Depending on the relative strength of the anti-liberal wing of those same religions, liberal wings of the various religions will come and go, wax and wane, or sometimes develop into completely new religions. Although there are certainly expressions of the liberal religion phenomenon in religion, liberal wings of religions are not the liberal religion phenomenon itself.

Anyone or any religion or any society can manifest principles of liberal religion. These principles are expressed within a particular religion as one among its many manifestations. Or they are expressed outside religion, moving beyond institutionalized religion if liberal religious impulses have been too thoroughly repressed.

The religious truths of liberal religion are, by necessity, open to questioning. Perhaps surprisingly, this does not mean that liberal religion necessarily rejects the possibility that its truth claims are in fact eternal. It merely means that this eternality will remain a possibility, a speculation. The beliefs of liberal religion may be strongly held, but liberal religion welcomes further development, interpretation, and even rejection when proven by experience or new revelation to be inadequate or just plain wrong. Any investigation into liberal religion should beware of claims that practitioners "have no beliefs," "can believe anything they want," or "are non-creedal." Even "non-creedalism" is itself a belief and should be understood as such. That the many creeds of liberal religion are acknowledged as contingent on the process and progress of truth does not thereby render those creeds nonexistent. Liberal religion simply refuses to confer on creed the status of dogma.

Perhaps the most fundamental doctrinal aspect of liberal religion is the ultimate freedom of the individual to question all aspects of religion, even the aspect of questioning itself. This has, at times, earned the religious institutions that fully embrace the liberal religion phenomenon the name "Free Religion" or "Free Thinkers." But this liberal religious tendency is, of course, manifest in a wide range of religious institutions. This fundamental aspect of liberal religion asserts itself whenever forces within religious organizations bring traditional or historical beliefs or practices into question. Contributing to the constant reformation of religion through liberal religion, the most basic assumptions, even those understood as eternally true (for example, God's grace, the finite power of human sin) are open to interrogation and, if need be, reform. Because of this incessant questioning, liberal religion presumes neither inevitable progress (a common hope of liberal religions) nor inevitable degeneration (a common lament of the illiberal).

Liberal religion, liberal religious movements, and individual liberal religionists seek to discover the good, the true, the beautiful, and the loving for their time and place, reforming or rejecting those religions, or those individual aspects of particular religions, that do not fit the best definitions and highest aspirations. This constant pursuit acts as barometer or compass for reforming religious institutions, revealing the excesses and deficiencies to which even avatars and scriptures are susceptible. Revelation from avatars and scriptures are not by necessity rejected, but liberal religion claims that revelation is never final.

Liberal religion encourages the use of reason and emotion, science and intuition; it often does not offer

answers per se, but rather offers guidance for how to deal with situations as they arise. It is through the attempts at getting closer and closer to the divine life and the highest form of human life that liberal religion provides a way of discerning the best religious life.

Seeking to discern genuine religion, liberal religion freely investigates wisdom and understanding from every religious impulse of humankind. Through investigating and sometimes integrating aspects of exogenous religious systems, liberal religion balances insights from the various, different, similar, and sometimes stubbornly contradictory religions in the world. Liberal religion welcomes insights from poetry, art, literature, human experience, scientific discovery, and the like. Similarly, liberal religion promotes the understanding of humanity as part of the natural world. Nature is considered a source of life's ongoing revelation of itself. Through philosophical and scientific reflection, as well as through immediate experience and appreciation, the realities and lessons of nature are considered to be immanent and accessible epiphanies. Thus, liberal religion sees progress in natural sciences as progress in religious understanding.

This brings us to another liberal religion doctrinal tendency: toward belief in the accessibility of religious truth to all irrespective of their religion, social status, education, and so on. Profound religious truths are discernible without necessarily the benefit of specific religious authority such as priest, prophet, scripture, ritual, congregation, or other social construction. Liberal religion observes that all religious faith is, however, *necessarily* filtered through the authority of the individual faithful. Liberals within religious traditions know that they are the ultimate authority by which they accept the authority of their religious tradition. This does not exclude the possibility that one's particular religion might be preferred, only that this preference requires an accompanying humility based on the knowledge that religion is, on some level, autobiography.

Probably because of this humility when it comes to religious truth, liberal religion argues for broad tolerance when it comes to religious beliefs and practices of others. Tolerance of a wide diversity of religious views prevails where liberal religion doctrines prevail. Where liberal religious insights argue for intolerance, such as with the intolerance for the beliefs of Nazis or the Ku Klux Klan, they do so precisely because they believe they are serving greater tolerance.

Mysticism in religion, the socially conservative aspects of religion, and fundamentalism in religion have been and continue to be studied extensively. Liberalism in religion is less studied but no less important to understanding religion as a human phenomenon.

— David V. McFarland

See also **Hinduism; Humanism, Religious; Islam; Jews**

Further Readings

Opton, F. G. (1982). *Liberal religion: Principles and practice.* Buffalo, NY: Prometheus Books.

Reines, A. J. (1987). *Polydoxy: Explorations in a philosophy of liberal religion.* Buffalo, NY: Prometheus Books.

COMPARATIVE RELIGION

Cultural anthropologists recognize that studying the religious beliefs of a particular culture is integral to understanding the culture itself, and comparing religious beliefs across cultures provides a more comprehensive explanation of human behavior as a whole. Anthropologists know that while all societies profess a belief in some sort of religion, those religious beliefs may not be shared outside a particular society. While some anthropologists argue that anthropologists should attempt to determine the truth or falsity of religions that they study, most anthropologists are inclined toward seeking objectivity in their work. Studies of some religious beliefs, such as belief in the occult, may require scholars to suspend rationality in order to study religions from the perspective of believers.

Historically, anthropologists have studied magic within the context of understanding religion because it forms the foundation for religious beliefs in a number of cultures. Beginning in the late 20th century, however, an increased public interest in magic, responsive in part to the success

of British author J.K. Rowling's Harry Potter series about a young wizard, New Zealander Peter Jackson's adaptation of J.R.R. Tolkien's *Lord of the Rings* fantasy trilogy, and American television shows such as *Buffy, The Vampire Slayer* and *Angel,* alerted anthropologists to the need to examine beliefs in magic within the context of cultural studies of both modern and postcolonial states. Those who prefer to approach anthropology as a science have harshly criticized this new approach to the study of so-called anthropological exoticism.

Early anthropological interest in the study of the occult received a major boost in 1937 with the publication of Sir Edward Evans-Pritchard's *Witchcraft, Oracles, and Magic among the Azande,* which established a theoretical framework for the study of magic within the context of ethnography. Evans-Pritchard concluded that there were vast differences in witchcraft as practiced by the Azande in Africa and beliefs identified as witchcraft in Western societies. In an attempt to analyze witchcraft within the context of postcolonialism, Henrietta L. Moore and Todd Sanders have examined the interactions between the mores of contemporary Africa and the traditional views and practices of African witchcraft. Other contemporary African scholars such as Barry Hallen, J. Olubi Sodipo, A.K. Appiah, and V.Y. Mudimbe have also taken up the Evans-Pritchard banner, further refining the anthropological approach to the occult within the context of religious beliefs.

While most anthropological studies of magic have focused on African cultures, some contemporary scholars, such as Susan Greenwood, have examined witchcraft in Western cultures. In *Magic, Witchcraft, and the Otherworld,* Greenwood reports on her observation of witchcraft in contemporary England by focusing on comparisons of high magic, Wicca, and feminist witches. Like anthropologists Jeanne Favret-Saada, Paul Stoller, and E. Turner, who advocate experimental approaches to the study of witchcraft, Greenwood contends that the correct way to study alien belief systems is to suspend personal beliefs while participating in the rituals of the group under review.

— Elizabeth Purdy

Religious Rituals

A religious ritual is a prescribed, routinized, and ceremonial action or set of actions, the function of which is symbolic and has specific significance to the performer and the performer's community. On a very basic level, rituals are an inherent part of living. They can be seen in many forms of animal life, from ants to humans. The importance and power of ritual can be seen in the persistence of rituals in contemporary secular society. These range from greeting rituals to elaborate and highly complex governmental and national rituals. Religious rituals have additional deeply rooted meanings and functions, and they also serve as public or private displays of one's commitment to and faith in a system of beliefs. Many of the various types of rituals that can be found in cultures and traditions throughout the world share common themes, patterns, and purpose. Ultimately, however, rituals serve as vehicles to create or enhance the proximity of the rituals' beneficiaries to the realm of the divine, to influence the divine or supernatural, or to facilitate the attainment of power associated with the spirit being who is propitiated. In their enactment, rituals take individuals out of the ordinary realm of everyday mundane experience and create for them an opportunity to undergo something higher, more sublime, and closer to the divine. There are certain aspects and parts of ritual that can be found throughout the religious cultures of the world. The more common elements and themes are discussed below.

Purification and Sanctification

Because of the sacredness associated with most ritual performance, many are preceded by rituals of purification. These typically include physical cleansing of participants, ritual items, and ritual sites. Additionally, fasting, abstinence, solitude, and other similar practices may be performed. These are meant to help prepare the participants physically, emotionally, and spiritually to perform the subsequent rituals, as well as to receive the blessings, forgiveness, or powers that other rituals are meant to confer. Purification rituals may also be done on their own as a preparation for most everyday activities, from eating to working to sleeping.

Personal, Public, and Performer

When the individual who performs a ritual is a commoner or lay person, the ritual is generally a personal one. Rituals of ablution, prayer, meditation, offerings at a home altar, and so on are typically undertaken by lay persons as a part of the daily enactment of their religious beliefs. When the performer is a designated officiant, such as a priest or a shaman, then the ritual is a mediated one, undertaken for the benefit of another (usually a lay person). In such cases, the beneficiary of the ritual will likely pay the officiant, with money or goods, for the rituals performed. Most religious traditions have individuals who are specifically trained and officially authorized to perform such rituals. They are generally referred to in English as "priests," and their primary function is to oversee both mediated and public rituals. The latter are meant to draw the community into joint participation and expression of acceptance of the beliefs and values being expressed by the ritual. They also function to promote a sense of unity, in which individuals are inspired to support and promote the communal system of behavior. Indigenous cultures often have shamans who perform rituals as well. In these cultures, shamans are called upon for special and individualized rituals, such as performing exorcisms, curing illnesses, warding off curses, and mediating with the world or spirits and ancestors.

Beneficiaries

Every ritual has a beneficiary, someone or something for which the ritual is undertaken. In a personal ritual, the beneficiary is generally the person who performs it. In a mediated ritual, on the other hand, the beneficiary is the individual for whom it is performed, or the inanimate objects for which or with which the ritual is enacted. An example of the latter is a ritual done to purify or sanctify a place or object. In the process, not only is the place or thing blessed, but the objects used in the ritual may then be seen as similarly sanctified. Typically, the rituals believed to be the most powerful are mediated ones, performed by qualified and authorized officiants.

Representational vs. Presentational

In explaining the role of symbols, Roger Schmidt provides the useful bifurcation of representational and presentational. The former has emblematic value, while the latter "presents" or shares in the essence of that which is symbolized. These categories are useful in application to ritual roles and functions as well. Secular rituals are, for the most part, representational in that they are not believed to cause any fundamental alteration of the participants. Their functions and significances are generally personal, social, symbolic, and not necessarily mandatory. Thus, attendance at one's graduation ceremony, for example, is not a prerequisite to graduate. A particular type of greeting on meeting someone may be a traditional ritual but is not always required. Most religious rituals, on the other hand, are presentational. They are believed to have the potential to bring about a fundamental change in the rituals' beneficiaries as per the particular ritual performed, and they are traditionally mandatory. A blessing of food actually alters the spiritual essence of the food. A marriage ceremony actually changes the participants spiritually, as well as legally and socially.

Source: © iStockphoto/Paul Piebinga.

Not all religious rituals are presentational, however. A good example of the difference can be seen in the communion bread and wine preparatory rituals in Christian churches. During the ritual in those Protestant denominations that perform it, the bread and wine used are believed to be affected to a degree but not fundamentally changed by the ritual. Instead, they serve a symbolic, representational function. The Catholic church, on the other hand, believes that the prayers and rituals of the priest actually bring about an alteration of the substance of the bread and wine, so that they come to share in the essence of Christ's blood and flesh although their outer form remains the same. The more indigenous and traditional a religion, the more its rituals are presentational. The more westernized and liberalized a religion, the more its rituals tend to take on a representational value and function.

Periodic

A periodic ritual is one that is undertaken at regular intervals, such as daily, weekly, monthly, annually, and so forth. The purpose is to mark time, to establish or maintain a connection between the performers and their cultures or communities, and to inspire active and regular participation of members of a tradition in its beliefs and practices. They thereby help to enhance bonds between members of a religious community and their belief system. Such rituals can be either communal or individual and can be performed by the beneficiary or by an officiant. Examples include daily meditation, prayers before meals, Sunday mass, or full moon services.

Imitative or Sympathetic

Imitative or sympathetic rituals are rituals in which participants ceremonially remember or symbolically reenact special events in a religious tradition's sacred past. The Christian practices of baptism and communion, the Jewish Seder, and the annual Muslim pilgrimage to Mecca are some examples. Such rituals may be periodic, as those mentioned above, or may be performed for special occasions. An example of the latter is a ritual of healing, in which a shaman reenacts a past event when a healing occurred or imitates the behavior of a particular spirit whose function it is to dispel disease or disease-causing agents. These rituals have often been labeled "magic" by outsiders to the traditions in which they exist.

Penitential or Corrective

Most religious traditions have specific rituals that serve to cleanse a member of consequences of sins committed, bad karma, or other such actions, and to bring the member back into grace with the divine or spirit world, as well as with the community. Common elements in these include a ritual bath, ascetic practices like fasting, repetition of certain prayers, a period of solitude, and sacrificial offerings. They are to be performed with the hope, but not guarantee, that the supernatural being who is propitiated will grant forgiveness. As such, they are to be performed with an attitude of contrition and humility.

Rites of Passage

Rituals called rites of passage mark one's transition through the various stages in life, from as early as conception throughout life until death, and even afterwards. They mediate and signify changes in individuals' lives, conferring on them identity and status in their communities, taking them from one state of physical and social being to a greater one. At the same time, these rituals validate the traditions, values, and hierarchy of the culture. Drawing on the work of Arnold van Gennep, Victor Turner developed valuable theories with respect to rites of passage. Significant here is his identification of three stages that can be seen in most such rites: the pre-ritual state, the liminal or transitional state, and the post-ritual state.

Puberty rituals are typical of rites of passage and are an important part of many cultures' process of adult identity formation. They function to transition youth from a state of relative freedom and social powerlessness to one of increased power, as well as increased social and familial responsibility. Prior to the puberty ritual, young boys and girls are viewed as children; they generally have few responsibilities or powers and relatively few distinctions. During the liminal state, which can last from a few hours to days or weeks, the youth are separated from the rest of the society and undergo a process whereby they are supposed to let go of their previous state of mind and prepare for their new identity as adults. At the end of the ritual process, the participants emerge with a new identity. Males are often expected to take more responsibility for the support and protection of their families. In many cultures, they

now may be ready for marriage, and they can no longer freely mix with nonrelated females. Likewise, females become of marriage age after puberty, must now dress differently, can no longer play with their friends in the same way, must avoid all but necessary contact with nonrelated males, and so on. They are now women and are expected to fulfill whatever role their cultures assign that state. Thus, puberty rites confer more specified identities, roles, and responsibilities.

Another example of a rite of passage ritual is initiation, or ordination, into a renunciant religious order as a monk or a nun. This is a special ritual, since it is only undertaken by certain members of a culture. It essentially removes them from their families and from the society around them. At the same time, it elevates their status within that society. They are given special privileges as well as special restrictions. Their state can be viewed as one of "extended liminality," in that they always remain as separate, even when living in the midst of the society. By their leaving the traditional social order in this way, they actually help to validate it. This is because they function to serve as protectors and teachers to those who remain in and support the society.

Arts as Ritual

Dancing, singing or chanting, music, and the various forms of visual art all have religious origins and continue to be integral to most religious traditions. The creation and performance of these are seen as ritual enactments. They are often preceded by rituals of purification, and their performances are believed to bring power or blessedness. As an example, Tibetan Buddhist monks ritually create elaborate *mandala*s, or sacred designs, using colored sand. The ritual is preceded by purification rites over the site and the objects used in creating the *mandala*. The actual creation can take up to a week. Once completed, it is followed by more rituals, and they conclude by sweeping up all the colored sand into an urn. Some of the sand is given to spectators, who see it as sacred and may keep it on their home altars, while the remaining sand is poured into a flowing body of water. The ritual is typically performed to bring healing to the earth. The dismantling of the *mandala* and dispersion of the sand reflects the Buddhist view of impermanence.

Vows and Rituals

Most people who do personal rituals do so as part of a regular adherence to religious beliefs. They typically integrate the rituals into their daily lives, along with eating, working, and so forth. On occasion or for special reasons, individuals may also add vows to their rituals. These take the form of promises to fulfill certain duties or abstain from certain acts for a specified period of time. They are generally done in combination with a vow to perform repeatedly a particular ritual for a certain number of times or days. An example of this is a Christian's vow of abstinence during Lent along with the performance of specific daily prayers, or a Hindu's vow to fast on Tuesdays and make specific offerings at a Hanuman temple. Thus, vows and rituals go hand in hand. Moreover, it is believed in many cultural traditions that if one undertakes vows in conjunction with rituals, the latter will be more effective.

Rituals embody the religious tradition of which they are a part. On the empirical level, they facilitate individual identity formation while validating and reaffirming the beliefs, values, and social cohesion and stability of the community. On the spiritual level, they serve as vehicles, in one manner or another, to draw beneficiaries closer to the divine, to enhance communication with spirit beings, to provide access to supernatural powers, or to facilitate one's path to salvation or enlightenment. Some rituals are seen to have little actual power, while others are believed to be highly efficacious. Traditional cultures tend to place far more emphasis on rituals and their powers. As a consequence, the lives of their adherents are much more ritually defined and supported. Moreover, there is an increasing view that many of the problems in urbanized and westernized society are exacerbated by the lack of ritual tools and supports to address them.

— *Ramdas Lamb*

See also **Rites of Passage**

Further Readings

Grimes, R. L. (1982). *Beginnings in ritual studies.* Washington, DC: University Press of America.

Schilbrack, K. (Ed.). (2004). *Thinking through rituals: Philosophical perspectives.* New York: Routledge.

Reproduction

Reproduction in anthropology refers to the processes by which new social members are produced—specifically, the physiological processes of conception, pregnancy, birth, and child raising. In its larger sense, "reproduction" is used to encompass the processes by which societies are reproduced for the future. The term is thus fraught with biological, cultural, and political meanings; power is a central focus in reproductive studies, as those who have the power to influence the process of reproduction can control large populations for better or for worse.

The maturation of the field of the anthropology of reproduction was marked by the publication of *Conceiving the New World Order: The Global Politics of Reproduction,* edited by Faye Ginsburg and Rayna Rapp. This collection expanded the meaning of reproduction into the political arena and generated the interface of reproductive studies with wider issues in the politics of women's healthcare. From a study of anti-abortion policies in Romania, to China's one-child policy, to the displacement of thousands of women in India and Pakistan to "purify the national bodies" of both countries, the chapters in this volume called attention to the impact of national and global processes on everyday reproductive experience, most especially through the notion of "stratified reproduction," which points to transnational reproductive inequalities based on gender, race, and class. In addition, Rayna Rapp's long-term fieldwork on amniocentesis illustrates racial, class, and religious differences in how women make choices about this uncertain technology and demonstrates the linguistic power of genetic counselors to influence these choices in favor of the culturally approved choice of abortion for genetically defective babies.

Since the 1990s, most anthropological studies of reproduction have focused on what have come to be called "the new reproductive technologies" (NRTs)—technologies designed to intervene in human reproduction. From the birth of the world's first test-tube baby in 1978 to the cloning of a higher vertebrate from an adult cell in 1997, the rapid expansion of the NRTs in the latter half of the 20th century dramatically redefined the parameters of biological reproduction. The NRTs include, among many others, birth control technologies such as intrauterine devices (IUDs) and the birth control pill; assisted conception technologies such as artificial insemination and in-vitro fertilization (IVF); screening technologies such as ultrasound, amniocentesis, and blood testing; reparative technologies such as fetal surgeries performed in utero; labor and birth technologies such as electronic fetal monitoring, synthetic hormones for labor induction and augmentation, and multiple types of anesthesia; and postnatal technologies such as infant surgeries and high-tech treatment of babies in neonatal intensive care units. All of these technologies are increasingly affected by developments in biotechnology, such as genetic engineering, which have major implications for the control and management of human fertility.

Like the obstetrical forceps developed by the Chamberlen brothers in the 16th century, the NRTs have double-edged implications for women and their offspring. While those early forceps did save the lives of babies who otherwise might have died, their overzealous and ill-informed application during childbirth by male midwives and obstetricians often left the mother's body severely damaged and led to increased maternal and fetal morbidity. The NRTs have been equally problematic, often creating as many problems as they solve and causing as much damage as they repair. For example, maternal mortality as a result of ovarian hyperstimulation, and increased congenital abnormality due to multiple births, are but two examples of the "downside" of in-vitro fertilization (IVF).

Reproductive technology has affected every facet of the reproductive process, from preconception onward. To an extent, these developments respond to specific impediments to fertility: IVF, for example, was originally used to assist women with blocked ovarian tubes. Feminist critics, however, have rightly pointed to other, less woman-centered, influences shaping the development of these technologies. For example, Robert Edwards, the research scientist who helped to develop IVF, was trained in embryology and foresaw tremendous research potential from the ability to manipulate the human embryo *ex vivo.* This potential was extensively exploited in the rapid expansion of human embryo experimentation in the 1980s and the 1990s.

The encounter between a largely male medical and scientific establishment and women's reproductive capacity is very pointed in the context of IVF, which is often represented as being a response to the "desperate" desires of infertile women, but can as readily be

interpreted as a response to the irresistible scientific urge to "unveil" and indeed to redesign "the facts of life." The tremendous value of early embryonic cells—both commercially and in terms of research—has made IVF an important source of human embryonic stem cells. This fact exists in uneasy tension with women's demands for improved reproductive services. As in other historical periods, the neglect of women's reproductive needs is most evident in terms of the kinds of services that will be developed and prioritized. While new embryo therapies are used to detect, and even to eliminate, genetic disease, other reproductive priorities remain devalued and underfunded. For example, while ever more sophisticated technologies are developed to deal with the complications of labor and birth, the normal physiological needs of laboring women remain understudied and unfulfilled. The scientific evidence that does exist supports simple technologies like eating and drinking during labor; woman-centered, supportive care; and upright positions for delivery as being of far more help to birthing women than high-tech machines.

Two major influences continue to shape the development of reproductive technology in ways that are not in women's interests. One is the continuing, and indeed worsening, effects of global inequality that are borne most heavily by women and young children—especially infants. Adequate, or indeed any, access to basic contraceptive technology remains out of reach of the majority of the world's female population (despite concerns about population growth, and largely as a result of U.S. anti-abortion policy). Consequently, resource intensive and largely private fertility care is provided to a predominantly wealthy world elite. Meanwhile, enduring tragedies of high maternal and infant mortality due to preventable causes (such as malnutrition and lack of a clean water supply); inadequate access to abortion or contraceptives; and limited, nonexistent, or ineffective reproductive healthcare are the main issues affecting the majority of the world's women. In sum, proper sanitation, adequate nutrition, improved vaccination programs, access to culturally appropriate forms of birth control, access to community midwives backed by adequate transport systems, and above all, increased literacy and education rates among women remain the most important and life-saving "reproductive technologies."

At the other end of the spectrum, at the cutting edge of 21st-century medical science, we note the resurgence of a new genetic essentialism. Reproductive technology is shifting its focus in the direction of germline gene therapies (therapies that can be genetically transmitted because they modify reproductive cells). Annexed to the project of mapping the human genome, reproductive science and medicine are increasingly aimed at both the elimination of genetic pathology and the effort to reengineer the genomes of humans and other life forms. In addition to existing means of technologically assisting conception, the effort to alter human genealogy is the single most important influence on contemporary reproductive technologies. This effort is driven by enormously competitive economic forces, and by an "if we can do it, we must do it" technocratic mentality, resulting in rapidly escalating and largely unregulated technological innovation.

While some commentators argue that reproductive technologies such as the freezing of eggs, cloning by nuclear transfer, germline gene therapy, and embryo biopsy will have a radical effect on gender roles and kinship definitions, the majority of evidence demonstrates a reverse effect: the restabilization of traditional and conservative family ideologies in the face of their potential disruption. At the same time, other influences, such as the lesbian and gay movement, the increase in transnational adoption, rising divorce rates, and greater economic independence for women, have proven more influential in the redefinition of family and parenthood. Consequently, although some uses of reproductive technology have created more parenting options, such as the use of artificial insemination by lesbians, the overwhelming pattern of access to NRTs is defined by the goal of enhancing conventional parenting arrangements by married, heterosexual, and middle-class couples.

Feminist concern about reproductive technologies in the 21st century will increasingly overlap with the criticisms of biotechnology and genetic engineering raised by environmentalists and the general public. Concern about genetically modified organisms in the food chain and in medical applications will increase, particularly as the human-animal border becomes ever more permeable. The extensive feminist literature on NRTs anticipates with great precision many of the profound social, ethical, and political concerns surrounding new forms of genetic and biological determinism arising out of the attempt to alter the human genome. In addition to the effort to redefine medical and scientific priorities in relation to women's reproductive health worldwide, feminist anthropological scholarship will continue to insist

upon the primacy of fully informed reproductive decision making, in its widest sense, as a fundamental component of human rights.

— *Robbie E. Davis-Floyd and Sarah Franklin*

See also **Feminism; Fertility; Genetic Engineering; Human Genome Project**

Further Readings

Davis-Floyd, R., & Dumit, J. (1998). *Cyborg babies: From techno-sex to techno-tots.* New York: Routledge.

Franklin, S., & Ragone, H. (1997). *Reproducing reproduction: Kinship, power, and technological innovation.* Philadelphia: University of Pennsylvania Press.

Ginsburg, F., & Rapp, R. (Eds.). (1995). *Conceiving the new world order: The global politics of reproduction.* Berkeley: University of California Press.

Research Methods

Social science involves the study of people. Social research methods are based on a systematic approach to studying social phenomena. Social sciences include anthropology, sociology, economics, psychology, political science, communications, and history. Researchers in each of these disciplines are interested in pursuing explanations for human social behavior. Sociologists and anthropologists, in particular, are interested in the empirical study of human behavior from a cultural and societal perspective. Oftentimes, social scientists are critiqued for their lack of a vigorous set of research standards that tend to be more apparent in the natural science disciplines. However, social scientists adopt both quantitative and qualitative methodologies by following a measurement process that helps to ensure both reliability and validity in their work. In addition, researchers develop studies that focus on exploratory, descriptive, and explanatory societal questions.

Research Design and Measurement in Social Research

Dimensions of research design include exploration, description, and explanation. Each design supports different fundamental research goals. Exploratory research is used when the goal is to become familiar with basic facts, people, and concerns. Researchers are often able to develop a well-grounded mental picture of the social situation that is unfolding. Researchers also generate main ideas and develop tentative theories, determine the feasibility of doing additional research, formulate questions and issues for further inquiry, and develop techniques and a sense of direction for research.

Descriptive research is used to provide an accurate profile of a group as well as describe processes, mechanisms, or relationships. In addition, descriptive research gives a verbal or numerical picture of a social setting. Researchers use the descriptive approach to find information to stimulate new explanations; present basic background information or context; create a set of categories and classify types; and clarify a sequence, set of stages, or steps.

Researchers carry out explanatory research when they are interested in solving a problem or establishing an explanation for why something exists as it does. A further goal of explanatory research is to determine the accuracy of a principle or theory. Explanatory research can also be used to find out which competing explanation is better and advance knowledge about an underlying process or social relationship. Explanatory research is especially useful to build or elaborate on a theory so it is more complete, extend a theory or principle into new areas or issues, and provide evidence to support or refute an explanation.

In addition to considering the type of design in social research, researchers must be able to develop measurement standards to establish consistency and accuracy in their concepts. Measurement involves developing a set of clearly defined variables that can be compared and analyzed as precise data points. In order to develop clear, well-defined concepts, researchers must conceptualize and operationalize their variables. Conceptualization involves developing a precise definition of the idea being studied. This definition serves as the standard for empirical measurement in the social world. Without this step, it would be difficult to develop a standard for the concepts being observed. The standard helps to ensure that the measure is observed consistently and accurately throughout the research study.

A second step in the measurement process is operationalization. Researchers operationalize concepts by specifically outlining how the measure will be

Source: © Photo provided by www.downtheroad.org, The Ongoing Global Bicycle Adventure.

tested empirically. In this process, it is imperative that researchers outline data collection steps. How do we capture the concept empirically? Whether we plan to test our concepts using surveys, participant observation, in-depth interviews, archival research, or experiments, we need to clearly establish guidelines for collecting data.

Measurement varies among quantitative and qualitative research designs. The process outlined above tends to be more relevant to quantitative research designs, where the research process is more deductive and linear. In quantitative designs, the researcher usually develops a hypothesis and then seeks empirical observations that either confirm or refute the hypothesis. In contrast, qualitative research designs usually depend on a grounded theory model, where researchers use an inductive approach to developing theoretical explanations. In this case, researchers may develop a research plan that requires they gather empirical evidence prior to developing theoretical statements or hypotheses. These designs tend to be nonlinear and more flexible in how they are carried out.

Proposing Research

Developing a strong research study requires a strong research proposal. Effort spent in this process helps the researcher outline a research agenda that combines both a discussion of relevant past research and proposed contributions to the field. A proposal should include the following sections: a clear and well-defined research question or problem, a discussion of relevant literature and past research studies, a description of how data will be collected including a discussion of how variables have been conceptualized and operationalized, and a conclusion that includes ethical issues and points for further discussion.

The proposal creates a map of sorts for the researcher to follow. With a well-defined plan of study, the researcher can enter his or her study process with a clear idea of the overall agenda.

Specific Research Designs

Traditionally, social science researchers work with both quantitative and qualitative frameworks. Over time, emphasis has been placed on one research design or the other. However, more recently, there has been a push for collaboration among research designs. Different levels of depth, detail, and understanding can be accomplished through a combination of designs. For example, a field researcher concentrating on participant observation can collect rich, detailed descriptions of what she sees in the field, but may not have the data in a format that allows for any quantification for comparison. By including a survey tool, she can then compare basic demographic characteristics or other data that suits her research needs. Triangulation of methods has become accepted practice. Most social scientists agree that a combination of methods assists in helping to ensure validity and reliability.

Because of the nature of the data that is collected, most research methods are inherently quantitative or qualitative. Quantitative methods include survey research, secondary analysis, existing statistical analysis,

and experiments. Qualitative methods include field research, historical comparative research, and natural experiments. Focus groups, case studies, and content analysis can be used as either quantitative or qualitative depending on how they are employed and the suitability of the research question.

Consistently increasing in the use since the 1930s and the development of George Gallup's Gallup Poll, survey research is one of the most popular means of collecting data in the social sciences. If they are directed to a representative target population, surveys have shown to be useful in measuring popular opinion. Surveys are also used to measure attitude, behavior, knowledge, and consumer preference. Popular tools across the social sciences, surveys provide large amounts of data that can be gathered quickly, are relatively inexpensive to collect, and are easily quantified to be used for statistical analysis.

However, there are drawbacks to this method as well. Because most surveys consist of close-ended questions, the depth and breadth of the response is limited. Respondents may be choosing the 'best' response, though it may not truly represent their feelings or ideas. In addition, survey analysts have to account for a standard margin of error that can be derived from analyzing cases of missing responses, deceit, or simply misunderstanding the nature of the question.

Two additional quantitative methods that are often used in conjunction are secondary analysis and existing statistics. Each method relies on past collection of data. Secondary analysis is used when a researcher is interested in re-analyzing a study that has already been carried out. This occurs to offer a test of reliability of the study but can also serve as a means to test other cause-and-effect relationships or theoretical explanations of the variables.

Using existing statistics is slightly different. In this method, researchers are not collecting the data first hand either, but instead develop their own analytic schemata for data that has been compiled by another source. For example, researchers use U.S. Census data to analyze educational attainment by neighborhood by using zip code aggregate data and educational attainment rates by high school.

The experimental method is used most often in psychology but has been used to isolate causal factors in both sociology and anthropology. Used to isolate factors of cause-and-effect relationships, experiments are highly detailed in their design and rely on the researcher's ability to test for validity through control of the experiment conditions. Most experiments in the social sciences rely on a controlled, simulated environment, where participants are observed before and after a change to the independent variable.

Qualitative methods differ in that the form of data is not numeric but highly detailed and relies on an incorporation of thematic analysis and empirical observation. Examples of data include, but are not limited to, interview transcriptions, maps, photographs, diaries or journals, oral histories, and document analysis. Common qualitative methods include field research, historical comparative research, and natural experiments.

Field research is based on techniques of observation and analysis in a natural setting. The goal of field research is to capture a real picture of human social behavior. In order to do this, researchers study groups and individuals in their natural social settings. Researchers can take on numerous roles in the field. Roles are categorized by four distinctions: participant observer, complete participant, complete observer, and observer participant. As participant observer, the researcher acts as a pseudomember of the group. Members are aware of the researcher's role and recognize the duality of their responsibility as participant and observer. When the researcher acts as a complete participant she acts as a member of the group, keeping her identity as a researcher hidden from the group. There is some question as to what level of deception is acceptable. As a complete observer, the researcher remains undetected and unnoticed, reporting observations. The fourth role the researcher assumes is the observer as participant. In this situation, the researcher is a known, overt observer, however she has limited contact with members. She remains slightly detached from the group, which some argue allows for greater objectivity.

Two issues emerge in terms of validity of field research data. Researchers need to consider internal consistency, or whether the data are plausible given all that is known about a person, group, or event, not considering forms of human deception. External consistency, or whether observations and data can be verified or cross-checked with other sources of data, needs to be considered as well. Both of these issues rest with the research design and operationalization of the research question.

Historical comparative research is another form of qualitative research. Sources for this data include

archives, library collections, and memory studies. Historical comparative researchers look for three things in their evidence: implicit conceptual framework, particular details, and empirical generalizations. The conceptual framework should include an implicit understanding of assumptions and perspective of the person reporting events. Researchers need to take careful consideration of times, dates, events, chronology, people involved, and locations. It is essential that researchers try to verify information by focusing on factual statements on which there is agreement. However, consideration must be taken to ensure that data is valid and not simply the result of a hidden historical agenda. The researcher is also interested in interpretations of evidence and the "silences" or cases where the evidence fails to address a particular event, topic, or issue.

Ethical Issues

Researchers need to be aware of their own cultural biases. Without this awareness, judgments of other cultures may be made that jeopardize the validity of the data. Even though it is difficult at times, one way to do this is to defocus before entering the field. This step involves figuratively removing oneself from the primary focus of the research paradigm. The goal is to remain open to everything one may encounter and to not take occurrences for granted but to acknowledge everything as potentially important and meaningful.

Social research methods allow us to provide explanations of human social behavior. Through a systematic approach, researchers can begin to make sense of the social world. Although some disciplines focus on particular methods over others (psychology: experiments; sociology: surveys; anthropology: field research), each takes into account the goals of the discipline in an effort to collect the most reliable and valid results possible.

— *Erin Elizabeth Robinson-Caskie*

Further Readings

Babbie, E. (2002). *The basics of social research* (2nd ed.). Belmont, CA: Wadsworth.

Creswell, J. (2002). *Research design: Qualitative, quantitative, and mixed method approaches.* Thousand Oaks, CA: Sage.

Neuman, L. (2003). *Social research methods: Quantitative and qualitative approaches* (5th ed.). Boston: Allyn & Bacon.

Wysocki, D. K. (2004). *Readings in social research methods.* Belmont, CA: Wadsworth.

RESEARCH IN ANTHROPOLOGY

Anthropology has for many years studied social cultures, beginning with the civilized societies studying the cultures of the not-so-civilized in undeveloped areas. In recent years, the role of anthropology has been reevaluated and changes have been made. Today's anthropologists are using more of an interdisciplinary approach, which helps in understanding human motives and capabilities. Anthropology has broadened to include the areas of development, tourism, emotions, ethnicity, and global systems.

In the past two decades, anthropology has taken on many areas of specialization. For example, scientists specialize in such topics as agriculture, education, the environment, feminism, nutrition, and urban issues. Others focus on a certain geographic area, such as Africa, Europe, the Middle East, or North America. Independent self-sufficient cultures, which have been the focus of traditional anthropology, no longer exist. Trends now are toward studying urban areas and global issues. Some anthropologists have moved into a new area of research known as cultural studies. Others continue to use the more traditional methods of research. This type of work is now called applied anthropology.

Anthropology was traditionally associated with colonialism, as many studies took place in undeveloped areas. Most anthropological research and writing was done by white Europeans and Americans. This is changing, as people from all cultural backgrounds are beginning to work in anthropology and cultural studies. Within the framework of applied anthropology, scientists are increasingly attempting to use their research skills to help solve important world problems.

After World War II, many colonies received their independence. The subdiscipline of development anthropology has helped small societies to adjust to the changes that came with independence. Groups of indigenous peoples have also begun to organize in an attempt to better their conditions and defend their rights to the land and natural resources. Many anthropologists have become advocates for these groups. Some Native American tribes have hired anthropologists to help them protect their cultural heritage. In some cases, Native Americans are working as anthropologists themselves, in order to help their tribes.

More and more anthropologists have become interested in poverty, violence, and injustice. Some have helped human rights organizations to excavate and identify remains of people killed in ethnic and political mass killings. They have helped bring some of the perpetrators to justice in such places as El Salvador, Rwanda, and the former Yugoslavia.

In some areas of the world, governments are hiring subsistence farmers to grow crops for export. Anthropologists who specialize in nutrition and health have shown that rather than helping, these changes have increased poverty, malnutrition, and infant mortality. In the United States, factory closings and outsourcing have been studied by anthropologists. They hope the results of their research will show businesses and governments the potential negative effects of these actions. As times have changed, so has anthropology.

– Pat McCarthy

Revitalization Movements

Anthropologists such as Anthony F. C. Wallace first employed the term revitalization movement in 1956. The term was created to explain how a society functions under severe stress. A movement would arise because of the complete disorganization and conflict within a society and the need for reform and transformation. Wallace explained that when members of a society feel that their needs are not being satisfied, this process enables them to reorganize and reestablish a more fulfilling culture. Usually, revitalization movements have a religious factor, but they may be pursued from a political stance. Religious revitalization movements frequently occurred in indigenous or traditional societies during colonial times and from first European contact. Other social movements and organizations that have been closely associated with revitalization movements include Cargo Cults, *Terre sans mal* movements, Madhist movements, Millenarian movements, Messianic movements, Nativistic movements, and separatist churches.

In his book *Religion: An Anthropological View,* Wallace stresses two aims for a revitalization movement: to provide "immediate salvation to the presently afflicted" and "to reorganize the culture in such a manner that a better way of life is brought into being to take the place of the old."

A revitalization movement has five stages. The first stage is called "The Steady Stage." It is characterized by small amounts of stress and disorganization within the society. There may be a number of incidents where deviance occurs; this is thought to be caused by society's penalty for the current situation. The second stage is called "The Period of Increased Individual Stress." The equilibrium becomes insecure and unsteady within the social system. Disease, war, social subordination, and acculturation arise, which leaves individuals uneasy and under a great deal of stress. Individuals feel that society has failed them and blame the current system. Crime and illness are significantly present even though the situation is still regarded as a temporary glitch in the system. "The Period of Cultural Distortion" is the next stage. Individual members of society attempt to take control of their lives by using self-destructive means such as drinking, gambling, sexual discrepancies, and attacking public figures in the community. Previously prominent individuals in the community begin to lose hope of reviving the community.

The fourth stage is "The Period of Revitalization." Without the completion of this stage, the culture will die out, split into smaller groups with similar attributes, or integrate into another, more secure and stable society. There are six criteria that are associated with this stage. There must be the construction of a new order. This could be through formulation of a new religion, political system, or social organization, which becomes the central focus for achieving a superior society including a more profitable way of

life. The initiative is to have an ideal system to work towards that can easily be contrasted to the present, unsuccessful system.

There is a specific routine or set of instructions that are followed in order to achieve this society. These steps promote a renewed sense of hope and confidence in the future. The next criterion involves communicating the message of this new culture or institution to others. The individuals who were the founders of this new ideal society must find ways to spread the news of their new code. They attempt to draw in as many people as possible who will follow and obey their code. The main attraction of this culture is the reassurance that it will lead the population to stability, organization, and salvation.

Organization is an important criterion within the revitalization. Society must be structured with the official who established this "utopian society" present. There must be a group of individuals who organize and delegate the mass with followers who will listen and follow instructions. These groups are referred to as disciples and their followers. The disciples insure that the movement towards their goal is in progress while the followers participate in the existing society supporting the disciples. The criterion involves adaptation. The disciples must be able to deal with and adapt to any flaws in their new system. This may include modifying the existing strategies within the code to defend the end product of the cultural revitalization. The followers must believe that this movement is truly for the best. Individuals who do not follow the code are referred to as deviant, or more severely, enemies of the state.

The last criterion of the Period of Revitalization is routinization. This criterion places emphasis on maintaining society's transformation. There is no longer a need to convert individuals. Maintenance occurs through ritual, myth, and the recollection of why their society has transformed. Order and morale must be preserved within the social, political, and religious segments. The final stage of the revitalization movement is "The New Steady State." Any changes that must be made to the code in order to keep equilibrium within the culture must be recognized. This may involve altering the focus of values to meet the needs of an ever-changing society. As ideas evolve, cultures evolve as well.

Past revitalization movements include the Cargo Cults in Melanesia, *Terre sans mal* movements in the South American tropical forest, Madhist movements in Islamic areas, Millenarian movements in Christian areas, Messianic movements in Judaic areas, Nativistic movements among the North American Indians, and Separatist churches among African Americans. There are four main attributes of these revitalization movements: revivalistic characteristics, as seen with the Ghost Dance; utopian characteristics, as seen with the *Terre sans mal* movements; assimilative characteristics, as seen with the American civil rights movements; and finally, expropriative characteristics, as seen with the Cargo Cults.

— *Simon Brascoupé and Jenny Etmanskie*

See also **Ghost Dance; Social Change; Wallace, Anthony F. C.**

Further Readings

Harkin, M. E. (Ed.). (2004). *Reassessing revitalization movements: Perspectives from North America and the Pacific Islands.* Lincoln: University of Nebraska Press.

Kehoe, A. B. (1989). *The Ghost Dance religion: Ethnohistory & revitalization.* New York: Harcourt Brace & Company.

Wallace, A. F. C. (1966). *Religion: An anthropological view.* New York: Random House.

Rites of Passage

Variously known as "life crisis" ceremonies, rites of passage, or by the French term *rites de passage,* this complex of practices includes birthing, coming of age, commencement exercises, marriage, ordination, recruitment into secret societies or military formations, accession to high office, and mortuary processes. In all known human societies, rituals of status transition are highly organized and consume considerable material resources and social energy.

For nearly a century, anthropological approaches to rites of passage have been profoundly influenced by Van Gennep's classic proto-structuralist model of the "tripartite" structure of these commonly occurring rituals, a formulation that has shown remarkable resilience and longevity in the intellectual history of the discipline. According to Van Gennep, and as famously developed by Victor Turner, such rites

commence with the radical separation of the person or persons being transformed, often marked through special adornment, locale, or comportment. The subject then enters into a special interstitial or intermediate state—in Turner's terms, "betwixt and between" conventional social statuses or categories—in which he or she is neither student nor graduate, child nor adult, unmarried nor married, layman nor priest, heir-apparent nor king. During this "liminal period," the person undergoing ritual transformation is often subject to special prohibitions and precautions; he or she may be apprehended as especially pure, sacred, stigmatized, or polluted and may be subjected to pain, humiliation, and heightened risks. The person undergoing such a transformative rite is often, in effect, reduced to a subordinate or fluid state subjected to collectively imposed refashioning. This in-between period is often characterized by paradoxical or dramatic reversals of ordinary behavior, often involving real or symbolic violence, exaggerated humor, and carnivalesque elaboration of the lower half of the body; one needs, in effect, to step outside of normal society and socialized frameworks in order to alter one's social position. In the final stage of reaggregation, during which basic principles of social life are celebrated or reinvigorated, the subject is reintegrated into normal life, usually into a different (often higher-ranked) social role than that occupied before the rite.

Source: © iStockphoto/Israel Talby.

Initiation rites, among the most highly elaborated rites of passage, often emphasize the detachment of the initiate from his or her prior links to childhood and exclusively domestic realms by incorporating images of birth and death; they often involve the physical isolation of initiates, often according to principles of strict gender segregation, as well as practices of physical incision, quite literally "cutting" earlier bonds by rupturing the body's surfaces. Often, initiatory cutting is directed towards the organs of generation (the male foreskin, or, less commonly, the female clitoris or labia), signaling, in part, that sexual pleasure and libidinal drives are henceforth to be subordinated to larger, collectively regulated projects of social and symbolic reproduction. Such rites may, at the manifest level, intensify categorical distinctions between human and animal, as well as male and female, while at other levels blurring or transcending these contrastive schemes.

Their tripartite sequence, the extraordinary qualities of the liminal phase, and the bodily symbolism of radical transformation render rites of passage highly appropriate for dramatizing transformations in persons other than the rite's formal subjects. Those organizing, performing, or attending the ritual often take on certain liminal, interstitial qualities during the ceremony and undergo significant (if subtle or backgrounded) transformations and shifts in status. Rites of passage are thus nearly always collective enterprises that proceed upon multiple tracks, establishing important connections and distinctions among varied persons and groups beyond the proximate, central foci of ritual attention.

For example, the rites of christening or bris (the Jewish circumcision), while manifestly directed towards transforming the moral and spiritual status of the infant, also confirm or help establish important shifts in other persons' conditions, especially in the

generations of the child's parents and grandparents. The parents are established in front of the family and the religious community as persons of tradition, substance, and faith. Grandparents from both sides of the family are, if possible, prominent at a christening, and often exhibit considerably warmer, less formal relations with one another than they did at the wedding. At the Jewish bris, the paternal grandfather often holds his grandson as the foreskin is excised, evoking a line of patriarchal authority that in principle stretches back through the generations to the original covenant between the Lord and His chosen people. In this ambiguous liminal position, holding his male flesh and blood under the knife, the grandfather takes on aspects of the early patriarchs themselves, recalling Abraham's abortive sacrifice of Isaac and Moses' role as the first circumciser. In this sense, the bris is equally a rite of passage for the grandfather and his grandson, who emerge from it confirmed respectively as patriarch and novice within the family and the wider community; as a reenactment of the mythic forging of the covenant between Yaweh and his chosen people, each bris also celebrates the collective solidarity of the Jewish community.

At the end of the life cycle in modern American society, the funeral orchestrates another set of complex social and temporal relationships. The dead person may be thought of as moving from initial separation (through special treatment, including embalming), into the ambiguous liminal status of funeral corpse, to a final state of integration into the domain of the dead (signified by burial or cremation). This close attention to the dead body not only manages the deceased's social transition out of the living world, but separates the mourners as a collective social unit out of ordinary life, placing them into an ambiguous interstitial space and time. They wear special somber clothes, adopt a solemn demeanor, and may even be expected to view or kiss the corpse, before the coffin lid is closed and the service begins. At the rite's conclusion, they are collectively reintegrated into ordinary life, often through actions such as food consumption and lively conversation at a reception, that emphasize the renewal of life.

The ultimate consequence of the funeral's double tripartite structure is an achieved marked separation between the categories of life and death. Paradoxically, this ritual distance enables subsequent moments of communion between the living and the dead, as in visits to the cemetery, which are often tied to key moments in the annual calendar, such as Christmas, Memorial Day, or Mother's Day.

In an important reformulation of previous approaches, Terry Turner argues that the intermediate or liminal phase of such rites is characterized not so much by "anti-structure," as by a kind of hyper-structuration, enabling a kind of regimenting or reconceptualization of the opening and closing phases of the ritual process. The associated cognitive and affective transformations may not necessarily be immediately accessible to the putative subjects of initiation rites (who may primarily experience terror, discomfort, and disorientation during the ceremony itself); indeed, the underlying structural logic of the key transformations may only become apparent to actors later in the life cycle, as they initiate subsequent cohorts or generations.

Precisely because rites of passage have such profound implications for the reproduction of social formations as well as for the refashioning of individual selfhood, these ritual complexes are often subject to intense political struggle and may emerge as arenas through which history is actively made. Nguni state formation in the early 19th century, for example, was predicated on the suppression of circumcision lodges through which local lineages reproduced themselves, in favor of higher-order recruitment into cross-cutting military regiments. Lincoln's Gettysburg address, a closing oration in an extended mass mortuary process, occasioned the collective reimagining of American democracy, catalyzing and codifying an extended historical transformation that is still being played out to this day. North American society in the early 21st century is gripped by bitter debates over gay marriage, an issue arguably capable of determining the course of national elections. At stake in the organization and evaluation of rites of passage, it would appear, are the constitutive principles upon which human collective life is founded, contested, and potentially remade.

— *Mark Auslander*

See also **Religious Rituals; Societies, Secret**

Further Readings

Turner, V. (1967). Betwixt and between: The liminal period in rites de passage. In *The forest of symbols: Aspects of Ndembu ritual* (pp. 93–111). Ithaca: Cornell University Press.

Turner, T. (1977). Transformation, hierarchy and transcendence: A reformulation of Van Gennep's model of the structure of rites of passage. In S. Moore & B. Myerhoff (Eds.), *Secular ritual* (pp. 53–70). Amsterdam: Van Gorcum.
Van Gennep, A. (1960). *The rites of passage*. Chicago: University of Chicago Press.

Rivers, W. H. R. (1864–1922)

William Halse Rivers Rivers was an unusual talent who made significant contributions both to psychology and anthropology, although his reputation has survived best in anthropology, particularly in the field of social organization.

Rivers was the eldest of four children born to Henry, an Anglican churchman and speech therapist, and Elizabeth Rivers. His education was interrupted by ill-health and a serious stammer, and when typhoid fever prevented him sitting for his exam for Cambridge, he switched to medicine. In 1886, Rivers graduated bachelor of medicine from the University of London, the youngest graduate from Bartholomew's Hospital for almost a century. After service as a ship's surgeon, Rivers gained his MD from London in 1888 and was elected Fellow of the Royal College of Physicians. In 1893 he was appointed Lecturer in Psychological and Experimental Psychology at Cambridge.

In 1898, Rivers took part in an expedition to an island group in the Torres Straits, between Australia and Papua New Guinea. He was invited to take part by virtue of his role as a prominent psychologist. After refusing the offer, Rivers eventually decided to go, kindling his lifelong interest in anthropology in the process. He made a second trip in 1901 and in 1902 went to Melanesia, and also studied the Todas of southwestern India. His book *The Todas* (1906), the result of that expedition, is widely regarded as a classic.

Through all this, Rivers retained his interest in psychology. Between 1903 and 1907, Rivers and a colleague, Henry Head, took part in a protracted experiment on the peripheral sensory mechanism. The experiment involved cutting two cutaneous nerves in Head's left forearm and mapping the process toward the full recovery of skin sensitivity. While the conclusions of the study have risen and fallen in esteem, the value of the experiment and the conditions under which it was performed have had a long influence. A feature of Rivers's career was his attention to the requirements of methodology.

In 1904, Rivers cooperated with his friend C. S. Myers and the venerable James Ward to found the *British Journal of Psychology.* This was an important milestone for the development of independent British psychology.

In November 1907, Rivers took an extended trip to the Solomon Islands, later extended to Melanesia. The trip lasted about a year. Soon after his return, he was elected a Fellow of the Royal Society, along with Bertrand Russell.

When Rivers began *The History of Melanesian Society* (1914), he was thinking about social development in evolutionary terms, but while writing that work, he came to stress the important role even small groups of immigrants could have, changes which could in all likelihood quickly look like evolutionary changes. This led him to adopt the diffusionist views championed by his Cambridge colleague, the Australian-born ethnologist Grafton Elliot Smith. Rivers regarded *The History of Melanesian Society* as his magnum opus, but it has not had the influence of other works like *Kinship and Social Organization* (1914). Many regard Rivers's main contribution to be the study of social organization.

In July 1915, soon after his return from a third expedition to Australasia, Rivers returned to medicine. After a year at a military hospital in Lancashire as a civilian physician, he was commissioned in 1917 into the Royal Army Medical Corps with the rank of captain and sent to Craiglockhart Hospital, near Edinburgh in Scotland. While there, Rivers had responsibility for counseling Siegfried Sassoon. The two became close friends, even though Rivers was ambivalent about his role in coaxing Sassoon back to the front. For his part, Sassoon never forgot Rivers's kindness and fatherly attention to his welfare. They remained in close touch for the remainder of Rivers's life.

After the war, Rivers returned to Cambridge where he concentrated on his work in psychology, psychiatry, sociology, and ethnology, stressing the interrelationships among them. He served as first president of the medical section of the newly formed British Psychoanalytical Society. In opposition to the mainstream psychoanalysis, he emphasized the role of fear as a primary psychological motivation. He preferred to speak of "the unwitting" to the unconscious, and

disagreed with Freud and Jung over the alleged universality of symbols. Rivers's academic respectability helped psychoanalysis acquire an audience in Britain.

Rivers died unexpectedly on June 4, 1922 from a strangulated hernia. At the time of his death he was the Labor Party candidate for the University of London.

— *Bill Cooke*

See also **Smith, Grafton Elliot; Social Structures**

Further Readings

Slobodin, R. (1978). *W. H. R. Rivers.* New York: Columbia University Press.

Stocking, G. W. (1995). *After Tylor: British social anthropology, 1888–1951.* Madison: University of Wisconsin Press.

RNA Molecule

RNA (ribonucleic acid) is a single-stranded nucleic acid. This molecule is involved in protein synthesis.

There are several types of RNA:

mRNA: This is messenger RNA, which serves as a code for proteins. It does this by carrying information in what are called "codons" or a "triplet code" that is specific for a particular amino acid.

rRNA: This is ribosomal RNA, which forms the basic structure of the ribosomes. rRNA also catalyzes protein synthesis.

tRNA: This is transfer RNA, which serves as an adaptor between mRNA and amino acids. One end of the tRNA has an "anti-codon" that matches with the mRNAs codon; the other end has an amino acid attached.

snRNA: This is small nuclear RNA, which serves to function in a variety of nuclear processes, as well as structural and catalytic roles, mainly the splicing of pre-mRNA.

snoRNA: This is small nuclear RNA, which is involved in processing and chemically modifying rRNA.

hnRNA: This is heterogeneous nuclear RNA, which is pre-mRNA that contains noncoding regions (called introns) that separate coding regions (called exons).

Other noncoding RNAs: These RNAs function in other diverse cellular processes, including X-chromosome inactivation, telomere synthesis, and the transportation of unprocessed proteins to the endoplasmic reticulum.

Compared with the DNA molecule, the RNA molecule has some basic differences in structure. The two molecules have many of the same nucleotides: adenine, guanine, and cytosine. However, only DNA has thymine, whereas RNA contains uracil instead. Another major difference is in the sugar that makes up the phosphate backbone. The DNA molecule contains deoxyribose, whereas the RNA molecule contains ribose. In addition, they both have functional differences; RNA synthesizes proteins, whereas DNA synthesizes RNA.

The RNA molecule, initially, may sound like a small insignificant molecule; however, it is capable of supporting extremely small and simple life forms called "viruses." The viral genome can be made up of RNA (single-stranded or double-stranded), or DNA (also single-stranded or double-stranded). Viruses are called "obligate intracellular parasites," because they need to use the host's enzymes and ribosomes in order to synthesize copies of their own genomes. Also, viruses are not actually cells; rather, they consist only of nucleic acid enclosed in a protein shell, called a "capsid," and they need to infect a host cell they replicate.

The prevailing belief in modern science is that RNA was most likely the first genetic material to exist. In a primordial sense, the formation of genetic information would have made it possible for molecular aggregates (precursors to simple cells) to pass along not only transient samples of molecules, but more specifically, permanent molecular instructions to make more of these molecules.

During the process of transcription, DNA produces RNA, and during the process of translation, RNA (along with ribosomes, which are also made of RNA) produces proteins (both structural proteins and enzymes). These processes involve intricate machinery, which could not have evolved all at once. However, it is conceivable that it did emerge from a simpler process. Therefore, prior to the existence of DNA, a more primitive mechanism involving the

alignment of amino acids along strands of RNA could have existed. Consequently, the first "genes" were most likely not the more organized DNA molecule, rather short strands of RNA that could have self-replicated in a prebiotic environment.

In the 1980s, a scientist by the name of Thomas Cech proved that RNA molecules were important catalysts in eukaryotic cells. This discovery extinguished the axiom that only proteins could act as a biological catalyst. Cech and other researchers discovered "ribozymes," which help to catalyze the synthesis of new mRNA, tRNA, and rRNA. Taking this into account, it can be visualized that RNA could have been autocatalytic and capable of consistent self-replication in a prebiotic environment long before proteins, enzymes, or DNA existed.

It is well established that the DNA molecule is a far more stable repository than the RNA molecule for the storage of genetic material. Conceivably, once DNA molecules evolved, RNA molecules maintained their primitive role as intermediates in the translation of genetic expression. Consequently, the DNA molecule became the storage center that can synthesize mRNA. However, the model provided by the RNA molecule paved the way for the DNA molecule.

— John K. Grandy

See also **DNA Molecule; Genetics, History of**

Further Readings

Alberts, B., Johnson, A., Lewis, J., Raff, K., Roberts, K., & Walter, P. (2002). *Molecular biology of the cell* (4th ed.). New York: Garland.

Cech, T. (1986). RNA as an enzyme. *Scientific American, 255*(5), 64–75.

Hartmann, R. K., Bindereif, A., Schon, A, & Westhof, E. (2005). *Handbook of RNA biochemistry.* New York: John Wiley.

Robbins, Richard H. (1940–)

Richard Robbins is currently the SUNY Distinguished Teaching Professor at State University of New York, Plattsburgh. Robbins earned his BA in psychology at Rutgers University in 1961, an MA in anthropology at New York University, New York in 1964, and a PhD in anthropology at the University of North Carolina, Chapel Hill in 1970. Professor Robbins' contributions to anthropology are in the areas of globalization, applied anthropology, public policy, and teaching. His publications reflect his strong commitment to and success in teaching undergraduate anthropology. Robbins has earned many honors and awards for teaching including the Outstanding Academic Title of the year award in 1999 for his text *Global Problems and the Culture of Capitalism.* He was also the recipient of the 1994 Textbook and Academic Authors Association Excellence Award for the outstanding text in the social sciences and humanities, *Cultural Anthropology: A Problem-Based Approach.*

Robbins's field research and publications include studies of suicide among the Naskapi Indians of Quebec, political change among the Cree Indians on Hudson's Bay, and the social and economic history of an Acadian fishing village in New Brunswick. Robbins's contributions to teaching, however, most distinguish his career. He has worked to improve undergraduate education and to enhance collaborative writing through computer software and Internet sites. He has also contributed to the Consortium for International Cooperation in Higher Education and the National Endowment for the Humanities as a consultant for the development of general education. Robbins regularly presents papers on teaching science and anthropology, collaborative learning, the foundations of an undergraduate education, and education and cultural change. His textbooks focus on developing citizen-activist students who can examine the policy and cultural changes needed to address contemporary global problems.

— Barbara J. Dilly

See also **Anthropology, Social; Globalization**

Further Readings

Robbins, R. H. (2001). *Cultural anthropology: A problem-based approach* (3rd ed.). Itaska, IL: F. E. Peacock.

Robbins, R. H. (2005). *Global problems and the culture of capitalism* (3rd ed.). Boston: Allyn & Bacon.

Rock Art

Rock art is painted, engraved, or scratched elements (signs, figures, writings) on rocky surfaces such as open-air rocks, caves, decorated menhir, boulders, and slabs. It may also include portable art and other forms of artistic representations of prehistoric populations. Often it is identified with cave art. The scientific study of rock art using archaeological methods is known as rupestrian archaeology.

Traditionally, engraving, bas-relief, graphics, and painting are considered the main genres of monumental rock art and mobile art (small artistic objects made of stone, bone, antler, or images on tools, everyday items, musical instruments, decorations, etc.). Both monumental and mobile rock art can be divided into two categories: animalistic (predominant in monumental art) and anthropomorphic (represented mainly in statuettes), which exist in three main forms: realistic (or naturalistic), ornamental, and gesture (singing).

The most striking examples of rock painting are found in the Pyrenees; complex polychromatic animal paintings decorate the caves at Lascaux, Montespan, and Trois Freres in France and Altamira in Spain. Such traits as three-dimensionality, perspective, proportion of items and their elements, and the impression of movement are typical of them. Sometimes connections between several images (animalistic and others) can be traced; a few may illustrate the development of a situation over time. Impressive scenes of hunting dominate in animalistic painting; it has become the background for a series of theories of the function of rock art in prehistoric culture. Human presence in rock art painting is usually conveyed by a series of signs symbolizing anthropogenic impact on the animal (images of human weapons, animal injuries, human hands on the animal images, etc.)

Characteristic woman statuettes with exaggerated features of fertility (often called Paleolithic Venus) are a most peculiar form of mobile art. Their finds are connected mainly with Central Europe (Pavlov, Dolni Vestonice) and the Kostenki region of Russia and Middle Dnipro area of Ukraine (Mezin, Mezhirichi). They are made of soft stone (such as loess, sandstone, talc); most of them are schematic, with no portrait traits or any other personal features.

The first attempts at artistic activity date to the Early Paleolithic (Acheulean and Moustierian) period and are considered the result of experiencing the natural environment. Straight, curved, and wavy lines scratched or engraved on tubular bones, ribs, antlers, pebbles, and stone (mostly chalkstone and sandstone) are associated with this stage. Later, handprints and "macaroni" forms of artificial sign appear. The general development of rock art can be represented by the following chronology:

1. 32,000–27,000 BC: few images of heads or front parts of animals;
2. 26,000–22,000 BC: origin of sculpture and painting;
3. 21,000–17.000 BC: gradual improvement of all genres;
4. 16,000–10,000 BC: golden age of rock art;
5. 10,000–6,000 BC: simplification and schematization of painting.

The general evolution of rock art was a gradual transition from simple painted or engraved lines, or

Source: © iStockphoto/Matthew Scherf.

representations of animal or human fragments, at the beginning of the Upper Paleolithic period, to complex polychromatic compositions at the end of the Upper Paleolithic period, to simplified schematic images during the Mesolithic period.

Rock art in different parts of Europe differs in artistic object, composition, and technique as well as forms and styles. The Franco-Cantabrian region is known for caves with realistic painting and engraving (Altamira, Lascaux, Nio, etc.). The Mediterranean (Italy, southern France, and southeastern Spain) is characterized by relatively more schematic images alongside numerous human handprints on cave walls (Balzi Rossi, Trois Freres, La Madelein, Font-de-Gaume). Some regard this as a unique area or as a special stage of rock art evolution. Eastern Europe (Central Europe and Siberia) is characterized by highly developed mobile art (including Paleolithic Venus) and bone ornamentals.

— *Olena V. Smyntyna*

See also **Acheulean Culture; Cave Art**

Further Readings

Bahn, P., & Rosenfeld, A. (Eds.). (1991). *Rock art and prehistory.* Oxford: Oxbow Books.

Conkey, M. W., Soffer, O., Stratmann, D., & Jablonski, N. G. (Eds.). (1997). *Beyond art: Pleistocene image and symbol.* Memoirs of the California Academy of Sciences; Wattis symposium series in Anthropology, 23.

Dowson, T. A. (1998). Rock art: Handmaiden to studies of cognitive evolution. In C. Renfrew & C. Scarre (Eds.), *Cognition and material culture: The archaeology of symbolic storage* (pp. 67–76). Cambridge: McDonald Institute for Archaeological Research.

Role and Status

The script that an actor followed was once written on a roll of paper, and the part played became known as a "role." As Shakespeare famously wrote, "All the world's a stage, and all the men and women merely players." Sociologists define "role" as a combination of expected behaviors in a socially understood situation.

Closely related to social roles is the concept of status. Status refers to a social position, that is, the social niche people occupy in relation to others. A distinction is usually made between "ascribed" and "achieved" status. Ascribed status is assigned, often on the basis of birth, with age and sex being important markers and with some societies using perceived "race" and ethnicity to assign status. Achieved status is attained through the behavior of an individual, often in terms of occupation and skills. As Ralph Linton pointed out, one occupies a certain status while one plays a particular role.

For example, most people know me as an anthropologist at a university where I teach, read and write, attend meetings, and occasionally do fieldwork. I play the roles of instructor, researcher, colleague, and ethnographer, and my achieved status is fairly high. Within my kinship system where I have a mostly ascribed status, I am a son, brother, brother-in-law, nephew, uncle, husband, father, grandfather. In the schools, I play the role of secretary of the PTA and occasional speaker. Within one very small group, I am a less than mediocre archer, and there I have a low status.

People define roles for themselves and attempt to achieve a certain status through playing that role, but if their attempt is not socially accepted, they will not achieve that status. For example, a person may attempt the role of a prophet by preaching on street corners, but if others do not gather to listen, he will attain little or no status and presumably will eventually abandon that role.

Indeed, people form expectations about the roles that will be played both by themselves and others. The surrounding social world contains many clues, some subtle and some obvious, that encourage everyone to act within the expectations that others have for them. The status attached to these roles will come largely from their predetermined societal evaluation.

The term *role confusion* refers to a situation in which people have difficulty determining what role they should play and is usually divided into *role strain* and *role conflict.* Role strain occurs within the same role set; for example, in a large family gathering a person may feel conflicted among playing the roles of uncle, husband, or son-in-law. Role conflict occurs across different role sets; for example, if a person's son is in one of her university classes, she may feel conflicted between the roles of mother and instructor.

The traditional concept of role is rather too rigid for use in contemporary social and behavior sciences and has been modified by the inclusion of the concept of self-identity, which allows actors to simultaneously express their selves and fulfill their roles.

— *Robert Lawless*

See also **Rank and Status**

Further Readings

Bennett, M., & Sani, F. (Eds.). (2004). *The development of the social self.* New York: Psychology Press.

Goldin, L., (Ed.). (2000). *Identities on the move: Transnational processes in North America and the Caribbean Basin.* Austin: University of Texas Press.

Rome, Ancient

Rome and its vast literature and civilization formed the point of departure for scholarly investigation during the 19th century beginnings of anthropology, archaeology, and sociology. At the time, university admission required the knowledge of both Latin and Greek. This educational practice had begun during the Renaissance and was only dropped during the mid-1960s in Europe. For many, Greek and Roman civilizations were the first "alien" civilizations encountered.

The history of Rome and its empire covers over a thousand years. From obscure, mythical beginnings, Rome went on to rule the ancient world. Its political power and cultural influence reached beyond its well-defended borders and were supported by the way Roman society was organized and by its (initially) generous treatment of its allies. Between approximately 600 BCE and 200 BCE, a long-running struggle took place between the patricians and the *plebs,* and a republic of sorts emerged, which lasted in name until 44 BCE, when a battle for ultimate power arose among the patrician generals. Rome became an empire that relied on military strongmen to defend its interests and to pursue the expansion of its territory to support the center. In the fifth century CE, the western Roman Empire fragmented under the joint pressures of barbarian invasions and internal economic weakness.

Roman Social History

Rome was situated at an important river crossing approximately 17 miles inland from the mouth of the Tiber, and thus was in a position to control trade into the back country. The city had a mixed population of locals and foreigners from its very beginnings.

The common inhabitants of Rome were originally divided into three *tribes* (either related to the root "tres"—three—or thought to derive from "trifu," a term used on some second century BCE bronze tablets found in Umbria, where it appears to mean "community"). Later, more tribes were created to accommodate the inhabitants of the incorporated territories, those where Roman citizens had settled or whose original population had been incorporated as citizens. There were always four tribes for the city of Rome, and, ultimately, 31 "rustic" ones. Every citizen had to belong to a tribe, and personal names would be ordered as follows: first or given name; then the family name or, in the case of patricians, the name of the *gens* (clan); next the name of the father; then the name of the voting tribe; and last, a *cognomen,* frequently an optional nickname. The standard example is always Marcus (*preanomen*) Tullius (his *gens*) Marci filius (son of Marcus) Cornelia tribu (voting tribe) Cicero (cognomen). Later, these *cognomina* became more popular than the first or given names, and during the empire even the *plebs* began to use them.

Roman citizens were also divided according to wealth into a *classis* (group or class; plural: *classes*); the two classes were those who could afford to arm themselves and the rest, who could not. During the fifth century, at the time of the Middle Republic, this rough division was refined into five *classes:* three that functioned as heavy infantry, and two as skirmishers. During the Late Republic, the division into *classes* was also used for tax purposes. Until 167 BCE all individuals had to pay *tributum* or direct taxes, an amount that could vary from year to year according to the needs of the state. After that date, all citizens, inhabitants of Italian *coloniae* or Italy itself, were exempt: the wealth that came from the provinces, which were under direct government of the Roman state, was sufficient.

Decisions about which class one belonged to were in the hands of two patrician *censors* (later plebeians were eligible as well), who conducted a *census* every four or five years. Those who were too poor to contribute in any way to the well-being of the state were called "proletarians" because the only thing they provided was their *proles,* or offspring. The *classes* similarly served to assign people to voting groups that made up the original assembly, the *comitia centuriata.* The majority within each group decided the vote for that group. The voting system in Rome was more complex than described here, but it appears to have

been weighted in such a way that the aristocracy could outvote the plebs and the old the young. During the Late Republic and imperial times, the *censors* also judged people's morals and could remove those they objected to from the voting rolls. Censuses were conducted not only in Italy but also in the provinces and colonies.

The *plebs* consisted of all those who were not of patrician descent. Originally, members of the *plebs* were not allowed to hold religious positions and were excluded from the senate and magistracies and forbidden to intermarry with patricians, but they did have to serve (if they could afford it) in the army. During the Conflict of the Orders, a period of approximately 200 years, the *plebs* organized itself, and set up a parallel government on various occasions. *Secessio,* where the entire *plebs* of Rome would leave the city, occurred several times: gained were inviolability for its officers, the *tribunes,* and a host of other benefits and laws as well as political equality with the aristocrats for the wealthier among them. Eventually, the rights and officers were absorbed into the larger structure of the government of the *populus Romanus.*

It is calculated that slaves made up approximately 10% of the population of Italy; most slaves were prisoners of war, or had been kidnapped by pirates raiding the Mediterranean seaports. Owning slaves was a symbol of wealth: some owners had several thousand, others just had two or three. A child of a free man and a slave woman would be free, and many Romans would promise freedom to their slaves after a certain number of years of work. Freedmen would receive (limited) citizenship, and some rose to high positions in imperial times. Slaves could be used for agricultural work, crafts, teaching, mining, or gladiator fights, and could be secretaries, administrators, and so on. In such capacities they worked alongside citizens. The state owned a large number of slaves for public works.

The population of Rome during the first century CE consisted of about 1,000,000 inhabitants, who were mostly supported by the subsidies provided by rich members of the elite, eager to buy votes. *Panem et circenses,* bread and games, were a real phenomenon. The many religious holidays provided plenty of opportunity for handouts. Of all games, the gladiatorial ones were the most famous. The games originated in Etruscan funeral practices, and remained popular in Italy and in its colonies until they were forbidden in 325 CE They involved vast expense, and emperors vied with each other in outspending their predecessors: a clear case of conspicuous consumption and influence buying. The contestants often were slaves, prisoners of war, condemned criminals, or citizens who had sold themselves for a fee. The gladiatorial games were held in the Forum during the republic, and later in the Colosseum, which could hold up to 55,000 spectators.

There were many other *ludi* (games) as well: chariot races, for instance, were held in the Circus Maximus, which could contain up to 150,000 spectators and provided permanent tiered seating. Many of the *ludi* were held on religious holidays, whose number increased from about fifty in republican times to close to 180 in the fourth century CE Gambling and betting on the different teams was common, as were fights among the fans and factions. Other *ludi* are the *ludi scaenici,* or theatrical performances, which began during the mid-fourth century BCE Initially, performances consisted of mimes and pantomimes, with some musical accompaniment. Later, plays (comedies, tragedies) could be performed anywhere, but they were often connected with temple festivals; temporary seating and stages would be set up. Only in the first century BCE were permanent theaters constructed. *Ludi scaenici* were often paid for by the state and the presiding magistrates. Women and children could attend, but were seated separately from the men. On days of festivals, the courts would be closed, certain agricultural chores were restricted, and some workers would get the day off.

The Roman Family and Roman Religion

The term *familia* could mean "the household": it would include all those who lived in a house, including the slaves. Freed slaves would take the name of the person who had freed them and continued to belong to the *familia.* Roman family structure favored the male line: the *paterfamilias* and all his close bloodline were called *agnati* (sing. *agnatus*). A woman who married into a family became *agnata* as well. She could avoid this fate by spending three nights of the year elsewhere, in which case she continued to be a member of her own father's line, and her property would remain her own. *Cognati* (cognatus) were *all* those linked by blood; *adfines* were those one was related to by marriage. The *paterfamilias* held power over his entire household and could order the death

Source: © iStockphoto/Luigi Petro.

of his children, forbid marriage, or order divorce. Unless a father released his son from *patria potestas,* the son would remain dependent on his goodwill.

Roman patricians worshipped their male ancestors and had masks representing them hanging in their houses. These masks were worn by actors during important religious events in the family, or during funeral processions en route to the pyre. The lower classes also practiced cremation, the custom in most of Western Europe from approximately the third century BCE until the middle of the second century CE, when the Hellenistic custom of burial took over. The poor often belonged to "funeral clubs" that helped defray the expense. The spirits of the dead were believed to go to the underworld; those refused entrance would wander the earth. Relatives would visit graves and bring offerings of food or small gifts.

The Roman household had its own protective spirits, the *Lares* and *Penates,* who were worshipped in the home. The state had its own set. In general, it can be said that the Roman religious pantheon very closely mirrored the Roman family: an all-powerful father (Jupiter) and a close set of *cognati.* Later, when Greek culture became more influential, the Greek pantheon was "translated" into the Latin one, and characteristics of the gods were adjusted. Once the Middle East was conquered, the emperors found it to their advantage to claim divine descent and demanded to be worshipped the way Eastern potentates were worshipped. This created problems at home, not so much among the *plebs* as among the other patrician families, and among the adherents of new cults, such as Christianity.

Originally, education of young aristocrats took place at home; both mothers and fathers were involved. But during the late second century BCE Romans began to feel the need for a more thorough education: the conquest of Greece no doubt had much to do with this. Greek teachers and slaves (to teach) were in high demand, and during the first century BCE all children of patricians (some girls, as well) grew up bilingual. From an early age patrician boys were trained in oratory—after the Greeks arrived, in rhetoric, a more systematic approach to giving speeches and arguing with political opponents. Young men would "finish" their education by studying a few years in Athens or in Alexandria, which was also Greek-speaking. Or, if they wanted, they could study law in Berytus (Beirut), which had a flourishing law school after the first century CE. They could also stay in Rome and attend law school there. With Greek culture came the Greek approach to life and its pleasures, and many conservatives railed against the *graeculi* (the Greeklings). The first century BCE witnessed the growth of Latin literature: much of what is read and studied today was produced during that period or shortly thereafter.

Roman Administration

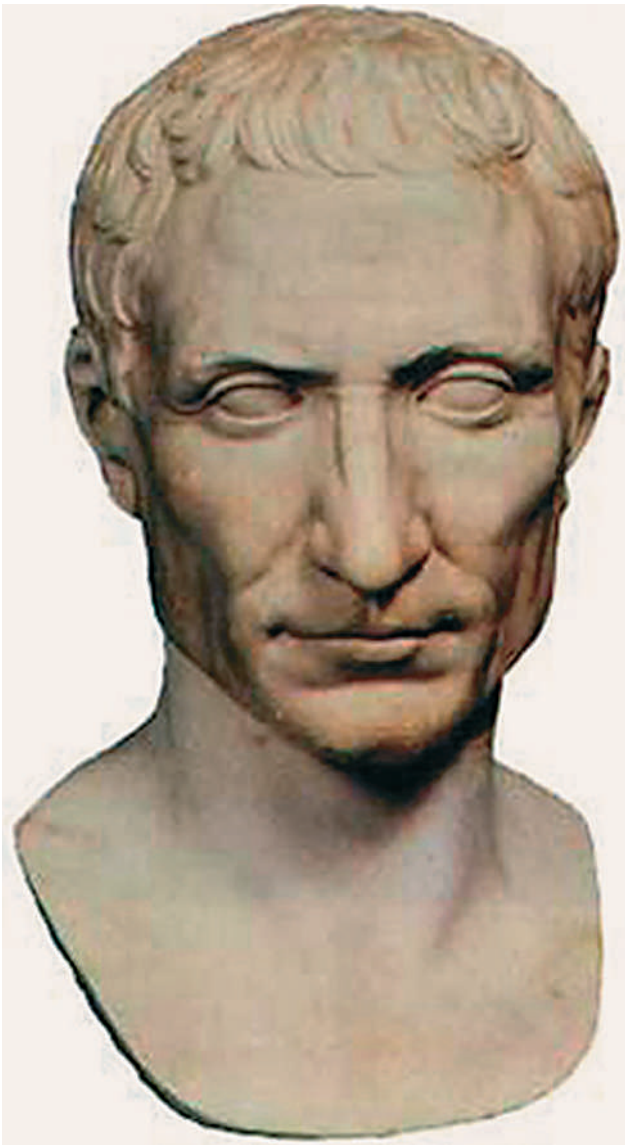
Rome's expansion was successful due to its administrative organization. Once it had conquered an enemy, this enemy could become an ally on very generous terms, or else, the city would be razed to the ground. The creation of colonies began in the fourth century BCE, first on Italian soil, later anywhere else. The colonists had their own magistrates and organization, retained their Roman citizenship, and were expected to perform military duties if required. Local

patricians also received privileges and developed loyalty to Rome. During the time of the emperors (beginning ca. 50 BCE) the system was expanded beyond the borders of Italy, and colonies were established as far away as Germany, Spain, Britain, north Africa, and the Middle East.

Of old, the senate played an important part in governing Rome; the senators' power, however, was frequently limited. The origins of the senate are obscure, and it is not certain that it was made up entirely of patricians from the beginning. To be a member one had to own a certain acreage. The number of senators varied over the centuries from 300 to almost a thousand in the mid-first century BCE. The son of a senator would also be a senator, of course, but the highest magistratures went to those who had earned the right to them. High status was conferred, not inherited, and a military career was the surest way to glory and success. Another way was to become an expert in Roman law—especially during the last four centuries of the empire. During republican times, former magistrates became members of the senate for life, and thus controlled most aspects of government, making financial as well as military and religious decisions. Originally the representatives of the *plebs* could only attend the senate by sitting in the vestibule of the senatorial meeting hall; later, they acquired the same privileges as the patrician senators. By the end of the republican period, however, the senate had lost all power.

The republic effectively ended with the rise of Gaius Iulius Caesar (100–44 BCE). Although he never took the title of emperor (*Imperator*), he certainly created the model. By means of intrigue, bribery, dubious loans, marriage and other alliances, and brilliant military, political, and oratorical skills, Caesar, a patrician by birth, managed to gain the trust of the *plebs* and the loyalty of his soldiers. To ensure his succession, Caesar had adopted his great-nephew Octavian, since he had no sons himself. Octavian, although only 18 at the time of Caesar's death, was as gifted in military and political skills as his great-uncle or "father." He took the religious title of Augustus ("consecrated" or "holy") in 27 BCE, thus becoming the *de facto* first emperor, although he claimed to have restored the republic.

The rise of Christianity during the first and second centuries CE created increasingly larger problems for the Roman empire. Originally seen as a sub-sect of the Jewish religion, Christians had been given the same exemptions as the Jews: as monotheists, their religion was not absorbed into the larger Roman religious system, and some autonomy had been given to some Jewish territories. Only in the third century CE was Christian dogma sufficiently established to be seen as a threat to the Roman state; however, by that time the Church had so many members that intolerance was no longer an option.



Source: © iStockphoto/Luigi Petro.

It is calculated that by the second century CE, the territory ruled by the Empire covered about 2 million square miles, with a population of approximately 55 million. In 293 CE, to facilitate rule and to better control corruption, Diocletian (a usurper himself) split the Roman empire into two: a Roman (western) half, and a Greek half (with its capital in Byzantium).

The third and fourth centuries CE saw increasing attacks from northern tribes, the Goths, Visigoths, Ostrogoths, the Vandals, various Germanic tribes, and in 476 the western Roman Empire was no more. Roman culture (including language and dress) was henceforth transmitted by the Catholic Church and the Pope.

— *Thérèse de Vet*

Further Readings

Adkins, L., & Adkins, R. A. (1994). *Handbook to life in ancient Rome.* New York & Oxford: Oxford University Press.

Whittaker, C. R. (2004). *Rome and its frontiers: The dynamics of empire.* London and New York: Routledge.

Rowe, John Howland (1918–2004)

John Howland Rowe was a highly recognized scholar of Andean studies with significant contributions in the areas of history, ethnohistory, archaeology, linguistics, and ethnology. Born in Maine, he was educated at Brown University in classics and went on to receive his PhD from Harvard in 1947. He taught and worked to found anthropology programs at universities in Cuzco, Peru and Popayan, Colombia before accepting a position to teach linguistics and archaeology at the University of California, Berkeley. He was promoted to full professor in 1956 and served as an influential department chair from 1963–1967. Before he retired from Berkeley in 1988, he helped to found the departmental library, now one of the largest anthropology collections in the U.S. He was also instrumental in establishing the Kreober Anthropological Society and the Institute for Andean Studies, the oldest professional society dedicated to the study of Andean culture and archaeology in the U.S. Rowe was the recipient of many honors including several honorary degrees, prestigious fellowships, and Peru's Order of the Sun, their highest civilian honor.

Rowe's scholarly work is considered seminal in several areas. His training in classics prepared Rowe to deal with both material culture and written documents. His 1946 publication "Inca Culture at the Time of the Spanish Conquest" is an early result of historical research. The piece has remained a standard description of precolonial life in the Andes. Throughout his work on the Inca, he emphasized their highly developed state at the time of European contact and the strong persistence of their cultural patterns into colonial times. This work opened the door for further work on Inca ethnohistory at a time when many scholars claimed that the Inca people had "disappeared."

Rowe's other major contribution was in the area of Andean archaeology. Rowe did not participate in the important Viru Valley Project led by Gordon Willey in 1950. Instead, Rowe turned his attention to the Ica Valley on Peru's southern coast. Working there with students, Rowe developed a chronological sequence that is still used in much of the region today. Rowe's scheme divided Andean prehistory into a series of "periods" of regional development punctuated by "horizons" characterized by the spread of recognizable art styles ("horizon styles") promulgated by state-like or state-level societies (Chavin, Wari/Tiwanaku, and Inca). Rowe's work on chronology emphasized the concept of "style" rather than the "type-variety" concept that took root in the American Southwest.

Rowe's published works include many review articles as well as several publications on Andean culture and language, some of which were equally influential in their subfields. A full bibliography of his scholarly work is available through the George and Mary Foster Anthropology Library at University of California, Berkeley.

— *Jo Ellen Burkholder*

See also **Ethnohistory; Ethnology; Peru**

Further Readings

Rowe, J. H. (1945, January). Absolute chronology in the Andean area. *American Antiquity, X*(3), 265–284.

Rowe, J. H. (1946). Inca culture at the time of the Spanish conquest. In J. H. Steward (Ed.), *Handbook of South American Indians* (Vol. 2, pp. 183–330). Washington, DC: Smithsonian Institution.

Rumbaugh, D. M. (1929–)

Duane Rumbaugh was born in Iowa in 1929. He earned an MA from Kent State University and a PhD at the University of Colorado where he studied experimental psychology. He has been a leading researcher in the field of comparative psychology and the relationship between intelligence and language since his career began in 1958 at the San Diego Zoo and San Diego State College. His focus has been on primate research (both human and nonhuman), to further the understanding of both the great apes and ourselves. He is well known for the establishment of the LANA (language analogue) Chimp Language Project in 1971. The project, which incorporates the use of symbols and lexigrams, employs Dr. Rumbaugh's innovation of computer-monitored keyboards that examine how primates acquire language. Rumbaugh and his wife, Dr. Sue Savage-Rumbaugh, cofounded Georgia State University's Language Research Center in 1981, which Rumbaugh directed for 20 years. Rumbaugh is currently Regent's Professor Emeritus in GSU's Department of Psychology and Biology. Rumbaugh's interests in understanding our primate cousins and the similarities of how we learn and develop led him to join the Great Ape Trust of Iowa where he coordinates academic and community relations.

Rumbaugh's research draws heavily on the concepts of early cognitive development in both apes and young humans in his studies of language competency. Through his study of children and young adults with learning disabilities, Rumbaugh claims that experience in the early cognitive stages of both human and nonhuman primates is a key component in learning language. Rumbaugh's research shows that both human and nonhuman primate brains look for patterns, craving to structure their environments. From these patterns emerge what Rumbaugh terms "emergent" behavior, or behavior that does not follow any set pattern. Emergent behavior is not predictable or set by any type of reinforcement. Rumbaugh has said that "primates (both human and non) have the ability to manifest intelligence because they compute their experience relative to the here and now, and try to optimize, to do things efficiently, which means to do things in creative ways."

— *Brian Q. Flannery*

See also **Ape Language; Apes, Greater; Intelligence; Language, Animal**

Further Readings

Rumbaugh, D. M. (1977). *Language learning by a chimpanzee: The LANA project.* New York: Academic Press.

Rumbaugh, D. M., & Washburn, D. A. (2003). *Intelligence of apes and other rational beings.* New Haven, CT: Yale University Press.

Russell, Dale Allen (1937–)

Dale A. Russell is a vertebrate paleontologist whose contribution to anthropology is limited to a 1981 paper published with model-maker Ron Séguin proposing a hypothetical hominid-like "dinosauroid" evolutionary endpoint for troodontid dinosaurs. Russell and Séguin postulated that if non-avian dinosaurs had not become extinct, they could have evolved, as did primates, toward a hominid form that is an evolutionary ideal for intelligent beings.

Russell received his BA in general science from the University of Oregon, Eugene in 1958, his master's in paleontology from the University of California, Berkeley in 1960, and his PhD in geology from Columbia University in 1964. He conducted postdoctoral research at Yale University under John Ostrom before becoming curator of vertebrates at the Canadian Museum of Nature in Ottawa, where he spent most of his career. It was during his time in Canada that he described the troodontid dinosaur *Stenonychosaurus,* which served as the inspiration for his controversial "dinosauroid" paper published in 1981. During his career, he has participated in fieldwork in Mongolia and has described a number of dinosaurs from around the world. He is also noted for his 1971 paper with physicist Wallace Tucker suggesting that a supernova led to the extinction of the dinosaurs, which, while never widely accepted, was the first extraterrestrial hypothesis for dinosaur extinction. He is further noted for the description of a fossilized heart in a specimen of the dinosaur *Thescelosaurus* in 2000, which is now considered unlikely. He is currently the Senior Curator of Paleontology at the North Carolina Museum of

Natural Sciences and a visiting professor at North Carolina State University.

— *Alan D. Gishlick*

See also **Hominoids**

Russia and Evolution

Russia produced a number of notable evolutionists who contributed to research and theory in natural history, biology, and anthropology. Russian intellectuals widely accepted Charles Darwin's *On the Origin of Species* (published in Russian translation in 1860) and the evolutionary force of natural selection, but reaction to it was shaped by various political leanings and ideological goals. Russian progressives and anarchists were generally less predisposed to the theory as they felt it reflected the bourgeois intellectual tradition in Britain. Some conservatives, however, were proactive Darwinists (for example, K. A. Timiriazev, for whom a present-day State Biological Museum and Agricultural Academy in Moscow are named). Social transformation in Russia intensified with the emancipation of the serfs in 1861, and many descendants of nobility, military, and urban classes pursued careers in the sciences. There was a small but engaged and prepared audience for evolutionary theory in Russia in the 19th century.

Indeed, many Russian evolutionists took issue with one particular facet of Darwinian evolutionary theory while maintaining their general acceptance of the theory. This issue was Darwin's use of the 18th century Malthusian concept of the "struggle for existence" that was attributed to British competitive individualism and popular acceptance of Malthus. The struggle for existence stood for overpopulation and intraspecific competition as forces driving Darwinian selection. Rather, Russian intellectuals felt that competition was specific to particular ecological conditions. In Russia, wide expanses of the natural world were sparsely populated, especially in Siberia. Naturalists focused on cooperation and variation within species as evidence counter to the struggle-for-existence assumption. Human population pressure was not as great in Russia as Britain, and the communal lifestyle of the Russian peasantry was an important form of social organization for 90% of the population. Russia was a net exporter of agricultural products during the 19th century. Russia had a small middle class and exhibited little social competition; society was markedly hierarchical, but the communitarian values of the Russian majority were an ideal to be envied in some Western academic circles (for example, August von Haxthausen in *Studies on the Interior of Russia,* 1850).

Karl Kessler, one of Russia's leading 19th-century naturalists and ichthyologists, defended Darwinian selection theory in publications in the 1860s and 1970s, but in 1879, Kessler gave a speech "On the Law of Mutual Aid" to the St. Petersburg Society of Naturalists challenging the primary role of the struggle for existence. According to the law of mutual aid, fish and all animals, including humans, were governed primarily by parental feeling and care of progeny as instincts driving nourishment and reproduction. Alliances among former enemies evidenced the increasing material and moral benefits of mutual aid. Kessler died in 1881 before publishing his theory of mutual aid, but a number of Russian scholars picked up Kessler's idea and developed it, including A. F. Brandt in *Symbiosis and Mutual Aid* (1896) and Prince Petr Kropokin in *Mutual Aid: A Factor in Evolution* (1902). The concept of *vzaimnopomosh,* or mutual aid, was common sense in Russian society, a factor which may have led to the success of the 1904 Russian translation of Kropotkin's book from the original English. Mutual aid was the strong force driving natural selection in 19th-century Russian evolutionary theory.

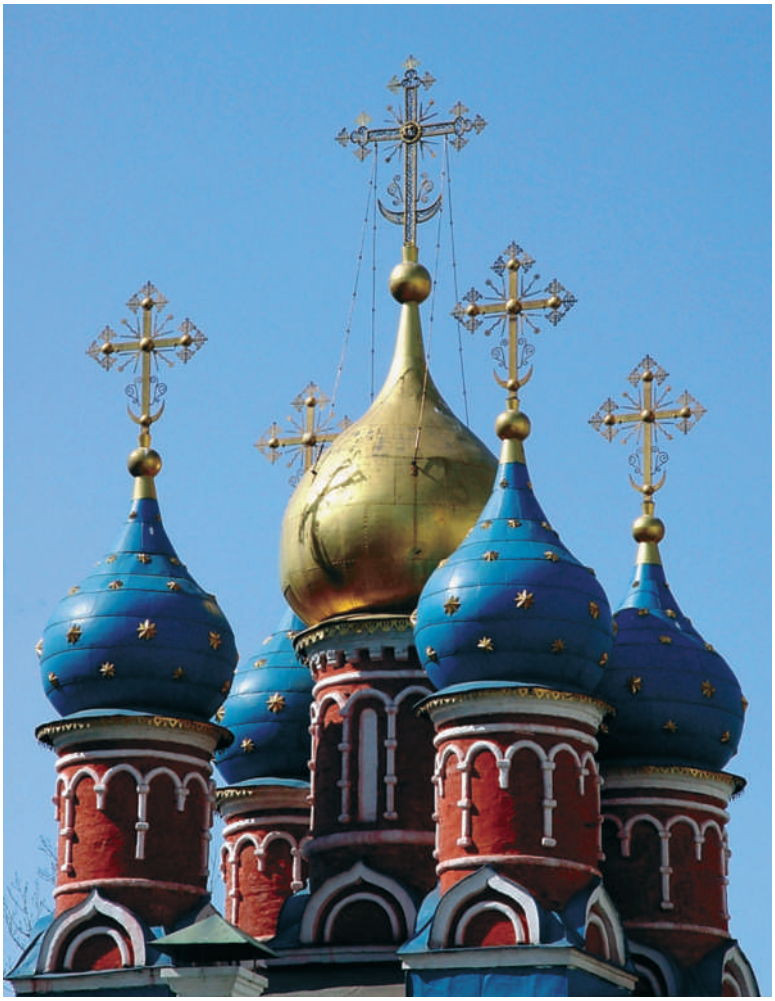
From Mutual Aid to Reciprocity

Prince Petr Alekseevich Kropotkin (1842–1921) began five years of military service in Siberia when he was 19 and uncertain in his career plans. He turned his attention to naturalistic observations, and as Darwin's observations on the *Beagle* 30 years earlier informed his view on evolution, Kropokin's travels through Siberia were an avowed influence on his theory. The severity of climate in Siberia, destruction due to natural calamity, and a lack of intraspecific conflict led Kropotkin to emphasize cooperation as the creative factor in evolution. Kropotkin perceived environmental threat and the paucity of life, rather than overpopulation. He observed migrations

of fallow deer on the Amur, great gatherings of birds in the Usuri, and herds of semi-wild horses and cattle in Transbakalia, and he saw these animals struggling together for sustenance, not against one another. Kropotkin felt that intraspecific competition could not lead to "progressive evolution," and following Kessler, argued that mutual aid was far more important than mutual struggle in evolution. Similarly, Kropotkin was critical of the Hobbesian view of each against all as the law of life for primitive man.

Kropotkin made a deduction about the origin of human sociality following the law of mutual aid. Kropotkin argued that sociality originated in colonies where mutual aid institutions—for example, communal life among Australian Aborigines and the Bushmen's fondness for sharing—began, and that the family was an institution of recent invention. In the course of history, mutual aid institutions were invaded by what Kropotkin termed "parasitic growths," in which individuals rebelled in two ways. Those building higher-level institutions, or commonwealths, followed one path away from mutual aid. Those who were more self-centered and worked to build their own wealth followed the second. The tragedy of history, as Kropotkin put it, was a "three-cornered contest" in which those living in mutual aid became a hindrance to progress. As societies began to lose their primitive character, Kropotkin argued that more gentle institutions, such as clans and families, began to develop. The family was a late product of human evolution for Kropotkin, and sociality had its origins in communal life. Similarly, the role of family in human life history evolution is currently questioned among anthropologists.

Russian ideas about mutual aid and its role in evolution occurred almost a century before analogous ideas made their way into anthropology from biology and game theory. Today, the evolution of cooperation is widely appreciated in terms of reciprocal altruism and strategies such as "tit for tat" cooperation. Kropotkin realized the origin of such strategies was an important issue, but he reserved speculation for future "ulterior" studies.



Source: © iStockphoto/Galina Barskaya.

Twentieth-Century Russian Evolutionism

At the turn of the 20th century, social upheaval in Russia took evolutionary theory on a turn toward the Marxist-Leninist theory. Following crude group selection arguments, Vladimir Il'ich Lenin (1870–1924) and his followers argued that peasants and indigenous people were entering into a stage of capitalism from the feudal or the primitive social stages of evolution. Communism was to be the ultimate evolutionary stage with no formal state. Studies of Russia's peasant commune, or *mir,* aiming at producing models alternative to unilineal Marxist-Leninist theory, influenced anthropology through the research of populist agricultural economist A. V. Chayanov and others. Chayanov's data provided important comparisons for Marshall Sahlins' concept of the domestic mode of production. Chayanov had evidence that the Russian peasant's willingness to drudgery varied with the life

cycle of the household, and this created cycles of socioeconomic differentiation. Chayanov proposed a path of development that was an extension of the peasant *mir*. However, as Lenin had already surmised that class exploitation was the cause of differentiation, Chayanov's data and suggestions were considered counterrevolutionary. Chayanov's theory directly challenged the assumptions of those promoting rapid modernization and unilineal thinking about social change, and he lost his life in the purges, as did many academics at that time.

Lenin's followers devastated the Russian countryside during the Bolshevik Revolution and resulting civil war, and then, the New Economic Policy (1921–1928) allowed a short period of entrepreneurial activity, intended to jumpstart the Russian Soviet economy. What followed after Lenin's death—Stalin's policies of collectivization and amalgamation of peasant communes into politically directed workshops (for example, *artel*), collective farms (*kolkhozy*), and then state farms (*sovkhozy*)—was draconian and guided by the goal of building socialism. The suffering of the Russian population and deaths estimated in the millions during collectivization and the purges was a result of unilineal evolutionary social engineering.

Soviet evolutionism and the war on primitive communism was particularly harsh for certain ethnic groups, such as the Volga Germans, who were uprooted and sent *en masse* to exile in Siberia, and the indigenous peoples of Siberia. The indigenous Siberians became targets for Soviet missionaries because many native Siberians were illiterate; they lived under the common law, but the Tsar had named hereditary kings (*kniazki*) to collect tribute. There were successful herdsmen who owned thousands of animals while the poor owned less than 50. There were middle-men mercantilists and practitioners of shamanism. Under Marxist-Leninist ideology, mutual aid and other institutions of primitive communism were hindrances to progress. Many Siberians who had resisted Soviet power in the 1920s and early 1930s, large herd owners and shamans in particular, were arrested and executed in the late 1930s. Soviet evolutionism was teleological, dogmatic, ethnocentric, and tragic.

In contrast, 19th-century Russian evolutionism has its modern descendants in anthropology. For example, Kropotkin's emphasis on mutual aid among hunter-gatherers is reinterpreted in Alan Barnard's "foraging mode of thought." Russian evolutionism has also informed anthropological studies of economics in small-scale societies, peasants, utopian communes, and societal change. The role of Russian scholars in the development of evolutionary theory and its interpretation in anthropology should not be overlooked.

Russian plant geneticist Nikolai Ivanovich Vavilov (1887–1943) is another evolutionary biologist who suffered under Soviet politics. Vavilov gathered a vast collection of plant seeds and conceived the theory that domesticates originate in regions where the species in question and its parasites showed maximum variation. He eventually proposed seven main centers of origin for plant domestication and multiple smaller centers, based on modern crop and wild plant phenotypes and genotypes. Vavilov also proposed the idea of primary and secondary domesticates. Secondary domesticates are weeds that grow along with primary domesticates that are watered, inadvertently harvested, and eventually domesticated. He linked his theory of plant domestication to the problem of animal domestication and the development of early civilizations. In 1940, Vavilov was repressed as a promoter of "bourgeois pseudoscience" by the head of the Institute of Genetics of the Soviet Academy of Sciences, Trofim Lysenko. Vavilov died in prison in 1943. His work is still cited by archaeologists studying domestication processes.

— John P. Ziker

See also **Darwin, Charles; Hobbes, Thomas; Malthus, Thomas; Reciprocity**

Further Readings

Axelrod, R., & Hamilton, W. D. (1981). The evolution of cooperation. *Science, 211,* 1390–1396.

Barnard, A. (2004). Mutual aid and the foraging mode of thought: Re-reading Kropotkin on the Khoisan. *Social Evolution and History, 3*(1), 3–21.

Durrenberger, E. P. (Ed.). (1984). *Chayanov, peasants, and economic anthropology.* Orlando, FL: Academic Press.

Todes, D. P. (1989). *Darwin without Malthus: The struggle for existence in Russian evolutionary thought.* New York: Oxford University Press.

STATE DARWIN MUSEUM, MOSCOW, RUSSIA

Initially founded in 1907 by Alexander Kots (1880–1964), a professor at the Moscow Higher Women's College, the State Darwin Museum has had a complex and difficult history. The plans to expand the museum were constantly pushed aside and then resumed for more than 80 years. The museum is now one of the biggest in the world in the field of natural history, detailing the beginning, growth, and diversity of life on the Earth; the evolution of animal behavior and the distribution of animals on the planet; and the origin of humanity and the history of its relationship with nature. It also holds the largest collection of aberrant mammals and birds, which has a unique scientific interest, consisting of 800 mounts with the rarest aberrations. In addition to regular specimens, in concert with the beliefs of its founder, the State Darwin Museum features extensive use of wildlife art. Kots believed that wildlife art could stimulate the public interest in biological diversity.

The relationship between the museum and the different regimes that governed Russia in the 20th century were not always easy. The location given to the museum in 1913, the building of the Higher Women's College, soon proved to be too limited for the scope of the collections. Although the Soviet government passed a decree for the building of a new and larger museum as far back as 1926, the founder did not live long enough to witness it. Four years before his death, Kots, whose entire life was committed to the establishment of the museum, was forced to say that his expectations could not be fulfilled because of the sad conditions of Russian society. When the building of the Women's College, which had been renamed the Lenin Pedagogical Institute in the meantime, became unsafe in the 1980s, the museum was even closed to the public. The construction of the new museum had started in 1974 but was only completed 20 years later, and the permanent exhibition was not opened until 1997, the 90th anniversary of the museum. Yet when the new museum was finally established, its building was already too small for its fast-growing activities and events, and in 1994, a new decree was issued granting the construction of an additional building.

— Luca Prono

Sagan, Carl (1934–1996)

Jewish-American astronomer and physicist Carl Sagan was known for both his popularizing of science and addressing social issues with an evolutionary awareness. Born in Brooklyn, New York, Carl Sagan was one of two children born to Sam Sagan and Rachel (Gruber) Sagan. Considered to be an intelligent and inquisitive child, his interest in science began at an early age due to the ever-growing popularity of science fiction as well as advancements in technology. Graduated from Rahway High School (1951), Sagan entered the "Hutchins Program" at the University of Chicago, where he received his BA in 1954 and 1955 (general and physics) and MA (physics) in 1956. Sagan continued his education at the University of California, Berkeley and received a PhD (astronomy/astrophysics) in 1960.

Considered an inspirational teacher, Sagan taught at both Harvard University (1962–1968) and Cornell University where he was director of the Laboratory of Planetary Studies. Yet his major contributions were in research and writing, such as his insights into atmospheric conditions on the planet Venus and planetary conditions on Mars in relation to the possibility of extraterrestrial evolution elsewhere in the universe. Working on various government projects, he was well known for his contributions to the *Galileo* and *Pioneer* X and interpretative results of the *Mariner* unmanned space probes. Further inquiry into extraterrestrial life continued by SETI (originally Project OZMA) established Sagan as a prominent scientific figure and reaffirmed his own speculation into the existence and duration of extraterrestrial life. However, it was Sagan's ability to convey technical scientific information and stimulate the public's imagination that made him famous. Sagan was best known for his PBS series *Cosmos* (1980) and his novel *Contact* (1985), which was later adapted for film by Robert Zemeckis (1997). Sagan also received many awards and medals for his academic, public, and literary contributions.

Sagan's academic achievements and theoretical development were directly or indirectly influenced by H. J. Muller, Harold Clayton Urey, Stanley Miller, Joshua Lederberg, Gerald Kuiper, and Jim Pollack. His theoretical orientation was driven by hopeful speculation about the evolution of extraterrestrial life. To these ends, Sagan had directed his scientific inquiries toward the theoretical precursors of life on this planet and other planets in the universe. Consequently, atmospheric and general conditions became a point of scientific speculation. Due to proximity, and perhaps influenced by the romanticism of science fiction, the planets Venus and Mars became targets in the quest for planetary knowledge and possible confirmation of extraterrestrial life. Drawing upon the popularized "greenhouse effect" on our planet, Sagan applied this principle to the conditions on Venus. According to Sagan, Venus's greenhouse effect was due to a combination of carbon dioxide and water vapor (Sagan's addition) that would serve to retain inferred radiation. Though high surface temperatures were speculated, Sagan speculated that Venus's planetary rotation could possibly hold temperatures to a point that may support life, for example, similar to life found in extreme temperatures at thermal vents. The information sent by *Mariner II* confirmed Sagan's belief that intense radiation contributed to Venus's temperature (greenhouse effect). However, Venus's surface temperature was greater than expected; consequently, it appears impossible for Venus to support life.

Source: © Bettmann/CORBIS.

Turning to the planet Mars, Sagan speculated that life, albeit microbial, may exist. However, the preliminary photos taken by *Mariner IV* did not expose any overt expressions of life. He then speculated on two key Martian features: the "canals" and the "wave of darkening" that are observable. As a plausible explanation, Sagan hypothesized two points concerning these features: the "canals" were a product of plate tectonics and the "wave of darkening" is a product of raging turbulent dust storms. Although the explanation for the appearance of "canals" was proven false, the explanation of dust storms retained its viability. However, as science advanced, the possibility of simple or advanced extraterrestrial life on Mars was negated by both *Viking* and more recent expeditions.

Influenced by both scientific method and Darwinian evolution, Sagan rejected religious or traditional cosmologies in favor of a rational and scientific explanation. In this critical process, he fought and exposed the pseudoscience that is often promoted and accepted without critical analysis. From the annals of theoretical space exploration and the duration of technological life in the universe (known as the "value L"), Sagan turned his attention to problems that face our species on this planet. He opposed militarism and the nuclear buildup of the Cold War, mostly contributing to the debates on SDI and the reality behind a nuclear winter. Promoting peace, democracy, and education, Sagan continued to endorse an optimistic view in an otherwise nihilistic reality of planetary extinction. Implementing whimsical and catchy phrases like the *Baloney Detection Kit,* Sagan encouraged readers to apply skepticism and logic in the evaluation of any expressed ideas—religious, political, and scientific. As a secular humanist, evolutionist, and materialist, Sagan knew the perils that ultimately face an individual. Even during his life-ending battle with complications from myelodysplasia, Sagan continued to enlighten and promote the peaceful unity of our species. Perhaps it was his understanding of the true nature and implications of evolution in the cosmos that contributed to his relentless and productive quest for extraterrestrial life.

— David Alexander Lukaszek

Further Readings

Davidson, K. (1999). *Carl Sagan: A life.* New York: John Wiley & Son.

Sagan, C. (1980). *Cosmos.* New York: Random House.

Sagan, C. (1997). *Billions and billions: Thoughts on life and death at the brink of the millennium.* New York: Random House.

Sahara Anthropology

Late Stone Age North and West Africa have been stereotyped as a monolithic culture in two hypotheses: the African Aqualithic and the Neolithique de Tradition Soudanis. Lithic diversity was ignored in favor of a broad-based cultural tradition defined by remains from aquatic activities and by the supposed observance of wavy-line and dotted wavy-line pottery. However, a recent reanalysis of Saharan pottery concluded that wavy-line pottery constitutes a pottery mode-tradition rather than a horizon style, thus restricting the value and applicability of the Khartoum Horizon Style to the dotted wavy-line component only for the Sahara-Sahel Belt. The dotted wavy-line

motifs frequently appear with other motifs on the sherds, reducing their diagnostic value and highlighting the cultural variability of the region in the early Holocene. Furthermore, some of these motifs are misidentified.

In addition, the McIntoshes, influenced by the ferrocentric tenets of *Technology, Tradition and the State in Africa,* dismissed early pastoralists as the progenitors of social complexity and downplayed the importance of Late Stone Age Dhar Tichitt.

By contrast, MacDonald approached the issue by using polished stone rings and hachettes (defined as small axes under six centimeters) to hypothesize a tandem spread of the items subsequent to the initial adoption of pastoralism across the Sahara and their use as mediums of exchange. His model postulates that the spread was complete throughout the Sahara-Sahel by 1800 BC. This chronologically distributed pattern, stressing long-distance mediums of exchange with cattle serving as their repositories of wealth, is taken as indicative of incipient social complexity arising ca. 4000 BC. with transitory leadership positions; these transitory peaks eventually took hold and developed into complex, hierarchical societies such as seen at Dhar Tichitt and Kerma.

MacDonald's hypothesis has been incorporated by Andrew Smith into a model of population movement claimed to be depicted in the rock art of the Tassili. Smith relates the appearance of Proto-Berbers, represented by the white-face rock art style, around 3500 BC with the black-face style of preexisting populations, showing ideological similarities to modern Fulani cultural practices. Following the results of Paris's excavations of burials and settlements in the Aïr Mountains of Niger, and his tenuous conclusion of a migratory flow of Proto-Berbers of unknown origin bringing with them tumuli, Smith brackets these events as a package. The platform cairn, making its earliest appearance ca. 3800 BC in the Central Sahara, is regarded in the model as the earliest form introduced by the Proto-Berbers, who Smith postulates originated in Northeast Africa.

Northeast Africa is the location for the claimed earliest expression of pastoral social complexity. The postulated degree of control over labor and the expression of ritual activity by Nabta Playa's Late Neolithic (ca. 5000 BC) inhabitants for the construction of the cattle tumuli and stone structures has been heralded as the start of social complexity in the Egyptian Western Desert, which subsequently influenced the ideology of the Predynastic Nile Valley inhabitants.

These competing hypotheses share a common thread in recognizing that socioeconomic strategies are manifestations of behavioral adaptations whereby knowledge and culture are transmitted through social learning. They differ in timing when the accumulated repertoire was materially expressed in a wide diversity of situations through socially mediated responses to internal or external stimuli. Social diversity serves as a warning against simplistic, linear models. It highlights the importance of developing an explanatory framework for investigating regional socioeconomic networks against the backdrop of differential resource access, environmental stimuli, variable cultural norms, and socio-ideological evolution.

New data, from the excavated Saharan tumuli in the 1990s and early 21st century, are helping to redefine the previously held tenets by demonstrating meaningful occurrences of symbols empowering

Source: © iStockphoto/Eileen Morris.

socio-ideological settings in socially transmitted patterns. This social reproduction of culture needs to be engaged with and defined anthropologically to a greater degree than is currently done by Saharan archaeologists. The construction of the Saharan tumuli was probably the outcome of the interpopulation integration outlined earlier, under variable degrees of resource abundance. This integration was likely to have been preceded by warfare in the Libyan Sahara, evidenced in Late Pastoral (3900–1800 BC) rock art from the Acacus, and the emerging dominance of prominent individuals in Messak Settafet rock art. Yet while rightly recognizing the relationship feedback between landscape, structure, and society, an important avenue of this investigation has been the role the act and consequence of building the tumuli had on the reproductive capabilities of the society. Designating and linking landscape systems and exchange goes some way toward explaining how social complexity arose and became institutionalized.

The production of these tumuli would also have involved redistribution of resources by the elite at the accompanying ritual celebrations. The set of shared values, wherein the social value of a clan or lineage was affirmed, applied to individuals along horizontal sections of society. The social access to status burial was thus widened but remained elitist, and distinct disposal areas were formed in Wadi Tanezzuft. These serve as cultural markers of vertical differentiation, or incipient complex social hierarchy, with a strong trend toward ethnic fragmentation that increased ca. 1800–810 BC in Wadi Tanezzuft with formalized burial sites and ceremonial centers.

There existed in the Late Neolithic increasing ethnic fragmentation and pooling of economic wealth (in the form of ovicaprids or cattle, depending on the region) in the hands of an emerging lineage elite and formalized through the acquisition and control of prestige trade items with regionalized mediums of exchange. Contra the McIntoshes, the pastoral burials were not constant. They vary in time and space, and the material culture demonstrates socially transmitted patterns of culture through cumulative inheritance systems. The deposition of goods within the tumuli show that the descendants were wealthy and powerful enough to dispose of them.

Cultural structures, imbued with power symbolism, were visible symbols of social organizational principles with wealth accumulation partly substituting for abstract symbols. The rise of the political ideology of domination and enculturation, with its thoughts and rules, lies behind the regulation of behavior and the instigation of principles of descent, selective material redistribution for prestige, and labor divisions. These early manifestations of social complexity and hierarchy separated ritual and political influences and were the basis for the later early Sahara, West African and Nubian states.

— *Michael Brass*

See also **Archaeology; Neolithic Cultures; Pottery and Ceramics; Rock Art**

Further Readings

Brass, M. (2003). Tracing the origins of the ancient Egyptian cattle cult. In A. Eym & C. A. Bennett (Eds.), *A Delta-man in Yebu: Occasional volume of the Egyptologists' electronic forum* (No. 1., pp. 101–110). Parkland, FL: Universal Publishers.

Wendorf, F., Schild, R., & Associates (Eds.). (2001). *Holocene settlement of the Egyptian Sahara (Volume 1): The archaeology of Nabta Playa.* London: Kluwer Academic/Plenum Publishers.

Sahelanthropus Tchadensis

Sahelanthropus tchadensis is an extinct hominin discovered in Chad in 2001–2002. The fossils were discovered by Michel Brunet and colleagues, who are part of the Mission Paléoanthropologique Franco-Tchadienne (MPFT).

The species name literally means Sahel-man from Chad; Sahel is the name of the region where the fossils were found. Brunet and colleagues have nicknamed the fossil skull Toumaë (or Toumai), which means "hope of life" in the local Goran language.

The holotype (the specimen that illustrates the characters of the species) includes a nearly complete cranium and the other fossils include parts of two mandibles and some isolated teeth.

At the time of this writing, the fossils are still being analyzed; however, it is clearly a very important specimen for a number of reasons. First, at 6–7 million years old, the age of the specimen places it around the time of the common ancestor of humans and chimpanzees. The discoverers claim that it represents the

oldest hominin discovered thus far—one very close to the root of the human family tree.

Second, if the Toumai fossils represent the oldest hominins, their discovery 2,700 km west of the Rift Valley in East Africa brings into question the long-standing theory that East Africa was the birthplace of hominins. This fossil, together with other early fossil hominins like *Orrorin* and *Ardipithecus,* suggests that early hominins in the late Miocene were geographically more widespread than previously thought. In addition, if Toumai proves to be bipedal, walking upright like humans, the mosaic environment associated with the fossils may also suggest that this key adaptation evolved before hominins moved onto the savanna.

Finally, the remarkably complete skull presents a unique combination of ape-like and human-like characters that make it particularly noteworthy. Although the brain is the size of a chimpanzee's, the face is more human looking than hominins half its age. The human-like characters that link this specimen to other hominins include the small upper canine teeth, which are worn at the tips, and the intermediate thickness of the enamel in the premolars and molars. Aspects of the skull also align it with other, more recent, hominins. These include the size and shape of the foramen magnum (the hole in the base of the skull for the spinal cord) and a relatively flat face.

The relationship of Toumai to other fossil hominins and modern humans is currently unknown. It may represent a species that was a sister group of other hominins, or it could be part of the human lineage. There is even some controversy regarding whether or not the fossil actually represents a hominin. Perhaps the chief significance of this fossil is the finding of unsuspected diversity of early hominins. This suggests that there were likely many "experiments" with becoming human, some of which were more successful than others.

— Shara E. Bailey

See also **Evolution, Human**

Further Readings

Brunet, M., Guy, F., Pilbeam, D., Mackaye, H., Likius, A., Ahounta, D., et al. (2002). A new hominid from the Upper Miocene of Chad, Central Africa. *Nature, 418,* 145–151.

Wood, B. A. (2002). Hominid revelations from Chad. *Nature, 418,* 133–135.

Sahlins, Marshall D. (1930–)

Marshall D. Sahlins, a prominent and highly esteemed anthropologist and ethnographer, is recognized internationally for his theory of the historicity and pervasiveness of culture in everyday life and the process of cultural change.

Born and raised in Chicago, Illinois, Sahlins completed his undergraduate work at the University of Michigan and his graduate work at the University of Michigan and Columbia University. He served on the faculty of both universities, and since 1973 has been Charles F. Grey Distinguished Service professor of anthropology at the University of Chicago, while lecturing at Cornell University and throughout North America, Europe, and Asia. He has been a member of the American Academy of Arts and Sciences since 1976.

Sahlins gained international attention and excited anthropological debates as a result of his theory about the history of European contact in Polynesia and his work with indigenous peoples of the Hawaiian Islands. He has also conducted ethnohistorical field research in Turkey.

Sahlins's assertion that culture will always exist, albeit transformed, since it has historically differentiated people through segregation, domination, and repression, has stirred debate about the consequences of globalization for distinctive cultures. He maintains that a process of cultural recuperation will occur in which culture will live in new forms, emerging from cultural resistance and new patterns of human life. As he puts it, "homogeneity and heterogeneity, modernity and tradition are no longer opposed terms."

Throughout his works *Moala: Culture and Nature on a Fijian Island* (1962) and *Evolution and Culture* (with Elman R. Service, 1960) and in his lectures, Sahlins describes collective interpretations of culture and its enduring nature, maintaining that culture will always exist as it adapts and transforms. His argument against the cultural diffusion position—that Western civilization has invaded and destroyed the cultures of indigenous populations—has gained increasing support from cultural anthropologists. Sahlins argues that cultural resistance modified Western influence and that Western scholars may not understand non-Western peoples and their cultures, which are resisting and changing globalization "through . . . new patterns of human life." His theory

of cultural change helps explain the dynamics of adaptation and conflict during globalization. Sahlins's other books, *Social Stratification in Polynesia* (1958) and *Stone Age Economics* (1972), contain elaborations of his theory of cultural change based on his very extensive ethnohistorical research on social stratification, decision making, and customs by analyzing material flow and social relations, types of reciprocities, and the relationships between reciprocity and kinship, wealth, food, friendship, alliances, peacemaking, and marital alliance. Sahlins provides strong support and verification for his theory.

The significance of Sahlins's theory of cultural change lies in its influence on contemporary anthropologists to conduct ethnographic field research in small-scale cultures with a perspective of the changing forms and dimensions of traditional cultures, resulting in a basic theoretical component of cultural change and social change curricula and ethnographic methodologies.

In summary, Sahlins has championed understanding cultural differences by focusing on collective interpretations of culture. By understanding the patterns of non-Western peoples, he maintains that Western anthropologists can research cultural change but may not be able to understand non-Western mentalities.

— *Stewart B. Whitney*

See also **Ethnography; Ethnohistory; Polynesians**

Further Readings

Sahlins, M. D. (1958). *Social stratification in Polynesia.* Seattle: University of Washington Press.

Sahlins, M. D. (1976). *The use and abuse of biology: An anthropological critique of sociobiology.* Ann Arbor: University of Michigan Press.

Sahlins, M. D., & Service, E. R. (Eds.). (1960). *Evolution and culture.* Ann Arbor: University of Michigan Press.

SAMBUNGMACHAN

Sambungmachan is an archaeological site in Central Java, Indonesia, from which three crania have been recovered. The earliest finds consist of a nearly complete *Homo erectus* (Sm 1) cranium missing the face and part of the base, the central portion of a *Homo erectus* tibia, and numerous remains of Late Pleistocene mammals. The date of the skullcap and tibia fragment has proved impossible to determine. Based on its mineral content, it probably dates to the Late Pleistocene. The cranium is probably male, and has a cranial capacity of 1,100 cc. The skull is important because it shows a mixture of *Homo erectus* and *Homo sapiens* characteristics, such as a thick cranial bone, pronounced brow ridges, high forehead, and rounded brain case, that link it to the *Homo sapiens* of the Ngandong site and earlier *Homo erectus* specimens from the site of Sangiran. The tibia fragment was found years after the cranium. It is similar in morphology to other *Homo erectus* specimens, such as Kabwe in Africa and those found at Zhoukoudian in China.

Recently, a new cranium (Sm 3) was recovered that has been attributed to the Sambungmachan site based on its overall morphology. It was found among a collection of curiosities sold by an antiques dealer in Jakarta to a New York City antique dealer. The owner of the store took it to Eric Delson, a physical anthropologist at the American Museum of Natural History. Delson identified the skull as *Homo erectus* and similar in morphology to the known specimen from Sambungmachan (Sm 1). The probably male cranium, like the original Sambungmachan specimen, shows a mixture of *Homo erectus* and *Homo sapiens* traits. However, unlike Sm 1, the cranial capacity of Sm 3, is only 875 cc. Because it was found out of context, the age of the skull cannot be determined except in broad terms and is approximately 100,000 to 1.5 million years old.

In 2002, an additional cranium was found at Sambungmachan (Sm 4) by a local farmer while collecting sand. The skull is that of a middle-aged *Homo erectus* who suffered and recovered from two head wounds. Unlike the other two skull caps found at Sambungmachan, the morphology of the new cranium is similar to early *Homo erectus* from the sites of Trinil and Sangiran, which date from 1.2 to 1.8 million years ago.

— *Donald E. Tyler*

See also **Homo Erectus; Homo Sapiens; Indonesia; Java Man; Meganthropus; Modjokerto; Ngandong; Paleoanthropology; Sangiran**

Further Readings

Lewin, R. L., & Foley, R. A. (2004). *Principles of human evolution.* Victoria, AU: Blackwell Publishing.

Shipman, P. (2001). *The man who found the missing link.* New York: Simon and Schuster.

Swisher, C., Curtis, G. H., & Lewin, R. (2000). *How two geologists' dramatic discoveries changed our understanding of the evolutionary path to modern humans.* New York: Scribner.

SAMBURU

The Samburu are, traditionally, a pastoral society found in central northern Kenya. They probably number between 100,000 and 200,000. The Samburu are closely related to the Maasai, they speak a dialect of Maa, and they share a common history with the Maasai and have a similar social organization. Both are polygamous and have age-sets; Spencer identified six ascending levels of a segmentary descent system: the lineage group, hair-sharing group, sub-clan, clan, phratry, and moiety.

There are, however, important differences from the Maasai. The Samburu have been less affected by colonial land alienations. Indeed, the Leroghi Plateau, which they now occupy, was once cleared of Maasai for colonial occupation but incorporated into the White Highlands. The Samburu have also, relatively recently, adopted camel pastoralism. Camels are expensive stock requiring very different treatment and herding from cattle. Their adoption has been eased by the harsher and drier conditions in the lands where the Samburu live.

The Samburu are close allies with the Rendille and Ariaal, both smaller pastoral groups who live in the same region. In common with other ethnic groups in the region, they intermarry and form diverse alliances of trade, friendship, and cooperation. In times of extreme hardship, such as the rinderpest epidemic of the late 1880s, the surviving Samburu sought refuge among their neighbors.

In common with other pastoralists in this region, Samburu homes consist of an inner kraal around which huts are built by adult married women, and the whole is fenced with bushes. Several families can share one compound, although stock may be segregated and each man's herd may leave by a different gate. Stock are valuable for all sorts of purposes; the favored food, however, is milk, which women collect in the morning and evening from cattle allocated to them on marriage. It is not typical for wives to share each other's stock. Indeed, it is quite possible for one wife's herd to prosper and another to fail. Each has to contend with her fate. Although wives milk and tend animals and allot them to their children, sale of stock is a male prerogative, leading to problems of impoverishment for families with profligate or alcoholic fathers and intense family debates over which animal is sold.

In recent years, the Samburu have experienced the diverse problems with their governments that afflict most pastoral populations. These include the pressures to settle and adopt sedentary livelihoods amid allegations of desertification, the requirement to modernize, and, allegedly, state-sponsored cattle raiding. Recently they have also lost land to conservation interests with the establishment and enforcement of protected areas. They, like the Maasai, have generally resisted pressure to change their dress, but livelihoods are diverse. In common with other groups, Samburu

Source: © Lynn Kilgore.

politics are responding to the new opportunities presented by nongovernmental organizations.

— *Dan Brockington*

See also **Maasai; Polygamy**

Further Readings

Holtzman, J. (2001). The food of elders, the "ration" of women: Brewing, gender, and domestic processes among the Samburu of northern Kenya. *American Anthropologist, 103*(4), 1041–1058.

Spencer, P. (1965). *The Samburu. A study of gerontocracy in a nomadic tribe.* Berkeley: University of California Press.

Spencer, P. (1973). *Nomads in alliance: Symbiosis and growth among the Rendille and Samburu of Kenya.* London: Oxford University Press.

SAMOA

Samoa is a chain of nine islands in the South Pacific located about 14 degrees south of the equator and divided into two political entities—the U.S. Territory of American Samoa and the neighboring independent country of Samoa (formerly Western Samoa until 1997). The Samoan archipelago is primarily volcanic and comprises of three major islands, Savai'i, Upolu, and Tutuila, and several smaller ones, including Olosenga, Ofu, Ta'u (the latter of which form the Manu'a group), and two coral atolls, Swains and Rose. The Samoan islands were formed by volcanic activity and are essentially mountains and ridges of erupted rock sitting on the Pacific Plate. Although no volcanic eruptions have been historically recorded in American Samoa, eruptions have occurred on the island of Savai'i as recently as the early 1900s.

Archaeological evidence suggests that the Samoan islands, as well as others, including Vanuatu, the Loyalty Islands, New Caledonia, Fiji, and Tonga, were first colonized by Austronesian speakers from Melanesia. These peoples were known as Lapita, makers of a distinctive dentate-design pottery who traveled east around 1300 BC as part of a major diaspora into Remote Oceania. Numerous radiocarbon dates from archaeological sites such as To'aga on Ofu and 'Aoa on Tutuila demonstrate that Samoa and the rest of these island groups were settled by Lapita no later than 900 BC.

These first settlers were horticulturalists and skilled ocean navigators who brought with them plants and animals such as taro, pigs, dogs, and chickens. The quick dispersal of Austronesian speakers

Source: © iStockphoto/Brandon Upper.

from Southeast Asia into parts of Melanesia and eventually Polynesia is attributed to their invention of the outrigger sailing canoe and mastery of various navigational techniques such as a compass using the stars.

Samoa and Tonga appear to have been the jumping-off point for Polynesian dispersal eastwards after about 500 BC. Ancestral Polynesian culture and Proto Polynesian language developed in this region between ca. 900 and 500 BC directly out of the founding Lapita cultural complex.

Archaeologically, Samoa is probably best known for its distinctive star mounds—massive rock platforms with radiating arms built by the ancient Samoans for cultural and sporting events—and stone adzes made from basalt. Large quantities of basalt debris have been found in village sites such as Maloata and Tulauta, and large basalt boulders with smooth dish-shaped concave areas, sometimes with grooves for sharpening the bits, have been found in streams and along the coast. The excellent quality of the basalt found in Tutuila made it especially attractive for ancient Polynesian tool makers. Chemical analysis of the adzes indicate that Samoan stone was highly sought after and traded or transported to islands hundreds of miles away.

The first recorded European contact of Samoa occurred in 1722, when Dutch navigator Jacob Roggeveen sighted several of the islands. He was followed by French explorers Louis-Antoine de Bougainville in 1768 and Jean-François de La Pèrouse in 1787. A monument in Aasu, Massacre Bay, is dedicated to the 12 members of La Pèrouse's crew who were killed there. The first European Christian missionary, Englishman John Williams of the London Missionary Society (LMS), arrived in 1830. He succeeded in converting many Samoans to Christianity, and his followers had a profound impact on Samoans and their cultural lifeways.

— Scott M. Fitzpatrick

Further Readings

Clark, J., & Herdrich, D. (1993). Prehistoric settlement systems in Eastern Tutuila, American Samoa. *Journal of the Polynesian Society, 102*, 147–186.

Kirch, P. V. (2000). *On the road of the winds: An archaeological history of the Pacific islands before European contact.* Berkeley: University of California Press.

Kirch, P. V., & Hunt, T. L. (Eds.). (1993). *The To'aga Site: Three millennia of Polynesian occupation in the Manu'a Islands, American Samoa.* Archaeological Research Facility Contribution No. 51. Berkeley: University of California.

Sangiran

Of the four major geographical areas where fossil hominids are found, Southeast Asia is the least understood. Except for some isolated teeth, the only fossil hominid remains in Southeast Asia are from sites near the Ngandong (Solo) River of central Java, Indonesia. Of fossils sites in central Java, Sangiran is the most important. The villages in Sangiran are famous among paleoanthropologists because they lie on sedimentary layers rich in the remains of *Homo erectus* and other extinct plants and animals. Fossils from the dated volcanic levels of Sangiran indicate that *Homo erectus* lived in the Sangiran area for almost two million years.

Approximately 150,000 years ago, volcanic pressure pushed the Sangiran area into a volcanic dome. This dome has been eroded by natural forces (rivers, rain, and humidity) into the depression that exists today. Currently, the Javan Plio-Pleistocene is subdivided into four major geological formations: the Kalibeng (Upper Pliocene), the Pucangan (Lower Pleistocene), the Kabuh (Middle Pleistocene), and the Notopuro (Upper Pleistocene). The Sangiran Dome deposits exceed 300 meters in thickness and encompass all four formations. With the exception of the Kalibeng, these deposits have yielded at least 100 fossils and numerous teeth of *Homo erectus* and *Homo meganthropus.*

The importance of the site of Sangiran was determined by paleoanthropologist Ralph von Koenigswald in the 1930s. The site of Sangiran is filled with cereal grains grown by the local inhabitants. In the process of farming and seasonal monsoon rains, the deposits of Sangiran continue to be eroded, yielding the remains of *Homo erectus* and dozens of other mammals such as buffalo, turtle, crocodile, hippopotamus, rhinoceros, and elephants. These farmers have an intimate knowledge of where fossils can be found. Von Koenigswald quickly recognized the farmers' knowledge and offered payment for fossil humans.

At first, Von Koenigswald was paying the farmers for each fragment that they brought to him. He changed his policy when he discovered that the farmers were breaking large fragments into several pieces to get more money. In the early 1960s, an Indonesian geologist/paleoanthropologist, S. Sartono, continued the work of Von Koenigswald and taught the local people how to identify human fossils. Nearly all of the important specimens from Sangiran have been found by local farmers who removed them from their original locations and brought them to Sartono. Because they were not found in a controlled archaeological excavation, the dates of the important specimens remain problematic. In 1996, the importance of the Sangiran site was recognized and protected as a World Heritage Location by UNESCO.

— Donald E. Tyler

See also **Homo Erectus; Java Man; Indonesia; Meganthropus; Ngandong; Paleoanthropology; Sambungmachan**

Further Readings

Lewin, R., & Foley, R. (2004). *Principles of human evolution.* Victoria, AU: Blackwell.

Shipman, P. (2001). *The man who found the missing link.* New York: Simon and Schuster.

Swisher, C., & Curtis, G. H. (2000). *Java man: How two geologists' dramatic discoveries changed our understanding of the evolutionary path to modern humans.* New York: Scribner.

Sapir, Edward (1884–1939)

Edward Sapir was an American anthropologist and professionally trained linguist. He was one of the founders of the science of linguistic anthropology. He made significant contributions to general linguistic theory, Amerindian linguistics, and Indo-European linguistics. Sapir also made substantial contributions to cultural psychology, culture theory, and ethnology.

Sapir's scholarly development in linguistic anthropology began in graduate school at Columbia University under the tutelage of Franz Boas, a leader in the development of American anthropology. Boas was interested in the study of the anthropological approach to linguistics because his own research on Native American languages led him to posit the idea that the culture of a given people reflected the language they spoke. While Sapir's first graduate work was in Germanics, Boas gave Sapir the additional opportunity to study American Indian languages. Sapir continued the technical study of languages throughout his career. Although Sapir's were the Athabaskan languages, he also studied Indo-European, Semitic, and African languages.

Sapir's study of languages led him to conclude that the study of linguistics was a social science rather than a natural science because language was primarily a cultural and social product. Sapir asserted that language serves as the index of the network of cultural patterns of a civilization. He argued that the real world of human beings, to a significant extent, consists of the language habits of a group. Language is therefore a guide to social reality, and only the social sciences could provide a scientific understanding of the relationship between language and cultural phenomena.

Sapir's scholarly contributions to the area of linguistic anthropology emphasized that languages are systematic, complete systems. Sapir conceptualized language as a purely human and non-instinctive method of communicating ideas, emotions, and desires by means of a system of voluntarily produced symbols. In his book *Language: An Introduction to Speech,* Sapir analyzed the elements of speech, the sounds of language, grammatical processes and concepts, and types of linguistic structure. Through such analyses, Sapir set forth his perspective that language was an attribute of humankind, that it is variable in place and time, and that it influences the ways in which people think and behave. One of Sapir's students, Benjamin Whorf, further developed the proposition that there is a systematic relationship between categories of language and thinking. Eventually this idea was termed the Sapir-Whorf Hypothesis.

Sapir was also a cultural theorist who was keenly interested in the relationship of personality to culture. Indeed, scholars consider Sapir as one of the first theorists to examine the interplay of culture and personality. While linguistics influenced his thinking as a cultural anthropologist, Sapir's work in this area significantly considered the importance of psychology and psychiatry. He wrote several essays in which he examined such topics as cultural anthropology and psychiatry, the concept of personality, and the

relationship between culture and personality. In these essays, Sapir clearly distinguished the apparent differences in the subject matter and purposes between cultural anthropology and psychiatry. However, he saw the service that anthropology could provide to psychiatry because the variability of cultural patterns demonstrated the elasticity of human behavior and the problematic nature of the concept of "normal behavior."

— *Patricia E. Erickson*

See also **Anthropology, Cultural; Athabascan; Boas, Franz; Culture and Personality; Linguistics, Descriptive; Sapir-Whorf Hypothesis; Whorf, Benjamin Lee**

Further Readings

Sapir, E. (1921). *Language, an introduction to the study of speech.* New York: Harcourt, Brace and Company.

Sapir, E. (1949). *Culture, language, and personality: Selected essays.* Berkeley: University of California Press.

Sapir-Whorf Hypothesis

Edward Sapir (1884–1939) and Benjamin Lee Whorf (1897–1941) developed the idea known as the Sapir-Whorf Hypothesis. Sapir and Whorf posited that the particular language we speak influences the way we see reality because categories and distinctions encoded in one language are not always available in another language (linguistic relativity). Scholars also interpret the hypothesis as standing for the proposition that differences in the structure of languages produce differences in how people think (linguistic determinism). However, neither theorist specified exactly the relationship between language and thought; that is, whether he believed that language determines thinking or just influences it. Consequently, because of its lack of specificity, the Sapir-Whorf Hypothesis has been a controversial idea since its inception in the 1920s and 1930s. Scholars in a variety of disciplines, including anthropology, education, linguistics, philosophy, and psychology, have disagreed about the role of language in thinking and how Sapir and Whorf intended to conceptualize that relationship. They have conducted research based on their conceptualization of the Sapir-Whorf Hypothesis in the hopes of finding empirical evidence to support it. However, research findings remain inconclusive, and the Sapir-Whorf Hypothesis is a subject that scholars continue to investigate.

From his studies of the research of Wilhelm von Humboldt and his own research on languages, Sapir concluded that there is clearly a connection between language and thought; however, he did not clearly state whether he believed that language determined thought. Rather, he argued that no two languages are ever sufficiently similar such that they could represent the same reality. Instead, he posited that the worlds in which different societies live are distinct worlds, not merely the same world with different labels attached to them. Furthermore, Sapir believed that we see and hear and otherwise experience the world very largely as we do because the language habits of our community predispose certain choices of interpretation.

One of Sapir's students, Benjamin Lee Whorf, further developed the proposition that there is a systematic relationship between categories of language and thinking. Many scholars attribute the development of the Sapir-Whorf Hypothesis to Benjamin Lee Whorf. Whorf was not an academic linguist but a fire insurance inspector; the study of linguistics was his avocation. Whorf studied the Hopi language under the supervision of Sapir. He developed a theory in collaboration with Sapir that many scholars identify as extreme Whorfianism. Extreme Whorfianism states that the structure of a human being's language determines the manner in which a person understands reality and behaves with respect to it. Whorf argued that we categorize nature along lines laid down by our native languages. Thus, for example, Whorf believed that speakers of Chinese dissect nature and the universe differently from Western speakers. In sum, Whorf believed that the culture of a people determines their language and their language determines the way that they categorize their thoughts and their experiences in the world.

Although Sapir and Whorf described a relationship between language and thought and culture, neither of them formally wrote a hypothesis that specified a relationship that scholars could subject to rigorous empirical testing. Instead, they proposed broad definitions and gave examples from their research to illustrate their arguments. Indeed, scholars formally named the ideas the Sapir-Whorf Hypothesis

only after the deaths of Sapir and Whorf. Yet the hypothesis remains an authoritative but controversial statement primarily because of its two central principles: linguistic relativity and linguistic determinism.

The principle of linguistic determinism is troublesome to many scholars and a source of criticism. This principle posits that we construct our thoughts based upon the language that we speak and the words that we use. In its strongest sense, linguistic determinism means that language determines thought; that is, humans may be able to think only about objects, events, processes, and conditions that have language associated with them. In this view, language and thought are identical. In its more moderate sense, language partially influences thought because the culture of a society influences its language. The writings of both Sapir and Whorf do not specifically commit them to a particular position on this issue.

Many scholars believe, based on their interpretations of his writings, that Whorf committed to a strong version of linguistic determinism; that is, that language determines thought and, consequently, thought is not possible without language. Scholars have challenged this strong determinism view on both theoretical and empirical grounds. Some scholars criticize the strong version of linguistic determinism from the perspective of causality; that is, how does one determine whether language has affected thought or thought has affected language? In order to make such a determination, one must separately observe thought and language, an observation that is virtually not possible. Additionally, they argue, if there is no thought without language, then how did language develop initially? A third criticism concerns translatability; that is, scholars argue that although languages may differ in the way they express certain details, a concept can always be passed on between languages, contrary to what a strong version of linguistic determinism would hold. While it may be true that the sense or connotation contained in a word may be lost in translation, the fact that the concept can be translated supports a more moderate view of the relationship between language and thought. Fourth, there is the issue of codability, or how many words it takes to express a concept or term in one language. Those who support the strong version of linguistic determinism argue that the fact that a culture has only one word for something that would take others ten words to express must mean that different thinking occurs. However, other scholars indicate that this does not mean that two people see the world differently; rather again, codability illustrates the idea of language partially influencing thought. Finally, there is the theory of universals, attributed to Noam Chomsky, that argues that there are deep structures common to all languages. In this view, all cultures are related and have similar realities.

Given the above criticisms, few scholars today would accept the strong formulation of the Sapir-Whorf Hypothesis. Most scholars subscribe to a moderate or weak form of linguistic determinism, one that posits that language influences thought but does not determine it. This view accepts the principle of linguistic relativity; that is, that there is a close relationship between the structure of a language and the culture that uses that language. In this view, language influences the way we think and it influences us to look at the world in a certain way.

Linguists and anthropologists have long recognized the importance of language to culture. The Sapir-Whorf Hypothesis explains that different cultures understand and appreciate the world in different ways and that language is the vehicle to express that difference. Today, while linguists and anthropologists generally agree that language influences thought, they do not believe that it determines thought. However, scholars continue to examine how language influences thought. Therefore, as a theory of linguistic relativity, the Sapir-Whorf Hypothesis remains a significant and substantial contribution to the fields of linguistics and anthropology.

— *Patricia E. Erickson*

See also **Anthropology, Cultural; Sapir, Edward; Whorf, Benjamin Lee**

Further Readings

Chomsky, N. (1968). *Language and mind.* New York: Harcourt Brace Jovanovich.

Pinker, S. (1994). *The language instinct: How the mind creates language.* New York: Harper Collins.

Sapir, E. (1949). *Culture, language, and personality: Selected essays.* Berkeley: University of California Press.

Whorf, B. Lee. (1962). *Language, thought, and reality: Selected writings of Benjamin Lee Whorf.* Cambridge: The M.I.T. Press.

SARDINIA

Sardinia is a large island in the middle of the western Mediterranean Sea. Close by, to the north, is the smaller island of Corsica; to the southeast is Sicily. Sardinia has been a part of Italy for more than a hundred years, but the Italian peninsula is a fair distance across the sea to the east. Before going to Italy, Sardinia was controlled by Spain; before that Byzantium; earlier the Vandals, who came after the Romans. In recent centuries, Sardinia was regularly raided by Saracen Moor pirates; the Sardinian flag, called "quatro mori," features four captive black Moors with blindfolds.

Sardinia has a Mediterranean climate of wet, mild winters and hot, dry summers and Mediterranean vegetation of oak forests, which have been much cleared by human action to provide open pasture and agricultural land as well as human settlements. Traditionally cultivation has focused on Mediterranean crops: wheat, tomatoes, olives, and grapes; livestock are predominantly sheep, and also goats and pigs, with some cattle and horses. The corresponding Mediterranean diet common to Sardinia is bread and pasta, olive oil, tomato sauce, wine, sheep's and goat's milk cheese, prosciutto, lamb, mutton, and pork, supplemented by vegetables and fruits.

Today, a million and a half Sardinians (*sardi*) are spread across the island in many agropastoral towns, some exceeding ten thousand inhabitants. The two main cities are Cagliari, the capital, on the south coast, and Sassari in the north. The two main geographical features are the great Campidano valley running up the west of the island and the massive Gennargentu mountain range and plateau filling most of the eastern half of the island. Between valley and mountain, history and culture divides. The rich agricultural Campidano valley, bread basket of the Romans, was always the great target and prize of foreign invaders and imperial conquerors, and the culture was one of a beleaguered peasantry. The rugged mountains, home of escapees from the plains, resisters, rebels, and *banditi,* was friendlier to the *pastore* (shepherd) with his flock, than to large-scale agricultural production.

Sardinians have always identified strongly with their local community (*il comune*), which commonly includes a main settlement, water sources, pasture, forest, agricultural land, gardens, and orchards, and may include offshoot settlements and, today, light industries. Intended by design to be self-sufficient—a common ambition in the traditional Mediterranean Europe—these communities tended to be closed and

Source: © iStockphoto/Janine Bolliger.

inward looking: endogamous in marriage, agonistic with other communities, chauvinistic about the special virtues of each. All Roman Catholic, all speaking *Sardu,* a language derived from Latin (with the exception of a few small pockets of Spanish and Greek speakers), all depending on agropastoral production, all with similar customs, dress, and norms, the *comuni* differentiated themselves from each other by minor differences in dialect, cuisine, and politics. But they shared, especially in the mountain *comuni,* a fierce independence at the community and family levels. In the mountains, they followed a strict code, called the *codice barbaracino,* named for the highland region of Barbagia, which dictates individual "self-help," *vendetta,* in response to insult or attack, vengeance in relation to injury to honor, property, or person, and neutrality and silence by anyone not directly involved.

Since WWII, mass media and education, as well as labor migration, have substantially Italianized Sardinia. Standard Italian is taking the place of Sardinian, and traditional agropastoral work has declined in prestige in favor of modern, salaried, "clean" office work. Young Sardinians complain that they "don't want to be *contadini* (peasants)." And yet, great value is still put on *genuino* (pure) water, food, and relationships. Sardinians today are torn between the modern and the *genuino.*

— Philip Carl Salzman

Further Readings

Assmuth, L. (1997). *Women's work, women's worth: Changing lifecourse in highland Sardinia.* Helsinki: Finnish Anthropological Society, Transactions No. 39.

Salzman, P. C. (1999). *The anthropology of real life: Events in human experience.* Prospect Heights, IL: Waveland Press.

SARTONO (1928–1995)

Sastrohamidjojo Sartono was one of the founders of modern geology and paleoanthropology in Indonesia. He was born in Madiun (East Java) on June 30, 1928, and died suddenly during a research visit to the Netherlands on October 25, 1995.

In the fall of 1956, Sartono received his BSc in mathematics and natural science from the University of Indonesia, and in the fall of 1958 he received his doctorate in science and geology from the Natural Science University in Bandung, Java. His dissertation was titled "The Stratigraphy and Sedimentation of the Most Eastern Part of Gunung Sewu (East Java)."

Sartono accepted the position of lecturer with the Department of Geology at the University of Indonesia at Bandung in the fall of 1956. Then, in the fall of 1959, he became professor of geology when the University of Indonesia at Bandung became the newly formed Institute of Technology Bandung (ITB). He remained professor of geology and paleoanthropology at ITB until his death.

Sartono devoted his life to the study of the Sangiran site, as well as other sites in Java and other Indonesian islands. He had received training in paleoanthropology from G. H. R. von Koenigswald and many other scientists from Europe and Japan, and he continued the practice, begun by von Koenigswald, of training local farmers to identify faunal remains. Nearly all of the hominid remains found in Indonesia were discovered by local farmers working the fields, and by working with them, Sartono recovered nearly all of the fossil hominids known in Java. Without his work, the fossil record from Indonesia would be very small. Sartono received numerous awards and recognitions for his research and published numerous articles in scientific journals.

— Donald E. Tyler

See also **Homo Erectus; Indonesia; Java Man; Meganthropus; Sangiran**

Further Readings

Lewin, R. (2004). *Principles of human evolution.* Victoria, AU: Blackwell.

Shipman, P. (2001). *The man who found the missing link.* New York: Simon and Schuster.

SASQUATCH

Sasquatch, Bigfoot, and the Yeti are all varieties of bipedal human-like primates whose existence has yet to be proven. Reports of the creature known as Sasquatch date back to the ancient legends of Native Americans living on the west coast of the Americas,

from northern California to British Columbia. Photographs, eyewitness accounts, film, footprints, and audio recordings have been collected sporadically over the past two centuries. Yeti sightings in the Himalayas date back to 1887, and Bigfoot sightings on the west coast of the Americas have been reported since the early 1800s. None of this evidence, however, has ever conclusively proven the existence of this creature, and in many cases, especially in the latter half of the 20th century, the evidence was proven to be a hoax.

It is possible that such creatures exist, but major doubts have been raised. The biggest obstacle is the lack of a body; no Sasquatch capture (dead or alive) has ever been thoroughly documented and scientifically analyzed. At one point in our history, primates did live in North America, but not during our recent history. No fossil evidence shows the existence of primates in North America later than 22 million years ago. Furthermore, of the primate fossils that were created over 22 million years ago, none of them were ape sized. Also, there exists no fossil evidence of a nonhuman hominoid in the western hemisphere. The Sasquatch phenomena has become wildly popular for a number of reasons; perhaps the biggest is the possibility that this creature represents the missing link in the chain of evolution that Darwin predicted. The problem is that this hypothesis requires a gradual development over time from either a gorilla or another large ape that walks on all fours to a bipedal Sasquatch. There would have to be a series of interconnecting species, for which no fossils have been found. Also, in order to maintain its species, the Sasquatch would have to reproduce, and without a sufficiently large population, there wouldn't be enough genetic variation to sustain the species. Without sufficient genetic variation, any species becomes more likely to succumb to recessive genetic disorders. As long as the aura of public interest continues to surround the subject, and as long as startling yet unreliable eyewitness accounts and other such evidence appear, it will be impossible to disprove the existence of such a creature. Since disproof is highly improbable, the question of this creature's existence puts the burden of proof on the advocates of a Sasquatch theory; however, to date no incontrovertible empirical evidence has been found. Such evidence as blood, hair, skin, or droppings would be far more suited to proving the existence of this beast, for such evidence would provide a DNA sample for study and interpretation. Until such evidence is found, the existence of the Sasquatch remains a hypothesis for anthropologists.

— James Paul McMillan

Further Readings

Daegling, D. J. (2004). *Bigfoot exposed: An anthropologist examines America's enduring legend.* New York: Altamira Press.

de Saussure, Ferdinand (1857–1913)

Swiss linguist Ferdinand de Saussure was the founder of structural linguistics, which broke with philological and historical approaches to language to establish a new approach to language based on the understanding that "language is a form, not an essence." In defining language as a system of signs, he also became the father of modern semiotics. His notion that the meaning of a sign is to be found in its relation to other signs laid the foundation for the structuralist school in linguistics, semiotics, and social theory.

Born November 26, 1857, in Geneva, Switzerland, Saussure could read and write five languages by the time he was 15 years old. He attended the University of Geneva and the University of Berlin before receiving his PhD at the University of Leipzig in 1880. In 1879, while still a student, he made his reputation with a brilliant contribution to historical linguistics, *Memoir on the Original System of Vowels in the Indo-European Languages,* which theorized about how vowel alternations take place in Indo-European languages.

Saussure proceeded to teach in Paris at the École Pratique des Hautes Etudes. He then returned to Geneva and became a professor of Indo-European linguistics and Sanskrit and general linguistics at the University of Geneva from 1891 to 1912. He wrote no other books but was enormously influential as a teacher. He is best known for the *Course in General Linguistics,* a book constructed from notes of his lectures taken by students.

The *Course* is brimming with ideas. Saussure broke with the dominant comparative-historical school of his day by pointing out that the historical origins of

Source: Courtesy, Library of Congress.

language are irrelevant to the ways people actually use language to communicate. The fact that "beef" is an Anglicization of a Middle French word that entered into English after the Norman conquest is completely unnecessary for understanding its use in contemporary speech. Saussure argued that in addition to *diachronic* studies of language evolution, there was a need for a synchronic linguistics that would describe languages as they work in contemporary life.

Perhaps his most influential contribution to linguistic and social theory was his distinction between language (*langue*) and speech (*parole*). Language, for Saussure, is the signifying system through which we communicate. Speech refers to actual utterances. Because we can communicate an infinite number of utterances, it is the system behind them that is important. Saussure illustrated this with reference to a chess game. The chess game has its rules and its pieces and its board. These define the game. Actual games of chess are only interesting to the participants. Thus while linguists may collect data from actual instances of speech, the goal is to work back to the system of rules and words that organizes speech.

Only slightly less important was his notion of the arbitrary meaning of the sign. Any word, Saussure said, is a sound that stands for an idea. The word *tree* does not refer to the thing in the world but rather to a concept we have in our heads. The same concept can be represented by many different words in different languages because the relationship between any given sound and the idea it signifies is arbitrary—it is created by society.

Although both Saussure's langue/parole distinction, and his insistence on the arbitrariness of the sign have been criticized, his influence has been remarkable. The structuralist movement in anthropology, cultural studies, linguistics and literary theory, and social theory derive from his work, as do, in a less direct way, the influential deconstructionist and post-structuralist work of Roland Barthes, Jacques Derrida, Michel Foucault, Julia Kristeva, and Jacques Lacan.

— Mark Allen Peterson

Further Readings

Culler, J. (1985). *Saussure.* Ithaca, NY: Cornell University Press.

Harris, R. (1987). *Reading Saussure: A critical commentary on the "cours de linguistique générale."* London: Duckworth.

de Saussure, F. (1974). *Course in general linguistics* (Wade Baskin, Trans.). London: Fontana/Collins.

Schaller, George B. (1933–)

The next time you have the good fortune to see an endangered species, you might be the beneficiary of George Schaller, a naturalist who has become well-known for his efforts to describe and preserve animals who are in danger of extinction. George Schaller was born in Berlin, Germany, but found himself in Missouri as a teenager. He later received his doctorate from the University of Wisconsin. His interest in non-human species began during his childhood and has continued through his interesting adult life. He has traveled extensively throughout the world and studied various types of animals. These travels and studies provided him with the material needed to write numerous books and articles. One of his publications, *The Mountain Gorilla: Ecology and Behavior* (1963), provided valuable information about the

activities of gorillas in the wild that had previously not been available. His successful professional activities have also resulted in numerous awards including the National Book Award in 1973 and the World Wildlife Fund Gold Medal.

George Schaller is also important for his attempt to protect animals from possible extinction. Those of us who are concerned about improving our environment and protecting the many species of animals whose presence is endangered will find George Schaller to be someone well-deserving of our praise. His works provide valuable information for future generations of individuals who have an interest in animal conservation, and serve as an inspiration to many of us to work for the improvement of our natural wildlife environment.

— William E. Kelly

Further Readings

Schaller, G. B. (1963). *The mountain gorilla: Ecology and behavior.* Chicago: University of Chicago Press.

Schaller, G. (1972). *Serengeti: A kingdom of predators.* New York: Knopf.

Schaller, G. B. (1977). *Mountain monarchs: Wild sheep and goats of the Himalaya.* Chicago: University of Chicago Press.

Schaller, G. B., et al. (1958). *The giant pandas of Wolong.* Chicago: University of Chicago Press.

Schliemann, Heinrich (1822–1890)

Heinrich Schliemann was born January 6, 1822 in the vicarage of Neubukow, Germany, and died December 26, 1890 in Naples, Italy. Most of his ancestors were vicars, traders, and farmers. His father was a poor and violent vicar, and his mother, who died when he was nine, took care of their nine children. According to Schliemann's autobiography, when he was given a book on world history for Christmas, he promised his father he would excavate Troy.

Schliemann left school after graduating from junior high school. For several years he worked in a grocery and then as a bookkeeper in Amsterdam. As he had a great interest in languages, and a great talent for learning them, he became fluent in reading and writing a great number of them—estimates differ from eight to sixteen languages. In 1846, Schliemann, who spoke Russian, founded an office for an Amsterdam trading firm in St. Petersburg, and the city was his primary residence until 1864. There he also founded his first trading company in 1847, the same year in which he became a Russian citizen. In 1851/52, Schliemann traveled to California to search for his younger brother, Ludwig. After his return to St. Petersburg, he married Jekaterina Petrowna Lyschina (1826–1896), with whom he had three children. During the Crimean War (1853–1856) his business flourished, and he made an enormous profit; however, during the first worldwide economic crisis, in 1857/58, he suffered heavy losses.

In the following years, he traveled through many countries in Europe, North Africa, and the Near East, and considered giving up business to dedicate himself to other goals—he received great satisfaction from reading Sophocles, Homer, Horace, and Virgil. In 1864, Schliemann and his wife were made hereditary freemen of St. Petersburg, and he also closed down his trading firm—by that time, he was extremely rich. Between 1864 and 1866, he undertook further extensive journeys through Asia and North and Central America, after which he decided to become a resident of Paris. There he stayed until 1870, and studied philology, philosophy, archaeology, and literature. His first book, *La Chine et la Japon au Temps Present,* was published in 1867. In 1867/68, he visited North America, Italy, Greece, and Turkey. In the meantime, his wife and children remained in St. Petersburg. In 1869, he published his second book, *Ithaka,* in which he compared various contemporary locations to those mentioned in Homer. The same year, he received his doctorate from the University of Rostock (in absentia), became a citizen of the U.S., divorced, and married a young Greek schoolgirl named Sophia Engastromenos (1852–1932), with whom he had two children.

Schliemann's history of excavations started in 1870. Without permission, he led an excavation in Hisarlik (Troy) but was driven away after ten days. From 1871 until his death in 1890, his primary residence was Athens. In 1871, his groundbreaking excavations in Troy began. Seventy to eighty Greeks were employed to actually do the digging. In his diary, Schliemann noted that he was the first to ask the question whether there had ever been a Troy, not only

Source: Courtesy, Library of Congress.

theoretically but also practically. In his first book on Troy (*Ilios*), he refers to his own method as "research by pickax and spade" combined with a love for the ancient classics, in particular, Homer. One could also describe his method as the visualization of myths at authentic locations, a method which does have a long history. What dissatisfied him with respect to archaeology was that it was done slowly and carefully so that little progress was made. Instead of removing one layer after another, he wished to simply dig deeper and deeper. Luckily, after being advised in a letter by the French archaeologist Emile Burnouf, he wrote down the location of his findings. And his findings were immense. By 1873, he had dug up two-thirds of the city and found "Priam's Treasure." He also claimed that his findings proved that the *Iliad* was based on actual events, and his firm belief in the historicity of the Trojan war was the reason behind all his excavations.

He published his findings in 1874 under the title *Trojanische Alterthümer.* The public showed great interest in his work; however, the reaction of the scientific community was less enthusiastic and rather skeptical. In 1875, he gave presentations in many major European cities, as he was a well-known man by then. As a consequence, he was awarded honorary membership in the Society of Antiquaries of London (1876), the *Deutschen Anthropologischen Gesellschaft* (1877), and the *Berliner Gesellschaft fuer Anthropologie, Ethnologie und Urgeschichte* (1881). He continued to lead excavations. In 1876, he received permission to dig in Tiryns, Mykene, and Orchomenos. A year later, his book, *Mykenae,* was published, and his Troy collection was exhibited in London and then transferred to Berlin in 1881. As a consequence of his enormous success, he received further great honors: in 1881, he was made freeman of Berlin, and he was awarded an honorary doctorate by Oxford in 1883.

In 1876, his method for excavations was still to dig without considering the various layers but with his mind solely focused on setting free the monuments of a particular period—a method of which the Greek archeologist supporting him, Panagiotis Stamatakis, was very critical. In Mykene also, Schliemann managed to dig out many precious treasures and interesting sites, which he always connected to stories passed down from ancient times.

After the archaeologist Frank Calvert and the Oriental scholar Archibald Henry Sayce informed Schliemann of their interpretation of the various layers he had excavated, Schliemann attempted to identify the seven layers he had found himself, and he published his reflections in his book *Ilios.* He concluded that work by stressing that he hoped that his "research by pickax and spade" proved that the events described in Homer's poems actually did take place. There he also stresses that he never doubted the unity of the Homeric poems and that the *Iliad* and the *Odyssey* were composed by one man only.

In the following years, he excavated in Marathon, Tiryns, Orchomenos, Alexandria, and Troy. In 1890 he became deaf and had an ear operation in Halle, after which he left the city, although his physician advised him not to. On December 24, 1890, he visited Pompeii; on the 25th he had a breakdown while on the way to visit a doctor. Ten days before his 69th birthday, on December 26, he died in Naples. After his death, his books *Bericht über die Ausgrabungen in Troja im Jahre 1890* and *Selbstbiographie–Bis zu Seinem Tode Vervollständigt* were published. In the following years, the archaeologist Wilhelm Dörpfeld

continued to excavate in Troy, financed by Schliemann's wife, Sophia.

Irrespective of Schliemann's great findings, many critics doubted that he was a proper archaeologist. However, there were others, like Sayce, who held that Schliemann's research by spade began a new era for the study of classical antiquity.

— *Stefan Lorenz Sorgner*

See also **Archaeology; Troy**

Further Readings

Schliemann, H. (1968). *Troy and its remains* (P. Smith, Ed.). Manchester, NH: Ayer.

Schuchhardt, C. (1979). *Schliemann's discoveries of the ancient world* (E. Sellers, Trans.). New York: Avenel Books.

Traill, D. A. (1996). *Schliemann of Troy: Treasure and deceit.* New York: St. Martin's Press.

Schmidt, Wilhelm (1868–1954)

Although he was born into humble circumstances in Hörde, a small town in Westphalia (western Germany), Father Wilhelm Schmidt became a lifelong student of the world as a leading authority in his day on linguistics, ethnology, and comparative religion. At the age of 15, he entered the mission school of the Society of the Divine Word (*Societas Verbi Divini,* SVD), at Steyl, in the Netherlands. This seminary was established in 1875 by Father Arnold Janssen for the training of Roman Catholic missionaries; Schmidt completed his education there and was ordained into the priesthood in 1892. After he studied Semitic languages at the University of Berlin for 2 years, Schmidt began teaching at the new SVD seminary in Mödling (near Vienna), Austria; he held this post from 1895 until 1938, when he left Austria because of the Nazi takeover.

Schmidt developed a special interest in the languages spoken in regions where his SVD colleagues served (i.e., North and South America, Europe, the Far East, and Oceania); he obtained the support of Janssen to publish a journal that would advance this missionary endeavor and promote anthropological studies. In 1906, Father Schmidt launched *Anthropos: International Review of Ethnology and Linguistics;* the year 2005 witnessed the publication of *Anthropos,* Volume 100. This journal, which has published thousands of articles and reviews, remains one of Schmidt's greatest contributions to anthropology. From the beginning of his work as professor and editor, Schmidt encouraged missionaries to become better students of the people groups among whom they worked—and to advance the study of *Völkerkunde,* the world's cultures and languages.

In addition to his teaching and editorial work, Father Schmidt helped to start the Vatican's Ethnological Missionary Museum; this collection was established in 1926 and was directed by Schmidt from 1927 until 1939. During this same period, he founded the Anthropos Institute and Library at Mödling/Vienna as another means to advance his religious-apologetic-anthropological agenda; Fathers Wilhelm Koppers, Paul Schebesta, and Martin Gusinde, also SVD clergy, helped establish this research center. When the *Anschluss* occurred, Schmidt transferred the Anthropos Institute and its library to Fribourg, Switzerland, where it remained from 1938 until 1962. By 1962, the Society of the Divine Word moved their Institute to Sankt Augustin, outside Bonn, where it remains today. Wilhelm Schmidt also taught at the University of Vienna (1921–1938) and at the University of Fribourg (1939–1951). Over the course of his professional career, Father Schmidt was in constant contact with coworkers from different parts of the world and applied his comparative perspective and linguistic skills in many research projects. He published over 600 books and articles and received honorary degrees from six universities.

Schmidt's initial scholarly activity focused on linguistics, including the languages of Papua New Guinea—one of the places where SVD missionaries worked. He expanded his study to include Oceania (including Australia) and identified connections between "Austronesian" (formerly Malayo-Polynesian) languages and those spoken in Southeast Asia; Schmidt named this family the "Austro-Asiatic" languages.

Father Schmidt also made significant contributions to the field of cultural anthropology and was a leading figure in the German school of Diffusionism, along with Frobenius, Graebner, and Ratzel. In opposition to theories of cultural evolution, these—and other scholars in Europe and America—proposed a system of "culture circles" (*Kulturkreise*), by which

cultural traits diffused outward from their points of origin. This historical-geographical emphasis, which was worked out in great detail, countered the theory of unilinear evolution but did not hold up under close scrutiny. Nevertheless, the "Vienna Cultural-Historical School" exerted great influence on the development of anthropological theory, including advocates of the "American Historical Tradition" (e.g., Boas and Kroeber), and avoided the excesses of the British diffusionist school (e.g., Rivers and Smith). One of Schmidt's best known books, available in English translation, delineates his views (*The Culture Historical Method of Ethnology: The Scientific Approach to the Racial Question* [1939]) and partially explains his conflict with the National Socialists.

Though he wrote many books and articles, published in the *Anthropos* journal and elsewhere, there is no doubt that Schmidt's greatest work is his 12-volume magnum opus, *Der Ursprung der Gottesidee: Eine historisch-kritische und positive Studie.* This study is a compilation of an enormous body of data, and its production occupied much of his career—from the appearance of the 1st volume in 1912 until the 12th volume in 1955. In this collection and analysis of a vast array of religious traditions (reminiscent of the range of illustrations treated by Frazer or Eliade), Schmidt attempted to prove (à la Andrew Lang) that the religions of the technologically primitive (or "ethnologically oldest") peoples include a "monotheistic" trend. In short, he was attempting to demonstrate that the widespread recognition of a "High God" reflected the original monotheism of the Bible. This view has not been widely accepted by specialists in the anthropological and historical study of religion, and many scholars have given up their attempt to discover the religious *primordium.* In the end, Schmidt, who rejected an evolutionary explanation of culture and religion, fell back on a similar method—that is, assigning cultural and religious levels to a theoretical historical sequence. The monumental *Ursprung der Gottesidee* is available only in German, but two English titles that reflect Schmidt's work in this area are *The Origin and Growth of Religion* (1931) and *High Gods in North America* (1933). These and his other works reflect important stages in the history of anthropological theory—and in the rise and development of "missionary anthropology."

— Gerald L. Mattingly

Further Readings

Bornemann, F. (1982). *P. Wilhelm Schmidt S.V.D. 1868–1954.* Rome: Apud Collegium Verbi Divini.

Brandewie, E. (1983). *Wilhelm Schmidt and the origin of the idea of God.* New York: University Press of America.

Brandewie, E. (1990). *When giants walked the Earth: The life and times of Wilhelm Schmidt, SVD.* Fribourg, Switzerland: Fribourg University Press.

Evans-Pritchard, E. E. (1965). *Theories of primitive religion.* Oxford, UK: Clarendon Press.

Harris, M. (1968). *The rise of anthropological theory: A history of theories of culture.* New York: Thomas Y. Crowell.

Honigman, J. J. (1976). *The development of anthropological ideas.* Homewood, IL: Dorsey Press.

Schneider, David M. (1918–)

David Murray Schneider was among the leading contributors to symbolic anthropology and the study of kinship. He defined culture as a system of meanings and symbols and emphatically distinguished culture from the social system. Schneider also made important contributions to Micronesian ethnography. From the 1960s through the mid-seventies, he was a powerful force in the University of Chicago's anthropology department. He was instrumental in founding the Association for Social Anthropology in Oceania. And, through his analysis of kinship as a cultural system, he became arguably the most important precursor of postmodernist deconstruction in anthropology.

Schneider was born in Brooklyn, New York, in 1918. His parents were Eastern European immigrants and political radicals. He attended Cornell University intending to major in agricultural bacteriology, but, largely under the influence of R. Lauriston Sharp, he switched to anthropology.

Following a brief stint of graduate work at Yale, Schneider was drafted into the army. Upon his discharge, at Margaret Mead's urging, he was admitted to Harvard's new doctoral program in social relations. There he studied under anthropologist Clyde Kluckhohn as well as sociologists George Homans and Talcott Parsons. A period of fieldwork on the Micronesian island of Yap in 1947–48 led Schneider

to conclude that his predecessors' work on kinship was "absolutely all wrong," and he devoted his career to developing an alternative approach.

In 1955, Schneider coauthored with Homans *Marriage, Authority, and Final Causes,* a book that criticized Claude Lévi-Strauss's structural analysis of the prevalence of matrilateral over patrilateral cross-cousin marriage. That led to a vituperative debate with British anthropologist Rodney Needham.

Schneider's most widely cited book is *American Kinship: A Cultural Account,* in which he employed kinship to illustrate his approach to studying culture. He attempted to eliminate prior assumptions, identify the meanings and symbols through which community members define their own cultural units, and use his interpretive insight to elucidate the order underlying his informants' cultural system. The result was a view of kinship that differs from the commonsense perspective held by most American natives but was intended to make that commonsense perspective intelligible to the critical observer. He argued that kinship is a cultural system, not a set of biological facts. Americans use biological relatedness as a symbol in terms of which kinship is defined and differentiated from other cultural domains, but the application of that symbol is not dictated by objective biogenetic reality. Later, he argued that at the cultural level it is impossible to distinguish kinship from such other domains as religion and nationality. Ultimately, he claimed that kinship is merely an anthropological construct that does not exist in any known culture. His last major work, *A Critique of the Study of Kinship,* explored the implications of kinship's (alleged) nonexistence and how the illusion of its existence had distorted cultural analysis throughout the history of anthropology.

— *Richard Feinberg*

See also **Kinship and Descent; Symboling**

Further Readings

Feinberg, R., & Ottenheimer, M. (Eds.). (2001). *The cultural analysis of kinship: The legacy of David M. Schneider.* Urbana: University of Illinois Press.

Schneider, D. M. (1968). *American kinship: A cultural account.* Englewood Cliffs, NJ: Prentice Hall.

Schneider, D. M. (1984). A *critique of the study of kinship.* Ann Arbor: University of Michigan Press.

Schwartz, Jeffrey H. (1948–)

As an iconoclast and innovative thinker, Jeffrey Schwartz has broad interests in archaeology, anthropology, evolutionary theory, systematics, and philosophy. His undergraduate work involved anthropology and premedical biology, and this was followed by a graduate program in archaeology at Columbia University, where he studied human and animal osteology at archaeological sites in the circum-Mediterranean region. While an external student at the University of London, Schwartz became interested in issues of development and homology, systematics, and fossil primates, focusing on the evolution of vertebrate dentition then under investigation by Jeffrey Osborne. At the British Museum of Natural History, Schwartz worked on Eocene fossil primates, including lemurs, and began to apply information on dental development to lemur phylogeny.

Upon returning to the United States, Schwartz completed his PhD dissertation on "Dental Development and Eruption in the Prosimians and its Bearing on Their Evolution." He then started a collaborative research program with Ian Tattersall at the American Museum of Natural History. At the museum, Schwartz participated in the numerous discussions and talks taking place on systematic theory and evolution. His interest in punctuated models of evolution and cladistic systematics led to an exploration of developmental processes and their phylogenetic implications in a cladistic context. His research on theoretical dental homology led to new approaches to tooth identification and early Eocene primate work. Schwartz also continued to write on general developmental issues such as the role of different cell types in stimulating the growth of structure. By the 1990s, these interests naturally came together in the field of developmental genetics and his proposal for a non-Darwinian model of evolution under the label of "sudden origins." These investigations emphasized the role of developmental genetics in making rapid evolutionary changes and establishing genetic novelty in a species without requiring the external force of natural selection.

In the late 1980s and early 1990s, Schwartz also began to focus attention on hominid evolution. This interest resulted in his well-known and controversial *Red Ape* book, in which he expands on his theory of a common ancestry between orangutans and humans. This theory is also notable for its extremely rare

(among the anthropological and archaeological community) independence from the tyranny of DNA sequence similarity as the last word on phylogenetic relationship. Schwartz's work in hominid evolution has emphasized the relatively superficial level of systematic detail and documentation prevalent in the field of primate paleontology and the practice of some paleontologists of preventing access to fossils by independent researchers.

Schwartz has published about 125 journal articles, chapters, and abstracts and 11 books and monographs. The three-volume series *The Human Fossil Record* provides the first comprehensive and detailed review of the craniodental morphology of Homo and the early fossil hominids. His *Sudden Origins* book integrates population and developmental genetics to show how evolutionary novelty may result in new patterns of biology, behavior, and ecology of organisms while avoiding the teleological mysticism that haunts most evolutionary perspectives in anthropology and paleontology.

Schwartz recently completed the second and revised edition of his *Red Ape* book, in which he provides new critiques of the morphological and genetic issues surrounding the evolutionary reconstruction of human origins. His current research projects include continued work on the systematics and phylogeny of modern and Pleistocene humans, the origins of modern human population diversity, the osteology of ancient Carthage, the craniodental morphology of humans and other anthropoids, and the role of regulatory genetics and development in evolution.

— John R. Grehan

See also **Evolution, Human; Genetics, Human; Hominoids; Non-Darwinian Evolutionary Mechanisms; Orangutans; Tattersall, Ian**

Further Readings

Schwartz, J. H. (1993). *What the bones tell us.* New York: Henry Holt & Co.

Schwartz, J. H. (1999). *Sudden origins: Fossils, genes, and the emergence of species.* New York: John Wiley & Sons.

Schwartz, J. H. (2004). *The red ape: Orangutans and human origins.* Boulder, CO: Westview Press.

Science, Philosophy of

The philosophy of science is a subdiscipline of philosophy that utilizes the fields of epistemology (how we know what we know) and metaphysics (the fundamental nature of reality, often outside human observational experience) to study the principles and methods of science and the natural world. It seeks to understand the meaning, method, logical structure, and reliability of the scientific way of knowing about the world by developing and testing scientific theories. It also studies the relationships between different sciences and explores the issue of reductionism—the idea that theories of one science (such as biology) can be reduced to those of a more fundamental science (such as physics), or even a "Theory of Everything."

Science uses a particular approach to knowing about the world and how it works by providing natural explanations for natural occurrences. Scientific explanations come from observations that can be repeated and confirmed by other researchers. Science utilizes the process of discovery; it is open to change as new information is discovered. According to scientific realists, all scientific thinking rests on just a few major principles: a real knowable universe exists, independent of human perception; the universe behaves according to certain predictable laws, without any outside influence; and these laws are knowable through observation and testing. This is the essential nature of science.

Or is it? Philosophers of science debate many of these points, and several schools of thought have emerged that represent or challenge the above position. These include logical positivism, the deductive-nomological model, the hypothetico-deductive method, social constructivism, and postmodernism.

Logical Positivism

Logical positivism developed from the ideas of positivism, epistemology, and mathematical logic. Positivism was derived from the work of French philosopher August Comte (1798–1857), who hypothesized that human culture evolved through three stages: theological, metaphysical, and positive. In the theological stage, humans understand nature through religious superstition and magic. During the metaphysical stage, magic and religion are replaced by

impersonal but unobservable forces. The final positivist stage, according to Comte, is where understanding truly lies: humans rely on observation and experiment to understand nature. Positivists were skeptical of metaphysics in general and many theories involving phenomena that were not directly observable. Logical positivists, however, through the work of Gottlob Frege (1848–1925) and Bertrand Russell (1872–1970), added mathematical logic to the positivist philosophy. Mathematical logic is subject-neutral and, through the use of symbolic rather than linguistic terms, makes it possible to analyze objectively all kinds of concepts.

Logical positivists believe that all the events that take place in the natural world are controlled by the laws of nature. These laws can be determined through the observation of consistencies in the relationships between observable phenomena and make possible the explanation of natural phenomena. They developed the verifiability principle: a statement is meaningful if and only if it can be proven true or false through experience. These statements are proven true or false through mathematical logic, written as material conditionals (mathematical if-then statements). Logical positivists originally required that every element of every scientific theory must be expressed in precise mathematical ways, using definitions called correspondence-rules. These correspondence-rules explain how the nonobservable elements of the theory make a difference to observational experience. If there is no observable difference in result between a theory that includes an unobservable element X and one that doesn't, then, say the logical positivists, there is no evidence that element X is present at all. The correspondence-rule requirement made it necessary to account for every element in the theory in a way that could be verifiable through observation. Therefore, one of the central issues of the positivist approach is the difference between observational terms and theoretical terms.

Logical positivism has developed certain difficulties. For example, the observational/theoretical distinction is often difficult to define. Some observables are too small or large to be observed by humans without instrumentation, which to some make them theoretical. Also, difficulties in writing the correspondence-rules to allow dispositional properties stimulated Carl Hempel (1905–1997) to argue against such a rule in favor of the idea that all the terms in a theory should be understood as an interconnected whole, rather than individually developed. Additionally, the act of observation or the presence of instrumentation can, in some cases, alter what is being observed, changing its behavior, its fundamental nature, or both. Finally, philosophers such as Thomas Kuhn (1922–1996) have argued that scientists do not, in fact, choose between competing theories in a rational manner using objective facts; rather, their observations are influenced by the theories they are testing.

The Deductive-Nomological Model

The deductive-nomological model of scientific explanation was developed by Hempel and Paul Oppenheim (1885–1977). In this model, the description of the phenomenon is deducible from a set of premises and the laws of nature. The deductive-nomological model sets out four main conditions that must be met for a scientific explanation: the explanation for the phenomenon must be deducible from the set of premises, using mathematical logic; the set of premises must contain at least one natural law necessary for the explanation; the statements composing the set of premises must be empirically testable; and all the laws of nature used must be independently confirmed. This model creates criteria for determining the explanatory power of the theory separate from any subjectivity of the practitioner. However, many philosophers of science argue that there is no true explanation without determination; mathematical logic alone is inadequate to represent the connections between the events in question. The model might allow the scientist to get the pieces of the theory right, but she will not be able to determine which piece is the determining one that explains the phenomenon.

The Hypothetico-Deductive Method

The hypothetico-deductive method, also known as falsificationism, was developed by Karl Popper (1902–1994). It is the model most commonly associated with science today. The method begins with the scientist developing a hypothesis that may explain some phenomenon. The scientist then develops a list of observable predictions that, if true, would support the hypothesis. The hypothesis is then assumed to be true, and a series of experiments are undertaken in an attempt to disprove, or falsify, it. Observations that are contrary to the hypothesis are considered

evidence against it; observations in agreement with the hypothesis are considered evidence in support. It is possible to test competing hypotheses in this manner; a comparison of how well each is sustained by its predictions can lead to acceptance of one over another. Failure to falsify the hypothesis does not prove it, but rather gives it confidence. Repeated failed attempts to falsify a hypothesis lead it to become a more established theory.

However, critics point out that it is unrealistic to imagine that scientific experiments really operate this way. The complexity of the experiment and the world, they say, often make it impossible to isolate one variable to test. Willard Van Orman Quine (1908–2000) raised important concerns about this method. He argued that scientific terms and evidence have to be understood holistically, in that the meanings of scientific terms are introduced in interdependent networks, and only networks of hypotheses can be tested, not individual ones. Since observations, hypotheses, and theories are embedded in our overall understanding, it is not possible to make truly independent observations. Quine and Pierre Duhem (1861–1916) believed that it was often impossible to create experiments that would definitively support one hypothesis over another. The ideas of these two men were combined to form the Quine-Duhem thesis, which states that any observations seemingly contradicting one's hypothesis can always be accommodated to any theory because humans adjust their interpretations of results by altering other, connected beliefs. In other words, it is possible to save the hypothesis by revising the assumptions to accommodate the observation. While this criticism sounds fatal to the method, Quine was pragmatic in his proposed solution: he contended that scientists adjust their hypothesis to maximize its productiveness in generating new predictions, consistency with former beliefs, overall simplicity, and the modesty of the claims. Adjusting the hypothesis in this way maximizes its likelihood of being "true."

Despite these issues, the hypothetico-deductive method is the most popular scientific approach in use today. However, the controversial Quine-Duhem thesis persuaded some to reject the hypothetico-deductive method in favor of more relativistic approaches. Social movements such as environmentalism and postmodernism, as well as concerns for the social effects of technology, have heightened the interest in the social aspects of scientific inquiry. This has led many philosophers of science away from the realist view of how science is performed and toward relativist models such as social constructivism and postmodernism.

Social Constructivism

Social constructivists believe that reality and knowledge are not empirically discovered but rather constructed through organized human behavior. Most agree that the world is real and knowable, but they argue that scientific knowledge is socially constructed and people vary in how they understand that world. An extreme version of social constructivism is the idea that humans themselves, through scientific (or other) knowledge, invent the physical universe.

David Bloor, studying what he termed the sociology of knowledge, developed the "Strong Programme" to describe the development, distribution, and maintenance of knowledge. Bloor defined something as "knowledge" if it was taken for granted, institutionalized, or invested with authority by a group of people. The four tenets of the Strong Programme are (a) causality, or what causes knowledge or beliefs to become more or less widely held; (b) impartiality, concerned with all beliefs, true or false; (c) symmetry, in that the same kinds of concepts can explain true or false beliefs; and (d) reflexivity, in that the patterns of explanation can be applied to sociology of science. Bloor argued that truth alone is insufficient to explain why a true belief comes to be held by scientists, but rather social factors play a role. Critics argue that there must be some objective ways to compare true and false beliefs that, while filtered through a social lens, nonetheless reflect an independent material world.

Postmodernism

Postmodernists reject the modernist positivist idea that there is an objective reality about which science holds the monopoly of truth. Instead, they posit that all humans subjectively interpret reality through their experiences. In this view, all science takes place through these filters, and both observations and theories are influenced by them. There is no one true way of understanding the universe, no universal narrative that would justify privileging the scientific explanation for a phenomenon over other explanations. Critics of this model argue that while it is useful

to open science to pluralistic views, it is still critical to maintain an ability to discern legitimate truth from shared belief in untruth, and scientific explanation is not a democratic process.

Postmodernism is heavily influenced by the idea that language and narrative shapes human thought and experiences. David Orr, a postmodernist philosopher of science and proponent of ecological literacy, argues that scientific knowledge alone is insufficient to understand the universe; rather, social issues such as ethics and equity must be included.

While there are some scientists who believe that scientific explanations can be used to explain everything, most believe that science is useful for answering certain types of questions, leaving others to the realms of theology and moral philosophy. Scientific thinking, in whatever form, remains a powerful tool for humans to use to understand the world we live in.

— *Cathy Willermet*

Further Readings

Curd, M., & Cover, J. A. (1998). *Philosophy of science: The central issues.* New York: Norton.

Klee, R. (1997). *The philosophy of science: Cutting nature at its seams.* New York: Oxford University Press.

Scientific Method

The expression "scientific method" is problematic for several reasons. First, it suggests that there is a single and uniform method employed in all scientific disciplines. However, even a cursory examination of various scientific fields reveals that this is not the case. Secondly, it ignores the historical fact that the general conception of science, including its purported methodology, has undergone changes since ancient times. Finally, it seems to encompass everything that is included in the cognitive processes of science, while in fact there are radical differences between two aspects of scientific cognition: the varied ways in which hypotheses are formed versus the more structured ways in which hypotheses are evaluated.

During the early modern stages of the scientific revolution, three major theories of scientific method were proposed: the first was the experimental approach advocated and practiced by Galileo and Toricelli, the second was a kind of empirical induction advocated by Francis Bacon, the third was the radical skepticism together with theological assumptions employed by the French mathematician and philosopher René Descartes. In the actual history of science, the evolution of the experimental trend proved fruitful, while the trends initiated by Bacon and Descartes turned out to be largely fruitless in modern science (even though they led to interesting developments in philosophy).

It is generally agreed that there is no recipe for scientific discovery, even though there is some agreement about the requirements for evaluating investigations and explanations. To understand what kinds of requirements are ideally regnant, it is useful to note the contexts in which scientific explanations occur.

To begin with, in any scientific inquiry there is the investigator, or much more commonly a team of investigators, conducting the research. Second, there are facts or problems, which the researcher(s) seek to discover, identify, explain, predict, or control. This factual component may be generated by the researchers, from other sources (such as others in the scientific community), or induced by phenomena occurring in the natural or human world. Third, there are the symbols used to represent the facts together with the symbols (which logicians call "syncategormatic terms") used to organize and manipulate the factual concepts of interest. Fourth, at any given time there is a system of generally accepted, seemingly well-supported, conceptual schemes (theories, laws, concepts, etc.) that serves as a framework within which the results of the research are expected to fit. Fifth, there are varied sources of information, such as journal articles, conferences, and personal communications. Sixth, there are various rules and procedures, which ideally indicate the necessary logical requirements for making transitions from the factual component to the theoretical component. Following the proposal of F. S. C. Northrup in *The Logic of the Sciences and the Humanities*, one may call these the epistemic correlations. Seventh, there are various evaluative criteria and related procedures that serve to distinguish between scientific and unscientific accounts, or to try to choose the best among competing scientific explanations. This component of the context of scientific investigations includes, but is not limited to, criteria intended to eliminate or minimize

bias. All these criteria may be referred to as the cognitive criteria. Eighth, there is the scientific community, composed primarily of investigators engaged in related fields of exploration. It is this community that should ultimately determine whether an individual scientist, or team of scientists, has obeyed the scientific and logical requirements that they all ideally accept. Of course, there are other things that initiate, guide, encourage, hinder, or prevent scientific exploration, such as funding and moral, social, political, and religious influences. These, however, are not integral components of science itself; they are external impositions. Whether such external impositions are needed, or desirable, is another matter.

Because of their importance in guiding scientific enterprises, the cognitive criteria will now be considered in some detail. The first criteria to be noted are those we may call objectivity criteria, since they are intended to distinguish between idiosyncratic (subjective) and objective features of experience. What is ideally required, although not always possible in practice, is repeatability of observations, experiments, logical and mathematical operations, publicly accessible measurable data, and where possible, double-blind experimental conditions and other safeguards against bias and deceit. Such cognitive restrictions ideally lead to intersubjective agreement among competent colleagues.

Another group of criteria, partially overlapping the objectivity criteria, are those criteria that ideally lead to the identification and rejection of scientifically unacceptable accounts. One group is those accounts for which nothing could possibly count as evidence for or against them. Typical of such pseudoexplanations are fatalistic doctrines. A second group of scientifically unacceptable accounts are those based solely upon gratuitous assumptions or intuitions. A third group of pseudoexplanations, which may seem superficially to be genuine scientific explanations, are those explanations which employ essentially mysterious obscurantist language. A fourth group of defective explanations is those which, other things being considered equal, assume more than needs to be assumed and thus violate the principle of parsimony. Fifth, some putative explanations should be rejected because they are discovered to be internally inconsistent. These five criteria, which serve to identify and discard such scientifically unacceptable accounts, as well as some additional considerations, one may refer to as the eliminative criteria.

Finally, there are criteria that guide scientists in evaluating and choosing among rival scientifically respectable explanatory accounts. These criteria may be referred to as the scientific hypotheses criteria. The logician Irving M. Copi in his *Introduction to Logic* gives one of the best expositions of such criteria. The first criterion is relevance, which insists that minimally from a logically adequate account it must be possible to deduce the fact(s) to be explained. This minimal requirement is, of course, met even by many unscientific explanations. A second criterion is what Copi calls testability. Testability requires that in addition to relevance, a plausible scientific hypothesis must make it possible to predict some other fact. Confirmations of such predicted facts cannot *prove* an account to be correct, although they can increase the likelihood of the account being correct. However, if predicted facts are disconfirmed, then either the account must be rejected or *ad hoc* assumptions must be introduced. The third criterion is compatibility with previously well-established hypotheses, which insists that ideally a scientific account should fit into the framework of accepted science. Fourth, there is the criterion which Copi calls predictive or explanatory power, by which he means the range of observable facts that can be inferred from the rival alternative scientific explanations. If other requirements are equally satisfied by rival hypotheses, but more facts can be deduced from one of them, then this one is preferable. The fifth is logical simplicity, sometimes also referred to as Occam's Razor or the principle of parsimony, which recommends that if rival accounts satisfy the other requirements equally well, then the one making the fewest assumptions is to be preferred.

There are basic presuppositions that form the current dominant scientific worldview, that is, the beliefs about nature and human experience that scientists usually take for granted and which make much of both pure and applied science possible. One of the interesting things about modern science is that most of its predominant presuppositions are really only refined commonsense conceptions:

1. In general, scientists take for granted the reality of space and time, even though in relativity theory they are treated as coordinates in space-time.

2. Scientists also share with common sense a belief in the reality of the material world.

3. Scientists also share with common sense the presupposition that matter (or matter-energy) is quantitative, that is, that matter exists in precise quantities specifiable in terms of conveniently selected units.

4. Another basic presupposition of modern science is the belief that natural objects, including human phenomena, are interdependent, either causally or otherwise.

5. Logically associated in seeking to understand things causally is the presupposition that, on the macroscopic level at least, nearby entities obey uniform, consistent laws.

6. Modern science also presupposes that much of nature can be understood non-teleologically, that is, that much of the natural order, as well as kinds of natural disorder, can be understood and explained without introducing notions of conscious goal-seeking purposes.

7. A similar basic presupposition of modern science is that the universe is intelligible in strictly naturalistic terms. Supernatural beliefs play no role in studying and comprehending nature.

Given the interests of individual researchers or their teams together with their knowledge of problems and contributions of others in relevant fields, and guided by the cognitive criteria and presuppositions, various possible problems and solutions arise. These possibilities are hypotheses—creations of the scientific imagination as to what to expect if certain observations, experiments, calculations, or theoretical elaborations are carried out. Once these creative imaginings have occurred, two additional essential steps in scientific method ideally must occur.

First, researchers must deduce from a hypothesis what might serve as confirming evidence if the hypothesis is correct, or what might serve to refute it if it is not correct.

Second, when possible (and this is not always possible), researchers try to test the hypothesis by seeking the confirming or refuting evidence under controlled conditions that are open to replication and the possibility of intersubjective agreement in the scientific community.

Although this sounds simple and straightforward, in many cases the processes involved are actually very complicated and variable.

All of the disciplines concerned with understanding aspects of human social phenomena try to rely on dependable cognitive methods, however it is not feasible to suggest that they all succeed in meeting scientific standards. Therefore, the most one can do here is to present a kind of idealized model representing what is involved in the best of social studies.

First, the researchers try to determine the variables to be studied. Second, the investigators seek a hypothesis (a possible relationship between, or among, these variables). For example, if the variables are drug use, poverty, and crimes of certain kinds, what might be sought are possible connections among these variables, or a relationship between or among them. Third, the researchers try to construct a test by means of which changes in the variables can be measured to discover whether the hypothesized relationship among the variables is confirmed or disconfirmed. Fourth, the test is implemented and the results are measured and recorded. Fifth, frequently but not always, these results may be used to form generalizations and to suggest further research. Sixth, members of the scientific community critically assess the protocol employed and suggest further investigations and possibly other hypotheses to explain the findings.

Although the theoretical framework of science will probably undergo significant changes, the basic method of science involving deductions of testable consequences, which has proven to be superior to all rival alleged cognitive methods, will probably remain the same. With the ongoing pursuits of scientists, guided by the cognitive context of science, hypotheses will arise, testable consequences of these hypotheses will be inferred, evidence for and against will be sought, tentative but plausible conclusions will be reached, and these conclusions will form parts of the evolving and naturalistic scientific worldview.

Concomitant with this evolving worldview, there will be new applications that may radically alter the world of everyday life. What effects scientific developments will have on religion, on morality, on economic arrangements, on politics, or on international relations, remain to be seen.

— Tad A. Clements

Further Readings

Hoover, K., & Donovan, T. (2001). *The elements of social scientific thinking* (7th ed.). Boston: Bedford and St. Martin's Press.

Sagan, C. (1993). *The demon haunted world: Science as a candle in the dark.* New York: Random House.

SCIENTISM VERSUS FUNDAMENTALISM

Both used as pejorative terms by opposing factions, *scientism* and *fundamentalism* imply a mutually exclusive application of the scientific method or religious dogmas to all spheres of human life. What these two otherwise opposite trends share is an uncritical reliance on science on the one hand and religion on the other, so that both groups finally end up having the same attitude toward their guiding principles, making them fetishes.

As Michael Shermer, the publisher of *Skeptic* magazine, puts it, "Scientism is a scientific worldview that encompasses natural explanations for all phenomena, eschews supernatural and paranormal speculations, and embraces empiricism and reason as the twin pillars of a philosophy of life appropriate for an Age of Science." Scientism has been used in its pejorative sense both from an antiscientific standpoint and by supporters of science who argued for a less reductionist notion of science.

As its name suggests, religious fundamentalism seeks to maintain strict observance to the founding principles of a given religion, thus often taking on an antimodernist attitude. Fundamentalism postulates that the texts and dogmas of one's own religion are infallible and precise, in spite of scientific scepticism. The phenomenon of religious fundamentalism is often fed by a sense of alienation from the surrounding society and by the complexity of modern society. As Richard Antoun has pointed out in his study *Understanding Fundamentalism: Christian, Islamic and Jewish Movements* (2001), Christian, Muslim, and Jewish fundamentalists share the same worldview, which is based on the infallibility of the scriptures and expresses outrage at the pace and extent of modern secularization.

Fundamentalism has especially come to refer to any religious enclave that intentionally refuses to be identified with the larger religious group in which it originally arose. This is because the fundamental principles upon which the larger religious group was founded have been distorted by alternative principles. Fundamentalism is thus on the rise in our contemporary societies, where traditional religions have lost their influence on the majority of people, but where science is unable to offer all the answers once supplied by religious beliefs. The spreading of religious sects and cults in the most industrially advanced countries is evidence of the strength of the fundamentalist sentiment even where scientism and rationalism seemed to have weakened religion.

— **Luca Prono**

SCOPES, JOHN (1900–1970)

John Scopes was the defendant in the 1925 case *State of Tennessee v. John Thomas Scopes,* a landmark in the contentious history of evolution education in the United States.

Scopes was born on August 3, 1900, in Paducah, Kentucky. Following a brief stint at the University of Illinois at Urbana, he enrolled at the University of Kentucky at Lexington, where in 1922 he witnessed his professors successfully lobby against a proposed antievolution bill in the Kentucky legislature. After receiving a BA in law in 1924, he accepted a position coaching football and teaching algebra, physics, and chemistry at Central High School in Dayton, Tennessee.

In Tennessee, teaching evolution in public schools and universities was prohibited by the Butler Act, enacted on March 21, 1925. Wishing to challenge the law, the American Civil Liberties Union offered to represent anyone willing to be the defendant in a test case. Sensing the opportunity to publicize their town, a group of Dayton civic leaders approached Scopes. Although he was unsure whether he had actually taught evolution, he disapproved of the Butler Act and consented to be involved. He was arrested on May 5 and indicted on May 25, 1925.

The case became a media circus, with national figures such as William Jennings Bryan and Clarence Darrow commanding the spotlight; during the preparation for the trial, a reporter commented, "Poor little Scopes was almost forgotten." In the trial itself (July 10–21), the defense stipulated that Scopes taught evolution. "So I sat speechless," he later observed, "a ringside observer at my own trial, until the end of the circus." After he was found guilty and fined $100, he

spoke for the only time during the trial, calling the statute unjust and pledging to continue to oppose it. On January 14, 1927, his conviction was overturned on appeal on a technicality, and the state's attorney general declined to prosecute him again.

After the trial, Scopes enrolled in the PhD program in geology at the University of Chicago. Owing to his notoriety, he was refused a fellowship in 1927; the fellowship's administrator advised him to take his "atheistic marbles and play elsewhere." Turning to commercial work, he worked for Gulf Oil of South America for three years, mainly in Venezuela, where he married Mildred Walker in 1930. To please his bride, he converted to Roman Catholicism, but remained an agnostic; the couple had two children.

Returning to the University of Chicago in 1930, Scopes began work on his dissertation, but was prevented from completing it by financial woes. He worked as a geologist for the United Production Corporation, later the United Gas Corporation, from 1933 to 1964. In 1960, he was persuaded to help in promoting the film *Inherit the Wind,* a cinematic version of the 1955 play loosely based on the trial, in which Scopes is represented by the character Bertram Cates. His memoirs, published in 1967, aided in the repeal of the Butler Act the same year. He died in Shreveport, Louisiana, on October 21, 1970.

— *Glenn Branch*

See also **Creationism, Beliefs in; Darwinism, Modern; Evolution, Human**

Further Readings

Larson, E. (1997). *Summer for the gods: The Scopes trial and America's continuing debate over science and religion.* New York: Basic Books.

Scopes, J. T., & Presley, J. (1967). *Center of the storm: Memoirs of John T. Scopes.* New York: Holt, Rinehart and Winston.

Selection, Natural

In Charles Darwin's theory of natural history, selection is the principal mechanism that is responsible for the evolution of life on Earth.

Three conditions must be met if natural selection shall occur in an ecological system. First, organisms living in the system must show phenotypic variations that bear upon their survival. Second, those variations must be heritable. Third, the environment must constrain the growth of the populations in the ecosystem by placing only limited feed resources at their disposal.

Whenever all three conditions are fulfilled, natural selection will occur among the organisms. They must then compete against each other for the scarce resources. The better an organism is adapted to its environment, the higher its chances are to get more resources and, finally, to have more offspring than its rivals. The number of adult offspring of an organism is called its "fitness." The fitter an organism is, the higher the relative frequency of its genes in the genetic pool of its population is, so that, in the long run, some genes will be present only in a few organisms or will even totally disappear. Natural selection has sorted them out—and not some mysterious drive to perfection inherent in living nature (as supposed, for example, by Jean Baptiste de Lamarck's famous pre-Darwinian evolutionary theory).

The process of natural selection applies also to the biological origin of *Homo sapiens sapiens.* Evolutionary anthropology must therefore recur to natural selection as an explanation for the genetic endowment of the first human beings.

That the history of life on Earth has to be explained by natural selection was claimed simultaneously and independently by papers of Charles Darwin and Alfred Russel Wallace, which were presented at a meeting of the Linnean Society in London on July 1, 1858. Both naturalists were inspired by Thomas R. Malthus's *Essay on the Principle of Population* (1798). They transferred Malthus's crucial idea that population growth is geometrical but food increase only arithmetical, from human to natural history. As a meticulous naturalist, Darwin thought over evolution by natural selection following his return from the voyage on HMS *Beagle,* but only after Wallace had sent Darwin a paper on the same idea, could he be urged by his friends to publish a first systematic account of his thought, *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (1859). This work has to be honored as the birth certificate of modern evolutionary theory.

The first five chapters of *The Origin of Species* infer the hypothesis of natural selection. Chapters 6 to 13

document its explanatory power by deducing and checking its consequences for specific biological problems, so that the theory of evolution by natural selection can be affirmed as well grounded in Chapter 14.

Darwin's inference of the hypothesis of natural selection brings together four sets of empirical data. The first set contains the wealth of experience in artificially selecting parents for breeding plants and animals that shall show some desired properties. The second set includes facts about the variability of organisms of the same species. If heritable, such variations constitute the material on which natural selection can act. The third set comprises data on ecological restrictions that force organisms to struggle for survival. The fourth set consists of empirical data about reproduction and heredity, by which variations are transmitted from a generation to the next one in proportion to the fitness of the varying organisms.

Knowing the laws of variation, heredity, and ecological dynamics, and given sufficient data about present-day biodiversity, the Darwinian biologist should be able to deduce that natural selection is the principal mechanism by which life on Earth has evolved. Darwin himself did not know those laws—especially he did not know the laws of genetics. But in principle the hypothesis of natural selection is a deductive conclusion from premises discovered by the analysis of the above-mentioned data sets. It is therefore unnecessary to posit a principle of natural selection as a kind of not provable axiom for biology. It is even false to do so, since such a principle would limit natural selection to a particular class of entities, which are called "organisms."

Nowadays it is possible to explain the mechanism of natural selection as an effect of general natural laws that act upon systems consisting of self-reproducing varying elements under restrictions on growth (Manfred Eigen). Darwin's natural selection is then just one instance of this more general selective process—with organisms as self-reproducing elements, genetic differences as variations, and the environment as a set of restrictions on the system's growth.

Selection is generated by a natural dynamics that, on the one hand, can be described formally without referring to the history of life on Earth, and that, on the other hand, states what conditions real evolution must meet if natural selection shall be a confirmed explanatory mechanism in biology. This twofold way of thinking about selection originated in the work of the founding fathers of theoretical population genetics—Ronald A. Fisher, John B. S. Haldane, and Sewall Wright—in the 1920s. They began to study mathematically the genetic base of natural selection and thereby made possible the modern synthesis of Darwinian evolutionary theory and Mendelian genetics.

Whether natural selection is really the principal mechanism responsible for the evolution of life on Earth is a highly debated question. Current criticism often aims at some tendencies in orthodox Darwinism to turn natural selection into an almighty power. Research on molecular evolution has shown that most genetically transmitted mutations are selectively neutral, so that random genetic drift of such neutral mutations constitutes another important mechanism effective in real evolution (Motoo Kimura). Other critics underline the importance of nonadaptive phenotypic properties of organisms, which have to be seen either as features necessary for the stability of their anatomical structure or as vestiges of formerly functional adaptations (Stephen Jay Gould).

— *Stefan Artmann*

Further Readings

Darwin, C. (1982). *The origin of species.* Harmondsworth, UK: Penguin. (Original work published 1859)

Eigen, M., & Winkler, R. (1981). *Laws of the game: How the principles of nature govern chance.* New York: A. A. Knopf.

Fisher, R. A. (1999). *The genetical theory of natural selection* (variorum ed.). Oxford, UK: Oxford University Press. (Original work published 1930)

Semantics, Ethnographic

Ethnographic semantics, also called "ethnoscience" or "the new ethnography," is a methodology for formally uncovering how certain parts of culture are talked about—and presumably thought about—by native participants. It developed in the 1960s—mostly in the United States—as a branch of the newly named subdiscipline of cognitive anthropology (itself part of the general reaction to behaviorist paradigms in psychology and linguistics held through the 1950s).

Some equated ethnographic semantics with cognitive anthropology, though the latter term is now more closely associated with the discipline of cognitive science.

Several things prompted the rise of ethnographic semantics. First, even before the notorious Mead-Freeman controversy that erupted several decades later, it was becoming increasingly clear that different anthropologists were concluding different things from work at the same field site. In other words, ethnographic reliability and replicability were being questioned. Second, anthropologists were becoming more sensitive to issues of language and cultural knowledge. In short, anthropology was developing a renewed interest in covert meanings as opposed to overt structures. But while it was clear that language and culture were rule-bound—and that natives knew the rules well—most natives were hard-pressed to explain them. What was desired was a methodology that would address both these problems.

But if more attention was now being focused on systems of ideas, the question remained as to how they might best be retrieved. Simple ethnographic interviews would clarify the particulars of specific cases (assuming an ethnographer knew how to ask the right questions), but this would not necessarily capture the organization and structure of knowledge that informants had of their culture. Some kinds of formal devices were needed to extract this information in a rigorous, consistent, and reliable way. Two of the most favored were taxonomies and componential analysis.

In doing a folk taxonomy, the goal was to uncover how some domain—a labeled category of some aspect of culture—was hierarchically ordered. Such a structure was thought to reflect in many key ways how the people in a language-culture conceived of this named part of the universe. As a simplistic example, let's say the proverbial Martian anthropologist comes to Earth and wants to know how Americans think about furniture. In the native language he will ask an informant to "Tell me all the words you have for FURNITURE." This ideally gives all the items in this domain. Then the anthropologist attempts to tease out how all these words are organized by using other key sentences like "Is X a kind of Y?" After several iterations, structures will emerge (e.g., finding "kitchen tables" and "end tables" are a kind of "table," but not a kind of "desk"). In a componential analysis, the key attributes that make up a term are explored (e.g., in the English kinship system "father" being [+male], [+consanguine], [+1 generation above ego]). In both techniques, if the formal elicitation frames are conducted properly this supposedly assures that similar results will be found no matter who conducts the research.

Ethnographic semantics has been applied to numerous domains in hundreds of cultures, including disease terms in American English, categories of beer in Germany, color-textures in the Philippines, and scores of plant and animal taxa. Proponents argue that taxonomies and componential analyses demonstrate many cross-cultural similarities, and provide a universal framework for the study of native vocabulary. However, it now appears that human classification is much more complex than the original ethnoscientists envisioned, and ethnographic semantics is used more often today to supplement rather than replace standard ethnographic techniques.

— *James Stanlaw*

See also **Ethnology**

Further Readings

D'Andrade, R. (1995). *The development of cognitive anthropology.* Cambridge: Cambridge University Press.

Spradley, J. (Ed.). (1972). *Culture and cognition: Rules, maps, and plans.* San Francisco: Chandler Publishing Company.

Service, Elman R. (1915–1996)

Elman R. Service, a prominent cultural anthropologist of the 20th century, was born May 18, 1915 in Tecumseh, Michigan. His theory of cultural evolution that occurs as organic and superorganic factors influence different types of social organization in small-scale society is prominent among anthropologists, ethnologists, and social anthropologists.

Service completed his undergraduate degree in anthropology at the University of Michigan (1941) after serving in the Abraham Lincoln Brigade to fight fascism in Spain, which spurred his interest in

anthropology, and he completed his PhD in anthropology at Columbia University (1951). He served on the faculties of Columbia (1949–1953), the University of Michigan (1953–1968), and the University of California at Santa Barbara (1968–1985). He was married to Helen S. Service and remained involved in anthropology at Santa Barbara until his death on November 14, 1996. He was a member of the American Anthropological Association and the American Ethnological Society.

Attracted by the cultural dynamics of Latin American Indian ethnology, Service conducted field research in Paraguay, Mexico, and among the Havasupai culture of the Grand Canyon. Utilizing sophisticated ethnological research methodologies, which he developed throughout his distinguished career, Service conducted field research throughout Latin America focusing on cultural evolution and decision making among Indian peoples, discovering the organic (technological) and superorganic (cultural) circumstances and configurations that produced different types of social organization prior to the state.

Service developed a typology of societies whereby most societies can be classified into four principal types of social order (political organization and other social characteristics): bands, tribes, chiefdoms, and states. Applying trend analysis, he classified levels of political integration, specializations of political officials, modes of subsistence, community size and population density, social differentiation, and forms of distribution.

Based on the level of social order or organization, Service deduced that most societies had evolved to the state type, characterized by multilocal group political integration, high degree of specialization of political officials, an intensive agriculture and herding mode of subsistence, urban with high density of population, a class form of social differentiation, and a market exchange form of distribution.

Service's theory of cultural evolution is that the state, an institutionalized structure of authority, is virtually nonexistent in hunter-gatherer groups, where leadership positions are rarely permanent, and develops in agrarian society, where organizations and institutions are more likely to become integrated with stable configurations at each technological or cultural level, especially when stability has existed for a long time. Thus, he concluded that if no clearly definable organization tends to exist, there is no organization, suggesting that there may be cultural systems where redistribution could take place without one person being consistently the key to its workings.

— *Stewart B. Whitney*

See also **Anthropology, Cultural; Political Anthropology**

Further Readings

Service, E. R. (1962). *Primitive social organization: An evolutionary perspective.* New York: Random House.

Service, E. R. (1966). *The hunters.* Englewood Cliffs, NJ: Prentice-Hall.

Service, E. R. (1975). *Origins of the state and civilization: The process of cultural evolution.* New York: W. W. Norton.

Sex Identity

Sex identity refers to the social criteria by which men and women are defined within society. Although physical sex is biologically determined, sex identity, or gender, is defined culturally. There is thus variation in how women and men worldwide identify themselves with respect to each other.

The way in which a society defines sex identity is based on its cultural framework. Cultural definitions of sex identity are linked with a society's sex roles, which are in turn connected with the society's subsistence pattern, economic structure, kinship system, religious system, and so forth. Cultural ideas about sex identity therefore define ideal identities for women and for men and provide mechanisms by which individuals can live up to those ideals.

Identity and roles are related to the extent that specific roles are often a component of identity. Therefore, although sex identity is ascribed, meaning that it is given to an individual by society, it is also partly achieved by an individual through the fulfillment of the social roles that correspond to his or her identity. For example, primary sex roles include reproductive and productive roles. Where these sex roles are integral components of sex identity, failing to procreate or to perform the subsistence tasks associated with one's sex may lead to social stigma and doubts concerning an individual's true identity as male or female.

Other aspects of identity include general disposition and behavior. It is often the case that particular personality traits and their expression in specific socially defined ways contribute to an individual's perceived sex identity. Since a major aspect of sex identity concerns one's relationship with the opposite sex, male and female sex identities are often constructed in opposition to each other. Therefore, the personality traits, behaviors, and dress code that are considered appropriate to each sex are frequently in binary opposition to each other.

While this opposition of male and female identities is a human universal, societies differ in the extent of overlap between the two identities. While some cultural schemes delineate strict divisions between female and male identities so that they symbolize discrete categories, others have a large number of roles and behavioral traits that are considered to be characteristic of both sexes, with a few traits that are used as barometers of masculinity and femininity.

The opposition between female and male is mediated by alternate genders in many societies, particularly in North America. Societies such as the Navajo and the Mohave recognize that it is possible to assume a sex identity that does not correspond to one's sex at birth. For example, a biological male may assume the sex identity of a woman by taking on female chores, behavior, and dress.

People learn their sex identity from their parents and other members of their society through enculturation, the process whereby cultural values, practices, and meanings are instilled in an individual. This is done through various means such as verbal instruction, observation, and imitation, and the use of corrective measures in cases of inappropriate behavior. These measures aim to encourage the individual to adhere as closely as possible to the cultural ideal of what is masculine or feminine.

A primary means by which people achieve their sex identity is through initiation rites that mark the passage into adulthood. These rites are usually performed in adolescence and are designed to enforce adherence to characteristics of the appropriate sex identity and to teach youths how to fulfill their eventual roles.

It is therefore during initiation rites that youths prove that they are able to fulfill adult roles and to live up to their society's standards for female or male identity. For example, initiation rites may stress the ability to endure pain. In the case of the Kpelle of Liberia, male initiates are separated from their community for several years and made to endure circumcision and scarification as well as general harsh treatment. Throughout this period, they learn various tasks associated with men's work.

On the other hand, a girl's first menses may prompt the arrangement of a ceremony where themes that are central to women's lives are stressed. Among the Apache of North America, for instance, a girl's puberty ceremony invokes aspects of fertility and motherhood. Through various phases of the ceremony, allusions are made to Changing Woman, an Apache deity that symbolizes fertility and female strength.

Regardless of the form it takes, sex identity is an integral part of individual identity in most societies. Since it is learned from early childhood onward and is continually reinforced through various social mechanisms, this component of identity is often perceived to be normal and natural to the members of a given society.

— *Nancy Leclerc*

See also **Gender; Rites of Passage; Sex Roles**

Further Readings

Bonvillain, N. (1998). *Women and men: Cultural constructs of gender.* Upper Saddle River, NJ: Prentice Hall.

Brettell, C. B., & Sargent, C. F. (Eds.). (1993). *Gender in cross-cultural perspective.* Englewood Cliffs, NJ: Prentice Hall.

Ortner, S. B., & Whitehead, H. (Eds.). (1981). *Sexual meanings: The cultural construction of gender and sexuality.* New York: Cambridge University Press.

Sex Roles

The term "sex roles" broadly refers to the various social functions that are ascribed to individuals based on their physical sex. Sex roles are one category of roles among other social roles that are developed in societies to regulate human behavior and relationships.

One major aspect of human existence that contributes to the formation of sex roles is a person's reproductive potential, which is directly related to his

or her physical sex. In all societies, it is women who give birth to children and in many societies, it is women who exclusively feed them for the first few years of their lives because of their capacity for breastfeeding. Men's major contribution to the reproductive process is to inseminate women. Societies vary with respect to a biological father's implication in childrearing.

Sex roles in a society are also highly related to its subsistence pattern, or the means whereby food is obtained or produced. Depending on subsistence activities, there is a different sexual division of labor, or pattern whereby women and men divide subsistence tasks. Women tend to engage in tasks that are compatible with breastfeeding and other childcare activities whereas men tend to be assigned tasks that require travel further from the household. As with other human tendencies, however, there are exceptions to this pattern and there is wide variation with respect to which tasks are appropriate for men and women.

One common example of sex roles connected to the sexual division of labor is found among many foraging societies: men hunt large game and women and children gather wild plant foods and small game. In many cases, such as among the Ju/'Hoansi of Africa, women contribute a large portion of the diet, but men provide most of the highly prized meat. In a few societies, women contribute to the acquisition of meat either by hunting on their own, as is the case with the Agta of the Philippines, or by participating in communal hunts with men and children, as is the case with the Mbuti of Africa.

Agricultural societies, where subsistence depends on intensive cultivation, also vary with respect to the sexual division of labor. The tasks of women in these societies can range from processing harvested crops and tending farm animals, both of which can be performed close to the homestead, to active participation in plowing fields and other physically demanding tasks.

Superimposed on the division of labor in any given society are cultural beliefs about the relative importance of tasks assigned to men and women, the relative value of what is produced by these tasks, and the relative status of men and women. In some cases, men's work may be more highly valued because of the scarcity of that which is obtained, such as meat. This is often connected to higher social status for men. However, while higher status may entail a greater control over resources and their distribution, it may or may not entail greater power over women and their activities. Indeed, there is a wide range of variation with respect to power relations between women and men.

Sex roles are therefore also connected to political roles. Societies vary in the extent to which women participate in community decision-making processes. Societies that are egalitarian in nature tend to include women in decision-making processes, whereas more hierarchical societies tend to place most of the power in the hands of men.

In the earlier part of the 20th century, most Western societies subscribed to a model whereby women's roles were limited to bearing and rearing children and to household tasks. There was, therefore, an assumption that it was natural for men to be the primary breadwinners and decision makers. However, the anthropological record shows us that there is a great deal of variation in the way men and women contribute to the survival of their families and societies and in the way social control is exercised.

— *Nancy Leclerc*

See also **Gender; Rites of Passage; Sex Identity**

Further Readings

Bonvillain, N. (1998). *Women and men: Cultural constructs of gender.* Upper Saddle River, NJ: Prentice Hall.

Brettell, C. B., & Sargent, C. F. (Eds.). (1993). *Gender in cross-cultural perspective.* Englewood Cliffs, NJ: Prentice Hall.

Friedl, E. (1978, April). Society and sex roles. *Human Nature,* 68–75.

Sexual Harassment

Sexual harassment is the act of using some element of power to solicit a sexual favor from a person who does not want to participate in a particular activity. It is unwelcome activity in the form of speech, print, gesture, or some other form of sexual communication. Such activity is harmful and illegal and may result in adverse psychological, economic, emotional, and even physical effects on a person. We seem to

hear and read more about sexual harassment when it occurs in a private work environment, yet it has been shown to be a common occurrence in other arenas such as educational establishments, the military, and other public institutions.

Typically, sexual harassment involves a male harassing a female who is subordinate in the relationship. However, a male can be the victim of sexual harassment as a result of a female's behavior, and sexual harassment may also involve two individuals of the same sex. To decrease the incidence of sexual harassment, companies should adopt a clear policy that communicates to employees that sexual harassment is not permitted in their environment and that it will not be tolerated by anyone. We can expect the topic of sexual harassment to continue to be a major concern in our society, for a number of obvious reasons. For example, the role of women in the world is changing. They are more likely to be found in key positions in all walks of life where their presence is important and influential. In addition, they are more educated and more attuned to the need to work for equal treatment, which is something they deserve as major contributors in society.

— *William E. Kelly*

Further Readings

Collier, R. (1995). *Combating sexual harassment in the workplace.* Buckingham, PA: Open University Press.

Landau, E. (1993). *Sexual harassment.* New York: Walker and Co.

Minson, J. (1993). *Questions of conduct: Sexual harassment, citizenship, government.* New York: St. Martin's Press.

Sexual Selection

Sexual selection operates under the same process of differential reproductive success described by Darwin in *The Origin of Species.* This success, or fitness, is determined by the amount of genes contributed by an individual to the next generation. Sexual reproduction adds genetic variation and allows for distinct sets of characteristics, some of which are advantageous and allow for the perpetuation of specific traits. Natural selection drives population change. Sexual selection is the mode by which an individual chooses a mate with specific traits and behaviors.

The goal of any individual is to produce viable offspring, so he or she will select a mate who can ensure the achievement of this goal. Among many other species, mate selection is determined by female choice based on male display. Attributes such as a lion's mane or a peacock's tail feathers attract attention and lure partners. However, there are other species, like the Emperor Penguin, that have comparable nurturing responsibilities. Because the male and female take turns with the task of incubating an egg, both sexes are active in the selection process. In comparison, the male seahorse is the main contributor in ensuring the survival of the fertilized eggs. In short, the sex that expends more energy to guarantee reproductive success holds the power of choice.

In humans, sexual selection is based on both biological and cultural factors. Biologically, pheromones, chemical odors produce by the body, can attract potential mates. First discovered in silkworms in 1956, pheromones produce physiological responses and affect interaction. German researchers were able to isolate and extract a chemical compound from the female moth that resulted in the male moths beating their wings in a "flutter dance" without the presence of the actual female. Furthermore, a 1971 study of women in a college dorm showed that human pheromones influence menstrual cycles by synchronizing them. This sexual chemistry is also seen in the high levels of hormones released during initial attraction, which have similar properties to amphetamines and act to heighten awareness. On the other hand, endorphins, which create a euphoric sensation, are released in the presence of long-term partners.

Cultural factors that influence courtship rituals include concepts of beauty and social status. Universally, each culture has certain attributes that are desired in a mate, the three most important being health, age, and body symmetry. However, in the concept of health, what is defined as healthy is culturally determined. For example, a female considered overweight and unattractive by North American standards may have the ideal proportions in Latin America. Cross-culturally, however, men are more likely to place higher value on physical attractiveness, whereas women focus more on personality and social status.

Attraction, whether physically or socially determined, allows individuals to pick the best possible

candidate for both reproduction and childrearing. Even though many cultures permit polygamous relationships, few individuals are wealthy enough to put this custom into practice. Because of the long infant dependency of humans, both partners must expend energy to care for the young; therefore, monogamy is a more common cultural practice. However, this evolved from a more general trend of serial pair bonding, in which individuals had only one partner at a time but more than one throughout life.

For humans, though, sex is not only about reproduction. Sexual interaction is also associated with play, intimacy, and emotional attachment and comes in many different forms. Sexual practices vary cross-culturally and are directed by learned behaviors.

— *Luci Latina Fernandes*

See also **Marriage, Sexuality**

Further Readings

Middleton, D. R. (2002). *Exotics and erotics: Human cultural and sexual diversity.* Prospect Heights, IL: Waveland Press.

Ridley, M. (1993). *The red queen: Sex and the evolution of human nature.* New York: Penguin Books.

Sexuality

Human sexuality holds a great interest for anthropologists. As a biological reality and a reproductive force, sexuality affects all humans. However, there is much diversity in the experience, expression, and interpretation of sexuality throughout the world. Using a holistic perspective, meaning that various aspects of the human experience are considered to be interrelated and interdependent, anthropologists consider biological as well as cultural factors in an attempt to understand and explain the dynamics of human sexuality.

Some anthropologists are particularly interested in the interrelationship between sexuality and human physical and cultural evolution. Physical changes in the human species over time have influenced the nature of sexuality. In turn, changes in sexual practices may have had an impact on the physical changes that humans have undergone.

If sexuality is a biological reality, it is nevertheless interpreted through the various cultural frameworks in which it is experienced. Therefore, human culture has an enormous impact on the diverse meanings attributed to sexuality and sexual behaviors. Anthropologists consider sexuality to be a central aspect of human social organization that influences, and is influenced by, various other aspects of society such as food-getting, family structure, and religious belief.

Human Evolution and Sexuality

While all mammals, including humans, reproduce sexually, humans exhibit different patterns of sexuality than other members of this class of animals. Even among the primates—the order in which humans are categorized in the Linnaean taxonomic system and that includes apes and monkeys—humans are distinct when it comes to patterns of sexuality.

These differences are considered by anthropologists and other scientists as being representative of adaptive strategies, or coping mechanisms, that humans have adopted over time in response to environmental, biological, and social pressures. While some scholars focus on these pressures individually, the discipline of anthropology generally acknowledges that they are likely to be interconnected. In other words, there may not be one individual source for the uniqueness of human sexuality.

In contrast to many other mammals, for example, human females are sexually receptive throughout the year, regardless of whether or not they are fertile. This characteristic is related to the loss of estrus among human females. That is, at some point in their evolutionary history, human females gained the physical capacity to conceal ovulation. The period of time during which females are fertile became unknown to males and, in most cases, to females themselves. The process whereby females gained concealed ovulation may be linked to other physical changes that occurred through evolution such as the ability to walk upright and the loss of body hair.

As a byproduct of this change, humans mate throughout the year and sexuality has implications that range further than its reproductive function. The social impact of this trait touches on marriage, family structure, economic structure, and so forth. A related

trait, for instance, and another distinction between humans and many other mammals, is that humans demonstrate a tendency for pair bonding, where a male and a female collaborate in the raising of offspring.

What is the adaptive advantage of these interrelated traits? One answer may be that since humans have a longer gestational period and offspring have a longer maturation period than those of other mammals, collaborative parenting may lead to a higher success rate in the raising of young. Human babies are born defenseless and unable to survive on their own. Parents must therefore feed and shelter their young for a longer period of time. The capacity for year-round mating may be one factor that facilitates the maintenance of these pair bonds since the male and the female mate repeatedly, even during times where there is no possibility for reproduction.

Another example of the correlation between physical changes and human sexuality is sexual selection. Sexual selection refers to the process whereby physical traits that are highly appealing to members of the opposite sex will give the carrier a higher chance of obtaining mating partners and of passing on his or her genetic material to the following generation. Along with natural selection, where individuals with traits that help them survive stand a better chance of living long enough to reproduce and pass on the genes for those traits to the following generation, sexual selection is considered by anthropologists to be an important factor in the genetic variation of the world's human population.

Some scientists claim to have found traits that are universally considered to be appealing, such as body symmetry and the appearance of good health. This might lead anthropologists to conclude that humans are predisposed to desire certain traits in sexual partners. However, culture plays a vital role in this process as well. Cultural ideals about beauty in males and females play a large role in what is considered appealing or what is considered to be a sign of good health. Within a society, these ideals may change over time.

Culture and Sexuality

For humans, sexuality is more than a reproductive force. Humans engage in sexuality for pleasure, love, or other reasons. These reasons may supplement, or even replace, the desire to produce offspring. Nevertheless, the reproductive potential of sexual relations, particularly in the case of opposite-sex relations, affects the ways in which sexuality is experienced, even when it is performed for other reasons. At the social and cultural level, sexuality encompasses a wide range of human experiences, from sexual relations themselves to individual roles and identity.

The cultural experience of human sexuality is quite diverse and varies alongside myriad factors that stem from local cultural adaptations. These factors include subsistence patterns, kinship systems, and worldview. Therefore, while sexuality is a universal phenomenon, there is variation with regards to its actual functions within specific cultural contexts.

A society's subsistence pattern, or how societies obtain and distribute essential resources, may influence sexuality by providing a context to which people must adapt to survive. Subsistence patterns such as foraging, where people obtain their resources by hunting wild game and gathering wild plant foods, or agriculture, where people grow crops on permanent plots of land, entail different kinds of divisions of labor between men and women. In most cases, women will take on tasks that are amenable to their capacities for bearing and nursing children. There are exceptions to these patterns; societies vary in their flexibility toward the types of work that men and women perform.

This sexual division of labor has implications for a society's kinship system, or how societies regulate marriage and family structure. If tasks and resources must be managed for the survival of the group, social relations, including sexual relations, must be managed to avoid social conflict due to sexual tensions and jealousy and to provide a framework within which resources are shared.

Marriage, a human universal, is a means whereby sexual relations are sanctioned and recognized within a society. This institution takes different forms, however. Marriage can be monogamous, taking place between two individuals, or polygamous, meaning that one individual may have more than one spouse. There are two types of polygamy: polygyny, the more common form, permits a man to have two or more wives, whereas polyandry allows for a woman to have two or more husbands. Monogamous marriages are the statistical norm throughout human societies. However, many societies place a high value on polygamy as an ideal form of marriage. Regardless of the form it takes, marriage involves mutual responsibilities among spouses, including sexual obligations.

In fact, failure to meet sexual obligations is grounds for divorce in some societies.

Across the ethnographic spectrum, there is a range of expectations on sexual behavior before, during, and after marriage. These expectations are often different for males and females. In many cases, female virginity at marriage is highly prized and is a reflection of family honor. On the other hand, societies such as the Canela of the Amazon allow teens of both sexes to engage in sexual experimentation before marriage and encourage extramarital sex. Finally, there exist, in some cases, taboos against sex after the death of a spouse, particularly in the case of widows.

While traditional anthropological literature referred to marriage as a union between at least one man and one woman, same-sex unions that meet the criteria for the anthropological definition of marriage exist. In some African societies, such as the Nuer and the Zande, same-sex unions of varying levels of formality occurred. Today, same-sex marriages are being legally recognized in some Western nations such as Belgium, the Netherlands, and Canada.

Another human universal that is related to kinship is the incest taboo. In all societies, sexual relations or marriage are forbidden between people who are considered to be closely related. The degree of closeness is culturally determined. In most cases, forbidden sexual partners include parents, grandparents, siblings, and children. Certain categories of cousins, aunts, and uncles are frequently included. Depending on the kinship system, other individuals may be off limits because of their names or other culturally defined parameters.

There are various theories that explain the existence of the incest taboo. One concerns congenital problems that may arise through inbreeding. Another explanation is the "aversion theory," which postulates that children growing up together, such as brothers and sisters, will develop a sexual aversion to each other. Finally, the "alliance theory" states that it is advantageous for any group to form alliances with other groups. Marriage outside the immediate family establishes and maintains social ties between groups and provides a wider network of people upon which a family may draw in times of need or conflict.

If subsistence patterns and kinship systems help explain the practicality of certain sexual patterns, worldviews give meaning to sexuality. A worldview is a set of ideas that explain the world and prescribe appropriate behavior. An example of a worldview is religion, or a set of beliefs and practices regarding the human connection with divine or supernatural forces.

Regulations on sexual behavior that may appear to an outsider to be simple adaptations to local realities or arbitrary sanctions may carry greater significance to members of a society because of a shared worldview. Practices such as same-sex relationships, masturbation, oral sex, anal sex, sex during menstruation, sequential sex, group sex, spouse exchange, use of pornography, prostitution, and sexual violence are prescribed, prohibited, or relegated to particular circumstances according to beliefs and assumptions about what is appropriate and normal sexual conduct.

In fact, some acts that would be considered to be sexual in nature by Western standards are not considered sexual at all in their respective cultural contexts. For example, anthropological informants in African societies such as the Lesotho of South Africa have indicated that sex is defined by the contact between a penis and a vulva. Therefore, genital contact between members of the same sex is not considered to be sex.

While norms exist in every culture regarding sexual behavior, these norms represent a cultural ideal. In practice, there is variance from the norms in some individuals. Societies differ in the manner in which individuals believed to have transgressed sexual norms are treated. Sanctions may range from divorce, as in many Western societies in cases of adultery, to social stigma, as in the case of a Canela individual who refuses sexual access to another, to corporal punishment, as in cases of homosexuals who are persecuted in nations where homosexual activity is illegal.

Positions for intercourse are also socially prescribed and are often tied in with beliefs about what is normal or natural. While it is extremely difficult to observe sexual intercourse given the human tendency to conduct sexual acts in private, ethnographers have collected data on the frequency of particular positions. The most common positions for heterosexual intercourse are the missionary position, with the man lying on top of the woman, woman-on-top, man and woman side by side and face to face, and rear entry, with the man penetrating the woman's vagina from behind. The desire for orgasm also varies from culture to culture according to beliefs about the nature and purpose of sexuality. These beliefs are often connected to ideas about sex and gender identity, beliefs about the process of reproduction, or the relative social positions of males and females.

Through ethnographic studies, social and cultural anthropologists have found that there exists a great

diversity with respect to the ways in which sexuality is discussed with children or among adults. From sex-positive societies such as the Trobriand Islanders and the Canela, where children have opportunities to observe adults engaging in sexual intercourse, to sex-negative societies such as that of Inis Beag, Ireland where sex was rarely mentioned and was the cause of great anguish, there exist many patterns of ideas and practices.

Human sexuality is a complex subject but it is crucial to an understanding of the human experience. Today, as in the past, conflicts arise between and within societies regarding the appropriateness of various forms of sexual conduct, the roles of the sexes, and so forth. Since one's society so strongly influences an individual's perception of what is normal and natural sexual behavior, it can be difficult to accept the sexual practices of an unfamiliar culture. Unbiased anthropological inquiries into the evolution of human sexuality and the diversity of sexual norms and practices may help to shed light on these conflicts. However, since sexuality is such a central part of human life and touches on core aspects of group and individual identity, it is impossible to predict whether these conflicts will ever be resolved.

— *Nancy Leclerc*

See also **Marriage; Sex Roles; Selection, Sexual**

Further Readings

Diamond, J. (1997). *Why is sex fun: The evolution of human sexuality.* New York: Basic Books.

Middleton, D. R. (2002). *Exotics and erotics: Human cultural and sexual diversity.* Prospect Heights, IL: Waveland Press.

Suggs, D. N., & Miracle, A. W. (Eds.). (1993). *Culture and human sexuality.* Pacific Grove, CA: Brooks/Cole.

SHAMAN

The shaman is a ritual specialist who is a healer and spiritual mediator. He or she entertains a close relationship with the larger spiritual universe, endowing him or her with powers to divine or to heal and act as a psychopomp—a guide of the souls of the deceased to their afterlife. The word shaman is derived from the verb *šaman* meaning "to know." The term was borrowed from the Manchu-Tungus languages (comprised of, among others, the languages of the Even and the Evenki peoples of the Russian Far East and northern China). Shamanism is a powerful vocation, at times hereditary but always achieved through demonstrated expertise in the shamanistic arts. Though the first descriptions of shamanism were recorded in the Russian Far East, anthropologists and others now use the term to describe an array of ritual and religious practices that are found across the planet.

The classic work that summarized and defined shamanism was Mircea Eliade's *Shamanism: Archaic Techniques of Ecstasy.* First published in French in 1951, this text provides a detailed account of shamanism in all its facets. Eliade's work highlights some of the characteristic features of shamanism, which include the initiation of the shaman, the powers of the shaman, and the shaman in traditional cosmology. The term shaman is, in many ways, synonymous with the term "medicine man" or "curer" that was often applied to comparable ritual specialists in the Americas and elsewhere.

Central to shamanism is the spiritual death and rebirth of the shaman. Among the Sakha (Yakut) of the Russian Far East, a great bird carries off the future shaman's soul to the underworld where it must ripen. Once ready, the bird carries the soul back to the earth where it is cut into pieces and devoured by spirits of disease and death. It is through the feasting that the shaman gains power over these spirits, and the greater the number of spirits partaking in the feast, the greater the powers of the future shaman. In other regions, the shaman is spiritually tortured and killed by the souls of shaman ancestors who also cook the flesh. While the spirit is being devoured, the physical body of the shaman remains inert, and the community waits for the rebirth of the shaman. Shamans do not always willingly accept the "call" of the spirits or ancestors: in certain cases, future shamans will become physically ill and incapacitated if they resist the call to the vocation.

Once reborn as shaman, the new initiate must master shamanic techniques including songs, ritual techniques, and knowledge of medicinal plants. The shaman's assemblage often includes a drum or other musical instruments. The shaman is seen as having the power to communicate with spirits and the

Source: © MagnumPhotos.

shaman's spirit can often travel to distant locations, often the upper or lower spirit world. Central to the practice of the shaman is the altered state of consciousness or psychosomatic trance, in which the individual enters into a highly charged emotional state and is carried beyond normal consciousness and rationality. Though hallucinogenic plants are sometimes used to achieve this altered state, the shaman can achieve this state through the use of rhythmic sound and movement, thus the importance of the drum that can mimic the rhythm of the beating heart. However, achieving an altered state of consciousness is not the end; rather, it is simply the means to the end. The purpose of the ceremony and the ritual is to permit shamans to channel their souls and spirit-helpers to communicate and interact with the supernatural universe, exercising their power over the spiritual domain.

Elements of shamanism are found across the globe and in a number of forms of religious belief. Though shamanism is associated with animism, shamanic elements are found in Buddhism—the lama in Tibetan Buddhism is in many ways a syncretism of shamanic and monastic practices; Islam—the Whirling Dervishes use music, rhythmic prayer, and chants as well as dance to achieve a form of trance; and certain Christian sects that believe they can be possessed by the Holy Spirit and speak in tongues. However, those individuals that we can truly identify as shamans are usually found in those societies in which humans are part of a much richer spiritual tapestry, as is the case in the Russian Far East and Northern Asia.

Central to shamanistic cosmology is the division of the cosmological universe into an upper, middle, and a lower world inhabited by a variety of sacred entities and spirits. Shamans draw their power from the ability to navigate between these layers. In Central and Northern Asia, at the center of cosmology is the "World Tree," the tree of life and immortality; in other regions it is a "World Pillar" or a "World Mountain." The tree, pillar, or mountain is rooted in the underworld, tying it to the sky; it can also represent the many layers of the sky, and only the most powerful of shamans can ascend to the very apex of the heavens.

Symbolism and ritual are central to the practice of the shaman. The drum and other accoutrements of the shaman are usually decorated with a world tree or other elements of cosmology. The drum and instruments are the sole preserve of the shaman and retain the power of the shaman after death; after death a shaman's drum is often cut and rendered unusable, and the shaman's spirit is treated with due care. The same is true of the costume—often decorated with mirrors, pieces of metal, and a variety of symbols and patterns, it is a cosmological microcosm, inhabited by spirits even after the death of the shaman. In certain regions, the shaman dons a mask as part of his costume.

Shamans play a variety of roles. In certain societies, shamans can be either "white" or "black" as some will use spirits to harm rather than to help humans. The shaman is often called upon to diagnose the cause of misfortune that may be plaguing a community—for example, a long spell during which no game is killed while hunting. Under these circumstances, the shaman will try to identify any taboos that were broken or other breaches that may have offended or disrupted the spiritual harmony. Shamans invariably are called upon when illness strikes. Often disease is

understood in spiritual terms, caused by either spirits that attack or inhabit the body, or the loss or theft of one's soul (for example, by a sorcerer or rival shaman in another village), and shamans are called upon in these circumstances to diagnose the cause of illness and to use their powers to redress the spiritual imbalance and bring about a recovery.

— *Michel Bouchard*

Further Readings

Eliade, M. (1972). Shamanism: Archaic techniques of ecstasy (W. R. Trask, Trans.). Princeton, NJ: Princeton University Press.

Kozak, D. (2000). Shamanisms: Past and present. In R. Scupin (Ed.), *Religion and culture: An anthropological focus.* Upper Saddle River, NJ: Prentice-Hall.

Thomas, N., & Humphrey, C. (1994). *Shamanism, history and the state.* Ann Arbor: University of Michigan Press.

Shanidar Cave

Shanidar cave is located in northern Iraq at an altitude of 745 m. Nearby is the village of Zawi Chemi Shanidar, with archaeological remains dating back to ca. 10,000 BC). However, Shanidar is known for its middle-Paleolithic remains, which include several Neandertal skeletons between 60,000 and 46,000 years old.

The cave was first discovered by Ralf S. Solecki and T. Dale Stewart and was excavated from 1953 to 1960. During the first excavation, a complete skeleton of a nine-month-old child was found (Shanidar 9). It was difficult to know that he was a Neandertal because the bones were severely deformed. Later this individual would be studied by Muzzafir Senyürek from the Smithsonian Institution. This was the first of a total of nine individuals (two infants and seven adults) to be found during the excavations.

Shanidar 1 was about 40 years old when he died. He is a male who suffered a number of pathologies prior to his death; his right arm and leg were withered, and he had healed injuries to his right foot and left eye. Probably without the care of the group, this man would have died.

Shanidar 2 and 3 were found in 1957. They are respectively a Neandertal cranium and an almost complete skeleton of an adult male with a marked lumbar bilateral arthroses.

The Shanidar 4 skeleton was found surrounded by flowers considered to be of medical interest, which some researchers think were placed there intentionally. The palynological analyses showed that all the taxa represented had therapeutic properties.

Together with Shanidar 1, 3, and 4, Shanidar 5 shows signs of injuries ante mortem. Specifically, this adult had a wound over his left frontal. This individual was found in 1960 along with parts of Shanidar 4, 6, 8, and 9. Shanidar 6 and 7 were found beside Shanidar 4, and finally, Shanidar 8 was a little child.

The study of these Neandertal remains, together with those from other locations, shows that although it is common to find a high number of injuries, there was a strong feeling of cohesion between group members, which permitted the survival of the weak individuals.

— *Belén Márquez Mora*

See also **Neandertals**

Further Readings

Leroi-Gourhan, A. (1975). The flowers found with Shanidar IV, a Neanderthal burial in Iraq. *Science, 190,* 562–564.

Trinkaus, E. (Ed.). (1983). *The Shanidar neanderthals.* New York: Academic Press.

Trinkaus, E. (1991). The fossil human remains from Shanidar Cave, Iraq: Evolution and continuity among near-east late archaic humans. *Anthropologie, 95,* 535–572.

Siamangs

Siamangs are members of the order Primates belonging to the "lesser ape" family or Hylobatidae. Their scientific name is *Hylobates syndactylus,* although up until 1972 it was *Symphylangus syndactylus.* Siamangs are the largest species in the gibbon family, with a height of 30–35 inches and a weight of around 18–35 pounds. Siamangs have long black hair and a chromosomal count of 52. Most of the other gibbons have

Source: Photograph courtesy of Gregory Scott Hamilton, Honolulu Zoo.

chromosomal counts of 38 and 44, although one subgenus does have 52 chromosomes also. Siamangs differ from other members of their family by having a unique webbing of the skin between their second and third toes. There are two subspecies of siamangs, the Sumatran siamang (*H. s. syndactylus*), which is only found on the Indonesian island of Sumatra, and the Malaysian siamang (*H. s. continentis*), which is only found on the Malay Peninsula.

Siamangs mostly live in primary and some secondary forests. Their habitat ranges from lowland to mountainous forests, up to elevations of 12,468 feet. The majority of the siamang diet consists of leaves but also includes some fruits and flowers. Siamangs also have been known to prey on small animals. Siamangs spend the majority of their time feeding in the mid-canopy where common trees and leaves are abundant. They also feed at the tops of canopies and under cover near the ground. Members of a family group feed close together, usually staying within 100 to 200 feet of one another. Siamangs typically have smaller day and home ranges than other gibbon species due to the abundance of available leaves in their diet.

Like all hylobatids, siamangs live in monogamous families consisting of one female, one male, and offspring. Siamangs have a gestation period of 200–239 days, and females give birth every two to three years. During the first year, siamangs spend most of their time with their mother, but during the second year they spend more time with their father. The offspring stay with their parents for up to nine years. When the juveniles become young adults, they leave their parents to start their own families.

Siamangs are an arboreal species and rarely walk on the ground. They brachiate using their long arms and long, skinny fingers. Siamang hands are cup-shaped, allowing them to swing freely through the trees without having to grasp firmly onto branches. Siamangs also locomote bipedally along tree branches, holding their arms in the air so they do not drag on substrates. All gibbons, including siamangs, are renowned for their great vocal calls. Siamangs, however, have the most powerful call of all. They have an enlarged vocal sac in which vocalizations reverberate, making them extremely loud. Every day, the male and female duet together in 20-second bouts that can continue for 15 minutes at a time. Like all species of gibbons, siamangs are threatened by habitat destruction on both Sumatra and the Malay Peninsula. In fact, both species of siamang are endangered.

— Lisa M. Paciulli and Jared D. Glick

See also **Apes, Lesser; Gibbons; Hylobates; Primate Taxonomy**

Further Readings

Chivers, D. J. (1974). *The siamang in Malaya: A field study of a primate in tropical rain forest.* Switzerland: S. Karger.

Preuschoft, H. (1985). *The lesser apes: Evolutionary and behavioral biology.* Edinburgh: Edinburgh University Press.

Teleki, G. (1979). *Aerial apes: Gibbons of Asia.* New York: Coward, McCann & Geoghegan.

Siberia

Siberia is the continental region of north Asia; located in the Russian Federation, it extends from the Ural Mountains to the Pacific Ocean. Noted for its unforgiving climate and expansive boreal forests, or *taiga,* Siberia has contributed much to ethnological research, including studies of its indigenous peoples and languages, shamanism, and processes surrounding Russian colonization. Having been inhabited since the Pleistocene, Siberia is important to comparative research in old world prehistory and Paleolithic ecology. Research in Siberia today is integral to the anthropological study of Eurasia as it undergoes political and economic change after socialism.

Research on Siberia significant to anthropology includes a great deal of work on the history and ethnography of its native peoples. The history of Russian interaction with native peoples of Siberia, including the rapid expansion of the Russian Empire and its tribute and administrative systems, has been an important topic in comparative political economy and world systems theory. Studies of Siberian kinship and shamanism have influenced ethnological theories of social organization and religion. Soviet anthropologists had their own theoretical and applied developments relating to Siberia that flourished under the Marxist-Leninist prerequisites of the Soviet Union. Anthropological research in the circumpolar region, Beringia, and theories on the peopling of the New World involve Siberia. Property and identity transformations in Siberia have spawned a rich collection of ethnographic research in Eurasia since the 1991 cessation of the USSR. The documentation of endangered languages and practices of Siberia is an important area of applied anthropological research.

Archaeological studies have shown early peoples inhabited Siberia at least 20,000 to 8,000 years before present. Wide areas of the Eurasian Arctic coastline inhabited earlier are now submerged, including Beringia, the "land bridge" to North America. Anthropologists have made comparisons between the northwest coast of North America and the northeast coast of Asia that show striking ethnographic commonalities. Human interactions with big game, such as mammoths and other ungulates like reindeer and caribou, in Siberia and the New World are an important focus for paleoecological and human-rangifer comparisons across the circumpolar zone.

Modern ethnographic investigations of Siberia began under the direction of Russian anthropologists who published in Russian and English. Waldemar G. Bogoras (1865–1936) conducted ethnographic research with the Chukchee, Siberian Eskimo, Koryak, and Yukagir. One of his most influential studies, *The Chukchee,* was published in the Jesup North Pacific Expedition series edited by Franz Boas. A contemporary of Bogoras, Lev Iakovlevich Shternberg (1861–1927) worked in southeast Siberia with the Gilyak, Orochi, Goldi, Negedals, and Ainu. Shternberg's ethnography on the social organization and sexual life of the Gilyak influenced Claude Lévi-Strauss's thinking on kinship and marriage. Waldemar Jochelson (1855–1937), a contemporary of Bogoras and Shternberg, worked with Aleuts, Kamchadals, Koryak, Yakuts, and Yukagir. Jochelson's *Peoples of Asiatic Russia* was published in 1928 by the American Museum of Natural History. Bogoras established ethnography as a discipline in Russia and the Soviet Union with his colleague Shternberg. After the revolution, Jochelson emigrated to New York. Sergei Mikhailovich Shirokogorov (1887–1939), another Bolshevik refugee working in northern China and southern Siberia, published influential studies on the *Social Organization of the Northern Tungus* (1929) and the *Psychomental Complex of the Tungus* (1935), adding to anthropological interest in Siberian kinship and shamanism.

The role of the fur trade in the expansion of the Russian empire and development of the modern Russian state has been explored in historical and political economic studies. Sable pelts, the soft Siberian gold of the 16th through 18th centuries, drove Russian military and population expansion east to the Pacific Ocean. This was extended to Alaska and south to Fort Ross in northern California. In the 19th century, the fur trade diminished in importance as a source of income for the Tsar, but the production of pelts of fur-bearing animals has remained important for Siberian peoples and rural economies to this day.

The connections between Russian colonization and ethnic developments in Siberia have been explored by anthropology and history. After the Russian Tsar's defeat of the Tatar Khanate in 1551, Cossack armies continued east, defeating the horse-mounted and socially ranked steppe peoples in southern Siberia, and reindeer-herding and hunting-and-fishing people in northern Siberia. Beginning in the 16th century, Russian tribute collection intensified sable, squirrel, and fox hunting by native peoples, as did the fur trade

Source: © iStockphoto/Sergey Pristyazhnyuk.

in colonial North America. Russian fur trappers, merchants, and Russian Orthodox missions moved into Siberia, followed by peasants and exiles. Siberia's native identities and ethnic groups formed within the colonial context as the antithesis of Russian identity. Alexander Pushkin referred to the "Tungus, still wild" in an 1836 poem, for example. The Tsar's representatives created clan territories in Siberia, administered by native kings. Count Mikhail Mikhailovich Speranskii (1772–1839), while in exile in Siberia, developed a classification scheme (settled, nomadic, wandering) to determine tax and tribute liability as part of his effort at codification of Russian law. The Speranskii reforms also authorized clan administrations and steppe councils for administering Siberian peoples. Russian authorities continued to create and authorize native identities through the Soviet period, and this has been a subject of intensive anthropological study.

Soviet government policy on minority indigenous peoples was part of a larger problem of nationality across the Soviet Union. After the revolution, Vladimir Il'ich Lenin (1870–1924) promoted the idea of national rights for minority ethnic groups, and many gave their political support. A typology of administrative units was developed depending on the population of the ethnic group and its level of ethnic consciousness.

After the establishment of Soviet power in Siberia in the late 1920s and 1930s, the smallest ethnic groups, or small-numbering peoples of Siberia (*malochislennie narody*), were recognized in the titles of national and autonomous regions (*okrugy*) located in the Siberian provinces and territories. Larger ethnic groups, such as Yakut (Sakha) and Buryat, were recognized as titular nationalities in a series of autonomous republics within the Russian Federation. Early on, state ethnographers played critical roles in designing nomadic and clan soviets, as well as in determining favorable locations for planned cultural stations that included trading posts, red tents (for visiting political agitators), schools, and health clinics. Soviet anthropologists tracked the historical development of "ethnos" in Siberia through ethnographic research and demographic studies using tribute and census data. The concepts of "ethnic processes" and "ethnogenesis" were prevalent in Soviet anthropology. The *Peoples of Siberia,* edited by M. B. Levin and L. P. Potapov and published in English in 1964, presented the Soviet view on Siberian natives.

Siberian peoples are well known as practitioners of shamanism, due in part to early historical and anthropological research. The word shaman is derived from an Evenk word, *Šamān,* and has come to be used as the technical term for the religious leaders of kinship-based religions. Anthropological traditions in Siberian shamanism are strong among Hungarian, Russian, and American anthropologists. Siberian shamans are known to enter trances (*kamlanie*) during which they travel the cosmos to contact and influence spirits and deceased ancestors. Family and social rites were practiced, as well as rites to heal the sick and curse enemies. Siberian shamans were victimized as part of the political battle against primitive communism. Soviet policy toward shamans shifted through time and shamanism was viewed more in the line of folklore. Regional Departments of Culture created professional shamanic ensembles and recorded well-known shamans on the state Melodia

record label. Shamanism continues today in Siberia under new formats such as state licensing of shamans in Tuva and urban shamans in Buryatia.

Today, the 30 ethnic groups conforming to the small-numbering category have joined in a national association called the Russian Association of Indigenous Peoples of the North (www.raipon.org). The association, along with anthropologists and members of the international community, has been instrumental in lobbying for legislation promoting indigenous rights. A series of three laws was passed by the State Duma in 1999, 2000, and 2001 and signed into law, respectively, "on the fundamentals of legal status," "on the organization of communes," and "on territories of traditional nature-use" for "small-numbering native peoples of the North, Siberia, and the Far East." Implementation of the laws has been uneven, and some regions have municipalized former state farm property and given small grants to individual entrepreneurs rather than support communes.

Industrial development occurred rapidly in Siberia during the Soviet era, especially when gulag exiles from European, Russian, and other Soviet republics were forced into hard labor during the purges. Native Siberians assisted operations in Soviet mining, metallurgy, and infrastructure by providing transport and through collective and state production of domestic and wild foods. Russian, British, and North American anthropologists have broadly pursed ethnographic study of the development of rural economies in Siberia since the early 1980s.

Indigenous peoples, having been incorporated into the state farms during the Soviet Union, had become increasingly dependent on outside sources of transportation, fuel, administration, health, and education. After the collapse of the USSR, the transition from the planned economy in Siberia has affected property relations, and this has been a major area of anthropological research. With the dismantling of Soviet agriculture, native Siberians were provided opportunities to form communes, or *obshchiny,* that could hold title to hunting lands and domestic reindeer herds. The success of these native organizations varies a lot, depending on the region and access to markets. Where access is better, Siberian *obshchiny* have been successful in entrepreneurial sales of traditional products such as meat, fish, and fur. Where access to markets is limited, Siberian hunters, fishermen, and herders have concentrated on subsistence production and common-pool resources. Many traditional forms of knowledge and authority are being employed in hunting, redistribution, and consumption of native foods across Siberia in non-market social settings. Studies of hunting and gathering and subsistence in Siberia are important for understanding human adaptability and decision making in a rapidly changing mixed economy.

Archaeological studies on hunter-gatherer sites in Siberia are similarly important for understanding human involvement in the ecosystem, human migration, technological development, and climate change through time. For example, on Zhokov Island, 700 miles north of today's Siberian coast, a hunting settlement dated at 8000 years BP is being excavated by a Russian and international team. The peopling of Siberia and North America is one emphasis in research that combines archaeology and geology in the study of human society.

Processes of domestication are another area of focus in the anthropology of Siberian peoples. Berthold Laufer, another Jesup Expedition anthropologist from Leipzig, Germany who worked on Sakhalin Island and the Lower Amur region, wrote an early theory on reindeer domestication. Outside of prehistory, interdisciplinary research in Siberia and the wider Arctic region has focused on relationships between people and domestic and wild reindeer. The human role in reindeer/caribou systems combines anthropological, biological, and native researchers in monitoring and local projects. This topic is but one that has developed with growing Arctic globalization—evidenced by growing regional contacts, scientific and economic exchanges, and treaties. Documentation of the native languages of Siberia is an area of applied research that can aid native peoples in maintaining language fluency in an era of rapid globalization.

— John P. Ziker

Further Readings

Anderson, D. G. (2000). *Identity and ecology in Arctic Siberia: The number one reindeer brigade.* Oxford: Oxford University Press.

Gray, P. (2003). *Indigenous activism in the Russian far east: The Chukotko case.* Cambridge: Cambridge University Press.

Ziker, J. P. (2002). *Peoples of the Tundra: Northern Siberians in the post-communist transition.* Prospect Heights, IL: Waveland Press.

Sickle-Cell Anemia

Sickle-cell anemia (Hb S) is an inherited autosomal ("non-sex" chromosomes) recessive blood disease that affects millions of people throughout the world. It is caused by a mutation in the gene for beta hemoglobin (an oxygen-carrying molecule), producing a change in the shape of the red blood cell into a sickle shape. The distorted shape of the red blood cell is unable to pass through capillaries and causes blood clots to form. Consequently, these blockages impede the flow of blood, causing hemorrhaging as red blood cells (RBCs) enter surrounding tissue, giving rise to many complications throughout the body.

The disease was first discovered in Chicago in 1910 by James B. Herrick, who described the anemia as "peculiar elongated sickle-shaped" red blood cells in a young black student from the West Indies. Many scholars acknowledge that even before Herrick, the awareness of African cultures with the disease was characterized by the intense and chronic pain of the disease. This explains the early name "Chwechweechwe" given to the disease, which was a description of the recurring pain experienced by the patient.

Physical anthropologists of antiquity used "racial admixture" and "Negro blood" to imply that there was an inherent difference between the black and white races. However, with time, as physicians continued to discover sickle-shaped cells in "white" individuals in different areas of the world, the focus on sickle-cell anemia as purely a racial disease was challenged. Numerous cases of sickled cells were soon discovered in "white" populations throughout the Mediterranean, Mexico, and Europe.

The sickle-cell disease affects millions of people all across the globe. In the United States, approximately 72,000 people are affected by the disease, with the disease occurring in 1 in 500 African American births and 1 in 1000–1400 Hispanic American births. There are approximately 2 million Americans and 1 in 12 African Americans who are carriers of the sickle-cell trait. In Africa, there is a large variance throughout, with 40% of some tribes having the disease.

It was in 1949 that physical chemist Linus Pauling found that the sickle-cell disease was due to a molecular defect in the hemoglobin molecule. It was a specific point in the molecular composition of hemoglobin that Pauling suggested caused the sickling of red blood corpuscles. Molecular biologists determined that this disease was caused by an error in the amino acid substitution on hemoglobin. This was thought to be the first discovered molecular disease.

Molecular biology shows the importance of amino acid sequences during the formation of proteins. Each altered gene, called an allele, codes for different chemical and bonding interactions during protein formation. An individual who is homozygous for a gene has acquired two copies of one allele, SS (sickle-cell anemia) or AA (normal genotype). If only one sickle allele is inherited, then he or she is heterozygous (AS). In order for someone to have the sickle-cell disease, he or she must inherit the sickle-cell allele from both parents.

Scientists determined that if a child inherited only one copy of the Hb A allele from one parent then he or she was heterozygous and showed no serious health effects. It was also discovered that any individual possessing the sickle-cell trait would be resistant to malaria. Within populations, the advantages of having resistance to malaria are balanced through natural selection by the effects of sickle-cell anemia. Thus, although complex factors are involved, in areas where malaria is prevalent, the population will tend to shift toward selecting the sickle-cell gene for protection and to balance mortality. Biologists came to define this relationship of population genetics as "balanced polymorphism."

The major symptoms of sickle-cell disease are joint and bone pain, rapid heart rate, decreased respiration and fatigue, ulcers on the lower legs, severe abdominal pain, jaundice, delayed growth, poor vision, and fever. The mortality rate of the sickle-cell disease is highest within the first year of life; therefore, early detection is necessary for increased survival. Doctors commonly use electrophoresis along with a complete blood count (CBC) to determine if Hb S is present. This simple blood test enables doctors to determine the presence of sickle hemoglobin in the patient. In addition, genetic counseling is recommended for all carriers to prevent or discuss the implications of having a child born with sickle-cell anemia.

Although no cure has been discovered for the sickle-cell disease, many new drugs and treatments have been developed to stop the factors that cause the recurring, painful sickling crises. Researchers have found that the inflammatory response causes the cells that line the blood vessels to be sticky. This leads to a build up of sickle cells sticking to endothelial

cells that line the blood vessels, eventually causing a blockage. Some studies have shown that anti-inflammatory drugs, such as steroids and ibuprofen, can relieve sickling crises. In addition, blood transfusions increase the red blood cell count, and regular transfusion therapy has been found to help prevent recurring strokes in infants.

The present research shows a promising future for patients with the sickle-cell disease. One future treatment may be in gene transplant, in which a virus is used to transplant a normal gene (hemoglobin A) into the bone marrow cells of a sickle-cell patient (hemoglobin S). Although the goal is for the gene to instruct the bone marrow to produce normal hemoglobin, it has not yet proven successful in humans. Additionally, new vaccines are being designed in hope of fighting infection and early infant death associated with the sickle-cell disease.

The sickle-cell disease affects millions of people throughout the world and its implications must not be overlooked. The medical world has made great strides in research and treatment of this disease. Further genetic analysis in the development of innovative therapeutic agents provides a promising future for sickle-cell patients. With proper treatment and a healthy lifestyle, the life expectancy will continue to increase for patients who are suffering from the sickle-cell disease.

— *Joshua M. Zavitz*

See also **Genetics, Human**

Further Readings

Wailoo, K. (2001). *Dying in the city of the blues: Sickle cell anemia and the politics of race and health.* Chapel Hill: University of North Carolina Press.

Simpson, George Gaylord (1902–1984)

Born in Chicago, George Gaylord Simpson, probably the most influential paleontological thinker of the mid-20th century, was trained at Yale in vertebrate paleontology. In 1927 he took up a curatorial position in fossil mammals at the American Museum of Natural History, where he spent most of his career before proceeding to Harvard and then to the University of Arizona. Together with his American Museum colleague, the ornithologist Ernst Mayr, and the Columbia University geneticist Theodosius Dobzhansky, Simpson was one of the three main architects of what became known as the "Evolutionary Synthesis."

Following the rediscovery of the principles of Mendelian genetics in 1900, evolutionary science entered a period of ferment in which all possible avenues for explaining the emergence and establishment of evolutionary novelties were explored. Most of these explorations departed quite radically from purely Darwinian notions of natural selection—which were, indeed, somewhat out of fashion in the opening decades of the 20th century. During the 1920s, however, a series of contributions by such notables as R. A. Fisher, J. B. S. Haldane, and Sewall Wright placed the emerging science of population genetics on a solid mathematical footing, focusing attention upon processes influencing the survival and propagation of particular alleles in populations. These new perspectives attracted the attention of evolutionary biologists from other fields, and rapidly formed the foundation for a new view of the evolutionary process based on Darwinian principles. Simpson's book *Tempo and Mode in Evolution* (1944), written in trying conditions while he was in the U.S. Army during WWII, is credited, along with Dobzhansky's *Genetics and the Origin of Species* (1937) and Mayr's *Systematics and the Origin of Species* (1942), with setting the foundations for the neo-Darwinian view of the evolutionary process that was to dominate in biology for the next half-century.

Particularly in its post-1950 "hardened" form, the Synthesis taught that most, even all, evolutionary phenomena could be traced back to gradual, generation-by-generation changes in population gene frequencies under the guidance of natural selection. Simpson's particular contribution to the Synthesis lay in the eloquence and erudition of his attempt to reconcile the "gaps" in the fossil record with a linear notion of evolutionary process. In Simpson's view, the larger gaps—which he regarded as real, rather than as artifacts of the record's completeness—equated with episodes of fast evolution ("tachytely") which, like the slower episodes ("bradytely") that produced smaller gaps, resulted from the same basic set of "determinants"—population sizes and variabilities, generation

lengths, mutation rates, selection pressures, and so on. It was differences in the combination of determinants that gave rise to differing evolutionary patterns. As an extension of this line of reasoning, Simpson saw species not as discrete entities but as arbitrarily delineated segments of evolving lineages.

In addition to his very considerable and influential theoretical output, Simpson was a phenomenally productive systematic paleontologist whose interests ranged widely. He is probably best remembered for his studies of horse phylogeny, but he was also a major influence in paleoanthropology, especially around the time that this field capitulated to the Synthesis in the 1950s and 1960s.

— *Ian Tattersall and Kenneth Mowbray*

See also **Neo-Darwinism, Origin of; Paleoanthropology; Paleontology**

Further Readings

Laporte, L. F. (2000). *George Gaylord Simpson: Paleontologist and evolutionist.* New York: Columbia University Press.

Simpson, G. G. (1944). *Tempo and mode in evolution.* New York: Columbia University Press.

SIMULACRA

Simulacra (sing. *simulacrum*) refers in contemporary social science discourse to multiple copies that have no original or, in Baudrillard's words, "models of a real without origin or reality." The concept has emerged in postmodern social theory as a key term for talking about commodification, intellectual property, popular culture, and multinational cultural flows. It is usually closely linked to the concept of the *hyperreal,* simulated realities that are experienced as more real than the realities for which they substitute.

The term originates with Plato, who used it to distinguish between two modes of representation. Whereas the *icon* is a representation that participates in the idea of the thing it represents, the simulacrum captures only the outer form of things. The idea of the simulacrum was borrowed by social theorists Jean Baudrillard, Fredric Jameson, and Giles Deleuze and developed to analyze and critique aspects of modern and postmodern society.

Fredric Jameson makes simulacra a touchstone for his conceptualization of postmodernism. His primary example is photorealism, in which people create paintings that are copies not of real things but of photographs of real things. Deleuze furthers (and diverges from) this argument by pointing out that beyond a certain point, the simulacrum is not a copy twice removed but rather a phenomenon of a different nature altogether, something that undermines the normal distinction drawn between copy and model. A copy, no matter how many times removed, is nonetheless defined by some relationship to an original. A copy, in other words, is always made in order to stand in for its model. A simulacrum, on the other hand, takes on a life of its own. Simulacrum, in this sense, is a perfect descriptor for the synergistic blend of commodified texts and goods that make up an increasingly large component of contemporary popular culture.

The most complete theorization of simulacrum comes from Jean Baudrillard's essays *Simulation* and *America.* Baudrillard argues that the distinction between mere copies of copies and simulacra can be understood as a series of stages:

Representation. The image is the reflection of a basic reality.

Counterfeit. The image masks a basic reality.

Simulation. The image masks the absence of a basic reality.

Simulacrum. The image bears no relation to any reality.

To illustrate these, it is useful to take examples from popular culture. Consider, for example, the life of Zorro as a popular culture form spanning 80 years of time and three continents of production. The "basic reality" is the novel by Johnston McCulley, first published in 1919. Over its span, Zorro has gone through all the stages described by Baudrillard:

1. *Representation.* At this stage, we find signification through reference. This is the realm of the sequel or the movie version of the novel. Here we find the 1920 Douglas Fairbanks film *The Mark of Zorro* "based on the novel by Johnston McCulley" and McCulley's own four sequel novels and 50 short stories.

2. *Counterfeit.* Here we find the dozens of reinventions of the film that sprang up in the wake of *The Mark*

of Zorro's success. Borrowing signs from that film, they re-create Zorro but weave the character into new narratives that are not consistent with the original film or the novel. The new adventures of Zorro in these films *imply* an original story, but do not make it explicit or seek consistency with earlier Zorro texts. Zorro may have won a bride in a previous film; here he is courting another. He may have been unmasked at the end of the original film, yet here no one knows who he is.

3. *Simulation.* There is no Zorro in *Zorro's Black Whip* (1940) or in *Don Daredevil Rides Again* (1951), or in several other films and stories featuring the image of the black masked swordsman. The Black Whip resembles the Zorro of earlier films (except for her gender), but aside from his name in the title, there is no mention of Zorro in any episode of the serial. Zorro is absent as a referent, yet his costume, his weapons, and his name indexically link these films to the character. "Zorro" has become an absent signifier into which new meanings can be poured.

4. *Simulacrum.* A blonde, teenaged Zorro swashbuckles his way through the 1975 animated TV series *The Legend of Zorro.* Two rival queens hire Samson and Zorro, respectively, to recover a dead king's will in *Zorro Contra Maciste* (1963). Zorro encounters Dracula in one comic book incarnation and crosses swords with the Three Musketeers in another. Four different Zorro action figures graft Zorro's head to metallic bodies with bulging biceps and six-pack abs that more resemble other cyborg action figures than the "gay renegade" of old California. In these incarnations, the signifiers of Zorro remain intact yet disembedded from any of the narratives that originally constructed its meanings.

Baudrillard claims that America, in particular, is the perfect "simulation society," an artificial world constructed of signs without reality. Modern Americans are, he writes, more likely to compare the real to representations of it than the other way around: to compare a sunset to a painting or to compare experience of a place to the images they have seen of it. He argues further that Disneyland and Disney World, with their "Main Street, USA" and other simulations of America that exist only in the imagination, are the most perfect examples of the American simulation society.

But simulacra are by no means limited to the United States. More and more popular culture fits the notion of simulacra. In particular, much of contemporary children's popular culture is released in simultaneous synergistic packages of electronic games, television series, movies, collectors' cards, and other commodities. None of these are spin-offs of the others—or they all are. Either way, they clearly fit the definition of simulacra.

— Mark Allen Peterson

Further Readings

Baudrillard, J. (1983). *Simulations.* New York: Semiotext(e).

Baudrillard, J. (1988). *America* (Chris Turner, Trans.). New York: Verso.

Jameson, F. (2000). Postmodernism, or the logic of late capitalism. In *The Jameson Reader* (pp. 188–232). Oxford, UK: Blackwell.

Massumi, B. (1987). Realer than real: The simulacrum according to Deleuze and Guattari. *Copyright, 1,* 90–97.

Siwalik Hills

Siwalik Hills is a range of foothills of the Himalayas extending from northeast Pakistan through northern India to southwest Nepal, famous for its rich fossil beds containing extinct apes and other primates. The region has a long history of paleontological research and exploration, beginning in the early part of the 19th century. However, the most intensive research has been conducted since 1973 in the Potwar Plateau of Pakistan by David Pilbeam and his colleagues.

The fossiliferous sediments in the Siwalik Hills are very extensive, measuring several kilometers in thickness. During the Miocene (23–5 million years ago), active uplift of the Himalayas led to increased erosion, and this produced massive volumes of sediment that were deposited by floodplains and rivers. The sediments range in age from more than 22 million years old to less than 1 million years old and provide a remarkably complete fossil record by which to document the evolutionary history of mammals in the region. The sedimentary sequence in the Potwar Plateau has been subdivided into a series of geological formations: Kamlial Formation (18–14 million years old), Chinji Formation (14–10 million years old), Nagri Formation (10–8 million years old), Dhok

Pathan Formation (8–5 million years old), and Soan Formation (5–1 million years old).

In addition to fossil apes (hominoids), several species of strepsirhines (sivaladapids and lorisids) and cercopithecoids (Old World monkeys) are known from the Siwalik Hills. In addition, a few isolated teeth from the middle Miocene Kamlial Formation (16 million years ago) belong to a small catarrhine primate (about 3–4 kg) that is quite similar dentally to contemporary species from China and East Africa. They appear to belong to a lineage of primitive catarrhines that originated prior to the divergence of the Old World monkeys and apes. Two groups of fossil strepsirhine primates are known from the Siwalik Hills. The sivaladapids, represented by *Indraloris* and *Sivaladapis* from the Chinji and Nagri Formations (14–9 million years ago), are the last surviving members of a diverse group of strepsirhines (the Adapiformes) that inhabited Europe during the Eocene (34–55 million years ago). They are medium-sized (4–7 kg), arboreal primates with specialized teeth for leaf eating. Slightly later in time, from the Dhok Pathan Formation (8 million years ago), is *Nycticeboides,* which appears to be closely related to the living slow loris from Southeast Asia. Old World monkeys or cercopithecoids first appear in the Siwalik Hills in the Dhok Pathan Formation and are the only fossil primates known from the Soan Formation. *Presbytis sivalensis* (or *Semnopithecus sivalensis*) from the Dhok Pathan Formation (7–8 million years ago) is a small colobine monkey related to the living Asian langurs. A baboon-like cercopithecine (*Procynocephalus subhimalayanus*) and a macaque (*Macaca palaeindica*) are recorded in the Soan Formation at 2.0–3.5 million years ago, while a gelada baboon, *Theropithecus oswaldi delsoni,* is know from somewhat younger deposits dating to 1.5–0.9 million years ago.

The most common and best-known fossil ape in the Siwalik Hills is *Sivapithecus.* Three species are represented: *S. indicus* (12.5–10.5 million years ago), *S. parvada* (10 million years ago), and *S. sivalensis* (8.5–9.5 million years ago). Smaller, female specimens of *Sivapithecus* were previously included in the genus *Ramapithecus,* once considered to be a human ancestor. However, with the recovery of additional specimens, especially a partial skull of *S. sivalensis,* it became clear that *Sivapithecus* was more closely related to the orangutan. Other fossil apes from the Siwalik Hills include "*Sivapithecus*" *simonsi* (10.5–11.5 million years ago), which is probably more closely related to *Dryopithecus* from the later Miocene of Europe than to *Sivapithecus,* and *Gigantopithecus giganteus,* the largest of the Siwalik apes (about the size of a modern gorilla), which is known from the Dhok Pathan Formation (6.5–7.0 million years ago).

— *Terry Harrison*

See also **Hominoids**

Further Readings

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego: Academic Press.

Hartwig, W. C. (Ed.). (2002). *The primate fossil record.* Cambridge: Cambridge University Press.

SLAVERY

Contemporary images and theories of slavery have become deeply entwined with the constructions of modern slavery in the New World. This entwinement is due to the reality that the institution of slavery was the primary mold of the conquered New World. From its overall scale, its rationalization of labor, and its integration within a capitalist mode of production to its legally sanctioned discipline of the body and its powerful demographic and geographic effects, slavery in the New World constituted the most ambitious enterprise of this sort. From the 16th to the 19th century, nearly 11 million people were shipped as slaves to the Americas and were forced in what was historically unprecedented to labor for the remainder of their lives in societies run by culturally, linguistically, and ethnically distinct people. Not surprisingly, anthropology's images and theories have drawn largely from the abundant historiography of slavery in the United States and the Caribbean. They thus tend to depict slavery in its American and Caribbean plantation form, where African slaves were property (as legally defined in the Code Noir), subject to compulsory labor, familial separations, and systematic dehumanization. Variations in these representations do exist, however, including the idyllic way Brazilian slavery has been represented by Gilberto Freyre (contrasted with the institution of slavery in the United

States). Despite its scale and historical importance, modern Euro-American slavery was but one incarnation of slavery among many others present across a wide spectrum of societies. Historians, in particular, have generated a substantial body of work on the patterns and pervasiveness of slavery in Europe going back to the Greeks and Romans and persisting through medieval Christendom.

Early anthropological investigations focused on slavery as a social, quasieconomic institution, and monographs from the period document the extent to which different societies practiced slavery. These first writings forwarded two main concepts, warfare and cannibalism, as the explanatory sources of slavery. The potential production value of enslaving enemy bodies captured during wartime came to be valued over immediate killing. Cannibalism, with its rituals of keeping captives before killing them, also reaped the benefits of forcing their captives into labor during these waiting periods. Anthropology proffered that as humankind moved toward more complex agricultural and sedentary societies, the economic rationale for slavery grew, spawning the exploitation of new sources for obtaining slave labor. Accordingly, profiteers obtained slaves through kidnapping, legal punishment, conquest, debt, piracy, and trafficking.

To this point, anthropology articulated its discussions and commentary on slavery through an evolutionary framework. From this evolutionist view, modern slavery in the New World was a remnant of past primitive practices—as anachronism—rather than constitutive of the creative forces of modern times, specifically the intersection of agrarian capitalism with a colonialist racial ideology. Contemporary anthropological debates on slavery have sought to avoid interpretations that reduce slavery to its New World institutionalization. This endeavor, combined with the availability of extensive materials on the diversities of practices of slavery in different societies, most notably Africa (with the works of Igor Kopitoff, Suzanne Miers, and Claude Meillassoux) and South Asia, have led to the reevaluation of key characteristics that historians and social scientists used to define slavery, namely property and compulsory labor, both derived from the conceptualization of slavery in the New World. Some anthropologists in fact question the use of the legal notion "property" as a universal construct, which, Kopytoff describes as changing "with different cultural and socioeconomic contexts." The rights that the notion implies do not provide an understanding of other forms of slavery, especially where kinship and community relations figure centrally, and due to the structure of the political economy, the commodification of the bodies of others is not at issue. In the same vein, compulsive labor, so much a distinctive feature of the New World experience, brackets an understanding of those forms of slavery (for example, domestic slaves or slave educators in ancient Rome) that do not necessarily imply the same level of socially alienated compulsory work. Kopytoff suggests that conceptualizing slavery in terms of property and compulsory labor can only lead to the opposition slavery versus "freedom," which is a Western Enlightenment construct, obscuring a more complex relationship with other categories (such as citizenship and other cultural modes of identification). Meillassoux and Kopytoff's works have contributed to this displacement of concerns regarding slave and slavery by conceptualizing slavery as a dominant institution in Africa, in rupture with traditional Western constructs.

Anthropology has not been fully at ease in theorizing slavery. Indeed, a thorough review of anthropological research on slavery does not take us much further than it took Kopytoff or Meillassoux, almost a quarter of a century ago. It is perhaps the recency and even the contemporaneity of the phenomenon that define this uneasiness and "silence" of anthropology to generate serious and sustained theoretical considerations. Moreover, the study of slavery from the anthropological perspective presupposes an epistemological evaluation of the condition for a possible legitimacy of its own discourse about an object that partially was instituted out of a shared rationalization process. Anthropological narratives about slavery emerged at the core of a crucial contradiction in which both, modern consciousness about slavery and the "primitive other," raison d'être of classical anthropology, were engendered by the same Enlightenment project. The latter provided the analytical tools to think about primitive societies and their primitive practices—such as slavery—while, paradoxically, its enlightened philosophers were claiming freedom for those outside the dark world of slavery to guide the path of humanity. The task for anthropology is thus to evacuate the heavy ethnocentric biases that are embedded in these analytical categories to think about societies and slavery and to move beyond the established analytical framework

that is too present in the traditional historiography and sociology of slavery.

— *Louis Herns Marcelin*

See also **Enlightenment, Age of; Haiti; Labor**

Further Readings

Meillassoux, C. (1986). *Anthropologie de l'esclavage: Le ventre de fer et d'argent.* Paris: Presses Universitaires de France.

Miers, S., & Kopytoff, I. (Eds.). (1977). *Slavery in Africa: Historical and anthropological perspectives.* Madison: University of Wisconsin Press.

Patterson, O. (1982). *Slavery and social death: A comparative study.* Cambridge, MA: Harvard University Press.

Watson, J. L. (1980). *Asian and African systems of slavery.* Oxford, UK: Blackwell.

Smith, Grafton Elliot (1871–1937)

The story of Grafton Elliot Smith is the story of the brilliant colonial boy who did well for himself. He was born on August 15, 1871 in Grafton, New South Wales, the son of Stephen Sheldrick Smith, a teacher, and his wife, Mary Jane Evens. Smith soon showed his precocious intelligence, developing an interest in anatomy after dissecting a shark. He was able to attend the University of Sydney, graduating with an MD in 1895 and winning a gold medal for his thesis on the anatomy of the brain in non-placental mammals. The following year, Smith was awarded a traveling scholarship to study for his PhD at Cambridge University, and in 1899 he completed his extraordinary ascent by being elected a Fellow of St. John's College, Cambridge.

While Smith's rise was rapid, his colonial origins meant he was at a disadvantage for the best appointments in Britain, so in 1900 he went to Egypt as the first occupant of the Chair of Anatomy at the Cairo School of Medicine, a post he held until 1909. With his colleague Fredrick Wood Jones (1879–1954), Smith investigated thousands of mummified remains, diagnosing many diseases along the way (gout, leprosy, smallpox, and tuberculosis among them). This work vastly extended contemporary knowledge of life in ancient Egypt. For his work on an ancient brain recovered by archaeologists, and as anatomical advisor to the archaeological survey of Nubia (now northern Sudan), Smith was elected a Fellow of the Royal Society in 1907. This work complemented a major project of cataloguing brains that Smith undertook before going to Egypt and which was published in 1902. Smith's Egyptian work was published as *The Royal Mummies* (1912) and remains his principal contribution to science.

The second, and less helpful, phase of Smith's career began when he returned to the United Kingdom in 1909 to take up the Chair of Anatomy at Manchester University, a position he held until 1919. It was at Manchester that Smith developed his controversial theory, which became known as diffusionism. It was Smith's belief that *Homo sapiens* emanated from central Asia rather than from Africa. This view was not unique to Smith; its best known advocate was Ernst Haeckel (1834–1919). Smith outlined his theory of diffusionism in a series of works, principally *The Diffusion of Culture* (1933). Smith's extreme version of diffusionism failed to convince during his lifetime and has not been revisited. After his death, a longstanding colleague, A. C. Haddon (1855–1940), noted tactfully that Smith's zeal for diffusionism outran his discretion.

Less controversial then than it is now, Smith also subscribed to some racist readings of evolution. He had no doubt that Australian Aborigines were "the most primitive race . . . which represents the survival with comparatively slight modification of perhaps the primitive type of the species." Smith then saw the racial order move progressively upwards through the Africans, the Mongols, and on toward the "Alpine Race," which in turn was divided between its Mediterranean and Nordic Races, "in which the latter of which the reduction of pigment was carried a stage further to produce the blondest of all human beings." Smith's racism was not obsessive or malevolent, as it was with some of his contemporaries. For him it was simply the clear testimony of science.

Smith was a talented popularizer who wrote several works designed for the non-specialist reader. For example, *The Search for Man's Ancestors* (1931) was part of an influential popular science series called The Forum Series, published by Watts & Co. for the Rationalist Press Association (RPA). Even more influential was another RPA series called the Thinker's Library, in which Smith had a book titled *In the Beginning: The Origin of Civilization* (1932). Smith

became an Honorary Associate of the RPA in 1925 and he was knighted in 1934.

It is perhaps inevitable that Smith has been accused of being the mastermind behind the Piltdown fraud. This theory, always unlikely, was squashed with findings in 2003 that definitively placed responsibility back on the original suspect, Charles Dawson, the man who found the Piltdown pieces.

Smith's health was eroded in the 1930s by a series of strokes brought on by hypertension and diabetes. He died on January 1, 1937 after another stroke. He was survived by his wife of 37 years, Kathleen, and his three sons. Each year the Australian Neuroscience Society presents the Sir Grafton Elliot Smith Award to the best emerging neuroscientist.

— *Bill Cooke*

Further Readings

Smith, G. E. (1923). *Essays on the evolution of man.* Oxford: Oxford University Press.

Stocking, G. W. (1995). *After Tylor: British social anthropology, 1888–1951.* Madison: University of Wisconsin Press.

Smith, William (1769–1839)

William Smith was born on March 23, 1769 in Churchill, Oxfordshire, England, the first son of five children of the village blacksmith. He had a meager formal education but had a natural curiosity concerning local rocks, fossils, and geography. When he was eight years old, his father died, leaving the family in dire circumstances and resulting in his education shifting to the more practical aspects of surveying, geometry, landscape study, and mapping.

At eighteen he became an assistant surveyor with the office of the prominent surveyor Edward Webb, which provided Smith the opportunity to travel extensively and study the landscape in depth as part of his employment. Through these small jobs, he gained a reputation and, in 1791, started a business of his own. By 1794, he was supervising the digging of the Somerset Canal, a six-year undertaking that necessitated a meticulous study of the rock structures to determine the best possible route. It was during this time, together with the mapping of potential coal mining sites, that Smith made the important discovery that certain beds had characteristic fossils and that they were unique to that stratum and that period of geologic history. As his travels and rock collections continued, his theory that a particular stratum could be positively identified solely by the fossil remains found in it was reinforced again and again. These observations would be a basis for the conclusion of later evolutionists of the law of faunal succession: in general, in the development of life on the planet, fossils in the layers of sedimentary rocks in any location are in a definite sequence from the bottom to the surface of a section, with the youngest stratum on the top. This concept was virtually unknown to scientists of the period.

To put his theory to work, Smith coordinated his notes and first began to draw local maps—not of the surface topography of outcrops, nor of the composition of the rocks, but of their strategic order, using the fossil record as the classifier. Twenty-one counties were produced. These were new kinds of maps, with the unseen world below the surface on display, used as a device to predict with accuracy what rocks would appear and what fossils would be present.

After confirming the validity of the local maps and with his employment with various canal-building companies ended, Smith had a series of engineering jobs that enabled him to again travel to various parts of England with side trips to Wales. His vision was to make a geologic map of all of England and Wales using his principles of fossil position. This he completed in 1815 and updated in 1820. It represents the first true geologic map anywhere in the world. It is displayed at Burlington House, near London's Piccadilly.

Tragically, this map was at first overlooked by members of the scientific community. They reacted to Smith's humble beginnings and limited education when compared to their "learned mentality."

Later in his life, in 1831, Smith was awarded the Geologic Society of London's highest honor, the first Wollaston Medal for outstanding achievement in geology—work that contributed greatly to the historical development of the new science of geology and earned him a title of the Father of English Geology.

— *Paul A. Young*

See also **Geology**

Further Readings

Winchester, S. (2002). *The map that changed the world.* New York: HarperCollins.

Smuts, Barbara B.

It is not easy to understand human behavior in terms of social relationships. Many books have been written on the subject and many more will be written in the future. Perhaps this is due to the fact that an interest in social interactions, especially between males and females, will always be a subject of inquiry for us. However, a University of Michigan professor has made a valid attempt at giving us certain insights about human relationships between the sexes based on her many years of field research where she studied the social relationships of primates.

Dr. Smuts received her PhD from Stanford University; as a scholar she has focused on primates and analyzed the relationship between males and females while conducting field research studies. What she observed and learned in her studies may help us to better understand similar relations between humans of different genders. By having a better understanding of nonhuman social interactive relationships, we could be in a better position to understand our own forms of human behavior and perhaps even to improve on them. Such information is becoming more important because we are at a time in our society when more attention is being given to male and female interpersonal relationships. Dr. Smuts's works will increase in value because of their contributions to a better understanding of these roles.

— *William E. Kelly*

Further Readings

Smuts, B. B. (1999). *Sex and friendship in baboons* (2nd ed.). Cambridge, MA: Harvard University Press.

Social Change

Human relations may be considered as patterned interactions over time. Thus, temporal change and continuity are constant and fundamental features of the human condition. In this perspective, the typical usage of the social change concept—as only applying when a "normal" state of affairs is radically and rapidly altered—involves several flawed assumptions, including the idea that stasis is normal and that only change needs explanation. The alternative is to think of our key topics, including society, culture, and nature, as processual—as unfolding over time. Anthropology has a twofold relationship to social change. On the one hand, the long time period of human biological and cultural evolution provides bountiful evidence of social change; on the other hand, the microscopic time and space perspective of ethnography favors static views of culture and society and thus misleadingly renders change abnormal and exogenous.

Cultural evolution is generally used for major changes in social organization that have taken place over the length of human prehistory and history, involving the emergence of ranking and stratification, states and bureaucracies, specialized occupations, cities, and so on. Empirical generalizations about and theories of cultural evolution abounded in the 18th and 19th century. Among the most important are found in the works of Karl Marx and Friedrich Engels, Herbert Spencer, Edward Burnett Tylor, and Lewis Henry Morgan. Typically, these authors approached social change as a series of stages with distinctive lists of characteristics, such as Morgan's memorable, if patronizing, "savagery, barbarism, and civilization," further subdivided into lower, middle, and upper units (resulting in odd terms such as "upper savagery," whose marker was the invention of the bow and arrow). Such stage theories tended to assume progress over time, arrogantly envisioning the most powerful European-based societies of the world as the pinnacle of change (Marx and Engels, however, envisioned a further step forward, to "communism"). Clearly, then, cultural evolution models reflected not just "pure" scholarship but also the worldview of European imperialism and emergent capitalism.

At the end of the 19th and beginning of the 20th centuries, Franz Boas emphatically criticized the flaws of stage theories, such as their rigidity and egregious speculation. Nevertheless, he also addressed change as a kaleidoscopic flow of influences among cultures—so-called historical particularism. His interest in social change waned, however, when confronted by recent changes in non-Western cultures impacted by the West, which he tended to ignore. The late Boasians (such as Alexander Lesser) initiated the study of recent history among Native Americans, but this was overshadowed by the revival of stage theories

of cultural evolution under the auspices of Leslie White and Julian Steward. While White reasserted the single line of advance posited by 19th-century theorists, Steward more subtly argued for many regional histories, which were partly unique but across which one sometimes finds comparable and thus generalizable transitions, such as the formation of class- and state-based societies. Without doubt, the revival of evolutionary models was shaped by the post-World War II triumph of United States technological, political, and economic power.

Emerging from White and Steward, there have been two important lines of inquiry. One explores the causes of change between stages—is it technological improvement, especially control over energy? Is it gradually growing populations? Is it sacred consensus? Is it political coercion, and if so, based on what? Territorial circumscription? Management of irrigation? The other questions the stage approach—at least in its most schematic format—emphasizing complex systems dynamics and ambiguous, transitional cases, while at the same time retaining the insight that there are broad tendencies over time toward inequality and centralization of power.

Alongside these developments in the course of the 20th century arose the functionalist view of societies (which can be crudely summarized as "everything works together, all in the present"), which was shaped by the development of sustained fieldwork-based ethnography as a research method. Ethnography has many virtues, but we noted its static bias above, a characteristic example being Bronislaw Malinowski's omission of migratory wage labor to plantations by young men in his Trobriands ethnography. Since then, British social anthropology struggled with how to insert social change. Godfrey Wilson pioneered by looking at the effects of mine labor and then unemployment during the Great Depression in southern Africa; following him, the researchers of the Rhodes-Livingston Institute and the "Manchester school" of social anthropology made change, conflict, and adjustment their principal agenda. Within structural-functional anthropology, Edmund Leach outlined a dynamic, if cyclical, model in *Political Systems of Highland Burma.* And most radically (in political as well as intellectual terms), Peter Worsley challenged the functionalist bias toward cycling back to stasis by examining revolutionary millenarian movements among non-Western peoples.

This set the stage for anthropology's increasing attention to recent history as the context for inherently processual culture. The background was the tumultuous world of the 1960s, filled with rebellions against colonial masters, communist bureaucrats, and inherited intellectual verities. The key scholar was Eric Wolf, whose magisterial synthesis *Europe and the People Without History* proposed that the diverse modern cases studied by anthropologists form part of one worldwide network, constantly undergoing change through the unfolding of global capitalism. In this history, European imperialists and non-European peoples are mutually causal and equally dynamic. June Nash, Eleanor Leacock, Sidney Mintz, Talal Asad, Worsley, and many other anthropologists contributed to this perspective, as well as Immanuel Wallerstein, Samir Amin, Andre Gunder Frank, and others who developed "world system theory."

No longer could scholars view non-Western peoples as occupying timeless "tradition" until "modernity" was imposed from outside, whether as "progress" or "destruction." Instead, certain characteristic cultural qualities of "modernity"—intensive non-face-to-face communication, say, or citizenship in imagined collectivities—emerge from a dynamic interaction of cultural segments throughout the world system, with local inflections as well as global commonalities. Debatably, some scholars posit that these changes are now so intense that we live in a foundationless "postmodern" period, one of total "globalization." Even if the language of these approaches is overheated, social change is now central rather than intrusive in the study of anthropology.

— Josiah McC. Heyman

See also **Anthropology, Social; Boas, Franz; Harris, Marvin; Steward, Julian H.; White, Leslie A.; Wolf, Eric Robert**

Further Readings

Johnson, A. W., & Earle, T. K. (1987). *The evolution of human societies: From foraging group to agrarian state.* Stanford, CA: Stanford University Press.

Sanderson, S. K. (1990). *Social evolutionism: A critical history.* Cambridge, MA: Blackwell.

Wolf, E. R. (1982). *Europe and the people without history.* Berkeley and Los Angeles: University of California Press.

Social Structures

Social structure has been used in anthropology as the descriptor for a variety of conceptualizations of human organization. The term, wrote Claude Lévi-Strauss, "has nothing to do with empirical reality but with models which are built up after it." The building up of such models was a central preoccupation in anthropology in the mid-20th century. These theorists built on an ancient conversation dating from Plato, Ibn Khaldûn, and Vico and stretching to the figures who laid the foundations for 20th-century social theorizing: Freud, Marx, Durkheim, and Weber. The models addressed social phenomena ranging from marriage rules to political forms. Several features of this conversation in anthropology distinguished it from a similar one in sociology taking place during the same period in which such themes as class, norms, and inequality were emphasized. These included a concern with non-Western political organization and kinship structures and terminologies, which were shown to be overlapping and in many ways mutually constitutive, and a comparative approach in which a premium was placed on providing as much data from as diverse sources as possible.

Structural-Functionalism

Several theorists, in what came to be known as "structural-functionalist" anthropology, also known as "British social anthropology," addressed the question of social structure as a part of their larger interest in the interconnectedness of individuals and societies. They include E. E. Evans-Pritchard, Meyer Fortes, and A. R. Radcliffe-Brown. Each regarded kinship as one of the chief entrées into social structure. Their approach was strongly comparative. They sought to identify the "rules" of descent that governed the composition of kin groups such as patrilineages, clans, and tribes, units they portrayed as integral to political organization. The structural-functionalists were later criticized by Harris for drawing universalistic conclusions from historically situated data, for example by not assigning enough weight to colonialism, the slave trade, and other encroachments on local political organization.

Radcliffe-Brown argued that social structures were "just as real as are living organisms" and that social structure was "the set of actually existing relations, at a given moment of time, which link together human beings". He differentiated between his own approach, in which social structure encompassed "all social relations of person to person" and "the differentiation of individuals and of classes by their social role," and that of Evans-Pritchard, whom he saw as using the term "to refer only to persistent social groups" in his 1940 ethnography of the Nuer.

Evans-Pritchard's ethnography was the best known example of "descent theory," in which the structural-functionalists argued that segmentary lineages formed the basis for the societies, most of which were in Africa, that they presented as examples. Lineages were shown to unite and divide along blood lines. Their argument thus posited lineal underpinnings for kinship and political organization. What mattered to the individuals who comprised these systems, they argued, was related to the composition of the groups over time rather than laterally, in the present.

Comparative Anthropology

While the structural-functionalists were developing their theories of social structure in Britain, George Peter Murdock led the way in promoting a comparative approach in the United States. In 1949 he published *Social Structure,* in which he posited a model of human organization whereby human social structures were seen to conform to natural laws just as those recognized in the hard sciences. Murdock made his assertions based on (what came to be called) the Human Relations Area Files, a database he created in which features of numerous cultures were codified and described. This allowed him, and many others since, to compare structural features and to greatly advance the comparative method in anthropology. Murdock argued, for example, that postmarital residence carried more weight than lineage structure in influencing kinship terminologies.

Lévi-Straussian Structuralism

Claude Lévi-Strauss was known for theorizing as to the ultimate rootedness of culture and social organization in the structure of the human mind. He saw the study of social structure as entailing the systematic investigation of an "order of elements" that includes kinship and descent systems and marriage rules, and an "order of orders" in which "anthropology considers the whole social fabric as a network of

different types of orders." In this latter category, he included "lived in" orders such as the economic and political, and the "thought of" orders that are "external to objective reality" such as myth and religion. He argued against Radcliffe-Brown's model, preferring not to see these orders as concrete but as cognition-based.

In *Elementary Structures of Kinship* (1969), Lévi-Strauss pointed to the universality of the incest taboo and theorized that the prohibition of incest had led to the initiation of marriage rules, which dictated who could marry whom. Lineage groups encouraged or discouraged marriages between or within kin groups for reasons that had to do with the avoidance of incest (however defined by the particular group) and the building of alliances between groups through marriage. "Alliance theory," as this came to be called, thus challenged descent theory by arguing for intergroup dynamics as more socially constitutive than a concern with blood lines.

Interpretivism and Practice Theory

Theorizing about "social structure" had waned in anthropology by the end of the 1960s and given way to what came to be called "interpretivism," a movement mainly associated with Clifford Geertz but furthered by many others. The interpretivists endeavored to improve on social structural models that had begun to seem static and ungrounded. Victor Turner, for example, sought to portray "social structure in action" in his work on Ndembu rituals and other social practices. Sherry Ortner, in an important survey of trends in anthropological theory, declared that a new emphasis on "practice" had emerged in anthropology. She mentions structural Marxism, with its emphasis on "beliefs, values [and] classifications," as an early threat to social structure, but ultimately relegates it to those anthropologies that assumed "that human action and historical processes are almost entirely structurally or systematically determined." With practice theory, however, came a new emphasis on the "agent, actor, person, self, individual [or] subject." An actor, by definition, possessed agency, the ability to act. Practice theorists, also called "poststructuralists," sought a balance between structure and agency. The leading theorist in this vein was Pierre Bourdieu, whose idea of "habitus" offers a dialectical solution to the problem of reconciling structure and agency, an approach he calls "genetic structuralism." A habitus is a "system of acquired dispositions functioning on the practical level as categories of perception and assessment or as classificatory principles as well as being the organizing principles of action." Anthony Giddens's theory of "structuration" accomplishes a similar purpose by offering a model that encompasses both structure and action and elaborates on their mutual constitution.

Social structure no longer enjoys a central place in mainstream anthropology. However the current emphasis on agents, which sought to correct for an overemphasis on structure, is beginning to lead to a reappreciation of structure, albeit in new forms and from new angles, in theorizing as to the nature of individuals and groups and how they shape each other. Interdisciplinary subfields such as network analysis trace their origins to Radcliffe-Brown and his contemporaries. Social structure stands as a key idea in 20th-century anthropology. Moreover, its influence continues as one of the main ideas that made post-structuralism possible, and as a precursor to subfields of social analysis utilizing new empirical methods never anticipated by its originators.

— *Diane E. King*

See also **Anthropology, Social; Lévi-Strauss, Claude; Radcliffe-Brown, A. R.**

Further Readings

Harris, M. (2001). *The rise of anthropological theory.* Walnut Creek, CA: AltaMira Press.

Smith, M. G. (1998). *The study of social structure.* New York: Research Institute for the Study of Man.

SOCIALIZATION

Socialization as a concept originated in sociology and refers most simply to the process of learning to pattern behavior and adapt to society's norms, rules, and strictures for playing specific social roles. Although it has not been central to British social anthropology, the discipline's focus on society has contributed to a heavier emphasis on socialization than in American cultural anthropology, where the closely related concept of enculturation has been more important. Enculturation refers to the way individuals learn to pattern their thinking and feeling in culturally

appropriate ways. Nonetheless, since all human beings undergo both kinds of learning, many anthropologists use the terms almost interchangeably to refer to the entire learning process necessary to be able to function in any given society or culture.

Studies of both socialization and enculturation in anthropology have tended to be grounded in theories of cognitive development that are holistic and social, rather than those that are more universalizing. George Herbert Mead and Lev Vygotsky are two popular sources for anthropologists to turn to because both thinkers focused on the social aspects of cognitive development. Both wrote about the importance of mastering symbols as a marker of maturity and, especially Mead, about the centrality of role playing in the learning process.

The earliest studies of socialization in anthropology focused largely on the ways that children and other immature members of society imitate the behaviors of adults or other mature members. Indeed, a review of the majority of the ethnographies of childhood, from the first by F. C. Spencer in 1899 up to the present, reveals that imitation is central to the socialization process in virtually every culture on earth. Classic examples of both American cultural anthropology, such as Margaret Mead's study of growing up on the island of Manus near New Guinea, and British social anthropology, such as Meyer Fortes's work with the Tallensi in East Africa, focus on the ways children rehearse interests, skills, feelings, behaviors, and other aspects of life in their culture and society without long-term repercussions for any mistakes.

In addition, these and many other ethnographers indicate that childrearing is actually secondary to the "culture-seeking" activities of children themselves. This is not to deny the role of teaching, other kinds of instruction, and, especially, such corrective feedback as threats, teasing, and shaming in the socialization and enculturation processes, but rather to emphasize both the agency of children and, more important, the near impossibility of transmitting most cultural knowledge in verbal form. In this way, the centrality of participant observation among both anthropologists in the field and young children everywhere have the same basis. Indeed, many societies actually deny that children, especially those under the age of six or seven, have any ability to understand the world around them, make appropriate decisions about their thoughts and feelings, or exercise control over their behavior. As a result, few people in these societies bother to teach young children at all, through either verbal or other kinds of training. They are left to learn through observation and imitative play, sometimes with the threat of censure if they act inappropriately, but often (especially outside of the West) without a formal lesson on how to act.

Despite the early emphasis on imitation in ethnographies of childhood, as well as the simplified definition of socialization given to many introductory students in anthropology—"the process of learning to live in society"—anthropologists have generally not thought of the process as simple replication. Imitation is always selective and even creative. For example, Margaret Mead noted with interest that children on Manus showed almost no interest in those activities deemed most important by adults, notably religion and ritual exchanges. They were very choosy in deciding which of their elders' behaviors to imitate in play. At the same time, children's imitation often both stems from and fosters a sense of identification with those of higher status, whether adults or older children. Eventually, this imitation develops into actual assistance in the carrying out of tasks and then into independent action. Some cultures also assign young children to this apprentice-like role, in which they are expected to perform family chores under the guidance of an older mentor, in the process learning through both imitation and guided instruction.

Another reason that imitation could never be seen as simple replication is because the societies in which most anthropologists have engaged in their studies of the socialization process are themselves undergoing tremendous change. This change, whether due to colonialism, postcolonial state formation, or globalization, has resulted in "socialization crises," in which adults' knowledge of the world is relatively useless to children educated by such outsiders as missionaries, state education systems, or the media. Studies of socialization, as well as adult resocialization, in these kinds of societies have tended to focus on the ways that old and new symbol systems have been negotiated, combined, and confronted by all actors for the benefit of themselves or their societies.

A theoretical problem with the notion of imitation has also emerged in the social sciences more generally following neo-Marxist and later postmodern critiques of the way that using the universalizing label "socialization" actually hides, or mystifies, the

reproduction of specific class, race, gender, and other hegemonic systems. From this perspective, socialization must be studied as dialogic processes, in which individuals confront multiple socializations into family, community, school, church, and a host of other institutions over the course of their entire life, post-childhood socializations often being referred to as secondary socializations. The influences of these and many other institutions and symbol systems act simultaneously and often in contradictory ways to locate individuals within the matrix of society. This view aims to replace the traditional notion of socialization with one that recognizes that all individuals have multiple subject positions available to them, as well as multiple limitations based on race, class, ethnicity, nationality, gender, sexuality, and other factors. It also recognizes that individuals not only absorb ideas, values, skills, and behaviors from elders and others, but they also resist and transform them as well.

— *Barbara West*

See also **Anthropology, Cultural; Anthropology, Social**

Further Readings

Luykx, A. (1999). *The citizen factory.* Albany, NY: SUNY Press.

Mead, M. (1975). *Growing up in New Guinea.* New York: William Morrow.

Societies, Class

The word *class* comes to us from the Latin *classis,* which referred to the division of Romans according to property. It takes on its modern sense in English from the late 18th century, when the profound sociopolitical upheavals associated with the French and Industrial Revolutions redrew the social map of Europe. Prior to this time "rank," "estate," and "order" were more commonly used to speak of the exploitative self-differentiation of society into functionally interrelated and hierarchically organized sociocultural groupings. Subsequently, most of these meanings were subsumed within "class," though precisely with the difference that the term no longer automatically connoted a natural or divinely ordained social layering.

Given this volatile history, it is no surprise that there has been little consensus on the definition or even existence of classes. Indeed, it has been argued that class is so hard to define because the meaning of the concept is itself a stake in class struggles. Naturally, many would disagree (perhaps thereby proving the original point).

These conceptual tensions are in play in the anthropology of class and class societies, along with an additional problem. The word, together with its contested meanings, carries the birthmarks of the European sociocultural realm from which it sprang. How then are anthropologists to treat the question of class?

Three basic options may be mentioned. Class can be quietly set aside as insignificant for anthropology on the grounds that the comparatively economically undifferentiated societies traditionally studied by ethnographers are not class societies. Alternatively, class can be employed, but within a restricted compass. Finally, the concept can be wrestled into a new form in the attempt to make it adequate for various kinds of non-Western societies.

The principal social scientific approaches to class have come out of political economy, sociology, and above all, Marxism. For Karl Marx (1818–1883), to speak of classes was to speak of distinct groups of people defined by their ownership and control over productive property or by their lack of it. Class division was the defining aspect of any complex social order and the ruling ideas the ideas of the ruling class.

Neither this, nor any other conception of class, has been central to the main current of anthropological thought. Where appeal has been required to kindred phenomena, categories like stratification, status group, and hierarchy coming out of the Weberian tradition have often been found more serviceable. It is a moot point, however, whether this has been a matter of choosing concepts most appropriate to non-Western societies, as thinkers like Louis Dumont (1911–1998) have argued, or of ignoring class, as Talal Asad has charged.

The point proved especially moot from the mid-1960s on, as increasing political militancy both at home and in the newly postcolonial countries radicalized many anthropologists. Their discipline, some came to think, had historically made class politics disappear behind dubious assumptions about order and consent in traditional non-Western societies.

The evolutionary model of 19th-century anthropology, and the work of Lewis Henry Morgan (1818–1881)

Source: © iStockphoto/Diane Diederich.

in particular, had an ambiguous effect in this regard. To the one side, it furnished arguments accounting for the historical emergence of property-owning classes. To the other, it suggested that the most primordial societies would be classless. The latter was a logical if not an empirical requirement of the model, since class is a social differentiation, and by definition the undifferentiated ultimately predates that which is differentiated. With this supposition in hand, "survivals" of classlessness could be freely discerned in existing "primitive" societies.

Certain major anthropological thinkers in the first half of the 20th century could also be seen to have reinforced a similar result, if from different starting points. Franz Boas (1858–1942) emphasized the study of particular cultures as integrated wholes arising from discrete histories. Bronislaw Malinowski (1884–1942) viewed each society as a composite of parts geared to meeting the biological needs of the individual. A. R. Radcliffe-Brown (1881–1955) conceived of societies as functional units regulated by general laws oriented to ongoing social reproduction. From angles like these, it would be argued, class relations had little chance of getting the attention they deserved.

A shared desire to champion the interests of exploited classes, however, has been no guarantee of unanimity on the question of the presence or absence of classes in non-Western societies. Ambiguity on this issue was a feature even of the Marxist classics. Friedrich Engels (1820–1895) would famously come to modify the *Communist Manifesto's* (1848) declaration that the history of all hitherto existing society was the history of class struggles. In footnotes to later editions, the claim was qualified to cover only the period of *written* history. Prior to that time, there was little reason to credit the existence of property-owning classes. Moreover, Marx and Engels were alert to the continuing significance of common ownership in societies that had not yet come fully under the domination of the bourgeoisie.

In their wake, as Yuri Slezkine has detailed, early 20th-century Soviet anthropologists and ethnologists confronted the same dilemma in quite concrete circumstances. They could go hunting for evidence of survivals of primeval common ownership among the "small peoples" of the Soviet Union, or they could seek out disguised forms of class oppression on behalf of indigenous proletariats. In the West, Eleanor Burke Leacock (1922–1987) argued the case for a long era of "primitive communism" prior to the emergence of class societies, while Emmanuel Terray claimed that age and sex could function as classes in precapitalist social formations.

The positions argued by Leacock and Terray, respectively, though both drawing on Marxism, represent two opposed views of the remit of class. Leacock's approach has Marxist tradition on its side. Heavily influenced by Morgan's *Ancient Society* (1877), this tradition underlines the egalitarian nature of early kinship societies and typically conceives of the production of goods as determined by requirements of use. With increases in the productivity of labor, surpluses become available for differential appropriation. This in turn makes possible the emergence of ruling classes utilizing elements of a nascent state to put others to work for them.

One possible problem with this approach, as Maurice Bloch has emphasized, is that Marxism, having made class the linchpin of its theory of society, winds up having little distinctively Marxist to say about apparently classless societies. Instead, it merely reproduces the untenable arguments of 19th-century anthropology about "primitive" society.

An alternative is to dispense entirely with the evolutionary framework and the requirement it imposes to work out which of the canonical "stages" of the organization of the mode of production any given society falls within. This is the option pursued by structuralist Marxists like Bloch, Maurice Godelier, and Terray himself. The difficulty faced by this disparate group was that Marx's categories of thought were generated to explain European capitalist society. Their task, therefore, entailed identifying and extracting those elements of Marxist theory that might promise to be of universal applicability. For some, like Terray, class was one of those elements and could now be extended to understand unequal and exploitative relations in all societies. Others, notably Godelier, have been less than happy with discovering classes among peoples who have, and can have, no intimation of such a thing.

The general question raised by such concerns is a classic one: May we speak of "class society" if and only if people self-consciously define themselves as belonging to a class? Or can class exist as a deep structure, the "hidden secret" of the social order?

In general, it has been easier to argue the reality of class as an objective or "etic" social relation within existing non-Western kinship societies than as an intraculturally recognized or "emic" one. Or at least it has been plausible to make such etic claims within the spatiotemporal catchment area of European world expansion. Tangled in a planetary net of someone else's making, tribal, band, and rural peoples end up producing primary commodities for international markets; being answerable to local and national military-governmental structures; living off royalties from mining or forestry on their shrinking lands; and consolidating internal elites owing much of their status to monopolistic control over external sources of wealth. But it is another matter altogether that these subjugated peoples should come to see themselves as members of a class. And it is yet a further step that they should define their corporate interests as hostile to that of another class.

Such dilemmas become exacerbated when radical ethnographers attempt to put themselves at the service of nonexistent class struggles. The Africanist Wim van Binsbergen, for example, confronted this situation with the Nkoya of Western Zambia. Van Binsbergen hoped that his analyses of the economic and political condition of the Nkoya might encourage some of them to become militant and class conscious. The Nkoya, however, stubbornly regarded his ethnography as an opportunity to codify their history as a distinct people and bring credit to the splendor of their chieftainship.

Sobering experiences such as van Binsbergen's are no doubt only one among many of the reasons for the current receding tide of confident Marxist writings on class within anthropology. More recent work, such as that by Brackette Williams or Donna Goldstein, tends rather to tackle class while in the pursuit of other themes, commonly race, ethnicity, sexuality, and gender.

— *Sebastian Job*

Further Readings

Asad, T. (1972). Market model, class structure and consent: A reconsideration of swat political organization. *Man,* New Series, *7*(1), 74–94.

Bloch, M. (1983). *Marxism and anthropology: The history of a relationship.* Oxford, UK: Oxford University Press.

Dumont, L. (1970). *Homo Hierarchicus.* Chicago: University of Chicago Press.

Godelier, M. (1978). Infrastructures, societies, and history. *Current Anthropology 19*(4), 763–771.

Goldstein, D. M. (2003). *Laughter out of place: Race, class, violence and sexuality in a Rio shantytown.* Berkeley: University of California Press.

Leacock, E. (1954). The Montagnais "hunting territory" and the fur trade. *American Anthropologist, 56*(5) Part 2, Memoir 78.
Morgan, L. H. (1963). *Ancient society: Researches in the lines of human progress from savagery through barbarism to civilization.* New York: Meridian Books. (Original work published 1877)
Slezkine, Y. (1991). The fall of Soviet ethnography, 1928–38. *Current Anthropology 32*(4), 476–484.
Terray, E. (1975). Class and class consciousness in an Abron kingdom of Gyaman. In M. Bloch (Ed.), *Marxist analyses and social anthropology* (pp. 85-135). London: Malaby Press.
Van Binsbergen, W. M. J. (1984–2002). *Can anthropology become the theory of peripheral class struggle? Reflections on the work of Pierre-Philippe Rey.* Retrieved December 5, 2004, from http://www.shikanda.net/ethnicity/peripher.htm.
Williams, B. F. (1989). A class act: Anthropology and the race to nation across ethnic terrain. *Annual Review of Anthropology, 18*, 401–444.

Societies, Complex

Complex society refers to societies with states and social classes. Three kinds of complexity are involved: there are socially and culturally differentiated and unequal groups; social segments have specialized activities and roles; and these societies are geographically complex, with unequal exchange between specialized regions. The term "complex society" is typical social scientific jargon, being both dull and unfamiliar. However, its usage is justified. Civilization, an alternative term, has biased connotations, favoring the written and artistic products of upper classes. States and class society are terms that point to only the political and economic aspects, respectively, of the whole.

Complex society rests on a contrast with small-scale or simple societies. In the latter, people have equitable access to resources and enact similar activities, with differentiation deriving only from age, sex, and personal qualities. Foundational theories (e.g., Herbert Spencer's) emphasized the "evolution" from uniformity to differentiation, and anthropologists focused on the simple and uniform end. The topic of complex societies thus challenges standard anthropological approaches (such as fieldwork in small, bounded places) and concepts (such as singular, integrated culture).

Complex society has been a central concern of archaeology, especially the causes of change from non-state to state organization, and the economic, social, and cultural changes accompanying that transition. Leslie White's unilinear evolutionary formulation of increasing energy control was influential, but probably the most influential argument was Julian Steward's case (derived from Karl Wittfogel) for the centralized management of irrigation. This argument quickly encountered empirical objections (rather sophisticated irrigation systems can be managed under local control, meaning that centralized power is not needed), but the real impact of Steward was his careful comparison of the rise of complex societies in diverse world regions.

After Steward and White, much effort was devoted to formulating types of cultures and identifying single causes ("prime movers") of change from one stage to the next. Morton Fried postulated population growth as a prime mover, while Robert Carneiro proposed political-geographical circumscription. In this elegant model, societies remain small in scale by hiving off identical units until they reach a point of closure by other, similar units; at that point, political centralization begins. However, recent scholarship has changed focus.

First, this work moves away from prime movers toward multi-causal, interactive models of change. Second, it explores, through systems theory, the morphology and dynamics of complexity itself. Third, the dividing lines between simple and complex are no longer straightforward matters of correct typology and classification, let alone unidirectional evolution. Instead, social formations move dynamically between different levels of centralization and specialization over time and space. All these trends are illustrated by recent studies of ancient core-periphery relations. Complex societies emerge from and create unequal exchange relationships between geographic zones that are politically powerful, socially hierarchical, and densely populated (and thus appear to be core "complex societies") and other zones that are politically dependent, less hierarchical, and more sparsely populated (and thus appear to be "simpler societies"), but which produce valued raw materials for the core.

Shifting focus from simple to complex societies has particularly challenged cultural anthropology. The biases in favor of functioning social wholes (in British

and French anthropology) and singular, integrated cultures (in U.S. anthropology) do not fit the differentiation and unequal power characteristic of complex societies. Initial approaches—such as the study of "national character," treating vast nations as if they had one typical personality—were not satisfactory. Community studies became widespread, but scholars quickly realized that single communities could not represent entire complex societies. Community studies were also biased by the anthropological predilection toward the rural, culturally distinctive, and seemingly least modern.

Steward and his students first responded to this challenge by envisioning complex societies in terms of levels of integration, that is, a nested hierarchy of local ethnographic parts forming larger regional and national wholes. Though certainly an improvement, such levels were more an abstract architecture of units than the study of relations between them. Steward's students Sidney Mintz and Eric Wolf next explored the synapses between social segments, such as regional market systems and labor and resource exchanges between great landed estates and peasant communities. They also introduced the idea, to become influential subsequently, of major historical processes—such as world capitalism—unifying apparently differentiated places across space. Meanwhile, ethnographies of community types crucial to complex societies became more common in anthropology, such as plantations and cities.

By the 1960s and 1970s, it became clear to cultural anthropologists that the diverse range of modern ethnographic cases, whether simple or complex in their local manifestations, formed one unified world system organized around differentiated and unequal but interrelated roles in the capitalist economy. Furthermore, the world had many different processes of interaction, ideas as well as commodities. This favors methods—multi-sited ethnography—suited to processes with multiple local manifestations.

Anthropology's "integrated, meaningful whole" concept of culture could not survive confrontation with this degree of social complexity and processuality. The initial conceptualization was that of subcultures, that is, complex societies were assemblages of group or regional/local cultural variants. The subculture concept in practice was flawed, since it was applied to subordinate groups (e.g., African Americans), while dominant groups (e.g., Euro Americans) simply had "culture," which remained largely unexamined anyway. Recent work, especially by the Italian Marxist Antonio Gramsci, instead draws on theories that emphasize cultural construction over time within a web of power relations to examine the making of internally differentiated but coordinated cultural wholes, such as nations. Claudio Lomnitz, for example, built a complex model of Mexican society around communication among disparate and unequal actors in local, political, and national arenas, by documenting political rituals in public settings.

State and class societies may be organizationally complex, but the processes orchestrating them involve radical simplifications of cultural content, most notably commoditization. The global market in sugar described by Sidney Mintz brought about monocrop cultivation and drastic simplifications in diet, and similar arguments can be made for oil, the driving force of the contemporary world. Meanwhile, supposedly "simple" societies have distributed among their members, in a horizontal, cellular fashion rather a hierarchical one, immensely complex knowledge of plants, animals, and the spiritual world.

— Josiah McC. Heyman

See also **Anthropology, Cultural; Anthropology, Social; Gramsci, Antonio; Steward, Julian H.; White, Leslie A.; Wolf, Eric Robert**

Further Readings

Johnson, A. W., & Earle, T. K. (1987). *The evolution of human societies: From foraging group to agrarian state.* Stanford, CA: Stanford University Press.

Lomnitz-Adler, C. (1992). *Exits from the labyrinth: Culture and ideology in the Mexican national space.* Berkeley: University of California Press.

Sanderson, S. K. (1990). *Social evolutionism: A critical history.* Cambridge, MA: Blackwell.

Societies, Egalitarian

All human societies have mechanisms that maintain social order so that decisions can be made, disputes resolved, and behavior regulated. In large states this is clearly apparent in the political and judicial structures developed for such purposes. However, in many

societies these formal mechanisms seem nonexistent. In classic anthropological discourse, these egalitarian societies are "tribes without rulers."

Egalitarian societies are those in which little or no formal structure exists that places authority and power into the hands of certain individuals or groups on the basis of hereditary right or positions of authority. Indeed, in egalitarian societies there are no positions of authority. Every man, and in some societies woman, has an equal say in matters concerning the group and participates fully in decision making. No person can exert authority over another, and there are no avenues for individuals to acquire privileged positions that might provide them with unequal power over others.

It is easy to see how shared decision making in small band societies can be managed without too much difficulty. Many food-gathering societies spend most of their time living in family units small enough to manage their subsistence activities so that group dynamics can be jointly managed by consensus. The food-gathering bands of the Kalahari Desert and Australia are classic examples of this kind of egalitarian society.

Although it might be assumed that as a cohabiting population increases more formal mechanisms would need to be initiated to manage group interaction, this is not necessarily the case. There are dense populations that have informal, egalitarian relationships between individuals. In classic anthropological literature, these are found in horticultural and pastoralist societies located in Melanesia, Southeast Asia, and Africa.

Perhaps the best known of these are the "big man" societies of Melanesia. In these essentially egalitarian societies, some individuals are personally ambitious, setting out in their careers to garner more influence and prestige than other members of the group. These men display unique qualities of leadership and have persuasive oratorical and entrepreneurial skills. By manipulating relationships that give them greater access to wealth, these men are able to exert more influence over the members of the group than anyone else. However, these men have no authority and no power to make people do what they wish. They can only "lead" by persuasion. At any time, people can withdraw their support and the big man topples and another takes his place.

The existence of egalitarian societies might suggest that relations between all members of the society are based upon equality. However, one must take a closer look at the realities. There are extremely few societies where all members—men, women, and children—have an equal say in decisions made on behalf of the group. The Batek of Malaysia provides an example. The majority of egalitarian societies maintain inequitable relations between certain classes of its members. Even in those societies of the Kalahari Desert and Australia where equality between individuals is most apparent, women and the uninitiated have an inequitable part to play in matters concerning marriage, for example. When anthropologists talk about egalitarian societies, they are generally referring to the relations between men.

— Shirley F. Campbell

See also **Anthropology, Cultural; Anthropology, Social; Societies, Class; Societies, Rank**

Further Readings

Endicott, K. (1979). *Batek negrito religion: The worldview and rituals of a hunting and gathering people of peninsular Malaysia.* Oxford: Clarendon Press.

Middleton, J., & Tait, D. (1958). *Tribes without rulers: Studies in African segmentary systems.* London: Routledge & Kegan Paul.

Strathern, M. (1972). *Women in between; Female roles in a male world: Mount Hagen, New Guinea.* London: Seminar Press.

Societies, Rank

How people are socially situated in any given society vis-à-vis others is more than simply a political question, it is an issue of people's relative "value" as this is determined by the members of a community. In anthropology, issues of rank are often found in chapters concerning political processes. While the consequences of rank invariably filter into the political sphere, the basis for rank may find its roots outside it. In the political sphere, rank clearly identifies the hierarchical relationships of people operating within positions of power and authority. However, the basis upon which these relationships rest may be found within the belief systems of the people.

Rank commonly refers to the social position of people in societies recognizing social hierarchies of one kind or another. These societies are organized according to principles determining the relative value of certain groups or individuals over others. This often has implications for people's relative access to resources, opportunity, positions of power, and authority within the political or religious sectors. While all societies have some level of status differential where age, gender, and other individual characteristics are markers of relative value, those societies recognizing hereditary rank have more formalized means of attributing value, affording individuals with relative status.

The Trobriand Islands located in the Milne Bay Province of Papua New Guinea offer a classic anthropological example of hereditary rank established in the mythological origins of the four clans. Each of the clans has relative status to each other, with the Tabalu clan holding the highest rank. As well as each clan being ranked relative to the other three, the clan is made up of subclans that are likewise ranked. Not only does the highest-ranking chief come from the Tabalu clan, but he also comes from the highest-ranking subclan.

The indigenous people of the Hawaiian Islands had a more complex social system based on hereditary rank and classes. In Hawaiian society, people were born into social classes as inferiors, commoners, or nobles. Nobles were hierarchically ranked according to traced descent from the gods, with those more closely linked to godly descent occupying the higher echelons of the society and forming the elite classes of paramount chiefs. The whole system was ranked according to formal rules of hierarchical descent. The ruling elite maintained religious and secular control over the rest of the population, the latter providing tribute in the form of food and other wealth items.

The previous examples illustrate what anthropologists have classified as "ascribed rank," where individuals and groups find themselves in relative positions of rank by virtue of being born into socially established positions of hierarchy. In other societies, such as the "big man" political systems of Melanesia, men establish their rank by "achieving" status for themselves. In these societies, there is no formal, well-established hierarchical structuring of groups, no positions of rank to be filled. Instead, all groups enjoy relative equality with each other and group consensus is sought in decision making. However, there are some men who seek more status by manipulating relationships of exchange and marriage to build up positions of status. While achieved status gives them temporary "rank" in that people look to them for leadership and direction, their positions are extremely tenuous. They have no official status. Their status is achieved.

— *Shirley F. Campbell*

See also **Rank and Status; Societies, Class; Societies, Egalitarian**

Further Readings

Earle, T. K. (1997). *How chiefs come to power: The political economy in prehistory.* Stanford: Stanford University Press.

Kirch, P. V., & Sahlins, M. (1992). *Anahulu: The anthropology of history in the kingdom of Hawaii.* Chicago: University of Chicago Press.

Societies, Secret

Identifying the boundaries that circumscribe social groupings can present challenges, not only for anthropologists but also for those people living within the social groupings. There was a time in anthropological investigations where this did not seem to be a significant issue, when groups on the ground and living in relative communication with each other could easily appear as discrete social entities. It was in the latter part of the 20th century that the complexities of group interconnection became more apparent, with an increasing understanding of local and regional social dynamics. These regional and intraregional relationships necessitate that all social groupings define some kind of exclusivity that enables distinctions between and within the sentient social groups; "We are the people who do not eat human flesh" or "We are the people who believe. . ."

All social groupings, whether these are large-scale distinctions between societies or more esoteric divisions within social entities, are delineated by constructed boundaries defining difference. Often these differences are measured by the degrees of knowledge held by an "in-group" and considered distinct from the knowledge held by the "out-group." Secret societies are so defined by the use of some aspect of secrecy as an indicator of exclusivity. For example, medical

Source: Courtesy, Library of Congress.

practitioners, while not strictly speaking a secret society, might be likened to one by their use of technical language far beyond the comprehension of the majority of their clients. Furthermore, medical practitioners must undergo strictly maintained initiation and periods of hardship through long internships so as to be accepted into the profession. We tend not to consider such Western professions as secret societies because the knowledge they hold is theoretically available to all. But for most, this is not a reality given the exclusive conditions that enable only some to be admitted into the preliminary initiation and transferral of knowledge at university level. More traditional thinking about secret societies concerns groups who imagine that they hold secret knowledge or perform secret ceremonies exclusive to that group. They form a defined boundary around themselves that is recognized by both insiders and outsiders. Extensive initiations often accompany an individual's acceptance into the group, marking a transition from being an outsider to an insider. In Western societies, cloistered religious communities provide an example.

Imagery is used in many forms to represent the secret nature of these groups. This imagery can be in the form of sounds or words (Wicca magical texts), music (secret flutes identify men's secret societies in parts of Papua New Guinea), masks and costumes (Poro and Sande secret societies of West Africa), or art (bark paintings of Northeast Arnhem Land, Australia). While these artefacts may be the visual or auditory means of representing these groups, a more significant aspect of secret societies is the transformation from being an outsider to an insider. Initiations into a secret society are often accompanied by significant payments to the gatekeepers. The initiations, themselves, can be extensive and punishing. During the periods of initiation, esoteric knowledge is gradually revealed to the initiates, who gain by degrees the secret knowledge held by the group. Some of the most famous anthropological examples of secret societies are the Poro and Sande societies prevailing in West African social groups, the secret societies of Papua New Guinea, and the diversity of secret/sacred knowledge held by Aboriginal Australians in a variety of social groupings.

— *Shirley F. Campbell*

See also **Australian Aborigines; Societies, Rank**

Further Readings

Epstein, A. L. (1992). *In the midst of life.* Berkeley: University of California Press.

Herdt, G. H. (1981). *Guardians of the flutes: Idioms of masculinity.* New York: McGraw-Hill.

Murphy, W. P. (1980). Secret knowledge as property and power in Kpelle Society: Elders versus youth. *Africa, 50*(2), 193–207.

SECRET SOCIETIES

Secret societies are extremely varied in the forms they take and their members can be linked together by community service, religious values, political agendas, and economic interests. Groups as diverse as the Muslim Brotherhood, Freemasons,

Rosicrucians, the Mafia, Elks, Moose, and Chinese triads can all be considered secret societies. In spite of their differences, these groups all share a type of organization that keeps secret knowledge from nonmembers. They all also offer their members a system of mutual aid and assistance. Because of this closely knit structure, membership is limited to people of a particular group, which is defined by categories such as age, gender, social status, ethnicity, political, or religious faith.

A halo of mystery has always enveloped the existence of secret societies. This sense of mystery is often achieved through a recourse to religious or philosophical symbols or rituals. The significance of these are only known to members, so that some rituals become forms of initiation. Because of this spiritual dimension, members feel invested by a sense of responsibility and authority. They are united by the purposes that they have to accomplish. The mystery surrounding secret societies is enhanced also by the fact that only members and, sometimes, only members of a certain status have full knowledge of the society's actions. Because of their organization, secret societies often become separate entities that can act to legitimate or overthrow the larger political system, especially in countries where governments are unable to control social dynamics fully. For example, anthropologists who have studied Poro (male) and Sande (female) secret societies in Liberia have pointed out their role of assistance to the government and stimulation to social change. The methods of these societies, however, have also been criticized as violent and as perpetrating inhuman tribal practices such as female genital mutilation.

The role of secret societies in the political life of developed countries is still more ambiguous. Important politicians such as American presidents George H.W. and George W. Bush and Italian Prime Minister Silvio Berlusconi have been part of secret societies. Several plans made by secret societies and corrupted intelligence agencies to overthrow democratic governments have been uncovered in several countries. This has led to a certain degree of suspicion from the larger society toward secret societies.

— Luca Prono

Sociobiology

Sociobiology is the systematic study of animal and human social behavior from the perspective of biological evolution, especially from the gene's point of view. An evolutionary approach to social behavior means to focus not on the proximate mechanisms (e.g., biochemical or humoral) that cause a particular behavior, but mostly (even exclusively, if possible) on so-called ultimate explanations, which aim to discover why proximate behavioral machineries work that way and how they evolved as a result of natural selection.

The term sociobiology was coined by Harvard entomologist Edward O. Wilson in his book *Sociobiology: The New Synthesis* (1975). His bulky book is a valuable summary and synthesis of several new ideas about the evolution of animal societies developed in the U.S. and Britain between the mid-1960s and the mid-1970s. However, in the last chapter of his book, Wilson extended this newly emerging evolutionary approach to the social behavior of human species, which became the main reason for strong criticism of all sociobiology.

Most cultural and social anthropologists, sociologists, and philosophers felt and still feel insulted by the reduction of human behavior to what they called a biological and genetic determinism, which is, however, not a goal of sociobiology. They perceive sociobiology to be a modern renewal of Social Darwinism with all its objectionable consequences—justification of racial, economic, and gender inequalities—and a new pseudo-scientific apology for political conservatism. As a consequence of massive—and mostly unfair—criticism, sociobiology soon became an intellectual dirty word in academic circles. Today, the term sociobiology is seldom used by evolutionary biologists; however, sociobiological research is not dead. Sociobiological principles have become crucial parts of contemporary ethology, behavioral ecology, and evolutionary psychology.

Sociobiology has had a major impact on the conceptual revolution toward a gene-centered view of evolution. This paradigm shift in evolutionary theory was ingeniously and widely popularized by Oxford zoologist Richard Dawkins in his book *The Selfish Gene* (1976).

Altruism is often thought to be a distinguished mark of civilized human behavior, a quintessence of

humanism that differentiates us from the brute and selfish world of animals as well as from barbaric Hobbesian human societies. In this popular scenario, the natural human default is selfishness; humans are born as self-oriented, egoistic beings who have to learn as they grow through enculturation and socialization how to behave altruistically and prosocially. However, this view of Nature as "red in tooth and claw," which seems to be so well described in terms of "struggle for survival," is seriously undermined by the existence of altruistic behavior among animals.

A generally accepted explanation of animal altruism until the 1970s was group selection theory, which states that evolution works for the benefit of species rather than individual organisms. For example, through natural selection, organisms can develop special mechanisms (e.g., physiological, behavioral) that sense population density and can put limits on individual reproduction in order to prevent population overgrowth. By those evolved mechanisms, short-term individual and selfish reproduction interests are counterselected in favor of long-term population survival. Group selection theory has been refuted on theoretical as well as on empirical grounds, and contemporary biologists consider it to be a fallacy. Any population of reproductive altruists would be extremely vulnerable to spontaneous selfish mutants that are not genetically disposed to control their reproduction. A population of genetically determined altruists would then quickly turn to a population of genetically determined self-seekers. Group selection is not impossible, but is very rare.

However, from a classical Darwinian point of view there is nothing more altruistic than sacrificing one's own reproduction in favor of others. One can easily see why the Darwinian evolutionary parameter "fitness" is, in fact, misleading if we understand it as "survival success." It is not survival itself that counts in evolution but producing offspring. Evolutionary biologists now prefer to talk about "reproductive success" instead of "fitness." But then, how can sterile castes of social insects evolve by natural selection? Darwin was aware of the paradox of sterility in social insects like ants, bees, and termites, and he mentioned it in *The Origin of Species* (1859) as "by far the most serious special difficulty which my theory has encountered."

It was William D. Hamilton (1936–2000), a PhD student at London University, who recognized the pivotal role of altruism and its extreme form, sterility, in evolutionary theory. In 1964 he published a mathematical theory of a new concept, "inclusive fitness" (later known as the theory of kin selection), which became a Holy Grail of sociobiology. It was generally known that fitness parameters actually represent the number of copies of a gene passed to the next generation, rather than the number of offsping produced by parents. But only Hamilton understood that copies of genes are multiplied not only directly, passing from parents to their own offspring, but also indirectly (with a probability that depends on degree of relatedness) through offspring of their relatives, and this indirect reproductive gain has to be included in a fitness parameter. Hamilton discovered a mathematical formula (known as Hamilton's rule), which shows that from a gene's point of view, there are conditions under which a gene responsible for altruistic behavior will evolve: the reproductive benefit to the recipient of the altruistic act multiplied by degree of relatedness has to be higher than the reproductive cost to the altruistic individual. Hamilton is now considered by some to be the greatest evolutionist of the second half of the 20th century since Darwin.

It is estimated that eusocial species with sterile castes, like ants and bees, appeared several times independently during Hymenoptera evolution. Hamilton's rule offers an explanation for this evolutionary tendency. Due to a special haplo-diploid reproduction of Hymenoptera (males are haploid because they come from unfertilized eggs, females are diploid), the coefficient of relatedness between female worker bees is 0.75, but between bee mother (queen) and her offspring only 0.50. It follows, according to Hamilton's rule, that from a gene's perspective there will be more copies of a gene produced if female workers support the reproduction of their mother and take care of their sisters instead of having their own offspring (all other things being equal).

Based on Hamilton's rule, Richard Alexander, a zoologist from Michigan University, predicted the existence of a eusocial mammal living in a similar way as social insects, and this animal species was in fact later discovered on the Horn of Africa. Naked mole rats (*Heterocephalus glaber*) built subterranean tunnel systems inhabited by a colony of 70–80 members. There is only a single reproductive female, a queen, which mates only with one to three males who are brothers. Due to systematic inbreeding, the coefficient of relatedness among members of a colony is as high as 0.85.

A gene-centered perspective is able to explain unexpected altruistic behavior, and it is also able to

elucidate unexpected antagonistic behavior, such as between parents and their offspring. It was Robert Trivers, then at Harvard University, who pointed in 1974 to a parent-offspring conflict over parental investment. An individual offspring is more closely related to itself than to its siblings and parents; therefore, a child is selected to demand more parental investment for itself than for its siblings, which is more than a parent is selected to offer, since parents are equally related to all their offspring. Trivers ingeniously recognized that such fitness conflict can be behind offspring manipulative behavior to compel more care than it is in the interest of parents to give. For example, sending false signals to the parents that the offspring is younger than it really is, or performing a temper tantrum behavior (familiar not only to our own species, but also to young pelicans, baboons, or chimpanzees) in order to solicit extra parental care.

One of the most common objections to sociobiology is that there are many examples of altruistic behavior between genetically nonrelated individuals, even between members of phylogenetically distant species, as in many cases of symbiosis, which obviously cannot be explained by kin selection. Robert Trivers proposed a theory of reciprocal altruism. The idea is very simple: an individual can be selected for altruistic behavior to a genetically unrelated individual if it is reciprocated later. The major problem is that this system is vulnerable to cheaters and freeloaders. However, using a game theory approach (iterated Prisoner's Dilemma game) and computer simulations, he was able to demonstrate that under specific conditions, which can be met in nature, various cooperative strategies can be selected.

Sociobiology has been "dissolved" into modern ethology, behavioral ecology, and recently into evolutionary psychology. During the past three decades, scientists engaging in sociobiological research continually have been sharpening their conceptual thinking, improving their methodology in a way that cannot be easily accused of creating only evolutionary "just-so-stories," and they have successfully accumulated empirical data in support of sociobiological principles.

— *Peter Sykora*

See also **Darwinism, Modern; Darwinism, Social; Ecology, Human Behavioral; Ethology; Evolutionary Psychology**

Further Readings

Alcock, J. (2001). *The triumph of sociobiology.* Oxford: Oxford University Press.

Cronk, L., Chagnon, N., & Irons, W. (Ed.). (2000). *Adaptation and human behavior: Evolutionary foundations of human behavior.* New York: Aldine de Gruyter.

Segerstrale, U. (2000). *Defenders of the truth: The battle for science in the sociobiology debate and beyond.* Oxford: Oxford University Press.

SOCIOLINGUISTICS

Of the many fields of language study, sociolinguistics is one that provides understanding regarding the choices that people make to communicate with one another, to form communities, and to establish their personal identities in society. Sociolinguistics is a field in which communication, especially oral communication, is observed and documented in order to discover not only the nature and kinds of information that humans attempt to share but the manner in which they share it. Unlike the work of formal linguistics that strives to classify and describe the component forms of language, sociolinguistics attempts to characterize the ways that people use language in specific situations in a social context.

The Science of Linguistics and the Birth of Sociolinguistics

In the 19th century, the study of human language was an area of interest for philosophers and classical philologists. Much of the theorizing about language was done by researchers from Western Europe, and they took interest in comparative studies of language history relying upon the writings of the ancient philosophers, especially Socrates and Plato. As societies developed, and more and more nations enabled the education of their peoples in literacy, there was a renewed respect for the classical languages and the works of the philosophers who addressed language issues. Thus, the philologists continued to be driven to compare and contrast language as history, using their gleanings from ancient philosophy and literature. Their study was one in which the lives of the people

who used language were considered secondary to understanding the actual language characteristics themselves. However, studies in anthropology, particularly those of Charles Darwin, sparked curiosity for finding different approaches to understanding the role that language plays in the development of peoples.

Ferdinand de Saussure

Language researchers acknowledge the theories of a Swiss linguist, Ferdinand de Saussure (1857–1913), as having provided a revolution in thought regarding the study of languages that led to the growth of linguistics as a science and the development of the field of sociolinguistics in the 20th century. Although he did not write down his ideas in any lengthy pieces of text, the dissemination of his class lectures by his students after he died enabled linguists to take a look at the manner in which they had been approaching language study up to the end of the 19th century and to consider what Saussure thought was most important: language is a means for the communication of thoughts and ideas by individuals who belong to communities in which they developed their language; individuals gain an understanding of reality through social use of the language they know.

The *Course in General Linguistics* of Saussure continues to be read and cited to this day, and some linguists state that because of Saussure a tremendous shift, a Copernican revolution, occurred in the study of language and society. Saussure's theories caused the end of what was termed a Socratic tradition of linguistic thought. Instead of framing the study of language as governed by a set of rules that are applied to some word or statement all by itself, Saussure emphasized that language was a structured system that could be understood scientifically by watching how individuals in a community used it at given points in time, synchronically. Linguists have classified the Saussurean approach to language as holistic and one of *structuralism.*

Language Evolution and Change

Saussure was only two years old when Charles Darwin wrote *The Origin of Species,* and linguists in the early 20th century commented that Saussure's position about language change and evolution showed that he was aware of Darwin's theories. Saussure observed that it was important to understand the history of how some human languages evolve while others decay, given the nature of language for communication within societies and communities. He called it a *natural sequence,* referring to his view of looking at language change historically, diachronically. Therefore, Saussure's theory included a dimension of studying the language use of individuals in society (synchronic) and a dimension of studying language change in history (diachronic).

The Growth of Sociolinguistics

Although the seeds of sociolinguistics were planted at the turn of the 20th century, the term was not used until the early 1950s. In the 1960s and 1970s, there was a considerable body of work undertaken by individuals that might be considered the godparents of the field. Although many of the researchers were from cultures in the West, individuals from developing nations throughout the world began studying sociolinguistics for the sake of understanding their peoples and the ways that language use influenced the growth of their nations.

Sociolinguistic research has covered a broad range of topics including: the study of politeness forms (e.g., God bless you; hello; bye-bye), high and low languages (e.g., speech used in the courtroom and speech used at home), the cultural interpretation of silence in Native American tribes, nonstandard English, language use and social status, turn-taking in conversation, pidgins and creoles, gender differences in speech, and language dialects. In the latter decades of the 20th century, social uses of language became a major curiosity in popular American culture as Deborah Tannen published her research about communication between the genders and communication in the workplace.

Sociolinguistics as a Process

Those who call themselves sociolinguists are researchers who want to know how individuals communicate in particular contexts such as the political arena, in sports, in Web logs, or in courts of law. A second important role, shared by another group of linguists in the field of anthropological linguistics, is to characterize how languages develop and change, and how and why some languages become extinct. This role is one that depends upon learning about the structure of societies and the changes that take place as societies interact with each other.

Scientists who are involved in sociolinguistic studies typically employ ethnographic research designs. Their research incorporates much fieldwork and the documentation of language behavior that helps to answer particular research questions. What characterizes an *ethnography of communication* is that the use of language in general is related to specific social and cultural values. Anthropologist Dell Hymes is considered the father of this approach to sociolinguistic research.

Studying Language Use

In the 1960s, Hymes was concerned that as linguists and anthropologists studied human characteristics, each of the groups was missing important areas that might explain aspects of culture and society. He thought that linguists were becoming too focused on describing language forms and structures, and he thought that anthropologists considered language as a secondary entity to getting answers about other things of cultural interest (e.g., about medicine and curing).

Hymes proposed that a paradigm such as one on the ethnography of speaking would help both groups of scientists to get a fuller picture of their areas of study. For example, Basso studied the use of speech and the refraining from speaking in Western Apache tribes of east-central Arizona. In his time with these Native Americans, he was able to document and interpret the decision-making processes that individuals used in their conversations by applying an ethnography of communication. He added to the growing body of sociolinguistic knowledge, calling attention to the differences in interactions where individuals judiciously decide when it is appropriate to speak and when silence is important. From Basso's engagements with members of the Apache tribes, he documented conversations for several social contexts including courtship and being with people who are sad. Basso saw that silence is an acceptable behavior in Apache culture and one that is never curtailed by any participating individual in particular collaborative settings. In this culture, a person is silent because he perceives his relationship to be ambiguous or unpredictable in that setting. Basso explains that knowledge of the positioning of silence can help inform research regarding conversational behaviors and tempos in other societies, and comparative studies would provide additional information to the field of sociolinguistics.

Speech Communities and Language Varieties

Sociolinguistics involves the study of individuals in settings of language exchange, and the environments in which individuals develop their communication abilities usually includes members of a society or group beyond that of the family. This social group is sometimes characterized as a *speech community.*

Crystal defines a speech community as a cluster of speakers that can be quite tiny or involve whole nations, or cross several nations in a common geographic area where there is a shared spoken language or *language variety.* In the latter case (i.e., the language variety), the group of individuals may use a particular system of communication within their native language that might be derived from common factors such as an occupation, a regional situation, or a social class. A variety might also be a distinctive language that has developed within a religious group, a formal or conversational group, or a scientific group, to name just a few examples.

Sociolinguistics is especially interested in the study of the social dynamics that are involved when there are language varieties in speech communities that might appear to cause the stratification of society, or might indicate a division between and among groups of individuals within the society. Other considerations include concern for conversational variation and linkage of language varieties among individuals due to differences in occupations, professions, or social context. The term *register* is used to describe the ways that individuals use language depending upon who is in the conversation group. For example, a store clerk performs her job by using a particular speech register to guide a customer to a clothing rack, but at the bus stop after work she converses with that customer quite differently. A CEO uses one register to speak to his managers at work and another register while attending a sporting event with them.

MacNeil and Cran provide an elaborate ethnographical mosaic that answers many questions regarding the dynamics of American English across the United States in a wide variety of speech communities. Popular comments and informal theories about the influences of media culture upon the American public seemed to predict that language was becoming homogeneous, that there is one, singular, American English, but these researchers discovered significant diversity, individual choice, and creativity.

For example, they comment on the role that the *Valspeak* of California has played in the common speech of teenagers and young adults across America; the possibilities for transmitting real speech patterns, dialects, and accents in new technology and the implications to human interactions with computer-generated speech and synthetic faces; the dominance of English and the loss of Spanish in the Mexican American community.

Diglossia

Beyond the study of language in a defined speech community, there are situations in which individuals might use more than one language variety in the same language across speech communities. This is an especially well-studied area of sociolinguistics. Ferguson is credited for calling attention to this dynamic, which he termed *diglossia.* In his classic article, he gives an example of the Christian Arabs in Baghdad who speak a variety of Christian Arabic when they are together and speak a more general form of Muslim Arabic when they are in a mixed group. What is interesting about diglossic situations is that the language varieties exist side by side, and may have been maintained over long periods of history, over several centuries. These language varieties are not merely stages on the way toward a more common form of language. They are distinct, persisting variations that are accepted forms within their speech communities.

Historically, some diglossic situations are characterized as high and low usages of speech and language. Although these variations are sometimes referred to as dialects, they differ from standard dialects because there may be grammatically complex differences between two diglossic varieties and not just differences in speech characteristics. This can be somewhat understood as a distinction between formal speech and a vernacular. In the case of China, for example, there are a great number of language varieties in existence with so many low varieties that they are sometimes characterized as separate languages.

As societies advance economically, enhance education, and promote literacy, and as communication increases among members of speech communities in the society, diglossic language varieties tend to disappear. In some societies, when the community becomes aware of the multiplicity of language varieties, there are political discussions and movements to unify the language of the community and accept only one of the forms as the main language.

Pidgins and Creoles

A category of languages that is a source of considerable research by linguists, and especially by sociolinguists, includes pidgins and creoles. These are derivatives from interactions between groups of people with two very different languages, as in the case of French explorers trying to communicate with individuals in the Ivory Coast. Fasold explains that the role that pidgins play in revealing how human languages are created and evolve is particularly important for sociolinguistics but also requires characterization by formal linguists. As sociolinguists have characterized these two language varieties, other linguists have become curious in their own fields of study. These include studies of child language development, studies of nonstandard English, and studies of the innateness of language in human beings.

Sociolinguistic Horizons

Advances in media communication have helped to make people aware of societies other than their own that at one time received little recognition except from researchers. In the United States, from the date September 11, 2001, citizens have become accustomed to hearing and pronouncing the names of individuals from predominantly Muslim nations and learning about cultures in the Middle and Near East. There is a growing awareness around the world of how men and women live in countries in these regions and concern about political and economic change in countries that were seldom studied in detail in schools in the West. The tsunami disaster in Indonesia in December 2004 enabled societies around the world to connect and to try to understand the struggles of the affected nations in that part of the world. The field of sociolinguistics will continue to provide interpretations of the language interactions across the wide variety of existing social contexts, those that evolve in the 21st century.

— *Patricia N. Chrosniak*

See also **Linguistics, Descriptive; Speech, Folk**

Further Readings

Fasold, R. (1990). *Sociolinguistics of language.* Oxford: Blackwell.

Ferguson, C. A. (1996). *Socio-linguistic perspectives* (T. Huebner, Ed.). Oxford: Oxford University Press.

MacNeil, R., & Cran, W. (2005). *Do you speak American?* New York: Doubleday.

Tannen, D. (1991). *You just don't understand: Women and men in conversation.* New York: Ballantine.

Sociology

Sociology is the systematic study of human behavior occurring in a social context. It seeks to understand how and why people act the way they do across an enormous variety of settings. Two major influences are acknowledged to affect human social behavior: (1) cultural factors such as values and norms and (2) structural factors such as the economic and political structures of society. Sociologists generally study human behavior in complex rather than small-scale societies.

Sociology is a relatively young discipline, arising out of the tumult of the Industrial Revolution in Europe beginning in the 18th century. The social organization of society was profoundly altered by the processes of industrialization and urbanization.

The term *sociology* was coined in 1822 by the French philosopher Auguste Comte (1798–1857), who was the first to suggest that society itself is an appropriate subject for scientific study. Many of the earliest intellectual influences on sociology also heavily influenced the field of anthropology, including Max Weber, Émile Durkheim, Karl Marx, and Herbert Spencer.

A unifying concept among all sociologists is the belief that society constrains the options and opportunities of all individuals to some degree. In Durkheim's (1858–1917) terms, "social facts," the context in which people's lives are embedded, shape human behavior by defining the constraints and opportunities within which people must act. C. Wright Mills (1916–1962) argued that sociology allowed people to see their own personal troubles in the context of larger structural factors; he termed the ability to see this connection the "sociological imagination."

Theoretical Perspectives

Sociology is characterized by the use of broad theories to guide research and to provide an explanatory framework for data gathered through systematic observation. The major theoretical perspectives are briefly described below.

Functionalism. Associated with the earliest sociologists such as Comte and Durkheim, functionalism takes as its basic assumption that society works as a system, where each part contributes to the well-being and smooth operation of the entire group. Each part has a function that contributes to the stability of the system. Social solidarity rests on shared values as well as shared culture. Social problems are typically seen as a result of reduced social solidarity, often as a result of rapid social change. Social change may originate outside the social system; for example, the Industrial Revolution and the rapid urbanization that followed created disequilibrium in society, the aftershocks of which are still being felt today. Functionalists are also sometimes referred to as "structural functionalists" because they analyze how the parts of society, or structures, fit together and how each part contributes to the stability of the whole, its function.

Conflict Theory. A macrolevel perspective like functionalism, conflict theory focuses on inequality in society. It begins with the assumption that society is made up of groups that compete for scarce resources. Resources may be seen as financial, political, or social, such as prestige or respect. Privileged groups try to maintain their advantages, less privileged groups try to increase their resources. Conflict theory originated in the work of German social thinker Karl Marx (1818–1883), who observed and wrote about the conditions suffered by workers in the factories in the early years of industrialization. He developed a theory of class conflict, arguing that there is a fundamental conflict between those who own the means of production, the capitalists, and the workers, who only own their own labor and thus must work for wages.

Symbolic Interactionism. The focus of symbolic interactionism is interpersonal communication and the subjective meanings created in small social settings. A microapproach, it stresses that people are active agents in creating meaning, not passive recipients of culture. The dramaturgical approach (Goffman) looks at how people present themselves to others in everyday life so as to make the best impression. He compared social interactions to a carefully

staged play, with actors playing roles on both the front and back stage. Social constructionists are interested in how individuals create society through interactions.

Feminist Theory. Developing with the second wave of the feminist movement in the 1960s and 1970s, feminist theory has two major tenets. First, gender matters must be addressed in theory and research. Second, it questions the assumptions of rational objectivity and value-free research that had prevailed in sociology since its earliest days. Feminists argue that gender inequality, often called "patriarchy," is pervasive and exerts an influence on society equal to that of social class. While a great diversity exists among feminists regarding the causes and contributing factors of inequality, there is agreement that the origin is primarily structural rather than biological.

Methods of Sociology

Sociological research is based on scientific principles, not so different from those methods used by the hard sciences, in that the bases of nearly all social science research is observation and theory. Data are gathered systematically and analyzed within a theoretical framework that allows sense to be made from the mass of data collected, using one of several typical methods. Broadly speaking, sociological research can be described as either quantitative, meaning the collection and analysis of data that is numeric in nature, or that can be turned into numbers, and qualitative, or nonnumeric data.

Survey Research. Perhaps the most common type of social science research methodology, surveys are widely used by pollsters and marketers as well and have become ubiquitous in modern life. Surveys can be conducted over the telephone, through the mail, in person, and increasingly over the Internet. Survey research involves the use of standard questions, asked of a group of people, referred to as respondents, who are believed to be representative of the population of interest, a sample. In large-scale surveys, the sample should be drawn using random selection techniques that increase the likelihood that the sample will be representative of the larger population of interest.

Field Research. Observing people in their natural surroundings is a useful way of obtaining rich, detailed, and nuanced information, especially regarding how people actually behave, rather than how they say they behave. One of the many challenges of field research is systematically collecting and organizing the wealth of information that goes on in a natural setting. Data are often collected through the use of unstructured interviews, which are then transcribed and analyzed for patterns and insights.

Participant Observation. Like field research, participant observation occurs in natural settings where the researcher engages with his or her research subjects. By more actively participating in their subjects' lives, for example, by living and working among the population of interest, the researchers gain an understanding of reality from their point of view.

Experiments. Elements of classical experimental design include random assignment of subjects to the control and experimental group; pretesting of all subjects on the dependent, or outcome, variable; administration of the intervention, or independent variable; and a posttest to measure change in the dependent variable. The hallmark of experimental design is control: the research controls all (or virtually all) extraneous variables in order to focus on the effects of the variable of interest. Sociological research is often not amenable to laboratory experiments, and so often experimental conditions are approximated in the field. Natural experiments, for example, take advantage of change occurring in the real world such as a new law; data from before the change were introduced and afterward are compared in order to assess the effect of the change.

Topics

The topics of sociology include all aspects of human behavior and experience. Topics can be broadly categorized into social processes, the mechanics of human interaction and development; inequality; the major institutions that organize social life; and social change. Each of these broad categories is further developed below.

Social Processes

Culture, the sum of shared ideas, practices, and material objects that people have created, allow humans to adapt to and thrive in any environment. Culture is learned, primarily through language, and acquired through the process of socialization.

Socialization is the process by which individuals acquire self-identity and the skills needed for survival in society. It is essential for survival and development; children reared alone never develop the skills to live

productive, independent lives. Socialization is a lifelong process as we take on new roles throughout the life course. Sociologists acknowledge the contributions of psychologists to the understanding of human development, but focus their research and theory on the role of interactions with others in the creation of a self-concept. We gain information about ourselves through interactions with others and through imagining how others see us. Agents of socialization include important significant others, such as family and peers, and institutions, such as schools and the mass media.

Interaction, social intercourse, is a microlevel process that relies on shared meaning among the participants. Members of a society or subculture share norms and an interaction order that regulates social situations. Sociologists operating within the symbolic interactionist perspective argue that reality is socially constructed; that is, our perception of reality is largely shaped by the subjective meaning we assign an experience.

Inequality

Deviance and Crime. Sociologists have always taken a keen interest in crime and deviance, making some of their most significant and well-known contributions in this area. Durkheim, in the functionalist tradition, held that deviance often operates to increase social cohesion as societies pull together against perceived deviants. Defining what is deviant or outside the pale helps societies define their values and what they stand for. Thus, most sociologists believe that definitions of deviance and crime vary across societies. From a conflict perspective, powerful groups in society define what is deviant in order to control the behavior of the less powerful.

Stratification. All societies are marked by some form of social stratification, the organization of society into levels, although the most small-scale societies are generally only stratified by age and gender. The different layers are known as classes, and labels such as upper, middle, and lower class are used to describe the various levels. While classes may be defined by their economic conditions—Marx classified classes by their relation to the means of production, or economic status—there are noneconomic dimensions of class as well. Max Weber pointed out that class is not based on money alone but is also based on power and prestige. Members of different classes advertise their rank by displays of material and symbolic culture, which are also important markers of class.

Race and Ethnicity. Sociologists hold that race and ethnicity are socially constructed ideas, used to distinguish people based on perceived physical or cultural differences. Race more than ethnicity is often a master status, an identity that takes precedence over all other identities or statuses a person holds. Minority racial or ethnic status has profound consequences for people, affecting their life chances in virtually all areas.

Gender and Sexuality. Gender is one of the most influential and pervasive forces shaping our lives. The dominant gender ideology is patriarchal in that men, masculinity, and masculine attributes are more valued in society than women and female characteristics and values. Children are socialized into gender identity through various agents of socialization such as the family, media, peers, and schools. Significant debate occurs over the relative strength of these different agents and the degree to which individuals are able to shape their own gender image, as well as over the causes of persistent inequality in the labor market. Women have increased their level of education and labor force participation rate significantly but still lag behind men in terms of income and opportunities.

Institutions

An institution, to a sociologist, is a form of organization that performs basic functions in a society. They are supported by social norms of the society and are slow to change.

Work and the Economy. The truly major changes in the world of work occurred around 10,000 years ago with the agricultural revolution, the consequences of which are that most people eventually gave up hunting and gathering for a life of agriculture or raising domesticated animals. Then sometime in the 18th century, the Industrial Revolution ushered in a new era of work organized around the ability to mass-produce goods for the market. Some have argued that we are experiencing a third revolution characterized by service occupations and high technology.

Government and Politics. Politics is the arena of power relations, the social institution through which power is acquired and used by people and groups. Government is a formal organization that is responsible for regulating relationships among members of a society and between a society and societies outside its borders. Political sociologists primarily focus on how

the political arena and its actors are intertwined with other social institutions such as the media, economy, religion, and education.

Families. The traditional nuclear family in the United States consists of a mother, father, and at least one child. Today less than one quarter of all households are traditionally structured with a stay-at-home wife and children under age 18. Family diversity has been increasing for many reasons, one of which is the fact that many of the functions once performed by families have been taken over by other institutions, including education, health care, defense, and religion. As people live longer and are more invested in their own happiness, the divorce rate has increased, although it has now stabilized.

Religion. The sociological study of religion looks at the visible and knowable aspects of religion, such as individual beliefs and practices, and the actions and organizational structure of religious groups and institutions. How are individuals socialized into religious communities? What is the nature and source of conflicts between different religions or between religious and secular groups in society? What is the effect of religious belief or identity on individuals' actions in other aspects of their lives? These are the types of questions sociologists of religion strive to answer.

Education is the social institution responsible for the transmission of knowledge, skills, and cultural values, enhancing social stability and also facilitating social change. Education begins at birth, with socialization within the family, but in modern industrial society formal education lasts into adulthood as young people must master an enormous body of knowledge to prepare for careers. Functionalists see education as promoting social solidarity and stability in society, whereas a conflict perspective notes the contributions of formal education to the reproduction of class inequality.

The Mass Media. The media, operating through the newspapers, television, radio, and movies, are significant agents of socialization in today's society. The media both reflect the concerns and issues of society and help shape cultural norms and values. Interactionists look at the way media influences society, whereas conflict theorists focus on who controls the media and this information in society.

Health and Health Care. Health, health care, and disability are major concerns not only for individuals but for societies as well. Paying for health care is a major expenditure for governments and employers. People have control over their health through lifestyle factors, although social class, race, and gender influence health outcomes significantly.

Social Change

Population. Demography is the study of population size, composition, and distribution. Demography underlies many other areas of sociology because demographic variables such as age, gender, race, and population size, and growth rates affect many other social processes and aspects of social life. Changes in populations occur as a result of three processes: fertility, mortality, and migration.

Urbanization. Although cities have existed for thousands of years, up until 200 years ago no more than 3% of the world's population lived in cities. Today that figure is almost 50%. By 2050 it is estimated that two out of every three people will live in an urban area. Urban sociologists look at the evolution of the urban form, the experience of urban living, populations and groups living in and struggling for control of urban space, and many issues surrounding urban life, including race, gender, poverty, crime, urban economics, and the interaction between globalization and urbanization.

Collective Action and Social Movements. The history of modern, urban, industrial, and postindustrial society is increasingly the history of social movements. Social movements are involved in nationalism and movements toward independence and the increase in demands for equal treatment by disadvantaged groups across the globe. Social problems are typically recognized and addressed by social movements before they are tackled by governments.

The Future of Sociology

Sociology continues to be a vibrant discipline, continuing to grow and adapt to the changing needs of each generation. While in the past there was a significant divide between quantitative and qualitative sociologists, there is recognition that not only does each side make important contributions to understanding social life and processes, but it is also useful for researchers working in multiple traditions to collaborate. Large-scale survey research projects often now include a smaller qualitative component. Other areas that are expanding are examination of the role of technology and the Internet in social life.

— *Patricia B. Christian*

Further Readings

Becker, H. (1963). *Outsiders: Studies in the sociology of deviance.* New York: Free Press.

Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the sociology of knowledge.* Garden City, NY: Doubleday.

Collins, R. (1994). *Four sociological traditions.* New York: Oxford University Press.

Giddens, A. (1987). *Sociology: A brief but critical introduction* (2nd ed.). New York: Harcourt Brace Jovanovich.

Goffman, E. (1959). *The presentation of self in everyday life.* Garden City, NY: Anchor.

Mills, C. W. (1959). *The sociological imagination.* New York: Oxford University Press.

Ritzer, G., & Goodman, D. J. (2003). *Sociological theory.* New York: McGraw-Hill.

Sorcery

The word sorcery usually means some sort of individual manipulation of supernatural forces to harm another person or to enrich the self at the expense of another, and in this sense belief in it seems to be absolutely universal. The English word derives from the Latin *sort-, sors* ("lots"), as in sortilege, to decide by the random fall of certain designated objects. This was a common method of divination in the classical world, which anyone could learn to perform but which was widely considered to be a human intrusion into divine business; hence, it was frequently forbidden under both ecclesiastical and civil law. This is especially true in the Judeo-Christian tradition. But the term sorcery came to refer to a great many "occult" dealings that were potentially dangerous. Often where it appears, the term is not defined, and its various possible meanings may have very different conceptual bases, and so the student must take care to ascertain exactly what is meant.

Sorcery can have any of the many meanings of magic or witchcraft. It is often used as synonymous with shamanism. It can mean any of the "occult" dabblings and traffickings condemned in the Bible, including conjuring of spirits and any of various methods of divination; it is the most frequent English gloss for the Hebrew *kishuf* or *kishef* (*mechashefa,* a female practitioner of *kishef,* was famously translated as "witch" in the King James Version of 1611, thereby constructing that terrible commandment in Exodus 22:18: "Thou shalt not suffer a witch to live.") Sorcery generally has a negative connotation, as in "black magic," but not always; sometimes it refers to any individual efforts at manipulating the supernatural for personal benefit. Even within anthropology there is not uniform agreement on its appropriate usage. The following discussion will survey the most common meanings of sorcery by anthropologists, spirit invocation and command and harmful magic, and will consider some defenses against sorcery, remedies for misfortune caused by it, and anthropological explanations for this apparently dysfunctional phenomenon.

Sorcery in Anthropology

E. E. Evans-Pritchard in his famous work, *Witchcraft, Oracles and Magic among the Azande* (1937), is credited for having clarified the distinction between sorcery and witchcraft that most anthropologists recognize: sorcery is a learned magical practice requiring words, objects, and rituals, whereas witchcraft is an innate power that develops within some adults and operates mystically and sometimes without its bearer's knowledge. The same distinction had been noted earlier in Melanesia by Reo Fortune in his *Sorcerers of Dobu* (1932), with the difference that on Dobu, mystical witchcraft is women's unique capacity; sorcery is men's. But Fortune's report was not given credence until three decades later, and his pioneering place in the anthropology of sorcery and witchcraft was overshadowed by Evans-Pritchard.

Presumably the evil magician can demonstrate his techniques, and there are some ethnographic descriptions of how harmful magic is performed, but most descriptions of how sorcerers work are anecdotal, based in popular belief. One reason for the ethnographic difficulty in obtaining firsthand data is that sorcery is almost always covert. Sorcery manipulates the supernatural, which is always dangerous, and it is antisocial, so it is everywhere forbidden, even illegal; hence, it is clandestine, deeply feared, and discussed reluctantly and furtively, and it is more suspected than demonstrated in society. And some of the sorcerer's alleged techniques involve invocation and command of spirits, or fantastic animal familiars, or mystical powers, and are impossible to verify. Worldwide, sorcerers are far more often men than

Source: © iStockphoto/Andreas Vitting.

women. The most likely sorcerers are people who have legitimately learned how to exploit natural and supernatural powers without harm to themselves, so it is assumed that they can use those same powers for antisocial purposes, for their own purposes, or for hire to others such as priests or shamans and skilled herbalists or other types of healers. Or, it is assumed that ordinary people can learn the techniques of sorcery under the tutelage of a skilled sorcerer.

Spirit Command

All over the world it is assumed that some people have perfected a technique of summoning and commanding spirits, and this is one widespread referent of the term sorcery. The idea of sorcery as spirit invocation and command is probably universal, and attack by a human-sent demon is an occasional diagnosis of some physical malady or social misfortune. But in most of the world's cultures, contact with spirits is extremely dangerous, and persons known to have had such contact cannot move freely in society. Spirit invocation is a common function of priests and a common beginning to any ritual of supplication, and shamans enter states of ecstatic trance in which their souls travel out to negotiate with spirits. But both of these respected practitioners must go through a ritual of desacralization before returning to society. And spirits are generally considered to be sentient and willful beings who are not docilely commanded and who, instead, might strike the presumptuous person or those near to him. James George Frazer in his great work, *The Golden Bough,* recognized these problems in his discussion of spirit command as a magical act; he asserted that when spirits are commanded by magic, they respond passively and dumbly, like the forces of nature. This assertion may be widely unjustified. The widespread belief that people can command spirits and send them out on personal missions of evil remains a vague general fear, in the realm of conspiracy theory, only rarely associated with specific individuals.

Sorcery as Magic

Sorcerers may be assumed to have strengthened and energized their own measure of the personal power, similar to mana, that all cultures seem to believe in, and which is central to belief in magic. Or sorcerers' power may be bestowed by their spirit helpers, as among the Harney Valley Paiute of Oregon studied by Beatrice Whiting and reported in her classic work, *Paiute Sorcery* (1950). Apparently everywhere, sorcerers' power can be used to project things mystically through space. In Africa and the Americas, there are beliefs that sorcerers might dip a forefinger into some concoction and, by pointing it at their victims, project some malign influence—this belief is one rationalization for the avoidance of finger-pointing in social exchanges. (Would such sorcerers use their left hands for such nefarious acts? Sorcery is metaphorically referred to as "the work of the left hand" in Haiti and elsewhere, to distinguish this sinister act from honest, open worship of the gods, or from good magic.) In all regions of the world, illnesses might be caused by some foreign object or active agent mystically projected by a sorcerer into the body of the afflicted. In Africa and throughout the Americas, sorcerers send invisible darts, or needles, or bits of bone or tooth or other animal parts, or live animals, into their victims; among the Cebuano of the Philippines, as described by Richard Lieban, sorcerers' agents include seven-legged insects who eat away at the victim's insides and return at their master's command.

Perhaps the most common referent of the term sorcery is harmful or selfish magic, the sympathetic magic described by Frazer in *The Golden Bough.* Magic involves the manipulation and transfer of power through symbolic communication. Magic may

involve manipulation of natural forces, believed to energize all nature. Magic presumes a coherent universe in which all things are potentially interconnected; power can be sent along such connections by manipulations of symbols—objects, words, or actions that represent others and that take on and project their power through Frazer's classic principles of similarity or contact. The natural order of things is good and open; good magic, such as that used by Trobriand gardeners described by Bronislaw Malinowski, helps the natural forces along their regular paths. Traditional society tends to assume what anthropologist George Foster called "limited good": the necessities and luxuries of life are finite in quantity; if all people take just what they need, there is enough for all.

As it is harmful, sorcery works contrary to the natural order. It interferes with the natural movements of the forces and redirects them, and this is dangerous business; once dislodged, the forces of nature can run amok and injure the sorcerer or those near to him. It is assumed that the skilled sorcerer has methods that protect him from backfiring forces, but others do not. And, as sorcery is selfish, it upsets the natural distribution of goodness in the world; even though the sorcerer's aim may be personal enrichment, not direct harm to another, by accruing more than he needs, he automatically deprives others. These are further reasons why this form of sorcery is clandestine.

Sorcery has been described as using legitimate means—the principles of magic—for illegitimate ends. The best-known form of magical sorcery is the "voodoo doll," a southern U.S. form of image magic, which intends to harm a victim by harming an image of the victim. The image incorporates some features unique to the victim or some bodily effluvium or a piece of clothing that has been in close contact with the victim. For fear of sorcery, people are careful with their bodily leavings, especially those of vulnerable individuals: infants or the elderly or sick people. And sorcery has everywhere been used in feuding and warfare; in Africa today, inventories of offensive weapons seized from rebel combatants often include "charms."

The simplest and most widespread forms of magical sorcery are obscene gesture and curse. In the former, a person uses a part of the body as symbol to convey malevolent power, such as "giving the finger" in the West. Curse is the direct malevolent use of words whose meaning conveys some harm or misfortune. Curse must be distinguished from invocation; for example, "God damn you!" is invocation, calling on the Almighty to condemn the other to eternal torment in hellfire. This is very risky, because the deity may be offended by such human presumption (taking its name "in vain"). "Go to Hell!" is a curse. It contains the same meaning but uses the power inherent in the spoken words, enhanced by the evil intent of the speaker and carried and energized by his breath, his life force.

Defense and Remedy

In traditional stable societies, where there is sorcery there will be defenses against it and remedies for misfortune caused by it. Sorcery "works" through the well-described placebo effect; the victim and his social network all believe in its efficacy, and he may indeed suffer the intended symptoms. In his famous 1942 description of "The Voodoo Death," Walter Cannon took data from various early reports, especially Australian Aborigines' beliefs in sorcerers' technique of "bone-pointing." He showed the deleterious physiological effects of the body's overproduction of adrenaline in response to prolonged intense fear and the rapid and dramatic relief that can result from the patient's being convinced by a healer that the evil has been removed.

It is universally believed that power can be drawn from one source and used magically by individuals. Religious texts and symbolic objects are frequently used as protective amulets on people's dwellings, workplaces, and bodies. Reproductive power is extremely strong, and representations of both male and female genitals are universal power symbols. Quick defense can be made by symbolic use of parts of the body, such as the Italian *mano fica,* the "fig hand," the clenched fist with the thumb protruding slightly between the first two fingers (a crude representation of the female genitals) or the *mano cornuta,* "horned hand," representing horns, which also are power symbols used around the world. Making the "sign of the cross" over one's chest and crossing the fingers are similar hasty protective devices.

Because sorcery is difficult to detect, divination is often involved, first in diagnosing it, then, rarely, in assigning blame. Bad spells can be nullified or deflected by stronger magical or spiritual power, and this is a frequent reason for the performance of magical rituals or supplication of spirits. Accusations of sorcery are not made lightly. Most often the sorcerer

is not identified; frequently, specific persons are suspected, but lack of clear evidence forestalls accusations. Conviction means penalty and social stigma, and false accusation rebounds upon the accuser. A trial by ordeal might be required, with both accuser and accused participating.

If a malady is caused by possession by a demon sent by a sorcerer, an exorcism must be performed upon the victim or his surroundings. This might be accomplished by the healer's invocation of a more powerful spirit, which is commanded to drive out the offending spirit, or by his own mastery and command of the possessing demon. Relief comes through the placebo effect.

Everywhere there are civil regulations against defamatory language. Literacy enhances respect for the power of the word; spoken words can be repelled, but the written word achieves an awesome, perhaps terrifying permanence. Protective and aggressive charms containing writing are common today, and modern laws against slander and libel attest to the continuing respect for the power of spoken and written words.

Explanations

Sorcery seems dysfunctional and disruptive to social order, and its universality presents a puzzle. Social analysts have seen various "social control" functions in sorcery beliefs; fear of being suspected of this terrible anti-social impulse tends to keep people mindful of their social manners. A "social-leveling" function of sorcery beliefs has been seen in egalitarian societies in the suspicions that accrue to stingy people and hoarders or people who inexplicably have more than they need, thereby depriving others.

It has been said that fears of sorcery support social hierarchies; people more powerful politically are often presumed to have access to strong supernatural power. There are clear political situations in which suspicions of sorcery are advantageous; the Duvaliers of Haiti strengthened their autocratic rule by actively encouraging the popular sense that they were powerful sorcerers, and many African leaders have forestalled their enemies by promoting beliefs that among their entourage were powerful sorcerers.

But at the most basic level, suspicion of sorcery is surely a function of the inevitable tensions that arise between individuals in social relationships, the same sorts of tensions that generate witchcraft suspicions and conspiracy theories.

— *Phillips Stevens, Jr.*

See also **Magic; Shaman; Witchcraft**

Further Readings

Stephen, M. (Ed.). (1987). *Sorcerer and witch in Melanesia.* New Brunswick, NJ: Rutgers University Press.

Walker, D. E., Jr. (Ed.). (1989). *Witchcraft and sorcery of the American Native peoples.* Moscow: University of Idaho Press.

Speech, Folk

The designation *folk speech* is one of various terms that have been used to describe the language of ordinary people as used for routine purposes on the everyday level of face-to-face oral communication. Such variation refers to the pragmatic rather than to the grammatical aspect of language, that is, to the way language is used to communicate within the context of social interaction as revealed in different patterns of discourse, rather than to the internal structure of the linguistic code as seen, for example, in dialect variation.

Folk speech can be differentiated from two other major intralinguistic varieties: dialect and style. Following M. A. K. Halliday, we can say that dialect is linguistic variety according to *users* (regional populations or social classes) while style is variety according to *use.* Since folk speech is a natural product of face-to-face oral communication, it can co-occur with whatever dialect variation is natural to the speakers, thus the two varieties, folk speech and dialect, can be treated separately. Style can be defined as the intentional selection of alternative forms within the linguistic code for some specific communicative purpose. For example, "He regrets that he is unable to attend" and "He's sorry he can't make it" are denotatively synonymous, yet everyone recognizes at once that the first is formal while the second is informal in its occurrence. Stylistic variations of this kind, which mark different levels of formality, are called registers.

Other registers within the stylistic repertoire of a language correspond to different domains of use such as journalism, bureaucratic communication, sermons, lectures, and so on, as well as to the selection of alternative forms for esthetic effect in literature. In so far as the restricted mode is an automatic response to speaking conditions and not a matter of conscious choice, it is not "variety according to use," as is style. If, however, style is defined in its most neutral sense as simply "a way or mode of doing something," folk speech can be described as an informal register within the variegated functions of a complex speech community, unless the speakers master no other stylistic variants.

As a separate variety, we can describe folk speech as the restricted as opposed to the elaborated mode of language use. Borrowing terms from literary criticism, we might characterize the restricted mode as thinly textured discourse, since fewer of the grammatical and lexical resources of the language are employed than in the thickly textured discourse of the elaborated mode, in which the full grammatical and lexical resources of the linguistic code are employed. The restricted mode is thus the language of implicit meaning while the elaborated mode is the language of explicit meaning. The thinly textured discourse of folk speech is characterized by the use of simple verb constructions and preference for the active over the passive voice. Syntactically, folk speech is paratactic, that is, it is made up of simple sentences with only a few conjunctions used repetitively and with little subordination of clauses. Indeed, there is evidence that in the languages of some nonliterate, pre-industrial homogeneous societies there is no subordination at all. Another feature of folk speech is the avoidance of impersonal pronouns as sentence subjects. Thus, "Everybody knows he lives here" is used instead of "It is known that he lives here," and "A man used to come to town all the time" instead of "There was a man who used to come to town all the time." Also, ellipsis and unfinished sentences are frequent in folk speech. The syntax of the more thickly textured discourse of the elaborated mode is hypotactic, that is, it consists of complex sentences employing a wide range of syntactic devices for conjunction and subordination. The use of impersonal pronouns as subjects is also frequent, as is the use of prepositions to mark both temporal and logical relations. More frequent use is also made of complex verb phrases as well as of the passive voice.

On the lexical level, the restricted mode involves the use of a smaller vocabulary with a high proportion of words of emotional content as well as the frequent use of expletives. Folk speech is also characterized by the rigid and limited use of adjectives and frequent use of formulaic expressions such as "I mean" and "you know"—what Bernstein called sympathetic circularity. The elaborated mode, however, draws on a larger vocabulary with finer semantic distinctions on higher levels of abstraction. Another feature of the vocabulary of folk speech is that lexical precision is focused on those activities closest to the activities of local endeavor while other objects and events remain unlexicalized. For example, plants that were not useful to German rural dialect speakers, or that were not aesthetically pleasing or were particularly harmful to them, were simply referred to as "weeds," while attributes of those plants of particular interest were lexicalized in detail.

Even the more highly lexicalized domains of folk speech are poor in abstract terms but rich in concrete, particular ones based on local experience. A study of one local German dialect revealed that out of a list of 4,470 words only 210 were abstract, and out of 3,300 nouns collected in another region all but 420 were semantically concrete. For example, in one dialect the abstract word for "basket" was never used. In its place were seven different terms for different kinds of baskets employed for different purposes. It was also noted that the semantic range of abstract words tends to be more restricted in local dialects than in the standard language. For example, the word *Güte* with the broad semantic range of "kindness, goodness, excellence, purity, quality" is restricted in folk speech to only the quality of merchandise.

Another example of the preference for the concrete in folk speech is the use of concrete descriptive phrases instead of more abstract single words. Thus instead of "on account of his poverty" one hears "because he's poor," and instead of "after sundown," "after the sun went down." One also hears such locutions as "he'll be home by hog-killing time" instead of "he'll be home by winter," and "when it gets green" or "when the swallows return" instead of "in the spring." Often preference for the concrete takes on an ironic twist. Instead of saying that someone has been executed on the gallows, one might say that "he didn't drown in the Rhine." An Ozark woman too proud to accept welfare was reported to have said, "I'd sooner get me a tin bill and pick manure with the chickens."

A touch of humor is also often added, as when in the Ozarks a young man was described as being so drunk "he had to hold on to the grass to keep from falling off."

All speakers use the restricted mode of speech since it is a natural result of face-to-face oral communication. This is why many of the discourse features of the folk speech of local German dialects were the same as those found in colloquial speech. In both cases, a high degree of shared background information among interlocutors, together with the context of situation and cues such as intonation, body language, eye movement, and so on, make it easier for hearers to infer the communicative intention of speakers with recourse to fewer lexical and grammatical resources, thus the thinly textured discourse of this form of speech. When interlocutors share little background information, greater weight in communication is shifted to the inner structural resources of the linguistic code, thus the more thickly textured discourse of the elaborated mode. These pragmatic features have led John Gumperz to conclude that the difference between restricted and the elaborated speech is simply the difference between two modes of "signaling or calling on background knowledge."

Folk speech has long been of interest to folklorists who are less concerned about its nature than the way it reflects the shared local cultural experience of folk groups. Such scholars include nonstandard dialects in their study of folk speech along with the stock of proverbial comparisons, proverbial phrases, aphorisms, adages, sayings, and proverbs that comprise the phraseological level of language. They also include in folk speech the study of names (onomastics) and argots (special use of language by different groups) as well as occupational vocabulary as it appears on the folk level. The ethnography of speaking provides the broadest perspective for the study of folk speech since that line of research examines the linguistic resources available within a speech community and their use in socially situated discourse to form meaning patterns of language use in both speaking practices and esthetic expression.

Folk speech has also been exploited by writers for stylistic effect to evoke the impression of local color and a sense of time, place, and situation as well as in the development of character. For those purposes, features of folk speech can be used in dialogue within a narrative written in the standard literary language, or it can be used for the narrative voice as is the case of Mark Twain's Huckleberry Finn. The fact that folk speech contains such rich stylistic possibilities is one reason why it stands out as a definably different variety in the linguistic variation of a speech community.

— Glynn Custred

See also **Language Use, Sociology of; Sociolinguistics**

Further Readings

Brunvand, J. (1998). *The study of American folklore* (4th ed.). New York: W. W. Norton.

Givón, T. (1979). *On understanding grammar.* New York: Academic Press.

ANATOMY AND PHYSIOLOGY OF SPEECH

The computer revolution has added a new twist to the study of both anthropological linguistics and synthetic anthropology, as computer engineers and linguists attempt to design computers that can understand or reproduce speech naturally. Those involved in this endeavor are required to synthesize a large number of elements involved in linking computers and human speech across a spectrum of disciplines such as acoustics, artificial intelligence, digital signal processing (DSP), elocution, linear algebra, linguistics, physiology, probability theory, and psychology. Research into speech systems for computers began in the mid-1950s. While several speech system models are readily available for use on personal computers, they tend to lack the ability to follow the tonality and nuances of human speech. In principle, these models depend upon identifying segments of sound. The goal for newer models is that they will be able to produce more natural sounds by joining those segments as human voices do.

While it is unlikely that humans will be able to freely converse with computers in the near future, IBM, Nuance, and Speechworks have all begun experimenting with the use of computerized attendants that are expected to eventually replace the touch-tone phone menus that are so frustrating to the average caller. In 2001, some $240 million

was spent on speech software, mostly by banks and airlines. By 2006, that number is expected to top $1 billion. Many of the technological advances in designing computers that understand human speech have been derived from the work of deaf mathematician and computer expert Dimitri Kanevsky, who, in 1991, was the first to identify the method that allowed computers to respond to human speech without requiring a lengthy pause after each word. Using Kanevsky's algebraic algorithm, a number of voice-recognition products were subsequently marketed.

Kanevsky also developed software that allows special telephones to understand callers from around the world without the services of human transcribers. The use of voice translators has received a good deal of attention from those who are being called upon to interact with a multilingual world. Travelers who have been forced to resort to language dictionaries in the past have enthusiastically seized upon voice translators. Police officers, firefighters, and the military have also found that voice translators save lives and time when dealing with individuals who speak other languages.

In 2002, Kanevsky refined an earlier invention that allowed deaf individuals to interact with others without lip reading. He reduced a large laptop to the size of a tablet and gave it the ability to transcribe the sound of any human voice that it hears.

Visionaries believe that computers will eventually be able to communicate with humans without either speech or touch. In the spring of 2004, the National Aeronautics and Space Administration (NASA) announced that it was in the process of developing new technology that would allow computers using special software to connect with sensors placed on a user's chin and throat to receive words from brain signals.

— Elizabeth Purdy

Spencer, Herbert (1820–1903)

Herbert Spencer, a British social philosopher and sociologist, was a widely recognized visionary and the founder of the theory of sociocultural evolution, and he had a major influence on Charles Darwin and his theory of biological evolution.

Born in Derby, England in 1820, Spencer trained as a civil engineer and then became interested in social and economic issues, joining *The Economist* as a subeditor (1848) and writing *Social Statics* (1851), a book in which he described the synergy of society based on a core principle of justice—the law of equal freedom—which became the foundation of classic liberalism and the quintessential theory of the state.

Social Statics served as the dawn of Spencer's theory of sociocultural evolution, which he developed as a hypothesis in "The Development Hypotheses" (1852), asserting that each species arose through adaptive changes of previously existing species. In "Progress: Its Law and Cause" (1857), Spencer further developed his theory of evolution, claiming that progress occurred along an evolutionary divergent timeline from homogeneous or undifferentiated to heterogeneous or differentiated. He applied this theory to the disciplines of biology, ethics, metaphysics, psychology and sociology, defining evolution as "a change from a state of relatively indefinite, incoherent, homogeneity to a state of relatively definite, coherent, heterogeneity."

Spencer's interest in organic evolution as well as general evolution led him to write that "life . . . has arisen by a progressive, unbroken evolution . . . through the immediate instrumentality of what we call natural causes." He applied his approach to a comparative scientific study of society based on evolutionary principles, an approach distinct from that of the French sociologist Auguste Comte. Spencer's approach required classification of all available ethnographic and historical data of human society and social behavior in order to derive generalizations.

Spencer visualized sociology as the focus of the study of the natural history of society, and he considered descriptive sociology to be the "only history that is of practical value"and comparative sociology to be a compilation of the lives of nations and the "subsequent determination of the ultimate laws to which social phenomena conform."

Spencer maintained that there were many parallels between biological organisms and human societies, and he often referred to society as an organic system of structures that are mutually dependent. To Spencer, social functions create social structures, and to this position he assigned the general law of organization that "difference of functions entails differentiation and division of the parts performing them."

Source: Courtesy, Wikipedia.

Spencer's *Principles of Sociology* stands as a significant contribution to the theory and understanding of evolution. His theory that humanity evolves from a relative, socially static, undifferentiated society to a utilitarian, socially dynamic, differentiated society where social structures and functions transform to meet needs is an organismic model of interrelated and interdependent structures and functions (from the inorganic to the superorganic) as social systems where consequences occur as "the survival of the fittest." His functionalist theory of evolution became known as Social Darwinism.

Spencer's social systems theory of evolution (statics and dynamics) gained popular appeal in the late 1800s, and it contributed to the intellectual revolution of the 19th century, influencing the development of anthropology, biology, political science, psychology, and most important, sociology. His theory was formulated on the construction of a paradigm of ethnographic and historical data classified in a system of headings and subheadings. Spencer was the founder of systematic, inductive, comparative sociology which he called Descriptive and Comparative Sociology.

Spencer's contributions to anthropology and sociology are profound and beyond measure. He was among the first to claim that human society can be studied scientifically, and he ranks with Edward B. Tylor and Lewis Henry Morgan as one of the three prominent sociocultural evolutionists of the 19th century. His rejection of special creation and acceptance of organic evolution with increased integration stirred the public and inflamed the religious. Spencer's theory of sociocultural evolution together with Darwin's theory of evolution through "natural selection" revolutionized intellectual thought and social mentality. To Spencer, human social behavior is based on a normative order that conforms to natural or ultimate law, which defines the principles of human social organizational forms including marriage and the family, property, and equal freedom.

The influence of Spencer's works on modern social thought is omnipresent. Charles Horton Cooley, William Graham Sumner, William James, Émile Durkheim, Radcliffe-Brown, Thorstein Veblen, Simon Nelson Patten, and Edward L. Youmans were influenced by his works. His advocacy of individualism and laissez-faire based on the inheritance of acquired characteristics as imperatives of adaptation influenced 20th century capitalism, while his evolutionism brought strong reaction and rejection until the works of Leslie A. White, Julian H. Steward, and V. Gordon Childe helped anthropologists accept sociocultural evolution as a process of increasing structural differentiation and functional specialization.

— *Stewart B. Whitney*

See also **Darwinism, Social; Sociology**

Further Readings

Peel, J. D. Y. (1972). *Herbert Spencer on social evolution.* Chicago: University of Chicago Press.

Spencer, H. (1929). *The principles of sociology* (3 vols.). New York: Appleton.

Spencer, H. (1966). *The study of sociology.* Ann Arbor: University of Michigan Press.

Spengler, Oswald (1880–1936)

Oswald Spengler was born in Blankenburg (Harz) in central Germany in 1880, the eldest of four children. As a young man, his family moved to the university city of Halle, where he studied Greek and Latin, mathematics, and the natural sciences. It was during this time, he also began to study the writings of Goethe and Nietzsche.

After graduation, he taught mathematics, physical sciences, history, and German literature. However, his heart was not truly in it, and upon receiving a large inheritance in 1911, he left the profession for good.

It was about this time that Spengler began to interpret contemporary events as parts of a more "global" trend. He saw the encirclement of Germany by the Entente powers, the increasing polarity of those nations, and a string of international crises as signs that Europe was headed off the cliff. His theory was only confirmed as the Great War of 1914–1918 saw unprecedented bloodshed and destruction throughout Europe. Spengler's major work, *The Decline of the West,* has as its main point that historical civilizations (including our own) share a common life cycle and that there are readily identifiable patterns within each.

The book was an immediate success, first in Germany and then throughout Europe. Although professional historians dismissed the work as unscientific and amateurish, the man in the street found the themes easy to understand. Furthermore, as Germany struggled economically in the aftermath of the War, the decline of the West seemed to be at hand.

The Decline of the West has as its basic premise that world history is not linear but cyclical. Spengler used examples drawn from the ancient Egyptians, the Chinese, the Mayans in Mexico, the Greeks, and Western civilization. He saw human history as the perpetual record of the rise and fall of unrelated High Cultures and believed that he and his contemporaries were witnessing the twilight of European or Western civilization.

Spengler believed in the superiority of the "white" man. His 1931 book *Man and Technics* is an account of how throughout history the West has been unique in creating advanced technology. In it he warns of a future where the outer "colored" races eventually use that very technology against the West to destroy Western civilization. He was pleased with the National Socialist takeover in Germany in 1933 and had even voted for Hitler in the 1932 election. This is not to say that he was in total agreement with Nazi racial doctrine. He criticized their failure to reach out to all Europeans in the coming battle (as he forecast it) against the foes of white men. He met Hitler in the summer of 1933, after which Spengler declared himself "unimpressed" with the Fuhrer's capabilities. In fact, his later work, *Die Jahre der Entscheidung,* chided the Nazis for "going it alone" against the world in the soon-to-come battle against the West's enemies.

Spengler did not survive to see the Second World War that he had predicted. He died on May 8, 1936 of a heart attack in Munich. His views regarding the rise and fall of civilizations live on, however, as his major works have been both referenced and criticized by other historians and philosophers since 1922. Spengler's ideas have forced us to take another look at all cultures, including our own, with an eye toward how we can perhaps prevent the failure of our own civilization.

— *Thomas M. Prince*

Further Readings

Hughes, H. S. (1952). *Oswald Spengler, A critical estimate.* New York: Scribner.

Spengler, O. (1918). *The decline of the west.* New York: Alfred A. Knopf.

Spengler, O. (1934). *The hour of decision.* New York: Alfred A Knopf.

Spider Monkeys

Spider monkeys are members of the order Primates, formerly included in the family Cebidae but now placed in the family Atelidae. They belong to the genus *Ateles,* which includes four species. These New World monkeys are found throughout the tropical rain forest regions of southern Mexico and Central and South America. Spider monkeys range between 14–26 inches in length and have an average weight of about 15–22 pounds. They are slightly potbellied and have coarse hair that varies from beige to deep black. Spider monkeys exhibit sexual monomorphism; males and females are almost identical in size and color.

Spider monkeys have narrow hands with long, curved fingers that function as hooks to firmly grasp

Source: © iStockphoto/Eva Zurisadai.

tree branches, and most species lack an external thumb. They have extremely diverse locomotor abilities including arboreal quadrupedalism, suspensory behavior, and some bipedalism in the trees. A combination of long, lean appendages and exceptional agility assists them in making swift, acrobatic movements across the upper level of the canopy. Spider monkeys have a prehensile tail stretching from 24–36 inches that plays an important role in their arboreal lifestyle. The tail serves as a fifth limb as spider monkeys cross forest gaps up to 40 feet in length, sprawling out like spiders as they travel throughout the forest.

The social structure of spider monkeys is complex and generally referred to as fission-fusion. Spider monkeys form community units made up of approximately 15–25 members comprised of both sexes and a variety of ages. Females normally take on a more active leadership role than males, directing group activities such as traveling, foraging, and feeding. Although the spider monkey diet consists of an assortment of foods (leaves, nuts, seeds, flowers, insect larvae, and birds' eggs), ripe fruit is the main staple. However, because ripe fruits are an ephemeral resource in both space and time, spider monkeys split up into smaller foraging parties of two to eight individuals in order to reduce feeding competition among group members. The dominant females usually have feeding routes that increase their foraging and feeding efficiency.

The spider monkey gestation period lasts close to eight months, at the end of which there is a single birth. Infant spider monkeys have a long period of dependence, and the strongest social bonds are formed between mothers and offspring. Not only do newly born spider monkeys remain black and nearly hairless for almost one year, but their mothers continue to carry and provide milk for them until they are around two years of age. Spider monkeys stay close to, and do not attempt to travel independently of, their mothers until around age three. Females become sexually mature between the ages of four and five, while males do not reach full sexual maturity until after their fifth year of life. Unlike many other primates, grooming is not of great importance in spider monkey social interactions. This may be due to their lack of functional thumbs.

With half of the *Ateles* species being endangered, research continues in order to determine the reasons that they are at risk of extinction, as well as to assess what can be done to prevent further harm. In the Central American countries of Costa Rica, Nicaragua, and Panama, farming is a major contributing factor to the spider monkey's demise as vital habitat is lost to land cultivation. In addition, illegal hunting is also problematic. Spider monkeys have become an easy and attractive target, especially since they are relatively large and have a rather tame demeanor.

— Lisa M. Paciulli and Samantha J. Larson

Further Readings

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego: Academic Press.

Kinzey, W. G. (1997). *New world primates: Ecology, evolution & behavior.* New York: Walter de Gruyter.

Stereotypes

Stereotypes are rigid clusters of overly simplified social and cultural characteristics conjoined into a single, imagined identity or schematic theory used to label a social group and assess members' character, attitudes, and behaviors. They offer comfortable, convenient filters to make sense of complexity and are inherent in the act of social categorization and perception. Based on beliefs, knowledge, and expectations, they often have moral and judgmental overtones, which are generally viewed as derogatory and offensive. Group stereotypes are never grounded in holistic descriptions of heterogeneous cultures or social groups but are centered on some initially observed cultural behavior or visual cue. This cue is then interpreted using the stereotyper's frame of reference and meaning structure, homogenized, and overgeneralized in an attempt at differentiation. Intergroup differences are minimized and intragroup differences exaggerated using confirmatory bias and routine simplification. Sometimes these judgmental snapshots stem from distortions or misunderstandings about a behavior or attribute seen in an initial cross-cultural or cross-group encounter. Rapid superficial assessments then combine with established assumptions—often based on gender, race, age, ethnicity, culture, or "strangeness." Once established, a stereotype's condensing symbolism becomes tenacious and is used to justify subsequent actions toward the stereotyped group, a fact that has been apparent in colonizing situations, group conflicts, business dealings, or justifications of the status quo. People use stereotypes to rationalize asymmetrical power situations, validate prejudice, or in extreme cases to justify hostility, oppression, violence, war, genocide, or religious fanaticism.

While there has never been a comprehensive cross-cultural examination of stereotyping, it appears that stereotypic thinking is widespread and serves multiple purposes. The most important seems to be efficient information processing, memory formation, and categorization during enculturation, times of change, or when encountering a perceived threat. Stereotypes are used to simplify perceivers' thinking in new situations that require processing large amounts of information. They allow individuals and groups to rely on previously stored knowledge, conclusions, and assumptions, eliminating the need to assess ambiguous or disquieting information that brings their assumptions into question. As such, stereotypes can be part of coping strategies because they keep groups distinct.

Stereotypes can emerge from a realistic visual image that is overgeneralized using a classic logical fallacy; for example, honored Lakota warriors did wear long feathered headdresses, therefore all Indians wear them. As a result, stereotypes are held to be "true" even when they have been recognized to be only partially correct. This process occurs because stereotypes reflect societal desires, fears, projections, and imaginative speculations, which are more important to people than "facts." People want their assessments to be true because they uphold self-worth and cultural esteem; stereotypes recursively gain this pseudo-authenticity through repetitive, unquestioned use learned through standard processes of enculturation. Stereotypes also prescriptively define cultural expectations of acceptable behavior or proffer immutable "how not to behave" rules. This usage stems from the term's original (1725) denotation: a stereotype was the metal plate used in cylindrical printing presses. Just as there is the expectation that the metal "a" in the cylinder will print the letter "a" on the paper, so stereotyped social categories are fixed and conventionalized duplications. The category "mother" includes expectations of how mothers should act. If the stereotype is that all mothers are kind and gentle, when a person sees different behavior—such as yelling at a crying child—he or she jumps to the conclusion that that person is a "bad" mother. This assessment is done without obtaining any information about the circumstances. As ascriptions, stereotypes thus produce prototype effects.

Stereotypes work best if there is little contact with, and first-hand knowledge about, the people categorized. In this way, the categorizers do not have to deal with intracultural and intercultural diversity, which is messy. Americans today have little knowledge about American Indians, yet everyone theoretically can recognize an Indian. What they recognize, however, is the stereotype, based on phenotypes. This situation allows stereotypes to flourish and gain permanency because stereotypes are about the unknown but presumed known. And what is known is arbitrary and varies by culture.

Psychology has studied stereotypes to a greater extent than anthropology. While anthropology theorizes the cultural content of stereotypes in intragroup

relations, psychology is interested in the mental mechanisms by which stereotypes operate and influence interpersonal and intergroup perception and interaction as processes. A wealth of psychological theories have been developed to address the individual mechanisms that give rise to stereotypic thinking and the cognitive and motivational factors that contribute to their formation, maintenance, application, change and tenacity. Social identity theory sees stereotypes as a form of compensatory narcissism, while information theory views them as a way to encapsulate information compactly to ensure survival. Much research needs to be done to develop a unified theory of stereotypes and stereotyping that can explain why individuals and social groups stereotype and can assess its evolutionary implications and consequences, yet account for stereotyping as a cultural phenomena that varies by culture, time, and context.

— *Nancy J. Parezo*

Further Readings

Hilton, J. L., & von Hippel, W. (1996). Stereotypes. *Annual Review of Psychology, 47,* 237–271.

Macrae, C. N. et al. (1994). Stereotypes as energy-saving devices: A peek inside the cognitive toolbox. *Journal of Personality and Social Psychology, 66*(1), 37–47.

Snyder, M. (1981). On the self-perpetuating nature of social stereotypes. In D. L. Hamilton (Ed.), *Cognitive processes in stereotyping and intergroup behavior.* New Jersey: Lawrence Ehrlbaum Associates.

Steward, Julian H. (1902–1972)

Julian Haynes Steward is best known for his seminal contributions to cultural ecology, multilinear evolutionism, archaeology, and ethnography of the Great Basin and Plateau region, ethnology of South America, the settlement pattern and salvage approaches in archaeology, irrigation agriculture and early civilization, hunter-gatherers, peasants, and area studies. Steward became the single most important individual in cultivating an ecological approach to culture and cultural change from the 1930s into the late 1960s. In his research, publications, and teaching, he persistently developed a theoretical and methodological framework for studying cultural change as adaptation in which environmental influences were especially important.

Steward was born on January 31, 1902, in Washington, D.C. In 1918, at the age of 16, he entered the college preparatory school in Deep Springs Valley north of Death Valley, in eastern California close to the border with Nevada and at the western edge of the Great Basin. Local natural history was an integral part of school instruction and nature was part of his daily experience beyond the classroom.

After a freshman year at the University of California in Berkeley, Steward followed some of his fellow preparatory school students to Cornell University where he studied geology and zoology. His BA degree was awarded in 1925 at Cornell. Then Steward returned to Berkeley for graduate work in anthropology where he received a PhD in 1929.

In the late 1920s to 1936, Steward returned several times to various areas of the high desert environment that had been such a profound attraction to him at Deep Springs School. Now, however, he was devoted to field research in archaeology and ethnography, and this was the formative period in the development of his cultural ecology, aspects of which can be found in many of his early publications. He had avoided taking any side in the academic debate of his predecessors. Environmental determinists argued that the natural environment strongly influences human behavior, society, culture, and history. Environmental possibilists countered that the environment presents many opportunities allowing a wide latitude for human responses in which culture is decisive. Instead of armchair speculation and debate, Steward sought to subject the question of the relationship between culture and nature to direct empirical investigation through actual fieldwork on particular cultures in their habitat, although his own fieldwork mostly involved interviewing scattered elderly informants about their memory culture.

Steward believed that the environment had the greatest influence on societies with less developed technology. This reflects his Deep Springs experience, where relatively recent Euro-American ranching and farming contrasted with the ancient foraging life styles of the original indigenous occupants, two very different modes of adaptation. This contrast stimulated his interest in change through time, especially in relation to new technology and its social repercussions. The desert impressed on him the role of

water in human adaptation, a recurrent theme in much of his work, particularly with regards to demographic and economic factors in the evolution of early civilizations.

Through his ethnographic investigations on the Shoshone, Paiute, and other indigenous societies of the Great Basin and Plateau region, Steward specified three interrelated foci for field research on the cultural ecology of a particular society: the natural resources and the technology used to extract and process them from the environment; the behavior and social organization involved in the labor in these subsistence and economic activities; and the influence of these two sets of phenomena on other aspects of culture. The third component Steward termed the culture core, although he later retreated from that concept. Accordingly, by the 1950s Steward developed an ecological framework for describing, and to some degree explaining, a particular culture. His approach emphasized the relationships among the biophysical environment, natural resources, technology, labor, economy, and social organization. Steward discreetly rejected the dominant position of Franz Boas and his followers like Alfred Kroeber, namely, that culture and history were sufficient to explain all of culture. Cultural ecology was the focus of Steward's last fieldwork, a six-week trip to the Carrier people of British Columbia in the summer of 1940 where he worked mostly with one key informant.

In subsequent decades, Steward's cultural ecology was criticized on several grounds. His theoretical concepts, like the culture core, were not very clear and readily operational; his method was mostly intuitive; he was a functionalist with some of the pitfalls of that approach; correlations were confused as cause and effect relationships; and he ignored relevant aspects of biological ecology. In addition, Steward focused rather narrowly on subsistence economy to the neglect of many other important factors, such as population dynamics, natural hazards, political institutions, religion, and the larger regional and world systems. His biographer, Kerns, has also revealed male gender bias in his work, especially his concept of the patrilineal hunter-gatherer band which in turn contributed to the "Man the Hunter" image. In addition, Steward's ethnographic field methods involved interviewing individual elderly informants in English or through an interpreter to record memory culture, a common practice at the time. Like most anthropologists until recently, Steward focused on traditional culture and ignored the colonial situation that oppressed indigenous societies, assuming the inevitability of their sociocultural assimilation or even extinction. Nevertheless, Steward, far more than any other single individual, launched ecological research in cultural anthropology and archaeology in America. His successors, including his critics, built and continue to build their own work on the basic foundation he established.

Steward's methodological approach, which he called multilinear evolution, was to select for detailed comparison a small number of particular cultures that were in similar environments (e.g., same types of desert or forest) and at the same level of sociocultural complexity (family, tribe, or state). The cultures selected should be widely separated geographically to avoid the possibility of cultural similarities arising from diffusion. Consequently, similarities in the sample of cultures that Steward selected would be the result of parallel adaptations in the sense of similar responses to similar environmental conditions.

This thinking fed into the evolutionary typology of political organization still used to this day by many anthropologists of band, tribe, chiefdom, and state. However, Steward rejected 19th-century unilinear evolutionism, the idea that all societies inevitably pass through a series of stages from simple to complex cultures. Instead, he envisioned far more complex phenomena with multiple lines and rates of cultural evolution, each depending on the variables in specific situations. Actually Steward had a deep revulsion to any grand theorizing or dogma. Unlike another neoevolutionist, Leslie White, who was concerned with universal laws of culture, Steward searched for specific cause-effect relationships in a limited set of circumstances and phenomena.

Steward's multilinear evolutionism was variously criticized for demonstrating correlations rather than causality; using inadequate sampling and avoiding statistics; confusing method (multievolutionism) and process (multilinear evolution); and neglecting negative cases where postulated relationships between culture and environment might not be sustained. Nevertheless, several cases of parallel adaptations in cultural evolution in different regions of the world identified by Steward remain widely accepted to this day by many archaeologists and cultural anthropologists.

From 1935 to 1946 Steward worked at the Smithsonian Institution in the Bureau of American Ethnology. At the Smithsonian, one of Steward's

achievements was to conceive and edit the monumental *Handbook of South American Indians* in seven volumes. However, Steward had a great deal of assistance from Robert Lowie, Gordon Willey, and especially from Alfred Metraux, the latter a specialist on the ethnology of that continent. This benchmark publication included contributions from more than 100 authors from a dozen countries, was organized on the basis of cultural types, and identified major theoretical issues that subsequently guided research for decades. Later, Steward, together with Louis Faron, published a synthesis of this handbook that became a standard textbook on the anthropology of the continent.

While at the Smithsonian, Steward also developed the Institute for Social Anthropology and served as its first director. It was focused primarily on the changing economy of peasant communities in Latin America and yielded more than a dozen monographs by various research associates, many of them Steward's students. After World War II, Steward contributed to the establishment of area studies, including an innovative project on Puerto Rico and subsequent studies elsewhere in Latin America and in Africa and Asia.

The Puerto Rico project was one of the first efforts by anthropologists to analyze a national society. Steward described Puerto Rico as an American colony. This and other research initiated by Steward also contributed to the development of modernization studies, dependency theory, and world systems theory, especially through some of his students and associates like Sydney Mintz and Eric Wolf. Simultaneously, such work eventually contributed to the foundation of political ecology, which has flourished since the 1990s.

Steward's cultural ecology certainly continues to strongly influence anthropological research on the relationship between culture and nature. In contrast, his multilinear evolution has not received as much attention, and he lost interest in it as well in later years. Steward's influence is seldom adequately acknowledged by subsequent researchers who are studying what essentially amounts to cultural ecology or multilinear evolution. Nevertheless, in 1952 Steward was awarded the Viking Fund Medal in General Anthropology, and in 1954 he was elected to the National Academy of Sciences, the latter quite rare for any social scientist during that era. Also, several of his former students recognized him in a collection of essays edited by Manners in 1964. Then in 1969, graduate students at the University of Illinois honored him by establishing the *Journal of the Steward Anthropological Society*. Steward died on February 6, 1972. An obituary by Manners in 1973 includes an appendix listing Steward's more than 200 publications. From the 1930s into the 1960s, Steward was one of the main pioneers in the development of a scientific, empirical, materialist, behavioral, ecological, and evolutionary approach to explaining culture and cultural diversity. Steward himself was as extraordinary as his contribution to American anthropology.

— *Leslie E. Sponsel*

See also **Cultural Ecology; Ecology and Anthropology**

Further Readings

Kerns, V. (2003). *Scenes from the high desert: Julian Steward's life and theory.* Urbana: University of Illinois Press.

Steward, J. H. (1955). *Theory of culture change: The methodology of multilinear evolution.* Urbana: University of Illinois Press.

Steward, J. H., & Faron, L. C. (1959). *Native peoples of South America.* New York: McGraw-Hill.

STONEHENGE

Stonehenge is one of the most recognized formations of megalithic architecture and has a long history of speculation as to its builders, age, function, and changes over time. Located on the Salisbury Plain in Wiltshire, England, it is one of over nine hundred such circles of standing stones in Great Britain alone. Thousands more are evident in France (especially along the coast of Brittany), Spain, Denmark, Italy, and Malta.

Megalithic (mega = large, lithos = stone) architecture is generally characterized by three components: a tumulus; a large artificial mound or communal burial site; and a collection of large stones. It is one of the major characteristics of the western European Neolithic age and represents one of the earliest known stone architectures in the world. This architecture appeared from the fifth millennium B.C.E. as the agrarian way of life compelled a more sedentary existence. It can be termed simple when it involves a single standing stone, a menhir, placed in stark contrast with the surroundings; open but more complex

if many standing stones are arranged in a circle, semicircle, or aligned in parallel rows; and closed when the stones are used to construct a burial chamber and covered with a tumulus.

A henge is an English term denoting a usually circular, prehistoric structure and earthworks, which can consist of a ditch, mound, wood, and a series of standing stones, of which Stonehenge provides one of the most striking examples.

Source: © iStockphoto/René Mansi.

The construction of Stonehenge has been divided into roughly three periods. The first division, using radiocarbon dating methods, is calculated at ca. 3000 BC and was composed of a circular enclosure surrounded by two banks of earthworks, with the outer bank 380 feet in diameter, 8 feet wide, and about 3 feet high, and with a ditch between. The ditch varied in width between 10 to 20 feet and 5 to 7 feet in depth. Artifacts taken from the ditch confirm the date of construction. The inner bank was composed of a local chalk work about 6 feet high and 20 feet wide, with a diameter of 320 feet upon which were positioned a pair of portal stones. To the northeast was a 35-foot entrance or avenue with a standing stone set back a short distance. This naturally shaped standing or heel stone, weighing about 30 tons, is about 20 feet long by 8 feet wide by 7 feet thick, with the lower 4 feet buried in the ground. It is inclined inward toward the circle at an angle of 30° from the perpendicular but is thought to have been erect originally. The stone is composed of sarsen, a very hard sandstone with a source at Marlborough Downs some 20 miles to the north. Stonehenge is composed of a variety of local materials and denotes a familiarity with the geological composition, texture, durability, and color.

Toward the end of this period, 56 Aubrey or X holes were dug inside the circle and varied from 2.5 to 6 feet in width and 2 to 4 feet in depth, spaced rather evenly in a 288-foot diameter circle. These holes were named after their 17th-century discoverer, John Aubrey, who described the filled-in circles that bordered the embankment. He speculated that Stonehenge served as a temple and that the avenue was oriented toward the point on the horizon where the sun would rise on the summer solstice. The heel stone added further weight to the directional hypothesis as it is placed in a direct line of sight for an observer standing exactly in the middle of the circle.

Four points within the circle denoting four post holes form a remarkably accurate rectangle, which may have helped in setting out the site or, according to American astrophysicist Gerald Hawkins, may have established a position for observation of the sun and moon. But one of the certain functions of the first Stonehenge was an interment site for at least 55 cremation burials found at various locations, some dated soon after the original site was completed.

Stonehenge may have retained this shape and its structure for centuries, but eventually the site was altered. During a second phase, the main new work done was a planned but partially completed double circle of blocks of bluestone. For the most part, they are made of dolerite, blue sandstone, and limestone. The chief deposit for the dolerite is the Prescelly Mountains in Wales, some 150 miles away, although bluestone blocks were present in a neighboring area centuries before Stonehenge was built. The avenue was reconstructed and followed a winding route from a repositioned entrance down to the Avon river some two miles away.

Before the circles were finished, major social and political upheavals took place and the stones were dismantled and the double ring holes filled in. Alterations were begun during this third period of

Source: © iStockphoto/René Mansi.

reconstruction. More than eighty massive sarsen blocks, some up to 50 tons, were brought in from Marlborough Downs near Avebury, 25 miles away, and Stonehenge began to take its present form.

How these stones were conveyed, the amount of human energy expended, the time span, and the engineering expertise required are all daunting achievements. On a circle with a diameter of 100 feet, three upright sarsen stones were positioned and capped with a continuous ring of lintels in the center of the site. Within this circle, five even more enormous trilithons, or formations, consisting of two uprights supporting a lintel, were positioned in a horseshoe formation. These are the stones that dominate the landscape today and are the prominent feature at Stonehenge.

When these stones were in position, the discarded bluestones from the second period were dressed and erected in an oval setting inside the sarsen horseshoe. Its precise form is uncertain as they were dismantled once again and rearranged in their present form in a circle between the sarsen circle and the horseshoe.

A final discovery in 1923, Y and Z filled-in holes, formed two concentric rings of pits dug about 20 feet apart around the outside of the circle of stones. These may have been intended for a new placement or replacement of stones that was never carried out.

The major impact of Stonehenge is two-fold. As an engineering feat, it speaks of a society possessing the manpower, social organization, and engineering skills necessary to complete such a task. As to its astronomical significance, there are some striking circumstances of location and structures. The particular latitude of Stonehenge allows for the direction of sunrise at the summer solstice and mid-summer rising full moon at its extreme southerly stand-still position to be at right angles through use of the rectangle formed by the four stations. Had its position been a few miles north or south, there would have been misalignment. The position also gives a clear view of the horizon for 360° for celestial sightings. The different heights of certain stones, such as the Heel Stone and Station Stone, enabled an observer at the center to use the tops of these stones to line up with the distant horizon, thereby facilitating observations and alignments.

— *Paul A. Young*

Further Readings

Burgers, C. (2003). *The age of Stonehenge.* Edison, NJ: Castle Books.

Hawkins, G. S., & White, J. B. (1988). *Stonehenge decoded.* New York: Hippocrene Books.

Mohen, J. (1999). *Megaliths, stones of memory.* New York: Harvey Abrams.

Stratigraphy

Stratigraphy is the science of rock layering, with particular concern for composition, geographic distribution, and geological and chronological importance. This discipline also involves the interpretation of rock strata in terms of mode of origin and geologic history. As a main branch of sedimentology, stratigraphy generally relates the large-scale vertical and lateral similarities between units of rock layering to environment of deposition. Those relationships are defined

by lithologic and physical properties, geographic position, distribution, paleontological characteristics, and age relationships. Stratigraphers, using these properties and details of a sediment's composition, structure, and texture can then synthesize aspects of environmental geology and, moreover, interpret the broader aspects of Earth's geologic history.

Any stratigraphic investigation only becomes productive with a proper understanding of sedimentology, as stratigraphy is more a progeny than sibling of sedimentology. Formally, sedimentology is the study of natural sediments, both lithified (sedimentary rocks) and unlithified, and of the processes by which they form. Sedimentology includes all processes that give rise to sediment or modify it after deposition. These processes may include weathering, which breaks up or dissolves preexisting rocks; transportation; deposition; and diagenesis, which chemically and physically modifies sediment after deposition and burial, converting it into sedimentary rock. Sediments such as mud, sand, and gravel deposited by mechanical processes are known as clastic sediments, whereas those deposited predominantly by chemical or biological processes (limestones, dolomites, rock salt, chert) are known as chemical sediments.

Sedimentologists classify sedimentary rocks according to origin and size of included particles. However, the vast array of conditions by which sediments accumulate has borne a great number of sedimentary classification schemes giving rise to hundreds of sedimentary types, which invariably overlap. To complicate this system, most sedimentary rocks are, at least in part, made of several types of sedimentary rocks.

In order to make greater sense of the complexities of sedimentary relationships, classifications and hierarchal organizations were produced to give clarity and uniformity to stratigraphic analysis. Lithostratigraphic units in descending order are the supergroup, group, formation, member, and bed or stratum. The formation is the fundamental unit of stratigraphic geology, just as the cell is fundamental to biology. A formation must be lithologically distinct and large enough in scale as to be mappable. These classifications are defined strictly on the basis of lithology. Boundaries between units, including formations, are placed at the position of distinctive rock change or a distinctive erosional surface. In this manner, the divisions between units have the least possible ambiguity.

All rocks, whether metamorphic, igneous, or sedimentary, weather at the surface of the Earth. Metamorphic and igneous rocks are formed at temperatures and pressures that are not seen at the surface so when these rocks are brought to the surface they become unstable. In the absence of air, most minerals in these rocks would remain intact for millions of years; however, because of Earth's climate, water, and atmosphere, these minerals break down and convert in a predictable sequence. The new minerals that will eventually form sedimentary rocks are stable at lower temperatures and pressures and are very slow to convert.

Sometimes difficult to distinguish from sedimentology, stratigraphy is specifically concerned with the layering and orientation of sediments. This outgrowth of sedimentology is based predominantly on the law of superposition, which presumes that in a normal sequence of rock layers not heavily disturbed or overturned since their deposition, the youngest rocks will lie above older rocks. Stratigraphy is primarily concerned with stratigraphic nomenclature, lithostratigraphy, chronostratigraphic and biostratigraphic series, and correlating specific successions between regions. From studying stratigraphic sequence of depositional layers, the geological history of a region or outcrop can be reconstructed. Stratigraphers must account for such factors as the average rate of deposition of the various sediments, their composition, the extent of the strata and any incorporated fossils to construct a proper analysis. These sequences are then correlated to those of similar age in other regions with the ultimate aim of establishing a consistent geochronologic sequence for the entire Earth. In areas where the strata have undergone folding, faulting, and erosion, stratigraphic techniques are used to determine their correct sequence.

In order to properly reconstruct a stratigraphic sequence of rock layers, uniformity among the scientists performing fieldwork must exist so that each sequence can be arranged in approximately the same manner. To this end, and to ensure uniform usage of stratigraphic nomenclature and classification within the field, a stratigraphic code compiling the principals and practices of stratigraphy was developed. The latest version of this code, known as the North American Stratigraphic Code, was published in May, 1983 by the North American Commission on Stratigraphic Nomenclature and is widely accepted by North American geologists.

Great efforts are made in stratigraphy to reconstruct and interpret ancient environmental conditions through stratigraphic correlation. Stratigraphers use

correlation for most practical applications; there is indeed a great monetary benefit from understanding where fossil fuels and other raw materials can be located based on the lithology of sediments. Thus, correlation of sediments becomes vital to any future geologic endeavors as globalization necessitates greater material allocation. The location of fossil fuel reservoirs is intimately tied to the ancient environments in which they were originally deposited. For this reason, reconstruction of ancient environments and paleoclimates has become a foremost concern for many geologists. Most readily available hydrocarbons used in the modern age are extracted from sedimentary rocks, as fossil fuels are, on occasion, the last stop in the decomposition of rocks yielding their primary constituents. Sedimentary rocks are also responsible for aquifers and are host to a wide variety of metallic and nonmetallic ores.

Seismic phenomena on the earth have given sedimentologists and stratigraphers the opportunity to see below the surface and unlock architectural mysteries of subterranean bedding. However, scientists need not wait until an earthquake strikes near their research area to extract information about the subsurface. Artificially generated seismic waves are used to obtain information regarding geologic structure, stratigraphic characteristics, and distributions of different rock types. Seismic stratigraphy was created to study the seismic data for these purposes.

Sequence stratigraphy is another branch of stratigraphy in which the cycles of worldwide ocean level changes are studied in rocks, preserving these marine transgressions and regressions that are then correlated to other time-equivalent rocks around the world. The principal of sequence stratigraphy is intimately linked to the assumption of cosmopolitan eustatic sea level changes. A sequence is representative of a complete cycle of the rise and fall of base sea level. Sequence stratigraphy is truly a method of interpreting stratigraphic data initially deduced through seismic data, then made applicable to an outcrop or well log data. Well logs are produced from data obtained from measurements of electrical conductivity, transmissibility of sound waves, and emission of nuclear radiation in the rocks adjacent to the well bore. The variations in measurements reflect the gross lithology of the rocks surrounding the bore hole. An instrument known as a sonde that is designed to measure velocity of sound waves, electrical resistivity, and natural or induced gamma radiation emitted by the rock then relays its measurements back to the surface and is recorded onto digital tape. As the sea level swings from highstand to lowstand, a progression of depositional tracts are laid down, being preserved in the rock and recorded in well logs. Typically, sequence stratigraphy focuses on clastic sediments deposited on continental margins because these sedimentary environments are particularly affected by cycles in relative sea level change. The sequence concept was a revolution for stratigraphy and although not all geologists agree that reliable global sea level charts can be assembled from sequence stratigraphic data, most agree that these changes do affect the sediment geometry and rock unit distribution on continental margins or within time-equivalent sedimentary basins.

A relatively new branch of stratigraphy, known as magnetostratigraphy, applies concepts of geomagnetism to old rocks, allowing stratigraphers to reconstruct a detailed magnetic polarity time scale for the Earth. The primary application of magnetostratigraphy is as a tool to correlate marine strata. This discipline becomes appreciated when paleontologic or lithologic correlation is difficult using traditional methods. Mostly, the phenomenon of polar reversal acts as a contemporaneous, synchronous event that provides a precise tool for chronostratigraphic correlation. However, magnetostratigraphy is not limited to marine sediments and its techniques have been expanded in recent times to correlation of on-land sections. Therefore, most work in magnetostratigraphy in the future will correlate older on-land strata, thereby extending the data for polarity shifts further back in geologic time. Combining magnetostratigraphy, sequence stratigraphy, and paleoclimatic data, anthropologists can determine the duration in which a fossil or artifact locality was used. The paleomagnetic data from the Peking man site of Zhoukoudian suggests that the deposits of human fossils and artifacts endured from approximately 500 to 230 thousand years ago.

The incorporation and catalog of fossil remains has played a key role in most analyses of sedimentary rock younger than the Cambrian explosion of life. Fossils have been a most important means of correlation because, as a result of evolution, rock strata of approximately equal age exhibit similar flora and fauna. Dating and correlation of stratified rocks by means of fossils is known as biostratigraphy. The benefit to rock strata and fossils is mutual; fossils localized in strata can be dated using relative and absolute

dating, and in so doing provide a date to the sediment itself. The fundamental unit in biostratigraphy is the biozone. This biostratigraphic unit is a body of rock characterized by its fossil content, making it distinct from adjacent strata. The simplest form of biozone is the taxon range zone where the zone is defined between the first (lowest) and last (highest) occurrence of a single genus, species, or higher taxon. However, biozones can incorporate multiple taxonomic groups to define a range. In anthropology, most fossil specimens found around the world owe much of their importance to the date prescribed to them from stratigraphic paleontology or biostratigraphy.

All rocks, whether igneous, metamorphic, or sedimentary hold some clues to their origin and the environment. However, sedimentary rocks, with their structures, textures, fossils, and compositions provide a matchless insight into past environments, climates, ecosystems, orientation of ancient continents, and mountain systems that have long since vanished. The task of deciphering, compiling, understanding, and utilizing the evidence locked in strata is the stratigrapher's primary charge.

— Christopher C. Matson

See also **Smith, William**

Further Readings

Boggs, S., Jr. (2001). *Principles of sedimentology and stratigraphy* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.

Nichols, G. (1999). *Sedimentology & stratigraphy.* Malden, MA: Blackwell Science.

STRATIGRAPHY

During the second half of the 19th century, the International Geological Congress (IGC) was founded and tried to homogenize the standards for a common stratigraphic scale. Yet, its attempts failed and it was not until the 1960s that the International Union of Geological Sciences (IUGS) formed a Commission on Stratigraphy to work again on that topic. Modern stratigraphic systems bring together two scales that are interpreted with the help of other dating methodologies. A time scale (defined in terms of eons, eras, periods, epochs, ages, and chrons), for which each division is defined by its beginning and ending points, is used in conjunction with a scale of rock sequences (described through systems, series, stages, and chronozones). These schemes are then combined with other dating techniques—such as radiometric dating, paleoclimatic dating, and paleomagnetic determinations—which were developed during the 20th century. This combination of different methodologies has resulted in a less confusing terminology and in increasingly more consistent information on which to draw conclusions about Earth history.

— Luca Prono

STRUCTURALISM

Structuralism emerged in the 1970s as a departure from the theoretical foundations of structural functionalism. It is among a variety of approaches to the study of social structure based on the general premise that there exist underlying structures that form the foundation for a social reality that only appears to be variable and changing. From the constructionist perspective, social structure is viewed as being either intentionally or unintentionally created by social agents. It is also used as a methodological or analytic tool by some social scientists to explain the regularity of social action by placing unpredictable behaviors outside the model. For structuralists, structure is recognized as the underlying force that drives social action, which in itself is viewed as merely a manifestation of a primary but hidden reality that lies beneath the level of consciousness. From this view, structures do not change, only the externalization of these structures in terms of changes in human action. The goal, therefore, of such analysis is to reveal the hidden universal and relatively constant social laws that influence the systems of society at the interaction, group, and institutional levels. This perspective deemphasizes the influence of individual agency, or individuals acting and choosing voluntarily.

Darwin, Spencer, Durkheim, Marx, and Freud took a structural approach to define their worldview, and planted the seeds for what was to become structuralism. Each of these individuals saw, from his unique perspective, a system of structures that was both greater than the sum of its parts and the cause of behavior rather than its result. Building on these perspectives but taking a linguistic turn, Ferdinand de Saussure (1857–1913), a Swiss linguist who is generally considered the father of structuralism, concluded that all social facts and patterns could ultimately be seen as resulting from the structures of language. Like Freud and Marx, Saussure concluded that it is structures that determine social interaction, not individual agency. Once a language is developed, the words and the thoughts they trigger become one entity, which then forms the social patterns incorporated as part of a particular culture. Language becomes autonomous and self-sustaining, allowing the subject to be undermined or totally ignored.

Formalizing these concepts into a single school of thought, Roman Jakobson wrote in 1929, "Were we to comprise the leading idea of present-day science in its most various manifestations, we could hardly find a more appropriate designation than *structuralism.* Any set of phenomena examined by contemporary science is treated not as a mechanical agglomeration but as a structural whole, and the basic task is to reveal the inner . . . laws of this system." Lévi-Strauss, a French structural anthropologist who knew Jakobson and was influenced by his work, as well as by the American school of anthropology, studied these inner laws not by looking at the observable details of a society, but instead by examining what he felt to be universal structures of the mind that manifested themselves in signs and myths. Where Saussure felt that the primary structures of society were rooted in language itself, Lévi-Strauss looked into a culture's myths, its literary traditions, and its guiding principles.

All forms of structuralism tend to see structure as the defining factor in determining social activity, often at the expense of human agency. It examines how a culture creates meaning for itself through its patterns of structured activities. There exists a sharp division between structuralists who believe the term refers to observable patterns of social practices, such as roles, norms, and language and those who see structures as the underlying principles upon which social patterns are built. This divergence of perspectives has never been successfully resolved, but opened the door for the school of post-structuralism, which is particularly critical of structuralism's inability to deal with the "temporality" of reality and the subsequent social changes that occur over a culture's history.

Post-structuralism combines the structural linguistic approach of focusing on language, or more specifically on text, with the idea that social reality is merely the superficial manifestation of underlying linguistic structures. The primacy given to the unconscious by Freud and Lévi-Strauss was used by post-structuralists to disavow the legitimacy of all texts, since a text is nothing more than an expression of the writer's unconscious. Therefore, texts cannot be understood by examining their content, the story, but rather must be deconstructed into linguistic formations or codes that are representative of all cultural texts.

It concludes that ultimately there is nothing real except words and how they are used together to form texts that literally construct reality. And, because it is people that invent and use words, they do in fact have significant agency in creating their reality and are not wholly proscribed by underlying or external forces. This perspective then allows for language to be used to change reality over time.

Two major proponents of this school are the French authors Derrida and Foucault. Their work, often criticized for being opaque, had an important impact on sociological thought. Both felt that the use of language by individuals does not create subjective meaning, but that the creation of language is "anonymous" and therefore without agent or subject. Throughout his varied and controversial works, Foucault attempts to demonstrate how systems of categorization structure our beliefs and practices, as well as what we think of as our knowledge. However, for Foucault, this knowledge is really the pretext for authorization and power. In other words, the stories or texts created by individuals are really the method by which society authorizes those in power to control those who are not.

Taking this critique of structuralism one step further, Derrida tries to demonstrate that the ability to describe and understand structures requires the writer, or scientist, to be somehow outside, to transcend, the structures being described, which he says is impossible. He concludes that individuals can never successfully stand outside their cultures and objectively study the structures within their culture, and therefore, there is no legitimate scientific methodology for interpreting

cultural structures. Conversely, the investigator who attempts to understand the structures of another culture can do no better than to superficially describe those structures because interpreting another culture's structures always involves the subjective perceptions of the observer and is necessarily suspect. Acknowledging this arbitrariness, Derrida focuses his investigations more on the act of writing than on oral or spoken communication. He takes this perspective, at least in part, because writing fixes the communication in time and exploits the arbitrary nature of both the act of signifying and of meaning itself.

In the end, these diverse structuralist and post-structuralist approaches to the understanding of social and cultural phenomena and to the cultural methods used to create meaning, have, according to recent criticism by Giddens and others, led down a path to their own demise. According to Giddens, the structuralist tradition has been unable to handle the very issues it raises. Structuralist theory takes its own conflicting ideas and codifies them in terms of binary oppositions, but never truly resolves these opposing forces. For Giddens, the structuralist attempt to deny the agency of the individual and the importance of subject has been misguided. "Social agents, not social theorists, produce, sustain, and alter whatever degree of "systemness" exists in society." Giddens goes on, within the general theory of structuration, to suggest that there can be reconciliation between structure and action because there is a "duality of structure." He contends that we can move beyond the contributions and limitations of structuralism by looking at both how structural properties are generated and sustained as well as what circumstances agents need to reproduce or change those structures.

— *Paula B. Moore*

See also **Derrida, Jacques; Foucault, Michel**

Further Readings

Giddens, A. (1987). Structuralism, post-structuralism and the production of culture. In A. Giddens & J. Turner (Eds.), *Social theory today.* Stanford, CA: Stanford University Press.

Lévi-Strauss, C. (1968). *Structural anthropology.* London: Allen Lane.

Waters, M. (1994). *Modern sociological theory.* London: Sage.

CLAUDE LÉVI-STRAUSS

Claude Lévi-Strauss has been called one of the 20th century's greatest intellectuals. He is a French anthropologist whose work in ethnology led to the development of structuralism as a method for understanding society and culture. Lévi-Strauss was born into a Jewish intellectual family in Brussels, Belgium, in 1908. His father was an artist.

Lévi-Strauss studied law and philosophy at the Sorbonne University in Paris. He then taught in a secondary school. In 1935, he joined a French cultural mission to Brazil as a visiting professor at the University of San Paulo. From 1935 to 1939, he taught at the University of San Paulo. During these years, he made several expeditions into the Amazon rain forest to do ethnographic fieldwork.

Source: © Veldman Annemiek/CORBIS KIPA.

In 1939, Lévi-Strauss returned to France to aid the World War II effort, but he fled to New York after France was invaded by Germany. For the remainder of the war, he taught at the New School for Social Research, where he formed professional relations with Franz Boas and Roman Jakobson.

Lévi-Strauss returned to Paris in 1948. He was awarded a doctorate by the Sorbonne after he submitted as his major and minor theses *The Family and Social Life of the Nambikwara Indians* and *The Elementary Structures of Kinship.* The latter work was published in 1949 and was immediately hailed as an important contribution to the anthropology of kinship.

In 1959, he accepted the chair of social anthropology at the College de France. Around this

time, he published *Structural Anthropology,* a collection of essays about structuralism. He also worked to develop anthropology as a discipline in France by creating places of study, including the Laboratory for Social Anthropology. This was also the home of the journal *L'Homme,* which would publish anthropological research. Lévi-Strauss was elected to the Académie Française in 1973. He received the Meister-Eckhart-Prize for Philosophy in 2003.

Lévi-Strauss used structural analysis to study mythology. He sought to answer the question of why myths from around the world are so similar. He found the answer not in their content but rather in their structure. His legacy includes his theory on how the human mind works, which may be his most important scientific contribution. He argued that people progress from a natural state to a cultural state because there are laws or mechanisms in their brains. This means that humans really do not possess free will but instead are the products of mechanical evolutionary forces.

— Andrew J. Waskey

Strum, Shirley C.

Shirley Strum has had an interest in primitive life since she was a child. This interest was furthered in a number of ways. She successfully pursued it at Stanford University where she earned a PhD in anthropology. This brought her to Kenya where she found a group of baboons nicknamed the Pumphouse Gang. She has studied primates for at least 29 years and has focused on a number of different areas of primate behavior.

Professor Strum teaches a course in "Conservation and the Human Predicament" at the University of California at San Diego during the spring semester. Her specialty is physical anthropology, reflecting her professional training and field experiences. However, most of her time is spent in Kenya where she continues to study baboons. She is also the director of the Uaso Ngiro Baboon Project. In addition, she has developed an appreciation for conservation and has worked to support it. Profession Strum's work will be of interest to scholars concerned with evolutionary theory regarding human beings. What she has found may help explain and account for some of the characteristics of present-day humans.

— William E. Kelly

Further Readings

Strum, S. C. (1987). *Almost human: A journey into the world of baboons.* New York: Random House.

Strum, S. C., & Fedigan, L. M. (Eds.). (2000). *Primate encounters: Models of science, gender, and society.* Chicago: University of Chicago Press.

Strum, S. C., Lindburg, D. G., & Hamburg, D. (Eds.). (1999). *The new physical anthropology: Science, humanism, and critical reflection.* Upper Saddle River, N.J.: Prentice-Hall.

Subcultures

The concept of subculture has a particularly strong, yet controversial trajectory in the social sciences in general and anthropology in particular. The concept was formulated in early social theory to address a variety of sociocultural forms that are included in a totality, be it society or national culture. These forms could be the subdivisions of national culture, minority groups, immigrant or refugee populations, or rural/semi-rural communities, for example. Subcultures were seen by many authors as both "cohesive social systems" and variants of a national culture, cultures within a cultural world. For instance, various community studies of rural populations were conceptualized as completely integrated systems, subcultures that are autonomous from the works of the nation-state. This perspective was mostly shaped by the modernist paradigm, which views society as an integrated whole, a thing which can be understood through concepts of order, systems, shared norms, and values.

The urban ecological model calls for ethnographic methods to study peculiar urban situations (e.g., ghettos, social and economically isolated neighborhoods) that generate particular conditions for emerging norms and behaviors that contrast with those of the dominant society, and was put forward by the School of Chicago. In the United States, the Great Depression and the aftermath of World War II led to mass migrations of diverse populations and

structural transformations in major cities, which contributed to increased marginalization of minorities, violence, illegal drug trafficking, and crime. These created conditions that fostered youth frustrations and fed their articulations into subcultures, such as gangs, with complex norms, structures, and behaviors that are contrary to the mainstream society. The ethnographic study of subcultures brought to light in sociological and anthropological discourses complex sociocultural processes that underlay these behaviors. Indeed, the social sciences were called upon to help formulate public policies that target the minorities and the marginalized. "Subculture" in these studies was a keyword that was widely understood as a metaphor for social pathology (for many authors, the analytical framework was formulated in terms of "deviancy" or "anomy"). It referred to a process through which marginalized groups took their marginalization as a condition for transgression, yet not for protestation or resistance.

The neo-Marxist assumptions that underwrote the cultural studies (formulated through the British scholars at the Birmingham Centre Contemporary) favored a conceptualization of subculture as resistance. Drawing from Antonio Gramsci's concept of hegemony and Louis Althusser's ideology, its tenets suggested an approach to subculture that emphasizes both the specificity of (sub)cultural practices and the historical process that sustains these practices in the first place, as well as the dialectic of social conditions and consciousness. Although "subculture" became the theme of predilection for cultural studies, anthropology's unique contribution was in understanding the meanings of these practices as related to some form of resistance.

Although subcultures as phenomena remain understood as dominated cultures (reactive to or expression of resistance against the dominant culture) and as such associated with the working class, (sub)cultural practices are co-opted and commodified by larger socioeconomic processes. This is the case in terms of youth cultural practices, for example rap music in the United States, where, with the incorporation of youth culture into popular culture, the concept of subculture becomes difficult to delineate. The role of anthropology is thus critical in defining the future of this concept in a globalized world.

— *Louis Herns Marcelin*

See also **Anthropology, Cultural; Ethnology; Gramsci, Antonio; Societies, Complex; Urban Ecology**

Further Readings

Cohen, A. K. (1997). A general theory of subcultures. In K. Gelder & S. Thornton (Eds.), *The subcultures reader* (pp. 44–54). London: Routledge.

Hebdige, D. (1979). *Subculture: The meaning of style.* London: Methuen.

Jenks, C. (2005). *Subculture: Fragmentation of the social.* Thousand Oaks: Sage.

Sudanese Society

Sudan is an ancient African nation; early Stone Age or Paleolithic sites suggest dates as early as 250,000 BCE. The states of Nobatia, Mukuria, and Alwa adopted Christianity for centuries until they converted to Islam in 1315. Today, Sudanese society is multi-ethnic and multi-religious.

The medieval Funj Muslim kingdoms of the Blue Nile might well be descendants of the Shulluk of southern Sudan; the Ingessana and Nuba of central Sudan might well have been the same northern Nubians who had ruled both Egypt and Sudan in ancient times; the other Nilotic Dinka, Nuer, and Anwak groups might well have been the same Ethiopian Sudanese of Aksum and Nubia; and the western African groups might well be related to the populations of the other regions. As Davidson realized, in the continent of Africa, "all these regions really belong together, and what is particular to each of them is general to them all in their foundation and emergence."

An agrarian society, Sudanese society is strongly influenced by familial, religious, and ethnic affiliations as well as ideological and political orientations. Strong systems of extended family relations comprise a series of closely interrelated nuclear families all over the country, with each nuclear unit going about its separate business.

The cultural diversity of the country is characterized by peaceful alliances and intermarriages as well as social disputes that sometimes are caused by the strict system of ethnic classification. Experiencing a long history of ethno-regional relations across the border with Egypt and the non-African nations, Nubia and its Riverain people have categorized themselves into distinct groups based on *ahl al-balad,* the owners of land, *abid* or ex-slaves who still have

obligations towards ex-masters, and the *halab* whose descendants belonged to Upper Egypt. In the other parts of the country, "conflicts between the agriculturalists and the nomads or among nomads, farmers and migrant laborers are but a few of the daily cases heard at the different courts. Cases of land dispute include *harig* (setting fire to fields), *taadi* (vegetable garden and field trespass with intent to cause damage), and *juruf* (disputes over land on the river banks)."

The winds of social change, however, have been blowing vigorously over the rural side of the country. "Although the *muazzafeen* [public service employees] still respect the indigenous authority of *Aurs* [descendants of ruling families] and the *punuk* [the indigenous court], they are committed, at the same time, to enforce the regulations of the Damazin administration. Very often conflicts occur when administrative decisions interfere with cultural and local ties."

At the present time, however, the question of Sudanese center-regional relations, rural development, and national identification constitute major political issues. The increasing consciousness of the Sudanese non-Arab, non-Muslim population about African heritage and the issues of national identification and religious tolerance motivated the need for anthropological and sociological research on the historical role that the Sudanese African cultures played to shape the Muslim tradition of the country, and the vital recognition of the diversity of Sudan in all spheres of political, social, and religious life. The Sudanese ancient African religions of many animist groups in the south and the Nuba Mountains might have mutually influenced popular Sufi life, as well as Christianity, with mythical interpretations and rituals. Perhaps the cultural heritage of the Sudanese communities was largely reflective of the multi-ethnic and religious diversity of the country more than any strict adherence to the Arab-Islamic models of the orthodox shari'a. Up to the establishment of the 'Abdallab Arab dynasties and the Funj Muslim kingdoms that succeeded the Nubian Christian kingdoms of Sudan, the spreading of Islam was rather nominal under the direct influence of the Bedouins and the traders, who were not highly knowledgeable of Islamic jurisprudence. The Sufi leaders, like Qulam-Allah ben 'Ayid and Hamad Abu Dannana, later on increased the dissemination of shari'a in the country. When the Funj consolidated their rule, they encouraged many jurists to teach Islam as a different faith from the Sudanese indigenous habits or Christian customs.

Among the majority Muslims of Sudan, the emergence and the growth of Sudanese modern political groups brought to life an ideological rivalry between the Sufi popular Islam and the formal tradition of Islamic jurisprudence, as well as conflict regarding the politics of separating state management from the political control of religious groups—an issue that had been largely initiated and pursued by Sudanese socialist and liberal parties, trade unions, and professional associations throughout the modern history of Sudan. In recent decades, a complete rehabilitation of Islamic jurisprudence has been placed at the top of the agenda for the movement to revitalize the Shari'a.

What possibilities would the Sudan's cultural and religious diversity offer to help achieve national integration instead of authoritarian rule? Sudanese society has experienced multi-cultural interpretation and practices of Islam since the 7th century. In the post-independence era (1956 onwards), both civilian and military regimes exercised the pre-independent secularly oriented governance of the country. Applying an ethnocentrist Arab Islamic state by the Muslim Brotherhood groups since 1983, the succeeding military governments (1983–1985; 1989–2004) made serious attempts to indoctrinate the Sudanese political and religious liberality. These state intrusions failed to transcend the persistent African cultures that had earlier merged with the traditions of popular Islam, Christianity, and the much older African supernatural traditions to create the unique systems of Sudanese individuality, spiritual philosophy, national ideology, and liberal reality.

Sudan is a country composed of pluralist cultures that assertively defied authoritarian rule. The advancement of this popular mode relied on the observance of international human rights norms and civil freedoms, despite restrictions by recurring military regimes. Following the October, 1964 and the April, 1985 popular uprisings, the Sudanese political parties, military groups, trade unions, professional associations, and many human rights and civil society organizations agreed on the freedoms of organization and assembly as well as those of thought and expression to ensure civil and political rights, as a prerequisite of social stability and progression. This national contention prevailed among the succeeding transitional governments of Sudan that also witnessed a significant movement towards the realization of the right of self-determination to the largely non-Muslim

southerners and the other Muslims in the northern, western, and eastern regions of the country whose political and economic concerns were increasingly aggrieved.

Recently, the Sudan witnessed a massive flow of emigration, which included significant sections of the population, especially professionals and skilled workers. This occurred despite state-imposed strict measures to regulate emigration. The state's concerns with levels of aggregate investment, in essence, developed deficit monetization. New formulations of agricultural mechanization had earlier aggravated uneven development in the country, thus provoking massive migrations from the rural areas into urban centers. This further encouraged the brain drain, which developed as a consequence of unresolved strains in the individual, familial, national, and regional levels of interaction.

The international community and the regional entities of the African Union and the Arab League have collaborated closely with the American-led western powers to help the Sudanese make a just and permanent peace. The Niavasha Peace Protocols (2004) offered a viable opportunity to resolve Sudan's civil wars on the basis of flexible center-regional power and fair wealth arrangements. Still, the cultural realities of the country deserve careful attention by the next transitional government to augment the politically approved developmental consensus on the basis of stable national democratic consensus. In the light of the unabated cycle of violence in the south, Darfur, Nuba Mountains, and eastern Sudan, substantial revisions are needed on the part of the state in full collaboration with the opposition groups to advance popular participation in national decision making. Measures should be undertaken to rationalize the flow of national and international migration, reform educational programs, and promote the absorptive labor capacity of cities and rural areas in order to serve development and the nation-building of the whole country.

— *Mahgoub El-Tigani Mahmoud*

Further Readings

Duany, W., & Duany, J. (2000). Genesis of the crisis in the Sudan. In J. Spaulding & S. Beswick (Eds.), *White Nile, black blood.* Trenton, NJ: The Red Sea Press.

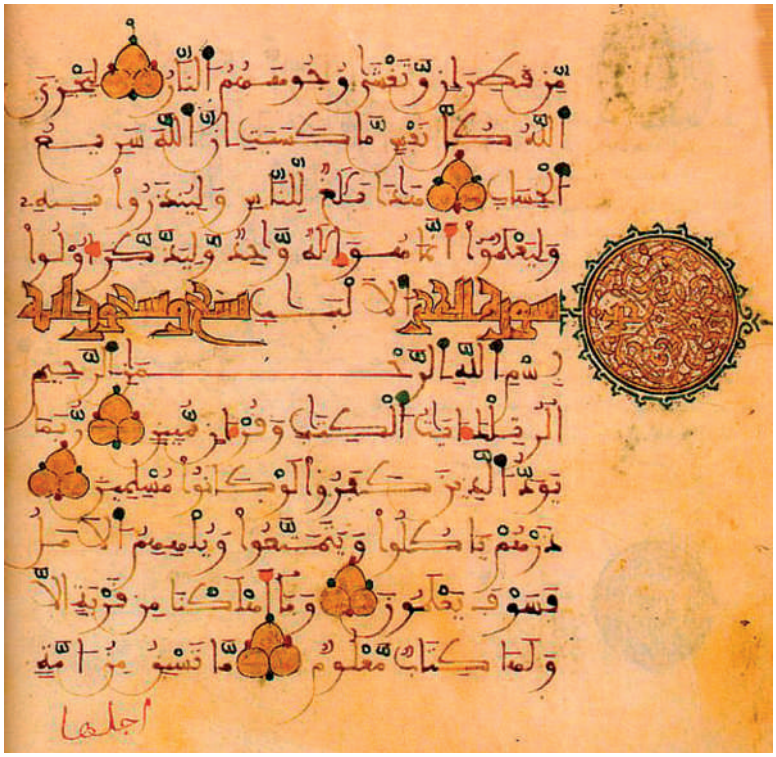
Fruzzetti, L., & Ostor, A. (1990). *Culture and change along the Blue Nile.* Boulder, CO: Westview Press.

Lobban, R., Kramer, R. S., & Fluehr-Lobban, C. (2002). *Historical dictionary of the Sudan.* Lanham, MD: Scarecrow Press.

Sufi Islam

In most Muslim societies, pioneering Sufi mysticism taught the principles of Islam in a simple way by committing its disciples to a special moral and social order with a specific worshipping recitation based on the Holy Qur'an and the Hadith (the Prophet's sayings and deeds). "The Mawlawiyah ("Mevlevis" in Turkish), known to the West as the whirling dervishes, utilized the words and worldview of simple villagers, without using technical theological vocabulary, and thus they made divine truths accessible to those who were not literate or formally educated in theological Arabic or Persian." The Sufi leaders observed a life of austerity, piety, and spiritual influence. The disciples believed in the miraculous actions and the blessing nature of the Sufi as a *Walli* (saint) who must be strictly obeyed. The North and East African Muslim *Sheikh,* the *Maraboute* of Senegal, and the other West African societies became a great spiritual force that often protected the poor and other powerless groups from the injustice of rulers. Sometimes, however, the Sufi would not strictly adhere to the formal shari'a (Islamic jurisprudence) in the striving to increase their non-Muslim followers.

Since medieval times, many African and Asian indigenous cultures were incorporated into the Muslim Sufi tradition. Kings, chiefs, maharaja, or sultans believed in the supernatural powers of the Sufi *Walli.* In continuity with the ancient dancing parties of old deities in Africa, the *turuq* adopted necessary changes to ensure the monotheist meanings, ablution, and recitation of the Qur'an. In the post-Christian Nubia, the Sufi *Wali* or his successors assumed the privileges, high esteem, and miraculous expectations of the Christian saints to facilitate the difficulties of life for the Bedouins and the peasants. This helped Sufi teachings, rather than the formal shari'a, to merge with the old mythology and folklore.



Source: Courtesy, Wikipedia.

These accounts of early Islam indicate a unique liberalism of the Muslim community under the flexible teachings of the Sufi tradition. The Sufi orders often separated the spiritual leadership of society from the authority of the state. The rulers would not initiate state projects without Sufi advice. With this prestigious status, many Sufi leaders collaborated closely with the ruling groups to maintain stable social and religious relations with their believers. Many colonialist and post-independence governments encouraged the Sufi influence in Middle Eastern and African societies to avoid the engagement of Islamic jihad (holy war) in state politics. The Sufi leaderships accordingly enjoyed prestigious political and economic positions in collaboration with the governing groups.

— Mahgoub El-Tigani Mahmoud

Further Readings

Fluehr-Lobban, C. (2004). *Islam societies in practice* (2nd ed.). Gainesville: University Press of Florida.

Hassan, Y. F. (1974). *Tabaqat daif Allah* (2nd ed.). Khartoum: University of Khartoum.

Sumerian Civilization

Sumerian civilization began in the flood plains between the Tigris and the Euphrates rivers. Deep beneath the land that now covers most of modern day Iraq lies the ancient country of Sumer where Sumerian civilization thrived. It covered approximately half of Mesopotamia. From 3500–2000 BC, this civilization flourished in the Mesopotamian land where the first cities began.

The Sumerians were the first civilized people to maintain a writing system called cuneiform (meaning curved lines). With this invention, the Sumerians were able to record literature, common laws, and business transactions and eventually created educational systems to teach cuneiform writing. The Sumerians gave the modern world a legacy of inventions, including agricultural and irrigation methods, weights and measures, the wheel, and the plow. They created the first city-state known for its architecture and its complex political, social, and economic structure that organized a legal system, labor practices, trade, and burial rites.

For thousands of years, cuneiform writing was the only writing system available to humans. At first, writing was developed to help govern trade and other business transactions. Later, people needed a way to identify themselves for business matters. Craftspeople developed pottery seals that, when rolled in moist clay, left behind a unique design or signature.

Writing quickly grew into a way of recording mythology, poetry, literature, mathematics, and historical events. For example, the legendary and much exaggerated tales of Gilgamesh were written in cuneiform. Gilgamesh was a mythical Sumerian ruler who possessed superhuman characteristics and engaged in fierce battles with ferocious animals. In fact, an epic tale of Gilgamesh tells of a great flood and is strikingly similar to the story of the flood in the Old Testament.

Cuneiform writing also enabled law codes, royal decrees, and court rulings to be recorded, preserved, and passed down through generations. The Sumerian King List, a chronology of legendary kings, is an historic example of this Sumerian legacy.

Writing was a skill that demanded great dedication and painstaking practice. Education became organized as children learned to read and write in cuneiform. The first schools resulted and children of only the wealthiest families attended them. At first, the purpose of school was to learn how to be scribes who could read and write cuneiform. However, in time, students began to study the sciences as well.

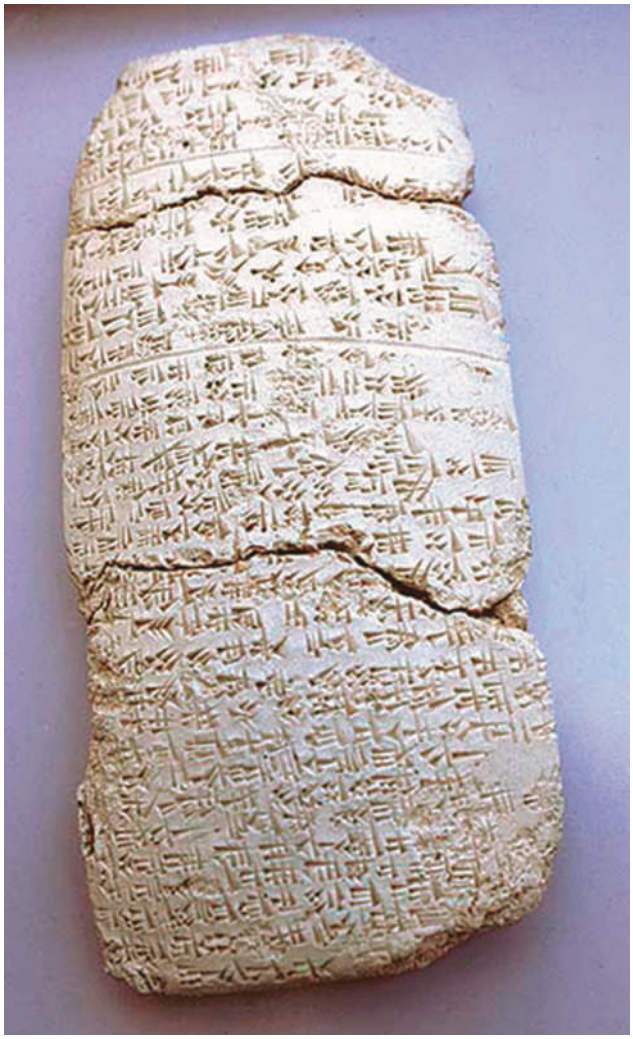
Despite the lack of adequate or consistent rainfall, Sumerian civilization was agriculturally based because the Sumerians developed an irrigation method. They dug canals that brought water to their farming fields. The Sumerians became skilled farmers, credited for inventing the plow to till the soil. Their chief crops were barley, wheat, and grains. They also grew peas, onions, lettuce, grapes, and figs. They raised sheep, cattle, and goats for milk, wool, and meat. They fished the abundant rivers and hunted an occasional antelope, gazelle, deer, or wild bull as a much-appreciated special treat.

As agricultural processes became more efficient, crops and livestock became plentiful. An array of specialized occupations emerged as some Sumerians were able to leave the farm and take up specialized crafts. Merchants, teachers, priests, physicians, musicians, poets, scribes, and tradesmen existed in addition to farmers and fishermen. Other Sumerians created weapons, cloth, and pottery. In fact, the first wheel ever invented was used as a pottery wheel. Further advances in the use and design of the wheel included turning it on its side and creating open spokes. This eventually created not only wheeled wagons but later in Mesopotamian history, chariots that would be used in battle.

As more people settled into Sumer, the need for buildings increased. Sumerians built homes, religious temples, and eventually, defense walls around their city-states to protect them from warring neighbors. Naturally, some citizens became skilled builders.

Because wood and stone were scarce and unsuitable for building, clay became the main building material. Sumerians made clay bricks that were cemented together with asphalt. Common citizens lived in small houses of two or three rooms with no windows. Wealthier families lived in two-story houses with the first floor used for servant quarters and meal preparations.

Not only did the Sumerians build homes, but their legacy includes impressive and elaborate buildings called ziggurats. These huge houses of religious worship were towers built with terraces. Each level was smaller than the one below and the walls inside were elaborately decorated.



Source: © FreeStockPhotos.com.

The processes of irrigation and building required maintenance and cooperation of the Sumerian citizens. Rulers emerged to organize labor and send out traders to seek materials like wood and precious metals and stones, which were not readily available in Sumer.

All this change led to a growth in population and created a more complex lifestyle. The most populous areas were the city-states. The political structure of Sumerian civilization was different from other societies because their communities were fashioned into independent city-states that were originally organized around a temple and a priesthood. The earliest rulers of city-states may have been called an "en,"

meaning "high priest." They would have been a representative of the local god and responsible for managing the temple lands and the people entrusted to work on them. As societies grew more complex, a second office of leadership, called an *ensi* or "governor," emerged to manage civic affairs such as law and order, commerce, trade, and military efforts. In time, the people democratically selected leaders to rule in times of war and peril. These leaders, called *lugals*, meaning "great man," oversaw civil, military, and religious functions of the city. The office of lugal seemed to emerge at a time when defense walls were first constructed. It was customary for an elected ruler to step down and return to his place in society after a military crisis ended. Over time, however, the constant threat of war created a need for rulers to remain in power for longer periods of time. Eventually, rulers served for a lifetime, passing rule to their sons as successors to a king's throne. As a state of dynasties had taken root, kings and royal families emerged.

Kings wrote and enforced local codes of law and, in Sumerian civilizations, legal matters were settled in courts of law. Three to four judges, who were often honorable men of the community, heard disputes. Much like the courts of today, evidence could be presented and witnesses gave sworn testimony. Perjury was punished by divine retribution because the gods would curse liars. However, decisions were not legally reversible because there was no process for legal appeal in Sumerian courts.

The most famous Sumerian city-states were Uruk, Ur, Eridu, Kish, Lagash, and Nipur. What we know today of these city-states comes from archaeological digs.

The glorious city of Ur, during the Third Dynasty of Ur dated at 2112–2004 BC, was an important center of Sumerian culture. Ur is identified in the Bible as the home of Abraham. The city's proximity to the Persian Gulf made it an important seaport because southern Mesopotamia relied on trade for hardwoods, precious metals, and stones.

Archaeologist C. Leonard Wooley discovered what we know about Ur in the 1920s and 1930s. He found burial sites dating to 2600–2000 BC. The most common and simplistic sites had the deceased rest on their sides, as if they were asleep. The burial site contained a few personal possessions and ceramic bowls and jars for food and drink. Other more elaborate gravesites contained substantial quantities of goods, vehicles, and personal and household servants. Although Woolley suggested that royal attendants drank poison and died willingly for their sire, the exact methods or reasons for these sacrifices are unknown. Sumerians buried their dead with possessions that the dead might want or need in the afterlife. For the wealthy or royal family members, this would also include servants and other members of the household staff.

After 1900 BC, Sumer would be overtaken by the Amorites and Guti, tribes from Elam. Sumer would never regain political domination and the whole of Mesopotamia would remain a warring land until the rise of Babylonia under Hammurabi, who would once again regain the region's glory.

— *Debra M. Lucas*

Further Readings

Crawford, H. (2004). *Sumer and the Sumerians* (2nd ed.). Cambridge, UK: Cambridge University Press.

Landau, E. (1997). *The Sumerians.* Brookfield, CT: Millbrook Press.

Sumner, William Graham (1840–1910)

William Graham Sumner, a founder of sociology and a brilliant anthropological theorist of normative order, was strongly influenced by the writings of the British evolutionist Herbert Spencer.

Sumner was born in Paterson, New Jersey on October 30, 1840. He studied political economy and graduated from Yale University (1863). He studied French and Hebrew at the University of Geneva in Switzerland, ancient languages and history at Gottingen University in Germany, and Anglican theology at Oxford University. Following his ordination as an Episcopal priest (1869) and his service at parishes in New York City and Morristown, New Jersey, he was appointed professor and chair of political and social science at Yale (1872).

Having established a very visible, natural reputation as a professor spotlighted by his economic theory of individualism, private property, and laissez-faire in opposition to tariffs, socialism, and social reform movements in the 1870s and 1880s, Sumner became

interested in the evolutionary theory of Spencer and primary natural laws and adopted Social Darwinism while abandoning the study of political economy for sociology. He transformed his life's work from popular lecturer, essayist, and polemicist to objective sociological researcher and scholar, teaching the first course in sociology (the "science of society") offered in the United States. He employed ethnographic methodology in his research and conceptualized a classificatory schema of tribes and peoples with their characteristics that was later established by G. P. Murdock as the Human Relations Area Files.

Sumner's major works include *Socialism* (1878), *The Forgotten Man and Other Essays* (1883), *What Social Classes Owe to Each Other* (1883), *War, and Other Essays* (1894), *Folkways: A Study of the Sociological Importance of Usages, Manners, Customs, Mores, and Morals* (1906), *Earth-hunger and Other Essays* (1913), *The Challenge of Facts, and Other Essays* (1914), and *The Science of Society* (with A.G. Keller, 1927).

Folkways is an anthropological and sociological classic. Sumner knew the power of words (he was fluent in 14 languages), and he chose his words very carefully. By inducting from ethnographic and historical materials, he shaped a model of sociocultural evolution and examined folkways as people's customary acts, which evolve toward uniformity and social institutions. As such, folkways became the means of adaptation to social conditions; they are the acts to satisfy people's needs of maintenance, protection, perpetuation, and security.

Folkways are conventional customs for appropriate behavior. Those folkways that are judged to be necessary for societal welfare become mores (and institutionalized as laws) where violations and commensurate sanctions (social control punishments) exert coercion for compliance. Those mores considered ethical principles constitute morals. To Sumner, the social grid of folkways, mores, and morals make normative social order possible and produce universal institutions: people will conform to the "norms" because they are right and their violation constitutes taboos and results in severe punishment. Sumner perceived the tendency of folkways and mores to evolve as a people adapt to meet their needs.

Sumner's other contributions include the concepts "ethnocentrism," "in-group" and "out-group," a dynamic conceptual model of social institutions ("crescive" and "enacted"), the theoretical underpinning of sanctions and social control, and, above all, principles upon which a compendium of ethnographic material can be utilized in the "science of society."

Sumner died on April 12, 1910 while in midstream of his life's work. His theory of unilinear evolution failed to incorporate Spencer's theory of dynamic change, resulting in rejection by anthropologists and sociologists. Nevertheless, his contributions are significant and influential, perhaps the classic work of American anthropology and sociology, and hold promise for the emergence of a "science of society."

— *Stewart B. Whitney*

See also **Folkways; Darwinism, Social; Spencer, Herbert**

Further Readings

Davie, M. R. (1963). *William Graham Sumner: An essay of commentary and selections.* New York: Crowell.

Sumner, W. G. (1906). *Folkways: A study of the sociological importance of usages, manners, customs, mores and morals.* New York: Dover.

Sumner, W. G., & Keller, A. G. (1927). *The science of society* (4 vols). New Haven: Yale University Press.

SUPERORGANIC

The term "superorganic" was probably first used by the early sociologist Herbert Spencer in the late 19th century, in contrast to "inorganic" or "organic." To Spencer, and other cultural-determinist sociologists and philosophers like Émile Durkheim and Auguste Comte, human society is superorganic in that it exists at a higher level of complexity than physical things or biological organisms. Viewed through Spencer's social evolutionary thought, superorganic refers to the claim that culture is an entity that exists over and beyond the individuals that make it up. That is, just as inorganic entities (such as rocks) and organic biological entities (such as plants) have real ontological existence, so does the super- or meta-force of culture.

The notion of the superorganic was brought into anthropological discourse in 1917 in a debate between two of the most influential figures of the time, Alfred Kroeber and Edward Sapir, in the *American Anthropologist,* the premier journal of the day. Both were students of Franz Boas who, as a literal founding

father of American anthropology, spent much of his career wrestling to understand the relationship between the individual and culture. To Boas, it became clear that the individual—both as recipient and beneficiary of culture, but also as its carrier and creator—was primary.

Kroeber, as did all Boasians, rejected the notion that culture was biological, or something that humans inherited. Neither were there any superior or inferior cultures, either in intellectual potential or social advancement. He parted paths with Boas, however, when he argued that humans are trapped in the web of historical and cultural forces. As Kroeber said in his seminal article, it is tempting to leap from the individually mental to the culturally social, but are we justified in doing so? Every schoolchild today knows much more than Aristotle, but even a thousand of them cannot match his impact. This is because all knowledge is social, and "it is knowledge, not the greater development of one individual or another, that counts. . . . A super-Archimedes in the ice age would have invented neither firearms nor the telegraph." This is obviously a recasting of the Great Man theory of history for an anthropological audience. But to Kroeber, the superorganic was actually what made anthropology a science—with its subject matter being the universals and regularities of human behavior as mediated, if not completely dictated, by the forces of history and culture. And it simplified anthropology's task immensely, by eliminating human decision making from the analytical equation.

Sapir disagreed with this dismissal of the individual and questioned the whole superorganic premise. First, he considered the analogy of social phenomena to the development of inorganic to organic processes to be false. We what we call the social is only a *selection* of the phenomena that is reducible to inorganic or organic processes and is not some new abstract force. When we talk about culture we are only talking about an abstraction culled from the observations of individual behavior, after all. He also argued that the "laws" of history or sociology are only rarely generalizable and almost never predictive. And finally, he asks where the laws of the superorganic apply: at the level of the individual person, or the group? If it is at the group, which group: "a clan, a language, a priesthood?"

The superorganic is still actively debated in anthropology, though usually manifested in different discourse. Leslie White—with his evolutionary view of culture and notion of "culturalogy"—is just one notable example. And under the influence of postmodernist theories of culture, this dialogue will no doubt continue.

— James Stanlaw

See also **Boas, Franz; Kroeber, Alfred Louis; Sapir, Edward; Spencer, Herbert; White, Leslie A.**

Further Readings

Kroeber, A. L. (1917). The superorganic. *American Anthropologist, 19*(2), 163–213.

Sapir, E. (1917). Do we need a "superorganic?" *American Anthropologist, 19*(3), 441–447.

Spencer, H. (1988). The evolution of society. In P. Bohannan & M. Glazer (Eds.), *High points in anthropology* (2nd ed.). New York: Alfred A. Knopf.

White, L. (1987). *Ethnological essays.* Albuquerque: University of New Mexico Press.

Survivals, Cultural

Toward the end of the colonial era, there seemed an imperative to collect, record, and catalog as much about the disappearing cultures encountered by colonial Europe as possible. From the perspective of the 19th-century traveler, government official, and academic, it seemed that cultural traditions were rapidly becoming extinct following the perceived lure of the modern world to those living in a traditional world. Cultural survival seemed impossible.

The mindset predominant during this era framed these cultural worlds in a "pre-" and "post-colonial" context. To the European, a pre-colonial world contained cultural traditions "found" by the civilized world to be in a kind of timeless equilibrium. The concept of "tradition" as something close to static and unchanging became a pivotal marker distinguishing these cultures as they were before colonial "discovery" and after. However, one has to question this notion of "tradition" and examine more closely what it implies in the context of cultural survival. Was it really the tantalizing "gifts" of the modernizing world seducing peoples of other cultures to

abandon their cultural traditions in such a way that survival became an issue?

The survival of a culture may be threatened by the imposition of other cultural forms that significantly alter existing forms and belief systems. Religious conversion is an example that is readily found in many examples of threatened cultural survival. Loss of language poses a further threat to a culture's survival, given the unique ways in which culture is expressed and transmitted through language. Further, the inability to pursue one's livelihood may have a detrimental effect on cultural survival. To herdsmen of the cattle cultures in eastern Africa, the removal of cattle from their care severely disrupts their view of the world and themselves within it. Cultural survival is threatened when the central focus of that culture is destroyed.

Of a more extreme nature, cultural survival becomes a major concern when a population decreases to such an extent that significant institutions can no longer be maintained. A classic example is the once prosperous Mandan Indians of North America. In the middle of the 18th century, an estimated 9,000 Mandan lived along the upper Missouri. Significant ritual activity required large numbers of Mandan participation. When waves of smallpox epidemics swept through the villages, these rituals could not be performed due to the sheer loss of life. The epidemics eventually diminished the population to approximately 63. Under such circumstances, cultural survival is extremely difficult, if not impossible.

People have always negotiated cultural change as new ideas, opportunities, or changing circumstances have arisen. Borrowings and reconfigurations of "other" ways of doing things have been an aspect of human culture from the beginning. The concept of survival is not an issue when these processes occur gradually and with the full involvement of the people in question. However, when this is not the case and change is imposed by outside forces (and sometimes inside forces brought about by revolution), cultural survival becomes an issue. The central questions are "What do we mean by survival?" and "What are the conditions that affect the way one culture 'survives' better than another?" "How does one measure 'survival'?"

— Shirley F. Campbell

See also **Anthropology, Cultural; Culture Change**

Further Readings

Bodley, J. H. (1990). *Victims of progress.* Mountain View, CA: Mayfield.

Steward, J. H. (Ed.). (1967). *Contemporary in traditional societies* (3 vols). Urbana: University of Illinois Press.

Swahili

Swahili (more properly *Kiswahili*) is in the Bantu family of languages that dominate most of sub-Saharan Africa. It is used as a first language by about five million people along the East African coast from Mozambique and the Comoro Islands to Somalia. More important, it is used as a lingua franca (in the form of nonstandard sociolects) by more than 30 million people in the interior, even into the Congo basin. It has a standard form, based on the Zanzibar dialect *Kiunguja.* This standard form, in roman script, is an official language of Kenya and Tanzania. It has also become widely taught in the U.S. as the "African" language, partly due to anglophone East Africa's accessibility to American scholars and partly to its adoption by African Americans for African heritage celebrations such as Kwanzaa.

Swahili is similar to other Bantu languages, with a system of noun classes whose prefixes occur linked in concord paradigms with other phrasal constituents. Thus, ***yule mtu mmoja mkubwa*** (lit: that person one large, "that one large person"). Verb inflectional affixes include subject, object, tense prefixes, and voice and aspect suffixes. Stems are often made from a syntactically unmarked root and a derivational suffix. However, unlike most Bantu languages, Swahili lacks tone as a distinctive phonemic feature. Lexically it is marked by many Arabic loans, so much so that some have portrayed Swahili as "Arabic" even though these have been modified into Bantu forms. The Arabic stem *k-t-b* (e.g., *kitab* "book," *kutub* "books") has become the Bantu noun stem plus prefix of *ki-tabu* "book," and *vi-tabu* "books." (Indeed, *Kiswahili* itself is similarly based on the Arabic *sawaħil,* "coasts.")

What is significant about Swahili is not its structural features so much as its varying sociolinguistic conditions. In the early 19th century (after hundreds of years as the language of the coastal mercantile

ports), it became the lingua franca of slave and ivory caravans from the coast to the interior. European colonial administrators, in turn, adopted it as the language of native affairs, required it for jobs, and supported its standardization, thereby providing it some degree of prestige. However, missionaries had ambivalent views in regard to its development. These ranged from supporting ethnic vernaculars in order to proselytize in a first language rather than in a "Muslim" second language, supporting Swahili as the language of a native church (much of the standardization was accomplished by missionary linguists), and supporting English instead as the language of a Christian African elite. With independence, and the desire for national symbols, Swahili was viewed as an alternative to either English (a medium of former colonial control) or an ethnic vernacular (a potential for exclusive ethnic privilege and exclusion). Tanzania made it their national language and developed it as a medium of post-primary instruction as well as national legislative and legal affairs. Kenya kept it as an official language along with English. English still occupies a position of dominance as the language of wider opportunity and education, and the challenges and prospects of developing Swahili to displace, or at least draw even with, English constitute an absorbing issue in language planning. For example, many pro-Swahili activists hold that some actions must be taken to slow the growth of English forms into Swahili.

— *John Rhoades*

Further Readings

Hinnebusch, T. J. (1979). Swahili. In T. Shopen (Ed.), *Languages and their status* (pp. 209–293). Cambridge, MA: Winthrop.

Wald, B. (1990). Swahili and the Bantu languages. In B. Comrie (Ed.)., *The world's major languages* (pp. 991–1014). New York: Oxford University Press.

Whiteley, W. (1969). *Swahili: The rise of a national language.* London: Methuen.

SYMBOLING

In its simplest definition, a symbol is a thing or action that represents another thing or action, and anthropologists agree that symboling is the unique cognitive capacity that allows advanced primates to have culture and to communicate their cultural concepts. Although they are used as synonyms, as verbs "symbolize" and "symbol" differ: to symbolize means to use existing concepts as symbols, and some higher nonhuman primates demonstrate this ability. To symbol means to symbolize, but also to create new symbols, a capacity of people but not yet convincingly shown to exist in apes and monkeys. In its most general usage, as representation and embodiment of meaning, and by the recognition that many cultural symbols are unintelligible separate from their cultural contexts, in the late 20th century the symbol became the focus of a specific field of anthropology: symbolic anthropology.

The term symbol is used popularly as synonymous with any of a variety of simpler forms of representation, for example, a sign, icon, or emblem. In fact, the symbol can do all that those forms can do, but it can do more: it not only represents, stands for, a thing or action; conceptually, the symbol can take on certain properties of its referent, and thereby it can stand in for, take the place of, the thing it represents. The symbol can be complex, embodying different levels of meaning, and even quite different realms of meaning, and displaying the quality sometimes known as "multivocality." The symbol can convey different meanings simultaneously, within the same communicative context, or in different contexts.

Also, the symbol may or may not bear any resemblance to, or have any intrinsic association with, its referent. This becomes clear when we understand that words are symbols. The concept of abstract speech and thought is of the same order as symboling. Leslie White's famous 1949 example of holy water (in *The Science of Culture*) illustrates the capacity, and complexity, of symbolic meaning. The unique capabilities of human culture are perhaps best demonstrated through religious ideas, and these semantic capabilities of the symbol are at the very core of religion. Raymond Firth observed in his 1973 work, *Symbols, Public and Private,* that "the relation [of the symbol to its referent] is such that the symbol by itself appears capable of generating and receiving effects otherwise reserved for the object to which it refers—and such effects are often of high emotional charge." This illustrates the amazing strength of the symbol: the symbol can take on the very qualities of whatever it represents, and if its referent has power, then the symbol itself becomes powerful. The concept of powerful

symbols is at the very core of religion, and is the means whereby magic is enacted. Religious symbols, such as the Christian cross, have power and are used protectively as amulets. Reproductive power is extremely strong, and objects representing the vulva, such as cowries, or the penis, such as horns, are ancient and widespread symbols of power. Some symbols transcend cultural boundaries and may be universal, such as eggs, horns, or the color red; most symbols are understandable only within their specific cultural/linguistic context.

Source: © iStockphoto/Dor Jordan.

Culture is recognized as a system of meaning, and each symbol is at once the locus and the vehicle of meaning. The social science focus on symbolism received strong stimulus by C. K. Ogden and I. A. Richards's *The Meaning of Meaning,* published in at least eight editions from 1923 through the 1940s. In the latter 20th century, a convergence of various influences—Freudian psychoanalysis, principles of linguistics, French structuralism, and the focus on symbolic meaning—gave rise to a new emphasis within cultural anthropology, the field of symbolic anthropology. Sigmund Freud's psychoanalysis taught that certain unconscious drives and influences are revealed through the careful examination of certain conscious modelings and expressions, through his famous principles of displacement and condensation. Much of Freud's reasoning has been dismissed, but he laid the foundation for recognition of basic cognitive dynamics and the nature and role of symbols in human consciousness. The study of linguistics expanded on understanding of the structure and processes of cognition; words embody meaning in culturally unique ways and, as explained by Edward Sapir and Benjamin Lee Whorf, certain linguistic constructions can influence perception and human action. Linguistics provided the framework for a very painstaking mode of investigation into meaning, the field of ethnoscience, in the 1960s. Structuralism, particularly as expressed by Claude Lévi-Strauss, drew from certain principles of linguistics and semiotics—the study of signs—to reveal further patterns of cognition. Lévi-Strauss' delineation of apparently universal cognitive dichotomies, such as culture/nature, village/bush, east/west, right/left, sun/moon, male/female, sacred/profane, stimulated new and exciting ethnographic analyses of specific cultural, spatial, and cosmological constructions both within and beyond anthropology. And the recognition by certain anthropologists, notably Victor Turner and Sherry Ortner, of what Ortner called "key symbols" in culture helped to stimulate anthropology's concentrated focus on symbolic meaning.

Symbolic anthropology became an American emphasis by the 1970s, though it had parallel emphases in Britain and Europe. Two of Turner's works, *The Forest of Symbols* (1967) and *The Ritual Process* (1969) became classics. Turner came to focus on ritual as a stereotyped and formalized enactment of social drama, symbolic of many layers and complexes of meaning, "themes." His concepts of the appositions of structure and "anti-structure" and his application of Arnold van Gennep's notion of "liminal" states, were influential beyond anthropology. Clifford Geertz' widely-cited essay, "Religion as a Cultural System" (1965) defines religion as "a system of symbols." His concepts of "deep play" and "thick description" were also widely influential (it is interesting to note that outside of anthropology, Geertz' use of the phrase "deep play" was misunderstood and has been variously applied and interpreted, including in terms of his "thick description," as a phenomenon whose full meaning is revealed only after careful dissection of convoluted layers of meaning). Geertz was arguing that—contrary to earlier anthropological premises, especially the premises of ethnoscience—cultural meaning is not deep in people's heads but is public, communicated,

and expressed in symbols, and can be adequately interpreted by outsiders.

Symbolic anthropology as a separate field of emphasis was criticized for several reasons. By isolating and focusing on symbols, even symbolic complexes, it tended to lose sight of their relationship with other dimensions of culture, to homogenize differences within a culture, and to emphasize and even exaggerate them beyond their importance within their cultural contexts. Theorists with Marxist or other materialist bent complained that by emphasizing the conceptual, symbolic anthropology lost sight of the structural and the material, both of which are critical in explaining social conduct. And, it might be noted, for heuristic purposes anthropology breaks down various institutions of culture and regards them as lenses through which the cultural system may be viewed, and so we have social anthropology, ecological, economic, political, legal, religious, and so on, a theoretically endless string of anthropologies. It might be argued that symbolic anthropology probably could not last for long as a separately demarcated field because it is tautological; culture *is* symbols.

But symboling may again emerge as a central focus for anthropological study, prompted by the recognition of a likely biological basis for this universal human capacity. In his 1975 book *Rethinking Symbolism,* Dan Sperber had suggested that symbolism may be rooted in inherent aspects of human cognition. Such suggestions are being confirmed today by modern developments in neuroscience, which have indicated cortical bases for that very fundamental primate cognitive capacity: imitation. Experiments by Marco Iacoboni and his colleagues at UCLA have shown that specific areas of the human brain are involved in subjects' imitation of actions, both when the stimuli are actions, and when they are symbolic representations of actions.

— *Phillips Stevens, Jr.*

Further Readings

Des Chene, M. (1996). Symbolic anthropology. In D. Levinson & M. Ember (Eds.), *Encyclopedia of cultural anthropology* (pp. 1274–1278). New York: Holt.

Dolgin, J. L., Kemnitzer, D. S., & Schneider, D. M. (Eds.). (1977). *Symbolic anthropology: A reader in the study of symbols and meanings.* New York: Columbia University Press.

Ogden, C. K., & Armstrong Richards, I. (1946). *The meaning of meaning* (8th ed.). New York: Harcourt, Brace & World.

Syncretism

Syncretism is defined as any attempt to reconcile disparate—and sometimes opposite—beliefs and practices. It represents a blending of schools of thought and is often associated with establishing analogies between two or more discrete or formerly separate traditions. Most academic studies of syncretism focus on the blending of religion and myths from various cultures. Viewed positively, syncretism seeks underlying unity in what appears to be multiplicity and diversity. It is common in language, literature, music, the arts, technology, politics, social organization and kinship, and economics. Anthropologist Jonathan Friedman has also suggested that the term syncretism may be useful in the study of social organizations, material culture, and processes of localization and globalization. Viewed negatively, syncretism is a contentious concept and has undergone many transformations. Among some religious leaders, for example, the term syncretism often implies impurity or contamination. Disagreements center on the word itself and on the history of its applications.

Contemporary celebrations of Christmas, Easter, and Halloween offer examples of syncretism in practice. Syncretism is not a new phenomenon. The ancient Romans adopted pagan Yule traditions that eventually made it into Christmas celebrations (Christmas trees, Yule logs, and the like), and Roman Catholics in Central and South America integrated elements from indigenous Latin American and North American religious traditions.

The Ancient Greek prefix "*syn*" means "with" and the word "*krasis*" means "mixture." Thus, the term "*synkrasis*" meant "a mixture or compound." The Greek words *σνγκρητισμόζ* (synkretismos) and *σνγκρητί ζειν* (synkretizen) do not appear in classical literature until the time of Plutarch (AD 45–125). Plutarch used a political meaning of the term in an essay titled "On Brotherly Love" (*Peri Philadelphias*),

which appeared as a chapter in his *Moralia.* In searching for the origin of the word "syncretism," Plutarch claimed to have found an example of syncretism in the Cretans, who reconciled their differences and came together in an alliance whenever they were faced with an external threat. He labeled this coming together as "their so-called 'syncretism'." For Plutarch, syncretism was not only a testament to political expediency but also fostered peace and brotherly love. Greek culture was a mixture of Persian, Anatolian, Egyptian, and later Etruscan-Roman elements into an overall Hellenic framework.

Throughout the 19th century, overt syncretism in folk beliefs was seen as a strong indication of the cultural acceptance of alien or earlier traditions. By the end of the 19th century, however, identities were no longer predicated on the existence of continuous and immutable cultures, and the concept of syncretism came to the forefront largely because it blurred local distinctions—a characteristic that made it useful for the rulers of multicultural nation-states. At the same time, the rejection of syncretism or "anti-syncretism" in the name of purity or orthodoxy helped to legitimize a desire for cultural unity.

Among American anthropologists, the term syncretism is most closely associated with Melville J. Herskovits, who is best known for his research on the survival of African cultural traits among blacks in the Americas. Herskovits advocated an appreciation of what he called "syncretized Africanisms" and focused on various types of "acculturation" in order to address more general issues of culture contact. Syncretism is apparent in New World religions such as Brazilian *Candomble,* Haitian *vodun,* and Cuban *Santeria.* These religions analogized various Yoruba and other African gods and selected Roman Catholic saints. Perhaps the most syncretized New World religion is Brazilian *Umbanda*, combining African deities, French spiritualism (*Kardecismo*), local aboriginal spirits, African and Hindu deities, and North American aboriginal leaders.

In *The African Religions of Brazil,* Roger Bastide attempted to account for syncretism by stressing historical processes like conquest and migration. He traced the various ways in which African, European, and aboriginal religions have come together in what he termed an "interpenetration" of civilizations. Rather than offering a psychological explanation, Bastide focused on groups of people who were differentiated by sex, social class, and age. By contrast, Stephen D. Glazier's research on the Spiritual Baptists in Trinidad focused on individual Baptist leaders and their practice of borrowing rituals from a variety of religious traditions but keeping these borrowed rituals separate in time and space. According to Glazier, one outcome of this process is a religion that is marked not so much by syncretism as by a dynamic juxtaposition.

Studies of syncretism in South Africa have focused on African Independent Churches (AICs). Anthropologist J. Y. D. Peel cogently argued that syncretism was not central to AICs because these churches represented reinterpretations of Christianity but never encouraged a mixture of Christianity and tribal elements.

In general, anthropologists have regarded the term "syncretism" favorably. Yet Stewart and Shaw report a growing uneasiness with the term among anthropologists who have been influenced by postmodernism. A major contribution of anthropologists has been to demonstrate that syncretism is not inevitable. It is possible, for example, for two groups to live in close proximity and largely ignore each other. For this reason, anthropologists find it both necessary and informative to examine syncretism with respect to relations of power. In *Syncretism and the Commerce of Symbols,* Goren Aijmer dramatically shifted the focus of research by asking, "Under what specific conditions do people in any one group pay attention to the cultural symbols of another group?" Aijmer concluded that syncretism is most intense whenever the inequality between cultures has been the most pronounced. Equally important, war, conquest, colonialism, trade, migration, and intermarriage bring syncretism to the forefront. Race, gender, age, and social class are also factors. He suggested that scholars must examine the relationships between global and localized syncretism. Are two or more religions influencing one another equally or is one dominating the rest? How does syncretism relate to issues of entrepreneurship and to theories of modernization?

It should be emphasized that authenticity and originality are not always dependent on the alleged purity and uniqueness of religions and that many so-called "original" religions are the result of a unique syncretism that has not occurred elsewhere. Researchers need to become sensitive to the ways in which people negotiate and redefine the boundaries of their ideas and practices. Shaw and Stewart underscore the need to examine problems of agency, especially when

agency is ascribed to religious traditions without reference to religious specialists.

At times, syncretism is seemingly intentional, while at other times it is largely unintentional. There are always unexpected consequences. It is imperative for scholars to chart the increasingly complex interconnections between syncretism, social change, and resistance. Stewart and Shaw concluded their study of syncretism by suggesting that the term be recast as "the politics of religious synthesis." A major focus, they postulated, should be on "anti-syncretism" and the antagonisms shown by agents who are largely concerned with the defense of religious boundaries.

— *Stephen D. Glazier*

See also **Anthropology of Religion; Religious Rituals**

Further Readings

Greenfield, S., & Droogers, A. (Eds.). (2001). *Reinventing religions: Syncretism and transformation in Africa and the Americas.* New York: Rowman and Littlefield.

Lawson, E. T. (2003). Agency and religious agency in cognitive perspective. In S. D. Glazier & C. A. Flowerday (Eds.), *Selected readings in the anthropology of religion: Theoretical and methodological essays* (pp. 99–106). Westport, CT: Praeger.

T

Taboos

Taboo is a concept that originated in a very specific cultural meaning and became generalized in popular English. Popularly it means forbidden and to be avoided—by custom, or because of some danger, or under some general supernatural sanction, or by explicit divine order. But in anthropology, it has much more specific meaning. Based in the universal idea that all things have an inherent mystical power of some sort, taboo means the avoidance of a specific behavior for fear of harm by a dangerous power, or of dangerous pollution caused by the intermixing of incompatible powers. Taboo circumscribes some kind of supernatural threat that is usually simply termed "danger." Some tabooed acts might have horrendous society-wide consequences; examples are incest, culturally defined but universally forbidden, or severe forms of sacrilege. But most taboos are sanctioned by some specific consequence, most commonly infection by some powerful mystical force, which can cause psychological or physical sickness, or some reversal of personal fortune, to the offender or to those close to him. Such infection may be termed pollution, or contamination, or defilement; it renders the offender impure or unclean, and such impurity or uncleanness is contagious, so the offender should be somehow isolated until the contagion has dissipated or a cleansing ritual of some sort has been performed. Examples of widespread taboos include entry by members of one sex into areas or activities restricted to the other; entry into certain adult activities by children, or into sacred areas or activities by uninitiated or otherwise profane persons; entry of objects associated with wildness or violence and death, such as weather gear, weapons, or butchering instruments, into areas demarcated for peace, socialization, healing, or sacred activities, such as the home, hospital, or temple; performance of acts involving tying or cutting or closing, or symbolic representations of any of these, by pregnant women; committing incest; physical contact with people with various sorts of bodily lesions, or with menstruating women, or with corpses; exposure of the adult genitals; and various magical activities. In such senses, taboos are culturally universal, and the concept has important implications not only for ritual behavior but for social and political organization.

The term was first introduced into European and American awareness by Captain James Cook after his Polynesian voyages and investigations of 1768–1779. It was recognized as having universal parallels by James George Frazer in the ninth edition of *The Encyclopedia Britannica,* 1875–1889. In Polynesian languages the term meant forbidden, as in a simple injunction, but it also meant sacred, and it involved a ritual prohibition enforced by a specific kind of supernatural sanction. In Polynesia and Melanesia it was defined in terms of *mana,* a communicable power innate in all things. Mana occurs in varying types and degrees of intensity, and in certain concentrations its different forms should be kept apart, lest some misfortune occur from their intermixing. Most mana is positive, like that of chiefs or benevolent spirits, but it can be overpowering to ordinary unprotected people, resulting in sickness or even death. It is similar to the concept of the sacred, which should be approached and handled only by sacralized priests; contact by ordinary people can pollute the sacred and endanger the offender. But mana can also be negative, even evil, like that in demonic spirits or corpses, or the malicious magic of sorcerers, and it is contagious, from initial to secondary contact, and a contagious person is isolated until the appropriate cleansing rite has been

performed. Early ethnologists of Polynesian belief and custom gave three prominent examples of taboo acts by ordinary people: touching chiefs, corpses, or newborn babies, but it should not be assumed that the resultant afflictions are identical. The English word "taboo" derives from the Melanesian and Polynesian variants *tapu, tabu,* or *kapu,* meaning having a dangerous quantity or type of mana, but like mana, the nature of taboo varies considerably throughout Melanesia and Polynesia.

Explanation of taboo has proved challenging throughout the history of anthropology. Explanations based in rationalizations of sensible prohibitions–avoidance of sexual relations among close kin or of eating dead flesh—quickly proved unsatisfactory. Early scholars saw in taboo a supreme example of the "irrational" in primitive culture. Captain Cook asked the men why, since they enjoy the company of women, it was *tabu* to eat with them; their answer was simply that it was their custom, and the custom was right. Indeed, the complex and widespread system of taboos in Hawai'i was seen as so cumbersome in the context of modernization that it was publicly violated and abrogated by King Kamehameha II in 1819. Less than a year after its abolition, most of the system was recorded by the missionary William Ellis in his four-volume *Polynesian Researches.* Taboo was quite early recognized as reinforcing patterns of respect and authority in Polynesia, and subsequently it has been seen to have important social, political, and cosmological functions.

It is a magical concept; the magical act involves establishing an active mystical connection over a distance. Magic most often involves the principles of similarity and contact; things which appear or behave similarly, or which have been in contact with each other, have a causal connection. Frazer in his *The Golden Bough* identified taboo as "negative magic"; it means avoiding the establishment of a magical connection by avoiding imitation of or contact with something. Sigmund Freud famously placed the origin of the taboo concept in the Oedipus complex, in *Totem and Taboo* (1913).

Émile Durkheim saw taboos as among a larger class of "interdictions" necessary to maintaining separation between the sacred and the profane. A. R. Radcliffe-Brown, in his famous Frazer Lecture on Taboo (1939), asserted that, as first observed by Frazer, taboos provide supernatural enforcement for the rules of society, and that these social results of taboos "constitute their essential function and the ultimate reason for their existence." Lucien Lévy-Bruhl offered similar interpretations in his various efforts in the 1930s to show how patterns of social organization develop out of patterns of thinking.

The concept of supernatural danger seems to have been recognized first by Frazer, and subsequent scholars have recognized its social implications. Mary Douglas incorporated it into the title of her great work, *Purity and Danger* (1966). Therein she surveyed many fields, examined instances of ritual avoidance in the Hebrew scriptures, especially *Leviticus,* and following the functionalist explanatory tradition in anthropology, she showed that taboos underpin social structure everywhere. Douglas further interprets taboo as functioning in a critical system of social and cosmological classification, serving to keep things of different orders and classes separate from one another. The apparently universal village-bush or culture-nature dichotomies recognized by Claude Léví-Strauss are strengthened and maintained by taboo, for example, Lele taboos against bringing fishing equipment into the village. Nature is wild and chaotic, culture is calm and orderly, and the classic principles of sympathetic magic explain how things that have been in contact with things or states retain the qualities of those states when separated from them. Many well-known "superstitions" can be similarly explained, for example, early warriors were forbidden to bring armor into the home; world religions forbid bringing weapons into places of worship; and western European heritage has superstitions about placing hats on beds or opening umbrellas inside the home.

— Phillips Stevens, Jr.

See also **Magic; Polynesians; Religious Rituals; Shaman; Sorcery; Symboling**

Further Readings

Douglas, M. (1966). *Purity and danger. An analysis of the concepts of pollution and taboo.* London: Routledge & Kegan Paul.

Radcliffe-Brown, A. R. (1939). *Taboo.* Cambridge: University Press.

Steiner, F. (1956). *Taboo.* London: Cohen & West.

Tahiti

Tahiti is part of the Society Islands, a group of 11 major islands and numerous smaller islets in the South Pacific also commonly referred to as French Polynesia; these islands are included geographically as part of East Polynesia by archaeologists. Tahiti is one of the windward isles of the archipelago, along with Maiao, Me'etia, Mo'orea, and Tetiaroa; the leeward isles include Huahine, Maupiti, Porapora, Ra'iatea, Taha'a, and Tupai. Tahiti, a double volcano, is the largest island in the Societies, comprising roughly two thirds of the Societies' total land area of 1,600 km.

The first human settlement of Tahiti may have occurred as early as 200 BC when settlers from Samoa and/or Tonga moved eastward; this chronology, however, based on dates from the Cook and Marquesas islands, has been disputed by some archaeologists. The earliest acceptable dates hover around AD 600, but because this would include a "long pause" of more than 1500 years between the settlement of Western and Eastern Polynesia, other researchers have argued that the earliest occupation sites have not yet been found. As further work is conducted and radiocarbon chronologies are more accurately determined (especially in places such as the Marquesas) the issue of when settlement actually occurred may be resolved.

Early archaeological research in the Societies began with Kenneth P. Emory in the 1920s and Garanger in the 1960s who primarily studied *marae,* the stone temples commonly found throughout Eastern Polynesia. Unfortunately, early focus on these ancient structures has resulted in a gap in understanding other aspects of prehistory in Tahiti and the rest of the Society Islands, although this been changing in recent years.

Due to this lack of intensive chronological research, only a basic chronology of human settlement has been proposed for the Society Islands, and primarily for the 'Opunohu Valley on Mo'orea. For this valley, Roger Green from the University of Auckland proposed four main phases of occupation: 1) the Pre-Atiro'o Phase (AD ??–1000), in which shifting cultivation occurred on the hillsides which led to heavy erosion; 2) the Atiro'o Phase (AD 1000–1650), in which the first evidence for stone structures appeared along with the development of arboriculture, especially of the Tahitian chestnut; 3) the Marama Phase (AD 1650–1788), which was signaled by the conquest of the area by other chiefs, as well as the construction of elaborate *marae;* and 4) the Pomare Phase (AD 1788–1812), a period when European contact led to massive changes in the traditional lifestyles of local inhabitants. Throughout this cultural sequence, Polynesians in Tahiti and the rest of the Societies were becoming increasingly complex socially and economically, with an elaboration of temples that show an increased control by the social elite.

European contact with Tahiti came after the British explorer Samuel Wallis landed on the island in 1767. The hospitality of the local Pomare family toward these and other Europeans fueled the myth of Polynesia as a "paradise" where people lived and loved freely. As Patrick Kirch noted in 2000, "No island society was more influential in forming eighteenth-century European conceptions of Polynesia and the "noble savage' than "Otaheite," purported isle of love and salubrious existence where nature's bounty made work unnecessary."

Throughout the late 18th and 19th centuries, trade and exchange between Tahitians and Europeans grew. One of the most famous trading incidents occurred in 1789 when the H.M.S. *Bounty* arrived in Tahiti to gather breadfruit trees so to feed slaves in the Caribbean. Captain William Bligh was set adrift with other crewmembers after the ship was captured by the Master's Mate Fletcher Christian in the famous "mutiny on the Bounty." The mutineers returned to Tahiti where some of them decided to stay; the others, including Christian, escaped to the remote island of Pitcairn with some Tahitian men and women, forming a small colony. After a violent beginning, they settled down; many of the descendents of Pitcairn today are related to the Bounty's mutinous sailors.

— *Scott M. Fitzpatrick*

See also **Polynesians**

Further Readings

Garanger, J. (1967). Archaeology and the Society Islands. In G. A. Highland, R. W. Force, A. Howard, M. Kelly, & Y. H. Sinoto (Eds.), *Polynesian culture history: Essays in honor of Kenneth P. Emory,* Special Publication No. 56 (pp. 377–396). Honolulu, HI: Bernice P. Bishop Museum.

Green, R. C. (1996). Settlement patterns and complex society in the Windward Society Islands: Retrospective commentary from the 'Opunohu

Valley, Mo'orea. In M. Julien, M. Orliac, & C. Orliac, (Eds.), *Mémoire de Pierre, mémoire d'homme: Tradition et archéologie en Océanie,* (pp. 209–228). Paris: Publications de la Sorbonne.

Kirch, P. V. (2000). *On the road of the winds: An archaeological history of the Pacific Islands before European contact.* Berkeley: University of California Press.

Taj Mahal

The Taj Mahal stands on the banks of the Yamuna River in the city of Agra, in the northern Indian state of Uttar Pradesh. It is one of the most recognized buildings in the world. The Taj Mahal is actually a complex containing a mausoleum, a mosque, a guesthouse, a large entrance gate, and extensive gardens filled with waterways, pools, and fountains. The monument was constructed in the 17th century under the direction of Shah Jahan at the peak of Mughal power in India.

The Mughal Empire (AD 1526–1707) was a stable unifying force in India for two centuries. Its roots can be traced back to Central Asia. Mughal is the Indian spelling of Mongol. The Mughal style blends balance and harmony with intricate decoration. Mughal influence is still seen throughout India today in architecture, language, customs, and fashion.

Shah Jahan rose to the throne at the peak of the empire's power and glory in 1627 after five years of rebellion against his father. Mughals had no system for determining ascension to the throne, so imperial princes were forced to fight for it. The strongest or smartest would become the next emperor. Shah Jahan immediately ordered the deaths of a brother, nephew, and some cousins to clear away possible rivals. He settled his family into Akbar's Red Fort palace, took control of the empire, and commenced almost 30 years of peaceful rule.

Shah Jahan's favorite wife was Mumtaz Mahal. She was beautiful and very intelligent and would accompany the Shah everywhere as his closest adviser. When she died in 1630 while giving birth to his fourteenth child, Shah Jahan went into deep mourning for two years. In 1632, he ordered the construction of a mausoleum at Agra to house her remains. The entire project took 22 years to complete with the efforts of 20,000 laborers and craftsmen.

Two supervisors were chosen to oversee the project. Workers came from all areas of the empire, Persia, and Central Asia. A site was selected on a bend of the Yamuna River in sight of the Red Fort. To prepare the site, a deep foundation was set on arches. This base was constructed to protect the mausoleum against flooding during the monsoon season. The base for the tomb was constructed from red sandstone, a common building material of the time. The tomb itself, however, was built of solid white marble, which appears to change color in the light at various times of the day. The marble is covered with intricate inlay of precious and semiprecious stones incorporating three major elements seen in Muslim art: passages from the Qur'an, flowers and plants, and geometric designs. The artisans were so skilled that it is very difficult to see any seams in the marble panels. As you read the passages going up the wall, the letters gradually increase in size so the lettering looks uniform from the floor. The calligraphy inlay was created with onyx. Twenty-eight varieties of precious stones were used for the designs. Materials were brought great distances by elephant, including jade and crystal from China, turquoise from Tibet, sapphire and lapis lazuli from Sri Lanka, and more.

The stone monuments for Shah Jahan and Mumtaz Mahal are in a large central chamber under the dome. A lacy marble screen keeps visitors at a respectful distance. The actual tombs are in a chamber beneath that. The tomb chamber originally had massive silver doors, chandeliers, and precious Persian carpets. The tombs were covered with sheets of pearls. All of the finery here was stripped and carried away by marauding soldiers more than one hundred years later when the empire was in a shambles.

The Taj Mahal is flanked by two matching red sandstone structures. One side is a mosque for guests to pray in, and the other side is a guesthouse for visitors. The garden is divided into four quadrants by waterways representing the four rivers of Paradise. Each quadrant is divided into four, and those again into four, making an ordered, symmetrical grid. The gardens are filled with shade trees and flowers. Fountains and a reflecting pool make a peaceful place for walking. The entrance of the huge front gate perfectly frames the entrance to the tomb. The design of the Taj Mahal both structurally and decoratively expresses joy and happiness; Islamic tombs are not

Source: © iStockphoto/Aravind Teki.

meant to be places of sorrow. The Taj Mahal epitomizes joy, balance, and harmony.

— *Jill M. Church*

See also **India, Philosophies of; Islam; Temples**

Further Readings

Nou, J. (1993). *Taj Mahal.* New York: Abbeville Press.

Rothfarb, E. (1998). *In the land of the Taj Mahal: The world of the fabulous Mughals.* New York: Henry Holt and Company.

Stierlin, H. (2002). *Islamic art and architecture.* New York: Thames and Hudson.

Tamarins

Tamarins are one of 16 species of small New World monkeys grouped in two genera: *Leontopithecus* and *Saguinus.* They belong to the subfamily Callitrichinae, which also includes their smaller counterparts, the marmosets (*Callithrix, Cebuella,* and *Mico*) and Goeldi's monkeys (*Callimico*). Callitrichines are the smallest monkeys in the world, with bodies ranging between 20–30 centimeters in length with a tail of 30–40 centimeters. They have thick fur, which makes them look deceptively larger than their actual body size. In addition, many are brightly colored and have distinguishing manes, tufts, and moustaches. Callitrichines are unlike other New World monkeys in several features: they do not have prehensile tails, they lack a third molar (except *Callimico*), and they regularly have twin offspring (except *Callimico*). Callitrichines were once considered the most ancestral New World monkeys because of their small body size and derived claws (instead of nails). However, these traits are more likely derived specializations related to adaptations for insectivore and exudate (gum and sap) feeding rather than signs of primitiveness.

Tamarins are found in the tropical regions of South America and Panama. They are diurnal, arboreal, quadrupedal, and feed on plants, insects, and exudates. Tamarins are unable to gouge holes in tree

Source: © iStockphoto/Tom De Bruyne.

Source: Photograph courtesy of Gregory Scott Hamilton.

bark to stimulate the flow of exudates. Instead, they exploit exudates found at holes previously gnawed by sympatric marmosets or holes made by wind and insects. Tamarins use their derived claws to cling to tree trunks while feeding on saps and gums and for searching for insects hidden in tree bark.

Tamarins exhibit variable social organization and have been found in polygynous, monogamous, and polyandrous groups mostly composed of recently dispersed, unrelated individuals. In polyandrous groups, there is often one breeding adult female and more than one breeding adult male. It is thought that male tamarins allow other males reproductive access to the female because the survival rate of offspring raised by two fathers is higher than the survival rate of offspring raised by one. Adult males and other group members play an active role in raising the young, which is necessary since female tamarins often give birth to twins. By having group members help carry the infants, females do not expend unnecessary energy transporting them. This also allows females to forage unimpeded. In addition, healthier females are able to produce more offspring at more frequent intervals. In tamarin groups in which there is more than one adult female, the subordinate females' reproductive capabilities are often hormonally suppressed by the dominant female. This means that even though there may be more than one adult female capable of breeding in a tamarin group, usually only the dominant female produces offspring.

At least three species of tamarin are considered critically endangered: the black-faced lion tamarin (*L. caissara*), the black lion tamarin (*L. chrysopygus*), and the golden lion tamarin (*L. rosalia*). The latter is most known for a successful captive breeding program and reintroduction into the forests of Brazil when it was on the brink of extinction.

— *Lisa M. Paciulli and Andreas Jensen*

See also **Marmosets; Monkeys, New World**

Further Readings

Fleagle, J. G. (1999). *Primate adaptation and evolution.* San Diego: Academic Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* East Hampton, NY: Pongonias Press.

Rylands, A. D. (Ed.). (1993). *Marmosets and tamarins: Systematics, behavior, and ecology.* Oxford: Oxford University Press.

Taphonomy

Taphonomy is the study of processes by which organic remains and traces are incorporated into the fossil record. The term is derived from Greek roots: *taphos,* meaning burial, and *nomos*, meaning law. Taphonomy is the subdiscipline of paleontology and archaeology predominantly concerned with the characteristics and context of fossil remains, in which the challenge of deciphering information from ancient remnants is considerable. The rigors of death, transport, and burial severely modify and degrade organic remains to cause information loss: loss of original chemistry, loss of original size and shape, and loss of biological context. Only rarely do geologic processes stem this loss and preserve the remains of an individual or assemblage as a fossil. By then, the richness and diversity of a living ecosystem has become a few bones or shells scattered along a thin layer of siltstone. By measuring, mapping, and understanding the way dead vertebrate, invertebrate or plant remains behave on this transition from biosphere into lithosphere, taphonomists help clarify natural biases of the fossil record and oppose the entropy of information invoked by death and time.

History

The origins of taphonomy lie in the development of paleontology during the late 15th century, when Leonardo da Vinci recorded concern that marine fossil deposits found at elevations far from the coast could not be explained by the preponderant theory of biblical deluge. Questions about what agents and mechanisms could explain the mortality, assemblage, and preservation of such fossil deposits formed the basis of taphonomical investigation, as it became recognized that a better understanding of these processes could provide more accurate answers about ancient life and environments. Archeology and forensic science were also challenged by postmortem processes to focus, in archaeology's case, on prehistoric hominid reconstructions, and in forensic sciences, to discern the time and cause of death for legal reasons. The fusion of these aspects with concepts of physical biology and sedimentology occurred in 1940 when the Russian paleontologist Efremov coined taphonomy as "the study of the transition (in all its details) of animal remains from the biosphere into the lithosphere."

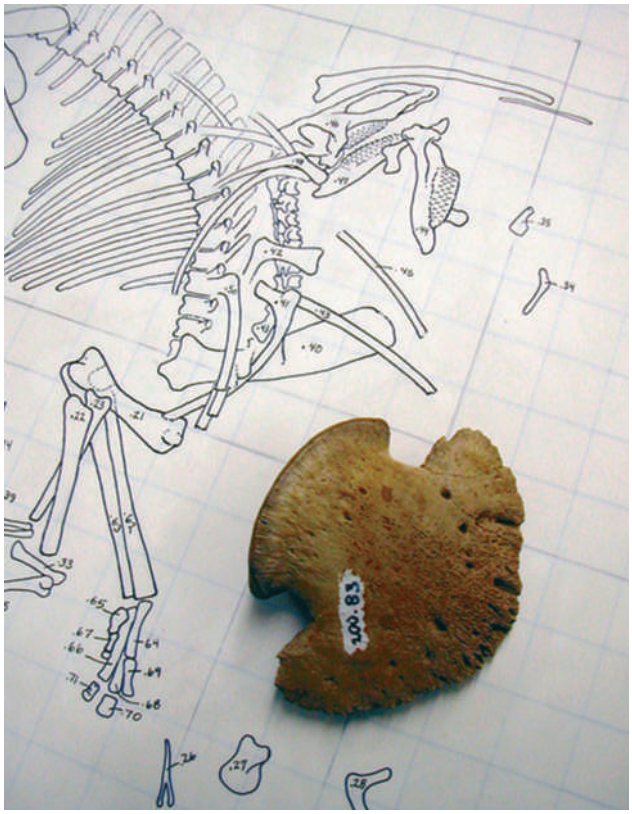
Process and bias

Taphonomic studies are based upon observing the abundance, distribution, and modification attributes of fossils. Data collection starts with the mapping, measuring, and identification of all elements in context with enclosing sedimentology. The taxa present may be identified and any evidence of sexual and age distributions considered, with a view to later calculating the relative abundance and representation of different species.

The spatial relationships and orientation of fossil elements can be critical to the interpretation of paleohistories. The alignment of elements (or a whole carcass) can demonstrate factors from the time of death or burial such as stream flow direction and rate of deposition. Further information about the taphonomic history may be deduced by combining the spatial data with detailed lithological study. In the case where an accumulation of bones with vertical orientations could derive from a high-energy hydraulic event or be the result of biological factors like trampling around a waterhole, the structure of sedimentary layers surrounding the bones will indicate the correct paleohistory.

Further evidence can be found directly on the fossilized elements, most of which show modification and damage from different stages of their life-and-death cycle. By studying characteristics of the damage, such as shape, size, and position on the element or carcass, the most likely explanation or taphonomic path may be resolved. Pathological and traumatic damage is sustained during life and is evidenced by diseased tissue, natural fractures, and healed bone growth. Postmortem damage may result from many factors including predation, scavenging, trampling, and transport, which may all leave signs upon the hard tissues, such as tooth marks and erosions. Postburial damage is sustained due to the compaction of burial in sediment or diagenetic dissolution, which may leave characteristic fractures.

The correct identification of such fossil evidence can be greatly assisted by studying the taphonomic path of modern organisms. For example, when reasoning why there is a preferential preservation of males over females in Pleistocene deposits of fossil Irish elk, it may be of great help to study the factors affecting seasonal mortality in extant elk herds. Other types of actualistic experiments may include the butchering of mammal carcasses or monitoring the



Source: Photograph courtesy of Mark James Thompson.

agents of decomposition, comparing the effects on fresh organic tissue with those of fossil counterparts. Conclusions must allow for differences when comparing environments across great timespans in order to minimize the degree of bias that will inevitably develop.

Our view of the quality and quantity of biota in ancient environments can also be biased due to organisms having different preservation potential. Mortal processes tend to destroy soft-bodied organisms and preferentially preserve those with hard shells or strong skeletal structures. This causes hard-bodied organisms to be overabundantly represented in the fossil record, skewing our data with which to reconstruct accurate paleoecologies. The effect can apply equally within fauna or marine environments, in which the movement of shell material by waves or currents will affect the eventual composition of the fossil assemblage. Small or thin shells may be abraded away while larger, more robust shell material may be concentrated. Another factor for taphonomists to consider is that only those remains of organisms inhabiting a depositional environment will tend to be buried and fossilized, compared to those from erosional or nondepositional areas. These sorts of factors explain the paucity of taxa in some fossil assemblages, and why fossils of terrestrial vertebrates are rare compared to marine invertebrates. In extremely rare cases a mass mortality event will capture a census assemblage where all of the contemporaneously living members of a community are preserved together. These exceptional deposits are termed *Fossil-Lagerstätten*, coined from a German mining word meaning *mother lode*. These deposits are treasured for their greater, more complete sample of biota that provides less biased evidence with which to study paeloecologies.

Mortality

Death is an inevitable part of the cycle of physical elements through a biologic host, and the modes of death may be coarsely classified into dying or being killed. Although the actual causes of mortality are many and include death by predation, drowning, dehydration, starvation, and hypothermia, amongst so many others, it remains difficult to ascertain with confidence the cause of death in any long-dead organism from its fossilized remains. Any direct evidence of fatal cause is usually requisite in the soft tissues, which rarely endure into fossilization. Most evidence of attritional mortality is ambiguous. Even in the rare fossils in which a vertebrate forms the stomach contents of another, it is challenging to determine if the consumed organism was killed in the act of predation or was in fact scavenged after an earlier unrelated mortal event. Catastrophic events can be more suggestive by providing an apparent sedimentological record with which to analyze mortal cause. Dinosaurs in Mongolia were fossilized in the act of fighting or still perched upon a nest of eggs, demonstrating how rapid the sand-slides were that entombed them, and thereby showing the likely cause of death to be suffocation.

Biostratinomy

At the instant of death, a host of biological and physical processes will modify and degrade an organism's remains until the potential protection of burial. The study and understanding of these processes and their effects on taphonomic histories is called biostratinomy. The first agent of change is usually necrolysis, the process of decomposition and putrefaction.

This removes the soft tissues that normally bind bodily elements together, allowing them to disarticulate. Other agents that can effect disarticulation are predators and scavengers, including ancient man whose tool use during butchering operations created unique marks and fractures on bony elements. Necrolysis and disarticulation also have the effect of exposing a greater amount of the remains to weathering factors such as saturation, desiccation, and temperature changes, as evinced by characteristic surface textures, oxidation, flaking, or fractures. The consumption of remains by predators and scavengers will often result in further disarticulation and scattering, but not the total loss of material. The resulting fecal deposits are termed *coprolites;* these can provide valuable information of dietary behavior, while elements that have been consumed and passed can be deduced from characteristic corrosion of surfaces.

Most organic remains undergo some form of transport between death and incorporation into the fossil record, either by physical or biological processes. Due to the inherent nature of sedimentation, hydrodynamic transport and sorting of remains is often a major agent of dispersal or accumulation. In the case of vertebrates, it is common for the different individual bones, which have different hydrodynamic properties, to be transported different distances from the initial point of death. Plants too are only very rarely preserved in situ with all their different components attached: leaves, stems, trunks, fruit, flowers, and seeds. An organism's remains believed to be in situ are termed *autochthonous;* whereas if the remains have moved they are *allochthonous.* Because allochthonous fossil assemblages require transport, there will usually be evidence of the transport process such as abrasion or an obvious contrasting environment. A vertebrate carcass, bloated with the gases of necrolysis, can float away from the site of death to travel great distances on ocean currents before descending to the sea floor. Fossilized remains of dinosaurs, found wholly within marine sediments, indicate the carcasses were transported over 60 kilometers from their nearest terrestrial habitat. But not all hydraulic agents of transport have the effect of dispersing remains. Rivers can concentrate scattered elements to form rich bone-beds in point bar deposits, and wave action in marine settings may concentrate invertebrate remains to geological proportions.

There can also be active biological agents of accumulation to consider in taphonomic study. Extant porcupines in Africa have been observed collecting up to thirty-eight bones each year, accumulating them in each lair to gnaw on for minerals and to control the length of ever-growing incisor teeth. This type of taphonomic history may be indicated in an accumulation of fossil bones where flat-bottomed grooves on bones are prevalent.

Diagenesis

As remains are entombed, usually in sediment but sometimes in amber, they become isolated from biostratinomic modifications, but then begin a new stage of different processes acting to modify their original mineralogy and texture even further. This post-burial physical and chemical alteration of remains is termed diagenesis. After deposition, organic tissue is compacted as it is buried beneath successive layers of sediment. Hard tissues will be broken, the resulting fractures combining with those of previous processes to obscure the true taphonomic histories. Compaction also causes plastic deformation that distorts morphological measurements, and in some cases causes misidentification of elements or even taxa.

As the organic tissue and any associated bacteria come into contact with ascending or descending groundwater, the remains become a focal point and catalyst for geochemical reactions of enrichment or dissolution. It is common for the organic tissue to be dissolved away altogether, leaving only casts and molds in the sediment to preserve a shape or outline. Carbonization occurs where the original remains are lost as volatiles, leaving behind a film of mostly carbon that can preserve soft tissue outlines and is a common mode of plant preservation. When the surrounding groundwater contains favorable elements in solution, processes of mineralization may take place. Minerals like phosphate, pyrite, quartz, and calcite may precipitate into the pore spaces and replace the original tissue structures. In exceptionally rare cases, anaerobic bacteria may continue activity for some time after burial, their metabolism releasing gases that initiate rapid precipitation at the microscopic sites of consumption. In this way, soft tissues such as skin and internal organs are preserved as three-dimensional, mineralized replacements.

The mineralizing processes of diagenesis may assist the long-term preservation of the remains by replacing relatively soft bone minerals with those more resistant to crushing and, much later, erosion. From

this aspect, diagenesis and other mortal processes may be seen to provide information of the past rather than destroy it, enabling material to be discovered for the taphonomist to ponder.

— *Mark James Thompson*

Further Readings

Behrensmeyer, A. K., & Hill, A. P. (Eds.). (1988). *Fossils in the making: Vertebrate taphonomy and paleoecology.* Chicago: University of Chicago Press.

Donovan, S. K. (Ed.). (1991). *The processes of fossilization.* London: Belhaven Press.

Lyman, R. L. (1994). *Vertebrate taphonomy.* Cambridge: Cambridge University Press.

Martin, A. J. (2001). *Introduction to the study of dinosaurs.* Malden, MA: Blackwell Science.

Mountain, M., & Bowdery, D. (Eds.). (1999). *Taphonomy: The analysis of processes from phytoliths to megafauna.* Canberra: ANH Publications, Australian National University.

Shipman, P. (1981). *Life history of a fossil: An introduction to taphonomy and paleoecology.* Cambridge, MA: Harvard University Press.

Tarsiers

Tarsiers are small arboreal primates (genus *Tarsius*) that inhabit the forests of various islands of the Philippines, where they are active primarily during dawn and dusk. Their common and genus names reflect the fact that this small primate's tarsal (ankle) bones are extremely long, making its "heel" a major component of hind limb elongation. Functionally, tarsal elongation acts as a lever in the tarsier's leaping mode of locomotion. There are at least five recognizable species of *Tarsius: T. syrichta, T. bancanus, T. spectrum, T. pumilus,* and *T. dianae.* Solitariness among males and females is the most consistently documented social behavior.

Tarsius is unique in many ways compared to other extant primates. It is the only primate with reptilian-like scales, which are located around its nipples and on its tail (which bears a tuft of hair only at its tip). It is also the only primate whose tail is longer than its body and whose eyeball is larger than its brain. It has conical eyeballs that do not move in their sockets, however it can rotate its head 180 degrees in either direction. The tarsier grows sinus hairs externally on its nose and has interdigitating, sensory hairs around its upper and lower lips (forming an "oral organ"). It has a grooming claw on its third pedal digit. It is also the only primate that develops hemochorial placentation in the environment of a bicornuate uterus, and that begins amniogenesis via cavitation but then converts the process to folding. The tarsier is totally proteinivorous, eating prey larger than itself, including fish, birds, lizards, and poisonous, neurotoxic snakes. Whether as a result of becoming unique or remaining primitive compared to other primates, the tarsier bears a well-developed anterior cusp (paraconid) on all three of its lower molars that lies distinctly apart from the next cusp behind (metaconid). Its upper anterior teeth are caniniform and those behind increasingly premolariform; the lower anterior teeth resemble the lateral teeth of toothcombed primates, with the teeth behind becoming increasingly premolariform. Furthermore, its chromosome number is the greatest among primates (2N = 80).

Tarsiers have for the longest time been grouped with primates of Madagascar, lorises, and bushbabies in the suborder *Prosimii.* One compelling reason is that they all uniquely possess a grooming claw on the second pedal digit. The morphological counterpart to

Source: © iStockphoto/Ronald Fernandez.

the lateral tooth of the uniquely prosimian toothcomb complements this hypothesis. Dental features link *Tarsius* with the loris group.

In 1918, Pocock grouped *Tarsius* and anthropoids in the suborder *Haplorhini* because they all supposedly have laterally continuous (not slit) nostrils. The remaining prosimians were relegated to *Strepsirhini.* Pocock was incorrect about *Tarsius,* but Hill kept *Haplorhini* alive by confusing "single nostril" with "single upper lip," a feature that does not, however, correctly characterize all New World monkeys (making *Tarsius* and catarrhines the only primates with a smoothly continuous upper lip). Various questionable features have been invoked in support of *Haplorhini*, for example, hemochorial placentation (but cetaceans and various bats and rodents, not *Tarsius,* approach the anthropoid condition) and partial postorbital closure (which develops differently and involves different bones in *Tarsius* versus anthropoids). The absence of a retinal fovea and a rhinarium do, however, support this hypothesis.

— *Jeffrey H. Schwartz*

See also **Lorises; Monkeys, New World**

Further Readings

Fleagle, J. G. (1999). *Primate adaptation and evolution* (2nd ed.). New York: Academic Press.

Niemitz, C. (Ed.) (1984). *Biology of tarsiers.* Stuttgart: Gustav Fischer Verlag.

Wright, P., Simons, E. L., & Gursky, S. (Eds.). (2003). *Tarsiers: Past, present and future.* Rutgers, NJ: University of Rutgers Press.

Tasmania

The first evidence of human habitation on Tasmania dates from around 23,000–25,000 years ago, when the Bass Strait was actually a land bridge and allowed for easy passage between the mainland and Tasmania. Then, between 8,000–12,000 years ago, with the warming of the Earth, the Strait flooded, leaving the small population stranded for the longest period of human isolation ever.

These aboriginal Tasmanians were hunter-gatherers who ate marsupials such as wombats and kangaroos, seafood such as crayfish and crab, and plant foods such sea kelp, roots, berries, and fungi. Their political organization was akin to many other food collecting societies in that homestead groups of between two and eleven were joined together through both kinship and geography into acephalous bands of 40 or 50 people. Bands were the primary landholding units, not landowning as there was no private property recognized, while tribes were the largest political units. Contemporary aboriginal organizations say that nine tribes existed prior to European contact. While some publications speak of 35 coastal and 22 inland "tribes," this is most likely a misuse of the word for what anthropologists generally call bands.

Despite their relatively simple technology, Tasmanian aborigines did not live in a "state of nature." They transformed their habitat through the use of controlled burns to clear the land for easier travel, flush out animals, and encourage the growth of new plant life. They also created tools, nets, and baskets and other containers from bone, wood, stone, woven grasses, sinew, seaweed, and bark. Small boats were also constructed out of bark and grasses, to travel to offshore islands in the summer months for hunting seal and muttonbirds and gathering other seasonal foods.

Tasmania's cold, wet climate necessitated both shelter and some protection for the naked body. There were two basic designs for shelter: bark, lean-to windbreaks and dome-shaped huts thatched with grass or bark and lined with feathers or fur. This latter form dominated in Tasmania's cold western area and were lived in year-round, while the temporary windbreaks sufficed in the warmer areas of the east. Despite Tasmania's weather, most people actually wore very little clothing. Women did don cloaks made of kangaroo skins, as did men at the coldest times, but children and many adults protected themselves largely by rubbing a mixture of fat, ochre, and charcoal onto their skin. In addition to this adornment, adults also practiced cicatrice, or ritual scarification, and wore necklaces of fur, shell, or other materials.

Tasmanian aborigines' religion had many features in common with those on the mainland. They believed in spirits, had totemic animals and plants, and observed their associated taboos. They also cremated their dead, avoided speaking of them afterward, and had a strong belief in the afterlife. The only existing examples of Tasmanian visual art are geometric petroglyphs of circles, lines, and dots seen today on

the west coast, which may tell creation myths and other dreamtime stories. Unfortunately, few language features—other than several songs, place names, and a few word lists—were recorded from the five related dialects that were spoken on Tasmania prior to European settlement.

The first person of European descent to land on Tasmania was Dutch explorer Abel Tasman, who arrived in 1642 but did not see any of the island's inhabitants. This event didn't recur for another 130 years; in 1772 Nicholas Marion du Fresne, a French explorer, met a large number of aborigines at what is now called Marion Bay. Later, many more European explorers, including Cook, d'Entrecasteaux, and Baudin, all made brief landings on the island and enjoyed relatively friendly relations with the natives. Unfortunately, this changed in 1803 when European settlers arrived on Tasmania, bringing with them superior weapons, new diseases, and ideas about both private ownership of land and the evolution of human societies that had devastating effects on the indigenous population. For example, in November, 1828, Europeans were given permission to kill any indigenous person on sight when martial law was declared on the island. In the end, this devastation was so great that by the 1830 census, only 350 aborigines were recorded and by the late 19th century, most Europeans believed that the last Tasmanian aborigine, Truganini, died in May, 1876.

Fortunately, the mythology of Truganini as the last Tasmanian was just that, mythology, for in the 2001 census, 15,773 Tasmanians identified themselves as being indigenous, far more than the estimated 1,500–7,000 who lived on the island before European settlement. This transformation has been fueled on three fronts. First, the recognition of aboriginality by those of European descent has been delinked from strict racial definitions to include the descendants of those aborigines who were transported to the Furneaux Islands in the 1830s, many of whom married or at least had children with the small European sealing community that had taken up residence on some of the larger islands. Many of these people moved back to Tasmania between the 1940s and 1970s, for economic reasons. Second, political developments among aborigines themselves have encouraged more people to recognize their own indigenous origins. Third, some aboriginal people from the mainland and Bass Strait and Torres Strait islands have moved to Tasmania in the past decades.

The priority for many people who consider themselves today to be aboriginal Tasmanian is cultural recovery. Toward this end, aboriginal child care centers were established in both Hobart and Launceston in the 1980s. Numerous aboriginal community events also take place each year in cities, towns, and at aboriginal sites all over Tasmania. The other priority has been the physical recovery of ancestral remains from museums all over the world, toward which the state of Tasmania has been helpful in passing a law requiring all such samples be returned. As a result, in February, 2002, the British College of Surgeons returned samples of Truganini's skin and hair, along with the bones of other indigenous Tasmanians that they had held since the 1870s. Numerous other scientific institutions both in and outside of Australia have done likewise since the 1970s.

— Barbara West

See also **Aborigines; Ornamentation; Petroglyphs**

Further Readings

Council for Aboriginal Reconciliation and ATSIC. (1992). *Aboriginal people of Tasmania.* Canberra: Commonwealth of Australia.

Cove, J. J. (1995). *What the bones say: Tasmanian aborigines, science, and domination.* Ottawa: Carleton University Press.

Plomley, B. (1993). *The Tasmanian aborigines.* Launceston, Australia: The Plomley Foundation.

Tax, Sol (1907–1995)

Dedicating himself to the dual goals of "action anthropology" and the internationalization of anthropology, Sol Tax was instrumental in changing anthropological practice and pioneering new forums for anthropological debate. Although he published relatively little over the course of his career, Tax made significant contributions in three theoretical areas of anthropological research: acculturation, capitalism in small-scale societies, and cultural identity.

With regard to action anthropology, Tax's activist-oriented approach to anthropological practice led the way to the contemporary approaches to applied anthropology. During the 1940s, Tax opposed what

was then considered applied anthropology because it was based in an ideology of modernization that disregarded the culture of those being aided. In order to disassociate himself from applied anthropology of the time, he conceptualized action anthropology as a practice in which anthropologists not only learn but, of equal importance, aim to help. Such ethnographic projects must consider the opinions, needs, and critiques of those who are the subjects of study and aid. His contributions are recognized by the Society of Applied Anthropology, which awards the Sol Tax Distinguished Service Award to anthropologists who have demonstrated long-term commitments to applied approaches, communication among the subdisciplines, ethical practices of research, and editing anthropological journals.

As director of the Fox Indian Project, Iowa from 1938 to 1962 and as an ethnologist working for the Carnegie Institution in Guatemala from 1934 to 1946, Tax participated in substantial ethnographic projects, in which his action anthropological approach was evident. With the Fox project his position on action anthropology congealed. Reacting against the acculturation models of post-World War II anthropology, Tax took the position that then current models—preserving traditions and acculturation into the dominant society—were theoretically inadequate and failed to serve the best interests of the Fox. In contrast, Tax argued that the Fox and other American Indians were and continued to be active agents in the processes of change. The culmination of the Fox project and his position on action anthropology came with the pan-Indian "American Indian Chicago Conference" in 1961, which focused on the future, not on their past and the maintenance of tradition.

Tax's research in Guatemala proved to be the most fruitful theoretically. For more than 50 years, his book, *Penny Capitalism,* has generated debates within anthropology as well as within other disciplines about the effects of capitalism on and the economic rationality of members of small-scale societies. Furthermore, it preceded Chaynovian-inspired analyses of household peasant economics by nearly 15 years. Parallel to the economic debates are those related to cultural and ethnic identity. Under his influence, Mesoamericans ceased to be identified as members of tribes, and he recognized that identity was oriented first around community, not language. More importantly, his discussions of Mesoamerican indigenous identity anticipated postmodern theories of difference and power relations as essential components to cultural identity.

From organizing international symposia to translating many of the ethnographic monographs associated with the Carnegie project into Spanish, Tax's most significant contribution to the internationalization of anthropology was the founding of the journal *Current Anthropology* in 1959 with the support of the Wenner-Gren Foundation for Anthropological Research. Since its inception, with Tax at its helm for the first 15 years, the journal has been dedicated to publishing anthropological research from all subdisciplines submitted by international scholars and reviewed by an international board.

— *Walter E. Little*

Further Readings

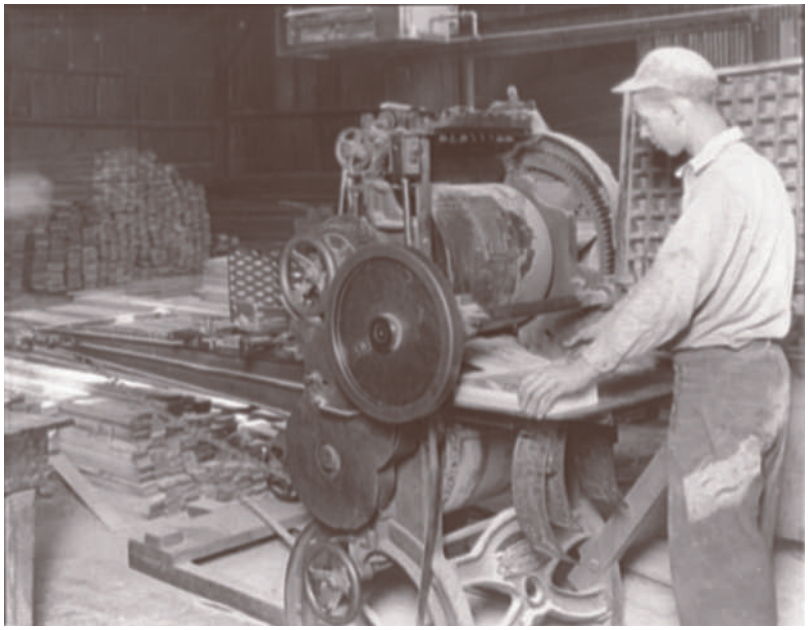
Stocking, G. W. Jr. (2000). "Do good, young man": Sol Tax and the world mission of liberal democratic anthropology. In R. Handler (Ed.), *Excluded ancestors, inventible traditions: Essays toward a more inclusive history of anthropology. History of anthropology* (Vol. 9, pp. 171–265). Madison: The University of Wisconsin Press.

Tax, S. (Ed.). (1952). *Heritage of conquest: The ethnology of middle America.* New York: Coopers Square Publishers.

Tax, S. (1953). *Penny capitalism: A Guatemalan indian economy.* Washington, DC: Smithsonian Institute of Social Anthropology.

TECHNOLOGY

Technics can be a tool extending human body parts and senses or a combined physical system (man-tool, man-machine, man-natural process) created by a culture and utilizing human powers and external natural powers, structures, and systems for human cultural purposes. It is not important whether these systems and powers are predominantly animate or inanimate, natural or artificial, located inside or outside of humans. Technics may be human work with bare hands or with a tool, a factory production line, soil cultivation with a tractor or with animal power, corn



Source: Courtesy of the Library of Congress.

growing, bread baking, or wine fermentation. There is one phenomenon differentiating technics from nature: the relevant structures and powers must establish a purposeful process that doesn't work primarily for nature but for humans.

The term "technics" is usually understood objectively, with the emphasis placed upon the artificial element of the total technical system. It usually represents the "technical phenotype," that is, the means of the technical operation: a tool, a machine, or an automatic system. The term "technology," on the other hand, is understood as a process, as the functioning and operation of the technical systems.

Technics is a part of the human, antinatural culture and is rationally understandable only within this culture. Yet we must distinguish between two historical levels of technical development and between two basic development lines of technics: *biotic* and *abiotic.*

Hunting and gathering was the first stage of biotic technics development; its second stage, the Neolithic Revolution, was the first great technical revolution. The Neolithic period witnessed the arrival of almost all cultural plants and domestic animals. Basic procedures of food "manufacturing" and processing were also discovered during this time. Even the third stage of biotic technics development—the modern biotechnologies, cloning, and genetic manipulation—will hardly be able to surpass the Neolithic Revolution. Neolithic biotic technics, as a cultural channeling of a possibly multifunctional live system, was in harmony with the similarly antinatural abiotic technics: it utilized the activities and characteristics of live systems but it didn't interfere with their genetic information; it didn't distort the natural biospheric information.

The abiotic technics production line, which is usually connected with the idea of technics itself, can be schematically described by the following terms: *tool–machine–automation.* This line developed in harmony with biotic technics up to the Industrial Revolution, that is, in harmony with the human skills and procedures utilizing the processes transforming live organisms.

This difference between the two lines of technical development presents not only the hidden antinatural character of all technics but also the environmental advantages of the currently neglected biotic technics. Naturally, abiotic technics is more aggressive environmentally. Even though its energetic and functional bases were originally based in humans (humans activated and controlled tools), the original human functions in the instrumental anthropotechnical system (especially those energetic and kinetic ones) were transferred to the technical system from the beginning of mechanization. And this technical system doesn't retrieve its energy from renewable resources but from nonrenewable fossil biomass.

The energetically much more thrifty biotic technics is mostly represented by live systems even today: microorganisms, cultural plants, domestic animals. Biotic technics remains, therefore, connected to the weakly integrating renewable energy of the Sun, even though it is forced to operate on behalf of man and culture.

The first stage of the historical development of abiotic technics—instrumentalization—was characterized by slow improvements and differentiation in tools. It developed in harmony with biotic technics for millennia. Classic workmanship utilized natural human skills; it developed both the physical and intellectual characteristics of human beings, and its destructive effects on humans were negligible. Then, in an attempt to increase work productivity and utilize the power of cooperation, workmanship was divided into suboperations comparable with the later

machine operations. This was the beginning of factories where human beings worked instead of machines.

The second stage of abiotic technics development—mechanization—was disseminated by the Industrial Revolution. Mechanical technics, which replaced artisans, brought the huge productive forces of science into the manufacturing process. Nevertheless, along with the increased productivity of human work, machines started a technological oppression of humans. From the very beginning, this technics tended to establish large machinery systems—factories. This was the basis for a strongly integrated global technosphere. Two large abiotic subsystems based on fossil fuels and spanning the whole planet appeared in the 20th century: (1) a predominantly stationary machinery subsystem (the power plant, electric power distribution networks, and other stationary mechanical technical devices), and (2) a predominantly mobile machinery subsystem (oil refineries, a worldwide network of oil product pumping stations, various vehicles, etc.).

The third stage of the abiotic productive technics development—automation, characterized by the establishment of fully artificial, technical systems—has disposed of the technological oppression of man but has narrowed the possible exercise of human labor in the labor market. Automated technics originates not only as a result of a high degree of scientific knowledge development. It also originates because natural biotic evolution has not utilized all the possible substance configurations in the environment of the Earth. The original, natural ecosystems, which were designated for all living things, were disturbed by technics, occupied, and transformed into an environment designated exclusively for humans.

The current postindustrial phase of abiotic technical creativity is based on an arrogant approach to nature. There is almost no respect for the values, integrity, and requirements of the natural evolution of the biosphere. Even though traditional biotic technologies are stilled used, and even though there are new technologies that are less aggressive toward nature, preserve energy, and produce minimum or no waste, the general character of the human approach to nature remains unchanged. This is more than just the dominance of abiotic technology; this is the dominance of the abiotic model for creating and satisfying human needs. The establishment of environmentally friendly manufacturing processes is up against environmentally reckless consumption. The technics-saturated human lifestyle also includes environmentally destructive consumer technics: private cars, household devices, hobby equipment, computers, TV sets, mobile phones, and so on.

The environmentally significant term *technosphere* describes a transnational system of functioning, reproduction, and evolution of technics. This spontaneously expanding and culturally determined system includes not only abiotic technics; it also includes the older and environmentally less aggressive biotic technics. Nevertheless, abiotic technics is dominant in the current technosphere. Its expansion, enlarging the cultural space, proceeds along many axes: vertically, horizontally, and transversally. New technical forms automatically occupy free social-cultural niches similar to the way plant and animal populations occupied their ecological niches.

Even though the evolution of technics and the technosphere is qualitatively different from the evolution of live systems and the biosphere, both fields are connected by many analogies and isomorphisms. For example, both evolutions need a comparatively free substance and energy; both need their own, internal information. A significant input of energy is able to include even rather large inanimate structures in the artificial technical systems, which are then capable of purposeful operation, specific cultural reproduction, and evolution.

The genetic information of technics, which has become a part of the social-spiritual culture, is created neither by an average human individual nor by the current world culture. It is created by a highly specialized element of the workforce in the technically most developed countries—by the technical intelligence. And this element can also complement it, change it, and develop it in the direction of the desirable technics. However, abiotic as well as biotic technics have coexisted with humanity from the very beginning; they have helped humans survive and to a certain extent they have been established by nature itself: by the position of humans in evolution, by humans' special biological equipment, and by our need to defend our environmental niche even under undesirable natural conditions. Let's hope that the precultural natural-biological dependence of humans upon technics will not just reproduce itself again and again but will eventually force us to establish a sustainable form of the planetary technosphere.

— *Josef Šmajs*

Further Readings

Bernal, J. D. (1954). *Science in history.* London: Watts.

Ellul, J. (1964). *The technological society.* New York: Vintage.

Lilley, S. (1948). *Men, machines and history.* London: Cobbett.

Teilhard de Chardin, Pierre (1881–1955)

Are science and theology reconcilable in terms of evolution? As both an eminent geopaleontologist and cosmic mystic, Pierre Teilhard de Chardin presented a dynamic worldview. He argued that the human species does occupy a special place within a spiritual universe, and that humankind is evolving toward an Omega Point as the end goal of converging and involuting consciousness on this planet.

With his steadfast commitment to evidence of pervasive evolution, Teilhard, as natural scientist and Jesuit priest, became a very controversial figure within the Roman Catholic Church during the first half of the 20th century. Because of his bold interpretation of the human species within earth history and this cosmos, he was silenced by his religious superiors for taking an evolutionary stance at a time when this scientific theory was a serious threat to an entrenched orthodox theology. Going beyond Charles Darwin, Teilhard even maintained that evolution discloses the meaning, purpose, direction, and destiny of the human species within life, nature, and this universe.

As a geopaleontologist, Teilhard was very familiar with the rock and fossil evidence that substantiates evolution. As a Jesuit priest, he was acutely aware of the need for a meta-Christianity that would contribute to the survival and fulfillment of humankind on this planet, in terms of both science and faith. Sensitive to the existential predicament of the human species, with its awareness of endless space and certain death, Teilhard as visionary and futurist ultimately grounded his personal interpretation of evolution in process philosophy, natural theology, and cosmic mysticism that support panentheism (defined as belief that God and the World are in a creative relationship of progressive evolution toward a future synthesis in terms of the collective spirit of humankind).

Galileo Galilei endured house arrest and humiliation as a result of his claiming that the earth does in fact move through the universe, a scientific discovery that the aged astronomer was coerced into recanting by his dogmatic persecutor, Pope Urban VIII (formally Cardinal Maffeo Barberini), under the intolerant Jesuit inquisitor, Cardinal Robert Bellarmine.

As a direct result of the conservative standpoint taken by his religious superiors, Teilhard suffered both alienation and discouragement because he claimed that species (including the human animal) evolve throughout geological time, or else they become extinct; his daring evolutionism attacked fixity, essentialism, and biblical fundamentalism.

Discovering Evolution

As a child, Teilhard showed an interest in both natural science and religious mysticism. Sensitive to his beautiful Auvergne surroundings in France, and particularly drawn to the study of rocks, he found delight in a plowshare which he supposed was an enduring object, free from change and imperfection; however, after a storm, the youth discovered that his "genie of iron" had rusted. Later, Teilhard recounted how he threw himself on the ground and cried with the bitterest tears of his life. As a result of this devastating experience, the boy vowed seek his "one essential thing" beyond this imperfect world of matter and corruption. To be "most perfect," as he put it, Teilhard entered the Jesuit society at the age of seventeen in order to serve God. At the same time, he intensified his interest in geology on the channel island of Jersey. Throughout his entire life, the scientist-priest would never abandon his love for science, concern about human evolution, and devotion to mystical theology—especially eschatology.

In 1905, as part of his Jesuit training, Teilhard found himself teaching at the Holy Family College in Cairo, Egypt. This three-year experience offered him the unique opportunity to do research in both geology and paleontology, expanding his knowledge of earth history. It also exposed him to a rich multiplicity of cultures, both past and present, that surely jarred him from European ethnocentrism. Following this teaching obligation, he then finished his theology studies at Hastings in England.

During his stay in England Teilhard read Henri Bergson's new, major book, *Creative Evolution.* This metaphysical work had an enormous influence on the

scientist-priest, since it resulted in his lifelong commitment to evolution. It is worth emphasizing that it was not Darwin's publications, but rather Bergson's interpretation of evolution that convinced Teilhard that species, including the human animal, are mutable throughout organic history.

While on one of his field trips, Teilhard unfortunately became involved in the discovery of the controversial Piltdown skull, which was later determined to be a fraud. Although he had questioned the validity of this fossil evidence from the very beginning, one positive result of his involvement was that the young geologist and open-minded seminarian now became particularly interested in paleoanthropology as the science of fossil hominids.

After his stay in England, Teilhard returned to France where, during World War I, he was a stretcher bearer at the front lines. Remarkably, he emerged from his horrific experiences in the war trenches even more optimistic that evolution had been preparing the Earth for a new direction and final goal in terms of the spiritualization of the human layer of this planet. In fact, during the global war, Teilhard had several mystical experiences which he recorded for posterity. It was his emerging mysticism that would eventually allow him to reconcile science and theology within an evolutionary vision of the human future that was grounded in a spiritual reality.

In 1923, as a result of an invitation, Teilhard next found himself as a geologist participating in a scientific expedition into Inner Mongolia. A year in China gave the Jesuit a splendid opportunity to begin his career as a specialist in Chinese geology. It was during this time, while in the Ordos Desert, that Teilhard essayed "The Mass on the World," a mystical account of his offering up of the entire world as Eucharist to a Supreme Being as the creator, sustainer, and ultimate destiny of an evolving universe. He expressed his dynamic Christology by viewing this planet as a part of an ongoing spiritual evolution, and continued to devote his life to synthesizing science and theology.

Upon returning to France, Teilhard ran into serious problems with the Roman Catholic Church because of his unorthodox beliefs. In Paris, he began giving public lectures on and teaching about evolution. This Jesuit priest was even bold enough to offer a personal interpretation of Original Sin in terms of cosmic evolution and the emergence of the human species in a dynamic but imperfect (unfinished) universe; he saw this cosmos as a cosmogenesis moving from chaos and evil toward order and perfection.

Source: © Bettmann/CORBIS.

When a copy of Teilhard's controversial essay fell into the hands of some of his superiors, he was censored by the Church: he could no longer teach or publish his own theological and philosophical views, and he was even exiled from France by the Jesuit order. Teilhard found himself back in China. There he wrote his first book, *The Divine Milieu*, a spiritual essay on the activities and passivities of the human being; Teilhard's unorthodox book was denied publication.

Fortuitously, Teilhard next found himself a member of the Cenozoic Laboratory at the Peking Union Medical College. Beginning in 1928, geologists and paleontologists excavated the sedimentary layers in the Western Hills near Zhoukoudian. At this site, the scientists discovered the so-called Peking man (*Sinanthropus pekinensis*), a fossil hominid dating back at least 350,000 years but now relegated to the *Homo erectus* phase of human evolution. Teilhard became world-known as a result of his popularizations of the

Source: © Dean Conger/CORBIS.

Sinanthropus discovery, while he himself made major contributions to the geology of this site.

The Phenomenon of Man

Attemping to bring his scientific knowledge and religious commitments together, Teilhard began writing a synthesis of facts and beliefs aimed to demonstrate the special place held by the human species in a dynamic universe. Teilhard completed his major work, *The Phenomenon of Man* around 1940; in it, Teilhard steadfastly committed himself to the concept of organic evolution, but his work was again denied publication by the Vatican.

Teilhard argued that the evolving universe is a cosmogenesis. Essentially, the unity of this universe is grounded not in matter or energy but in spirit (the within-of-things or radial energy); thereby he gives priority to dynamic spirit rather than to atomic matter (the without-of-things or tangential energy). Moreover, Teilhard was a vitalist who saw the personalizing and spiritualizing cosmos as a product of an inner driving force manifesting itself from material atoms, through life forms, to reflective beings. He discerned a direction in the sweeping epic of this evolving universe, particularly with the emergence of humankind. However, his alleged cosmology is merely a planetology, since the scientist-priest focused his attention on this earth without any serious consideration of the billions of stars and, no doubt, countless planets that exist in those billions of galaxies.

Of primary significance, Teilhard argued that the order in nature (as he saw it) reveals a pre-established plan as a result of a divine Designer, who is the transcendent God as the Center of creation or Person of persons; the direction in evolution is a result of the process law of complexity-consciousness. Teilhard was deeply interested in and concerned about the infinitely complex entity that would emerge in the distant future as the result of a spiritual synthesis, rather than occupying himself with the infinitely great and the infinitely small objects now in this universe.

For Teilhard, this cosmic law of increasing complexity and consciousness manifests itself from the inorganic atoms through organic species to the human person itself; or, this process law has resulted in the appearance of matter, then life, and finally thought. Evolution is the result of "directed chance" taking place on the finite sphericity of our Earth. Teilhard emphasized that evolution is converging and involuting around this globe: first through geogenesis,

then through biogenesis, and now through noogenesis. The result is a geosphere surrounded by a biosphere, and now an emerging noosphere (or layer of human thought and its products) is enveloping the biosphere and geosphere. For this Jesuit priest, noogenesis is essentially a planetary and mystical Christogenesis.

The idea of a developing noosphere was also explored in the writings of the Russian scientist Vladimir I. Vernadsky (1863–1945). Very similar to Teilhard's comprehensive and dynamic orientation, Vernadsky presented a holistic view of life on earth in his major 1926 work, *The Biosphere*.

Teilhard stressed that the process of evolution has not been a continuum: From time to time, evolution has crossed critical thresholds, resulting in the uniqueness of both life over matter and then thought over life. A person represents an incredible concentration of consciousness or spirit, resulting in the immortality of the human soul. Consequently, the Jesuit priest claimed that the human being is ontologically separated from the four great apes (orangutan, gorilla, chimpanzee, and bonobo).

For Teilhard, the ongoing spiritual development of our own species is converging and involuting toward an Omega Point as the end-goal or divine destiny of human evolution on this planet. His theism maintains that God-Omega is one, personal, actual, and transcendent. In the future, God-Omega and the Omega Point will unite, forming a mystical synthesis beyond space and time.

After *The Phenomenon of Man* was denied publication, Teilhard wrote *Man's Place in Nature: The Human Zoological Group* (1950). This work is a more scientific statement of his interpretation of evolution. Unfortunately, the publication of Teilhard's third book was also denied along with his request to teach in Paris.

While living in New York City, Teilhard twice had the opportunity to visit the fossil hominid sites in South Africa. On Easter Sunday, April 10, 1955, Teilhard died of a sudden stroke in New York City. He was buried at Saint Andrew's on the Hudson, far removed from France. By the fall of that year, the first edition of *The Phenomenon of Man* was published in its author's native language.

Teilhard was committed to science, evolution, and optimism despite his daring speculations and mystical orientation. Teilhard introduced into modern theology the concept of organic evolution at a time when this scientific theory was rejected by many who saw it as a threat. Unfortunately, in trying to reconcile science and theology, the Jesuit priest pleased no intellectual community.

Teilhard was an extraordinary human being of intelligence, sensitivity, and integrity. He experienced both the agony and ecstasy of time and change. His optimistic commitment to cosmic evolution flourished while he served on the blood-stained battlefield of a war-torn humanity, researched among the rocks and fossils of a remote past, and reflected in the deepest recesses of his profound soul on the meaning and purpose of human existence. As such, Teilhard himself exemplifies both the phenomenon of man and the ongoing quest for truth and wisdom in terms of a comprehensive anthropology.

— *H. James Birx*

See also **Anthropology, Philosophical; Bergson, Henri; Evolution, Human; Evolution, Organic; Teleology**

Further Readings

Bergson, H. (1998/1907). *Creative evolution.* Mineola, NY: Dover.

Birx, H. J. (1991). *Interpreting evolution: Darwin & Teilhard de Chardin.* Amherst: Prometheus Books.

Miller, J. B. (Ed.). (2004). *The epic of evolution: Science and religion in dialogue.* Upper Saddle River, NJ: Pearson/Prentice Hall.

Teilhard de Chardin, P. (1965). *Hymn of the universe.* New York: Harper & Row.

Teilhard de Chardin, P. (1966). *Man's place in nature: The human zoological group.* New York: Harper & Row.

Teilhard de Chardin, P. (1975). *The phenomenon of man* (2nd ed.). New York: Harper & Row/Harper Colophn/Perennial Library.

Teilhard de Chardin, P. (2001). *The divine milieu* (rev. ed.) New York: Harper & Row/HarperCollins/Perennial Classics.

Walsh, J. E. (1996). *Unraveling Piltdown: The science fraud of the century and its solution.* New York: Random House.

Teleology

Teleology (from Greek words *telos,* "end," and *logos,* "reason, discourse") is the study of processes in nature

as they are driven by their ends, goals, and purposes. This is diametrically opposed to a mechanistic explanation based only on cause–effect sequences in time series.

Teleological thinking was natural for mythical, anthropomorphic explanations of nature. A tradition of nonmythical teleological explanation starts with Aristotle's concept of *causa finalis,* thanks to his extraordinary influence on natural sciences in the Middle Ages, although teleological concepts of nature can be found in pre-Socratic philosophers and Plato's dialogues. Aristotle included the end as an additional and the most important cause of all natural processes. It presuppose in general that a final state of affairs in future explains or predetermines the movement from previous states to final ones.

Teleology was never too far from theology. Theologists in the Middle Ages identified Aristotelian ends and goals in the universe with purposes and intentions—and those with God's will. The Aristotelian concept of *causa finalis,* after being hybridized with Plato's concept of eternal Forms and cosmic Demiurge, started to be a common explanation of a complex design of living beings, their functionality, and their goal-oriented behavior Argument from design became one of the most important theological arguments for the existence of God. This argument turned out to be even more important with the rise of modern science in the 16th and 17th centuries, when the Aristotelian concept of *causa finalis* was expelled from nonliving nature.

Modern study of Aristotle's philosophy revealed that his concept of teleology traditionally has been misinterpreted. In contrast with general belief, Aristotle did not think that the natural motions and changes of nonliving objects achieved a goal in the same way that developing organisms do. Natural processes of non-living objects, like stones falling down to the center of the Earth, are not (in Aristotle's words) "for the sake of" anything, in contrast to organismal development which is, in fact, for the sake of a mature individual.

Specific philosophical attempts to reconcile the cause–effect mechanistics of Newtonian physics (*nexus effectivus*) with obvious teleological causality (*nexus finalis*) present in living beings were made by Kant (1724–1804) in his *Critique of Judgment.* Kant saw a principal difference between man-made artifacts on one hand and organisms on the other hand, similar to Aristotle. In artificial things, like a clock, all parts are put together to act as an integral whole; each part exists for the other parts, but not thanks to them, as in living beings. A constitutive force of the clock is outside of the clock, in a human being who is able to act in accord with the idea of the whole. As he pointed out, one cogwheel does not create another one and clocks do not create other clocks; they are not able to replace missing parts by themselves, nor are they able to repair themselves.

It is important to keep in mind that Kant's reasoning on finality was done within the framework of his transcendental philosophy, from which it follows that teleology is a methodological approach rather than an ontological doctrine. We not only can (despite the mechanical cause–effect causality of physics) but we must think of organisms as directed by their own natural goals, and we have to keep in mind that these goals are not analogous to human intentions ("purposiveness without purpose"). They are domain-specific principles (*principia domestica*) of natural science. This is why Kant is so critical of introducing the concept of God to natural science in order to explain teleogy in nature, and then later to use natural teleology as an argument for God's existence.

Kant hoped that someday a scientist like Newton would be born who was able to explain even very simple teleological phenomena, like the production of a stem of grass, from natural laws without any need to use the idea of an intentional purpose. His kind of scientist appeared a half century later, and his name was Charles Darwin. Darwin, in his work *The Origin of Species*, came up with a radically new scientific explanation of teleological phenomena in the living world. According to his theory, functional designs and behaviors of organisms are not products of a divine designer, as suggested by the British theologian William Paley in his *Natural Theology* (1802), but adaptations to environment, outcomes of spontaneous evolutionary process based on a combination of genetic changes and natural selection. Both genetic changes and natural selection are, in principle, not goal-oriented natural mechanisms. Genetic changes are random with respect to the direction of adaptation; they do not respond to the needs of the organism for better adaptation (at the time, neo-Lamarckian inheritance of acquired characteristics and directed mutations were not confirmed). Although many evolutionary histories seem to be goal-directed lineages (for example, the evolution of the horse), evolutionary mechanisms are not

providential—neither mutations nor natural selection has a purpose or goal.

The impersonal, nonpurposive, mechanistic nature of Darwinian evolutionary theory has been under strong criticism since it was formulated by Darwin in the middle of the 19th century, first by various so-called vitalists in the late 19th century and early 20th century who tried to understand the teleologic character of individual development. They refused to reduce life to physico-chemical mechanisms, and they argued for life-specific principles. One of the most influential was German embryologist and philosopher Hans Driesch (1967–1941), with his neo-Aristotelian concept of entelechy. According to him, entelechy is an acting force in the embryo working towards developmental ends. Another example is French philosopher Henri Bergson (1859–1941) and his concept of a mystical live force, *élan vital.*

Following the rapid rise in the second half of the 20th century of modern biology based on biochemistry, and later on a molecular approach, almost all biologists rejected the concept of a natural force specific only to living things that does not obey physical and chemical laws. On the other hand, in nonscientific circles, opposition to the Darwinian explanation of life's complexity remains and recently reappeared with the Intelligent Design movement. The main claim the movement is that it follows from empirical evidence itself that Darwinism is not a correct and scientific theory because it is not able to give a fully satisfactory explanation of the adaptive complexity of life. Therefore, it is necessary to suggest the existence of an intelligent designer—a new, not-yet-known, goal-oriented natural force—as a scientific alternative to Darwinism. However, the vast majority of biologists regard the Intelligent Design concept as pseudoscience.

— *Peter Sykora*

See also **Aristotle; Darwin, Charles; Darwinism, Modern**

Further Readings

Dawkins, R. (1986). *The blind watchmaker.* New York: W. W. Norton.

Gotthelf, A. (1987). Aristotle's conception of final causality. In A. Gotthelf & J. G. Lennox (Eds.), *Philosophical issues in Aristotle's biology* (pp. 204–242). Cambridge: Cambridge University Press.

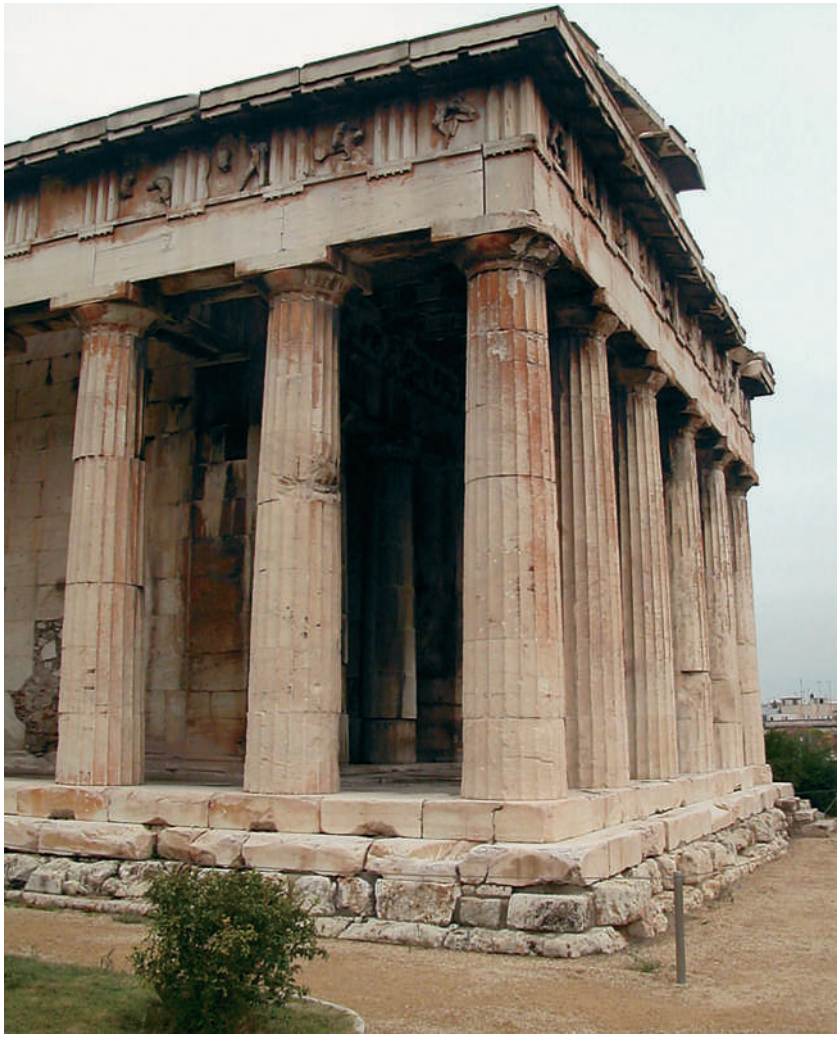
Mayr, E. (1988). The multiple meaning of teleological. In *Toward a new philosophy of biology* (pp. 38–66). Cambridge, MA: Harvard University Press.

Temples

In the classification of architecture, the temple falls into the devotional class, that is, a building constructed as a place of worship. The ancient Indians, Egyptians, Sumerians, Greeks, and Romans all built beautiful temples, which are marked by their own individual characteristics. Temples in some form must have originated as soon as image worship came into vogue, for a temple is the "house of God." In ancient Indian literature, temples are referred to as *Devalaya* or *Devakala,* meaning the house of gods. The earliest temples, therefore, were modeled after residential buildings.

The Brahmanical conception of a temple, however, is somewhat abstruse. It envisages the temple as the visible outer body of the invisible deity, a visible image of which is installed in it as a symbol of the invisible spirit that pervades all nature, that is, God himself, thus enhancing the status of the temple from the seat of the divine to the divine itself. Since the temple is considered the outer body of the deity, its various parts are given names that correspond to parts of the human body and are likewise decorated with architectural designs. For example, the outer face of a temple with a lavish display of ornamentation is the visible representation of the deity itself.

At the height of its architectural development, the Indian temple was the spiritual centre from which religious and social life was regulated. In addition, there is ample evidence of secular art in the temple architecture. The art on the temple walls and the terracotta panels witness the contemporary socioeconomic conditions of the people, thus supplying material for social history too. The *Aryan,* popularly known as the north Indian and *Dravida,* or the south Indian, are the two basic schools of Indian temple architecture accepted since the Vedic times. A temple is indicated as a *Prasad* in the north Indian and as a *Vimana* or *Harmya* in the south Indian school. *Mandir,* the most



Source: © iStockphoto/Karen Grieve.

commonly used word nowadays, meaning a house made of stones, is altogether absent in the earliest known texts and inscriptions. Modern Indian writers recognize three styles of temple architecture: the *Dravida,* the *Nagra,* and the *Vesara.* The Indo-Aryan had no temples. The first small Brahmanic shrines made their appearance in the Gupta period (AD 350–650). Foundations of a single Vishnu temple (Hindu) of the second century BC, however, have been found at Besnagar in Madhya Pradesh. Gupta temples were simple and small with a small cella and carved doorways. South India is the true cradle of Hindu temple architecture. The Hindu temples vary regionally but generally consist of a towering shrine, central cella, and a columned hall surrounded by an elaborate wall. The Buddhists built cave temples, of which Ajanta is one of the most exclusive. There are more than 1,200 rock cut Buddhist temples in different parts of India. The medieval Jain temples are amazingly beautiful, built on remote and secluded mountaintops and made of white marble, shining against the blue sky; the most remarkable ones are found at Girnar, Palithana, and Mt. Abu.

In 3500 BC, the cities of Sumer were dominated by huge temples with hieroglyphs on the walls. Later, there appeared sculptures and figurines showing gods, priests, kings, soldiers, slaves, and animals. These were built on hills or mounds in the shape of a pyramid, with steps leading to the top where next to the low temple building stood a very tall tower where God was supposed to live. These mounds made of earth and the temples and towers on top of them were called *ziggurats.* Sumerian temples made an essential contribution to large-scale farming by synchronizing agricultural operations. They owned vast estates and employed their own establishments of slaves, controlled the farm lands, received taxes, and operated as markets and banks. The city-states were, in fact, temple-states that belonged to local gods. Temples in Sumer had many roles—religious, social, and economical. In Babylon there were two great temple areas. The temple of Marduk, the patron god of Babylon, is the best-known temple, besides nearly 400 smaller altars and 1,000 shrines. Ancient Egypt had two types of temples, the morgue temples for the dead rulers (for example, the temple of Queen Hat-Shepsut in Thebes) and divine temples that held images of gods. The divine temples had a typical architecture—avenues of sphinxes led to the temple flanked by two obelisks that represented the rays of the sun. The temple entrance was constructed with two huge towers called pylons slanted inward and a courtyard leading to a huge hall called a hypostyle hall. At the center was a shrine for the divine image. The Egyptian temples had flat roofs with columns inside. The temple of Karnak is one of the oldest and greatest. As in Sumer, the temple was the initial form of city in Egypt, as the land, people, ruler, and priests all belonged to the local god of the temple, which thus

became the center of socioeconomic, political, and religious life. Temples owned huge properties, had slave labor working on temple forms, and were the chief money lenders. The classical Greek temples were rectangular with slanting roofs supported by beautiful columns, with a portico at each end or a colonnade extending around the entire building. The temples were east facing, made of marble or other stones, and the central cella housed the image of the deity standing on a pedestal facing the single door entrance; an altar stood outside the shrine. Later temples were collections of buildings including smaller shrines of related minor deities and national heroes, houses for priests, and stalls. The Greek temples of Apollo at Delphi, of Diana at Ephesus, and the Parthenon are the best examples of Greek architecture. The original Roman temples did not have the image of a deity for several hundred years. Influenced by the Etruscans, early Roman temples were oblong wooden structures with a huge inner cella. It was only later, when they came under Greek influence, that they adopted Greek gods at the cost of neglecting their own. The Pantheon, meaning "all the gods," the most outstanding Roman temple, is a circular building with a huge dome made of concrete. Roman temples had an altar inside the shrine and instead of the colonnade around the entire structure there was a wall of engaged columns. Temple architecture reached its pinnacle in size and splendor during the Roman Empire. The Inca and Mayan temples were generally stair-stepped pyramids with the shrine at the top constructed of stones and decorated with stucco and bas-relief ornamentation. The Temple of Warriors and the Temple of the Plumed Serpent are the best examples of Mayan and Aztec temples, and the Temple of the Sun at Cuzco is the best example of Incan temple architecture.

— Abha R. Pal

See also **Angkor Wat; Religious Rituals; Sumerian Civilization**

Further Readings

Bhattacharya, T. (1963). *The canons of Indian art or a study on Vastuvidya.* Calcutta: Firma K. L. Mukhopaddhyaya.

Darlington, C. D. (1969). *The evolution of man and society.* London: George Allen & Unwin.

Mukherjee, R. K. (1964). *The flowering of Indian art.* Bombay: Asia Publishing House.

Tenochtitlan

Tenochtitlan was the capital city of the Aztec empire that occupied highland central Mexico during the 14th through 16th centuries. The city was composed of a ceremonial and administrative core surrounded by palaces and residences of the society's elite. Aztec urbanites, numbering as many as a quarter of a million, comprised a diverse array of ethnic groups that immigrated to the city from the distant reaches of the empire and represented a range of specialized occupations, including farmers, artisans, warriors, priests, and bureaucrats. The invasion and conquest of the city by Spanish conquistador Hernán Cortés in 1521 brought world attention to Aztec culture. Since that time, archaeological and historical studies of Tenochtitlan have made significant contributions to anthropology's understanding of pre-Hispanic urbanism in the Americas.

According to Aztec oral tradition, Tenochtitlan was founded by the Mexica people in AD 1325 on an island and reclaimed swamp land near the western edge of Lake Texcoco in the Basin of Mexico. The city was connected to the mainland by three large artificial causeways, which extended from the lakeshore to the city's central civic-ceremonial district that contained the major politico-religious buildings of the capital. These causeways, along with a complex network of freshwater aqueducts, canals, dams, and irrigation and sewer systems, made the city a technological marvel. Beyond the central district were the opulent palaces of the rulers and other bureaucrats, the houses of the nobility, and numerous buildings dedicated to administering the empire. The remainder of the city was composed of urban dwellings of the commoners, some of which were situated upon and surrounded by raised agricultural fields. Tenochtitlan's layout and built environment established the city not only as the geographical core of the empire but also as the conceptual center of the universe.

The central ceremonial district of Tenochtitlan measured approximately 13 hectares and was enclosed by a 30-meter-thick wall called *coatepantli* ("serpent wall") that was said to have been decorated with representations of serpents. The Spanish priest Bernardino de Sahagún counted 78 different buildings in this district, although only 30 have been archaeologically identified to date. In addition to buildings, numerous sculpted monuments adorned

Source: © iStockphoto/Skip Hunt.

public spaces and sacred places, populating the ceremonial district with representations of key players in Aztec cosmology. For example, the colossal statue of Coatlicue, the old goddess of the earth and mother of all Aztec gods, was erected as a powerful symbol legitimizing Aztec hegemony and rulership. Other monuments record notable events in Aztec mytho-history, such as the monument depicting the dismembered body of Coyolxauqui (representing the moon), who was slain by her brother, Huitzilopochtli (representing the sun), for attempting to kill their mother, Coatlicue. Together, buildings and monuments combined to form a microcosm of the social order and a blueprint of the composite natural/cosmic landscape encompassed by the empire, where worldview and beliefs were materialized and grounded in the physical realities of daily life.

In the center of the ceremonial district rose a giant platform, which served as the principal stage for state religious rituals, including human sacrifice. The raised platform supported a number of buildings: temples, shrines, a school and residence for high priests, a sanctuary for eagle warriors, a ball court, and a large skull rack (*tzompantli*) where trophy heads of sacrificial victims were publicly displayed. The largest building on this platform was the Templo Mayor ("Great Temple"), a twin-towered pyramid dedicated to the two most important Aztec gods, Huitzilopochtli (god of war) and Tlaloc (god of rain and fertility). The temple was constantly under construction and renovation during the 200-year history of the city, but reached its final height of 45 meters by the time the Spanish arrived in 1519. The building was covered with white lime plaster while the upper temples were painted bright red and blue. The pyramid and its precinct were clearly designed to impress the citizens of Tenochtitlan as well as foreign visitors. By conducting political and religious performances on the summits of monumental edifices, Aztec rulers visually and symbolically reinforced their position at the top of the social ladder. Thus, public celebrations staged within the milieu of the Templo Mayor and the ceremonial district allowed Aztec ruling nobles to capitalize on the physical hierarchy of spatial forms by transcribing the phenomenological sense of ordered spaces into social hierarchy.

Just beyond the central district were the administrative and public buildings, which included a courthouse for judges, a council chamber for war leaders, armories stocked with military arms and equipment, storage rooms for housing surplus from state-sponsored

tribute, and residences for the royal retinue of artisans and entertainers. Surrounding this zone were the palaces and dwellings of the rulers, nobles, and the city's social elite. This area also included extensive gardens and ponds, a library, an aviary, and a zoo.

The palace of the *huei tlatoani* ("great speaker"), the semidivine supreme ruler of the Aztec, measured 40,000 square meters and was finished with painted stucco. It housed his family and other nobles, as well as servants, visiting dignitaries, and government officials. Sahagún observed that the ruler's palace contained rooms where gold- and silversmiths, coppersmiths, feather workers, painters, stone cutters, lapidaries, and wood carvers practiced their trades. The objects crafted by palace specialists were the exclusive prerogative of the ruler. As markers of social rank and status and as items of exchange, these luxury goods acquired importance as a type of politico-symbolic capital; the *huei tlatoani* used these items as gifts to reward clients and attract allies. Yet, as props and costuming, the crafted objects contributed to the strong sensory impression and emotional intensity of state political and religious ritual and confirmed the legitimacy of the *huei tlatoani*'s claims to being physiologically superior to other members of society.

Outside of the ceremonial and administrative areas, the city was divided into four sectors: Cuepopan, Teopan, Moyotlan, and Aztacalco. Each of these neighborhoods was subdivided into smaller socioresidential configurations called *calpulli* ("big house")—a group of families related by kinship and friendship that acted as a landholding corporation. As equal and separate entities, the *calpulli* would contribute separately and more or less equally to common obligations of the state; each would separately deliver its part of a general levy in maize or other products to the designated common collection place; in time of war, each contributed a fighting unit under its own leadership. For ongoing duties, however, such as community labor or the delivery of products throughout the year, a scheme of rotation of the *calpulli* was in place.

Families that comprised each *calpulli* lived in walled or fenced compounds in which residential and other types of domestic buildings built of stone masonry enclosed a central patio space. Compounds were connected in various ways by formal streets, informal footpaths, and waterways (canals). This dense, orthogonal grid plan, emanating from the city's center, ordered the residential and commercial zones. Some *calpulli* were home to specific occupational specialists

such as weavers, potters, feather workers, lapidaries, or metalsmiths, while others housed farmers and other food service personnel. The houses of nonelite citizens, built of mud-covered reeds roofed with thatch, were usually located on *chinampa* agricultural plots alongside canals that edged the periphery of the city. *Chinampas* were rectangular raised plots of agricultural land formed of organic-rich sediments dredged from swamps and shallow lake beds. The thousands of plots that surrounded Tenochtitlan provided up to one half or more of the food consumed in the city. Indeed, there were so many plots and canals that the Spanish referred to Tenochtitlan as the "Venice of the New World." With no plows or draft animals, Aztec farmers used pointed sticks called *uictli* to plant their primary crop, corn, as well as beans, squash, tomatoes, avocados, and a wide variety of chilies and other cultivars.

The urban zone of Tenochtitlan absorbed the adjacent city of Tlatelolco, which was similarly structured with a central civic-ceremonial zone and several *calpulli.* Tlatelolco was unique, however, in that it was organized around the largest marketplace in central Mexico. The Spanish chronicler Bernal Díaz del Castillo observed as many as fifty or sixty thousand people buying, selling, and exchanging an astounding variety of foods; luxury goods made from gold, silver, jade, and turquoise; local and foreign polychrome pottery; cloaks, mantles, and clothing made from cotton or maguey fibers; and slaves exhibited in wooden cages.

By the time the Spanish arrived in 1519, the total area of Tenochtitlan-Tlatelolco encompassed at least 1,350 hectares and contained as many as 250,000 people (estimates of the entire population of the Basin of Mexico range from one million to almost three million). The dual city was composed of a highly diversified population, representing groups from all reaches of the empire. Growth of the city was mostly through immigration, a process actively supported by Aztec rulership with the aim of concentrating the empire's specialist producers. The city's expansion was abruptly terminated by Spanish conquistadors in 1521. In the succeeding decades, Tenochtitlan became Spanish colonial Mexico City, with Catholic churches placed atop or adjacent to the foundations of abandoned and demolished Aztec temples.

As one of the few examples of large-scale urbanism in the New World for which detailed written records and material evidence exist, Tenochtitlan has made significant contributions to theory in urban anthropology. Archaeologist William Sanders has attributed the early development of urbanism in this region to intensive cultivation and specialized agricultural adaptations (*chinampa* farming), which developed as a result of population pressure on land and the resource base. Incorporating the ideas of V. Gordon Child, Julian Steward, Karl Wittfogel, and Robert Carneiro, Sanders and his colleagues posited a materialist, cultural-ecological model, arguing that circumscription, competition, and differential access to strategic resources served as the basis for the development of stratification and social classes, market exchange, tribute extraction, and political centralization in the Aztec empire. More recent research by Elizabeth Brumfiel, Michael Smith, Deborah Nichols, Leonardo López Luján, and others has demonstrated that the cultural-ecological model does not necessarily account for all of the variation in settlement type, size, and distribution. Instead, archaeologists now tend to approach Aztec urbanism from a regional perspective, emphasizing the dialectic between social and natural landscapes and the role of city-states, market dynamics, imperialism, and ideology and ritual.

— E. Christian Wells

See also **Aztec Agriculture; City, History of; Mexico**

Further Readings

Berdan, F. F. (2005). *The Aztecs of central Mexico: An imperial society* (2nd ed.). Belmont, CA: Thomson Wadsworth.

Carrasco, D., & Moctezuma, E. M. (2002). *Moctezuma's Mexico: Visions of the Aztec world.* Niwot: University Press of Colorado.

López Luján, L. (2001). Tenochtitlan: Ceremonial center. In S. T. Evans & D. L. Webster (Eds.), *Archaeology of Mexico and Central America* (pp. 712–717). New York: Garland.

Terra Amata

Terra Amata is an open-air Lower Paleolithic, or Early Stone Age, site on the Mediterranean near the delta of the Paillon River in present-day Nice, France. Henri de Lumley, a 20th-century French archaeologist, excavated the site in 1966 prior to the construction of an

apartment building, the lowest floor of which now houses the Terra Amata Museum. Terra Amata is perhaps best known for producing evidence of some of the first artificial structures in the world. De Lumley identified hearths, post holes, and limestone blocks arranged in such a way that, when combined with the distribution of artifacts at the site, suggested the presence of temporary oval-shaped structures measuring 7–15 meters in length and 1–6 meters in width. Some structures contained the imprints of animal skins that are hypothesized to have demarcated working areas inside the structure.

The site was originally dated by the thermoluminescence method to 214,000 BP and 244,000 BP, respectively, for an average date of 230,000 BP However, sediments from the archaeological layers at Terra Amata were recently dated by the electron spin resonance method to 380,000 BP, which indirectly indicates it may be older than previously thought.

Terra Amata is a deeply stratified site with archaeological materials distributed throughout three major levels referred to as—starting with the earliest—the Lower Cycle, Beach, and Dune layers. During the excavations there, de Lumley thought he had identified 27 distinct living floors with six in the Lower Cycle, four in the Beach, and eleven in the Dune. Paola Villa's 1983 reanalysis of Terra Amata revealed a much more complicated depositional history. Villa examined site formation processes at Terra Amata based largely on an analysis of refitted stone artifacts and identified a high degree of vertical displacement of artifacts from one level to another. This observation led Villa to conclude that de Lumley's stratigraphic divisions were largely arbitrary and did not correspond to distinct anthropocentric levels of the site.

The maximum habitation area at Terra Amata measured approximately 100–150 square meters, though the density and distribution of artifacts in some levels suggested much more limited occupations. De Lumley excavated most of the site and recovered almost 10,000 stone artifacts of the Acheulean Tradition, which is a stone tool tradition associated with *Homo erectus.* The Acheulean artifacts found at the site consisted mainly of large choppers, expedient unifacial tools, and flake tools made of pebbles and other stone raw materials that originated at the site itself. In addition to an abundant artifact assemblage, ecofacts like animal bone, charcoal, coprolites (i.e., paleo-feces), and mussel shells were also recovered. In fact, one level of the site produced 43 coprolites.

Although the remains of animals hunted and consumed by the hominids occupying the site were abundant, they were very fragmentary and not well preserved. Species diversity was high and included elephant (which was the most common), red deer, wild boar, aurochs, thar, bear, and rhino. A small proportion of mussel shells were also identified among the animal remains, however it is unknown whether they were intentionally collected or if they are a natural occurrence.

Coprolites preserved in the Dune stratum contained the pollen of plants that flower in the late spring and early summer, suggesting Terra Amata was occupied at that time of the year. There is anecdotal evidence, particularly in the animal remains, suggesting late fall occupations as well. Regardless of when it was occupied, the artifacts, ecofacts, and structural remains point to occupations of limited duration by nomadic hunter-gatherers during the Lower Paleolithic.

— Phillip R. Hodge

See also **Acheulean Culture; Hominoids; Homo Erectus**

Further Readings

de Lumley, H. (1969). A Paleolithic camp at Nice. *Scientific American, 220,* 42–50.

Villa, P. (1983). *Terra Amata and the Middle Pleistocene archaeological record of southern France.* University of California Publications in Anthropology, Volume 13. Berkeley and Los Angeles: University of California Press.

TERRITORIALITY

Territoriality involves rights to specific locations or bounded areas and the resources and activities within them. Our assumptions about territoriality often are shaped by the contemporary nation-state, which lays claim to a large number of rights over a large, unitary, and bounded territory. Also, we may well be influenced by the concept of private property, involving a high level of exclusive rights over real estate, subordinate in most cases only to the nation-state. Indeed, extreme possessiveness and exclusiveness is, at times, assumed to be human instinct. Cross-cultural and

cross-historical evidence from anthropology shows, however, that the phenomenon of territoriality is more complex, variable, and changeable.

Studies of primate social organization suggest that there are biosocial roots of territoriality, but each species has its own pattern and there is a great deal of variation by habitat within species. Probably the most useful generalization is that species-specific patterns of territoriality and social organization are closely connected. In small-scale human societies, territoriality was not a matter of bounded, exclusive spaces, but one of diverse, socially organized rights to movement, products, and located ritual activities. Indeed, exclusion was probably less important as an organizing principle than choosing appropriate means of access. Small-scale societies are woven together by complicated networks of kinship (real and fictive), ritual brotherhood and sisterhood, marriage exchange, and gift-giving friendships. Each provide means for asking responsible parties (the "owners") for rights to visit and use space and resources. This is consistent with the high degree of mobility and flexibility in such societies.

The bundling together of rights and association of them with bounded territories emerges as a correlate of social stratification and, especially, the state. Premodern states often made impressive claims to territory, about which we should be cautious. They lacked the technological and organizational capacity to control many territories, often relying on local proxies for real control. States were preoccupied with key cities and specific trade routes to high-value, low-bulk resources, as well as fortified outer shells along boundaries with autonomous mobile populations. Complex vertical and horizontal frameworks of aristocrats and peasant communities governed most rural areas, and a great deal of ethnography has documented these as kinship/residence rules.

Contemporary territoriality (bounded national territories and private real estate), then, is quite distinctive. The creation of this territorial framework required considerable struggle and change in the last 200 years. Changes include the destruction of feudal privileges inside the nation-state and the establishment of direct bureaucratic governance across its space, as well as the development of citizenship, rights of insiders within the national territory, effectively also instituting the outsider status of "alien"—visitors or migrants. Through enclosure, older collective rights to land and resources were ended and the space converted into individual property. Nor has this transformation ended. Under current conditions of globalization, wealthier and more privileged populations can move across national boundaries while poorer populations are more restricted or move illegally, and new private property regimes include an increasing range of distinctive spatial rights (gated communities, etc.).

— Josiah McC. Heyman

Further Readings

Cunningham, H., & Heyman, J. M. (2004). Introduction: Mobilities and enclosures at borders. *Identities: Global Studies in Culture and Power, 11,* 289–302.

Sack, R. D. (1986). *Human territoriality: Its theory and history.* Cambridge, UK and New York: Cambridge University Press.

TERRITORIALITY IN PRIMATES

A territory is an area of space that an animal defends as exclusive property. As with other species, primates mark their territory through feces, urine, loud calls, and shrill hisses.

Territoriality is particularly strong in primates, who often resort to extreme violence to defend their territory from any perceived threat. Studies on territoriality in primates have led to the conclusion that chimpanzees can be as violent as humans. Scholars have also revised the notion that lethal group-against-group violence is a uniquely human behavior. As primatologist Jane Goodall suggested in her accounts of "warfare" among neighboring groups of chimpanzees, when it comes to aggression, the dividing line between humans and the rest of animal species is not clearly drawn.

The study of primates' defense of their own territory has provided a compelling counterargument to the established assumption that human violence is either the consequence of instinctive biological urges or deviant behavior provoked by social problems such as overcrowding and poverty. Instead, newer researches suggest that

aggressive behavior is a complex and intertwined combination of both. Researches on primates' territoriality has also proved that group violence and social cohesion are inextricably linked. Only when a group of male chimpanzees has formed a solid alliance between themselves do they attack neighboring territories for access to females and land resources such as water. Although humans are far more sophisticated in their cooperation, technology, and the kinds of resources they fight over, the evidence that apes form coalitions to defend and attack the territory of others suggests that all primate aggression, including human aggression, is more complex than an explosion of animal instincts.

In contrast to group-against-group conflicts, aggression against a single primate that has just reached the territory of the group regulates social stability. Among several types of monkeys, for example, the most aggressive encounters take place when a newcomer tries to join an established group. Newcomers must find their way into the hierarchy and, once they are established in the group, the level of aggression drops considerably, as each individual generally defers to those higher on the societal ladder. To be accepted in the new territory, a monkey should count less on its physical strength, aggressiveness, or fighting skills than on its ability to make friends. Older males often maintain their social position by cunningly associating themselves with other influential monkeys in the group.

Understanding primate violence as result of territorial violation can shed light on several human violent behaviors, and some scientists are even proposing that it could offer keys to the problem of violence in inner cities.

— Luca Prono

Textiles and Clothing

Textiles are woven and knit fibers and yarns that are twisted up in order to produce materials that are used every day. Human society produces numerous objects from the technology of textiles, for example, towels, sheets, carpet, clothing, toothbrushes, and upholstery. Also included are objects that use textiles to reinforce structures such as vehicle tires, bridges, and buildings. Textiles are created by the accumulation and combining of textile fibers. Different fibers are more suitable for certain textile material use than others. Carbon fibers, for example, are not suitable for products such as clothing, but are suitable for use in high-technology products and sports materials. Specific fibers may be used depending on their characteristics and advantages. Nylon, silk, and rayon were used in dress hosiery because they contained characteristics of elasticity and comfort against the human body.

Yarns are constructed through the assembly and twisting of fibers, forming a continuous strand. Again, there are many types of yarns that can be created depending on the twisting and quantity of yarns being used. They may be thin or thick, soft or rough to the touch, strong or more delicate, depending on the fibers being used in the process. The transformation of textile into material involves the use of knitting needles, a crochet hook, or a hand loom, or from modern technology, machines that knit or stitch to produce extravagant textile materials.

The next step in textile production is the finishing and coloring of the material that has been created. There are numerous techniques that can be used to create the desired qualities. These include processes such as flame retardants, stain-resistance applications, applications that reduce static cling, and so on. Color may be added through dye and decorations or patterns may be printed directly on the material.

The History of Textiles

There are several suggestions about the point at which textile production began. Most people agree that there is no concrete evidence that signifies the origin of textile creation. However, remnants of woven material have been found on clay pots dating back 27,000 years. It was previously believed that the history of textiles began with the discovery and use of the needle among the European Gravettian, mammoth-hunting peoples of Eastern Europe and Russia around 26,000 to 20,000 BC. The needle allowed cultures to bind objects, such as animal hides, together while attaching other objects, such as stones, shells, and teeth. Small bones were often substitutes for needles among hunters and gatherers. During the Stone Age, vines, guts, and sinew were used to string beads,

stones, and teeth. The oldest fragment of cloth was found in Cayonu, southern Turkey, dating back to around 70,000 BC. Given that domestication of plants and animals would not have existed, early textile production used materials found in nature. The process of felting is believed to be a prehistoric method of producing textiles. It does not require any stitching or weaving; instead, fibers such as wool are molded into shape using a combination of moisture, heat, and pressure.

Nomadic herding, fishing, and farming people frequently used bast fibers and twisted gut in manufacturing ropes, reins, meshes, and nets. These, combined with reeds, grasses, and sampling rods, are thought to be the earliest forms of the manipulation of materials in the textile creation process.

Methods of dyeing material were present during the Bronze and Iron ages (between 3000 BC and 400 BC). Evidence of dyeing practices has been found in Egypt, Switzerland, and Peru. The Paleolithic people were among the first people to use dye (ochre) to decorate parts of the body and bones of the dead. Other dyeing methods followed such as murex shellfish dyes, indigo, and woad. Later, metallic manipulation was used to tint colors. This is evident among the Persians, who used copper and cast iron boiling vats during the dyeing process. In southern Asia and the East Indies, turmeric and safflower were also used to dye cotton, linen, and silk.

Art was integrated into the production of textiles by the use of ornamentation to add aesthetically pleasing elements and patterns. Beads, tassels, loops, and embroidery began to decorate textile material, allowing for more intricate designs and unique expressions. In Turkey, beads were found among textile instruments dating as early as 2300 BC. Beads have also been discovered in other parts of the world including Egypt (dating from 1800 BC) and sites belonging to the Mycenaean Crete (dating from 1450–1300 BC).

The Māoris, Peruvians, Mesoamericans, and the North American Natives used complex twining techniques to attach feathers to objects. In Spain, baskets, sandals, bags, and caps have been found that date from 3000 BC and were manufactured using twining, plaiting, and weaving techniques. Subsequently, between 1200–800 BC, there was an emergence of fine and regular weaving, which suggests the invention of the heddle rod.

The exchange of textiles, mainly cloth, dates back to sometime after 1500 BC, when workers would trade textiles within their groups or communities. Thus began the trade movement that would increase as populations expanded and villages grew into towns. Before 750 BC, due to the benefits of trading textiles, a large portion of fabrication was produced for commercial trade and not for necessity. Textiles were desirable possessions, especially Chinese silk. There is evidence of Chinese silk in Egypt as early as 1000 BC. Chinese silk and cotton were also favored by the Romans.

It has been suggested that America was discovered as a result of the desire to import and export spices and textiles to and from the Orient more rapidly. Once America became established, it too joined the textile trade. With interests increasing on an international level, there was a high demand for new and improved techniques in textile production. Textile production was the first area to undergo industrialization during the Industrial Revolution. Inventions such as spinning machines, automatic looms, and the cotton gin were of great importance in upgrading the quality of textile production. The early 19th century brought even more new ideas and innovation to the creation of textiles. Synthetic fibers and dyes were introduced and rayon was created. The year 1910 marked a new era; this was the year nylon began to be manufactured in mass quantity. The first manufacturing plant was in the United States.

The History of Clothing

The evolution of textiles had a tremendous effect on cultures worldwide. As the textile industry grew, so did the significance of clothing. Clothing is believed to be a means of expressing a people's identity, or at least fragments of their lives. Clothing has different meanings to different cultures. It is impossible to fully understand a culture through clothing, but it is possible to get a glimpse into certain aspects of people's lives through the textiles they used and the clothing they wore. Some believe that by examining the changes in clothing worn by a culture, one can understand the culture's social transformations.

Clothing is defined as items or substances that cover the body from head to toe for decoration or protection from the elements. It is apparent that clothing has a unique function in each society, as evidenced by the particular outfits and dress that are worn for different events during a person's life. Most societies have specific clothing that is worn during

special ceremonies, such as initiations, or spiritual and religious events, such as marriage and burial ceremonies.

There are several theories concerning why societies wear certain clothing and how clothing originated. Ruth Benedict explains that there is not any one reason why clothing becomes a part of a culture's practice; in fact, there are probably several acceptable explanations. Explanations are bound to differ depending on the location and the characteristics of the culture and geographic conditions. She does, however, discard the theory that cultures began to wear clothes due to their modesty. Benedict stresses her belief that covering up revealing areas alone, or areas of a sexual nature, would in fact bring more attention to them, therefore the theory seems to be inaccurate.

Source: © iStockphoto/Matthew Brown.

Some speculate that clothing originated out of superstition and ideas of magic, to conceal a body part from evil or prevent spells being cast upon it. Others suggest that clothing originated out of necessity, to battle the severity of the climate and environmental conditions. In colder climates, there is evidence that tribes used animal skins to survive the harsh conditions. Clothing had much more to do with utility than style and fashion.

There are other theories concerning the origin of the use of clothing. Ornaments and amulets such as shells, teeth, and skins eventually were of economic importance and reflected wealth and power. There is an ornamentation hypothesis that proposes that ornamentation led to the use of clothing. Ornaments were popular among Brazilians and the central Australians. They did not possess a great deal of clothing but did, however, acquire a great number of ornaments. There would be more ornaments worn during ceremonies or on special occasions. In the Andamans, the natives decorated the body with scarification and painting as well as ornaments. Ornaments are objects that convey aspects of an identity, including sexual attractiveness, power, and social, religious, or political status.

Clothing may be used at times to distinguish an individual's origin. Fernand Braudel states that clothing or dress can be used to decipher concepts of time consisting of enduring time, social time, and social history. An example of this is the Mayan dress called the *traje*. The traje remained unchanged for quite a long period, and it could be identified with a specific region. To wear a traje was to indicate that one was Mayan.

Sometimes it is not the everyday clothing that indicates a difference within a culture but the clothing worn during special ceremonies. For example, the Bunnu Yoruba people may wear the same everyday clothing as other Yoruba groups, but will wear different clothing for special occasions or ceremonies such as marriages or funerals. For the Yoruba, clothing also specifies gender and power relations. White clothing is usually worn by men, whereas black clothing is worn by women. This cultural distinction in the style of clothing is currently more difficult and unreliable due to globalization and the rate at which trade has allowed the exchange of clothing and textiles. Dress or clothing is now available in a variety of areas and has no boundaries or limitation.

Clothing is not static. There has been an evolution of clothing from the moment of its existence. Some suggest that missionaries in colonial times influenced the change of dress within indigenous cultures. The missionaries not only brought with them the message of God but also clothing and other objects, in hopes of converting those cultures. This did not always work. Some cultures changed their clothing while others continued to wear their traditional dress.

Clothing has evolved due to the continuous technological advances in the textile industry that provide ever more fabrics, textures, colors, and styles to choose from. Since the Industrial Revolution it has been easy to obtain material and clothing from all over the world, and today's fashion trends integrate many multicultural characteristics. Although clothing has dramatically evolved, in many parts of the world cultures continue to follow their customs of wearing specific clothing for special ceremonies.

— *Karen Hodge Russell and Jenny Etmanskie*

Further Readings

Collier, B. J., & Tortora, P. G. (1997). *Understanding textiles* (5th ed.). Englewood Cliffs, NJ: Prentice Hall.

Eicher, J. B., Johnson, K. K. P., & Torntore, S. J. (Eds.). (2003) *Fashion foundations: Early writings on fashion and dress.* New York: Oxford International.

Scheoser, M. (2003). *World textiles: A concise history.* London: Thames & Hudson.

Theories

Theory, from the Greek word for viewing or contemplation, has played a significant role in the understanding of science since the early 19th century but was not considered central before then. Instead, philosophers and scientists spoke more often of (Natural) Law and of hypothesis, defined by Mill as "any supposition which we make (either without actual evidence, or on evidence avowedly insufficient) in order to endeavor to deduce from it conclusions in accordance with facts which are known to be real." As philosophical interpretation became more language based and conceptually analytical, however, theory became more important in the analytical tradition of science, and in the Marxist tradition, theory (*theoria*) was often contrasted with practice (*praxis*), following Marx in the *Theses on Feuerbach.*

In the period following Einstein and Darwin, however, "theory" became a term that applied to a set of laws and hypotheses that were well-attested, coherent, precise, and covered all of the explanatory domain in question. Hence, Einstein's general theory of relativity is understood to cover all dynamics previously covered by Newtonian physics, with the added benefits of improved accuracy and precision and increased coverage of phenomena that Newtonian physics could not explain. Theories replaced earlier theories, it was held, in particular by the philosophical school known as the Logical Positivists, or the Vienna Circle, on rational grounds, and this replacement was absolute progress.

Popper's Account and Theories as Explanations

Theories were thought at this time to be constructed on the basis of evidence through logical induction—generalizing from observed instances to formulate universal claims. This set up the Problem of Induction, which David Hume had first formulated in the latter part of the 18th century, and Karl Popper revived as a problem in 1934, in his *Logik der Forschung* ("the logic of research," unfortunately titled *The Logic of Scientific Discovery* when published in English). Popper observed, as Hume had, that a universal claim cannot be derived from any finite number of observations and so cannot be rationally justified or verified, as the positivists had sought to do. He defined theories as "universal statements . . . nets cast to catch what we call 'the world': to rationalize, to explain, and to master it." Theories explained events by giving a deduction from their universal laws and singular initial conditions that described the event to be explained. Carl Hempel generalized this as the *nomological-deductive model* of explanation. Variations for law-like generalizations that were not exceptionless universal statements, and for stochastic and probabilistic inferences, were also developed by Hempel and others. In particular, a historical form of explanation worked, so to speak, in reverse: if you could produce a law-like generalization from which, together with some initial and boundary terms, you could deduce (or induce or infer in some manner) the events that were recorded, then you had offered an explanation of the events—the so-called *covering law model.* If there were more than one generalization that covered the event, then the best theory was the one that covered the most events or cases. Prediction was not possible in historical science, of course, but *retrodiction* or the "prediction" of already known events from the covering law explanation was considered to be equivalent logically to prediction in the experimental and present sciences.

Social Accounts

Falsificationism, as Popper's view was called, underwent several revisions under challenges that to falsify a particular hypothesis meant to accept that several ancillary hypotheses had to be accepted, and that a negative result might in fact falsify them instead (known as the *Duhem-Quine hypothesis*). One reaction, by Feyerabend, asserted extreme methodological anarchism under the slogan "anything goes," basically allowing a scientist to use or assert anything she liked, from creationism to astrology, in explanation. Feyerabend may have intended this as a gadfly or as a piece of revolutionary thinking. In this, he focused on the political and social nature of science and its theories; they were to be regarded as serving the political and social interests of the wider community.

Later accounts of the nature of theories arose from a reaction to Popper's falsificationism. Thomas Kuhn, in the tradition of historians of science like Merton, proposed that scientific theories acted as global *paradigms*, a term he later came to replace with several different terms that more exactly expressed the various roles "paradigm" played in his account of science. Kuhn proposed that science alternated between "normal science" and "revolutionary science." During normal periods, a theory acted as a guiding principle in which its terms set out the ontology of the domain under explanation. Methods, viable explanations, disciplinary boundaries, and even reality itself was specified by the theoretical paradigm (the latter being an extreme overinterpretation of Kuhn's ideas). In short, a theory was an entire worldview, and during revolutions there was an incommensurability of terms, ideas, and methods that, in effect, made progress and communication difficult, if not impossible.

After Kuhn, Lakatos proposed that science consisted of "*research programmes,*" which were open to revision at the edges but consisted of a core of protected hypotheses. Unlike Quine's earlier *reviseability thesis,* which asserted that nothing was protected from rational revision, Lakatos held that any research program had a number of unreviseable theses or theories. These acted as the center of a research programme, which could either be *progressive* or static. A progressive research program was a sign of an active science.

Structural Accounts

Subsequent ideas about theories in the philosophy of science have not been as widely discussed in the social sciences as the ideas of Kuhn and Popper, which have tended instead to follow in the tradition of Foucault, Derrida, and other continental philosophers, whose accounts tend to treat theories more as social constructs and ideologies. However, there have been several attempts to make the notion of a theory more exact in the analytic tradition. Attempts were made by several logicians to formalize Kuhnian theory as set theoretical structures, hence the name Structuralism (not to be confused with the French philosophical movement).

A more general and novel attempt to formalize scientific theories was undertaken by Suppe and van Fraassen, whose view of science was based on it being a collection of *models* that were semantic structures. The *semantic conception,* as it became known, treated theories as explanatory conceptual structures in a mode similar to the N-D models, but added that theories were interpreted semantically, so that the model itself was insufficient as an explanation until all the terms had been assigned referents. The semantic view also treated theories as restrictions on the field requiring explanation—to propose a theory was to specify the explanatory domain it was to cover. A similar account of theoretical explanation as being a position held in a contrast space of alternatives was developed independently in the social sciences by Garfinkel.

Currently, a theory is regarded in the philosophy of science as a conceptual entity that plays an explanatory role in a science. Rosenberg defines it as a "relatively small body of general laws that work together to explain a large number of empirical generalizations, often by describing an underlying mechanism common to all of them." A movement known as the New Experimentalism treats a theory as a summary of empirical observations based upon experimental interaction with physical objects.

Theory Reduction

A theory that "reduces" to another theory is regarded as having been supplanted by that theory, which is regarded as progress. The reducing theory is expected to have a wider coverage of phenomena or explanatory domain than the theory it reduces. A number of critics have rejected the ideal of explanatory unity of the sciences, particularly in biology, and deny that reduction is either inevitable or desirable. In particular, *genetic reductionism* in psychology is regarded as

flawed. This parallels the question of methodological individualism in the social sciences.

Theory in Anthropology

Anthropologists usually mean by "theory" a *particular* theory—a functionalist, structuralist, or socio-ecological theory of social systems, for example. However, while "social facts" have been defined by Durkheim, along with method, and similar ideas used in other sociological theory traditions, the notion of a theory has been treated as something obvious or self-evident. How to test or formulate theories in general has been assumed or passed by, in general, and the ways in which theories explained their subject have been left unspecified.

Physical anthropology tends to rely on conceptions of theory building and testing from the physical and historical sciences. Cultural anthropology has often relied upon conceptions taken from critical theory or social constructivism, in which a theory is something constructed either by the researcher or by the community of which the researcher is a part. Mixed conceptions of theory are rare.

— John S. Wilkins

See also **Durkheim, Émile; Popper, Karl**

Further Readings

Durkheim, E., & Lukes, S. (1982). *The rules of sociological method.* New York: Free Press.

Feyerabend, P. K. (1975). *Against method.* New York: Verso Editions.

Lachapelle, J. (2000). Cultural evolution, reductionism in the social sciences, and explanatory pluralism. *Philosophy of the Social Sciences, 30*(3), 331–361.

Layton, R. (1997). *An introduction to theory in anthropology.* Cambridge: Cambridge University Press.

Thomas, Elizabeth Marshall (1931–)

Elizabeth Marshall Thomas was born September 13, 1931 to Laurence K. Marshall, founder of Raytheon Corporation, and Lorna McLean Marshall. She grew up in Cambridge, Massachusetts, graduated from Abbot Academy in Andover, Massachusetts in 1949, and then attended Smith College in Northampton, Massachusetts. After one year at Smith, her father retired from Raytheon and led the family on an anthropological expedition to the Kalahari Desert in southern Africa. The Marshall family was among the first to meet and study the Bushmen. They returned to the Kalahari many times in the next few years and often stayed for up to a year. From notes that she took during her experiences, she wrote *The Harmless People* (1959).

In 1954, Elizabeth Marshall Thomas graduated from Radcliffe College in Cambridge, Massachusetts with a degree in English. As a student, she wrote a fictional account of the Bushmen that won a short story contest in *Mademoiselle.* "The Hill People" was later published in the *Best of American Short Stories of 1953.*

In 1956, she married Stephen Thomas. They have two children, Stephanie and Ramsey. With them she returned to Africa to study the Doboth people. Her account of these experiences was titled *Warrior Herdsmen* (1965).

Although Elizabeth Marshall Thomas was not trained as an anthropologist, she keenly observed and recorded the lives of the Bushmen of the Kalahari Desert of southern Africa. In her account of these experiences, she presents a clear picture of the customs and the daily lives of a people living in very primitive conditions. The hunting and gathering activities are clearly described in a style reads as a novel rather than an ethnographic (anthropological) study. Hunters, vain young women, young boys, older women, the landscape, the plants and the animals are vividly portrayed. The reader is caught up in the everyday life and drama of the Bushmen as well as their ongoing struggle for survival.

Over the years, Elizabeth Marshall Thomas has written many articles and books including some novels. Most recently she published *The Hidden Life of Dogs* (1993) and *The Tribe of the Tiger* (1994). Most fascinating of her novels is *The Reindeer Moon* (1987), which is the story of a young girl in a prehistoric culture. Using knowledge that she gained from living with and observing primitive societies, Marshall Thomas was able to create a virtual culture and lifestyle of persons living in precarious situations. Elizabeth Marshall Thomas is a keen observer of the lives of others. These observations have done much to advance the knowledge of the Bushmen of the Kalahari Desert.

Her novels are important because they translate her observations of human life into believable fictional cultures. It is well worth one's time to read and study Thomas's work.

— *Linda Reiten*

Further Readings

Thomas, E. M. (1959). *The harmless people.* New York: Alfred A. Knopf.

Thomas, E. M. (1981). *Warrior herdsmen.* New York: W. W. Norton.

Thomas, E. M. (1987). *Reindeer moon.* Boston: Houghton Mifflin.

HOTTENTOTS

Hottentots are a people who live in southern Africa. When the first Europeans (Portuguese) came to the Cape of Good Hope, they found tribes with a Stone Age culture.

The Dutch who settled the area called the natives either "Bushmen" or "Hottentots." Those who lived in the remote rural areas and hunted in the bush they called Bushmen. Those who lived in more settled situations and herded livestock they called Hottentots.

The name *Hottentot* is believed to have come from the language of the Hottentots, which uses several kinds of clicking sounds. The name is probably onomatopoeic imitation of the four ways they make clicks into a staccato-sounding speech. The Hottentots call themselves *Khoikhoi,* which means "men of men."

Scholars believe that the Hottentots migrated from a northern part of the Great Rift Valley in East Africa several millennia ago. They wore a skin cloak *(kaross)* and were described as peaceful people with brown skin and of medium height. They were organized into tribes and clans headed by a chief.

Descriptions of the religion of the Hottentots report that they worshipped a superior being but were mainly ancestor worshippers. They also honored the moon and engaged in a variety of rituals, especially dances. Hottentots engaged extensively in witchcraft and used herbs for medicine and as intoxicants.

Some Hottentot women have been observed to have external genitalia and secondary sexual characteristics that are unique. Specifically, some have masses of fat, extended *labia minora,* and elongations of the *praeputium ditoridis.*

Originally, there were several different groups of Hottentots, but they have mostly died or been absorbed into newer immigrant populations. Many are now in Namibia.

In the 17th century, the Hottentots fought two wars with the Dutch settlers. The Hottentot war strategy was to destroy the economy of the Dutch by running off their cattle, but the natives failed to understand the economic power of the Dutch. In 1713, a smallpox epidemic killed a great number of the Hottentots.

In the 20th century, the term Hottentots was disparagingly used as a synonym for "exceedingly primitive."

— **Andrew J. Waskey**

SAN BUSHMEN

The words *San* and *Bushmen* are used to identify an indigenous people of southern Africa related to the Khoekhoe. They live mainly in Botswana, Namibia, and southeastern Angola. Bushmen is an Anglicization of *boesman,* the Dutch and Afrikaner name for them, although anthropologists now prefer to use the Nama word for "bush dweller": *saan* (plural) or *saa* (singular).

Despite what was first concluded by researchers, the San are not easily identifiable by physical features, language, or culture. Today, they have become largely undifferentiated from the Khoekhoe or their Bantu-speaking neighbors. Yet in the past, a distinct San culture existed and still survives in limited groups. San culture is centered on bands of people, and each band usually includes several families, between 25 and 60 people total. Bands

are not self-contained entities. On the contrary, there is considerable interaction through trade and particularly marriages so that the movement of people from band to band is comparatively frequent, and the composition of bands varies considerably in time. Each group has its own territory, and its decisions are influenced rather than imposed by older members. Many of the rural San live in lightweight, semicircular structures of branches tied with twigs and thatched with grass. Their rock art, which persisted well into the 19th century, is particularly fascinating, as it is not merely decorative. Scholars concluded that this art had a powerful ritual significance and has been associated with the trance dance and trance experiences of shamans.

At the turn of the 21st century, the San numbered about 100,000, with the majority living in the western Kalahari districts of Botswana. Namibia had the next largest group, and about 10,000 lived in southeastern Angola. In the new millennium, court cases have been fought by the San against their national governments. The Botswana government, for example, has faced several trials because of its decision to evict San tribes from their lands in the Central Kalahari Game Reserve, offering goats and cattle in exchange. Yet as one of the San spokesmen countered, people who have been hunters all their lives cannot be expected to become farmers overnight. Despite the reassuring statements issued by Botswana President Festus Mogae to the international community, the San continue to be persecuted and risk being imprisoned if they return to their ancestral land.

— Luca Prono

Tierra del Fuego

Tierra del Fuego ("land of fire" in Spanish) is the southernmost tip of Argentina and Chile's southern Patagonian territories. It is an archipelago that consists of a large island, called Tierra del Fuego as well, and a group of smaller islands separated from the continent by the Strait of Magellan. Half of the large island, and the islands west of it, are part of the Magallanes region of Chile. The eastern part of the archipelago belongs to Argentina. The archipelago of Tierra del Fuego is surrounded by the Andes mountains and the south Pacific Ocean to the west, the plateau of Patagonia and the waters of the south Atlantic Ocean (Mar Argentino) to the north, and the south Atlantic Ocean to the east. Usuhaia, the southernmost city on the continent and the capital of Argentina's province of Tierra del Fuego, is located on the Beagle Channel that leads out to sea and on to Antarctica.

The Spanish conqueror Hernando de Magallanes (Ferdinand Magellan) disembarked in Tierra del Fuego in 1520; however, the region was not fully explored until the early 19th century. In between, the official cartography identified the whole Patagonia area as secluded indigenous territories. The region, then, became known as "the edge" and its natives as inhabitants of the utmost end of the earth. It is not surprising that due to this metaphoric view of Tierra del Fuego, European explorers and conquerors engaged in expeditions in search of virgin lands and new commercial opportunities. Between 1826 and 1830, the English explorer FitzRoy landed in the Beagle Channel, which connects the Atlantic and Pacific Oceans. The naturalist Charles Darwin accompanied FitzRoy on one of his expeditions. It was particularly during this journey that Darwin began to formulate the theories later published in *The Origin of Species* (1859).

At the time of the first European native contact, four aboriginal groups inhabited Tierra del Fuego. The *Onas,* or *Shelk'nam,* in the northern steppe grassland had a pedestrian-hunter economy with the guanaco as their most important resource; the *Yaganes,* or *Yámanas,* in the region of the Beagle Channel, whose sustenance was based primarily on sea lions and the use of canoes; the *Alakalufs,* in the southwestern Chilean archipelagos, with a *Yaganes*-like economy; and the *Haush,* or *Manekenk,* on Península Mitre, at the eastern tip of Tierra del Fuego. The latter group subsisted on terrestrial and sea mammals. Although there is still much academic debate about the biological origins of these ethnographic groups, the diversity in their morphological characteristics surprised not only Charles Darwin but also ethnographers and travelers alike. Indeed, some scholars suggest that it is this diversity that provides accounts of the evolution and historical settlement of people in the Americas.

Source: © Royalty-Free/CORBIS.

Also, research suggests that this diversity is rooted in the varied geographical characteristics of the environments in which they live, and in their diets. Today there is almost no representation of these groups other than their fully assimilated and ethnically mixed descendents.

— *M. Fernanda Astiz*

See also **Argentina; Onas; Yaganes**

Further Readings

Briones, C., & Lanata, J. L. (Eds.). (2002). *Archeological and anthropological perspectives on the native peoples of Pampa, Patagonia, and Tierra del Fuego to the nineteenth century*. Westport, CT: Bergin & Garvey.

Martinez Sarasola, C. (1992). *Nuestros paisnos los indios. Vida, historia y destino de las comunidades indígenas en la Argentina*. Buenos Aires: Emecé.

Tikal

From atop Tikal's Temple IV, a structure that soars 65 meters into the air, it is possible to view one of the largest pre-Columbian Maya sites and its surrounding environs. Today, the jungle has reclaimed ownership of the city's buildings, which were so carefully constructed by Tikal's ancient inhabitants. Throughout the Classic period, however, Tikal was an important political regional capital with a reach that extended throughout the Maya world and beyond its borders.

Tikal's earliest known occupation dates to 800 BC, after which the site grew in size and population. The urban core includes the Great Plaza, ringed by the North Acropolis, Central Acropolis, and Temples I and II. To the west are Temples III and IV; additional structures include Temples V and VI, the South Acropolis, and the East Plaza. Excavations at the North Acropolis have revealed a long history of building renovations and information about the trajectory of the dynastic line, both of which commenced in the

Late Preclassic period (ca. 250 BC–AD 250). The North Acropolis became the focus of long-standing royal interment and ancestor veneration as indicated by rich funerary remains, portraiture, and hieroglyphs.

During the Late Preclassic period, Tikal's rulers sustained contact with Teotihuacán in central Mexico. Architectural style, artistic motifs, dress, and mortuary practices at Tikal attest to Teotihuacán's influence. The Mundo Perdido (Lost World) Complex at Tikal, for instance, included a pyramid (Structure 5C-54) initiated in the Late Preclassic period and constructed in the talud-tablero architectural style. The sloping wall and flat top style is ubiquitous at Teotihuacán. Interaction with Teotihuacán continued into the Early Classic period (ca. AD 250–600) and may have legitimated Tikal's position of prominence in the Maya lowlands.

After Teotihuacán's Early Classic demise, Tikal's rulers continued to assert power over, and forge links with, many neighboring rivals. However, competing Maya polities' militaristic maneuvers and political intrigues began to significantly undermine Tikal's dominance during much of the center's later history. Specifically, in the mid-6th century, Lord Water at the Belizean site of Caracol led a successful military campaign against Tikal, capturing and killing the ruler Double Bird. In the aftermath, known as the "hiatus," Tikal's monuments were defaced and dismantled, population growth halted, sociopolitical structures fragmented, and economic stability wavered.

Erection of new temples and twin pyramid groups in the 7th and early 8th centuries indicates renewed fortunes at Tikal. The twenty-sixth ruler, Jasaw Chan K'awiil (also Ruler A or Ah Cacau), who was entombed beneath Temple I, was responsible for this turn of events. For example, the defeat of Calakmul's ruler Jaguar Paw by Jasaw Chan K'awiil reaffirmed Tikal's reemergence as a power with which to be reckoned. Despite these gains, archaeologists believe that by the mid-9th century Tikal's central authority had waned and residences were abandoned. Collapse was not the result of a single event but most likely caused by combined phenomena like environmental degradation, social unrest, warfare, and political instability. Gradually, the jungle reasserted its status as Tikal's primary tenant. This important site, however, continues to yield new information. Combined archaeological efforts and decipherment of glyphic texts enrich understanding of Tikal's history, its dynamic role in political events of the Classic period, and the cultural legacy it imparted upon pre-Columbian and contemporary Maya peoples.

— Pamela L. Geller

See also **Mayas; Mexico**

Further Readings

Coe, W. R., & Haviland, W. A. (1982). *Introduction to the archaeology of Tikal, Guatemala.* Tikal Reports, 12. Philadelphia: University Museum, University of Pennsylvania.

Sabloff, J. A., (Ed.). (2003). *Tikal: Dynasties, foreigners, and affairs of state.* Santa Fe, NM: School of American Research Press.
Sharer, R. J. (1994). *The ancient Maya.* Stanford, CA: Stanford University Press.

TIKAL

Tikal, which means "city of voices," was the largest urban and ceremonial center in the southern Maya lowlands that now correspond to the northern part of the region of Petén, Guatemala. Its ruins, surrounded by a vast rain forest, constitute the central attraction of the Tikal National Park, established in the 1950s and designated a UNESCO World Heritage site in 1979.

The city was first founded as a small village during the Middle Formative Period (900–300 BCE), but became an important ceremonial center in the Late Formative Period (300 BCE–AD 100), when major pyramids and temples were built. Tikal prospered during the Late Classic Period (AD 600–900) thanks to successful military conquests and the expansion of its commercial activities. Its huge plazas, pyramids, and palaces, which have now become its distinguishing feature, were planned in this period. Maya art flourished in the city with monumental sculpture and vase painting. The appearance of Maya hieroglyphic writing and a complex systems of time-counting date back to this period, too. At the height of its prosperity, the heart of the city was populated by more than 10,000 people, with a total of 50,000 inhabitants in the surrounding areas. After this economic and artistic peak, the city suddenly declined and, as other major centers of the southern lowlands, was abandoned by the 10th century. The reasons for Tikal's decline are still unknown and the history of the city's governments also remains ambiguous.

— Luca Prono

TIKOPIA

Tikopia, a Polynesian community near the eastern border of the Solomon Islands, is arguably the most thoroughly documented small-scale society in the ethnographic record. That documentation exists primarily as a result of investigations by Sir Raymond Firth in 1928–29, 1952, 1966, and 1973. Based on those four field visits, he published nine full-length books and countless articles. In addition to Firth's path-breaking research, studies of varying length have been conducted by social anthropologists James Spillius, Torben Monberg, Eric Larson, and Judith Macdonald; ethnobotanist Douglas Yen; and archaeologist Patrick Kirch.

Tikopia is a "Polynesian outlier," meaning that its people are linguistically, culturally, and physically Polynesian, although their home lies outside of what we normally think of as the Polynesian heartland—a vast triangle bounded by Hawai'i in the north, Rapanui (Easter Island) in the east, and Aotearoa (New Zealand) in the west. It is located at 12° 18' S by 168° 48' E. Tikopia's climate is tropical. Its yearly calendar is divided into two seasons, generally termed the "trade-wind" and "monsoon" seasons (in Tikopian, *te tonga* and *te raki,* respectively). The trade-wind season, running from somewhere in April to October, is characterized by strong breezes blowing constantly from the southeast. It is relatively cool and tends to be the drier of the two seasons. The monsoon season is characterized by unstable weather. Blazing sun is interspersed with torrential rains, and extended periods of calm are interrupted by violent storms.

The island is approximately three miles from northeast to southwest and 1.5 miles from southeast to northwest. It is of volcanic origin and rises to a maximum altitude of about 1,200 feet. Tikopia's nearest neighbor is Anuta, 70 miles to the northeast, which it resembles in language and culture. To the west, its nearest neighbors are the Melanesian islands of Vanikoro, Utupua, and Ndenö, the Polynesian island of Taumako, and the Reef Islands with their mixture of Polynesian and non-Austronesian speakers. Tikopia's population at the time of Firth's initial study was around 1,270. Owing to substantial out-migration since the 1950s, the current resident population is only slightly larger, but there are now large Tikopian settlements on Vanikoro, Makira, Guadalcanal, and in the Russell Islands.

Prehistory

According to oral traditions, Tikopia was pulled up from the ocean floor by the demigod Metikitiki. The original occupants, the Atua i Raropuka (the Deity of Raropuka) and the Atua Fafine (the Female Deity), introduced the prototypical male and female economic activities: preparing sennit cord and plaiting pandanus-leaf mats. Several of the current descent lines claim autochthonous origin; others are said to have arrived from such diverse locales as Tonga, Pukapuka, Samoa, 'Uvea, Rotuma, Ontong Java, Motulava, and Anuta. Tikopians speak a Nuclear Polynesian language, related to Samoan and Tuvaluan.

Kirch's archaeological investigations indicate a period of continuous habitation spanning almost three thousand years, with tenuous suggestions of sporadic visits dating back close to another thousand. Kirch and Yen divide the island's cultural history into four periods, each typified by a distinctive artifactual assemblage. The earliest, which they term the "Kiki Phase," is characterized by Lapitoid ceramic ware, and it lasted from about 900 to 100 BC. The Kiki Phase gave way rather abruptly to the "Sinapupu Phase," characterized by incised Mangaasi-style pottery, apparently imported from northern Vanuatu. The Sinapupu Phase lasted to perhaps the 15th century AD and gradually gave way to the "Tuakamali Phase." The latter period is distinguished by a characteristically Polynesian artifactual assemblage and complete disappearance of ceramic ware. European contact began with Quiros's visit in AD 1606. Kirch and Yen use AD 1800 as the date marking the end of the Tuakamali and the inception of the "Historic Phase."

Over the period of human habitation, the natural environment evolved along with the cultural. Erosion was offset by shoreline aggradation, encouraged by a growing emphasis on arboriculture featuring *Calophyllum,* coconut, and *Antiaris* (the local barkcloth tree). As a result, Tikopia's land area has increased substantially over the past three millennia, with a corresponding reduction of the fringing reef. During the Tuakamali Phase, an open saltwater bay was transformed into a brackish lake. As early as the Kiki Phase, marine life and avifauna became less abundant, and wild animal protein was supplemented with domestic pig. Pig husbandry flourished briefly but was abandoned late in the Sinapupu Phase.

Through the entire sequence, contact with the isles of northern Vanuatu, Santa Cruz, and west Polynesia attests to a complexity belying the apparent isolation of this tiny dot of land amid the vast Pacific Ocean.

Economy

As a high volcanic island, Tikopia includes a variety of ecological zones and offers an assortment of foods. For centuries, the most important crops have included coconut, taro, breadfruit, and yam. Today manioc, papaya, and several varieties of banana have been added to the island's list of staples. Other fruits and nuts include the Polynesian chestnut, *Canarium* almond, *Burckella obovata,* Malay apple, watermelon, and edible pandanus. Tobacco has become a major nonfood crop. Betel—a mixture of slaked lime, the leaf or stem of a pepper plant, and the nut of the areca palm—is a popular intoxicant. Turmeric is grown and valued as a ritually charged pigment and a flavoring for foods.

Domestic pigs have been only a minor source of nutriment. Animal protein is more commonly supplied by wild birds, domestic chickens, and, especially, seafood. Although Tikopia has no lagoon, it does enjoy a fairly extensive fringing reef, providing shellfish and assorted small reef fish. The island is large enough to offer calm seas on the lee side, enabling men to fish from small canoes using a number of techniques. The brackish lake provides a variety of resources rarely encountered on an island of Tikopia's size.

While some foods are eaten raw, the most esteemed are cooked, either over an open fire or in an earth oven. The most appreciated of these are "puddings" made by mixing a starchy vegetable such as manioc or taro with rich, white cream expressed from the grated meat of mature coconuts.

Most houses even today are constructed from logs and thatched with sago and coconut leaves. They are built directly on the ground on or near the beach. Roofs are steeply pitched, and doors are only two to three feet high. The sandy floor is covered with coconut-leaf mats, and one typically crawls about on hands and knees while inside.

Social Organization

Tikopia is divided into two geographical districts, known as Ravenga in the east and Faea in the west. Within each district are a number of villages (*pōtu*).

In addition, the population is divided into four patrilineal descent groups called *kainanga,* which Firth originally glossed as "ramages" and later termed "clans." The *kainanga* are ranked and named; in descending order they are the Kainanga i Kāfika, the Kainanga i Tafua, the Kainanga i Taumako, and the Kainanga i Fangarere. Kainanga are nonexogamous, and they are geographically dispersed. They are led by chiefs (*ariki*), known as the Ariki Kāfika, Ariki Tafua, Ariki Taumako, and Ariki Fangarere. The chief is the senior male of his clan; other people are ranked in terms of genealogical seniority and their proximity to or distance from the chiefly line. An *ariki* is normally succeeded by his eldest son.

Since the kainanga are territorially dispersed, a chief may not be physically surrounded by members of his own clan. One chief, the Ariki Tafua, traditionally resides in Faea, whose population is made up predominantly of his clansfolk, while the other three chiefs traditionally reside in Ravenga. A Tikopian is expected to respect and obey all four chiefs and not only the leader of his or her clan. When important decisions must be made that bear on the community at large, the four chiefs consult. They usually make decisions by consensus.

Below the chiefs in rank are their close male relatives. These men are termed *maru,* and they serve—to use Firth's expression—as a chief's "executive officials." A *maru* advises his chief on matters of concern to the community, transmits the chief's decisions to the rest of the population, and makes sure the chief is kept informed of popular reaction to his dicta.

Each kainanga is made up of several *paito.* The word normally means "house," but in relation to descent Firth characterizes the *paito* as "patrilineal lineages." Members of a paito share in ownership of gardens (*vao*), orchards (*tofi*), houses, house sites, and canoes. A paito normally makes decisions about what crops are to be planted in which garden, when they are to be harvested, and how the foods are to be prepared, and it allocates labor for completion of the various tasks. A chief may override a paito's rights of ownership under certain limited circumstances, and he may even confiscate land or—in earlier times—punish an offender by exiling him to the ocean, a penalty considered tantamount to execution.

Virtually all of Tikopia's land is owned by one or another lineage, and it is under constant cultivation. Tikopians practice a form of crop rotation, but rarely is a plot permitted to lie fallow. Any garden that is not in active use may be temporarily cultivated by another lineage. A lineage that plants on another's land must compensate the owners by sharing a portion of the harvest. After a successful harvest, ceremonial first fruits payments traditionally were made to the chiefs. Today, such payments are likely to be offered to the church.

Kinship

Kinship terminology in the parents' generation is of an Iroquois type: the father and father's brother are both called *tamana* or *mmana;* mother and mother's sister are *tinana* or *nana;* the father's sister is *masikitanga,* and mother's brother is *tuatina.* In ego's generation, kinship terminology approximates a Hawaiian system: all cousins of the same sex as ego are called *taina,* while those of opposite sex are *kave.* Unlike most of Polynesia, Tikopians do not distinguish terminologically between older and younger same-sex siblings. A man calls his own and his brothers' children *tama,* while he calls his sister's children *irāmutu.* A woman calls all her siblings' children by the same term that she uses for her own: *tama.* Grandparents and ancestors are all called *puna* or *tupuna,* while grandchildren and descendants are all *makopuna.* In the affinal system, "husband" is *matua,* "wife" is *nofine,* a sibling-in-law of same sex as ego is *mā,* and a sibling-in-law of opposite sex is *taina.* Parents-in-law call children-in-law *fongōna* and are, in turn, called *fongovai.*

The interactional tone of kin relationships varies as significantly as terminology. Children treat their fathers with respect. One follows one's father's instructions; refrains from uttering the father's name; abstains from rough joking, practical joking, or conversation about sex; steps aside when meeting the father on a path; and avoids turning one's back on the father. Like the father, the mother is treated with respect, but the relationship is also characterized by unambiguous affection and a degree of freedom. The mother's brother and sister's child treat each other with easygoing warmth; they joke with one another and may discuss romantic concerns. The father's sister is treated with respect and is thought of, in certain respects, as a female father. The grandparent-grandchild relationship is warm and supportive.

Siblings of the same sex are expected to share relations of solidarity. They may tease each other and confide in one another about sexual affairs. If a question of ritual honor or political authority should arise

between same-sex siblings, the younger sibling normally defers to the elder, but under most circumstances, they refrain from using formal markers of respect.

Relations among siblings of opposite sex also tend to be friendly and relaxed. They respect one another, but the extreme brother-sister avoidance found in much of west Polynesia and some of the Polynesian outliers is absent on Tikopia. Brothers are expected to look after their sisters' interests, but they are not preoccupied with protecting their sisters' virtue as has been reported, for example, in Samoa. Indeed, Firth notes that a brother and sister may spend time together in the same house without a third party present to chaperone, and they are even permitted to sleep on the same mat, under the same covers. However, unlike Hawai'i, where a man of high rank might marry his sister, sexual relations between siblings or close cousins on Tikopia would be regarded as incestuous.

The relationship between a husband and wife is expected to be close and informal, although differences in rank, should they become relevant, favor the husband. In general, in-laws of adjacent generation and siblings-in-law of the same sex treat one another with extreme respect. One does not use the other's proper name and does not stand while the other is seated in his presence. They do not turn their backs on one another, do not tease each other, avoid discussing subjects relating to sex, and do not raise their voices near each other's homes. In speaking to each other, they express respect by using the dual form of the personal pronoun—a word that means "the two of you." Siblings-in-law of opposite sex are called by the same term (*taina*) as siblings of same sex and, like siblings, are expected to have a warm, close, informal relationship. They may talk about romance, may joke sexually, and are appropriate marriage partners.

Gender

Tikopia has a fairly clear gender-based division of labor. Men build houses and canoes, and they do most of the fishing beyond the fringing reef. Women devote a larger proportion of their time than men to child care. They prepare bark cloth for sheets and clothing, and they plait mats. Older children care for younger siblings, but girls play a more active role than boys in that regard. Both men and women work in gardens, but men are more likely to clear the brush, while women devote a somewhat greater proportion of their time to weeding, mulching, harvesting, and food preparation. Both men and women collect seafood on the fringing reef, but men are more likely to spear fish while women devote more of their time to combing the reef for shellfish.

Men tend to be politically and ritually dominant. Only men are chiefs and *maru.* Within the house, the highest-ranking male sits in the most ritually prominent spot. In decision making, a wife is supposed to defer to her husband's judgment. In church, only men are priests or catechists. And congregations are segregated according to gender, with men sitting on the ritually superior right side while women sit on the left. However, Tikopians say that men should treat women with respect, and they even say that a married woman is *tapu*—"sacred." A good husband considers his wife's feelings and takes her judgment into account when making decisions. A man treats his father's sister with the utmost respect and has a close, affectionate relationship with his mother.

Relations between boys and girls are generally relaxed, and differences in rank are not marked. Girls and boys might play together when very young. As teenagers they meet at dances, which occur on ceremonial occasions as well as more casually on the beach on moonlit nights. Firth reports that in pre-Christian times men of high rank practiced a kind of ritual marriage by capture. That, however, ended with establishment of the church.

Religion

The traditional Tikopia religion recognized several kinds of spiritual being. The generic term for spirit is *atua.* Some of these were ghosts of deceased neighbors or kin. Others were believed never to have been human. Powerful gods of nonhuman origin were called *tupua.* The great pan-Polynesian deities, known by such names as Tu, Tane, Rongo, and Tangaroa, were recognized on Tikopia but assumed less prominence there than in the major archipelagoes. The most important gods were spirits of deceased chiefs; paramount among them was the Atua i Kāfika, an ancestor of the premier chief, the Ariki Kāfika. During life, this man was an important cultural hero who introduced many elements of the island's historic social structure.

Central to Tikopian religion is the pan-Polynesian concept of *mana* or *manū;* Tikopians treat the two

words as synonymous. Firth translates manū as "power" or "efficacy." Tikopians cite manū to explain unusual success or good fortune. A person who has (or is) manū can affect the weather, crop fertility, success or failure in military combat, and the health of those around him. Persons of high rank, particularly chiefs, are believed to possess an abundance of manū and are expected to use it to ensure the community's well-being. Tikopian religion, as is true in much of Polynesia, was concerned more with assuring economic security for the living than with questions of abstract morality or rewards after death. Possession of manū is associated with genealogical seniority and direct descent from the most powerful gods.

As in much of Polynesia, Tikopian chiefs (*ariki*) are not only political leaders but served in the old religion as high priests. They were responsible for communication with the most important spirits and led the community in worship activities. Tikopia's most important worship activity involved an elaborate semiannual ceremony known as *te fekau o nga atua*—"the work of the gods." Worship ceremonies themselves were termed *fai kava*—"performing kava." Kava (*Piper methysticum*) is a type of pepper plant, and it was the most widely used intoxicant in Polynesia prior to the introduction of alcohol. It remains a ceremonially important beverage on many islands. Tikopians, however, prefer to ingest betel and reserve kava for the gods. Certain ritual practitioners poured kava liquid onto the ground as an offering during worship ceremonies.

While chiefs were ultimately in charge of worship, their jobs were largely administrative. Much ritual performance was handled by *pure* or *matāpure,* a term that Firth glosses as "ritual elder." *Matāpure* were the leaders of religiously important lineages, and their ceremonial role could be as prominent as that of the chiefs themselves. *Maru*—"executive officials"—might also assist the chiefs in carrying out religious activities, but their major responsibilities were in the mundane realm.

In addition to chiefs and ritual elders, whose functions could be described as "priestly," Tikopia recognized spirit mediums (*vakaatua,* literally "spirit vessel") who communicated with spiritual beings by going into trance states. A medium would be possessed by spirit familiars who spoke to the community through the *vakaatua*'s mouth. Tikopians often depended on spirit mediums to explain misfortune, to discern the fate of kinsfolk lost at sea, and to answer a variety of other perplexing or disturbing questions. Mediums might be either male or female and of any social rank.

Attempts to convert Tikopia to Christianity began in the 19th century but met with little success until the 1920s when Ellison Tergatok, an Anglican mission teacher from Vanuatu, settled on the island. Tergatok, who later was ordained as an Anglican priest, convinced the Ariki Tafua, Tikopia's second-ranking chief, to convert, and when he did, virtually the entire Faea district—where the Ariki Tafua made his abode—converted with him. Still, at the time of Firth's initial field study, approximately half of Tikopia's population, including three of the four chiefs, continued to practice the traditional religion.

The ensuing two and a half decades witnessed an ongoing rivalry between the island's Christian and pagan communities, with the Christians slowly but inexorably winning converts. Finally, during the early 1950s, Tikopia was struck by a powerful hurricane, followed by a drought and famine, and finally an epidemic that decimated the already-weakened population. Islanders perceived that pagans suffered more than Christians from these natural disasters, and they took that as a divine message. As a result, the last of the chiefs converted to Christianity and, with him, the remaining holdouts among the general population entered the fold.

At the start of the 21st century, Tikopia is a thriving devoutly Christian Polynesian community, and Tikopians have achieved a level of national prominence in the mostly Melanesian Solomon Islands that far exceeds their numbers in the population. Almost all Tikopians continue to be loyal Anglicans. Several have been ordained as priests, and two have served as bishops. A number of Tikopians have taken prominent positions in the civil service at the national and provincial levels. Particularly noteworthy was Sir Fred Soaki (Pa Nukuriaki), a long-time commissioner of the Royal Solomon Islands Police. On February 10, 2003, Sir Fred was assassinated while working to resolve an inter-island conflict that had torn apart the country over the previous four years. That, however, is another story.

— Richard Feinberg

See also **Firth, Raymond; Polynesians**

Further Readings

Firth, Sir R. (1936). *We, the Tikopia: A sociological study of kinship in primitive Polynesia.* London: Allen & Unwin.

Firth, Sir R. (1959). *Social change in Tikopia: Re-study of a Polynesian community after a generation.* London: George Allen & Unwin.

Firth, Sir R. (1961). *History and traditions of Tikopia.* Polynesian Society Memoir Number 33. Wellington, New Zealand: The Polynesian Society.

Firth, Sir R. (1991). *Tikopia songs: Poetic and musical art of a Polynesian people.* Cambridge: Cambridge University Press.

Kirch, P. V., & Yen, D. E. (1982). *Tikopia: The prehistory and ecology of a Polynesian outlier.* Bernice P. Bishop Museum Bulletin Number 238. Honolulu: Bishop Museum Press.

Time

The many differences between the ways time is understood in different cultures, as well as the ways in which such differences might affect those cultures, can be divided into three main areas: what time is, how time is experienced, and how it is measured—the metaphysics of time, the perception of time, and the metric of time.

The Metaphysics of Time

The term *time* can be used to refer to a number of different, though connected, concepts. The concept of change is a central one; one often refers to time when, in fact, one is thinking of the events occurring within time. This is most obvious with regard to utterances such as, "Time is the great healer," or *tempus edax rerum* (time the devourer of things). Strictly speaking, time has no causal powers, either of healing or of destroying; what a speaker is really referring to in such cases is the succession of causally related events whose occurrence is noted as the passing of time. Whether time is something in itself, rather than merely the relationship between events, is one of the main questions dealt with in the metaphysics of time.

Questions about the reality, the nature, the shape, and the origins of time are often bound up with more general cosmological theories. Such questions include: Did time have a beginning? Is time linear or looped? Is time real? Is time something in itself, over and above the events that occur within it? Generally, cultures only develop answers to questions of this sort when the questions have been asked, which usually involves the development of a philosophical tradition. As with the perception of time, many writers try to develop a metaphysical theory of time from the literature and languages of cultures that have produced no explicit, worked-out theory of time; they face the problems described below.

The Perception of Time

The phenomenon of subjective time perception is familiar: At its simplest, when one is engaged in pleasurable activities or is concentrating, time can seem to speed by, but when one is bored or waiting for something, time seems to drag: "Time flies when you're enjoying yourself," and "A watched pot never boils." Other factors relevant to perceptions of time may be age (time seems to pass more quickly the older one gets), the season, the weather, the time of day, and so on. It has been argued that these and similar factors lead to a larger-scale cultural phenomenon: that members of different cultures experience time differently.

Since it is impossible to directly compare the experiences of two people, evidence for such theories must be circumstantial; much reliance is placed upon the linguistic patterns—and especially the writings—of the cultures being compared. Two major problems face the researcher. First, it's important to distinguish between the way someone experiences the world and the theories of the world that person develops. For example, I believe that an oar remains straight when dipped into water, but I still see it as bent; however strong my belief that the oar doesn't bend, I can't see it as straight. In the same way, many cultures have developed the theory that time is cyclic, but no one has ever *perceived* time as cyclic. The way that time is talked and theorized about need not reflect the way that it is experienced.

Second, unless one already understands how a culture experiences the world, it's extremely difficult to understand or even to recognize that culture's use of metaphor and other indirect uses of language. Imagine trying to construct an account of how English speakers understand the nature of mind or experience mental phenomena on the basis of such

expressions as: "I'm of two minds about that," "He's lost his mind," "It's got a mind of its own," and "She can't make up her mind."

The Metric of Time

All human societies have developed systems of measuring time based on regularities in the natural world—usually using astronomical phenomena such as movement of the sun, phases of the moon, changing positions of other heavenly bodies (either directly or via the seasons), tides, migrations of animals and birds, etc. Aside from the fact that these regularities are easily observable, they were also linked with activities such as agriculture, hunting, and travel, and religious ritual.

The ability accurately to measure time both affects and is affected by societies; for example, although the Chinese developed clocks long before the Europeans (as evidenced by the Chinese mechanisms taken to Europe and used in the development of clocks there), the Chinese didn't manufacture or use them except as novelties. In Europe, on the other hand, the clock was seen as the symbol of scientific advancement and rapidly became ubiquitous in private houses and in public places. The measurement of time became the center of European social and commercial life, creating the structure of lives both at work and at play. Thus one distinction that might be drawn between different types of culture is that between those cultures whose experience of time is in terms of certain natural cycles (day and night, phases of the moon, some pattern of seasons, and the year) and those cultures that have developed measurement in such a way that their experience of time is in terms of a succession of more-or-less regular units such as hours, days, weeks, and months.

Often, however, the two ways of experiencing and/or of measuring time sit side by side in different aspects of a culture—evidenced most commonly in secular and religious aspects. For example, secular Western societies count days as twenty-four-hour periods running from midnight to midnight, relying on the solar calendar for most time keeping; for religious purposes, on the other hand, sunrise and sunset are still used to mark the bounds of the day, and the lunar calendar remains important for calculating certain feast and fast days.

—*Peter J. King*

See also **Cosmology and Sacred Landscapes**

Further Readings

Flood, R., & Lockwood, M.(Eds.). (1986). *The nature of time.* Oxford: Basil Blackwell.

Gell, A. (1992). *The anthropology of time.* Oxford: Berg.

Gyekye, K. (1995). *An essay on African philosophical thought: The Akan conceptual scheme* (Rev. ed.). Philadelphia, PA: Temple University Press.

Le Poidevin, R., & MacBeath, M. (Ed.). (1993). *The philosophy of time.* Oxford: Oxford University Press.

McTaggart, J. M. E. (1908). The unreality of time. *Mind, 17*, 457–84.

Mellor, D. H. (1998). *Real time II.* New York: Routledge.

Time in Anthropology

The nature of time is a topic of commanding interest to scholars in many different academic disciplines. Anthropology has been concerned with time in two major ways. The first is how human beings create and express time, including the generic, universal, homogenous time of science that many people take for granted. The second concern is the issue of representations of temporality, particularly in the anthropologist's ethnography, and how such representations "freeze" cultures in an effectively timeless or eternal state.

The Past

The legacy of modernism in the anthropological study of time is the challenge to the singular nature of time. By the late 1800s, a centuries-old opinion had begun to settle in as received wisdom; namely, that time was a uniform and universal yardstick of human existence and experience. Newtonian time was assumed to hold everywhere; Kantian time, while individually experienced, was a unitary phenomenon. Time tended to be conceived as a public, universal phenomenon.

In the late 19th and early 20th century, the universalist tendency came under closer scrutiny. Newly formed social science disciplines, such as psychology and sociology/anthropology, undertook studies of

time. The result was a growing sense that far from being public and universal, time and the experience of it was private and somewhat idiosyncratic. By the 1910s, a growing number of scholars came to believe that time was far from universal.

Several scholars figured prominently in the reformulation of time as privately held. Henri Bergson's writings on duration helped ground time conceptually in the perception of the temporal subject. Bergson's notion of *durée* was an expression of the flow of consciousness. And William James's now famous neologism "stream of consciousness" was itself an attack on those who would divide temporal consciousness into discrete units—as he said, like describing a river in terms of bucketfuls of water.

The Present

Émile Durkheim and his followers investigated temporality from an analytic and theoretical stance midway between public and private, shared and idiosyncratic. Durkheim, Marcel Mauss, and Henri Hubert conceived of time as variable across social groups—variably perceived, variably expressed. But they also considered time a shared phenomenon in its cultural expression. Hence a midpoint between the public and the private—time may be individually expressed and experienced, but it is at heart a social construction, a product of the social group, and must therefore be public and shared but variable across different social groups.

Most of the early work of these scholars involved sketching this position theoretically. The empirical investigations tended to center on calendars and the rhythmicization of time. That is, what are public expressions of time, and what social work do they accomplish? Calendars are an obvious answer, and Hubert's now-famous work on the representation of time examines how time is constructed calendrically. Part of the thrust of Hubert's argument is that time is a necessary component of magical and religious representations. The work of the calendar is not to measure time in the sense of giving magical or religious acts a fixed date, but to give tempo or rhythm to time, to regulate the intervals of the sacred and the profane.

E. E. Evans-Pritchard, Claude Lévi-Strauss, and Edmund Leach are all intellectually descended from Durkheim's structural position. Leach takes Durkheim and Hubert's argument to its logical conclusion in suggesting that time is nothing more than the alternation between the sacred and the profane. Leach's argument is succinct and well stated, if somewhat extreme. Leach seems to confuse the discursive, symbolic manipulation of time and the reality of time. That is, in a fit of Durkheimian exuberance he mistakes oscillations in temporality for oscillations in time. Thus ritual action does not actually, as Leach might claim, cause time to run backward, although it can cause a symbolic, temporal reversal that is as powerful as reality.

Evans-Pritchard specifically interrogates time and space in his monograph *The Nuer.* He argues that both are products of social groups and structural principles. In so doing, he suggests there are two types of times, ecological and structural. Ecological time is physical and pertains to the environment. Structural time refers to kinship and other social structures, and hence the social distance between elements of social structure. Evans-Pritchard makes the point that both are structured by activities. So, despite the seeming tangibility of a calendar, it is really religious, social acts that constitute time. Where Evans-Pritchard's argument is the weakest is his discussion of what Nuer must feel about time, even though they have no word that overlaps with our word "time." He argues that time must therefore be felt in a different, perhaps less hurried, way. It is altogether unclear where his evidence for this lies, since he offers no further explanation, although the thrust of the argument is similar to that of the Linguistic Relativity Hypothesis.

Evans-Pritchard and Meyer Fortes in their monograph *African Political Systems,* and Fortes alone in his *Structure of Unilineal Descent Groups,* interrogate the relationship between descent reckoning and social time. The concepts of age sets and especially of age grades elaborated by descent theorists paint a picture of the social time of the group mediated by socially defined age categories. Time is literally based on the (aging) trajectory of the social body. This view of lived social time is often overlooked but is deeply relevant to any study of the anthropology of time because of its cross-cultural pervasiveness.

The structuralism of Lévi-Strauss rarely addresses time explicitly, as one might expect from such a static theory. The essential temporal criterion in classifying societies is group awareness of their history. "Hot" societies were aware of their history, whereas "cold" societies tended to view historical pressures as coming

from outside the society. This understanding perpetuates the idea of timeless, primitive groups, which has not been an accurate model. Even diachrony for Lévi-Strauss is merely a different kind of structure, a multiplication of synchrony. Lévi-Strauss represents the other side of Durkheimian thinking from Leach. Whereas Leach had argued explicitly for a theory of time, Lévi-Strauss addressed himself primarily to issues of synchronic structure.

Clifford Geertz has argued that Balinese culture attempts to detemporalize time. In "Person, Time, and Conduct in Bali," Geertz explains his model of Balinese lived social time, based on groups of predecessors, contemporaries, consociates, and successors. His argument, that Balinese prefer to make fellowmen from contemporaries as much as possible, is reinforced by his interpretation of Balinese time. However, there is some slipperiness to Geertz's definition of time, for it is both the experience of time that he addresses and, elsewhere, it is the conception of temporal order. Geertz does not make explicitly clear what he thinks time is, or rather, what he thinks he is analyzing when he refers to time.

There has been some scholarly attention to the problem of conceptions of time, that is, what people *think* time is, as opposed to what they *say* time is. At the root of analysis of categories of thought is the Linguistic Relativity Hypothesis, also know as the Sapir-Whorf hypothesis (so named after its originators, Edward Sapir and Benjamin Whorf). The argument that because of grammatical facts about the Hopi language, Hopi individuals experience time not in quantifiable units (as speakers of English do) but in terms of general cycles has been provocative in fields within and outside of anthropology. The problems of Hopi conceptions of time, and the argument that one's reality is indeed affected by language structure and use, directs one to concentrate on how time is perceived—a problematic but worthy endeavor for the anthropologist, who typically studies what is said and done, not thought. Gathering nonlinguistic time data is certainly a challenge and tends to fall outside the purview of anthropology as well.

Currently one sees in anthropology increased attention given to dynamic tensions between individuals and structures, between patterned and novel activity. In this regard, practice theory holds important implications for the study of time. The theorists of structure and practice, of which Pierre Bourdieu and Anthony Giddens are exemplary, are interested in temporality to the extent that individual actors create their worlds with it. Thus, for Bourdieu, the time of prestation to counterprestation helps expose a wealth of cultural knowledge to the anthropologist. The tactical gift giver uses the tempo of gifting to make his prestation seem neither formulaic nor tardy. Time, in this model, is to be manipulated, or put more precisely, is the outcome of intentional, timed, acts.

In *The Fame of Gawa,* Nancy Munn argues persuasively for an ethnographically grounded, symbolic, and practice-centered approach to understanding the creation of symbolic value in a Massim society. The aspect of Munn's approach of particular relevance to the study of time is her investigation of the structuring of lived time, of the tempo of different kinds of prestation, from the reciprocal giving of food to the asymmetrical (nonreciprocal) *pokala* exchange. Elsewhere Munn has further developed these ideas of emergent spacetime (space and time are fundamentally, complementarily linked for Munn, and not oppositional categories) and has called for more research into how time is made local and valuable. The implications of this approach, and they seem quite reasonable, are that time is constantly (re)produced in everyday practice according to larger sociocultural structures.

Time is produced in ethnographic writing as well. Johannes Fabian suggests that temporality is smuggled in by certain ways of knowing and writing. Thus classic anthropological accounts tend to ignore time in favor of spatial analyses, with a timeless, "ethnographic present" the result. Fabian's is a reflexive approach that understands temporal operations to be at the heart of anthropology making its Other.

It is also true, following Fabian and others, that removal in space also indexes removal in time, of placement backward in time. In other words, tribal groups living far away from the metropole are assumed to live not just at a remove in space but in time as well. Hence the diorama view of culture, of the eternal present of primitive communities as depicted by so many anthropologists. Fabian, George Marcus, Michael Fisher, and others draw critical attention to the concept of time in (writing) anthropology.

The Future

The anthropology of time must work to resolve three major issues in the future. Certainly one issue is to

find a meta-language for time. And as philosophers at least since Immanuel Kant have observed, time inheres in all categories, making it exceptionally hard to distill for analysis. So isolating the problems and creating the vocabulary to talk about the problems will be the first set of issues.

The second set of issues will revolve around modeling time in a way that is simpler than reality but still does justice to reality. This may not be as difficult as it sounds. We know time is an aspect of all categories of knowledge. Part of this must be to do with language, or at least those languages which require a temporal argument to be made at each utterance. Thus far, insufficient attention has been paid to temporal coding in language, to what must be said about event order relations and what effect, if any, this would have on cultural concepts of temporality. But not just language—the temporal effects of other basic cultural regimes must be understood before the larger workings of time in culture can be clear. To this end, we must take to heart the critique of the time of anthropology. Indeed most disciplines have a particular time frame which guides analysis, and it must be made explicit at the outset of any study of the cultural temporality.

We also know that temporal regimes, like cultural ones, are shared. In fact, they must be shared in order to accomplish their main task of synchronizing the otherwise idiosyncratic behavior of individuals. The issue of synchronizing then leads us to the final set of issues. How do these beliefs become shared, and to what extent are they shared? How and why do some people choose to ignore common temporal regimes, such as Daylight Saving Time? These processes of selection and synchronization all engage temporality as part of the exercise of power.

— Michael W. Hesson

Further Readings

Evans-Pritchard, E. E. (1940). *The Nuer*. New York: Oxford University Press.

Gell, A. (1992). *The anthropology of time: Cultural constructions of temporal maps and images*. Oxford: Berg.

Munn, N. D. (1992). The cultural anthropology of time: A critical essay. *Annual Review Of Anthropology*, *21*, 93–123.

Tiwanaku (Tiahuanaco)

Tiwanaku (also called Tiahuanaco) was a state-level society centered in the southern Lake Titicaca Basin of South America. The exact dates for this civilization are an issue of contention, but most archaeologists agree that the peak of Tiwanaku cultural expansion occurred between the 8th and 10th centuries AD. The civilization saw considerable change, including a breakdown of centralized political control, after about AD 1000. The capital site of Tiwanaku was mentioned in versions of Inca tradition as the place where the world was created, the original home of the Inca lords, and the birthplace of Inca kings, and the site was in continual use through Spanish colonial times.

The capital and type-site for the Tiwanaku culture is located roughly 20 kilometers from the southern end of Lake Titicaca and 72 kilometers from La Paz, Bolivia. The site is best known for a series of large temple structures resembling large, artificial hills. Colonial Spanish observations and 20th-century archaeological investigations revealed temple architecture to consist of compacted earth held in place by cut stone blocks of red sandstone or dark gray basalt. Monumental gateways, such as the Gateway of the Sun, were intended as part of the latter phases of construction. The site has also revealed the presence of substantial monolithic statues, semi-subterranean courtyards, and the practice of human sacrifice.

It is estimated that the city's population reached 250,000 at its height. People of the city obtained needed resources from a vast complex of raised-field agriculture extended throughout the Lake Titicaca Basin as well as long-distance caravan trade networks reaching from the Atacama Desert in the south to the Moquegua Valley in the north. Available data suggest that Tiwanaku developed an economic system that included distant colonies of *altiplano* people as well as trade relations with people who were influenced by, but not fully incorporated into, the Tiwanaku culture. This long-distance trade, in addition to religious pilgrimage, may also have been what fostered the initial growth of Tiwanaku.

Secondary sites in neighboring valleys include multiple-component residential and administrative complexes at Khonko Wankane and Lukurmata. Large Tiwanaku sites such as these characteristically display artificial mounds, sunken rectangular courtyards, and

open plazas in addition to domestic architecture of mud brick and assemblages of characteristic artifacts. Most recognizable among the artifacts are a tall flared cup, or *kero,* and a short flared bowl, or *tazon,* used for serving corn-based beer and a stew of meat and potato.

Tiwanku social organization, architectural forms, and religion drew heavily upon earlier cultures in the Andean highland area known as the *altiplano.* The *Yaya-mama* (literally "man-woman") religious tradition is thought to have been a unifying force across cultural complexes as well as a strong influence on religion in Tiwanaku. The iconography of this religion shows strong male–female dualism in conjunction with felines, camelids, toads, snakes, and mythical creatures, many of which find their way into Tiwanaku iconography. Like many in the Andes, Tiwanaku people practiced several forms of cranial modification and buried their dead in a flexed seated position.

— *Jo Ellen Burkholder*

Further Readings

Janusek, J. W. (2004). *Identity and power in the ancient Andes: Tiwanaku cities through time.* New York: Taylor & Francis.

Kolata, A. (1993) *The Tiwanaku: Portrait of an Andean civilization.* Cambridge, MA: Blackwell.

Kolata, A. (Ed.). (2003). *Tiwanaku and its hinterland: Archeology and paleoecology of an Andean civilization.* Washington, DC: Smithsonian Institution Press.

TLINGIT

The Tlingit are a people who are part of the Na-Dene phyla, and reside in the southeast Alaska panhandle and inland Canada. They are a matriarchal society, receiving their lineage of crests from their mothers' clans. From time immemorial they have been a powerful people living on the edges of the boreal forests, using cedar as their medium for longhouses, canoes, utensils, and clothing. They are known for their potlatches and were fierce warriors. Their subsistence was derived mainly from the ocean: salmon, halibut, seal, shellfish, and seaweed. With the introduction of Europeans (first Russians, then Americans) to the

Chilkat Blanket, circa 1870–1880

Source: Photograph courtesy of Flury & Company Ltd., www.fluryco.com

Tlingit homeland, many confrontations, challenges, and changes took place among the Tlingit people. Diseases such as smallpox and the measles were new to the Tlingits, and the ravages of these illnesses nearly eradicated entire villages. Totem poles and other artifacts were either taken or burned, English was enforced, corporal punishment was administered for speaking Tlingit, and the potlatch was forbidden. Today the Tlingit are a modern people who are politically strong, and who are embracing their culture once again.

Lifestyles

In times of antiquity, the Tlingit were a dominant people known for their warriors who wore wooden helmets and leather tunics or wooden slat armor; for their longhouses made from thick planks of cedar and carved house posts and screens, which housed several families and slaves; for the totem poles carved with the details of ancestral lineage and natural and supernatural beings; for the canoes, especially the huge war canoes with elaborate clan carvings; for the potlatches that would last for about a week; and for the woven Raven's Tail and Chilkat blankets (later button blankets). These were mostly a seminomadic people who had their winter homes where their longhouses and totems were situated. There were fishing camps, berry gathering areas, bird-egg islands and rookeries, and areas where the herring spawned, as well as camp areas made during hunting, trapping, and war, or

Pamela Rae Huteson wearing an eagle button blanket and spruce-root hat.

Source: Photograph by Simon P. Roberts.

during trading times. Camp areas were owned by clans and individuals and were considered property to be distributed during potlatches.

The Tlingit are a matriarchal society, and claim their crests from their mother's moiety. The two main moieties are Crow/Raven and Wolf/Eagle; Crow and Wolf are from the inland Tlingits who are closer to the Athabascans; it may also be an earlier form of Raven and Eagle. Within these clans are subdivisions of various clans and houses. Marriages were arranged, and it was taboo to marry within your own clan, so care was taken to know the clans of the people. This clan knowledge was especially important when giving a potlatch.

A boy of 8 to 10 would be sent to his maternal grandfather or uncle to be trained until he reached manhood, not only as a hunter and fisherman, but also as a warrior. Girls lived in solitude for up to a year when they started their menses, during which time they would learn to weave and perform other skills that would prepare them for womanhood.

The raising of the totem, which illustrated their lineage and legends, was part of the memorial potlatch ritual, as well as one of the ways a new keeper/owner/chief of the house would prove that he was worthy of the position. There were many reasons for a potlatch, but unlike the Kwakiutl who sought to "bury" their guests with their wealth in competitive potlatches, the Tlingits focused on the memorial, since a high-caste person could have several memorial potlatches. Events in a potlatch could include oratory of ancestry and the rights of connections to the supernatural, songs and dances, name giving, feasts, gambling, and destruction of property (for example, canoes, copper shields, or slaves).

When a person died the remains were cremated, along with articles that would assist his or her journey in the spirit world, such as clothing, weapons, and at times a canoe or slave. Food and water were also thrown into the fire, to ensure that the person would not be hungry or thirsty en route to "Raven's house." A shaman was embalmed and placed in a memorial house or on a platform built in a tree. Usually his shamanistic articles lay beside him, for example, specific ritual clothing, rattles, and carved spirit guards that had watched over him as he slept in life.

Salmon runs started in late spring and lasted until early fall; stone and stake weirs were set at the mouths of streams to catch returning salmon. Stakes dating over 1,350 years old have been found at the Klawock River. Salmon was mainstay of the Tlingit diet and was supplemented by halibut, seal, sea lion, shellfish, herring eggs, seagull eggs, deer, bear, and beached whales. A variety of berries were gathered in intricately woven spruce root baskets, then dried and pressed into cakes and packed into bentwood boxes for storing. Eulachon or "candlefish," commonly known as "ooligan," was processed to make the oil for food and trade. Stone tools were crafted for hammering stakes as well as stone weaponry and sacred items. Petroglyphs and carved rocks were made to show clan ownership and placed along the shoreline. There are also petroglyphs of sailing ships, from when the first Europeans arrived.

European Encounters

When smallpox and the measles spread from village to village after contact with Europeans, some villages were abandoned; those not sick buried their dead and

left their homes to regroup in nearby villages, in an attempt to maintain their lineages. This was a time when many of the old customs were modernized, for example, memorial poles were replaced with headstones and the accompanying potlatch was replaced with a lunch or dinner. Despite conversion to Christianity, however, *at.óow* (clan crest artifacts) were still burned after the death of one known to be high caste.

The aboriginal peoples of the northwest captured the imagination of Europeans as museums of natural history opened throughout America, and tribal information and artifacts were in high demand. This prompted many to write about the Tlingits and other First Peoples they had contact with, for example, George Thornton Emmons, who was on active duty with the Navy, and Salisbury, a principal of the Klawock School on Prince of Wales Island. Some writings from these amateur ethnographers prove to be windows into the past of the Tlingit; others, like Salisbury's *Quoth the Raven: A Little Journey into the Primitive,* also revealed the "white man's" mindset pertaining to the civilizing of the "savages." Throughout the northwest there were part-time "collectors" of Native American artifacts who were not above grave robbery. Louis Shotridge (Tlingit) was hired by the University of Pennsylvania's museum to obtain Tlingit tribal artifacts with documentation and provenance on each item. To this day he has been praised for the quality of the artifacts, and especially the thorough information on each article; he proved to be superior to any other ethnographer working among the Tlingit people. However, he also angered his fellow Tlingits, to the point where some would hide their artifacts when he came to town. Affluent businessmen from Seattle would take voyages to the "wilds" of Alaska or Canada to gather artifacts from seemingly abandoned villages. A case in point is the pilfered totem standing in Pioneer Square in Seattle, which was stolen from the winter house of Tongass while the residents were living at their fishing camp.

Duplicate raven totem at Pioneer Square, Seattle.

Source: Photograph by Pamela Rae Huteson.

When the American saltries and canneries started appearing, the local Tlingit clans proclaimed their rights to fishing areas and imposed a fee, which for about a decade some did honor and pay, but with the increase of fellow Americans, and as the military's presence became stronger, the claims were no longer honored. In 1899, Jefferson Moser, an agent of the U.S. fisheries, noted the confusion the "Indians" felt about the lack of honor concerning the refusal to pay tribute for the use of the Tlingit's fishing areas.The mid-1800s to early 1900s, when the missionaries and schoolteachers started arriving and the United States assumed ownership of Alaska, became a time of great change within the Tlingit tribes.

Present Day

In 1938 the Indian Civilian Conservation Corps (CCC), with the collaboration of the U.S. Forest

Left: Replacement "Raven's Adventures" totem, in process of being recarved by Master Carver John Rowen. Right: The original totem carved by the CCC carvers at Klawock, Alaska.

Source: Photographs by Pamela Rae Huteson.

Left: Simon P. Roberts and Adrian Guthrie embark on the first Tlingit banishment in over 100 years. Right: One of the Combined Tribal Court of Thlingit Law Judges and a member of the Thlawaa Thlingit Nation Council of Elders, former Chief Theodore Roberts seated by grandson Simon P. Roberts, during banishment period.

Source: Photographs by Pamela Rae Huteson.

Service, employed Tlingit carvers from southeast Alaska to restore and re-carve the totems in an effort to preserve the cultural art and make them more accessible to the general public. Some of these carvers had once lived in the very abandoned villages from which these totems had been removed. Anthropologist Viola E. Garfield researched and documented the stories of these totems and presented her findings in *Wolf and the Raven*. The craft of totem carving was thought to have been a thing of the past; the CCC project, however, did much to revive and stimulate the skills as part of a series of events of cultural restoration. Also, Bill Holm recreated the form-line art design system traditionally followed by the Tlingit, Haida, Tsimshian, and Bella Bella that had almost been lost due to the various forces of acculturation working against the traditional clan artists. Holm's *Northwest Coast Indian Art: An Analysis of Form* created a revival in Northwest Coast art among the Tlingit artists, and serves as a part of many a new carver's curriculum. In 1976, when the Klukwan Frog House artifacts were sold, Klukwan's leaders created a law forbidding the sale of Klukwan artifacts.

A raven at the Castle Hill National Park in Sitka, Alaska

Source: Photograph by Pamela Rae Huteson.

There have also been unsettling events, such as the burning of regalia in 1992 when a Tlingit Evangelist, Flo Ellers, challenged a congregation as to what is not permissible for a Christian by stating, "There will be no Chilkat dancers dancing in Heaven."

In 1994, an unprecedented event attracted international attention when a judge in Everett, Washington released two teenage Tlingit boys to the Combined Tribal Court of Thlingit Law. The Tribal Court sentenced the boys to banishment, which had not taken place in over one hundred years. This caused a division among the Tlingit people: some said "there never was such a thing," while others rejected the leader of the project, and therefore rejected the banishment. However, many of the younger generation recognized it as a step toward sovereignty. One of the boys later stated, "There was nothing negative about my banishment. It was a time for self-respect, introspection, and purification. It helped me get back to my roots."

Since the first contact with Europeans, the Tlingit have adapted and adopted a new way of life. Their Tlingit culture, once denied them, is now being embraced; potlatches are being held; Tlingit art is flourishing; the sound of the adze is heard throughout the land; carvers are creating heraldic clan totems; tribal justice is taking its rightful place for the people; the language is being taught; and Tlingit clan conferences are being held to assist the people in making connections to their tribal past. There is also an increase in the number of Tlingit politicians, anthropologists, lawyers, and scholars. In ancient times, Raven taught the Tlingits, "the people," to adapt to change, a lesson that the Tlingits have learned well.

— *Pamela Rae Huteson*

See also **Inuit; Native Peoples of the United States; Tlingit Culture; Totem Poles**

Further Readings

Dombrowski, K. (2001). *Against culture: Development, politics, and religion in Indian Alaska.* Lincoln, NE: University of Nebraska Press.

Emmons, G. T. (1991). *The Tlingit Indians.* Edited with additions by Frederica de Laguna. Seattle, WA: University of Washington Press.
Hope, A., III, & Thornton, T. F. (2000). *Will the time ever come? A Tlingit source book.* Fairbanks: Alaska Native Knowledge Network, Center for Cross-Cultural Studies, University of Alaska Fairbanks.

Tlingit Culture

The name Tlingit means *in the people.* These Native Americans continue to inhabit many of their aboriginal village sites along the southeastern coast of Alaska. Foraging people, they were well adapted to hunting and gathering in rugged temperate rain forest and at sea. Tlingit came to depend on income from fur trapping and an active arts and crafts trade. Today they value education and work in business, industry, government, and professions.

Their kinship system was matrilineal, as in the Haida and Tsimshian tribes. Family name and inheritance, as well as rights to property and privileges, including resource sites and ceremonial activities, were passed down through the mother's side of the family. Each person belonged from birth to either the Eagle or the Raven group and was permitted to marry only a person from the other group. Ravens and Eagles were divided into clans, each with its own animal symbol or crest, and clans were further divided into houses or extended families.

Traditional religion was based on the animistic belief that spirits called *jek* inhabited people, animals, and objects in the natural world. The environment could be influenced, for good or ill, by human intervention, and that made it important to observe customs that ensured prosperity by placating the souls of animals hunted. The Tlingit also believed in a creator whose name had to be whispered. All members of the tribe were reborn from one of their ancestors, and the ancestors were included as elements of their totem pole designs. A shaman acted as priest, doctor, or counselor. When hundreds died of tuberculosis in the early 20th century, people lost faith in shamans and turned to Christianity for comfort. Russian Orthodox and Presbyterian missionaries made significant impact on the Tlingit. Many gave up their Tlingit names, from which they had derived identity and status, and were given new names when they became Christians.

Contact with Europeans began with explorations in the 18th century. After brief encounters with Russians and Spanish at the beginning of the century, the Spanish set up business at Nootka Sound in 1789, the Russians at Sitka in 1799; British trading companies became well established early in the 19th century. Tlingits suffered from disease and alcohol introduced by Europeans; hundreds died between 1836 and 1840.

Just when Tlingit culture was most vulnerable, European settlers began to arrive. Americans came looking for gold and began to occupy and control Tlingit lands. The U.S. purchase of Alaska from Russia in 1867 brought even more settlers to establish canneries, mines, and logging camps, challenging the Tlingit tradition of taking only resources needed for survival. American military strength silenced Tlingit protest. In 1912, Tlingits joined with other tribes and founded the Alaska Native Brotherhood (ANB) in an attempt to fight for their civil rights and subsistence sources. In 1929, Tlingits initiated a struggle to regain control of their natural resources that led to the Alaska Native Claims Settlement Act of 1971 and the return of millions of acres of land.

There has been a revival of interest in Tlingit dances, songs, language, artwork, stories, and potlatch gatherings. The fight for survival of a culture continues. Tlingit ability to live off the land and sea is continually at risk due to logging, overharvesting of fish by commercial fisheries, increasing population, and government regulation, but Tlingits are politically active on local and national levels and remain focused on land and resource claims, self-rule, and cultural resource control.

— *Susan Schroeder*

See also **Tlingit**

Further Readings

Jonaitis, A. (1986). *Art of the northern Tlingit.* Seattle: University of Washington Press.
Obery, K. (1973). *The social economy of the Tlingit Indians.* Seattle: University of Washington Press.

Tonga

The name Tonga is composed of *to* (to plant) and *nga* (a place). It also means "south." Recent archaeological findings suggest people arrived in the archipelago or "land lying in the south" about 1500 BCE from Fiji, located northwest of Tonga. These first colonists, seafaring ancestors of the Polynesians, were a culture distinguished by Lapita pottery. The Tongan creation myth explains how Maui fished the islands from the ocean.

Another myth describes the first *Tu'i Tonga* (king) as son of Tangaloa, a god, and a human female. This sacred line of kings and queens ruled from the 10th century CE to about 1470, when the reigning *Tu'i Tonga* transferred his temporal powers to his brother under the title of *Tu'i Ha'a Takalaua.* A similar transfer of power about 1600 resulted in the creation of a third line of monarchs, the *Tu'i Kanokupotu.*

Many believe Captain James Cook, who called Tonga the "Friendly Islands" when he visited between 1773 and 1777, was the first European to arrive. Actually, Dutch navigators Jakob LeMaire and Abel Janszoon Tasman had been there already, in 1616 and 1645, respectively.

Volcanic undersea mountains form two roughly parallel chains of islands. The western column is higher, having been raised well above sea level by repeated volcanic activity. Four of these islands still erupt. The lower islands in the eastern chain can resist erosion because of caps made of coral rock and limestone reefs. There are 169 islands, 36 of which are inhabited by 110,000 people. The capital is Nuku'alofa, on Tongatapu Island. The total area is 289 square miles.

A nation of paradoxes, Tonga was one of the most centralized and highly stratified societies in the Pacific before proclaiming itself an independent constitutional monarchy in 1875. Even though change of government by constitutional means has occurred in Tonga, as it has in most Pacific nations, under the present constitution it is not likely that the government would yield its emphasis on status, titles, and hegemony following a general election. All land is owned by the king, nobles, and government and leased to citizens who pay tribute, usually with food; foreigners cannot own land. Although there are parliamentarians elected by commoners today, these are outnumbered and outvoted by representatives of nobles who are unlikely to go along with any changes proposed by the former. For the most part, commoners are still excluded from effective participation in government. The current system is undergoing challenge from an active pro-democracy movement that seeks greater accountability. Aristocrats who do not want to change the current system claim monarchy can respond more quickly to the needs of people than democracy

Source: © iStockphoto/Ryan Pratt.

could. They suppress calls for reform and manage to intimidate critics by means of court actions and withdrawal of publishing licenses.

Tongans are a proud people with familial bonds to the land. Social practices grounded in loyalty to kin as well as respect for elders and the "old ways" of telling stories in song and dance; making medicines from plants; raising root crops, maize, watermelons, tomatoes, tropical fruits, fowl, livestock and timber; fishing reefs; weaving baskets; beating bark cloth; celebrating; and drinking kava together have enabled the small nation to survive challenges ranging from battles between chiefs to the arrival of trade ships in the 17th century and exposure to outside commerce in the 20th. Tongans sell fish, handicrafts, coconuts, pumpkins, and vanilla to others, but they are critical of the values of visitors and of the capitalist, individualistic, mass society from which they come. They want to maintain difference between themselves and the rest of the world; yet they covet the West's material wealth and comfort. Many have migrated to New Zealand, Australia, and the United States to find work and send remittances back to family.

Another paradoxical fact is that these warm, friendly islanders, predominantly Christian and both generous and hospitable, used to be skilled navigators and fierce warrior cannibals who had political and cultural influence over neighboring islands until two hundred years ago. Then they fought internally; civil war broke out in the 1780s. With a kingship believed to be partly divine in origin and an executive below the king determined by clear principles of inheritance from one generation to the next, there was no need for internal contests to decide who would rule until a succession of brothers held senior titles that made each an eligible heir. Aggression subsided in the 1790s but erupted again at the end of the decade with a political assassination. Sporadic but often bitter warfare continued for twenty more years. The old political system was demolished in this period, then reconstructed in the late 1820s in modified form.

Experts attribute the survival of the new system to the adroit leadership of George Tupou I, a high-ranking chief descended from persons who held the title *Tu'i Kanokupotu* and a convert to Christianity who introduced a Constitution in 1875 that eliminated the absolute power of chiefs. He was considered the only person able and willing to bring Tonga under united rule. He issued a new law code in 1850 and secured international recognition by issuing a second, bolder code of law in 1862 that included emancipation of people from serfdom, compulsory education of children, regular taxation, and new principles of land distribution.

Although Tongan is the official language, widespread knowledge of English resulted while Tonga was a British protectorate for the first 70 years of the 20th century. Today villagers know little English but enjoy an oral tradition of proverbs, religious epics, genealogies, poetry, fables, and myths. English is taught as a second language in elementary and secondary classrooms and used in business transactions in major towns. Tongan, meanwhile, is spoken in streets, shops, markets, schools, offices, and churches. Tongans are proud of nearly 100% literacy. Three separate Tongan dialects have been used in ceremonies by *ha'a matapule* (talking chiefs) whose task it is to mediate encounters between king, nobles, and commoners during tributes to the king on each major island once a year and whose place in the hierarchical social structure is below kings and nobles, and ahead of would-be talking chiefs and commoners.

Kin groups include married couples and their children and extended family living in different households. Everyone contributes to parenting, and adoption is frequent. Traditional brother–sister avoidance is enforced, and 10-year-old boys must sleep in a separate house. Brothers and sisters do not watch videos together nor discuss topics such as sex.

Gender and age establish hierarchy at any level of society. Inherited titles and land may follow a male line of descent, but females have higher status in the social hierarchy. An egalitarian attitude exists at home and in the marketplace. Human rights are generally well respected in Tonga, although political dissent is suppressed. Other nations are watching with concern the threat to freedoms of speech and press in Tonga.

— *Susan Schroeder*

See also **Fiji; Polynesians**

Further Readings

Campbell, I. C. (1989). *A history of the Pacific Islands.* Berkeley: University of California Press.

Campbell, I. C. (1998). *"Gone native" in Polynesia: Captivity narratives and experiences from the South Pacific.* Westport, CT: Greenwood Press.

Ferdon, E. N. (1987). *Early Tonga: As the explorers saw it 1616–1810.* Tucson: University of Arizona Press.

Tools and Evolution

There is an inherent problem within African Acheulian and Middle Stone Age assemblages reearch: how to recognize culture and ethnicity and the period in which hominins evolved the cognitive ability to invent social solutions to perceived or real ecological and functional challenges. There also exists the challenge of establishing the relationships between the stone tool assemblages and the cultures of which the knappers were a part.

These problems are investigated through functional, compositional, ecological, and temporal analyses of the Acheulian handaxes, the Acheulian-Middle Stone Age transition, the timing of the occupancy of the central African rain forests, the Still Bay level at Blombos Cave, and the Middle Stone Age layers at Klasies River. African archaeologists have used the typological categories introduced by Goodwin and Van Riet Lowe and the lithic Modes of Clark to create a conceptual framework in which they could operate; however, the framework has produced tensions and constraints whose chronological, cognitive, cultural, functional, and environmental problems have become prevalent in the Middle and Late Pleistocene research paradigms of Africa.

The development of more sophisticated models is required on an integrated regional basis in order to capture and subsequently extrapolate the differential expressions of lithic technology, temporally and spatially.

Background

John Goodwin and Clarence van Riet Lowe published a seminal work in 1929 which has influenced African archaeology ever since. Entitled *Stone Age Cultures of South Africa,* Goodwin and Van Riet Lowe proposed that the Stone Age sequence be subdivided into the Early, Middle, and Late Stone Age (hereafter shortened to ESA, MSA, and LSA). By proposing their alternative scheme to the European sequence of Lower, Middle, and Upper Palaeolithic, Goodwin and Van Riet Lowe were emphasizing the distinctiveness of the African archaeological temporal sequences and typological assemblages.

The post-World War II period witnessed the beginnings of a major overhaul of the archaeological discipline. Beginning with the advent of radiocarbon dating in the 1950s and continuing with the New Archaeology's hypothetico-deductive-nomological model, archaeology drew upon and attempted to reorient itself within the hard sciences. Goodwin and Van Riet Lowe proposed a classificatory scheme that was formally approved by the Third Pan-African Congress held in 1955.

The classificatory schemes outlined above for Africa and Europe were taken a step further and recombined by J. D. Clark on the basis of dominant lithic technologies. His resulting Modes of Technology divide the history of stone tools into five modes. The modes are held to be reflective of raw material availability, functional differentiation and manifestations of hominin technological strategies. The table outlines the current status of lithic mode recognition and classification.

Technological Mode	*Industry and Fossiles Directeurs*
Mode 1	Oldowan, Early Stone Age (choppers and flakes)
Mode 2	Acheulian, Early Stone Age (bifacial hand-axes)
Mode 3	Middle Paleolithic, Middle Stone Age (prepared cores, points)
Mode 4	Upper Paleolithic (retouched blades)
Mode 5	Mesolithic and Late Stone Age (microlithic composite flakes and blades)

After Clark, 1977, and Foley & Lahr, 1997.

These technological strategies are manifestations of behavioral adaptations whereby knowledge and culture are transmitted through social learning. The accumulated repertoire limits the risks of invention in technological and cultural evolution, but permits their expression in a wide diversity of situations through socially mediated responses to particular internal or external stimuli.

The mode classificatory scheme was built on the assumption of inbuilt progress in the evolution of stone tool technology. In this view, progress, combined with varying systems of inheritance, was enough to explain the contrasting time spans of the different lithic technologies. This framework was the intellectual birth of the model seeking to explain the advent of "modern human behavior" as a revolution occurring between 50 kya and 40 kya. It became clear there were serious inherent defects. One such

Source: © iStockphoto/Philippe Pellerin.

problem and its implications for African stone tool research involved the transitional boundary between the Acheulian and the MSA.

Interwoven with the investigations on the transitional period from the Acheulian to the MSA is the issue of how the stone tools were manufactured, what materials were used, the sources of the raw material procurements and what is signified in terms of the knappers' functional and cognitive capacities.

Inquiries into the uniformity or regional distinction of Acheulian handaxes need to account for the composition of stone procured, the flaking properties of the raw materials and the reduction sequences used. A 1990 study by Thomas Wynn and Forrest Tierson looked at Middle Pleistocene samples gathered from four regions of the world, including East Africa. The East African sites of Olorgesaille, Isimila, Kariandusi, and Lewa were selected. The results obtained in particular from Kariandusi reinforce previous studies that the form of the Acheulian bifacial implements was constrained by the raw materials utilized. Through function analysis, Wynn and Tierson were able to achieve a 75% success rate in sorting the Kariandusi handaxes into their correct raw material constituents. The remaining unaccounted for 25% was attributed to conscious cultural expression. However, given the time span of the East African sites chosen for the study (700–200 kya), Wynn and Tierson failed to adequately account for the possibility of temporal variation as viable alternative explanation.

This is an argument that has been picked up by Iain Davidson, in particular. Davidson rejects the hypothesis that the Acheulian handaxes were a product of deliberate intentionality. He argues that the observed patterning is insufficient evidence of the intent of the knappers and demonstrates the cognitive inability to communicate using symbols. Defined as "the assumption that the objects which the archaeologist recovers represent final forms corresponding to the self-consciously articulated, prior intentions of their one-time makers," the Davidson's Finished Artifact Fallacy hypothesizes differences between artifacts which are distinctive, repetitive and standardized, and those artifacts which have had form imposed upon them.

In place of the Finished Artifact Fallacy, Davidson advocates the re-examination of the Acheulian industry due to archaeologists having conducted selective studies through choosing which materials to analyze. He argues that archaeologists have unwittingly introduced patterns based upon both their selections and the procedural practices and technological steps used by the makers of the artifacts. This makes it extremely difficult to arrive at an understanding of the intentions and cognitive capabilities of the makers without eliminating and understanding these biases and steps. Davidson argues that the Acheulian handaxes are examples of this, as it is impossible to distinguish between flakes originating from cores or handaxes, and that this is therefore an indicator to the lack of guiding principles on the part of the knappers.

The functional hypothesis that the type of raw material chosen determined the shape and size of the Acheulian handaxe remains a persuasive argument. Reinforcing this hypothesis is the experimental archaeology showing resharpening reduction is capable, through three to four episodes, of altering an Acheulian handaxe into a Developed Oldowan handaxe. However, this demonstration of a plausible two-stage life suffers from the same inherent flaw as the Wynn and Tierson study: conflation of temporal variation.

Only two of the several clusters of late Acheulian sites mapped by Garth Sampson at Seacow Valley, South Africa, ranged within 1 kilometer of their corresponding quarry. The vast majority of the sites were situated near river beds and still within easy access distance to the quarries. The artifacts show three

developments over the symmetrical bifaces of the early Acheulian. The developments have been categorized as congruency, three-dimensional symmetries and broken symmetry. An example of the latter is the twisted profile handaxes that first appear ca. 350 kya. Wynn poses the question as to why symmetry would have been imposed and queries whether it might be connected with mate selection, a hypothesis also advocated by Kohn and Mithen but which ultimately rests on an untestable psychological basis.

Lithic assemblages have often been held up as representative of cultural entities, through either *in situ* cultural differentiation or population movements into new raw material niches permitting expansion of existing or development of new repertoires. Illustrative of this is the distribution pattern across the landscape of the Lupemban industry, dated to ca. 270 kya, particularly in relation to the prior Acheulian and Sangoan site patterns.

Increasing evidence has been put forward by Lawrence Barham for the Lupemban industry exhibiting a cognitive, technological, and adaptive sophistication not witnessed previously. Using environmental reconstructions, it is claimed that while the Sangoan exhibits a resemblance in distributional patterns to the Acheulian, there was an important difference which contributed to the emerging pattern that was to become the Lupemban industry: the Sangoan sites are generally found in habitats of higher productivity. This hypothesis holds that the loosening of ties to waterways and lakes permitted the subsequent knappers of the Lupemban industry to expand into and inhabit the Congo basin which, in the paleoenvironmental reconstruction, was forested.

Barham builds on the work done at Kalambo Falls, and his own work at Mumbwa Caves and Twin Rivers, to plot the known distribution of Lupemban sites over maps of the paleoenvironmental reconstruction of central Africa. The resultant model takes into account the glacial/interglacial cycles of African biogeography as well as lithic assemblage distribution mappings of 36 years ago. The problems within the model are manifest and raise serious concerns over both its accuracy and the conclusions drawn from it, namely that the central African rain forest was occupied at the time of the Lupemban.

Although climatic fluctuations can be deduced from the Congo fan deposits, these deposits do not extend beyond 200 kya. Neither do there exist reconstructions of climatic sequences from the internal Congo basin itself. While it is claimed that Lupemban sites existed in closed forests in Equatorial Guinea, through marine pollen profiles, more precise analyses are required for local areas and from the sites in question.

Barham claims that the Lupemban industry reflects a new composite stone tool technology: backed blades and segments, bifacial lanceolates, notched bifacial points and tranchets. These, according to his hypothesis, are the tools of a specialized hunting and gathering culture with the technological and social capabilities of extracting the nutritional requirements from closed canopy plant and animal resources.

Although Barham recognises the economic arguments brought to bear against an early occupation of the rain forests of central Africa, he fails to adequately address the concerns. The nutritional values of plant and animal resources in closed canopy forests are such that it appears unlikely modern hunter-gatherers occupied closed canopy forested areas for substantial periods of time prior to the latter portion of the LSA. If this turns out to be correct, then serious questions have to be posed about the viability of hominins occupying and surviving in these environments 270 kya.

Alternative hypotheses are required to be formulated which do not relate the Lupemban composite assemblage to a new cultural, and possibly ethnic, grouping adapted to survival in forested and semi-forested environments. More profitable lines of inquiry may look at how the Lupemban was adapted to savannah and semi-woodland areas, the variability in intersite assemblages and how the composition of this expression could be compared culturally and technologically with contemporary and later variable compositions.

Still Bay sites are only found in sub-Saharan Africa and are predominantly along the East Cape south coast. The dating of the Still Bay industry has long been an unanswered question in southern African archaeology. The results of radiocarbon dating on charcoal and shell from the Still Bay levels at Blombos Cave, on the southern Cape coast of South Africa, should be considered as infinite dates. Recent luminescence dates suggest an age of ca. 100 kya for the earliest MSA layer, BBC 3. The Still Bay points come from the BBC 1 phase which underlies a sand dune layer dated by optically stimulated luminescence to ca. 70 kya.

The diagnostic feature of the Still Bay industry is the leaf-shaped, bifacially retouched point possibly

used as a spearhead. The primary raw material used was silcrete. Length can vary from two to three centimeters to the very large "Blombos point." Deacon has suggested that this assemblage is indicative of craft specialization, because its function as a hunting spear point could possibly have been better served had the points been smaller. This hypothesis therefore accords stylistic symbolism to the artifacts.

Although there are no Mode 3 occurrences in Africa, and thus no African antecedent for the European Upper Paleolithic, certain viewpoints grew up around the question of the perceived lack of variation and change in the MSA. These are problematic from the viewpoint of the temporality and compositional significance of the Howiesons Poort industry in southern Africa. No site has been more central to the development of the debate than Klasies River.

Klasies River is situated on the southern-east coast of South Africa. The site is comprised of five MSA and one Holocene deposits from caves 1, 1A, 1B, 1C, and 2.

Oxygen isotopic analyses and uranium disequilibrium dating place the basal layer in correlation with MIS (Marine Isotope Stage) 5e. It has been proposed that the SAS member (MSA I and II) is in the region of 90 kya and the Upper Member (MSA III and IV) no less than 50 kya, thus out of the range of radiocarbon techniques. Contra Parkington, who hypothesized that southern African Howiesons Poort assemblages may also postdate 50 kya, the Howiesons Poort layer is underlain and overlaid by MSA II and III respectively. The Howiesons Poort is generally correlated with MIS 5a and 4, the boundary of which is estimated at around 74 kya.

Retouched blades were Clark's *fossile directeur* for Mode 3. Yet although blades are one of the main characteristics of the MSA and backed artifacts of the Howiesons Poort, neither should be viewed as anticipating the advent of a lithic assemblage on a separate continent. In the case of the Howiesons Poort, there is up to 25 kya in time between it and the Aurignacian.

The correlation of the Klasies River MSA sequences with periods of changing environmental conditions and the changing assemblage compositions led Ambrose and Lorenz to propose an ecological deterministic model of changing social conditions. Through analyses of resource structure, they claimed that the MSA inhabitants failed to respond to the changing environmental conditions in the same flexible patterns as their Holocene counterparts. These results indicated that their socioterritorial and technological systems were determined solely by the resource ranges available for exploitation with the least energy output.

While recognizing that the environmental stress caused by ecological changes at the start of the Howiesons Poort led to the increased resource ranges postulated by Ambrose and Lorenz, their hypothesis fails to explain why access to new raw materials would automatically result in the advent of new stone tool artifacts. In order for their functionalist ecological hypothesis to account for these new artifacts, Ambrose and Lorenz would be required to "ascertain for every concrete case the causal chain which linked the initial natural impetus and the resultant cultural transformation."

Hilary Deacon has proposed a structuralist alternative whereby the environmental stresses placed on the Howiesons Poort occupants resulted in attempts to maintain previously existing social structures and population levels: Instead of adapting to nature, they modified their behavior. Remnants of their adaptation can be found through examination of their stone artifacts in functional terms. He concludes, through analogies with backed artifacts from the southern African Wilton assemblages (8–4 kya), that the backed segments and trapezes are best regarded as hafted projectile points used in hunting; this analogy has subsequently been weakened by microwear and experimental analyses suggestive of the Wilton segments being components of knives instead of functioning as arrowheads. The MSA backed pieces are larger and were more likely to have been spear points and barbs. Ethnographic writings on the Bushmen record that projectile points carry both stylistic and social meaning, marking social and linguist groups, and are used as exchange gifts. The appearance of backed artifacts in the Howiesons Poort is, therefore, viewed as an attempt by the toolmakers to mark out social boundaries and the intensification of social networks under a period of environmental duress. As the climatic conditions improved toward the onset of the MSA III, the factors that influenced this cultural selection for a high level of symbolic behavior therefore gradually fell away.

The challenge posed by Deacon's generalized hypothesis was taken up by Sarah Wurz who, in 1995, took a random surface sample of Howiesons Poort artifacts from Cave 2. Comparisons were made with the 1968 Cave 1A top cutting (119 336 artifacts) sample (KR1A-68) of Singer and Wymer by using the use of the same major typological categories: waste, used pieces or edge-damaged pieces, and formal artifacts.

Lindly and Clark theorize that the continuous lithic industries reveal no evidence of stylistic patterning over time; they concede that the Howiesons Poort layers (Layers 10–21 of Shelter 1A) demonstrate a shift in the MSA to retouched stone tools. However, they make no reference to a recent technological and typological analysis of the MSA II stage at Klasies River Mouth, conducted by Thackeray and Kelly, that concludes the finished product does not necessarily represent they way things are in practice, but rather the way things should be ideally.

Howiesons Poort blades occur in greater frequency than their typical MSA predecessors and descendants, 17.44% versus 0.98%. There is also a lack of retouched and used artifacts. The backed artifacts have previously been suggested by Thackeray to be less standardized than their Later Stone Age counterparts, a conclusion countered by Wurz. The variation coefficient obtained falls within that recorded for the LSA, demonstrating the backed artifacts from the Howiesons Poort and the Later Stone Age were designed with a comparable mental construct of their shape parameters. Backed artifacts from the MSA Howiesons Poort and the Later Stone Age Wilton are design types of the same kind, although the Howiesons Poort backed artifacts range from two to three times their size.

Strengthening Deacon's argument, Wurz draws parallel between demonstrable archaeological and ethnographic usage of backed artifacts as projectiles. Amongst the Bushmen these projectiles are imbued with symbolism. Projectiles can take many possible forms and therefore the form chosen during the Howiesons Poort was a material action of choice governed by social rules and by extension was a form of modern behavior.

By comparing the raw material samples of KR2–1995 and KR1A-68 in terms of quartzite and nonlocal rock occurrences, Wurz determined that a marked difference is evident in the raw material composition. Around 27% of its Howiesons Poort artifacts were manufactured from non-quartzite (and consequently nonlocal) raw materials. By contrast the unbiased KR2–95 is comprised of 4% non-quartzite artifacts, with a high percentage (39%) of the retouched artifacts made from these materials. A high degree of selection is therefore present in the choice of raw materials.

Wurz used the analytical *chaine operatoire* approach in analyzing the choice of raw materials by the Klasies River people for their stone tools. Nonquartzite materials increase in numbers only in the middle stages of the Howiesons Poort, before again falling to low levels. Wurz attributes these raw material changes to conscious choices.

Wurz analyzed the backed artifacts in terms of segments (crescents), intermediates and trapezes to determine whether a relationship could be established between the form and extent of backing, and the resulting artifact. The waste materials are also regarded as by-products from the main design of shaping cores for the removal of blanks. Consequently, the production and subsequent use of backed artifacts were likely to have been the result of decision making and deliberate steps taken.

The sites of Kapthurin and Herto exemplify warnings about using typology uncritically as chronology. The mixture of the typologies in the lithic assemblages over a period of time in excess of 100 kya is a timely reminder that a direct correlation between typology and a set chronological timeframe is an uneasy assertion. The mixing of the Herto assemblage is on a greater scale than has previously been envisaged. Kapthurin poses a particular problem to mode model formulations, as the assumptions of progress inherent within do not take into account the mix of technological strategies that were employed.

It is therefore questionable whether the onset of Mode 2 is indicative of hominins having developed the ability to impose symmetry upon a stone tool or whether it was an extension of the process of tool reduction developing out of the Oldowan, Mode 1. It would be unwise to postulate a single purpose and function for Acheulian bifaces that flourished and evolved over 1.5 million years, and single purpose ideas such as sexual selection are untestable. It is more likely that the current opposing models of symmetry and reduction sequences are disguising real temporal and productive variations, which require greater chronological and stratigraphic control over the source sites to elucidate. The sequences involved are complex and varied and what is visible is the by-product of that variability, variability that itself might have changed over the course of hundreds of thousands of years. This changing variability is most vivid in the late Acheulian within the transitional period to the MSA, with Acheulian handaxes being knapped by the Levallois method.

The variability of the new MSA assemblages has led to hypotheses over cultural markings and new population settlement patterns. A recent hypothesis

by Barham regarding the occupation of closed canopy forests in Central Africa is questionable on the grounds of nutritional deficiencies of rain forest resources and on the low level of climatic resolution available. Questionable too is Lahr and Foley's linkage of the appearance of the new technology with the advent of a new *Homo* species, *Homo helmei,* thus linking anatomy with technology and culture.

The Klasies River MSA I and II assemblages date to the last interglacial but, contra the expectations of the Ambrose and Lorenz, there are important differences in their composition. MSA I follows a blade production strategy, with the MSA II a Levallois-like point manufacture. These lead into the Howiesons Poort via a tendency toward smaller blades in the upper MSA II sequence. This cuts across Ambrose and Lorenz's simplistic technological-ecological indicator models, undermines Parkington's use of the Howiesons Poort as a transitional phase to the LSA, negates Singer and Wymer's use of the Howiesons Poort for the arrival of new ethnic inhabitants and is a powerful indicator of changing cultural traditions which are reflected in the compositional makeup of the assemblages.

Ambrose and Lorenz see the Howiesons Poort occurrence as an adaptive response to environmental pressures that resulted in mobility pattern changes and the procurement of higher-quality raw materials for their stone tools. This viewpoint therefore presupposes that the technological changes are not related to stylistic preferences and expressions. To say that the environment determined their responses ignores the mental processes behind the conscious choices involved in making the changes they did. The Klasies inhabitants, for example, had perfectly good quartzite raw material available on the beaches, yet during the Howiesons Poort they imported silcrete from 20 kilometers away to manufacture the backed tools. The manufacture of the Howiesons Poort artifacts was, therefore, more likely to have been governed by social rules.

Deacon has proposed that the Still Bay is an example of a MSA craft specialization industry. Blombos and Klasies River are not a large distance apart, which suggests that the Klasies River inhabitants did indeed have access to such knowledge but made a cultural choice not to use it. Deacon suggests that craft specialization resulted in reciprocal trading, but it still remains to be determined first whether the Still Bay industry is indeed a form of craft specialization. What is clear is that the Still Bay industry points do not make for better spear points than other smaller bifacial tools, and this may have had something to do with a symbolic value being attached to them.

From before, but especially after, the publication of *Stone Age Cultures in South Africa,* African archaeologists have been increasingly concerned with typology. Cemented in Clark's lithic Modes, these typologies fostered a belief in a progressive lineage of lithic assemblages in Africa and contributed in particular to the Howiesons Poort being viewed as a transitional phenomenon to the LSA.

The Acheulian handaxes have been used as settlement markers in relation to their quarries and indicative of riverine resources at Seacow Valley. Kapthurin and Herto have mixed Acheulian and MSA industries, and together span of ca. 150,000 years which also covers the period in which the Lupemban is probably inaccurately claimed to have penetrated the central African forests. The changing nature of the manufacturing process of the Acheulian handaxes, the composition of the Lupemban industry and the changing compositional nature of the MSA industries at Klasies River are suggestive of evolving cognitive abilities that are most prominently expressed in the Howiesons Poort. Although environmental factors would have influenced the territorial ranges of the MSA peoples, conscious choices were made as to raw materials for their stone tools.

The untidy transition from the Acheulian to the MSA, the appearance of the regional Still Bay industry at Blombos and the integrity of the MSA at Klasies River, are strong arguments against simplistic lithic mode and cognitive-environmental proposals. The innovation in the Still Bay and the Howiesons Poort, while maintaining lithic patterned links to the preceding and later MSA assemblages, demonstrates the folly of linking new lithic expressions to incoming migrants possessing a different culture; this is paralleled in the caution over linking the Lupemban to new cultural adaptations by a new *Homo* species on the basis of weak data.

Sophisticated regional models are required, taking into account the full range of technological, faunal, geological, and taphonomic processes. These new models must incorporate variable cultural expressions, constrained adaptations to changing environmental conditions in terms of the existing cultural and social repertoire of the inhabitants, and the desire to link form to function when such linkages should

be inferred from the data rather than attributed to it and thus constrain it technologically and temporally.

— *Michael Brass*

Further Readings

Barham, L. (2001). Central Africa and the emergence of regional identity in the Middle Pleistocene. In L. Barham & K. Robson-Brown (Eds.), *Human roots: Africa and Asia in the Middle Pleistocene* (pp. 65–80). Bristol: Western Academic & Specialist Press.

Clark, J. D., Beyene, Y., WoldeGabriel, G., Hart, W., Renne, P., Gilbert, H., Defleur, A., Suwa, G., Katoh, S., Ludwig, K., Boisserie, J.-R., Asfaw, B., & White, T. (2003). Stratigraphic, chronological and behavioral contexts of Pleistocene *Homo sapiens* from Middle Awash, Ethiopia. *Nature, 423*, 747–752.

Davidson, I. (2002). The finished artifact fallacy: Acheulian hand-axes and language origins. In A. Wray (Ed.), *Transitions to language* (pp. 180–203). Oxford: Oxford University Press.

Fitzhugh, B. (2001). Risk and invention in human technological evolution. *Journal of Anthropological Archaeology, 20*, 125–167.

Henrich, J., & McElreath, R. (2003). The evolution of cultural evolution. *Evolutionary Anthropology, 12*, 123–135.

Henshilwood, C., & Marean, C. (2003). The origin of modern human behavior: Critique of the models and their test implications. *Current Anthropology, 44*, 627–651.

McPherron, S. (2000). Handaxes as a measure of the mental capabilities of early hominids. *Journal of Archaeological Science, 27*, 655–663.

Stringer, C. (2002). Modern human origins: Progress and prospects. *Philosophical Transactions of the Royal Society of London B, 357*, 563–579.

Wynn, T. (2002). Archaeology and cognitive evolution. *Behavioral and Brain Sciences, 25*, 389–438.

Totem Poles

The tall, elaborately carved and painted totem pole represents the most famous and well-known type of Northwest Coast art. Images on these carvings depict crests, beings that in some time in the past interacted with a family ancestor and bestowed upon his lineage the right to tell its story and depict its image. Crests were cherished family privileges that embodied family history and contributed to its status. When a family raised a pole that depicted one or several of its crests, it had to sponsor a potlatch to validate this display and pay the witnesses of its presentation of privileges with quantities of goods.

During their early voyages to the Northwest Coast at the end of the 18th century, explorers and traders saw almost no poles. Seaman John Meares sighted one in 1789, and in 1791 John Bartlett drew the earliest known depiction of a totem pole, a 40-foot-high frontal pole in the Haida village of Dadens on Haida Gwaii. Before that time, no traveler had described or illustrated exterior poles. It would only be during the 19th century that villages from the Tlingit to the Kwakwaka'wakw erected large numbers of totem poles.

The totem pole presumably developed from several aboriginal types of monumental art: interior house posts, facade paintings, and mortuary carvings erected out-of-doors. It is likely that the exterior columnar totem pole originated in precontact time among the Haida or Tsimshian. Totem poles were the single most striking type of 19th-century Haida art and increased in numbers from few in early contact times to abundant by the 1860s. While only two stood in Dadens in the late 18th century, by the first decades of the 19th century, large numbers of poles stood in both Haida Gwaii and in the Kaigani region.

Probably the increased wealth and growing competitiveness between chiefs inspired the flourishing of totem poles. Chiefs with greater riches wanted more impressive visual expressions of their high positions, and consequently commissioned taller and more numerous poles. Artists using metal tools they obtained in trade carved larger and more complex works of art. Commercial paints facilitated their decoration. After the northern British Columbia tribes invented the pole, it spread first to the Kaigani region of Alaska, north to the Tlingit, and in the later 19th century, south to the Wakashan groups. By the 1880s, the Haida had virtually ceased carving poles, but it was at around that time that the Kwakwaka'wakw began to erect more and more of them. It is possible that these express an ostentatious disregard for the British Columbia potlatch law, for poles were meaningless *without* the potlatch that validated their erection.

Source: © iStockphoto/Jeffery Logan.

Poles became widely known outside the Northwest Coast as a result of the combined effects of tourism, world's fairs, and museum collecting. In the 1880s, steamships brought sightseers up the Inside Passage. Fascinated by the totem poles they saw, tourists placed these monuments among the "must sees" on every itinerary. Poles themselves began traveling to distant places when they were presented at several world's fairs; in the 1876 Philadelphia Centennial Exposition, the Smithsonian Institution presented publically its first totem poles. For the 1894 Chicago World's Columbian Exposition, Franz Boas assembled an impressive array of poles, which eventually became part of the Field Museum's collection. And, at the 1904 St. Louis Louisiana Purchase celebration, an impressive array of Alaska totem poles stood before the Alaska building. These ended up returning to Sitka, where copies stand in the National Historic Park there. Other museums collected poles, and by the 1920s, few remained in their originating communities, for many had left for points south and east.

In the first several decades of the 20th century, both the Canadian and United States governments recognized the value of totem poles as tourist attractions and supported projects for the restoration of the remaining totem poles that, often decayed and deteriorating, still stood *in situ*. Instead of disinterestedly allowing these monuments to be taken away and erected in distant museums, efforts began to preserve, restore, and when necessary, copy the originals, now viewed as treasures. Between 1926 and 1930, the Canadian government collaborated with the Canadian National Railway to restore 30 Tsimshian poles along the railroad's Skeena River route. The Depression-era "Indian New Deal" restoration program propelled Alaskan totem poles into public attention. In 1938, the Indian Civilian Conservation Corps (CCC), under the supervision of the U.S. Forest Service, began restoring totem poles, most of which today stand in Ketchikan, the first stop on the ferry from Washington state. Others are in Wrangell and Sitka.

After World War II, the two major British Columbia museums, the Royal British Columbia Museum in Victoria (originally called the British Columbia Provincial Museum) and the Museum of Anthropology on the University of British Columbia campus in Vancouver, initiated salvage and restoration projects that have become models of cultural preservation. In 1949, the University of British Columbia purchased several Kwakwaka'wakw poles, house posts, and an eleven-piece house frame, which they planned to erect outdoors on the campus. From 1949–1951, Kwakwaka'wakw master carver Mungo Martin was in residence at MOA, restoring his and carving new poles. In the early 1950s, the Royal British Columbia Museum in Victoria hired Mungo Martin to restore or replicate some of its poles. Over

Tony Hunt totem pole, Stanley Park, Vancouver, British Columbia, Canada

the years, Martin worked with his son David, his adopted daughter's husband Henry Hunt, Hunt's son Tony Hunt, and Bill Reid, a man of Haida ancestry who was to become one of the most highly regarded northern Northwest Coast artists.

After the 1960s, with the reinvigoration of artistic creativity in the region, totem pole carving began to proliferate once more. New poles were raised in a variety of contexts including museums, universities, and Native communities. Among the most well-known living Northwest Coast totem pole carvers are Nathan Jackson (Tlingit), Robert Davidson (Haida), Calvin and Richard Hunt (Kwakwaka'wakw), David Boxley (Tsimshian), and Tim Paul (Nuu-chah-nulth). These and other artists are training younger carvers who will continue the tradition of Northwest Coast totem pole carving.

— *Aldona Jonaitis*

See also **Haidas; Tlingit; Totemism**

Further Readings

Barbeau, M. (1950). *Totem poles.* Ottawa: National Museums of Canada.

Garfield, V., & Forrest, L. (1961). *The wolf and the raven: Totem poles of southeastern Alaska.* Seattle: University of Washington Press.

Halpin, M. (1981). *Totem poles: An illustrated guide.* Vancouver: University of British Columbia Press.

Totemism

Totemism is often described as a kinship system linking humans ancestrally to powerful symbols present in the natural world. Totemic systems are said to be built around totems, which are fundamental signs of "kinship" running between human societies or individuals and the surrounding world. The term "totem" comes from "*ototeman*" in Algonquian (the largest family of languages native to North America) and the tribe of the Ojibwa who were found in the Great Lakes region of the eastern North American woodlands. Its original meaning was "his brother-sister kin." The grammatical root, *ote,* identifies an exogamous relationship between brothers and sisters born to the same mother. The classical definition was made by James Frazer that totemism "is an intimate relation which is supposed to exist between a group of kindred people on the one side and a species of natural or artificial objects on the other side, which objects are called the totems of the human group."

Totems connect human societies to the surrounding world and allow humans to construct social hierarchies that mirror those observed in nature. Totems are most frequently animals though they may also (rarely) be a plant, or even inanimate objects or forces such as the sun, moon, rain, or thunder. Generally totemic societies also have sacred animals and plants, which are not totems. They generally have essentialist beliefs in the animistic qualities of things observed in nature and are most frequently shamanistic. Animals, plants, and even natural phenomena are viewed as having the qualities of living things, including the possession of souls. Animacy may be attributed to spirits dwelling in objects, or the object or phenomena may itself be viewed as a life force. Many anthropologists see totemism as a mechanism for constructing order

in society and the surrounding world from the chaos of the universe.

In operation, a totem is generally considered taboo to the members of a clan who identify with that totem. As a rule of thumb, they cannot kill it nor consume its flesh (outside of occasional totemic rituals). The totem is seen as a powerful social feature that binds together the members of a totem clan. All clan members who share a totem are regarded as related kin. In this regard, totemic clans are also generally considered exogamous.

The term made its way into social theory in the late 19th century with the publication of John F. McLennan's comparative study "The Worship of Animals and Plants." As was in vogue at the time, he proposed an evolutionary stage in human development characterized by the worship of plants and animals. This was challenged by E. B. Tylor, who saw totemism as a means for people to classify the world and nature but did not see it as a basis for organizing religion. Instead, he saw totemism as linking specific clans to specific animals, rightfully pointing out its kinship role uniting clans and animals in both kinship and mutual alliance. In 1910, Sir James George Frazer published his monumental four-volume work *Totemism and Exogamy,* in which he compiled all known accounts of the subject to date. Frazer's own work had been conducted in Australia and Melanesia, where he observed the role of totems in beliefs related to conception and childbirth. He proposed that in primitive religions, conception was thought to occur when a spirit of a plant or animal impregnates a woman. In that way, the child has a direct relationship with the totem. He suggested that totemic beliefs are related to explaining reproductive processes. The sociologist Émile Durkheim, who was interested in early forms of religion, examined totemism in 1912 as part of his efforts to identify the ancient and "pure" forms of religion. He proposed that totemism may have been one of these elementary forms of belief. He saw the concept of the totem as a symbol of group consciousness that allowed primitive societies to conceive of the idea of sanctity.

In a movement away from the idea that totemism reflected a primitive or elementary form of religion, Franz Boas rejected any historical unity in totemic societies and proposed that such generalization existed only in the minds of ethnologists. He observed, in classic particularist form, that there existed no common psychological or historical origin for the practice and that since totemic practices exist in such a wide range of individuals associated with all possible types of social organizations and cultural contexts, the phenomena defies any definition that lumps it into a single category. A. R. Radcliffe-Brown was also unconvinced that institutions of totemism were real. He viewed the study of totemism as being compilations of beliefs and elements taken from different areas and institutions having in common only that they represent an intersection of the social and the natural. Another contemporary, Bronislaw Malinowski, maintained that totemism was an institution that could be studied comparatively, including from both biological and psychological frames. He considered totemism not so much as cultural phenomenon but as a desire to satisfy basic human needs in the context of the natural world.

Throughout the mid-20th century, the role of totemism in religion and social organization continued to be debated. Elkin, discussing totemic society in southern Australia, saw the belief as a means for humans to find solidarity with nature, thereby acknowledging links between humans and the world they live in. By classifying and giving order to the world through totems, aborigines were able to respect and worship the entire natural world. Elkin's idea that totemism was an organizing principle for religion was heavily criticized by Claude Lévi-Strauss, who saw in totemic societies various types of related religious phenomena extending well beyond totems.

Lévi-Strauss was most certainly influenced by Radcliffe-Brown, and he endeavored to expand on his writings. From a structural perspective, he viewed totemism as reflecting the abstract polarities of nature and culture present in human cultures. These oppositions, or polarities, could be charted to illustrate the complex relationship that, on the one hand, recognized natural realities such as animals and plants, and on the other, various groups and individuals who identified themselves as related to specific types of animals or plants. He discussed four specific types of totemic oppositions, or relationships, that could exist between nature and culture: (1) a group identifying with a specific species of animal or plant, (2) an individual identifying with a species of animal or plant, (3) a specific animal or plant identified with an specific individual, and (4) a specific animal or plant identified with a particular group.

— Keith M. Prufer

See also **Aborigines; Boas, Franz; Radcliffe-Brown, A. R.; Totem Poles; Tylor, Edward Burnett**

Further Readings

Boas, F. (1916). The origin of totemism. *American Anthropologist, 18,* 319–326.

Frazer, Sir J. G. (1910). *Totemism and exogamy.* New York: Macmillian.

Radcliffe-Brown, A. R. (1952). *Structure and function in primitive society.* New York: Free Press.

Toynbee, Arnold Joseph (1889–1975)

Considered one of the most influential historians of the 20th century, Arnold J. Toynbee and his interpretations of the world's civilizations have become standard reading for generations of students and scholars alike. Like Oswald Spengler before him, Toynbee wrote about human history as a series of civilizations, separated not by national characteristics, but by culture and religion. His major work, *A Study of History,* is a ten-volume piece written between 1934–1961.

Born in London, England in 1889, he attended both Winchester College and Balliol College at Oxford. After graduation in 1911, Toynbee began his teaching career at Balliol. He went on to teach at the University of London, the London School of Economics, and the Royal Institute of International Affairs. During World War I, Toynbee worked for the British Foreign Office in the Intelligence department and attended the Paris Peace Conference at Versailles in 1919. He served his nation in World War II by working again with the Foreign Office and returned to the Continent as a delegate in the peace talks at the end of the war.

Certainly one of the century's most prolific authors, Toynbee and his many works stand apart in the field of universal history. The scope of his *A Study of History* (sometimes called *The History of the World*) is the entire written history of humankind up to his present time. In it, his premise is that a distinct pattern can be found throughout all human historical experience. He is consistent throughout the ten volumes in describing civilizations that find conflict with other men, physical (nature) forces, or God. These peoples find either success or frustration in working toward a response to these events. Toynbee calls this phenomenon "Challenge and Response." In the last few volumes of the *Study,* Toynbee seems to find religion to be this "other force" in an increasing number of cases. Unlike Spengler's descriptions of a finite, predictable "life cycle" for each civilization, Toynbee is optimistic. Many civilizations do adapt to overcome whatever forces are arrayed against them.

It is interesting to note that Toynbee asks the question, "Does history repeat itself?" in his book *Civilization on Trial,* written in 1948. Of course, at the time the world's political order was still in flux. World War II had recently ended and the United Nations had just come into existence. The obvious implication of the question dealt with the great military conflicts the West had seen in the previous one hundred years. Would the nations of the world square off again in the next generation as they had done so many times in the recent past? Toynbee asks us to calmly consider that although in many ways history does indeed repeat itself, this does not mean that free will is compromised. Put another way, human destiny is not predetermined, for Toynbee writes that as long as there is life, there is hope, and that humans are truly the masters of their destiny.

In his writings, he saw the purpose of all preceding societies. Throughout history, Toynbee wrote, humanity continued (and still does so) to attempt to rise toward some higher kind of spiritual life. Toynbee believed that that goal has never been reached by an individual society, but perhaps has been reached by individual persons such as saints. He was a tough critic of society, and in his view, humankind is an unfinished project, a work in progress. All the civilizations that we know of have already broken down and gone to pieces, with the single possible exception of our own Western civilization.

Toynbee's politics appear to lean toward a liberal, nearly Socialist view of government. In his book *Change and Habit—The Challenge of Our Time,* he makes the case for an eventual world government. He calls the system of individual countries "a habit," and he maintains that humans can change their habits if the only alternative is disaster. To him, the framework of nation-states and competing military alliances (and the potential for nuclear conflict) between those nations imperils humanity's very existence. Toynbee details the steps required to attain the goal of a world government, including the ways our currently sovereign peoples would have to be convinced that it is in their interest to forgo local representation for the betterment of the human race. The other main benefit

gained from the world government model, according to Toynbee, is a more efficient plan for growing and distributing food to all of Earth's people.

He does recognize, however, the difficulties in getting people to simply get along with one another. Toynbee is correct to say that political equality among diverse peoples is nearly impossible when those involved are also socially, culturally, and physically many miles apart. Social issues such as the equality of the sexes, unique religious practices, and cultural mores vary widely from one region to the next. He makes the argument that within the United States there are still racial issues, particularly in the Old South, that are only one example of how difficult a task it would be to truly unite the world's population under a single ruling government. At the same time, he sees hope, citing the example of both Islamic people and the people of Latin America, who seem to be free from racial tensions among their different populations. Toynbee truly sees only one race—the human race—and feels strongly that artificial barriers such as nationalism must be removed in order for all of humankind to survive. It would appear that at this time in our own history, the nations of Europe, in the expansion of the European Union, are beginning to heed his warnings.

Fellow historians have sometimes criticized Toynbee's methods. One concern focuses on his reliance upon insight and imagination rather than arguments or induction. While some scholars defend his style as an example of using metaphor or simply being poetic, others declare that Toynbee fails to go the extra mile in getting his facts straight, thereby weakening some of his arguments. However, in the end, Toynbee must be given credit for his attempt to document our world's history as a unified one. He has succeeded in showing us that it is at least possible to envision such a future for humankind.

— Thomas M. Prince

Further Readings

Gargan, E. T. (1961). *The intent of Toynbee's history—A cooperative appraisal.* Chicago: Loyola University Press.

Toynbee, A. J. (1948). *Civilization on trial.* New York: Oxford University Press.

Toynbee, A. J. (1966). *Change and habit—The challenge of our time.* New York and London: Oxford University Press.

Transnationalism

Transnationalism is the idea that flows of transstate migrants and their symbolic and material accoutrements are bi- or multidirectional and ongoing. That is, where previous generations of migrants tended toward making a "clean break" with their societies of origin, many contemporary migrants continue to have ongoing ties with the communities from which they migrated. Transnationalism has been defined in anthropology as "the process by which immigrants forge and sustain simultaneous multi-stranded social relations that link together their societies of origin and settlement. . . . many immigrants today build social fields that cross geographic, cultural, and political borders." In many sending societies, out-migrants are expected to play an ongoing role. Receiving societies take a variety of approaches, ranging from barring the assimilation or naturalization of migrants to encouraging ongoing dualities of identity or citizenship, but in states representing the full range of these, the number of people living transnationally is on the increase.

Most theorists regard transnationalism as reliant on a new characterization of space. For Arjun Appadurai, deterritorialization is a feature of the new globalized world in which identity is increasingly disconnected, or at least disconnectable, from place. However, Michael Kearney locates transnationalism in its specificity of place, arguing that it differs from global processes that are "decentered" and take place in "global space"; rather, transnational processes are "anchored in and transcend one or more nation-states." This is reiterated by Aihwa Ong, who regards transnationalism as referring to "cultural specificities of global processes."

Transnational life is made possible by new technologies that facilitate transportation, communication, and the rapid transfer of funds around the world. Air travel, while too expensive for many migrants to use on more than an occasional basis, nevertheless now whisks people between continents in hours instead of weeks. Migrant remittances sustain or improve the lot of impoverished families. Internet-based forms of communication such as listservs, chat, e-mail, and Web sites facilitate the building and maintenance of deterritorialized communities. These technologies have rendered much of the world "self-consciously one single field of persistent interaction and exchange."

Transnationalism has given rise to, and is now facilitated by, new institutions. Michael Peter Smith and Luis Eduardo Guarnizo highlight cross-national institutional networks such as sending country governments' outreach to their nationals within host countries. Haiti, which does not recognize dual citizenship but has a Ministry of Haitians Living Abroad, is one such example.

As Sarah J. Mahler notes, many authors at least implicitly distinguish between transnationalism "from below" and "from above." The former concerns the daily lives of ordinary people, and the latter the macro-level political and economic forces dominated by elites. Anthropologists have focused disproportionately on transnationalism from below.

In an article in which he traces the course of anthropology and his own career in it over the past fifty years, Clifford Geertz notes that an interest in transnationalism began in anthropology only in the 1990s, before which it was "not thought to be a part of anthropology's purview" but that now studies of it seem to be "appearing on all sides."

— *Diane E. King*

Further Readings

Hannerz, U. (1996). *Transnational connections: Culture, people, places.* London: Routledge.

Levitt, P. (2001). *The transnational villagers.* Berkeley: University of California Press.

Ong, A. (1999). *Flexible citizenship: The cultural logics of transnationality.* Durham, NC: Duke University Press.

Travel

From a Western perspective, travel begins with Europe's fascination with the "Other." Examples of this include religious pilgrimages and the Renaissance expeditions of trade and exploration. Undoubtedly, travel is also tied to colonization by European forces, beginning with the travels of the Portuguese to Africa in 1455 to obtain slave labor when Pope Nicolas V granted the Portuguese the right to do so; followed by the voyages of the Portuguese navigator Bartholomew Dias in 1488 around the Cape of Good Hope; Christopher Columbus's voyages to the Americas from 1492 to 1502; and culminating with the numerous voyages of exploration of the Pacific by Spanish, French, Dutch and English navigators, mainly in the 16th and 17th centuries. Religious missionaries also contributed to the waves of travelers around the world, oftentimes writing long and detailed accounts of their experiences. Many of these accounts, if read with a critical eye, provide valuable insights into the lifeways of indigenous peoples before the massive changes wrought by centuries of contact. Scholars have found a series of parallels between the accounts written by missionaries during their religious expeditions and 19th-century travel writing.

Travel expeditions were of particular significance to European naturalists in the 18th (such as Sir Hans Sloane (1660–1753) who worked in Jamaica, and Maria Sibylla Merian (1647–1717) who worked in Suriname) and 19th centuries, particularly Charles Lyell (1797–1875), Thomas Henry Huxley (1825–1895), Ernst Haeckel (1834–1919), and especially Charles Robert Darwin (1809–1882). These travels made naturalists aware of the presence and relevance of the fossil record, the distribution of plants and animals, and the presence of societies with different cultures, languages, beliefs, rituals, and customs. Many of these findings contributed to the emergence of anthropology as a discipline. For instance, Sir Charles Lyell, close friend of Darwin and supporter of Darwin's theory of evolution, traveled around the world observing geological phenomena. From findings during these travels emerged the concept of uniformitarianism to explain geological changes throughout history. Thomas Huxley, a self-educated intellectual and author of *Evidence as to Man's Place in Nature* (1863), traveled aboard HMS *Rattlesnake* to Australia as an assistant surgeon from 1847 to 1851. His findings in natural history (particularly zoology) resulting from this trip were published in a work entitled *Oceanic Hydrozoa.* Ernst Haeckel, whose "law of recapitulation" was unfortunately appropriated by the Nazi party to justify nationalism and racism, traveled to the Mediterranean to conduct research on invertebrate groups.

Charles Darwin traveled for five years (1831–1835) as a naturalist aboard HMS *Beagle* on a British science expedition around the world. One of Darwin's best-known stops during this voyage was the Galapagos Islands, which Darwin conceived as "a group of satellites attached to America," with organisms that were physically comparable, organically dissimilar, yet at

Source: © iStockphoto/Christoph Ermel.

the same time closely related to each other. He also traveled to other parts of South America and the world, collecting specimens of plants and animals for further study. This voyage was instrumental in Darwin's development of his famous concepts of co-adaptation and modification of organic beings, and more importantly, his theory of organic evolution by natural selection. This theory holds that variation within species occurs randomly, and that the survival or extinction of organisms is determined by each organism's ability to adapt to its environment. Darwin published these theories in his book *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* in 1859.

Travel as a touristic experience in the West developed during the 18th century in England, under the premise that it was an activity that improved the life and soul of the traveler. At the time, the "traveler" was specifically a white upper-class male because only they had the means and social status to conduct these expeditions. Thomas Cook, an English preacher, is often recognized as the creator of the modern tourism era for putting together packaged tours in the mid-19th century, many of them available to working-class people. These tours included trips to the countryside and large cities of England, as well as abroad (Cook's first holiday abroad package was a tour to Germany in 1855). Those who traveled on Cook's trips were known as "Cookites." From this perspective, travel is a consequence of a uniquely Western dynamic. The Europeans "ventured to discover" and thus colonized much of the rest of the world. Thus, tourism and travel largely resulted from the success of European powers in grounding their presence in faraway places. There are common assumptions about travel from a Western perspective, including the supposition that modern tourism derives solely from the Western experience, and that travel is only associated with Western traditions.

A more comprehensive view, however, gives us a different explanation for the arrival of travel and tourism. Trade, conquest, and the quest for wealth and economic advantage are not the only reasons for traveling. There are multiple justifications for travel. Travel came about in the history of humanity long before the arrival of Western European colonizers to non-Western places. Archaeological evidence demonstrates extensive long-distance travel in the Western Hemisphere in pre-European times. Travel took place for many purposes other than colonization, and it did not occur only from the West to the non-West. For

instance, Japanese scholarship has focused on analyzing the propensity of Japanese citizens to travel and to purchase souvenirs as a result of centuries of traveling to pilgrimage centers. Believers in Islam have conducted religious pilgrimages to the city of Mecca (the *hajj,* considered one of the five pillars of the Islamic faith) in the form that it is conducted at the present time at least since the 7th century when the prophet Mohammed expanded and refined the pilgrimage. These trips, although not considered "packaged tours," required the same level of organizational skill and need to anticipate and fulfill the needs of travelers. Another motivation for travel for many societies has been the pursuit of knowledge. Mary Helms, for example, has argued that the elite of pre-Columbian chiefdoms in Panama traveled great distances to obtain esoteric, often sacred, knowledge that enhanced their political power. Other scholars argue that the main motivations for traveling include the search for authenticity, or the search for exotica, the primitive, the different, the Other.

Source: © iStockphoto/EauClaire Media.

Anthropologists have traveled to distant places since the beginning of the development of anthropology as a discipline in the mid-19th century. Early on in the formation of the discipline, and as a reaction to "armchair" anthropology, traveling to a far away, "exotic" society was (and in some instances, continues to be) the essential rite of passage of fledging anthropologists. However, the concrete act of traveling to the anthropologists' destinations (and encountering other travelers and tourists on the way) was not considered an important aspect of the ethnographic experience until quite recently. For instance, the Belgium-born anthropologist Claude Lévi-Strauss, founder of structural anthropology and considered one of the most influential intellectuals of the 20th century, is credited with writing one of the best anthropological accounts of basic human societies, anthropology, and human thought (and a must-read travel book at the same time), *Tristes Tropiques,* originally published in 1955. In his book, Lévi-Strauss noted that adventure and travel are not part of the anthropological profession. He pointed out, "The fact that so much effort and expenditure has to be wasted on reaching the object of our studies bestows no value on that aspect of our profession, and should be seen rather as its negative side."

It was only in the 1970s that tourism and travel became subjects worthy of discussion in anthropology. Although many reasons have been given to explain this fact, two have gained wide acceptance. First, anthropologists argued that their experience and reasons for being in a distant place could not be compared to that of tourists and felt that in many instances they were being unfairly compared with the tourists they encountered in these faraway places. Secondly, and perhaps as a result of the first argument, anthropologists considered that tourism was not a serious enough subject to discuss intellectually and ethnographically. Although in practically every

ethnographic field site anthropologists encountered at least occasional tourists, they were perceived as an undesired nuisance and given scant or no attention. The presence of tourists intruded upon the pristine tradition-bound images envisioned for these communities.

In 1976, Valene Smith published the influential edited volume *Hosts and Guests: The Anthropology of Tourism*. This volume marked the beginning of a more serious interest in tourism and travel in anthropology. This scholarship has focused on the many dynamics of tourism, including the types of tourism and tourists. The travel industry acknowledges several types of tourism, such as ethnic, cultural, ecotourism, historical, recreational, alternative industry, and these days even guerrilla tourism, agrotourism, and cybertourism. Smith defined the tourist as "a temporarily leisured person who voluntarily visits a place away from home for the purpose of experiencing a change." Thus, traveling carried out by tourists can be considered leisure travel, and it refers to voluntary displacement, which contrasts markedly with involuntary displacement due to political instability, wars, and forced relocation. Smith also developed a typology of tourists, dividing them into the explorer tourist, the elite tourist, unusual, massive, and charter tourists. Interestingly enough, as anthropologists had an elitist view toward tourists, elite tourists who prefer adventure and are concerned with having unusual and unique experiences with different cultures consider themselves "travelers," and would not accept the label "tourist" placed on them.

Applied anthropologists have also focused their attention on other kinds of marginalized "travelers." For example, a new phenomenon within the travel industry is the emergence of "transplant tourists." This refers to the fact that the lack of donated organs for organ transplants in wealthy countries has produced an elaborate market for body parts (particularly kidneys) sold by people in the so-called third world. The newer trade involves the traveling of the kidney seller to his or destination; the buyer sometimes provides airfare, accommodations, and even sightseeing tours.

In the 21st century, travel no longer involves only voluntary or involuntary displacement. Travel can also take place from the comfort (or discomfort) of one's own home through virtual travel. One example of virtual travel is what tourism researchers call "cybertourism." Cybertourism refers to travels carried out by individuals or groups via the Internet. Interestingly, cybertourism breaks down the assumed premise of travel and tourism (leisure) versus everyday life (work). The dichotomy between work time (home/community) and leisure (away from home/community) can be overcome daily if one is so inclined. It is no longer necessary to wait for a vacation to break the cycle. The conventional categories of ordering of space and classifications fall by the wayside in the face of virtual worlds that can be visited by simply hitting a particular series of keys on a computer keyboard.

— *Carla Guerrón-Montero*

Further Readings

Bruner, E. (2004). Tourism in the Balinese borderzone. In S. B. Gmelch (Ed.), *Tourists and tourism: A reader* (pp. 219–238). Long Grove, IL: Waveland Press.

Chambers, E. (2000). *Native tours: The anthropology of travel and tourism.* Prospect Heights, IL: Waveland Press.

Maccannell, D. (1999). *The tourist: A new theory of the leisure class.* Berkeley: University of California Press.

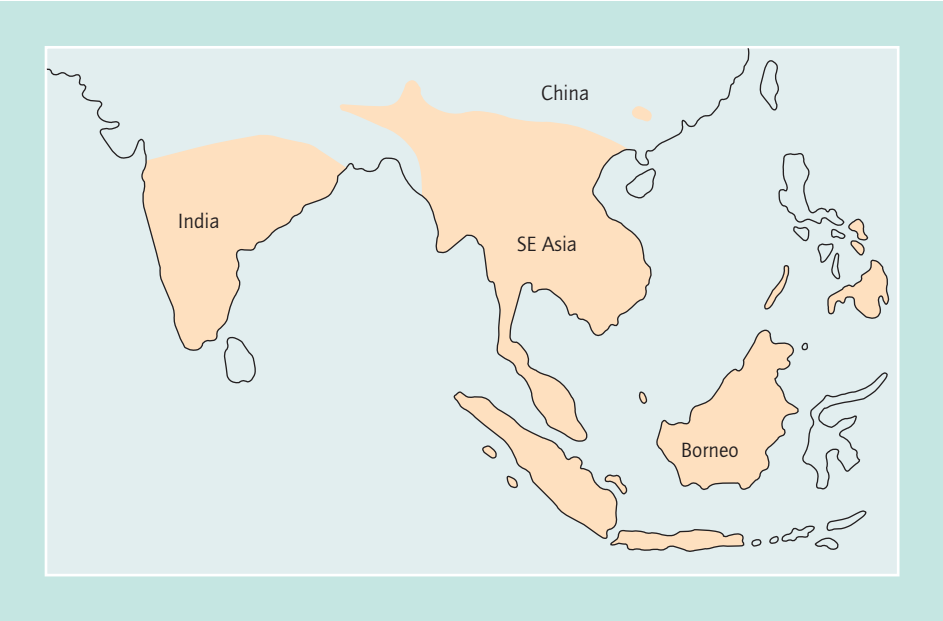
Treeshrews

A group of mammals belonging to the order *Scandentia,* and included in a single family, the *Tupaiidae.* They are endemic to the Indomalayan region, with a geographic range that extends from India to the Philippines. They reach their greatest diversity on the Southeast Asian island of Borneo, where ten of the twenty known species occur. Five genera of treeshrews are commonly recognized: *Tupaia, Anathana, Dendrogale, Urogale,* and *Ptilocercus*, of which *Tupaia* is the most diverse and best known.

Treeshrews are relatively small, squirrel-like mammals ranging in average body weight from less than 50g to about 300g. In many respects they retain anatomical features closely resembling the primitive eutherian mammalian condition. They have long, tapering muzzles with a moist glandular nosepad; relatively large eyes; small rounded hairless ears; a long slender body, covered in soft dense fur, which is

brown to olive in color, often with streaks or stripes; they have five short digits on their hands and feet, each bearing a well-developed claw; and a long, usually bushy tail, which is as at least as long as the head and body in most species.

They primarily inhabit lowland and montane forest, but do occur in secondary forest, plantations, and gardens. Some species are predominantly arboreal, although they often descend to the forest floor, where they forage for invertebrates and small fruits. Other species are largely or exclusively terrestrial. All of the species are diurnal (i.e., active during the day), except for the nocturnal pen-tailed treeshrew (belonging to the genus *Ptilocercus*). They are active, agile, and fast-moving creatures who are skilled climbers and leapers in trees and dense undergrowth. Treeshrews are generally territorial, with a paired male and female defending a small home range. Adults build nests in trees, hollow logs, or underground burrows as sleeping sites. During the breeding season, females produce two offspring, who are born hairless and with their eyes closed. They have a remarkable "absentee" maternal care system in which the mother gives birth to her young in a separate nest from her own and only visits them every other day for a few minutes to nurse them.



Geographical Distribution of Treeshrews in Asia

Common Treeshrew (*Tupaia glis*)

Since their initial discovery in the late18th century, their taxonomic position has proved problematic. Historically, they have been of interest to anthropologists because of their anatomical similarities and close relationship to primates, and they have sometimes been included in the same order. They share several key specializations with primates, including enlarged forward-facing eyes enclosed by a complete bony ring, a reduction in the sense of smell, a specialized tooth-comb at the front of the lower jaw (as in lemurs and lorises), a relatively large brain, postcranial adaptations for arboreal climbing, ridged skin on the

palms and soles, and a small litter size. However, current authorities, while still acknowledging a close evolutionary link with primates, prefer to include them in their own order, but group them together with primates, bats, and flying lemurs or colugos in the superorder *Archonta*.

The fossil record for treeshrews is poorly known, and the earliest undoubted representatives come from the later Miocene (about 10 million years ago) of Indo-Pakistan and China.

— *Terry Harrison*

Further Readings

Corbet, G. B., & Hill, J. E. (1992). *The mammals of the Indomalayan region: A systematic review.* Oxford: Oxford University Press.

Emmons, L. H. (2000). *Tupai: A field study of Bornean treeshrews.* Berkeley: University of California Press.

Martin, R. D. (1990). *Primate origins and evolution: A phylogenetic reconstruction.* Princeton, NJ: Princeton University Press.

Tropical Rain Forests

About one third of the world's forests are tropical rain forests. They are the most ancient, diverse, complex, and productive ecosystems on the terrestrial surface of the Earth. Although they cover only about 6–8% of the land surface, they contain about half of all life, whether this is measured by the number of species (biological diversity) or organic weight (biomass). These forests form a discontinuous green belt around the equatorial regions of the planet, concentrated within ten degrees latitude north and south of the equator but extending in many areas to 23.5 degrees north and south within the tropical zone. About half of the world's tropical rain forest is in the Amazon region, and about 80% of that is in Brazil.

In tropical rain forests the average yearly temperature is 20–28°C or more, while the average yearly rainfall is above 2,000 mm. The climate is the closest to the optimal conditions for plant growth anywhere on Earth with its combination of high temperature, rainfall, and humidity. Consequently, this type of forest is the norm for plant growth on this planet, while every other kind of plant community is some deviation in response to one or more kinds of stress such as lower rainfall or lower temperatures.

Water plays an extremely important role in the variation and dynamics of ecosystems in the tropical rain forest, as is implied by the designation *rain* forest. Rivers, streams, lakes, and swamps are found in many areas, and they are important to local people for water consumption, transportation, and trade, as well as for fish, birds, and other game for food.

The plant community of the tropical rain forest is characterized by its stature, luxuriance, and diversity. In mature forests there are giant trees, with few if any branches in their lower levels, standing like columns in a grand cathedral. Such forest is more or less stratified, with several layers that reflect vertical zonation in the microclimate and associated biota.

Animals are an important component of the structure, function, composition, and dynamics of these ecosystems. However, animals are relatively scarce. While their species diversity is high, their population density is low and individuals within a population are patchy in distribution. Furthermore, most animal species are arboreal, small in body size, solitary, camouflaged, and nocturnal. In addition, invertebrates such as ants and termites comprise most of the faunal biomass of the forest. The major exception to these generalizations about animals is the wild pig, which is terrestrial, large in body size and group size, diurnal, and noisy, and leaves obvious trails. Accordingly, in most tropical rain forests, wild pigs are usually the most important item by weight in the annual predation record for many indigenous hunters.

Since Europeans first started exploring tropical forests in the 15th century, this biome has probably attracted more attention than any other type of environment. It stimulates different reactions, depending on whether the observer's agenda is economic, political, religious, artistic, or scientific. Furthermore, the ambivalence of Western civilization toward the "jungle" is reflected in numerous binary oppositions like paradise/hell, rich/poor, harmony/chaos, peace/war, good/evil, and so on. That is, some people consider the forest to be a type of Eden, while for others it is Hades. This ambivalence is reflected in some local cultures as well. For example, as described by Colin Turnbull, in the Congo region of Africa, the Mbuti people who live inside the forest view it as affectionate and protective like parents, while Bantu neighbors dwelling on its margins consider it to be a dangerous place filled with evil spirits.

Such contradictory and contested images are also reflected in the scientific literature, although usually more subtly. The native or indigenous peoples of the forest have been viewed ambivalently by Western civilization as either "noble savages" (via Jean-Jacques Rousseau) or "bestial savages" (via Thomas Hobbes). In the ethnographic record of the Amazon, these positive and negative representations are exemplified respectively by Gerardo Reichel-Dolmatoff's publications on the Desana and Napoleon Chagnon's on the Yanomami. Usually more recent ethnographies are better balanced.

Source: © iStockphoto/Mark Huntington.

A rich source of reliable and detailed information about the natural history of the animals, plants, and ecosystems of the tropical rain forest is the local human community, especially indigenes. People who regularly engage in subsistence hunting, fishing, gathering, or farming in this ecosystem usually accumulate reliable and detailed knowledge of the species they seek for food in order to survive. What has been termed *traditional environmental knowledge* (TEK) can be critical in any attempts by outside agents to promote environmental conservation or economic development in tropical rain forests and other environments. Indeed, many such interventions have failed with dire social and environmental consequences because they ignored local cultures, TEK, and the like. Most, although not all, traditional indigenous societies have more often than not been sustainable, a fact proven by their continued existence as the descendants of the original inhabitants of an area over centuries or even millennia.

Forests survived in much of the tropics while humans inhabited them for centuries or even millennia, although in certain areas, such as those of some of the Maya in Central America and various islands in Polynesia, deforestation occurred already in prehistory. For the most part, however, deforestation in places like the Amazon is a recent phenomenon of the last few decades and is related to the introduction of alien technologies and economies as well as regional, national, and international politics.

Only since the 1960s has the rate of deforestation in the tropics become alarming. Through space and over time, different combinations of factors contribute to deforestation. These include cattle ranching in tropical America, government colonization schemes in the Brazilian Amazon and the Indonesian outer islands, gold mining in Brazil, oil extraction in Ecuador and Peru, plantation monocrops like rubber trees in South and Southeast Asia, and hydroelectric dams in various areas.

Cultural diversity and biological diversity are both extraordinarily high in tropical rain forests, a coincidence that is called the diversity principle. (Both types of diversity decrease progressively from the equator toward the poles.) Conservationists identify

Brazil, Congo, and Indonesia as among the megadiversity countries because of their high biodiversity. Such countries contain high cultural and linguistic diversity as well. They are also the hot spots (endangered areas) for both tropical rain forests and indigenous cultures. These two endangered phenomena are interrelated and cannot be considered in isolation from each other. Moreover, traditional environmental knowledge as well as land and resource use, management, and conservation practices are indispensable to consider in countering the threats to these cultures and to their forest habitats from both the human rights and environmentalist perspectives.

The awesome cultures and environments of the tropical rain forests have far too much intrinsic value to sacrifice merely for the material "progress" of the contemporary consumer society. The latter is predicated on infinite growth on a finite base, which is an impossibility. Such ecocidal societies are destined to self-destruct sooner rather than later. The tropical rain forest, the people who consider it their homeland, and their cultures and religions deserve to be appreciated and respected on their own terms. Tropical rain forests are the last refuges for biological and cultural diversity on Earth, and diversity is indispensable for continued adaptation and future adaptability.

— *Leslie E. Sponsel*

See also **Amazonia; Brazil; Indonesia**

Further Readings

Lye, T., de Jong, W., & Ken-ichi, A. (Eds.). (2003). *The political ecology of tropical forests in Southeast Asia: Historical perspectives.* Kyoto, Japan: Kyoto University Press.

Maffi, L. (Ed.). (2001). *On biocultural diversity: Linking language, knowledge, and the environment.* Washington, DC: Smithsonian Institution Press.

Slater, C. (Ed.). (2003). *In search of the rain forest.* Durham, NC: Duke University Press.

Whitmore, T. C. (1998). *An introduction to tropical rain forests* (2nd ed.). New York: Oxford University Press.

Williams, M. (2003). *Deforesting the Earth: From prehistory to global crisis.* Chicago: University of Chicago Press.

Troy

The city of Troy, situated on the northwest coast of modern Turkey, occupies a special place in Western culture. The story of the sack of Troy told by Homer was considered history in antiquity, then myth, then imaginative poetry, and then history again. It provided a major theme for Western art throughout the millennia; created the archetype for the "hero"; and created a view of war, honor, fame, and aggression that many have blamed for the continued glorification of warfare in the West. During the late 19th century, the story of Troy showed something else: that myth can contain kernels of truth. The businessman-turned-archaeologist Heinrich Schliemann began to excavate a site tentatively identified as Troy. His stunning discoveries appealed to the imagination of many generations. After his death, excavations continued under W. Dörpfield, in his turn succeeded by C. W. Blegen. Activities ceased after 1938. After a hiatus of 50 years, excavations resumed in 1988. New finds conducted on a larger scale continue to provide important information.

Troy in Myth and Epic

Troy is best known as the city attacked by the Greeks to regain Helen, the wife of the Achaean king Menelaos, after she was kidnapped by a Trojan prince. The *Iliad* tells the story of the last ten days of the battle for Troy, or Ilion—hence "Iliad"—and the decisive battle between another Trojan prince, Hector, and his Achaean or Greek counterpart, Achilles. The *Odyssey* retells the story of the return home of one of the other warriors, Odysseus. The story of the preliminaries to the conquest and the return of Odysseus are set in a timeless world, thought to provide a much-retold and therefore not very accurate description of early Bronze Age Greece, when writing, to our knowledge, was not used to transmit historical events. If the *Iliad* and *Odyssey* tell of true events, the poems must have been transmitted orally over a long period of time. The investigation of their oral origins during the late 18th century marks the beginning of philological research on "orality," laying the foundation for modern research on orality, oral performance, social memory, and the role of oral transmission among nonliterate populations.

Troy in Antiquity

Troy, also known under its modern name of Hissarlik (or Hisarlik), and sometimes identified with the city called "Wilusa" by the Hittites, is situated in northwest Turkey, or Anatolia. During the second millennium BCE, Troy was about a mile away from the coast and provided protection for trading ships sailing into the Black Sea. The south wind, necessary to sail into the Black Sea, only blows during the spring and the fall, forcing ships to wait. Homer calls the city "Windy Troy." It was only around the first century BCE that sailors learned to sail ships against the wind. A land trading route linking Asia Minor with Europe also led through Troy. Throughout time, Troy was an important site for visitors who exploited its fame for their own purposes.

The Greeks believed that the Trojan War, as told in the Homeric epics, really did take place. The poems were performed and reperformed, and Greek literature borrowed its heroes, plots, and language. The Greek historian Herodotus (late fifth century BCE) explained the Persian wars as a continuation of the east/west conflict that had existed since Homeric times, a trope that was borrowed again and again. When Alexander the Great, who considered himself a descendant of Achilles, set off to conquer the East ca. 335 BCE, he stopped at Troy and made offerings at the temple of Athena. In 192 BCE, Antiochus III, the Seleucid king of Asia Minor, stopped at the same temple before attempting his invasion of Greece.

But the Greeks were not the only ones to claim the city of Troy as theirs: two years after Antiochus III, the Roman Consul Scipio visited the temple on his way to subdue Antiochus. The inhabitants of Troy, aware of its historical significance, happily obliged and received benefits from all visitors, such as tax exemptions and financial support for temple construction. The Roman connection is somewhat tenuous: some aristocratic families claimed descent from the Trojans. When the city was destroyed, they believed, some Trojans made their way to Italy via Carthage on the coast of North Africa. The hero, Aeneas, scorned the offer of the Queen of Carthage to share her kingdom: he claimed to be on a holy mission to find new land for his followers "in the west." Thus, the story of the Trojan war provided a more noble excuse for Rome's continued conflict and final destruction of Carthage, a conflict caused by trade rivalry. Caesar and his descendants claimed direct descent from Aeneas to justify their conquests in North Africa and Asia Minor (Turkey and beyond).

Although the Homeric epics were lost in the West during the early and late Middle Ages, the story of the sack of Troy was not. Theodoric the Great (453–526), king of the Ostrogoths, claimed some Trojans had fled up the valley of the Danube and settled among the Franks. Trojan descent was widely claimed by German nobles and provided a (lame) excuse for the sack of Constantinople during the Fourth Crusade (1204). Sultan Mehmed II, the Ottoman conqueror of Constantinople in 1453, recognized Troy's symbolic power in his turn: he visited the fabled ruins, listened to a recitation of Homer, and announced that his conquest of Constantinople was in revenge for the sack of Troy by the Greeks two thousand years earlier.

During the Renaissance, Greek literature was reintroduced into the West and depictions of Homeric heroes and battles were rekindled in poetry and pictorial art. The fascination with the story grew, and during the Age of Romanticism the demands to free Greece from the Ottoman occupier gained force.

First Excavations

The Romantic view of Troy also inspired Heinrich Schliemann, who began excavations in 1870 on a site called His(s)arlik. Several trenches were dug through the man-made hill, revealing several layers of a city. One layer showed signs of burning, leading Schliemann to identify it as the Troy destroyed by the Greeks. Schliemann was the first to apply a technique called "stratigraphy" to conduct his excavations. Schliemann recognized 7 layers, with I (in Roman numerals) as the earliest one. This number was increased to nine by his successors, with several subdivisions indicated by letters of the alphabet. Excavation of such a long-occupied site—evidence recently has come to light that the site was occupied since the third millennium BC—is complex; old building materials were frequently used to construct new buildings, while the Romans razed the top of the hill for the temples whose construction they funded. Schliemann discovered the so-called "Treasure of King Priam," a hoard of gold jewelry. He shipped it to Germany, to the dismay of the Turkish government. After World War II the treasure was lost—only to reemerge in the mid-1990s in the Pushkin Museum in Moscow.

Current Excavations

Excavations resumed in 1988 under the joint leadership of M. Korfmann of the University of Tübingen and Brian Rose of the University of Cincinnati. Scholars of many other disciplines and countries participate as well. A problem in archaeology of the ancient world is that sites become the "property" of a country or a university, and as a result, publications appear in the corresponding language: in French (Olympia), German (Troy), or English (Athens). An added difficulty is that customarily, archaeological field reports are slow to appear. However, the team at Hisarlik is conscientious about rapid publication—in German.

The new (contested) finds show that after the city was destroyed during the 12th century, it was subsequently inhabited by Greeks—much earlier than commonly believed. They also show that Troy was an important center of political power in the second millennium BC.

— *Thérèse de Vet*

See also **Archaeology; Orality and Anthropology; Schliemann, Heinrich**

Further Readings

Dickinson, O. (1994). *The Aegean bronze age.* Cambridge: Cambridge University Press.

Easton, D. F. et al. (2002). Troy in recent perspective. *Anatolian Studies, 52,* 75–109.

Korfmann, M. (2004). Was there a Trojan war? *Archaeology, 57,* 36–41.

Latacz, J. (2003). *Troia und Homer: Der weg zur lösung eines alten rätsels.* Munich: Piper.

Tswana Bantu

The term "Tswana Bantu" refers to both ethnic peoples and a language. The Tswana Bantu population, related to the Sotho, divide themselves into subgroups (lineages): the *Hurutshe, Gwaketse, Kgalagadi, Kgatha, Kwena, Malete, Ngwato, Rolong, Tawana, Thlaping,* and *Tlokwa.* The country of Botswana (which literally means "Land of the Tswana") bears the name of the Tswana, but only a small portion of them are citizens there (approximately 800,000 to 1 million), whereas most of the Tswana Bantu speakers (2.5 to 3 million) reside in Bophutatswana ("The Place Where Tswana Gather") in the northeast of South Africa. Less than 25,000 Tswana Bantu reside in Namibia; perhaps 25,000 to 30,000 live in Zimbabwe.

According to its technical linguistic designation, Tswana (Setswana) belongs to the Bantu subbranch of the Niger-Kordofanian language family. It is closely related to Western Sotho and is sometimes referred to as such. English is the official language of Botswana; however, more than 80% of the population speak the Setswana (Tswana) dialect. Furthermore, Setswana is the language of the educational system and of the media. This does not pose a problem for those who speak other dialects of Tswana, for all of the dialects are mutually intelligible. Tswana was orally transmitted until the 1800s when British Protestant ministers (seeking Tswana Bantu converts) translated the Bible.

The issue of whether Sotho-Bantu speaking populations (such as the Tswana) came originally from northwest or eastern Africa is debatable, and a precise date is not available as to their arrival in southern regions of the African continent, nor is the actual reason for a mass migration known. However, one motivation may have been the gradual desertification of sub-Saharan Africa beginning approximately 10,000 to 8,000 years ago. This may have caused Bantu populations to leave hypothetical homelands in successive waves. Only one thing is known with certainty: by 1600 the Tswana Bantu speakers inhabited certain regions of present-day Botswana, South Africa, Namibia, and Zimbabwe.

At that time, they lived in major towns with satellite villages and practiced swidden agriculture of domesticated millet, sorghum, beans, melons, and *morama* (a tuber). The Tswana also continued to hunt, fish, and gather. Traditional drinks include palm wine and homemade sorghum beer. The measure of wealth was cattle that were used to pay debts and contract political alliances, and upon marriage cattle comprised payments to the bride's family; thus cattle were imbued with symbolic value. The breeding and herding of cattle was the responsibility of boys and men who also raised sheep and goats. This work was forbidden to women. Men also raised the timber frames of houses, cleared new fields, and assisted the women and children in planting, weeding, and harvesting crops. All objects of skin, wood, bone, and metal were made

by men. This division of labor persists to the present time, except that after oxen were used as draught animals men began to plough. Today women no longer are forbidden to raise cattle; however, the herding and milking of cattle are still done by males.

In traditional households, women were responsible for children, tilling the fields, building huts and granaries, thatching roofs, cooking food, making beer, and raising fowl. Women made the pottery. However, separating subsistence activities into male and female spheres is problematic, as classic studies of the Tswana illustrate, because many tasks were shared by young and old, wives and husbands, brothers and sisters, as well as relatives of near and distant kin. Men and women made baskets, but these men and women belonged to certain specialist lineages. Iron and coppersmith families, traditional religious healers, and those specializing in the art of pottery also adhered to hereditary precedents. Knowledge of these particular trades was considered to be a sacred trust that was guarded zealously against all usurpers; it was to be transmitted only from elder to apprenticed youth of certain hereditary lineages (both male and female).

Today, however, globalization makes such ancient crafts nearly obsolete. For example, though traditional skills were transferred to handcrafted furniture production and dressmaking in the 1950s and 1960s, by the 1970s, mass-produced furniture and mass-produced clothing made such skills unnecessary. Sometimes the only viable subsistence strategy is to leave the farming village to earn money as domestic and industrial labor. Many young people move to urban centers in search of work to assist hard-pressed rural families who struggle against drought and the poverty that attends it.

From the 1800s to the 1900s, the British and Dutch divided Tswana lands between them, now respectively called the sovereign states of Botswana and South Africa. Those Tswana who lived in (Reformed Dutch) South Africa were affected by Dutch racial policy called *apartheid,* the policy that created Bophutetswana, a nonsovereign "Black" country within the "White nation of South Africa." Those Tswana who lived in Botswana were British subjects and under British "self-rule" policy that encouraged chiefdom as long as the "chief" had the approval of the British colonial administration. The hereditary chief's power was not absolute but subject to the scrutiny of advisers and council. Often more able and elderly tribal leaders threatened British hegemony, causing the British to appoint a Tswana leader more amenable to British demands, someone who would readily collect taxes for the British and someone who would convince Tswana youth to work for the British for substandard wages under conditions of slavery, separated by geography and custom from white compatriots. Today, though apartheid has been outlawed, indigenous populations of Africa, such as Tswana, continue to fight against landed and monied proponents of apartheid, an entrenched hegemony difficult to either identify or eradicate.

As the Tswana Bantu have been economically colonized, so too have the Tswana sustained incursion of Christian ideology. Various European religionists sought to impose their religious beliefs upon Tswana Bantu. In the 1800s, British rule allowed the influx of many Christian denominations including Congregationalists (the London Mission Society), the Dutch Reformed Church, Methodists, Lutherans, Anglicans, and Roman Catholics, all of whom founded missions among the Tswana populations. However, despite their diligent attempts to convert the Tswana tribes, a recent Botswana government survey suggests that to a great extent the Tswana have retained ancient religious practices, such as the veneration of the ancestors and a belief in the efficacy of magic spells. According to this survey, as many as 50% of the Tswana may practice traditional religion. The next largest religious group is Roman Catholic. Various Protestant sects divide the remainder of the Tswana among themselves. Women are generally more involved with evangelical brands of Christianity than men, who often espouse indifference to it. Another complication is that those who avow Christianity and who regularly attend Christian services of various denominations may also venerate the ancestors with prescribed sacrifices and ceremonials. These same people may also continue to consult traditional religious specialists (shamans) and healers when modern medical practices fail, or when the cost of Western medical care is prohibitive.

The most eminent anthropologist of Tswana culture was Isaac Schapera (1905–2003). Schapera was research assistant to Bronislaw Malinowski while fulfilling Ph.D. requirements at the London School of Economics in the 1920s. He also fulfilled the position of professor at the University of Capetown from 1935 to 1950, dedicating his life to the documentation of Tswana Bantu history, law, art, language, literature, custom, and religion. Many

contemporary anthropologists owe him gratitude for his pioneering work among the Tswana.

— *Susan Kirwan*

Further Readings

Parson, J. (1984). *Botswana: Liberal democracy and the labor reserve in southern Africa.* London: Gower.

Schapera, I., & Comaroff, J. L. (1991). *The Tswana.* London: Kegan Paul.

Shillington, K. (1985). *The colonisation of the southern Tswana 1870–1900.* Braamfontein, South Africa: Ravan Press.

Turnbull, Colin M. (1924–1994)

Colin M. Turnbull was born in Harrow, England and educated at Magdalen College, Oxford. After serving in World War II in the British Royal Navy, he returned to Oxford and finished his education. Turnbull ultimately received his Ph.D. from Oxford in 1964. He also studied in India under Sri Anandamayl Ma and Sri Aurobindo (1949 and 1951), and then went to Africa where he was introduced to the Mbuti Pygmies.

The Mbuti Pygmies became a lifelong passion for Turnbull. As the African Ethnology curator for the American Museum of Natural History, he was in a unique position to return to the Ituri Forest in Africa to live with and research the region and its people. From his years of studying the Mbuti Pygmies, Turnbull produced his seminal book, *The Forest People* (1961). This very personal analysis of the Mbuti Pygmies and their culture was a unique view of a very rich and complex society that was often looked down upon by other peoples in the area and the world. Turnbull brought to the world stage all that was good and positive about the Pygmy culture and society. Through their songs and rituals, theses pygmies showed a deep love for life in the African forest. Turnbull also collected the songs of the Mbuti Pygmies and presented them in collections for the American Museum of Natural History. The love and esteem that he felt for the Mbuti Pygmies was immense, and he would see their life as a metaphor for his own life. Throughout his career, Turnbull wrote many other books about the Mbuti Pygmies of the Ituri Forrest and the conditions of the African people.

Source: Courtesy, Avery Research Center.

In 1965, Turnbull returned to Africa to study its peoples, but this time he did not go to study the Mbuti Pygmies. Instead, he studied the Ik of Uganda. This was a people displaced by the civil strife between Uganda and Kenya, as well as the development of a national wildlife reserve on their traditional hunting ground. Unlike the Mbuti Pygmies, the Ik were a people that because of these circumstances, had reduced their regard for each other to the point where they were immune to the suffering of their family members and other members of their tribe. Turnbull saw this and wrote that the society was not one of lofty values, but that this specific society and its culture were determined by the conditions that the people lived in at that

time. Unlike the rave reviews that *The Forest People* received, *The Mountain People* (1973) was severely criticized by many anthropological scholars. Some suggested that it was shoddy scholarship and that the book should be banned. Yet, others appreciated the depth to which Turnbull could understand the life and the conditions of the Ik.

Besides working as a curator at the American Museum of Natural History, Turnbull held professorships at a number of universities, including Virginia Commonwealth University and George Washington University. In 1982, he turned down tenure at George Washington University in order to devote his time to caring for his long-time partner Joe Towles.

Turnbull traveled extensively and studied various religions and cultures. He studied Hindu religions in India, the African culture, Samoan culture, and ultimately was ordained as a Tibetan Buddhist monk by the Dalai Lama. He became know as Lobsong Rigdol. In 1994, Colin M. Turnbull died in Lancaster County, Virginia.

— *Linda Reiten*

Further Readings

Grinker, R. R. (2000). *In the arms of Africa: The life of Colin M. Turnbull.* New York: St. Martin's Press.

Turnbull, C. M. (1962). *The lonely African.* New York: Simon & Schuster.

Turnbull, C. M. (1983). *Mbuti pigmies: Change and adaptation.* New York: Harcourt Brace.

Turner, Edith (1921–)

As one of the most important proponents of humanistic approaches to anthropology, Edith Turner has influenced how anthropologists think about women's roles within the discipline and how anthropologists write. Her first solo authored book, *The Spirit and the Drum,* originally written in the 1950s but not published until 1987, cannot easily be located in postmodern and feminist categorizations. In anticipation of postmodernist debates in anthropology, this deeply personal account of her years with the Ndembu of southern Africa challenged anthropologists to rethink both the fieldwork experience and ethnographic writing.

For most of Turner's career, she worked in collaboration with and was often overshadowed by her husband Victor Turner, who she met during World War II and with whom she shared a lifelong love of literature. After the war ended, while her husband attended the University College of London and then University of Manchester, Turner began an informal anthropological education. At the same time, she cared for their children, she attended lectures at Manchester, read anthropological theory and ethnography, and discussed the profession with her husband, his students, his colleagues, and his professors.

When her husband was awarded a Rhodes-Livingstone grant to conduct ethnographic research, Turner went into the field with their three children and collected data, writing her own field notes on rituals, ceremonies, and women's life, typing her husband's field notes, and serving as photographer on the project. Although their colleagues were aware that Turner and her husband collaborated in all aspects of research and writing, they rarely shared bylines. To a great extent, she put aside her literary and anthropological goals in order to support her husband's career and raise their children.

Not until the 1970s was Turner formally recognized for her anthropological contributions. In 1974 she was one of the founding members of the Society for Humanistic Anthropology, and in 1978 she shared authorship with her husband on the volume *Image and Pilgrimage in Christian Culture: Anthropological Perspectives.* In 1980, Turner was awarded a Master of Arts degree in English, despite never having earned a Bachelor's degree. In 1983, she was appointed Lecturer of Anthropology at the University of Virginia, where her performative approach to teaching has left an indelibly positive influence on her students.

Since her husband's untimely death in 1983, any doubts about Turner's capabilities as a fieldworker, theoretician, and anthropological writer have been laid to rest. At an age when most anthropologists are retiring, she has produced an oeuvre over the last 20 years that most anthropologists never accomplish. Aside from editing the journal *Anthropology and Humanism,* she conducted research in Zambia, Alaska, and Ireland, focusing on traditional healing, initiation and other rituals, and symbolic experience. In addition to a respectable number of scholarly articles, she has written three important ethnographic monographs: *The Spirit and the Drum, Experiencing Ritual* (1992), in which she returned to Zambia after

thirty years to update her research on spiritual processes and theories of pilgrimage, and *The Hands Feel It* (1996), which is about the spiritual beliefs and healing practices of the Inupiat of northern Alaska.

— *Walter E. Little*

Further Readings

Turner, E. (1987). *The spirit and the drum: A memoir of Africa*. Tucson: University of Arizona Press.

Turner, E. (1996). *The hands feel it: Healing and spirit presence among a northern Alaskan people*. DeKalb: Northern Illinois University Press.

Tylor, Edward Burnett (1832–1917)

Edward B. Tylor, founder of the study and curriculum of anthropology, is considered to be the first cultural evolutionist anthropologist and the father of the science of anthropology.

Tylor was born the son of Quakers on October 2, 1832 in London, England. He attended school at Tottenham, but due to poor health withdrew to travel to North America, where in Mexico he befriended ethnologist Henry Christy. Tylor was fascinated by anthropology and the prehistoric remains in Mexico, and he systematically investigated the artifacts and cultures of the peoples who had inhabited the area. His investigations evolved from incidental ethnography to sophisticated ethnology. Returning to England, he married Anna Fox, attended meetings of the Ethnological Society of London, and in 1861 published *Anahuac,* an account of his Mexican journey that contains anthropological commentary. In 1865 he published *Researches Into the Early History of Mankind* and *The Development of Civilization* to begin an active study of anthropology highlighted by his masterpieces, *Primitive Culture: Researches Into the Development of Mythology, Philosophy, Religion, Art and Custom* (1871), which is one of the major works of the 19th century, and *Anthropology: An Introduction to the Study of Man and Civilization* (1881), which still holds relevance today.

Tylor became a Fellow of the Royal Society in 1871. He received a Doctor of Civil Laws degree at Oxford (1875), was appointed Keeper of the University Museum (1883), presided over the newly formed Anthropological Section of the British Association (1884) and the Royal Anthropological Institute, was given a Readership in Anthropology (1884), became Oxford's first professor of Anthropology (1896), received an Honorary Fellowship at Balliol (1903), retired as Emeritus Professor (1909), received a knighthood (1912), and died on January 2, 1917.

Source: © Bettmann/CORBIS.

Tylor's contributions to the science of anthropology are historic, especially his analysis of small-scale society and the relationship between culture and mentality, and his work on the evolution of culture and the religion of animism (omnipresent spiritual life in all organic living things). Establishing a taxonomy or lexicon of anthropological concepts and a basic curriculum in anthropology studies were his academic goals and accomplishments. His basic curriculum is the prototype for the undergraduate degree in anthropology.

The principle of cultural evolution threaded his work: culture and civilization evolve along unilinear timelines from small scale ("primitive" or "savagery") to large scale ("civilization") in opposition to the theory of "cultural degeneration." His work took to task religious orthodoxy and divine inspiration of religious belief. Tylor labored to apply the scientific method to the study of humanity and crafted his theory of systematic evolution, describing the development of all societies along a single timeline or progressive pattern from a single natural state: human development progresses from "savagery" to "civilization."

Tylor asserted that culture had been created by intelligent men and had evolved into civilization, a "developmentalism" enveloped in comparative methodology. Interest in his works continues, and anthropologists subscribe to the theory that human culture evolves in relationship to physical evolution.

— *Stewart B. Whitney*

See also **Anthropology, History of**

Further Readings

Marett, R. R. (1936). *Tylor.* New York: Wiley.

Tylor, E. B. (1881). *Anthropology: An introduction to the study of man and civilization.* New York: Appleton.

Tylor, E. B. (1958). *Religion in primitive culture.* New York: Harper & Row.

Ubirr

Ubirr lies in Kakadu National Park in Arnhem Land, in the Northern Territory of Australia. Kakadu encompasses nearly 5 million acres of land, most of which is inaccessible by car. Darwin, the closest city of any size, is a 12-hour drive from Ubirr. Ubirr first appears to be a rather chaotic collection of rock art. Australian Aborigines have been painting and repainting the walls of Ubirr for thousands of years. In fact, Aborigines can boast the longest continually practiced artistic tradition in the world. Tribes of Aboriginal hunters and gatherers established the site over 20,000 years ago for its desirable location. The site was central to a large variety of plant and animal resources from the East Alligator River, the Nadab floodplain, marshes, nearby woods, and the surrounding rocky outcrops, making the area very valuable. The rock art at Ubirr and other sites in the area has been divided into three distinct periods based on the content of the pictures and the styles in which they were painted: Pre-Estuarine (ca. 40000–6000 BC), Estuarine (ca. 6000 BC–500 AD), and Fresh Water (500 AD to the present).

The rock art at Ubirr was created using a variety of materials and methods. While red ochre was the most prominently used pigment, there are also yellow, white, and brown paintings. In the more recent recorded past, Aborigines created the paintings using brushes made from feathers, bark, or chewing the ends of sticks. It is assumed these same techniques were used in the more distant past as well.

Scholars have identified 11 main art styles at Ubirr, spread across the three time periods. During the Pre-Estuarine period, the climate was drier and the sea level lower. Art at this time consisted of large naturalistic humans and animals, object prints, which are hands or other objects dipped in paint and pressed on the rock surface, dynamic figures, simple figures, and yam figures. Dynamic figures are small, detailed drawings of humans and animals. The human figures are generally animated, involved in some activity. Simple figures are stylized images drawn with a single thick line. Many are shown with boomerangs. The yam figures are human or animal forms blended with wild yams. The yam is usually the head of the figure.

The Estuarine Period began when flooding filled river valleys and created mangrove swamps. Crocodiles, barramundi, and catfish first appear in the landscape and in the rock art during this period. Beeswax art also first makes an appearance. Beeswax was applied to the rock walls to create simple designs and human figures. The x-ray descriptive style portrays both the external and internal structure of humans, animals, or inanimate objects.

During the Fresh Water Period, freshwater billabongs and swamps replaced saltwater systems. The paintings reflect new resources attracted to the area. Waterlillies, geese, and human figures carrying goose feather objects or goose spears were depicted. There are two styles of Fresh Water art: contact art and x-ray decorative style. The x-ray decorative style evolved from the earlier x-ray descriptive style. Some artists appear to have lost interest in the detail of internal organs and simply divided the figures they painted decoratively. Contemporary artists use both forms of x-ray art. Contact art records the initial contact of the natives with outsiders, both Chinese and European.

There are three main art sites at Ubirr: the Main Gallery, the Namarrgarn Sisters, and the Rainbow Serpent. The Main Gallery is a large rock overhang where family groups made camp for thousands of

years. Figures were regularly painted on the back wall of the shelter. The Namarrgarn Sisters at Ubirr are represented as crocodiles and the illustrations tell a story shared with children to explain what crocodiles are and why they are dangerous. This story is part of a longer cycle of stories learned over a lifetime. An individual is told additional stories as he or she passes through the stages of life, and may one day be given the responsibility of passing the stories on to others. The Rainbow Serpents are powerful ancestors from the Creation period. They are among the oldest artistic symbols used and can be found throughout the world even though their stories vary according to the environment, social, and cultural traditions of the location. In Kakadu, the Rainbow Serpent is described as an all powerful, ever-present "boss lady" who rests in quiet waterways. Rainbow serpents at Ubirr are almost always portrayed as females who are associated with water, will eat anything but flying foxes, and hate loud noises. When disturbed, they may cause a flood or an earthquake.

The rock art at Ubirr illustrates stories traditionally passed down through the generations to teach the young members of the tribe the "laws," or moral and ethical codes of their culture. Sadly, many Aboriginal tribes and languages no longer exist, so the stories associated with much of the art are lost to us forever.

— *Jill M. Church*

Source: Photo copyright © Marcel Bergmann.

Further Readings

Finley, C. (1999). *Aboriginal art of Australia: Exploring cultural traditions.* Minneapolis, MN: Lerner Publishing Group.

Gibbs, W. W. (2004). In the land of the dreamtime. *Scientific American,* 290, 108–110.

Lawrence, D. (2000). *Kakadu: The making of a national park.* Melbourne, Australia: Melbourne University Publishing.

Unamuno, Miguel de (1864–1936)

Spanish novelist and philosopher Miguel de Unamuno is best known for his conception of the "tragic sense of life," but was also a noted man of letters. Born in the Spanish Basque city of Bilbao, Unamuno studied philosophy and classics in the Spanish capital at the University of Madrid. In 1891, Unamuno was awarded a professorship in Salamanca, where he taught classics. He was later named rector of the University of Salamanca, and although the turbulent politics of Spain led to his having to give up the post between 1924 and 1930, he reassumed it upon his return to Spain in 1930. Unamuno also served a brief stint as a politician, as an independent republican deputy in the Spanish constituent assembly, the Cortes.

Unamuno's novels center around broadly "existential" themes, just as his philosophical work focuses on the problems pertaining to the human condition. The human being in Unamuno's novel must labor and toil under the shadow of death. Like condemned men to the gallows who have not been told the date of their execution, we live with death as a constant companion—one which we can neither embrace nor elude. From the tension that comes from being caught somewhere in the middle of life and death emerges a "tragic sense of life," a theme that echoes throughout his

writings. Unamuno's works revolve around the trials and sufferings of individuals, rather than broader social themes. The characters in Unamuno's novels do not "stand" for anything greater or larger than themselves, except insofar as they are exemplars of the tragic sense of life itself.

Unamuno pursued the Socratic ideal of the philosopher as a "stinging gadfly" that inspires the large and indolent "horse" of society to appropriate action. Despite his tragic sense of life, Unamuno was fundamentally constructive in his approach to the real problems of daily existence. Rather than encourage him to wallow in despair, Unamuno's tragic sense inspired him to use his talents and his reason to improve his lot and that of those around him.

Also crucial to Unamuno's worldview is the tension between reason and faith. Unamuno was both a passionate Roman Catholic, and readily acknowledged the difficulties of living a life of reason that nonetheless recognized and even embraced the need for faith as an integral part of a full and meaningful life. Unamuno's dedication to the Church may well have had its source in his belief in the necessity of commitment to an ideal—that a good life was one lived in accordance with some ideal. In this Unamuno personally exemplified what he saw as the two sides of the Spanish temperament. Unamuno described Spaniards as at once Don Quixote and Sancho Panza, idealistic and willing to suffer loss in the pursuit of an ideal, yet also at times intolerant and crassly commercial.

During the Spanish Civil War, Unamuno's early enthusiasm for the nationalists waned, causing him to lose his rectorship at the University of Salamanca. True to his ideas about commitment, truth, and decency, Unamuno refused to change his stance and died while under house arrest in 1936.

— Daniel Horace Fernald

Further Readings

de Unamuno, M. (1954). *The tragic sense of life.* New York: Dover Publications.

de Unamumo, M. (1995). *The Cambridge dictionary of philosophy.* (1995). Cambridge: Cambridge University Press.

Unamuno y Jugo, Miguel de. (1967). *The encyclopedia of philosophy.* New York: Collier Macmillan Publishers.

Uniformitarianism

Uniformitarianism is among the primary doctrines in the science of geology. It states that all processes that can be seen sculpting the Earth today have operated throughout geologic time and will continue to operate in the future. This also lends itself to the idea of "gradualism," whereby change in our world is slow and gradual because that is what we observe on Earth today. We see lakes and streams that slowly deposit centimeters of silt and mud per year, and the casual erosion by the Colorado River that has carved so deeply into the sandstones of Arizona created a scar that lays bare billions of years of depositional history. Using the principle of uniformitarianism, geologists can gain great insights into the formation of very old rock. By comparative analysis of the patterns and internal structures of old rocks and the structures of newly forming rocks in particular environments, geologists can safely infer which types of rock form in different environments.

The shifting dunes that populate the deserts in the more arid regions of the globe are products of wind blown sand. When analyzed, the rock particles that are incorporated in the microstructure of the dune have a characteristic form and dimension. When rocks of a similar structure are located beneath a modern temperate forest, geologists can deduce that when those rocks were deposited, the environment in which they were deposited was very dry, hot, and vastly different from the present ambience. The principle of uniformitarianism suggests that because the rock that is currently forming in the dune shares a very distinctive structure with older previously formed rocks, the two rocks are related because they seemed to have formed in the exact same manner. This illustrates a common occurrence in modern geology: a current overlaid environment floored by rock layers that were deposited in radically different climates. In most situations these observations can be explained using the principle of uniformitarianism. For hundreds of years geologists have concluded that the principal holds true, and it continues to be a useful reasoning tool when deciphering geological puzzles.

Originally dubbed the Huttonian theory by James Hutton (1727–1797), and occasionally referred to as "actualism," uniformitarianism is a cornerstone of geology and contributes to many other sciences. In many branches of science, initial logical assumptions

must be agreed upon and understood before anything novel can be gleaned from research. Uniformitarianism is one of geology's essential assumptions. Hutton, a Scottish farmer and physician, is considered to be the founder of modern geologic thought and was the first to recognize and describe the cyclic processes of the Earth. At his home in Scotland, Hutton was impressed by the sedimentary layers of sandstone that were once laid down horizontally (formally called the "Law of original horizontality"), but were now thrust up vertically and capped with younger layers perpendicular to the vertical beds. He realized that the cycle of uplift, erosion, deposition, solidification into rock, and finally uplift again was visible in the Earth's layers and the whole of the cycle could be deduced from looking at present rock strata (individual rock layers that represent specific depositional events). In 1795 he published his two-volume work entitled *Theory of the Earth, with Proofs and Illustrations,* which contained the first real counter-theory to the previous dogma of Catastrophism. There is, he wrote "no vestige of a beginning, no prospect of an end" to the geologic cycles of Earth. Hutton's visionary and controversial insights into geologic processes and the rock record allowed many later geologists to accredit him for being the first to conceive of the principal of uniformitarianism, which laid the groundwork for future scientists to make a profound discovery that changed the face of geology permanently: the earth is extremely old. However, this concept drastically altered the current perception of biblical occurrences guiding geology, which, up until then, were considered responsible for all land features. Uniformitarianism's paradigm altering agenda wasn't clearly an accepted doctrine until the 19th century. Expanding on Hutton's principals, a fellow Scotsman, John Playfair, in his *Illustrations of the Huttonian Theory* (1802), made little headway competing against the upheld religious dogma. For religious scholars, the suggestion that geological history reached much further back than what was allowed for in the Bible was absurd. It is clear that the process of erosion is painstakingly slow and, if the principle of uniformitarianism holds, the enormous amount of time needed for rock to be uplifted, eroded, formed into rock again, and be lifted up forming mountains is nearly incomprehensible. Since its initial rationalization, the principal of uniformitarianism has been fought at every turn; however, it remains today as a guide for all geologic explanations and reasoning.

After Hutton's initial description of the principle, Charles Lyell (1797–1875) formulated it into the doctrine as it is known today. Lyell, a British lawyer and honored geologist, was, perhaps, the greatest advocate of uniformitarianism. His work in the then-budding field of geology propelled this principle to become a mainstay of geologic reasoning, dislodging the preeminent theory of the day: Catastrophism. His magnum opus, *Principles of Geology,* in which his gradualist, uniformitarianist views on geology were ostentatiously exhibited, was accepted and used as a sounding board for many new scientists such as Charles Darwin and Alfred Russel Wallace. At the time, however, many of Lyell's contemporaries, such as the polymathic William Whewell, disliked the idea of a uniform and consistent world. Whewell's defense of catastrophism in light of uniformitarianism was grounded in a more empirical stance from such evidence as the fossil record. Even the earliest studies of the fossil record reveled gaps in the types and numbers of species that lived at different layers of strata. This insight was not perfectly in line with Lyell's work and as a result of Whewell's counterarguments, Lyell was forced to constantly defend and clarify his theory. Through his struggle, Lyell's work decidedly erected the scaffold from which modern geology was constructed. From this, many future scientists built upon this principle, and combined its logic with their own sciences' philosophy to form other hypothesizes that established many new and creative approaches to scientific quandaries.

The English anthropologist Sir Edward Burnett Tylor (1832–1917) also utilized the principle of uniformitarianism in expressing his hypothesis that civilized society had evolved through nonsupernatural processes from "savage" societies similar to those encountered throughout many parts of the globe. In his book, *Primitive Religion,* he explores the notion that human cultures, and especially religions, are products of natural, regular, progressive and uninterrupted expansion of the mental capacities of *Homo sapiens.* This apparent progression could be seen as a reflection of uniformitarianism and Tylor used this comparison to further his notion as a reasonable and sound science.

Although the principals of uniformitarianism and catastrophism have been at odds for centuries, with many champions on both sides that fought for a spectrum of reasons, the principle of uniformitarianism survives and is still taught today in modern geology

classes around the world. Usually the tendency is to teach a synthesis of the two principals because it is clear now that both have had an enormous impact on, not only the appearance of the Earth's surface, but also on the very inhabitants that occupy it.

— *Christopher Cody Matson*

Further Readings

Albritton, C. C., Jr. (Ed.) (1975). *Philosophy of Geohistory, 1785–1970: Benchmark papers in geology, Vol. 13.* New York: John Wiley.

Gould, S. J. (1987). *Time's arrow time's cycle.* Cambridge, MA: President and Fellows of Harvard College.

Palmer, T. (1999). *Controversy catastrophism and evolution: The ongoing debate.* New York: Kluwer Academic/Plenum Publishers.

United Nations and Anthropology

When the United States decided to reverse the Iraqi invasion of Kuwait, it did not act unilaterally. It turned to the United Nations (UN) Security Council.

When the Security Council sought to learn the extent of chemical, biological, and nuclear arms in Iraq, it did not rely on U.S. forces. It dispatched inspectors from the International Atomic Energy Agency (IAEA).

When the international community sought to maintain the suspension of combat in Bosnia, it did not rely only on national efforts. It sent in peacekeeping units under the auspices of the UN and North Atlantic Treaty Organization (NATO).

When states liberalized trade in services and strengthened intellectual property protection in the Uruguay Round, they were not content to draft rules. They created the World Trade Organization (WTO), and a highly institutionalized dispute settlement mechanism.

Formal international organizations are prominent participants in many critical episodes in international politics. Examples in addition to those above include the following: Security Council sanctions on Libya, IAEA inspectors in North Korea, UN peacekeepers in the Middle East, and so forth. The UN secretary-general's 1992 Agenda for Peace establishes an even broader range of current and proposed UN functions in situations of international conflict: fact finding, early warning, and preventive deployment; mediation, adjudication, and other forms of dispute resolution; peacekeeping; sanctions and military force; impartial humanitarian assistance; and postconflict rebuilding. But international organization influence is not confined to dramatic interventions such as these. On an ongoing basis, formal organizations help manage many significant areas of interstate relations, from global health policy (the World Health Organization or WHO) to European security (OSCE and NATO) to international monetary policy (IMF). What is more, participation in such organizations appears to reduce the likelihood of violent conflict among member states.

International Nongovernmental Organizations

Much recent scholarship analyzes global structures and processes as distinct level of social reality. The world is more than networks or systems of economic and political interaction and exchange; it has become a single international society, or world polity.

International nongovernmental organizations (INGOs) have proliferated spectacularly, from about 200 active organizations in 1900 to about 800 in 1930, to over 2,000 in 1960, and nearly 4,000 in 1980, but little systematic attention has been given to this domain of global organization. Unlike states, INGOs lack the rational-legal authority to make or enforce law. Unlike global corporations, they have few economic resources.

Since 1850 more than 35,000 private, not-for-profit organizations with an international focus have debuted on the world stage. Associations, societies, foundations, unions, committees, clubs, leagues, conferences, groups, federations, conventions, the range of designations is extraordinary. They include the Pan-American Association of Ophthalmology, the International Exhibitions Bureau, the Commission for the Geological Map of the World, the International Catholic Child Bureau, the International Tin Council, and the Tug of War International Federation. Most are highly specialized, drawing members worldwide from a particular occupation, technical field, branch of knowledge, industry, hobby, or sport, to promote and regulate their respective areas of concern. Only a few such as the Scout movement, the International Olympic Committee, the International Red Cross, and the World Wildlife Fund, are widely known.

Universalism

Humans everywhere are seen as having similar needs and desires. They are capable of acting in accordance with common principles of authority and action, and they share common goals. In short, human nature, agency, and purpose are universal, and this universality underlies the many variations in actual social forms. Most INGOs are quite explicit about this: any interested person can become an active member, and everyone everywhere is a potential beneficiary of INGO activity.

Universalism is evident also in the breath of INGOs' claims about what they do. Physics and pharmacology are presumed to be valid everywhere. Techniques for playing better chess are not country-specific. Red Cross aid will alleviate suffering in Africa as well as in Asia. Across every sector, the purposes and means of action promoted by INGOs are assumed to be useful and meaningful, right around the world.

Most INGOs adopt a purer form of universalism that stresses the fundamental uniformity of all human actors. Scientific, technical, professional, medical, and business-related INGOs rarely allow much room for particularism, and they account for the great majority of all INGOs.

INGOs are embodiments of universalism, individualism, rational volunteeristic authority, progress, and world citizenship. Decentralized world authority among states both facilitates transnational organizing, because centralized barriers to rational voluntarism are weak, and forces transnational organizations to focus their attention on states. In mobilizing around and elaborating world-culture principles, INGOs lobby and harangue states to act on those principles.

The Framework for Inquiry

Decision making in international organizations occurs within a context comprising the functions, the institutional framework and basic procedures, and the historical development of the agency.

Given the nature of the international system, the creation of an international organization requires concrete action by states. Usually, although not always, such actions are consecrated in a treaty. In any case, understanding must be achieved about what is to be done, and how.

International organizations have been set up to perform a variety of tasks: keeping the peace, promoting economic development, allocating the radio frequency spectrum, reducing obstacles to trade, ensuring that technology is used only for peaceful purposes, and facilitating the maintenance of stable exchange rates to name only a few.

In order to describe how decisions are usually arrived at in a particular international organization, it will be useful to classify the actors involved, to consider the ways in which they may exercise influence, and to list the modes of decision making that may be employed.

The actors in international organizations may be classified according to the following categories: representatives of national governments; representatives of and international private associations; the executive heads of organizations; high officials and other members of the bureaucracy of each organization; individuals who serve in their own capacity formally or informally as advisers; representatives of other international organizations, and employees of the mass media.

Of course, not all of these classes of actors will be active in all organizations. For each category of decisions, however, the actors will fall into one or more of these classes, and it is important to know which of these categories of actors typically have the most influence on the outcome.

Thinking About the Future of the International Organization System

In order to think about the United Nations (UN), we must escape the narrow perspectives of daily press coverage as well as the mainstream of the scholarly agenda. Harlan Cleveland believes that the study and teaching about international relations is usually hung up on what's wrong with the picture: riots and their suppression, military takeovers, drug traffic, corporate raids, financial psychoses, arm races, wars, and rumors of wars. If you stand back and assess the whole scene, you see numerous international systems and arrangements that are working fairly well. Examples include weather forecasting (World Weather Watch [WMO]); eradication of infectious diseases (WHO); international civil aviation (ICAO); allocation of the frequency spectrum (ITU); globalization of information flows; agricultural research for development; UN peacekeeping and peacemaking; ozone treaty; cooperation in outer space; law of the sea; the UN high commissioner for refugees; the Antarctic treaty.

The stage on which the drafters of the UN Charter performed was built during a long historical process, at least 500 years through which human inquisitiveness, restlessness, and acquisitiveness produced ever-increasing contacts among human settlements, across even longer distances. The results of this historical process presented opportunities at San Francisco that had evolved out of growing experience in peaceful cooperation among peoples. But there were also constraints produced by tendencies toward wars of increasing geographic scope with weapons of rapidly increasing destructive power.

If we look back in time from San Francisco, we readily see that the UN is a child of the League of Nations. It incorporates important institutional developments of the League, such as an international secretariat and the growth in importance of economic and social activities during the relatively brief history of the League. The UN Charter also reflects efforts to gain from the Leagues failures, as in procedures for deployment of military forces by the Security Council in response to aggression.

Nor was the League wholly a product of its founding conference, the Paris Peace Conference of 1919. The century bounded by the Congress of Vienna (1815) and the outbreak of World War I (1914) and became regarded as the era of preparation for international organization. The League evolved out of the Concert of Europe created by the Congress of Vienna, and united to create a new Europe out of the ruins of the Napoleonic Wars.

Humanity was placed on an irreversible path toward the league and the UN even earlier then 1815, as far back as in the late 15th century, when Europeans began a pattern of worldwide exploration that eventually led to extensive empires in Africa, Asia, and Latin America, and to Western domination of the world. Europe-based empires eventually led to the creation of a worldwide system of states. In its early years, the UN was deeply involved in the creation of independent states out of former colonial empires.

In developing a historical perspective it is worth remembering the depiction of the century between 1815 and 1914 as the era of preparation for international organization. How should we characterize the period between the founding of the League of Nations (1920) and today? Very apt would be the era of preparation for global governance. What have the pioneers in this first era of global organizations left as their heritage? They have achieved universality; they have created a network of global organizations responsive to a growing agenda of global problems; they have established a continuous, worldwide presence of his system of organizations, in at least 134 cities on all continents; they have made multilateral decision making commonplace and have developed new procedures for achieving consensus; they have greatly increased the number of tools available for peace building; they have achieved and made substantial progress in multilateral definition of a set of fundamental global values, such as peace, human rights, development, and ecological balance; they have made progress in breaking down barriers between the people of the world and global governmental organizations.

Overall we can conclude that there is much more potential for moving forward from this era of preparation for global governance than either the daily headlines or the mainstream of international relations research and teaching recognize. Supportive of possible greater employment of this potential are the vitality of INGO and NGO involvement in the UN system, and the large number of creative proposals coming from outside the UN system. Employment of this potential could move more rapidly if governments of states were able to perceive more clearly the long-term interests and needs of their people. This, in turn, might be facilitated by broader media coverage of the UN system, as well as scholarship that offers more probing analysis for the betterment of humankind.

— John A. Xanthopoulos

Further Readings

Alger, F. C. (1994). Citizens of the UN system in a changing world. In Y. Sakamoto (Ed.), *Global transformation: Challenges to the state system.* Tokyo: United Nations Press.

Archibugi, D. (1993). The reform of the UN and cosmopolitan democracy: A critical review. *Journal for Peace Research, 30*(3).

Cleveland, H.(1990). The management of peace. *GAO Journal, 11* (winter 1990–91), 11–13.

Foundation, S. (1994). *The UN system and NGO's: New relationships for a new era?* Muscatine, IA: 25th UN Issues Conference.

Ghali, B. B. (1992). *An agenda for peace: Preventive diplomacy and peace keeping.* New York: United Nations Press.

Rochester, J. M. (1993). *Waiting for the millennium: UN and the future of world order*. Columbia: University of South Carolina Press.
United Nations Association of the USA. (1992). *A UN revitalized*. New York: Author.
Wood, B. (1991). *Making the UN system work*. Paper presented at the International Studies Association Annual Conference.

Universals in Cultures

The universals in culture, which is part of the academic field known as the humanities, cannot be defined in a simple statement. The universals are the cumulative artistic and intellectual achievements of humanity.

They are a body of work created by those who have been singled out for special praise, extraordinary achievers of whom all human beings can be proud. But they are also the universal artistic and intellectual experiences of those who appreciate, and also participate in, the global experience.

The universals in culture are the study of great achievements in art and philosophy and the critical process by which they can best be understood and communicated to others so that they will never be forgotten.

The universals in culture, if understood, could also be a technique for living, accessible to every human being who wants to do more with life. They are a way of life filled with joyous moments of thought and esthetic pleasure.

When one understands the universals in a culture or cultures he or she will be addicted. Song and story, music and dance, and words and ideas, once embraced, become an essential part of life.

This article is intended to reaffirm the value of the humanities as they are represented in the universals of culture. As we are embarking into the new millennium we have to redefine the term human, and we must expand it far beyond anything known to our ancestors. We have a golden chance to enjoy the many dazzling facets of human genius as represented in the universals of culture.

In understanding the universals in culture we must understand the classification of culture. In other words we have to comprehend the classifications of ourselves, who we are as humans beings. The best person that has done this is the German philosopher, Friedrich Nietzsche (1844–1900), who applied the term *Apollonian* to describe order, logic, clarity, moderation, and control in society and in the human personality, and the term *Dionysian* to describe rebelliousness and reform in society, and spontaneity, passion, and excess within the human personality. Apollo was the god of the sun, hence of light and truth; Dionysus was the god of the earth, of spring and renewal, hence everything that was natural and beyond rational analysis.

Technology

As we analyze the universals in culture, we have to examine technology and humanity. Although the urge to create machinery is probably as old as the urge to create art, technology and humanity have not always been good friends. Instead of being viewed as servants of humanity, aimed at making life easier, machines were often seen as monsters that might take over the world. The global debate is superfluous by now, however, because technology is here to stay, and the issue becomes one of deciding how much technology we truly need and how best to keep technology from running our lives altogether.

The Industrial Revolution of the late 18th and early 19th centuries cleared the way for modern technology, but many writers, and philosophers were wary.

The novels of Charles Dickens (1812–1870) denounced the factory system, the exploitation of the poor, and the cruelties of child labor, which were seen as byproducts of technology.

The German philosopher Karl Marx (1818–1883) responded negatively to the new industrial age, viewing it as an opportunity for the further separation of the haves and have-nots.

To practice the art of being human requires free choice among significant options, and choice exists even in our heavily technological age. Today, opposition may be found in preference for crafts as opposed to factory made goods. There are many who refuse to own cars, but ride bikes or walk instead, many who even ban televisions from their homes. Yet protest does not imply total abstinence. Some people, such as the Amish, seem to get along without electricity, phones, radios, or television, but for the majority, a life devoid of all technology is unthinkable.

Love

We can scarcely overestimate the importance of love to most of us. Even the successive marriages of those disappointed by previous love are evidence that people keep looking for it. From early adolescence on, many seem to believe that, without love, life has been totally wasted or at least has been lacking in an important ingredient. The theme of many poems, novels, plays, operas, and works of visual art is love, as a source of both pleasure and pain. However it is defined in real life or in art, love is not just a matter of romance and marriage. It includes family relationships, friendship on many levels, and even a variety of games. It has been said that love and hate are opposite sides of the same coin, that one cannot hate when the object is not or has not been loved. Perhaps no other area of human experience is subject to so many interpretations and so much misunderstanding, or has been such intense source of anxiety, as has the concept of love.

Body and Soul

Despite the sentiments in poems and songs that love is timeless, despite the frequent use of the words eternity and forevermore, one is better off facing the probability that, if it is to have any meaning as a major force in human life, love has to be considered in relation to specific contexts. We cannot assume that everyone everywhere has been moved by an identical experience or entered into a relationship with identical expectations, no matter how similar the vocabulary. The context of love includes both historical time and geography.

The people in a certain remote area in Africa have no word that translates as "love," though parents probably show what we would consider affection for the young by teaching them how to survive in a hostile environment. In that harsh world, there seems to be little need for close family bonds and certainly none for romance between adults. In the ancient world of Greece and Rome the word love appears in poetry, philosophy, and mythology, but a citizen of that world, alighting from a time machine, would probably not understand if he overheard us saying "Love is blind" or "Love is the answer." Assuredly the time-traveler, having caught the latter sentence, would respond: "What is the question?"

Despite the many definitions and practice, the Western world has been influenced for centuries, up to the present, by a huge distinction that was made by the Greeks between eros, or love as physical lust, and agape, or love as a spiritual or intellectual relationship. Plato has given us a famous analysis of love, which includes both kinds of experiences.

Myths

Before any discussion of the four-letter word myth is possible, we must first think about other four-letter words: real and true. Contrary to popular usage, myth is not the opposite of those words. Myth is neither unreal nor false; rather, it is a necessary part of human existence, extending back in time, according to mythologist Joseph Campbell, to the Neandertal period (CE 250000–50000 BC).

Mythology developed not because a few people got together to make up stories. It had a deeper purpose than entertainment. Mythology is made up of stories told to each other to explain death and natural disasters, to justify burial and other sacred rituals, to create a sense of identity for a people, and to provide their heroes and their enemies. Myth can include folklore, fairy tales, fantasy, magic, and the supernatural as active forces in human life. It offers spells and curses as ways of accounting for the evils that beset us, but it also gives hope in the form of magic potions, rings, and secret words that the future will be better. The most enduring of all myths, in many versions in many cultures, tells of the eventual arrival of a wonderful someone who will take care of all our problems.

Mythology can provide the underpinning for beliefs about racial superiority and inferiority, and thus renders those beliefs difficult to question. It promises that hard work will bring success. To those who would like to rid the world of myth with the antiseptic broom of science, the mythologists would counter with questions about the myth of science as something that can answer all questions.

Thus, when we talk about mythology, we are dealing not with stories that represent erroneous views of life, but with an entire discipline within the humanities, a discipline that has had a profound an influence on human development as has religion, philosophy, or any of the arts. The myth making process reveals much about how humanity has coped and is still coping with the puzzle of being alive.

Nor is a myth confined to ancient history. Even in our enlightened age, people are nervous, frightened, and in need of heroes. Heroes come from the

collective mythology of the human race. So do villains and mysterious strangers who come from out of the fog, and solve our problems before disappearing once more.

There are primarily three categories of myth. The first is myths of childhood, sometimes named fairy tales; these stories, found in many cultures, have similar ingredients, such as witches, demons, elves, and strange, often terrifying landscapes.

A second category of myths is myths as explanation. Many of these arose in what are sometimes called prescientific times, centuries before there was anything like urban civilization. They seem to have fanciful explanations of natural events that had to be understood: storms, volcanic eruptions, eclipses, thunder, lightning, and other natural phenomena against which our ancestors must often have felt helpless. Imagine living at a time when nobody knew why the sun rose and set or what the stars were. Imagine, also, the genius of our ancestors who were not content with ignorance, and so imagined explanations for these phenomena.

The third category, archetypal myths, is regarded as the most important by many scholars who study myths to try to discern what motivated them and what they have in common. These are found the world over. All cultures have invented, told, and passed along stories in which certain characters (such as heroic leaders) and certain recurrent themes (such as magic numbers) have influenced the way people understand their existence,

An archetype is a model by which other characters, events, or ideas resembling it can be identified. The hero is an outstanding example, a person who stands out from the crowd because of very special characteristics. The hero is a universal mythological archetype, indicating to us that people have always needed and continue to need a belief in the amazing powers of a rare few born to lead, whose insights and courage enable them to take on challenges and obstacles that would defeat ordinary mortals.

The psychologist-philosopher Carl Jung (1875–1961) maintained that all persons are born with an instinctive knowledge of certain archetypes, the models by which we comprehend our experience and cope with the enormous and often baffling task of being human.

Death, Attitudes, and Life Affirmation

Just as we might study the humanities in terms of Apollo and Dionysus, asking whether a given work appeals mainly to the intellect or to the emotions, so might we devote considerable study to the question of whether an artist or philosopher is life affirming or life denying.

Refusing to acknowledge mortality may bring temporary comfort, but as we grow older, the fear of death, if it has been suppressed throughout our lives, can begin to undermine the happiness we might otherwise enjoy. Conversely, the subject of death has motivated some of the most glorious works of visual art, music, drama, and literature. For example, after the death of Brian Epstein, manager of the Beatles, John Lennon is reported to have commented, "Well, he got through it." Nothing was said about the fact that Epstein was in what we would normally consider the prime of life. His passing was not called untimely by those who knew him well. The diaries of Herman Melville, author of many novels including *Moby Dick*, confide in the reader about the artist's troubled soul, seldom at home in the world, apparently unaware of his own towering genius, a state of mind he shared with a fellow genius, Vincent van Gogh. Yet Epstein's apparent negativity, Melville's struggles with his inner demons, van Gogh's despair over lack of recognition combined with a constant questioning of the merit of his work, not to mention renowned writer Ernest Hemingway's depression over what he regarded as a waning of his creative powers, all these artists' difficulties only served to ignite the fires within them. Melville wrote one of his masterpieces, *Billy Budd*, just before his death; Hemingway penned *The Old Man and the Sea* while he was battling the shadows; van Gogh never stopped painting until despair totally overcame him; and Epstein was able to put his personal troubles aside as he mapped out a brilliant future for his charges.

That the work of many tortured beings lives on and inspires us with joy is often more than enough to affirm the goodness and the wonder of life. Of course, the secret is that greatness sometimes is achieved through agonizing pain and self-doubt. And sometimes the genius behind the greatness never transcends the pain, though we are the beneficiaries.

So looking at the larger perspective of universals in our culture, we can say that the humanities offer us reasons to cheer and reasons to weep. The humanities awaken us to the realities of both pain and triumph. In so doing, they assist us in taking an unflinching look at our own lives, in which we find both life-affirming and life-denying elements.

In life affirmation, the issue is the profound realization that the potential for a productive, exciting life belongs to each of us. We control our attitudes, as Zeno the Stoic would be quick to remind us.

An ancient symbol of life affirmation is that of the phoenix, a mythological bird of rare and exotic plumage and supernatural powers. The Greek historian Herodotus reported, however, that the phoenix actually existed and was known to have Egyptians every 500 years. The Roman belief was that each era bears witness to the birth of one phoenix, that it lives for a very long time, and that at the moment of death, it generates a worm that becomes the phoenix for the next age.

Yet another version of the legend is that the phoenix is a bird from India that lives for 500 years and then flies to a secret temple, where it is burned to ashes upon the altar, only to rise from the ashes 3 days later, young and resplendent.

In folklore, poetry, and song, in fiction, drama, and epic, the phoenix has endured through time as a symbol of rebirth, new growth, regeneration, and redemption. Religions have counterpart symbols: gods who die or descend into the underworld, there to remain for a time and then to rise, reborn and renewed.

Death itself, biological death, the single stroke that happens only once to each of us, will come as it may. One will find in the universals in all cultures sources of life-affirming models, such as the myth of the phoenix, models we have the power and the right to use as we reinvent ourselves and continue to be born anew.

Perhaps the best way to end this discussion is by quoting Joseph Campbell, the mythologist and philosopher, who cried out to us, "Live!"

— John A. Xanthopoulos

Further Readings

Campbell, J. (1961). *The hero with a thousand faces.* New York: Bollingen Foundation.

Clarke, A. (1968). *A space odyssey*. New York: New American Library.

Kazantzakis, N. (1952). *Zorba the Greek*. New York: Simon & Schuster.

Leeming, D. A. (1998). The voyage of the hero (3rd Ed.). New York: Oxford University Press.

Norman, D. (1998). *The invisible computer.* Cambridge, MA: MIT Press.

Webb, M. (1997). *The good death*. New York: Bantam Books.

Willis, R. (Ed.). (1996). *World mythology*. New York: Henry Holt Owl Books.

Universals in Language

The term *language universal* refers to those features or properties of language that are common to all languages. The notion that languages might share universal features creates a tension of sorts with conceptions of language, as developed by Boas and other early linguistic anthropologists, that held that languages (along with their respective cultures) were infinitely variable, that there were no constraints on the form a human language could take. This view was seriously challenged, in the second half of the 20th century, by the work of Chomsky and other linguists, and also by work on cultural universals carried out by anthropologists such as Berlin, Kay, and Brown. Universals can be found at all levels of language analysis, including phonology, morphology, syntax, and semantics. However, it is important to note that some universals are more universal than others; universals may be absolute, implicational, or relative.

Features that are found in all languages, without exception, are called absolute universals. For example, all languages: make use of dual patterning (phonemes→morphemes), have a low unrounded vowel similar to [a], have the principle of structure dependency, allow both *yes-no* and *Wh-* questions, allow for negation, have morphemes with the properties of nouns and verbs, and have pronouns for both first and second persons.

Implicational universals take the form of entailment propositions: if *x* is present, then *y* is also present. For example, if a language has a rounded front vowel, such as the [y] of French *tu*, it will also have the corresponding unrounded front vowel, in this case [i] as in *dire*. If a language has, like Japanese, subject-object-verb (SOV) word order, it will probably have post (rather than pre-) positions. If a language has a word denoting the color blue, it will also have words for green and yellow.

Relative universals refer to tendencies, features that most, but not all, languages have. For example, languages tend to have at least five vowels, but some, such as Aymara (Bolivia) have three. Most languages have nasal consonant sounds like [m] and [n], but Wichita (Native American language from western USA) does not. Similarly, languages tend to have pronouns for third person (*she, he, they*), but Latin does not.

All proposed language universals are hypotheses constructed from a sample of what is available; as hypotheses, they are always subject to falsification. For example, while it appears that all known languages had or have a vowel similar to [a], we could, in principle, come across a previously unknown language lacking that vowel. It could also be the case that languages that existed in the past, but that disappeared before any written or other record of them could be made, did not have a vowel similar to [a].

— *Ronald Kephart*

See also **Ethnosemantics; Generative Grammar; Language**

Further Readings

Brown, D. (1991). *Human universals.* Philadelphia, PA: Temple University Press.

Cook, V., & Newson, M. (1996). *Chomsky's universal grammar: An introduction* New York: Blackwell.

Croft, W. (1990). *Typology and universals.* Cambridge University Press.

Untouchables

The term *untouchable* is an English translation for the Indian terms *antyaja* and *achhoot* and refers to individuals and groups who inhabit the bottom rung of the hierarchical Indian social order known as the caste system. It is a social status forced upon those who either allegedly made serious transgressions against established orthodox Hindu rules of purity and conduct, or because of the defiling nature of their occupations are considered unclean. During the 20th century, several names have been coined in reference to them, including Harijan Scheduled Castes, and Dalit. The 1991 Indian census estimated the number of Harijans at 16%; however, many believe this number to be as high as 20% or higher.

The caste system has clouded origins in ancient India. Briefly mentioned in the *Rig Veda*, traditionally considered the most revered of ancient Hindu texts, it is a system of four *varna*s, or castes, that divide the society into priests and teachers, warriors and rulers, merchants and farmers, and laborers and servants. By the beginning of the Common Era, a fifth caste had been added, the *anchama*, or *antyaja*, the Untouchable. Members of this caste were placed outside the caste system (*avarna*), because their duties involved cleaning up after all the other castes or undertaking those tasks that were too impure and polluting for others to perform. Occupations in the category include leather workers, sweepers, scavengers, funeral workers, and so forth. The *Manusmriti* (third century BCE–third century CE) elaborates rules and restrictions for the various castes and firmly places Untouchables out of reach of most aspects of Hindu social and religious life that are available to the other castes. This text has continued to be used by the Hindu orthodoxy to justify the system and the inherent discrimination it perpetuates.

Treatment of Untouchables by orthodox and other caste Hindus has varied by time and region, with some *avarna* having had greater opportunities and rights than others. At its best, orthodox Hindu society has treated Untouchables like children, not yet capable of the rights of other adults to take part in the bulk of social and religious traditions. At its worst, Untouchables have been persecuted, tortured, and killed when attempting to step outside the narrow confines that orthodox Hinduism has placed on them. In many village regions, they have been relegated to living on the outskirts, forbidden to enter temples, not allowed in many schools, and prohibited from drawing water from wells used by caste Hindus. In some regions of the country where the percentages of *avarna* Hindus is high, they have been more able to create their own communities, build their own temples, dig their own wells, and, within reason, live like most other Hindus. Nevertheless, the majority of Untouchables are never far away from discrimination that has nothing to do with anything more than the reality of their birth. It is for this reason that attempts to overthrow the practice of untouchability are almost as old as the practice itself.

Terms of Identity

Harijan—In an attempt to remove some of the stigma associated with the commonly used terms for

Untouchables at the time, *avarna* (without caste) and *achhoot* (Untouchable), Mahatma Gandhi began to refer to them with the term Harijan (God's children or God's people) instead. While in prison in 1933, he helped found the Harijan Sevak Sangh, an organization focused entirely on combating untouchability. He also started a new weekly publication, which he titled, *The Harijan*. In it, he regularly described and railed against the practice and the degraded status Harijans faced. As a result of Gandhi, many Untouchables adopted the term for self-identity, and it is arguably the most popular term in India in reference to them today.

Scheduled Caste—The term *Scheduled Caste* first came into use in The Government of India Act, passed by the British in 1935. Among its provisions were several designed to benefit those groups who, at the time, were being referred to as Depressed Classes. The Act changed the classification to Scheduled Castes. From that time, it became the official terminology for *avarna* Hindu groups, and it continues to be so, for the most part.

Dalit, a term literally meaning depressed or downtrodden, was first used in the 1800s by an Untouchable social reformer named Jyotirao Phule, in reference to the social and religious situation in which Untouchables were forced to live. He adopted the term as a badge of honor. However, it was when another Untouchable, Namdeo Dhasal, started the Dalit Panther Movement (named after the U.S. Black Panther Movement) in 1972, and thereby gave the name real currency and a wider use. Like its namesake, the organization had a strong militant overtone to its stated goals and rhetoric. By the mid-1980s, it split into a variety of factions.

Since that time, the term *Dalit* is used primarily by social and political activists, most of whom are either Marxist, secular, or converts to a non-Hindu religion, especially Islam, Christianity, and Buddhism. While many Dalit activists claim the movement speaks for all Harijans, this is not the case, especially regarding Harijans who still consider themselves Hindu. In reality, very few rural Harijans have much of an awareness of the Dalit movement, which is primarily a phenomenon of urban and western India. Nevertheless, Dalit writers and activists have done an immense job of shedding light on the oppressed situation of Harijans, and this has led to an increase of pressure on the Indian Government, both from within India as well as internationally, to address more forcefully the problem and work to eradicate the discrimination. The influence of the movement is such that even the Indian Government has recently begun to adopt the term in reference to Harijans.

The Struggle Against Untouchability

Throughout much of recorded Indian history, orthodox rules of behavior have justified discrimination against those at the bottom, the *avarna*. At the same time, criticism of the practice also dates back to ancient times as well. In some of the earliest Buddhists writings, the Buddha rejects a system that bases one's worth on birth rather than actions. Since then, most religious reform movements that have arisen in India, especially devotional movements, have rejected birth-based social and religious status determination. Moreover, this has been one of the central themes in many of the movements. Yet, these attempts at reform had only limited, regional, or temporary success, and the practice continued. Finally, thanks primarily to the efforts of two 20th-century figures in India, Mahatma Gandhi and Bhimrao Ramji Ambedkar, Indian attitudes toward Untouchables gradually began to change.

Mahatma Gandhi (1869–1948)

Mahatma Gandhi was an important figure in attempting to rid the Indian social system of untouchability. Some say he was as concerned with its removal as he was with the removal of British control over India, and he frequently spoke and wrote against the practice. However, Gandhi did not reject the caste system per se. This is because he had seen poverty and oppression of the poor in England as well, so he did not believe the British social system to be as superior to India's. His love of India's cultural and religious traditions led him to feel that the caste system should remain but be cleansed of untouchability. As a consequence many Untouchables and anti-caste activists disliked him and refused to work with him in his efforts toward the eradication of untouchability. Among the more notable of these figures was Bhimrao Ramji Ambedkar.

Bhimrao Ramji Ambedkar (1891–1956)

Bhimrao Ramji Ambedkar was the most powerful and well-known Untouchable activist and leader in the first half of the 20th century, and he was among the principal authors of the Indian Constitution. He

came from an educated and relatively well-to-do family in India and did much of his higher education in the West, including in America, England, and Germany, earning both a doctorate and a law degree. The primary focus of his life's work and activism was the eradication of untouchability. In the process, he inspired the wrath and ire of both the British government and many caste Hindus. While his goal for the eradication of untouchability was similar to that of Gandhi, the two remained distant in their approaches. Not only did they not work together, often they worked at odds with each other. The main point of contention was between Gandhi's belief that the caste system could be cleansed of untouchability and Amdedkar's reject of the system in its entirety.

Several years after Indian Independence and his drafting of the Constitution, Ambedkar removed himself from politics. He had increasingly come to believe that Untouchables would never be treated equally as Hindus, so he turned his focus to Buddhism. In 1935, Ambedkar had sworn that he would not die a Hindu, and true to his word, in 1956, he formally converted to Buddhism. Immediately thereafter, he led the conversion of nearly 400,000 Harijans who were present as well. Seven weeks later he died, and in his honor nearly 750,000 more Harijans converted to Buddhism. Since that time, his inspiration has led to several million more Buddhist converts. Consequently, Ambedkar Buddhists are the most populace denomination of Buddhists in India today.

Fighting Untouchability in Contemporary India

Pro-Hindu Activists. While orthodox religious organizations and institutions continue, for the most part, to adhere to traditional attitudes toward avarna Hindus, forbidding or sharply restricting their participation in religious activities, other Hindu organizations are increasingly opening their doors to membership for all Hindus, and some have made concerted efforts to include Harjians. This is especially true of those organizations that have an international following and tend to be influenced by Western values. Even the Vishwa Hindu Parishad, an international but largely conservative Hindu organization, has come out against untouchability and has vowed to work toward its demise. Additionally, there are various religious organizations and movements started by Harijans themselves in an effort to work toward social equality, and also to create an environment in which they can freely express their own forms of religious and spiritual beliefs and practices.

Dalit Activists. As mentioned earlier, those who identify themselves as Dalit have, for the most part, rejected participation in the Hindu tradition, choosing either to convert to another religion or to follow a Marxist ideological approach rejecting religion altogether. Their influence is primarily urban, where untouchability is lessening for a variety of other reasons as well. However, Dalits are having relatively little effect in most of rural India. Nevertheless, they have been successful in influencing elements of the Indian Government, and Dalit activism may have inspired some of the more recent government policies to help Harijans.

Those Dalits who have converted to Christianity, Islam, or Buddhism, however, face an additional dilemma. After conversion, they often continued to be viewed as Untouchable by members of their new religious communities as well, and thus continue to face the same discrimination as when they were Hindu. Yet, now they are no longer qualified to participate in the benefits of the multiple government programs, which provide assistance in education, housing, vocational training, government employment, and even in securing elected positions. This is because on conversion, they are no longer officially members of the Scheduled Castes, which is a Hindu category. While the government is clearly being pressured to continue looking upon the converts as Schedule Caste members, this would be a de facto acknowledgment of the existence of untouchability in these religious traditions as well, and because many of their leaders officially deny its existence in their religions, several have been firmly against the move.

Nonreligious International Organization. A variety of international organizations have turned their focus on untouchability in India as a human rights issue. They have sought to confront the Indian government and its representatives on the issue in various forums. As an example, at the World Congress Against Racism and Xenophobia, held in South Africa in 2001, Indian government supporters fought hard to keep out any discussion of caste discrimination and untouchability, which they depicted as an internal issue for India. Nevertheless, a large number of Dalit activists attended the conference, and the issue was hotly debated with

the objective of having untouchability officially recognized by the United Nations as a form of racial discrimination.

Indian Government. Ever since Indian Independence in 1947, the Indian Government has been attempting to address the problem. The Indian Constitution of 1949 outlawed the practice of untouchability and any discrimination based on race, caste, sex, or place of birth. It also contains 14 separate Articles that deal with the issues of discrimination and create special provisions for members of castes considered backward. The Indian Government continues to work on the issue. It has shown that it understands the negative effect the persistent discrimination has on the economic progress of the country as well as how it is viewed on the international stage. Almost every year, new laws or amendments to existing laws are enacted to address the problems.

Along with this, various organizations and activists continue to exert tremendous efforts to facilitate Harijans' equal participation in caste Hindu social and religious life. Nevertheless, the prejudice and discrimination continues, and change has been slow to come, especially in rural areas. The persistence is primarily out of both indoctrination by, and fear of, the religious orthodoxy. Anyone who crosses the caste line in eating and close physical relations runs the risk of being ostracized by his or her community. This situation is maintained by the orthodoxy's continuous depiction and treatment of Harijans as polluted individuals, and its refusal to allow them into the mainstream of religious life. As a consequence, untouchability continues to affect where people can live and work, what they can and cannot do , and with whom they can interact socially, including eating, playing, and marrying. Thus, while government and activists work for changes, the reluctance of the orthodox hierarchy to address the issue more forcibly continues to benefit anti-Hindu activists in gaining international support and a reason for rural Harijans to convert to other religious traditions.

Lack of education, economic power, and political representation remain the major factors that keep Harijans at the bottom of the social, economic, and political ladders. This is especially true in the rural areas of the country, and it is in these areas where discrimination remains the most prevalent. However, as more and more schools are being built, and an increasing number of Harijan children are becoming educated, changes are occurring, albeit slowly. In urban India, however, life moves at a more rapid pace. Less and less is caste an issue. In some states, it is illegal to ask caste affiliation, and one can rarely know by looking at an individual. Economic class is replacing caste as the primary determinant of one's status. Because education and job training in the cities is more available to them, an increasing number of urban Harijans are availing themselves of these opportunities, resulting in better paying jobs, an increased awareness of their legal rights, and the knowledge of how to demand them. In the process, many urban Harijans are learning to navigate their lives away from the constant shadow of discrimination. Their rural counterparts still have a long way to go.

— Ramdas Lamb

Further Readings

Dube, S. (1998). *Untouchable pasts: Religion, identity, and power among a Central Indian community, 1780–1950.* Albany, NY: SUNY Press.

Khare, R. S. (1984). *The untouchable as himself.* Cambridge: Cambridge University Press.

Kumar, V. (1989). *Scheduled caste panchayat pradhans in India.* Delhi, India: Ajanta Publications.

Lamb, R. (2002). *Rapt in the name: The Ramnamis, Ramnam, and untouchable religion in Central India.* Albany, NY: SUNY Press.

Moon, V. (2000). *Growing up untouchable in India: A Dalit autobiography.* Translated by Gail Omvedt. Lamham, MD: Rowman & Littlefield Publishers.

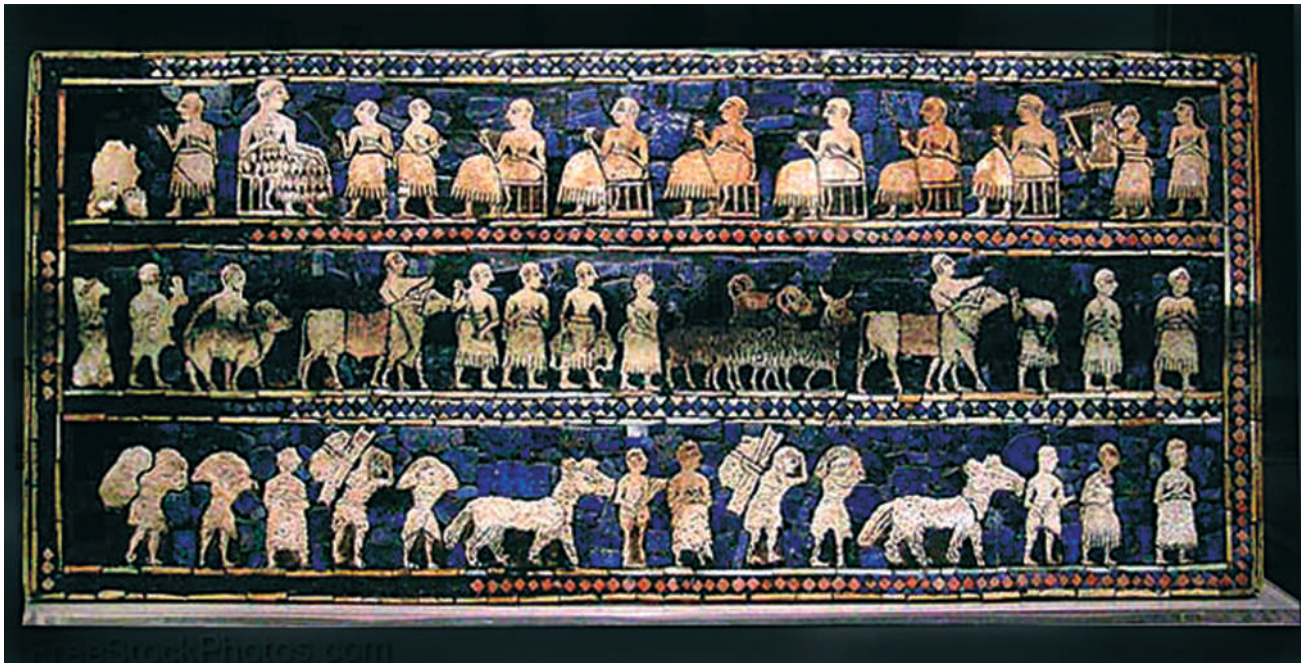
Parvathamma, C. (1989). *Scheduled castes at the cross roads.* New Delhi: Ashish Publishing.

Sharma, K. L. (1986). *Caste, class, and social movements.* Jaipur, India: Rawat Publications.

Zelliot, E., & Mokashi-Punekar, R., (Eds.). (2004). *Untouchable saints: An Indian phenomenon.* New Delhi: Manohar.

UR

Located in modern southern Iraq, the ancient site of Ur (Arabic: Tall el-Muqayyar) grew from a modest agricultural village to one of the most important cities of Mesopotamian civilization. Popularly known as the birthplace of Abraham, the Biblical patriarch (Genesis 11:28–31), Ur remained an important



Source: FreeStockPhotos.com.

economic and religious center from the fifth millennium to the first millennium BCE.

Although several archaeologists had worked there briefly before him, the excavations of British archaeologist C. Leonard Woolley, between 1922 and 1934, produced the bulk of our knowledge on ancient Ur. Woolley's deep soundings revealed that a 25-acre city was founded during the Ubaid period (fifth millennium BCE), one of the earliest periods of Mesopotamian urbanism. Following the Ubaid settlement, Woolley encountered a sterile deposit of water-born sediments he believed was evidence for the Biblical flood story in Genesis 6:9; today, scholars agree that the Euphrates river deposited these sediments during periods of seasonal flooding.

Starting in the fourth millennium, during the Uruk and Jemdet Nasr periods, a cultic precinct was established that would remain in use throughout Ur's history. The earliest temple was set on an artificial platform and decorated with colored cones set into the mudbrick walls. Burials associated with the prehistoric periods were excavated both in formal cemeteries and under house floors.

Beginning in the Early Dynastic period (2900–2350 BCE), Ur became one of several city-states in ancient Sumer whose history is preserved in excavated cuneiform tablets. A new temple was built above the previous temple with plano-convex bricks, a hallmark of early Dynastic building styles. Adjacent to the temple precinct, Woolley excavated what he described as the Royal Cemetery, a necropolis where approximately 2,000 graves were interred between 2600 and 2100 BCE. Lady Puabi was buried in a vaulted chamber within a well-preserved tomb (800), wearing extravagant jewelry of gold and lapis lazuli. Puabi was interred with attendants—musicians, guards, and servants—who apparently drank poison moments before the tomb's closing. Such instances of mass graves are rare in Mesopotamia, but speak to the power and wealth of Ur's royal family.

Starting in 2100 BCE, Ur became the capital of a unified Mesopotamian state. During what is known as the century-long Ur III period, the city's kings added to the preexisting temple precinct, erecting a temple dedicated to Nanna, the moon god and patron of the city, atop an enormous ziggurat. Cuneiform tablets dating to the Ur III period attest to the city's elaborate bureaucratic practices and its extensive trade relations with societies on either side of the Persian Gulf.

The Ur III period ended when the neighboring Elamites destroyed Ur in 2000 BCE; the city never regained the status it held during the preceding millennium. The city remained occupied despite its decline in importance, and Babylonian and

Assyrian kings renovated Ur's temple precinct from time to time. The city was finally abandoned around 400 BCE.

— *Benjamin W. Porter*

Uranium-Lead Dating

The Uranium-Lead (U-Pb) Dating is a method that encompasses several techniques that are employed in determining the geological age of both terrestrial and extraterrestrial (for example, meteorites) rocks. The method was first suggested by Boltwood in 1907 when he postulated lead to be the decay product of uranium. The method has a dating range from 4.55×10^9 years ago to approximately 5×10^4 years ago, and takes advantage of the long decay chains of the radioactive parent atoms such as ^{238}U, which spontaneously decays through 13 transitional stages until it reaches ^{206}Pb, which is stable and is termed the daughter. ^{238}U has a half-life of 4.47×10^9 years; the transitional stages have an accumulated decay time of 0.0073% of the primary half-life permitting the parent-daughter comparison for chronometric purposes if a closed system with accompanying equilibrium conditions exists. More recently, Uranium-Lead Dating methods based on closed system disequilibrium conditions have been developed (Figure 1).

Lead contains a mixture of four isotopes: ^{204}Pb, which is primordial and stable, and three radiogenic isotopes ^{208}Pb, ^{207}Pb, and ^{206}Pb, which are the end-product daughters of ^{232}Th, ^{235}U, and ^{238}U (^{232}Th: $t = 1.41 \times 10^{10}$ yrs; ^{235}U: $t = 7.038 \times 10^8$ yrs; ^{238}U: $t = 4.47 \times 10^9$ yrs). Therefore, the ratio ($^{208, 207, 206}Pb/^{204}Pb$) of the respective daughters (9.56, 10.42, 28), to the original ^{204}Pb will decrease with time in a measurable manner termed a "growth curve" that can provide what is called a "model age" using the ratios. The ratio change with time can be seen in the diagram of $^{207}Pb/^{204}Pb$ *vs.* $^{206}Pb/^{204}Pb$ (Figure 2).

Furthermore, there are three diagrams that can be generated from rock data that provide ages from the

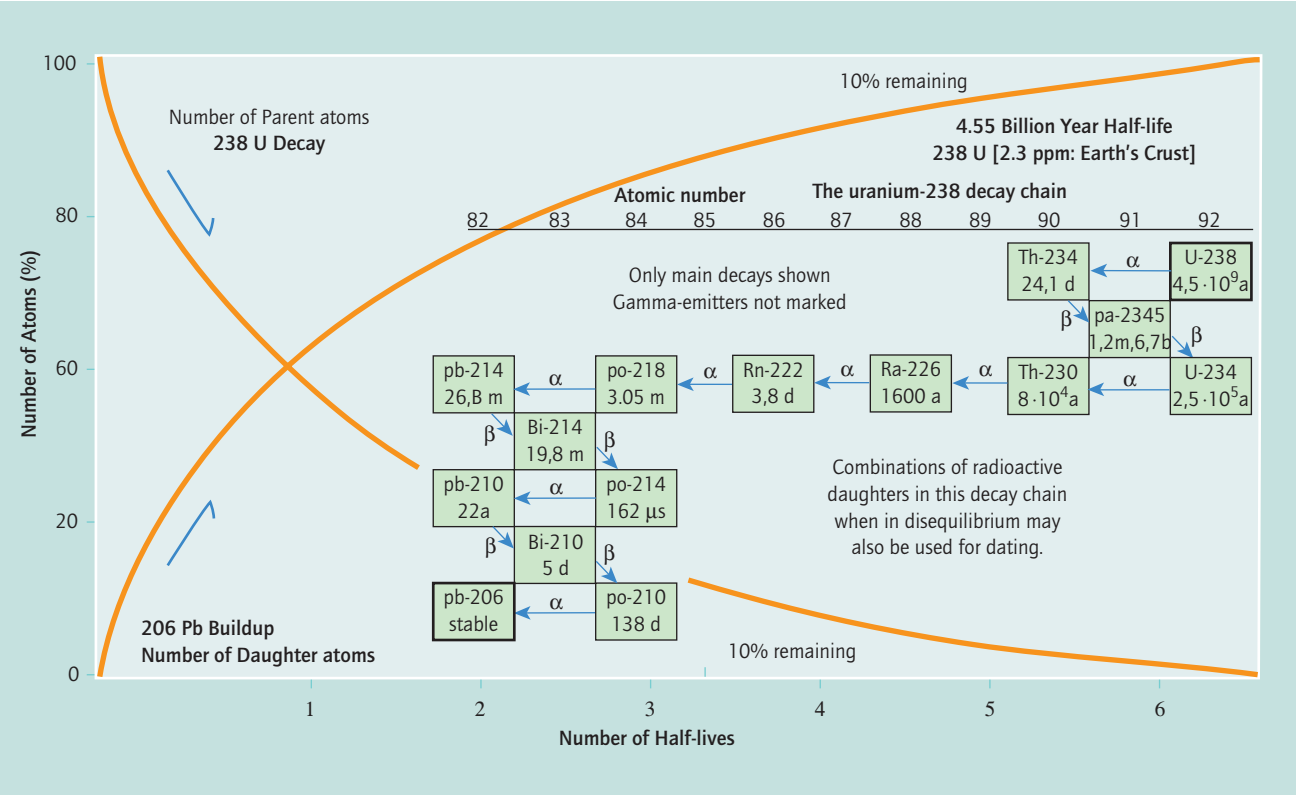


Figure 1 shows both the radioactive parent-stable daughter relationship between 238U and 206Pb, and some radioactive parent-radioactive daughter relationships. The latter relationships provide dating potential for closed systems in disequilibrium, while the former provide dating potential in closed systems in equilibrium.

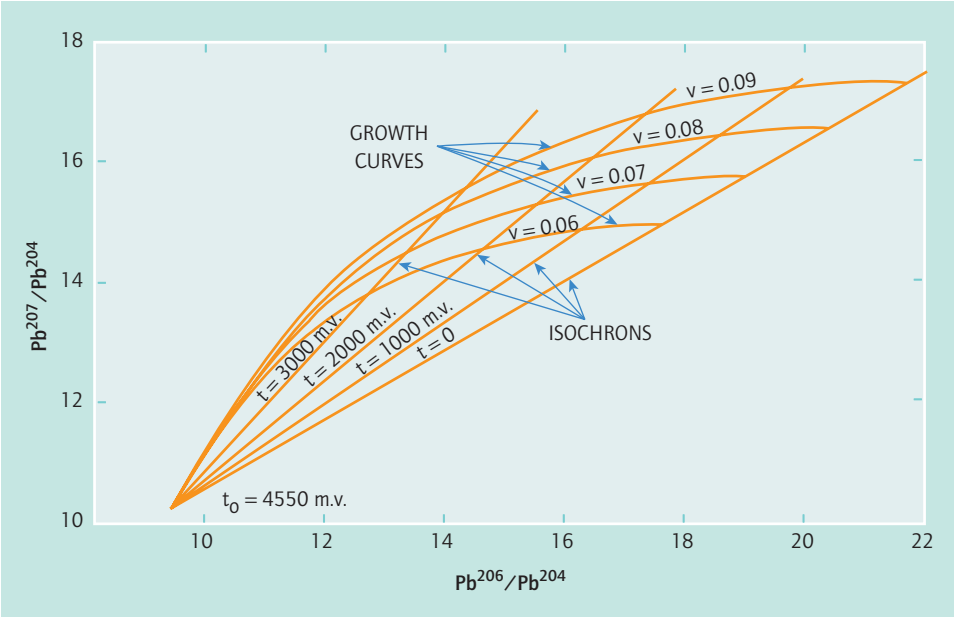


Figure 2 shows the important role that ratios of lead isotopes play in dating minerals. Growth curves can be determined independently of the uranium content. V= $^{235}U/^{204}Pb$.

straight lines produced by plotting $^{206}Pb/^{204}Pb$ vs. $^{238}U/^{204}Pb$, $^{207}Pb/^{204}Pb$ vs. $^{235}U/^{204}Pb$, and $^{208}Pb/^{204}Pb$ vs. $^{232}Th/^{204}Pb$. Therefore, an independent number of independent estimates of the rock's age can be obtained by measuring the lead isotopes and their parent isotopes. If the results agree, it is likely the age obtained is a fair approximation of the actual age. If the results conflict—a common problem because uranium and lead may be gained or lost from many minerals—the problem of loss or gain of isotopes is readily apparent. Using plots such as that shown in Figure 2 (lead-lead technique), the effects of lead loss can be minimized because it determines the ages from the lead isotopes alone. This approach permits a researcher to chart at what points in time metamorphic heating events may have occurred, thus helping to unravel the geological history of a rock or mineral.

With the development of more sophisticated analytical techniques in recent decades for directly measuring parent and daughters and their α, β and γ decay products, attempts have been made to quantify in a meaningful way the intermediate decay products of ^{232}Th, ^{235}U, and ^{238}U. These decay products are compared both with the parents and among themselves producing a wide rage of techniques that span a period of days to greater than a million years ($^{234}U/^{238}U$: 50×10^{3}–1.5×10^{6} yrs; $^{227}Th/^{235}U$: 10–200 $\times 10^{3}$ yrs; $^{224}Ra/^{228}Ra$: 2–20 yrs, $^{210}Bi/^{210}Pb$: hours –50 days). They are based on the disequilibrium of a daughter decay product rather than the equilibrium required for dating using the parent and stable daughter. These methods require that either a parent or a daughter be chemically separated by natural processes and remain thereafter in a closed system. The age limits obtainable are based on the half-life of the daughter or daughters, and the age upon the measured degree of return to equilibrium conditions. Unlike the rock and mineral limitation of traditional Uranium–Lead Dating, the disequilibrium method can be used on a wide variety of materials, including minerals in young volcanic rocks, bones, egg shell, wood, mollusks, terrestrial carbonates, and marine and lacustrine sediments.

— L. A. Pavlish

Further Readings

Farquhar, R. M. (2003). Lead isotopes in archaeology. In: *Physics and Archaeometry*. Special issue of *Physics in Canada, 59*(5), 275–284.

Russell, R. D., & Farquhar, R. M. (1960). *Lead isotopes in geology*. New York: InterScience Publishers.

York, D., & Farquhar, R. M. (1973). *The earth's age and geochronology*. Toronto: Pergamon Press.

Urban Ecology

Urban ecology is the study of humans and nonhuman organisms in urban areas, their interaction with their surroundings, and their reactions to environmental change. Anthropologists use theories, principles, or methods developed by ecologists to study how past cities arose, how current cities develop and change, and the effects of urban environments on people.

Ecological Theories of Urbanization

Archaeologists often use ecological theory to explain how relationships between humans and their environment have evolved, leading to urbanization. These theories are based on Thomas Malthus' proposition that human population always tends to increase unless checked by some force. The British archaeologist V. Gordon Childe argued that the birth of agriculture led to surplus food and sedentism (people remaining in a fixed area). This allowed more people to specialize in crafts, arts, or political functions, and socioeconomic differences among people are more pronounced in ancient cities than in rural archaeological sites. In the 1950s, cultural evolutionists such as Leslie White used systems theory to argue that all cultures tend to become urban as they increase the energy they capture and use. Karl Wittfogel, Julian Steward, Marshall Sahlins, and Robert Carneiro portrayed urbanization as unique ecological adaptations to particular environments, such as the need for political organization to regulate agricultural irrigation in arid areas. Ecological explanations remain important, but currently are usually integrated with warfare, ideology, and individual agency as explanations for the emergence of cities.

Ecological concepts are also used to explain how contemporary cities grow and change. In the 1920s urban sociologists Robert E. Park and Ernest Burgess founded the "Chicago School" of theory by encouraging students to study cities as laboratories. They used ecological concepts to explain urban growth and change, proposing that cities are comprised of ecological niches arranged in concentric rings around a central core. These sociologists considered the city an ecosystem requiring energy to maintain segmented niches, which experienced residential succession much like patches of forest. Individual human expectations and aspirations depended on an inhabitant's location within these niches. The Chicago School's later focus on demographics and statistical analysis of census information was criticized for lack of attention to individuality. Their quantitative techniques continue to dominate urban planning and research.

Environmental Impacts and Sustainability

Cities produce pollution and their expansion reduces habitat for native species. Researchers are also interested in how these effects feed back to change cities. For example, rain in coastal cities washes nitrogen from lawns and city streets into rivers, and eventually the estuary, where it can change the structure of shellfish communities. This can negatively impact shell-fishing economies and threaten a region's sustainability. Archaeologists such as Charles L. Redman and Joseph Tainter argue that environmental deterioration often led to abandonment of urban areas in the past. In 1992 the Canadian ecologist William Rees introduced the concept of "ecological footprint" to describe the far-reaching environmental impacts of cities. Urban planners and activists interested in sustainable development attempt to quantify ecological footprints. It is also important to understand what people in cities "value." The nascent field of ecological economics is an attempt to integrate concepts like ecological footprints with market-based analyses for decision making. Social ecologists such as Steven Kellert argue that concern about wildlife conservation is higher among urban residents, which suggests a positive environmental effect of urbanization.

Anthropologists George J. Armelagos and Mark N. Cohen, the historian Lewis Mumford, and biologist Jared Diamond have written about past tendencies for human health to deteriorate with urbanization because risk of disease increases and nutrition declines. Currently, urban pollution creates asthma epidemics, and mosquito-borne illnesses persist in many cities where the natural hydrology has been altered, among other problems. "Diseases of affluence" are also on the rise. A 2004 report by the RAND Corporation linked urban sprawl and reliance on automobiles to increased risk of asthma, high blood pressure, heart disease, and diabetes. Sustainability research is an attempt to identify why disadvantages begin to outweigh the benefits of urban life, and to correct problems through planning or social activism. Social scientists collaborate with geographers and ecologists using geographic information systems (computer mapping) that combine satellite imagery and aerial photography with census or questionnaire data to identify relationships between environmental quality and social conditions. When integrated with computer models of a city's production of nitrogen, use of water, or energy budgets, such approaches can be used to analyze a city's sustainability.

Urban Ecology and Social Movements

Low-income and minority populations are more likely to live in parts of cities identified by ecologists,

toxicologists, and epidemiologists as unhealthful. "Environmental justice" refers to social activism and academic research focusing on this relationship. Environmental sociologists such as Dorceta Taylor, and anthropologists like Melissa Checker and Vivienne Bennett, argue that environmental injustice is often related to discrimination based on gender, race, or class. In the late 1800s, the landscape architect Frederick Law Olmstead advocated using nature in parks to break down barriers between social classes in American cities, an approach still advocated by urban social ecologists such as William R. Burch. Some restoration ecologists (who typically restore habitats for wildlife) are attempting to restore human relationships with natural processes in urban areas; for example, integrating resources like water-purifying wetlands or urban forests with community-based development (a process in which neighborhoods plan, finance, or otherwise implement their own development projects).

Future Directions

The United Nations estimates that the global population living in cities will exceed 50% for the first time in 2007 and continue to rise. Biologists are beginning to study biodiversity *in* urban areas, and how social forces shape landscapes. Archaeological debates about the extent to which ancient cities were more or less healthful than their hinterlands, and what ideological or organizational shifts lead to urban sustainability versus collapse, will gain relevance. Applied anthropologists are being challenged to integrate their knowledge of social dynamics with ecological data to promote sustainable social change. Technological advances in computer mapping will allow for more collaboration between ecologists, toxicologists and social scientists studying urban environmental justice and sustainability.

— David G. Casagrande

Further Readings

Cohen, M. N. (1989). *Health and the rise of civilization.* New Haven, CT: Yale University Press.

Pickett, S. T. A., Cadenasso, M. L. Grove, J. M., Nilon, C. H., Pouyat, R. V., Zipperer, W. C., & Costanza, R. (2001). Urban ecological systems: Linking terrestrial ecological, physical, and socioeconomic components of metropolitan areas. *Annual Review of Ecology and Systematics, 32*, 127–157.

Tanner, M. J., Hernandez, D., Mankiewicz, J. A., & Mankiewicz, P. S. (1992). The big apple: Restoration-based education on the Bronx River. *Restoration and Management Notes, 10*, 14–17.

Urban Legends

Urban legends are those fanciful tales that grip listeners and are spread widely across continents and oceans while repeated by individuals often claiming the facts reported in the tale happened to a "friend of a friend," or are based on "facts" reported in news reports that the teller of the tale had allegedly read in the past. A classic example of an enduring urban legend is the enduring tale of the blind, white alligators that inhabit the sewers of New York. In the legends, sun-seeking tourist return from Florida with pet alligators, small babies that quickly became unmanageable and their owners, unwilling to kill them, simply flush them down the toilet. In this environment rich in food (rats), but lacking in sunlight, the alligators became blind albinos, witnessed by the occasional unwary New Yorker of urban legend.

Although urban legends are seen as modern manifestations, in terms of structure and role, they are not necessarily urban nor are they legends in the strict sense of the term. What they are is popular folklore that seeks to transmit popular lore—the knowledge or wisdom of the people—that are spread from individual to individual usually through narrative retelling of the tales. Academic interest in urban legends began in the first half of the 20th century as folklorists shifted their interests from the rural folk to cities where the majority of Americans and Canadians lived after World War I. Two scholars can be credited for coining and propagating the term urban legend. The first is Richard Mercer Dorson, who is credited with having coined the term, and who was already, in his 1959 book, *American Folklore,* writing about the legends in the big city and the legends of college students (active propagators and audience for urban legends). The other is one of Dorson's students, Jan Harold Brunvand, who popularized contemporary research on urban legends with a series

of publications examining American urban legends, beginning in 1981 with *The Vanishing Hitchhiker: American Urban Legends and their Meanings.*

Unlike traditional legends, urban legends are reported as contemporary events: the narrative power is derived from the narrative performance of the urban legend in which the audience—a friend, a group of colleagues on break, or fellow students in a dorm—are recounted a story that "actually" happened. Although urban legends spread thousands of kilometers, even over the ocean from England to North America or from North America to Australia, urban legends are invariably localized and contemporized: though the underlying story remains unchanged, the facts are changed to make it fit into the locality and the time period.

Although an urban legend may have a grain of truth, the origins of the legend—if it can be found—is often far removed from the tale that the listener will hear and has often been changed considerably as local details will be added to localize the legend. A case in point is "The Philanderer's Porsche" an urban legend that was recounted as "fact" in an Ann Landers' syndicated column that was published worldwide in 1979. In the letter Landers published, a man in California is said to have seen an ad in the paper for an "almost new" Porsche for the measly price of $50. Although skeptical, he nevertheless visits the woman selling the Porsche, and when he discovers that it is a legitimate car and sale, he buys the Porsche. However, curious, he returns to the woman who explains that her husband had run off with his secretary and instructed her (the wife), to sell the Porsche and send him the money. The author of the letter claimed to have read the ad in his local newspaper (the *Chicago Tribune)*; in turn, Ann Landers' managing editor thought that he had read the story. Upon subsequent fact checking, the story was shown to never have existed, though both the person who sent the letter and the newspaper's editor sincerely believed they had read the account in the news.

The managing editor of the *Chicago Tribune* did not need to feel too guilty, as newspapers are often published as "fact" in newspapers around the world. This particular legend, of a philandering husband and his wife selling his car, was in circulation in Great Britain since at least 1948, and published as "fact" on several occasions. Likewise, newspapers across North America will publish accounts of razor blades allegedly inserted in apples given out to children who are out trick-or-treating on Halloween night even though there exist no verified cases of sabotaged apples.

The examples of urban legends cited above fall into the popular motifs of the urban legend. Many of the tales can be described as cautionary tales, articulating some of the fears and anxieties of society. One such tale is the "old woman" and her new microwave. Gifted a new microwave by her children, the woman decides to use it to dry off her dog. Returning a few minutes later, she discovers that her dog had been cooked from the inside out. The legend highlights the danger of technology: new technology, though useful, may conceal hidden dangers.

One characteristic of a successful urban legend is the unexpected twist at the end of the narrative: it is outlandish, but seemingly plausible, and thus is taken as truth. It often mixes humor and horror, appealing to an individual's sense of morality or hidden anxieties to touch a chord of empathy. In the case of the Porsche, the listener will empathize with the wife and feel a certain sense of satisfaction that the unfaithful husband got what was coming to him.

Although urban legends are primarily oral narratives, they can be transmitted using a variety of means. As noted, urban legends often appear in newspapers reported as "true" events. They are also integrated into popular culture in television and movies. In 1998 the movie *Urban Legend* appeared poking fun at the genre, and was followed in 2000 with the sequel *Urban Legends: Final Cut.* Nonetheless, urban legends live on, and e-mail and the Internet has given urban legends new life. Although urban legends have always demonstrated the remarkable ability to travel far and wide, with instantaneous communication of e-mail, new forms of urban legend are emerging.

One example of a recent urban legend that was circulated widely was the report that authorities were planning on imposing a surcharge on e-mail. This urban legend seems to have originated in Canada, but quickly spread to the United States where it was modified to suit local tastes: in 1999 instead of requesting recipients of the e-mail message to write their Member of Parliament (Canada), American recipients were directed to write their representatives and say no to Bill 602P. This e-mail in circulation was thought to be true, even though it had no basis in fact, as neither Canada nor the United States ever had any pending legislation to impose a surcharge on e-mail messages. By the year 2001, the e-mail was in circulation in Australia and the citizens of this state

were being warned that their federal government was planning on imposing a 5-cent surcharge on all e-mail messages.

New urban legends continually emerge, and the Internet is serving as a medium to record this new folklore. However as mediums of communication change along with North American society, folklore will invariably live on, enthralling new generations.

— *Michel Bouchard*

Further Readings

Brunvand, J. H. (1981). *The vanishing hitchhiker: American urban legends and their meanings.* New York: W. W. Norton.

Brunvand, J. H. (1999). *Too good to be true: The colossal book of urban legends.* New York: W. W. Norton.

Coffin, T. P. (1968). *Our living traditions: An introduction to American Folklore.* New York: Basic Books.

Dorson, R. M. (1959). *American folklore.* Chicago, IL: University of Chicago Press.

Mikkelson, B., & Mikkelson, D. P. (2005). *Urban legends reference page.* Retrieved May 15, 2005 from http://www.snopes.com.

Urbanism in Ancient Egypt

Although ancient Egypt was once described as a "civilization without cities," contrary archaeological evidence has mounted as increasing numbers of settlement sites have been surveyed and excavated. Settlement archaeology began taking off in Egyptology in the 1970s, and was manifested particularly in the innovative research projects at El-Amarna, Elephantine, and Hierakonpolis, amongst other sites. These programs were partly designed to answer the question of what we know about ancient Egyptian cities, towns, and villages apart from their architectural details.

Ancient cities were unique in deriving a substantial portion of their income from their rural hinterland. As such, a broad-based model can take as its basis that a city is a unit of hierarchical settlement performing specialized tasks with an interactive hinterland network.

Developmental differences in urbanization, as expressed through evolving nature and functions, are the underlying premise of Wilson's claim that ancient Egypt did not possess cities until the New Kingdom. Wilson's biological metaphor assumes what Kemp has termed "an intuitive appreciation of culture in which archaeology has little place," and narrowly defines the concept of urbanism on the basis of Mesopotamian size and style.

Wilson's evaluation does not differ fundamentally from the rationale presented for the development of Egyptian settlements by Helck in his *Handbuch der Orientalistik*. Both models are based on varying Egyptian religious texts from different periods and an interpretative approach that excludes towns due to the "spiritual" foundations of Egyptian society.

The problem with using the religious Pyramid and Coffin texts to inform on the nature and degree of urbanism, per Wilson and Helck, is that the ancient Egyptian designations for their own settlements tends to be overlooked. There was no distinction made in the Old Kingdom between towns and other settlement forms.

A different model has been proposed by Hassan, who postulates that the ideological and social context of agriculture and trade differed from the mercantile economies of the preindustrial Middle Ages in Europe. Thus, these activities may be reflected in a territorial state spatial organization, with settlements hierarchical in character tending toward activity boundaries being defined, and the activities themselves becoming the domain of specialists. Thus activities would be focal in nature, designed to take advantage of the scaled settlement patterns relating the city to its hinterland, and to minimize the fluctuations in agricultural yield, caused by the unpredictability of the Nile flood levels, through food transportation networks.

Hassan's definition of "capital cities," referring to national capitals (for example, Memphis and Thebes), "town" to nome capitals, and "village" to rural settlements, is applicable to later dynastic Egypt. However, his model fails to demonstrate their appropriateness for both late Predynastic (Nagada I–III) and Early Dynastic Egypt. Hassan discretely broaches this problem when stating that a structure of 22 nomes was fixed by Fifth Dynasty times; however, nome boundaries were mobile. Because his model for the spacing of settlements is dependent upon population estimates generalized over the time span of dynastic

Egypt, and a hierarchical structure of administrative and redistributive sizes for settlements, its inherent inflexibility renders it problematic for the developing nucleated city-states of the predynastic, and the evolving manifestations of the territorial Pharaonic State.

Bietak defines four additional characteristics for distinguishing between settlement types: (1) Artificially-planned towns such as Amarna, Piramesse, and probably Early Dynastic Memphis; (2) Gezira-towns, which predominate in the Delta (e.g., Buto and Tell Ibrahim Awad); (3) Levee-towns, built on the top of high levee-banks; and (4) Tell-towns. A comprehensive inventory of 217 cities, towns and fortresses was compiled from Egyptian textual sources and analyzed by Butzer. His category, "city," refers to Luxor-Karnak and Memphis, the two national metropolises. The small and large centers were defined as market redistributive nodes for agricultural, economic (crafts, harbors), residential, and religious (cult centers with connected wide-ranging temple estates) activities.

Despite the large-scale, monumental architecture dating from the Middle Kingdom onward, no *in situ* Early Dynastic or Old Kingdom remains have been located. While possibly later occupational activity and/or sebakh-diggers may be responsible for this discrepancy, it has been argued that early Memphis was a mobile capital located close to the pyramid complex being constructed by the particular pharaoh at the time in the Memphite necropolis, Lower Egyptian Memphite nome. Love bases her hypothesis on scattered remains from Giza, Abu Rowash, Abusir, Saqqara, and Dahshur as well as on linguistics. The Greek-derived name Memphis stems from *Mn-nfr* meaning "Pepi is firm[ly established] and well." Thus Lehner has referred to the necropolis as a "capital zone," a nonnucleated 30 km stretch.

Assmann described New Kingdom Egypt as "the exact imitation of cosmic government on earth." O'Connor has applied this concept to royal cities such as el-Amarna and Thebes, suggesting that these cities were laid out to replicate and function as the cosmos. The temples were the reciprocators of the cosmic power, channeled to the citizens through the palaces, and thus maintaining the relationship between the city and the cosmos, and the pharaoh and his people.

In this hypothesis, Amun-Re at Thebes was the cosmic ruler of a cosmic and secular entity. The administrative palace and the temple were linked, but O'Connor pushes the limits of his hypothesis by postulating "the residential palace, like Amun-Re's horizon, was perhaps remote from the city proper." His hypothesis is more solid for al-Amarna where the residential palace is located at the northern edge of the settlement, mirroring the sun-Disc's emergence at the cosmos' edge, the eastern horizon (*akhet*). The pharaoh and the Disc join in sacred union in the city centre, before the pharaoh continues on to govern in the "secular city."

O'Connor combines Egyptian texts with archaeological data to further inform the available evidence on the Egyptian's worldview about the interrelationships between city, state, and the cosmos through examining not only temples but also the internal layout of palaces and towns.

O'Connor fails to adequately develop his cosmological hypothesis to account for population numbers and spatial interrelationships between cities, towns, and villages, and for the spacing of the settlements in the landscape. Hassan's functionalist model fails to adequately account for the ecological variability of the Nile floodplain. The fundamental principle of versatility and state ideology sometimes superseding functional constraints is clearly evident when viewed from peripheral sites such as Elephantine.

Instead, it is most plausible to conclude that ancient Egypt was a territorial state with a plurality of hierarchical settlements distributed across its landscape, constrained and reinforced by considerations of ecology and mobility, as well as logistical and ideological considerations.

— *Michael Brass*

Further Readings

Bard, K. (1994). *From farmers to pharaohs. Mortuary evidence for the rise of complex society.* Sheffield: Sheffield Academic Press.

Giddy, L., Jeffreys, D., & Malek, J. (1990). *Journal of Egyptian Archaeology* 76, 1–16.

Hoffman, M. (1993). *Egypt before the pharaohs: The prehistoric foundations of Egyptian civilization.* New York: Barnes & Noble Books.

Lehner, M. (1997). *The complete pyramids.* London: Thames & Hudson.

Midant-Reynes, B. (2000). *The prehistory of Egypt: From the first Egyptians to the first Pharaohs.* Oxford: Blackwell.

Pollock, S. (2000). *Ancient Mesopotamia.* Cambridge: Cambridge University Press.

Rothman, M. (Ed.). (2001). *Uruk Mesopotamia & its neighbors: Cross-cultural interactions in the era of state formation.* Oxford: James Currey Ltd.
Shaw, I. (Ed.). (2000). *The Oxford history of ancient Egypt.* Oxford: Oxford University Press.

Uxmal

Located in Mexico's modern-day state of Yucatán, Uxmal was a Late and Terminal Classic Maya center with considerable political and economic clout. The name Uxmal is thought to derive from Yucatec Maya, and roughly translates as "thrice built." Given its history and spectacular architecture, Uxmal is well named.

Archaeological excavations at Uxmal have been minimal, but consolidation of structures in the urban core has shed light upon the center's later history. Little is known about the earliest occupation of Uxmal, ca. 600–300 BC. However, the last major building episodes–and the ones that are presently visible on the surface—date to the ninth century, and indicate that the center reached its apogee during this time. With the demise of Maya centers in the southern and central lowlands, sites in the northern lowlands, such as Uxmal, flourished during the Late and Terminal Classic periods (ca. AD 600–1000). Evidence of increased building activities and expansion of trade networks testify that Uxmal was an important urban center. By AD 1000, the city was abandoned for reasons that are poorly understood, but may be connected to Chichén Itzá to the east and the rise of the Itzá, a Maya group who wielded considerable influence in the Postclassic Maya world. Nonetheless, religious pilgrims periodically visited Uxmal over the next three centuries.

Uxmal is best known for its distinctive Puuc-Chenes architectural style. Puuc style buildings are visible on the surface today, and date to the late and terminal classic periods. Chenes style buildings, entombed within Puuc architecture, represent earlier construction phases. Chenes buildings are low-lying and rectangular in shape; they are commonly found at Maya sites throughout the central lowlands of northern Guatemala (the Peten), and southern lowland sites near the Usumacinta River, which forms the

Source: © iStockphoto/Angelika Stern.

Guatemala–Mexico border. Named for the low range of hills that crosses the northern Yucatán, the Puuc style of architecture has several distinguishing features. Stone masonry was fine cut with no mortar. Sculpture and mosaics were concentrated on structures' upper façades. Buildings were vaulted, and had corbelled doorways and roofcombs. Certain structures were oriented with respect to astronomical and solar events. Notable and visually stunning buildings at the site include the House of the Governor, Nunnery Quadrangle, and House of the Magician. In particular, the House of the Governor is an impressive low-lying "palace" situated on an artificial platform. The building served as an elite residence and administrative center. Intricate masonry work depicts the rain god Chac, serpents, netted motifs, and astronomical symbols. It is likely that the structure was built to commemorate Lord Chac, one of the last reigning rulers. The seated human sculpture that hangs above the central doorway may in fact represent the ruler.

In his wanderings throughout Central America, 19th-century explorer John Lloyd Stephens offered a detailed description of the center's "magnificent" and "lofty" edifices. In 1996, UNESCO inscribed Uxmal as a World Heritage Site, as its ceremonial structures "represent the pinnacle of late Mayan art and architecture in design, layout, and ornamentation." A visual and political force to be reckoned with in its heyday, Uxmal today remains a prominent and striking marker of national identity.

— *Pamela L. Geller*

Further Readings

Kowalski, J. K. (1987). *The house of the governor.* Norman, OK: University of Oklahoma Press.

Miller, M. E.. (1996). *The art of Mesoamerica.* New York: Thames and Hudson.

Sharer, R. J. (1994). *The ancient Maya.* Stanford, CA: Stanford University Press.

V

Values and Anthropology

Anthropology has the highest regard for rigorous and honest research. Most anthropologists respect the internal, culturally defined explanations of truth of the people they study (*emic*) while doing scientific research (*edic*). Both types of research are part of cultural anthropology. In both cases, social facts are determined by observation; this requires actual field research. Both types of anthropology follow similar types of observation: by carefully recording the native *worldview,* attempts to understand another culture are undertaken. The anthropologist's carefully constructed analysis of any aspect of a culture studied is taken from an objective point of view, and must be pursued with equal qualified fairness and honesty. Anthropologists have a professional commitment to record what has, in fact, been observed, and those conclusions must honestly reflect what they claim to be studying through their observations. It is also important that other anthropologists could, if not replicate those studies, at least use the studies as valuable background for further research.

As in all social sciences, there is a code of conduct in Anthropology on how to do research. Anthropologists generate hypotheses that are to be internally consistent so that they do not create incongruous conclusions. The social scientist has an obligation to others in the profession as to their talent to make available truthful, however tentatively, calculations of what was observed in the field. These truthful observations are always helpful to other anthropologists, and making sure of the availability of these observations is seen as being a true professional. Even research in areas carried out in studies that are not only geographically distant, but that also have a certain theoretical distance as well from the original hypothesis, is appreciated by other anthropologists. In cultural anthropology, as a branch of learning in which use of the scientific methods are sometimes less than clear-cut, a good hypothesis can be even more important. As in the early days of anthropological explorations, the hypothesis should be able to combine contrasting observations recorded in the field notes of the anthropologists. This rigorous recording is still seen as a virtue within the profession. Also sympathetically appreciated among anthropologists is the use of simplicity of research design and sophistication of theory. The truly learned among this field show a strong appreciation for elegance in the study; like any science, honesty within the research and its resultant findings is first and foremost.

Today most anthropologists believe they have an obligation to the people they study. A social scientist with conflicting allegiances cannot always be relied upon to act in the public interest of those people being studied. In the field of anthropology today, it is acknowledged that enticements often exist that may tempt the field researchers to betray the trust of the people they are studying. To do this, it is important to remove as many conflicting interests as possible, including the often conflicting interests between the loyalties to those who pay the anthropologist, the loyalty to the discipline of anthropology, and the loyalty to the people anthropologists study.

This must be the first concern of professional anthropologists: to respect the integrity, anonymity, and the culture of the people they study. These concerns take priority over all other considerations. A close secondary issue is the need to be concerned with the contribution to the overall body of knowledge of culture, and the development of anthropological theory.

Finally, in the ethical value system of the social scientist, there is an applied legal responsibility to the

organization funding the research. The anthropologist must be concerned with what possible uses will come out of the research, and how this may affect the people being studied. Policy issues are always a concern before the anthropologist ventures out into the field. Who decides the fate of the people being studied is a major concern to be taken into account.

Two primary issues that are of concern for anthropologists are *cultural relativism* and *value-free* research. Cultural relativism is the thesis that all cultures are unique and, therefore, can be evaluated only in accordance with their own principles, values, standards, and morals. *Ethnocentrism* is the belief that one's own culture is superior to others. For an anthropologist, to be ethnocentric is deadly. The use of cultural relativism prevents the anthropologist's ethnocentrism from corrupting the results of any anthropological research.

Herskovits states that the use of cultural relativism does not mean that one can abdicate moral responsibility for the injustice within the dominant society toward tribal and peasant populations. Herskovits takes the position that to use cultural relativism in a self-serving way to further one's career is unethical. This means that the term cannot be used in objective anthropological research in order for the dominant culture to gain access to the resources of tribal people. The concept of cultural relativism was originally an answer to Western ethnocentrism. Western ethnocentrism has done more harm to many cultures than any other type of ethnocentrism. The forced *assimilation* of American Indians in North America through the boarding school system of the late 1800s and early 1900s is only one example of this.

Culture determines the shared values of any people. All cultures are ethnocentric, but science helps researchers to suspend their moral judgments while studying other people.

Ethics are not scientific; ethics look at how things should be. The anthropologist develops a set of professional ethics, those of tolerance and nonintervention. Western values, taken as absolute, have justified policies that have seriously harmed other peoples. This is why Herskovits promotes a type of scientific research in which anthropologists can suspend their own culturally defined values and observe other cultures in a more sympathetic way. The researcher learns not only how things are done, but also the local values of why they are done that way. Herskovits pointed out that cultural relativism is not *ethical relativism,* but *pluralism.* Most criticisms of cultural relativism have come from outside of anthropology; critics often claim that, following cultural relativism to its logical conclusion, one would have to support Nazi and Fascist extremes. Herskovits points out that Nazi and Fascist extremes were part of European ethnocentrism.

The idea of value-free research is that the researcher must remain detached from what is being observed. Objectivity is a primary virtue in any research. The values and prejudices of the social scientist must be suspended while carrying out the research. The social scientist must use measurements and data that any researcher can easily duplicate with the same results, meaning that what is being measured is what the researcher is actually studying. Thus, personal values need to be put to one side so as not to corrupt one's results.

It is understandable that such notions lead to passionate disputes, and are very contentious in anthropology. *Rational discourse* is another name for value-free. Central to this perspective is the idea that there exists an objective world that is independent of the observer. This world can be known through careful observation. Through rational empirical observation, and through using the scientific method, a commonly shared body of knowledge is expanded. All social scientists should share this set of information. Truth does exist independently of interpretations. Social science must remain free and neutral of political interests and cultural biases. Social reality must first be observed without moral interpretation to gain an understanding of the social world. Categories must not only be quantifiable but also mutually exclusive, with a strong preference for mathematical exactitude. Tools that are used in social science are those of objective measurements, standardized particulars, quantifiable information, and controlled statistics.

Rational discourse devotees claim that only by understanding the determined nature of what researchers are studying can they hope to make rational choices about the world in which they choose to live. Societies and nature follow lawful processes, operating beyond our control. *Determinism* operates behind our backs because we do not understand these lawful processes. Whatever choices we make have long-term consequences. To control these lawful processes we must first understand them objectively.

Not all anthropologists agree with the concept of value-free social science; the research values of rational

discourse have been attacked on many levels. Many anthropologists assert that it is hypocritical to maintain any claim of objectivity. The topic chosen for doing research, the theoretical models used, and even types of studies, all reflect the preconceived notions of the social scientist. Statistical analysts begin with assumptions about which data is relevant. Other conjectures about how to categorize the data are always highly subjective. Subjective choices are made about which statistical techniques to use and how to interpret the results, and thus subjectivity is unavoidable.

There exist heated political debates about why anthropology is even studied. Always, it is claimed, all research reflects not only individual biases but individual political agendas as well. The researchers must admit to their agenda because, as anthropologists, they study people. Another question often asked is if it is even ethical to attempt objectivity. It is claimed that politics is central to all science. Science evolved along with the evolution of a market economy. Science has served capitalism well by creating this worldview of objectivity in which truth is independent of ethics. The Industrial Revolution and the continuing revolution in technology could never have happened without embracing this worldview.

The all-encompassing reliance of scientific research on private or government funding has created a give-and-take pecuniary support. This type of dependence creates its own definition of professionalism. Because most studies are carried out either within a university setting or through research institutions, bureaucratic control becomes necessary for continued funding. Anthropology, being more exotic than, say, chemistry, is generally less rigidly controlled by administrators. This is a major reason why the very ethics of science has been called into question by anthropologists. It has been argued by a growing group of dissident anthropologists, or *critical anthropologists,* that all science, social or otherwise, has a political agenda. Practically speaking, this debate leads to three types of applied anthropology: the realists, the critical anthropologists, and the purely intellectual anthropologists.

A small group of *realists* (those who are often seen as "mainstream" applied anthropologists) work cooperatively with neoconservative groups to attack issues of sovereignty and social benefits going to the poor. Critical anthropologists (*radicals*) see themselves as advocates to empower the powerless, at least until these powerless groups become powerful enough to be their own advocates. Those advocates of intellectual autonomy (*intellectual anthropologists*), value-free science, and objectivity, criticize both realists and radicals.

Critical anthropologists claim science helps legitimate existing power relations, by accepting funding to do research. The university remains dependent upon this funding, and thus seriously limits any possible impartiality or academic freedom. Peer review keeps the dissident in line.

The critical anthropologists further challenge the discipline by claiming that anthropologists, like all professionals, have their own class interests to maintain. Critical anthropologists claim that the majority of anthropologists seek to develop a professional worldview, language, culture, and body of knowledge; they use these to market their own individual power within the profession and with those who control promotion, tenure, and research opportunities and funding.

This view claims that anthropologists exploit the people they study in order to develop professionally. Autonomy is maintained because the type of research being done supports the capitalists and government agencies; it is said that Anthropologists are like all scientists in this regard. The "ivory tower" syndrome is possible because collaboration with the non-science elite is brokered by the university administration and granting bodies. The discursive fads and unethical practices of social science are highly centralized. As in all science polemics, the aggressive attacks on each other are embedded within the essential consensus on professional ethics.

Internal politics within individual anthropology departments, and serious competition with sociology departments, have all too often linked individual anthropologists to government and business interests. Tenure, promotion, professional rivalry, and peer review often reflect these influences. Competition for professional recognition often influences choices of research topics.

Competition for funding has a direct influence on the direction in which the discipline itself goes. These competitive wars also artificially separate academic departments. All of the above tends to restrict individual anthropologists, limiting the success of any innovative practices. Funding provides a check on innovation while maintaining "epistemological orthodoxy." This conformist commonsense approach maintains artificial boundaries by defining legitimate research.

Anthropologists have long had to deal with the fact that what they do has a real impact on the people they

study, and that their responsibility does not stop with publishing their articles. The traditional view of anthropologists is one of "realism." The global spread of an industrial market economy cannot be stopped. Development needs to be regulated to lessen the injury and distress of modernizations on traditional rural communities. Science can be used to integrate people into a global market economy while helping those impacted people adjust to the disruptions to their lives. Anthropology as advocacy has grown increasingly popular since the late 1960s. Many anthropologists have increasingly come to believe their first responsibility is not to the discipline of anthropology, but to the people they study. Some anthropologists will state that people have a right not to be integrated into the global economy, to have their own history on their own lands, and to make their own mistakes. More and more, anthropologists are forming joint advocacy groups with the leaders of the groups of people they study, going beyond cultural relativism to social activism, using academic credentials to defend less powerful people against "colonialism," not as leaders, but as advocates. Groups such as Cultural Survival Inc. have formed to help endangered groups struggle for cultural and political sovereignty. Self-determination and indigenous control over their own lands, resources, and communities are replacing protection of impacted groups as a major theme in applied anthropology. Though there are still many anthropologists who work with government and private development plans, there is now at least an open debate on the moral responsibility of anthropologists.

A small group of anthropologists openly embrace the title "romantic." They feel that indigenous people have a lot more to teach than to learn from industrial nations. Western society is seen as inferior in its ability to adapt to the natural environment while providing for the material needs of all its citizens. Marshal Sahlins calls tribal society the "original affluent society."

There has now developed from these new groups of dissident anthropologists a set of ethics, used as a check on potentially unethical anthropology. To begin with, there needs to be a way to create a standard for a way of thinking, for choices of research topics and methodologies that will do no harm to the people studied. Freedom for the pursuit of truth as social scientists means the second concern is to protect anthropologists from their employers in government, university administration, or private funding agencies from influencing the results of their studies.

The political end of any research remains an important consideration. Self-restraint in research is a must at all times, to prevent the establishment of bureaucratic watchdog agencies that may not understand the issues involved.

Funding is a particularly difficult ethical problem. The researchers must ask to what purpose the results of their research will be used. If the potential for harm is instigated by the funding agency, then the research should be terminated.

In conclusion, the values of the anthropologist reflect three separate issues. First there is a professional commitment to carry out the best possible research. Anthropologists must use the highest professional standards in carrying out that research, if they are to be accepted as professionals. Second, anthropologists of all theoretical schools must accept responsibility toward the people they study. Third, anthropologists need to understand the legal contract carried with the employer or funding agency. Beyond that there is little agreement. Even the degree to which anthropology is a social science is highly debated. Issues such as the desirability of objectivity or value-free observation has come under attack since the late 1960s. The controversy is a long way from being settled. This brings up the closely related issue of cultural relativism and to what degree the anthropologist's responsibility is to the people being studied. Increasingly, a larger number of anthropologists come to strongly identify with people other than those in centers of power. If the anthropologists closely identify with people seen as oppressed, exploited, and powerless, this puts them in conflict with the funding agencies, which pay for research. There is little agreement as to what the role of anthropologists will be in the future.

— *Michael Joseph Francisconi*

See also **Anthropology, Economic; Cultural Ecology**

Further Readings

Bennett, J. W. (1996). Applied and action anthropology: Ideological and conceptual aspects. *Current Anthropology, 37*(1), S22–S53.

Bodley, J. (2001). *Anthropology and contemporary human problems.* Mountain View, CA: Mayfield Publishing.

Brown, R. H., & Malone, E. L. (2004). Reason, politics, and the politics of truth: How science is both autonomous and dependent. *Sociological Theory,* 22(1), 106–122.
Collins, R. (1998). *The social causes of philosophies.* Cambridge, MA: Harvard University Press.
Herskovits, M. J. (1972) *Cultural relativism: Perspectives in cultural pluralism.* New York: Vintage Press.
Sahlins, M. (1972). *Stone age economics.* Chicago: Aldine.
Sangren, P. S. (1992) The ethnographic record, rhetoric, and the authority of ethnography: "Postmodernism" and the social reproduction of texts. *Current Anthropology,* 33(1), 277–307.
Weber, M. (1949). *The methodology of the social sciences.* New York: Free Press.

Vayda, Andrew (1931–)

Andrew P. Vayda is retired from Rutgers University, New Brunswick, New Jersey, where he was Professor in the Department of Human Ecology, Cook College, and Rutgers University. Vayda received his PhD in Anthropology from Columbia University.

Vayda has maintained an interest in Popperian methodology and social science. He has taught numerous courses on the role of explanation and methodology in social and ecological science reflecting this interest in the work of Karl Popper. Additionally, his research in Indonesia as well as in other areas has reflected the importance of the work of Popper as Vayda has applied it to his own work on the processes and mechanisms of social and ecological change.

Vayda has been a major figure in anthropological research on human ecology. He has been concerned with the impact of human activity on the environment as well as in developing methods and explanations to explain the environmental effects of human action. Furthermore, Vayda has studied and written on the misuse as well as the proper use of ecological, evolutionary, and sociocultural theory. His interests extend to land use, especially tropical forestland use, conservation, and resource management. More generally he is concerned with the use of practical knowledge, including how it is produced, transmitted, and changed.

He has worked with and taught many of the major figures in the human and cultural ecology movement, including his most prominent student, Roy Rappaport, and the influential Julian Steward. Vayda continues to write influential books and articles, directing attention to the interrelationship between human and the environment while seeking ways to improve that interrelationship.

— Frank A. Salamone

Further Readings

Alland, A., Jr. (1970). *Adaptation in cultural evolution an approach to medical anthropology.* New York: Columbia University Press.
Vayda, A. P. (Ed.). (1969). *Environment and cultural behavior: ecological studies in cultural anthropology.* Garden City, NY: The Natural History Press.
Vayda, A. P., Walters, B. B., & Setyawati, I. (in press). Doing and knowing: Questions about studies of local knowledge. In A. Bicker, P. Sillitoe, & J. Pottier (Eds.) *Investigating local knowledge: New directions, new approaches.* London: Ashgate Publishing.

Venezuela

Located on the north coast of South America, Venezuela is a country of stunning scenery and extreme cultural diversity, including the forest-dwelling Yanomamo and modern Caracas with its economy fueled by petroleum. The climate is generally tropical, but diverse habitats from Amazon rain forest to tall, cold mountains support high biological diversity, including at least 21,000 species of higher plants and 323 mammals. With more than 40 living languages, Venezuela provides the stage for some of the most contentious debates in anthropology. Collaborative international research efforts have included Venezuelan, French, German, American, and other anthropologists.

Venezuela includes an area of 912,050 square kilometers—roughly the size of Texas and Oklahoma or France and Italy combined. The total population is 25 million, with an annual growth rate of 1.4%. Most people (85%) live in cities in the north, with more than four million in Caracas, the capital city. The

literacy rate is high (91%). Venezuelans are relatively healthy, having a 73-year life expectancy at birth. Infant mortality is 26 per 1,000 live births. With a US $3490 gross national income per capita in 2003, Venezuela is one of the wealthier Latin American countries, although 58% of income is concentrated among the wealthiest 20% of the population.

Sustained European contact began in 1499 when the Spaniard Alonso de Ojeda explored Venezuela's Caribbean coast. Caracas was established as a Spanish colonial center in 1567. The indigenous population was exploited for labor throughout the colonial era, and slaves were brought from Africa beginning in 1528. Simón Bolívar was born in Venezuela in 1783, and became the political and military leader of the regional struggle for independence from Spain. Venezuela declared independence in 1811, but the Spanish were not defeated until 1829. Bolívar abolished all slavery by decree in 1812. He is idolized by Venezuelans, and his visage appears in nearly every public area.

The German naturalist Alexander von Humboldt and French botanist Aimé Bonpland studied nature and culture as they traveled throughout the Americas between 1799 and 1804. They collected the first botanical specimen of the rubber tree in Venezuela's Orinoco Basin. The rubber boom that began in Venezuela's southeastern tropical forests in the 1870s led to exploitation and territorial invasion of Ye'kuana, Yanomamo, and other indigenous groups by rubber barons. Prior to the 1920s, coffee cultivated in the coastal foothills remained the primary export product, and led to the early assimilation of indigenous populations. Foreign-owned companies began to develop Venezuela's vast oil resources in the 1920s. A founding member of OPEC (Organization of Petroleum Exporting Countries), Venezuela nationalized its oil industry in 1975, resulting in rapid economic development but limited diversification. The petroleum industry currently accounts for one third of Venezuela's gross domestic product. Approximately 90% of Venezuela's crude oil exports go to the United States. This economic relationship produces a pronounced American influence on Venezuelan politics and culture, including entertainment and consumer commodities. Venezuelans take pride in a democratic two-party system that has existed since 1958. Steadily declining oil prices over the past 30 years have compromised the economy and political stability. Impacts of oil development on indigenous populations have been severe. Anthropologists Filadelfo Morales and Karl H. Schwerin have described a 40-year struggle between the oil industry and the Cariña people.

Cultural Groups

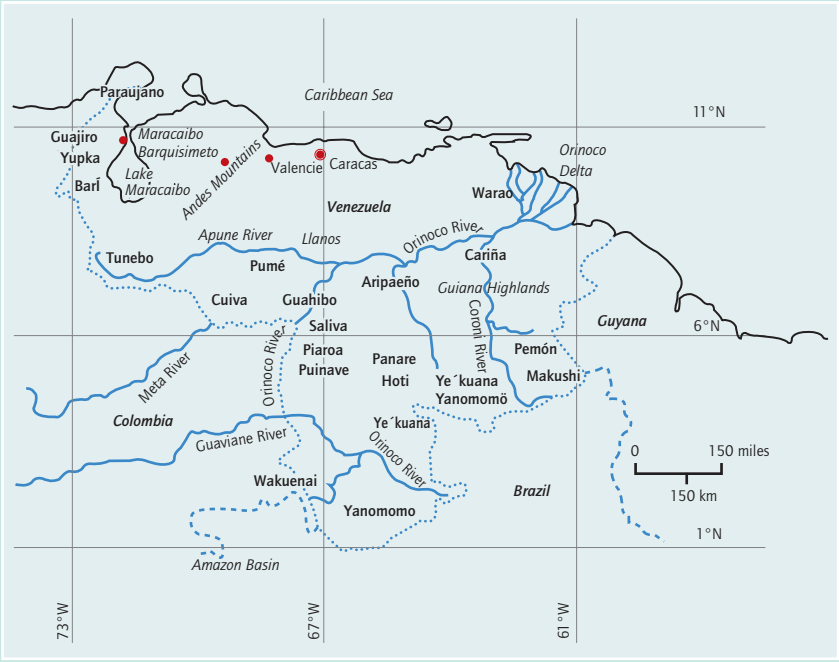
There are three general cultural groups. Spanish-speaking descendents of colonial immigrants and more recent immigrants from Europe and other Latin American countries work in petroleum, manufacturing, commercial agriculture, mining, and service industries. They are predominantly Catholic. European languages like German and Italian are sometimes spoken within this group.

Roughly 2% of Venezuela's people are indigenous descendents of those who migrated to the area before the Spanish. Most practice either pure or syncretic forms of Catholicism or Protestantism. Venezuela straddles the geographic ranges of the Carib, Arawak, Savila, and Chibcha linguistic families. Languages not assigned to a family (isolates) include Puinave, Hoti, Guahibo, and possibly Pumé. Some of these people were originally foragers who did not plant gardens, but most practiced swidden (slash and burn) horticulture to grow manioc, maize (corn), bananas, and plantains as staple foods—supplemented by fishing, hunting, and collecting wild plants. Some groups like the Yanomamo continue this lifestyle. Other groups like the Barí and Makushi combine subsistence horticulture with commercial agriculture and wage labor. Groups like the Cariña and Paraujano are more integrated into the dominant economy, live in towns, speak Spanish as well as their own language, and occasionally marry outside their ethnic group.

Regarding the third group, Venezuelan ethnohistorian Berta E. Pérez describes the Aripaeño of Bolivar State as an example of descendents of slaves who overcame diverse African heritages and banded together in resistance to colonial slavery. Other Afro-Venezuelan groups are concentrated in the state of Miranda. Most speak a creolized Spanish.

The population is unevenly distributed throughout five physiographic zones (Figure 1). The Andes and smaller forested mountain chains in the north separate the dry coast from the interior. Most people live in cities in the coastal plain or lower mountains. Sociologist Audrey James Schwartz's 1975 study of barrios (impromptu neighborhoods) that sprawl up hillsides around Caracas challenged Oscar Lewis's "culture of poverty" theory. Other groundbreaking

urban ethnographies from the area include Lisa Redfield Peattie's analyses of barrios in Ciudad Guayana and Margalit Berlin's participant observation of factory seamstresses. Indigenous groups still exist in this area. Lawrence Craig Watson and Maria Barbara Watson-Franke have studied cultural change among rural Guajiro, including migration to barrios in Maracaibo City. In 1981, Antonio J. López Epieyú published a dictionary of Guajiro language, still spoken by more than 300,000 people. Kenneth B. Ruddle has described change in agricultural strategies among the neighboring Yupka. On the basis of nearly 40 years of research, Venezuelan anthropologist Roberto Lizarralde has described change among the Barí. Further east, Johannes Wilbert, María Matilde Suárez, and Basilio Marío de Barral have published ethnographic and linguistic accounts of the Warao of the Orinoco Delta.



Venezuelan cultural groups discussed in anthropological literature and major geographical features.

South of the Andes Mountains, the llanos (plains) extend eastward and comprise one third of Venezuela's territory. Extreme seasonal variation in rainfall creates savannah punctuated by scrub woodlands and gallery forests along rivers. Commercial agriculture includes cattle and rice. Large rivers have supported trade networks. Ted L. Gragson's research shows how Pumé along the Apure River rely heavily on fishing to supplement swidden horticulture. Anthony Leeds has explained Pumé social organization using their cosmology. The Guahibo and Cuiva of this area were subsistence foragers, only recently transitioning to horticulture. The Cuiva have endured territorial invasion and genocide by ranchers.

In the east, the Guiana Highlands transition from savannah in the north to mountainous tropical forest in the south. The Pemón and Panare inhabit the transitional zone, where conflicts with mining and commercial agriculture continue. Most rivers flow into the Orinoco River, and are the lifeblood for groups like the Panare, the ethnographic subjects of Jean-Paul Dumont and Paul Henley. Mariano Gutiérrez Salazar's analysis of Pemón cosmology also documents the cultural importance of the area's rivers and mountains. The southern tropical forests of the Guiana Highlands are home to the Piaroa, studied by Joanna O. Kaplan, Pedro J. Krislogo, and Stanford Zent. Venezuelan anthropologist Nelly Arvelo-Jiménez and French anthropologist Marc de Civrieux have conducted ethnographic studies of the Ye'kuana (Makiritare). Walter Coppens has documented invasions of Ye'kuana territory. The Yanomamo inhabit the southeastern forests bordering Brazil. The Wakuénai are found to the less mountainous southwest, where Venezuela's rivers flow to the Amazon.

Issues in Venezuelan Anthropology

Anthropologists have influenced Venezuelan politics through social critique and activism. European colonists and their descendents relied primarily on Catholic missions to acculturate indigenous populations. Napolean Chagnon and others argued that missionaries negatively affected indigenous peoples.

Filadelfo Morales and Nelly Arvelo-Jiménez have criticized the government's peasant and indigenous development policies since the 1960s as culturally and socially destructive. In 1989 indigenous peoples formed the Venezuelan National Indian Council (Consejo Nacional Indio de Venezuela). They achieved a political victory when many of their rights were codified in the revised national constitution in 1999.

The Venezuelan Institute for Scientific Research (Instituto Venezolano de Investigaciones Científicas) was established in 1952. Jacqueline Clarac de Briceno suggests this shifted Venezuelan anthropology from particularism to functionalism. Much of the new research was ecological. Stimulating one of the most important debates in anthropology, Chagnon used sociobiology to argue that the culturally isolated Yanomamo he studied exemplified a natural human tendency toward warfare, contradicting Rousseau's proposition that "primitive" people are more peaceful. Timothy Asch's films of Yanomamo violence are still widely used in anthropology classes. French Yanomamo ethnographer Jacques Lizot rejects the focus on violence. Marvin Harris's proposal that Yanomamö warfare resulted from environmental protein scarcity stimulated extensive ecological research in Venezuela and elsewhere. Detailed analyses of Yanomamo nutrition and subsistence strategies by Lizot and Raymond B. Hames indicated no protein scarcity.

Paleoarchaeological research suggests that hunting populations had migrated into Venezuela by 11,000 years before present. The exact date of manioc (cassava) domestication is difficult to determine, but appears to have became a staple food by 4,000–3,000 years before present. Maize was domesticated in Mexico, and its cultivation spread eastward into South America. By analyzing carbon isotopes, Anna Roosevelt and her colleagues documented a shift from manioc to maize during the first millennium AD on the Orinoco floodplain. Many Venezuelan populations never fully adopted maize. The archaeological record indicates that beginning around 500 AD, a network of chiefdoms began to emerge in Venezuela, characterized by mound building, extensive trade networks, agricultural intensification, and irrigation. Excavations by Charles Spencer, Elsa Redmond, and Rafael A. Gassón in the western Llanos revealed variable house sizes, burials, and ceremonial plazas that indicate social stratification and centralized authority. Such chiefdoms still existed when the Spanish arrived. Complex, hierarchical, bureaucratic state structures like the Inca and Classic Maya never developed in Venezuela. Ethnographic research by Anthony Leeds and David John Thomas suggests that flexible subsistence reduces the potential for centralized authority.

Past anthropologists generally considered Venezuelan cultural evolution to proceed from complex pre-Columbian societies to simpler forms after European influence. Neil L. Whitehead, Jonathan D. Hill, Gassón, and others argue that the situation is more complex, with new forms of social organization emerging as indigenous populations cooperated with, or resisted, colonialism. Debates about regional networks of power and trade systems continue, including how important they were, how they changed with European influence, and whether they will continue.

Archaeological and ethnohistorical data show more social complexity emerged in western Venezuela than the east before the Spanish arrived. In the early 1970s, Betty Meggers suggested that chiefdoms did not develop in Amazonia because of poor soils, and thus nature constrains culture. Roosevelt's archaeological research in Venezuela and other Amazon areas, combined with ethnographic evidence from Emilio Moran, Jonathan Hill, Leslie Sponsel, and others, show flexibility in resource use can overcome many environmental limitations. A recent combination of archaeological and satellite data shows that past human activities created much of what was previously thought to be pristine Amazonian forest. Ecological studies from other areas of Venezuela include Stephen Beckerman's analysis of Barí foraging, horticulture, kinship, and protein budgets, and Michael Jeffrey Paolisso's research on Yupka time allocation.

The focus of anthropology in Venezuela, including ecological approaches, continues to shift from tribal to peasant and urban populations and issues of migration. The relevance of ethnohistorical analyses is increasing as people struggle to verify their ethnic ancestry. The biological and cultural effects of acculturation and migration represent an important current area of research. Further integration of ecological, biological, and cultural approaches will influence issues of health intervention and cultural survival, especially among formerly isolated groups like the Yanomamo.

— David G. Casagrande

Further Readings

Chagnon, N. (1983). *Yanomamo: The fierce people.* New York: Holt, Rinehart, and Winston.

Civrieux, J.-M. de. (1980). *Watunna: An Orinoco creation cycle.* San Francisco: North Point Press.

Márquez, G. G. (1990). *The general in his labyrinth.* New York: A. A. Knopf.

Pérez, B. (2000). Rethinking Venezuelan anthropology. *Ethnohistory, 47,* 513–533.

Rouse, I., & Cruxent, J. M. (1963). *Venezuelan archeology.* New Haven, CT: Yale University Press.

Venus of Willendorf

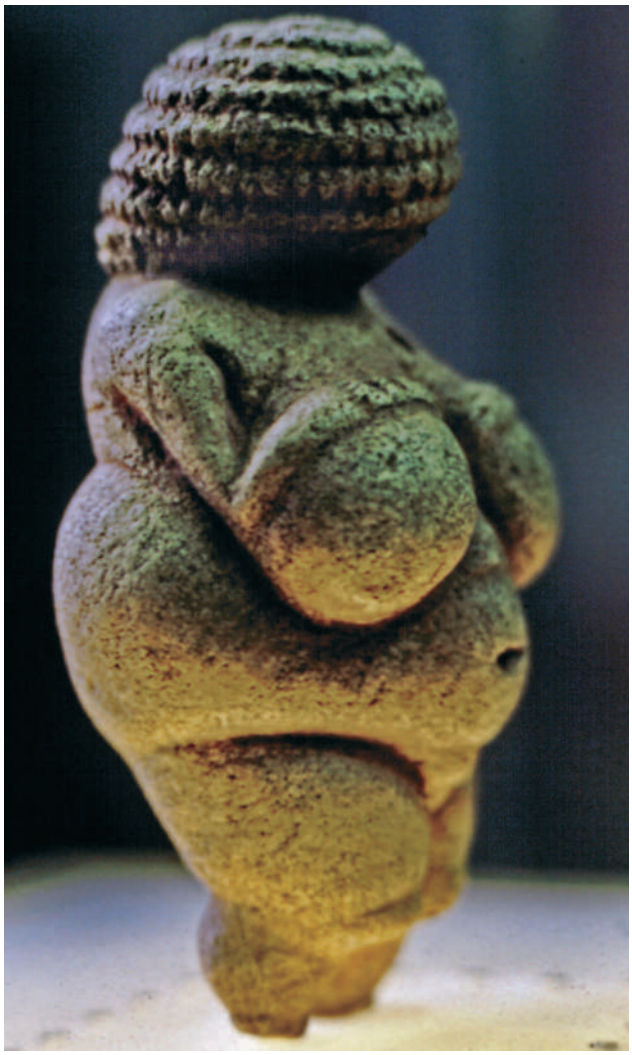
The Venus of Willendorf, a small female figurine with exaggerated sexual characteristics, is arguably the most famous example of Paleolithic portable art. It was found in 1908 by archaeologist Joseph Szombathy near the town of Willendorf, Austria, in loess deposits dated to the Aurignacian period (24000–22000 years BP). It is currently housed in the Naturhistorisches Museum in Vienna.

Prehistoric art is generally categorized as either *parietal* cave/wall art, or *portable* art. Portable art consists of small, transportable objects made from stone, bone, antler, ivory, or shell. These objects could be obviously functional, such as spearthrowers, or without an obvious function, suggesting ceremonial or ritual use. Portable objects were decorated with images of animals, humans, or symbols; some were sculpted into animal and human figurines. The human figurines, found throughout Eurasia from Western Europe to Siberia, are almost exclusively female. These female statuettes are generally called "Venus figurines" because they depict a faceless, voluptuous, often corpulent, female body with a heavy emphasis on the breasts, stomach, buttocks, and pubic region.

The Venus of Willendorf is 11 cm (4.3 in) tall, carved from limestone, and fits easily into the palm of the hand. The figurine depicts a fleshy woman with heavy hips and voluminous belly and breasts. Her large hips and thighs taper to small ankles. Her arms are small and are resting above her breasts, and both her wrists are adorned with bracelets. Her head is tilted forward; no face has been carved. However, much attention was given to her elaborate plaited hairstyle that extends down to the nape of her neck. The plaits are wrapped in seven concentric bands around her head. Originally the figurine was painted with red ochre. The statuette is made of nonlocal limestone, meaning that either the raw material or the finished product was brought to (or traded into) the site.

What do the Venus of Willendorf, and other Venus figurines, represent? With all art, the social context in which these figurines were carved holds the key to what made them meaningful to their owners. The social context, however, is not well understood for these nomadic Paleolithic societies, and there are many interpretations of the role of the Venus figurine.

The most commonly cited interpretation of these figurines is that of fertility fetish or fertility goddess.



Source: © Kathleen Cohen.

To support this view, researchers point to the artist's emphasis on the stomach, breasts, buttocks, and pubic area, suggesting sex and procreation. Some argue that the red ochre pigment originally covering the statue symbolizes menstrual blood, thought to be a life-giving material.

A second interpretation of the Venus figurines is as a talisman. Its small size makes it possible for men to carry it during hunting trips. Its fertility symbolism, again, could be thought to help increase the number of animals, bringing hunting success. Some cite the facelessness of the figurine, suggesting it functioned more as a symbol rather than a representation of a person. However, others argue that to humans, the face is a key feature in identity; since the Venus figurines lack a face, they lack identity, and can be regarded as anonymous sexual objects.

For many researchers, the figurines' fertility symbolism itself is questioned. Whereas some of the figurines appear pregnant, many are simply obese. For these active, nomadic Paleolithic hunting and gathering groups, obesity would be a rarity. None of the few male figurines or images from this period is depicted as obese. If this is an obese woman, she would perhaps have had a special status in the group. From this and the fact that these figurines are widespread geographically, some argue that the Venus figurines serve as an illustration of a prominent female deity identified as a mother goddess. Some researchers suggest that this reflects the relative importance, perhaps even dominance, of women in Paleolithic societies. Alternatively, its function might be tied exclusively to the female sphere, carved by women for women.

Despite the preponderance of explanations, the meaning of the Venus figurines remains elusive, and interpretations often reflect current society as much as that of its makers.

— *Cathy Willermet*

See also **Cave Art**

Further Readings

Bahn, P., & Vertut, J. (2001). *Journey through the Ice Age.* Berkeley: University of California Press.

Conkey, M. W., Soffer, O., Stratmann, D., & Jablonski, N. G (Eds.). (1997). Beyond art: Pleistocene image and symbol. *Wattis Symposium Series in Anthropology, Memoirs of the California Academy of Sciences Number, 23.* San Francisco: California Academy of Sciences.

Marshack, A. (1991). *The roots of civilization: The cognitive beginnings of man's first art, symbol and notation* (2nd ed.). Mt. Kisco, NY: Moyer Bell.

Vernadsky, Vladimir Ivanovich (1863–1945)

Vladimir Ivanovich Vernadsky, an outstanding Russian mineralogist, biogeochemist, historian of science, philosopher, and political figure especially concerned himself with the origin and historical development of humankind as a natural stage of the biosphere evolution, and a place of man as an "autotrophic" species in a present-day biosphere. The peak of his research work fell on in the period of great upheavals in the history of Russia. Nevertheless, his scientific career, successfully started in the Russian empire, was brilliantly continued in the USSR (Union of Soviet Socialist Republics). Holding high positions, Vernadsky expressed his dissent not once, but—however strange it might be—he was not subjected to repression. On the contrary, he became one of the figures of an official myth about the "coryphaei of natural science" who had come to believe in historical rightfulness of the communist ideas after a long period of hesitation. In the "pantheon of Russian science," he was given a place of an encyclopedist of the 20th century, a thinker and a scholar who had anticipated future tendencies of science and human development.

Vernadsky was a member of the Paris Academy of Sciences (1922), Czechoslovak Academy of Sciences (1928), Yugoslavian Academy of Sciences, and more than thirty 30 Russian and foreign scientific associations. All elements of an official cult were also present: an Academy collection of his works; numerous republications of writings; books devoted to his work, congresses, conferences, and seminars; perpetuation of his memory in the names of institutes, avenues and streets, metro stations, name grants, and prizes; monuments, memorial plates, and jubilee medals, and the list goes on. Harsh critics of his biogeochemical

works for idealism and vitalism in the 1930s to 1950s changed into violent apologetics in the 1960s. A true renaissance of Vernadsky's scientific work began. Since then, thousands of works have been written about his theory of the biosphere and the noosphere, philosophy, and history of science. Many people have been looking in his books for the answers to the burning questions arising at the present stage of human development. Many of his books have been numerously republished not only in Russia, but in West Europe and in the United States.

The Beginnings of Scientism and Liberalism

Vladimir Vernadsky was born on March 12, 1863, in St. Petersburg in a house in the Millionnaya Street, which starts from the Winter Palace, the main residence of the Russian emperors. His father, Ivan Vladimirovich, professor of political economy and statistics, was a chairman of the Political-Economical Committee of the Free Economical Society (Vol'noye ekonomicheskoye obshchestvo), the publisher and the editor of the magazines "*Ekonomicheskiy ukazatel*" and "*Economist,*" to which prominent Russian economists, liberal statesmen, and political men contributed. Natural science was popular in the Russian society of the 1860s and 1870s. It was seen as the means of liberation from religion and authoritative power. It's no wonder that, from a very young age, Vernadsky's favorite books were *The Space* by A. Humboldt and *On the Origin of Species* by Charles Darwin. He carried out meteorological observation, took research tours to the outskirts of St. Petersburg, collected herbariums and butterflies, participated in the publication of a hand-made natural scientific magazine in the gymnasium, and regularly read *The Nature* magazine. Young Vernadsky was also interested in historical books, ethical-religious writings, philosophy, philology, economics, and foreign languages; he was fond of fiction, painting, and theater. At a mature age, he could read and write in 15 languages, including Greek, Latin, and all Slavonic, Romantic, and Germanic languages. Evolution of nature, development of humankind, constitutional-democratic reforms in Russia, enlightenment of people, the role of science in modernization of the country, and the Slavonic problem all interested him since his childhood.

From 1881 to 1885, Vernadsky was a student at the Natural Scientific Department of the Physical-Mathematical Faculty of St. Petersburg University, where the flower leaders of in the Russian science gave lectures. Vernadsky took his broad scientific approach from them. The views of the intelligentsia of the postreformed Russia, who called for radical but gradual reorganization of the society, became the source of his becoming a scientist. The views were formed under the influence of the authority of science, which was growing all over the world, amazing discoveries and their technical realization testifying to the near coming of industrial society. Not only scientists themselves, but also a substantial number of manufacturers and politicians all over the world considered science the major factor in the improvement of society. It was becoming clear that the development of science was possible under a powerful state support. Vernadsky believed that it was especially important in Russia, where all scientific creative work was connected—directly or indirectly—with the state.

During a students' meeting in St. Petersburg University on November 10, 1882, and following short-term arrest, Vernadsky got acquainted with some humanitarians, and together they created a circle of liberal orientation. Later on, many of its members became prominent scientists and politicians. Among them was S. F. Oldenburg, who was a permanent secretary of the Academy of Sciences for more than a quarter of a century, and, in fact, was its head during the period of the revolutionary shake-ups. Vernadsky was elected one of the leaders of the scientific-literary society, where Aleksandr I. Ul'yanov—an elder brother of Vladimir Lenin, the would-be head of the Soviet government—was the secretary. In 1886, Vernadsky was elected chairman of an illegal students central council of united *Zemlyachestva* (associations of people of the same area). Its meetings often took place in his house. Ul'yanov and other future participants of the murderous assault on Emperor Aleksandr III were also present there. In 1887, Vernadsky's wife, Natalia E. Staritskaya, a daughter of Senator Egor. P. Staritsky, gave birth to son Georgiy V. Vernadsky, a would-be historian, professor of Yale, Harvard, Columbia, and Chicago Universityies in the USA.

The Formation of the Scientist

Vernadsky's teacher was Vasily V. Dokuchaev, the founder of genetic soil science, professor of

St. Petersburg University. Vernadsky carried out his first research in his expeditions in 1882 and 1884. In 1885, he graduated from the university and was offered the opportunity to stay there and prepare for the status of professor. His career, so successfully started, nearly broke down in 1887, when People's Enlightenment Minister Ivan D. Delyanov suggested Vernadsky should turn in his resignation, being accused of illegal activities and contacts with terrorists. Thanks to the interference of Dokuchaev and Staritsky, the resignation was substituted by a research trip abroad. In 1888–1890, Vernadsky was writing his master's theses in the best laboratories of Italy, Germany, France, and Great Britain. He took part in the World Industrial Exhibition in Paris, where he was in charge of demonstrating soil collections of Dokuchaev and his followers. As a result, the Department of Russian Soils got the golden medal at the exhibition.

From 1890 to 1898, Vernadsky was an assistant professor at Moscow University. He completed a master's thesis, "On a Sillimanite Group and the Role of Alumina in Silicate" (1891), and a doctoral dissertation, "The Phenomenon of Crystalline Material Sliding" (1897). He turned the uncoordinated gatherings of the Mineralogical Laboratory of the Moscow University into a valuable museum collection, and the laboratory itself into a research institute. In his first works, Vernadsky already tried to integrate different fields of knowledge (geology, paleontology, evolution) and create important natural scientific and world outlook view conceptions. This attracted youth to him and allowed him to quickly create a powerful scientific school, which united future members of AS USSR geochemist Aleksandr P. Vinogradov, crystallographer Aleksei V. Shubnikov, mineralogist Aleksandr E. Fersman, radiochemist Vitaly G. Khlopin, chemist-mineralogist Konstantin A. Nenadkevich, and others.

Vernadksy went on numerous geological-mineralogical and soil-studying excursions in Russia and Europe and studied geological, paleontological, mineralogical, and meteorite collections in the first-rate museums of the world. The number of his Russian and foreign contacts grew intensively and, by the end of his life, it included more than 2,000 people. In 1888 and 1897, Vernadsky worked out a concept of silicate structure, put forward a theory of kaolin nucleus, made a classification of siliceous compounds more accurate, created genetic mineralogy, and determined a connection between the form of crystallization of a mineral, its chemistry, genesis, and formation conditions. He paid special attention to practical usage of minerals. In 1903, his monograph "The Basics of Crystallography" came out, and in 1908, the publication of "An Experiment With Descriptive Mineralogy" issues began.

From the beginning of the 20th century, Vernadsky occupied an important place in the scientific community of Russia. From 1898 until 1911, he was a professor at Moscow University, an assistant of the rector, and one of the founders and a professor of the Shanyavsky University. In 1906, Vernadsky was elected junior research assistant at the Imperial Academy of Sciences and appointed the head of the mineralogical department of the geological museum. In the same period, Vernadsky formulated basic ideas and problems of geochemistry and carried out the first systematic research of the elemental structure of the atmosphere, hydrosphere, and lithosphere. From 1907, Vernadsky carried out geological research of radioactive elements, thus starting radiogeology in Russia. He was one of the first to see it as a powerful means of providing people with unlimited energy.

In 1902, Vernadsky started a course of lectures on the history of Russian science. From that time, historical-scientific issues became an essential part of his research. In 1902, his historical-scientific study "On the Scientific World Outlook" came out. Later, he published "Studies on the History of Natural Science in Russia in the 18th Century," "The Academy of Sciences in the First Century of Its History," studies on the history of crystallography and soil study, and articles devoted to outstanding Russian and foreign scientists. In his historical-scientific works, Vernadsky showed the continuous transformation of the world pattern and change in the value of obtained facts and conclusions, predetermined with a complex of cognitive and social-cultural factors. He also proved the originality of the Russian science and also the necessity to follow its age-old traditions. The history of science became for him a source of a better understanding of the biospheric evolution and scienctific development as its natural continuation.

Political and Scientificce Organizational Activities

In the prerevolutionary years, Vernadsky actively participated in social-political life, which was tightly

connected to him with an effort of turning the biosphere into the noosphere. In 1891 and 1892, together with a famous writer Leo Tolstoy, he founded a social fund for helping the starving in the Tambov region. In connection with the students unrest at the end of the 19th and the beginning of the 20th centuries, Vernadsky spoke in support of the reestablishment of university autonomy and regulation of the power of police inspectors at the universities. He worked out a project of the higher school reform (1901). At the time of the bourgeois–democratic revolution (1905–1907), Vernadsky took part in the organizing of the Academic Union, which demanded political liberties, constitutional monarchy, democratization of the higher school, abolition of censorship, and foundation of professional political unions of intelligentsia and nonmanual workers. At the constituent meeting of the constitutional–democratic party in October 1905, he was elected a member of the central committee. He was an active advocate of an agrarian reform, helping the starving, abolition of the death penalty, and general political amnesty. In March 1906, Vernadsky was elected as a member of the State Council on behalf of the academic curia, and in July, 1906, he resigned as a token of protest against the dissolution of the State Duma. For the second time, he was elected a member of the Council in January 1908. Together with other professors, he left Moscow University in 1911, protesting against the reactionary politics of People's Enlightenment Minister Lev A. Kasso.

In 1911, Vernadsky moved to St. Petersburg, and in 1912, he was elected as an ordinary academician on mineralogy at the Imperial Academy of Sciences. In 1911 to –1914, he organized and headed several academic radium expeditions to the Urals, Transcaucasia, Middle Asia, and Transbaikalia; organized a radium committee (1910) and mineralogical and radiogeological laboratories (1911); and conducted a reorganization of the geological museum on the principles of evolutionism. Vernadsky called for a radical reform of research. The government supported his idea to create the Lomonosov Institute, but World War I, which soon erupted, buried the project. Vernadsky understood that without the backing of scientists, Russia was doomed to defeat. In October 1915, he became a member of the State Council once again, and in 1916, a member of the economical commission committee of the Russian Parliament economical committee, included in the parliament assembly of the Entente.

In 1915, together with other science leaders, Vernadsky organized and headed the Committee for the Studying of Productive Forces of Russia (*Komissiya po izucheniyu proizvoditel'nyh sil Rossii*, or KEPS), which became the base for several dozen scientific institutions in St. Petersburg. Some members of the Cabinet of His Majesty the Emperor, of a number of civil and military ministries and committees, and many scientific and scientific–technical associations of Russia were among the members of KEPS. KEPS promoted the creation of a base of raw materials and minerals of the country and working out the scientific -organizational approaches to the study of source potential of the regions. In 1915 to 1917, KEPS participated in the publication of the magazines *Nature* and *Productive Forces of Russia* and, organized 14 expeditions to different regions of the country. In 1916, Vernadsky offered a plan of establishing a network of state scientific research institutes, and at the end of 1917 and the beginning of 1918, an institute of physical-chemical analysis and an institute for the study of platinum and other precious metals were organized. Other projects were fully realized in the Soviet period.

The work in KEPS stimulated Vernadsky to develop systematic research in the field of biochemistry, the theory of living substance and the biosphere. In 1916, he started working out the foundations of biogeochemistry, studying the chemical structure of organisms and its role in atoms molecular migration in the geological coverings surface of the Earth, and transformation of the atmosphere, the hydrosphere, and the lithosphere.

After the February Revolution of 1917, Vernadsky upheld the policy of the provisional government to continue the war and actively came out in favor of federal system in Russia. He was chairman of the committee for the academic institutions and scientific enterprises at the Ministry of the People's Enlightenment, and an assistant minister. Vernadsky actively participated in organizing a free association for the development and spreading of positive sciences, in working out plans for creating a network of universities and research institutes, as well as new academies in Siberia, Georgia, and the Ukraine. After the October Revolution, Vernadsky became a member of the Small Council of Ministers, and on its illegal meeting on October 17, 1917, he signed an "Appeal to the Citizens of Russia," which declared the Bolsheviks' seizure of power illegitimate. Hiding from arrest, Vernadsky left

for the south of Russia, where he went through all the horrors of the civil war and repeated change of power, and came to the conclusion that the Russian people were not ready for democracy. From that time on, he kept away from politics.

During the civil war, Vernadsky was one of the founders and the first president of the Ukrainian Academy of Sciences and the rector of the Taurida University. After the Crimea had been captured by the Bolsheviks in the spring of 1921, Vernadsky returned to Petrograd, where he was arrested for a short while, but was quickly set free. He continued as head of the council of KEPS, headed both the State Radium Institute, which he had also founded, and the Committee for the History of Knowledge. He supported the studies of the atomic nucleus, aiming at the usage of the radioactive decay energy. At the same time, Vernadsky conducted intensive biogeochemical research and prepared a vast manuscript, "Living Substance," (which came out finally in 1978). Vernadsky presented in it the first comprehensive conception of the leading role of the organic world and human beings' activity in the transformation of the biosphere. The first results of his research were published in 1922 in *Chemical Structure of the Living Substance*, and also in 1922, *Beginning and Eternity of Life.*

The Theory of the Biosphere and the Noosphere

From 1922 to 1926, Vernadsky was abroad, giving a course of lectures at the Sorbonne, working at the mineralogical laboratory of the natural history museum and at the Pierre Curie Radium Institute, trying to find the funds for organizing an international institute for the study of living substance. In 1924, Vernadsky published *The Studies in Geochemistry* in French, in which he gave for the first time a systematic account of his biogeochemical views. In 1926, Vernadsky returned to Leningrad and published his famous book *The Biosphere,* translated into French in 1929. He organized a department of living substance, which was transformed into a laboratory in October 1928. In 1933, Vernadsky headed the meteorite committee at AS USSR.

At that time, Vernadsky formulated the main principles and problems of biogeochemistry; created a theory of the biosphere and its evolution; set problems and began quantitative research of the elemental structure of living substance and its geochemical functions; and determined the role of individual species in the transformation of energy in the biosphere, in geochemical migrations of elements, lithogenesis, and mineralogenesis. Vernadsky outlined the main stages of the biospherice evolution and its basic patterns (expanding of the life zone, increase of accumulated solar energy in the surface coverings of the Earth, intensification of biotic circulation, growth of biodiversity and informational capacity of the biosphere, cephalization, or steady growth of consciousness in animals' progress).

Guided by the idea of Edgar Le Rou (1927), at the end of 1930-s, Vernadsky formulated a hypothesis of an inevitable conversion of the biosphere into the *noosphere,* i.e. the sphere of mind, and gave a brief characteristic of its features. Earlier, he had been proving the possibility of the autotrophic existence of man (1925), that is, the possibility of man's starting to live on artificially synthesized food thanks to the usage of immense reserves of nuclear energy. Vernadsky was sure that humans would become the most mighty geological power, capable of determining predestining the further development of the Earth and its organic world.

Vernadsky understood that the development of science in the Soviet Russia was possible only under state support, and he did his best to strengthen scientific potential of the country, believing that the future belonged to scientists and the communist regime would transform under the influence of the scienctific progress. He was one of those who agreed to the loss of autonomy of the AS USSR in exchange for providing it with significant material, financial, and human resources. Although he held the position of head of a number of academic institutions in Leningrad, Vernadsky left for Moscow because of the move of the academy to the capital, owing to the decision of SNK (Soviet Narodnyh Komissarovm, a Council of People's Commissars) and Politburo CK VKP(b) (Central Committee of the All-Union Communist Party of Bolsheviks). But he held the position of the head of a number of academic institutions in Leningrad. In 1941, together with other academicians, he went into exile in Borovoe, Kazakhstan. In 1943, he was awarded Stalin's Prize.. Half of it, he gave to the defense fund, and the rest, he distributed among his needy friends.

During the period from 1920 to 1945, penal institutions more than once prepared the materials about

Vernadsky's supposed participation in various anti-Soviet saboteur activities. To save his students, followers, friends, and staff from repression, Vernadsky sent dozens of intercession letters to the Presidium of the Supreme Council of the USSR, to the SNK, to the Office of the Public Prosecutor of the USSR, and to the People's Committee for Home Affairs.

Vernadsky abruptly changed his attitude toward the Bolsheviks in the middle of the 1930s, when the rhetoric of proletarian internationalism and class struggle was replaced with the ideas of concentration on the interests of the state, nationalism, and patriotism. He also liked the slogan about transformation of the USSR into the world scientific center. With the turn of the USSR into a successor of the Russian empire, he started viewing Bolsheviks as politicians who had managed to retain national independence of the country and return it to a merited place in the world. Vernadsky understood that the positive changes were bound up with the labor of millions of convicts. He believed that their work was "in the interests of the state" and that thanks to repression, the social and intellectual power of the masses could be better revealed. Most of all, he feared then that exterior forces would try to destroy "the communist Russian state" or would make it backslide from its modernization policy.

These very years became the golden age for the "scientific empire" of Vernadsky. He was the head of several academic institutions at the same time. There were dozens of venerable scholars among his followers, and still more ahead. In 1938, Vernadsky wrote about the accordance of his biosphere ideas to with the theoretical socialism of Karl Marx and Friedrich Engels, and he started to treat the October Revolution as an event of geological scale, which had "beguan the transition to the state system of conscious realization of the noosphere." Vernadsky saw the alliance of Great Britain, the USSR, and the United States and their struggle with the totalitarian regimes in Germany, Japan, and Italy as a guarantee of the victory of mind and democracy. He assured that "The ideals of our democracy are in harmony with spontaneous geological process and laws of nature." But what democracy did he consider ours? "Western" or "Soviet"? This is not clear from the last article published in his lifetime and written for publication not only in the USSR, but in the United States. It contained an outline of his ideas about the noosphere as the final stage of the development of the biosphere, directed by society on the basis of the laws discovered by scientists.

Vernadsky died on January 6, 1945. He was sure that the coming victory over Hitler's Germany would hasten the transition from the biosphere to the noosphere. He was buried at the Novodevich'ye cemetery.

Renaissance

The renaissance of Vernadsky's ideas came in the 1960s, first in Russia, then in the West. Since 1993, *The Biosphere* has been published four times and *The Scientific Thought as a Planetary Phenomenon* three times in Italy, Spain, Germany, France, and the United States. His ideas were used in the constructing of closed ecosystems in space flights and in the grand project of creating an artificial biosphere (Biosphere-2) in Arizona. Vernadsky's fate is typical for a scientist who started before the Revolution, then integrated into the Soviet regime, seeing it as a patron of science and the successor of the imperial ideology. Like other Russian scientists, Vernadsky treated science as means of serving the state and man, considering it the source of social and economical progress. His ideas and conceptions have gotten wide recognition in the world, and have became become one some of the theoretical grounds for the study of the history of humankind, the biosphere and its evolution, and for working out the measures of environmental protection. His ideas of the noosphere were further developed in the works by of Pierre Teilhard de Chardin.

— *Eduard I. Kolchinsky*

See also **Biogeography; Ecology and Anthropology; Evolution, Organic; Gaia Hypothesis; Russia and Evolution; Teilhard de Chardin, Pierre**

Further Readings

Kolchinsky E. I. (2002). "V. I. Vernadsky i bol'shevili." In M. Heinemann & E. I. Kolchinsky (Eds.), *Za "zheleznym zanevesom." Mify I realii sovetskoj nauki* (pp. 133–151). St. Petersburg: Dmitrii Bulanin.

Sagan, D. (1990). *Biopshere: Metamorphosis of planet earth*. New York: McGraw-Hill.

Teilhard de Chardin, P. (1975). *The phenomenon of man.* (2nd ed.). New York: Harper & Row/HarperCollins/Perennial Classics.
Vernadsky, V. I. (1998). *The biosphere* (rev. ed). New York: Nevraumount/ Copernicus/Springer-Verlag. (Original work published 1926)

Verne, Jules (1828–1905)

In the mid to late 19th century, Jules Gabriel Verne brought to the world an innovative approach to writing that was adventurous and romantic, yet scientifically sound. As the author of more than 60 novels, nearly 20 short stories, 30 plays, and various geographical works and opera librettos, Verne, along with H. G. Wells, is rightly credited as being a founding father of science fiction.

Born in the coastal town of Nantes, France, in 1828, Verne was heavily influenced in life by a family tradition of seafaring. He went so far as to run off to be a cabin boy on a merchant ship, but was returned to his parents who sent him to study law in Paris in 1847. While in Paris he became enthralled with the theater and began writing plays, the first of which was published in 1850. His father, who was extremely displeased with Verne's decision because of his desire for him to continue his study of law, subsequently cut off his financial support. As a result, Verne began selling his stories to make ends meet.

While in Paris, Verne married and gained two stepdaughters whom he also needed to support. He thus continued to write and research a variety of subjects including engineering, astronomy, and geology. His first novel *Five Weeks in a Balloon* reflected the fruits of his labor and led to a series of well-received books including *A Journey to the Center of the Earth* (1864) and *20,000 Leagues Under the Sea* (1870). It was not until he published *Around the World in Eighty Days* (1873), however, that he became a major success. The book was extremely popular and published in several languages. He continued writing and in the mid-1870s, a stage play was made of *Around the World in Eighty Days* that became hugely successful.

Verne's ability to intricately describe the scientific advances of the day and inject them into his stories

Source: Courtesy, Library of Congress.

(often using a "travel book" approach) widely appealed to readers in the late 1800s who were enthralled with global exploration and scientific progress. Although he was not trained as a scientist, he conducted meticulous research to make his books as realistic as possible. Combining adventurous stories with science fiction, Verne led readers on a voyage that seemed both plausible and genuine.

Today, his ideas cannot simply be considered fantastic or entirely fictitious, for they led Verne to postulate that there would even someday be vessels in the sky (*Robur the Conqueror,* 1886). His efforts to meticulously describe adventurous scenarios using modern science while making it understandable to a general readership is one of his greatest accomplishments and laid the framework for a new genre of writing that has inspired countless new achievements in writing and science.

— *Scott M. Fitzpatrick*

Further Readings

Renzi, T. C. (2004). *Jules Verne on film: A filmography of the cinematic adaptations of his works, 1902 through 1997.* Jefferson, NC: McFarland.

Smyth, E. J. (Ed.). (1999). *Jules Verne: Narratives of modernity.* Liverpool: Liverpool University Press.
Teeters, P. (1992). *Jules Verne: The man who invented tomorrow.* New York: Walker & Company.

Vikings

Vikings, Norsemen, or Northmen were a successful group of marauders and conquerors who expanded their influence over much of Europe, parts of the Middle East, and as far east as Russia. These groups of Scandinavian clans rose to prominence during the late 8th century and continued to be a part of Western destabilization until the late 11th century.

The common name of these people has its origins in how they were seen, the word *vikingr* was the name given to a person who would plunder. The word may have a deeper origin in the word *vik,* in which case *Viking* would roughly translate to "the men of bays (or coves)," referring to the bays and coves found in abundance on their homeland's coasts. The people known as the Vikings come from the region that currently includes Norway, Sweden, and Denmark. The Norwegians drove west into the Atlantic and the British Isles, while the Danes pushed south into the Mediterranean and Southwestern Europe and the Swedes pushed east into Russia. Seldom during the Viking Age did these Scandinavian men see any kind of national unity that could raise an army large enough to undertake the large tracts of land that they were raiding in one fell swoop. Rather the raids were held on a much more loosely based group of organizations created from fragile regional governments.

Viking incursions into Europe probably began in the late spring of 789, when three longboats landed on the shore of Dorset in the kingdom of Wessex. On June 8, 793, a Norwegian party assaulted a monastery at Lindisfarne off of the east coast of England. The islands of Ireland and the mainland of Scotland came under attack during the late 790s. To increase their range, permanent settlements were established. By 840, settlements had been built on Ireland and in Northern France, from this point until the late 9th century raids reached their peak of activity. By channeling the numerous rivers of Northern France and of Western Germany, the sleek and agile Viking longboats were able to maneuver their way as deep as Paris. By the year 880, the only Anglo-Saxon kingdom that had not fallen to the Vikings was Wessex. For the time the Danish invaders were satisfied enough to keep the eastern third of England, which then became known as the Danelaw. By the year 911, the Swedes (otherwise known as the Rus) had worked their way through the Baltic Sea, down the Dnieper, through the Black Sea and into Constantinople (modern Istanbul). The Viking intrusion into Russia, violent as it may be, seems to have had more of a basis in trade rather than plundering; grave evidence points to contact as far back as 650. As a result of unsuccessful moves on Constantinople a treaty in 911 provided that Rus soldiers were admitted into the city guard. At the same time in France Norwegian leader Rollo (Göngu-Hrolf), after a series of attacks on the French countryside (notably one unsuccessful on Chartres) worked out the Treaty of St. Clair-sur-Epte (911 AD) with King Charles the Simple. The treaty granted the lands that would later be called Normandy (it quite literally means the "land of the Northmen").

While the Danes and Rus were taking the continent of Europe in the latter half of the 9th century, the Norwegians were focusing on Atlantic islands. Although accounts vary, most place the colonization of Iceland sometime between the years 890 and 910, leading to full occupation by the year 930. Icelanders would like to point the tyrannical rule of Norwegian King Harald Finehair as the reason for emigration to Iceland; however, this is doubtful seeing as he would have been too young to have ruled during colonization. It is more likely that population pressures combined with land shortages made the relatively unpopulated and mostly free Iceland appetizing for colonization. In 982, Erik the Red was banished for 3 years from Breidafjord for a slew of killings. This was the third such banishment he had received, the first two coming from his homeland Norway and the third in Breidafjord, Iceland. Erik decided to go in search of lands that had been sighted some 50 years prior by a Norwegian sailor. What he found he named Greenland. For the next 3 years, he explored the coast, plotting out important stores of natural resources and lands that would be suitable for farming. When his banishment had ended, he returned to Breidafjord to gather those who would be needed to colonize the island. In 986, he returned to Greenland with

Source: © iStockphoto/Cindy England.

450 people and 14 ships (of the original 25 to set sail). Soon the colonies would expand to 3,000 people.

Meanwhile, as the Norwegians were discovering for themselves the Americas, Danish Vikings sought one last major conquest of England. In the year 1066, the death of the English King Edward the Confessor left a power vacuum in England. The sixth-generation descendant of King Rollo, William the Conquer, lead the forces of Normandy to victory in the Battle of Hastings. This established the foundation of the modern English monarchy and also marked the beginning of the end of the Viking's destabilizing impact on Europe. Not once since has the mainland of England been successfully invaded by a foreign power.

Despite the common perception, Viking society was not entirely composed of marauders and pirates. There existed varying degrees of morality, order, and law depending on exactly where an individual lived and to what distinct social class he or she belonged. There tended to be a diametric opposition between those who lived in the inner rural areas and those on the edge of their controlled territories. The common perception of a violent culture was dictated not by the writings of the Vikings, which were scarce, but rather by those from the cultures that came into contact with them, contact usually being a direct result of Viking exploration and raiding. However it should be noted that those who did the exploring were not indicative of the typical Norseman, in fact they were the exact opposite. The average Viking was more likely to have been a rural farmer who lived with an extended family. Each farmstead was headed by a patriarch who obtained his power and wealth through a complex system of inheritance.

Social Classes

Within Viking society there existed a rigid social structure that vaguely resembled feudalism. The bottom class consisted of slaves (sometimes called *Thralls*), who were typically debtors, criminals, and prisoners of war. These slaves were typically regarded as being property, not human beings with legal rights. The slaves did not have the right to debate or vote in the local assembly (the *Thing*). However there were instances in which a slave had a greater degree of legal power than a freeman: For example, a slave would be allowed to kill on behalf of his wife, even though she was a bondmaid, but a free man could not kill on behalf of his bondmaid (the dual meaning of bondmaid allows for an ironic interpretation). There were cases in which a slave was able to work his way out of slavery. This implies that the slave must have had certain rights to his own property and some way to gather sufficient funds. Other ways of escaping the slave class include being granted freedom by one's master and scoring a kill in combat.

The next class up consisted of the *Karls,* which could be described as the peasant class. The majority of the population was derived from this class of men, for it was mainly this group that cultivated the food supply. Every sort of diversified laborer whose talents would be applicable to everyday life was found in this

class: farmers, traders, soldiers, artisans, and so forth. Lawyers and practitioners of medicine could also be found in this class. These jobs, however, were not as frequently used for gaining the stable income as they are today, thus these jobs were practiced part-time by, most likely, farmers and traders. Most of the law at the time was not written down, but instead it was handed down in an oral tradition. Master lawspeakers would take on apprentices who would spend a couple of years memorizing the law. Some tended to be more apt at reciting the law; these men would be selected to be sent to the Thing. The better one was at reciting the law, the more clout one carried. Those with the highest degrees of respect would be used in settling legal disputes. Upon returning to a village from the Thing, a lawspeaker was expected to recite to the men of the village all of the new laws that had been adopted. However every free man, not just lawspeakers had the right to vote and debate in the Thing. Only the richest of the Karls held fertile land, and even then not every Karl held land. The only real measure of wealth was land, for there did not exist large enough governments to establish any kind of stable currency.

Should a Karl acquire enough land and clout, whether it be through force or by his personality, he could raise himself to the status of *Jarl*. These men made up the nobility; akin to local warlords, they could exact tribute and organize raiding parties. This is typically the highest level that Vikings could raise themselves to, for the political climate of the region was far too unstable to maintain large monarchies. Two major challenges that faced the would-be kings included a complex and therefore weak system of inheritance in which many challenges to the throne would arise, and the lack of any long-standing dynasties from which a ruler might claim legitimacy. So often the test for leadership came down to feats of strength and personality.

Religion

The Viking religion, like other polytheistic religions before it, did not adhere to one particular doctrine or order of gods. Many of the gods that the Vikings worshiped were subject to public opinion, and over time one god might fall out of favor, only to come back again in another form with a different name. The fluidity of their religion has been described as being the byproduct of having an oral tradition, rather than being written down like the major world religions that have survived to this day (the Islamic Koran, the Christian Bible, the Jewish Torah, and others). What is known of Vikings and their religion is mostly derived from foreign observers and the sagas, which were made some centuries after their fall from prominence in the 12th century.

Some of the more stable and high-ranking gods included Odin, Thor, Loki (who was actually a giant and companion to Thor), and the twin gods Freyja and Frey. These gods and many others were employed through a series of myths to explain many of the phenomena of the natural world. According to Norse myth, the universe does not exist as we comprehend it, but rather the universe is composed of several "worlds," such as the opposed worlds of fire and ice. Furthermore, the earth itself is said to be the back of a giant coiled serpent. Two major tales included the foretelling of the end time, called the *Ragnarok*, and Odin's sacrifice. The latter told of how Odin hung himself from the world tree to gain the knowledge of the mystical runes. He also sacrificed an eye to drink from the fountain of Mirmir such that he would gain complete and total wisdom. These stories were each designed to convey a single message or groups of messages, so they sometimes contradict each other. To strike a deep chord with the audience, these stories were often told as gruesome and violent.

Vikings felt that the gods and spirits ruled over almost every aspect of their life. This animistic belief dominated many aspects of Viking life; for example, small pendants in the shape of Thor's mighty hammer were worn by many. These pendants were thought to be useful in invoking the help of Thor, who is often seen as a hero to peasants and the unfortunate. Viking belief held that invoking the aid of the gods was necessary for all functions of life to be successful.

Rituals involving the daily life of a farmer were typically held by the women of the household. Animal and human sacrifices were not the least bit unusual: Ragnar, a Danish leader, hung more than 100 French as a sacrifice to Odin during a raid on Paris. Also included in their religious life was the use of small statues that represented a particular god, and chanting, which, like runes, was considered to have inherent magical properties.

Runes and Language

A rune is a special type of writing symbol that can be either a letter or a word, and in many cases can have

multiple meanings. Most runes were carved, and as a result they were created from a series of lines (for it would have been too difficult to carve a curve in a piece of wood or stone). The Futhark (the name of the runic alphabet) lacks some of the traditional vowels, and therefore the runes cannot be arranged to make all possible word sounds, making translation very difficult. Furthermore most of what was carved was probably done in wood and has not survived the ages. Only a handful of rune stones still exist. Much of what is said on the rune stones consist mainly of short sayings, and many of them are just dedications to the fame and glory of a loved one, that person's family, and of course the engraver. Despite the belief in the powers of runes, not many Vikings were literate. This too detracts from the availability of primary accounts of Viking law, culture, and military action.

Much of Viking culture has its roots in Germanic tradition. The god Odin, for example, has a direct corollary whose name is Woden (pronounced Vo-den). In addition to religious contributions to Scandinavian society, the peoples of Germany provided a linguistic touch. An example is the word *geld,* which means money in modern German, and was found in the word *heregeld,* which meant army tax. For the aforementioned reasons it is difficult to distinguish between what can be considered to be pure Norse beliefs and what was added on as an embellishment of history or a by product of the Christian influence.

Valhalla was a heaven reserved for the bravest of Viking warriors. In their afterlife it was thought that one could feast, drink, and fight all day long without any consequences: If one should die in a drunken frenzy in Valhalla, one would rise again the next day with no wounds or hangover. However it is now believed that Valhalla was a compromise between the Christian notion of heaven and the ideals of the Vikings, ideals that included their perpetuation through their legacy or fame, fame sought usually through battle and kept for the ages on the runestones.

The Vikings were famed for their skill as both sailors and warriors. Their shallow, sleek hulls, combined with the dual power sources of wind and oar, made the Viking longboat one of the most feared sites in any harbor. The small frame of the ship made it more maneuverable than most other ships of the time, and the dual power made it faster. This combination of speed and maneuverability allowed Viking warriors to make raids deep into Europe. The Viking sailors who set sail from Greenland and ended up in America had very few tools in terms of navigation. By modifying fishing boats with sails (thus creating the longboats), they were able to add range to their voyages. Although Vikings most likely used the altitude of the Sun and Polaris (the North Star) to determine their latitude, little could be done to determine longitude. They were not without resources: The path of clouds, birds and other wildlife, and debris in the water all were used to detect the proximity of land. These skills enabled the Vikings to consciously make long sea voyages, like the one that landed Erik the Red in Newfoundland.

The most significant piece of evidence in the Americas for the Viking encounter was found at L'Anse aux Meadows, Newfoundland, Canada, in 1960. Most of what remains of the Viking settlements are the foundations of their buildings and the trash that they threw away. Small circumstantial pieces of evidence were found such as clothing pins and other such trinkets. The most notable leftover piece would have to be an iron forge, a large piece of equipment that would not have served any purpose for the natives, who had not previously been known to practice iron smelting. Carbon dating confirms that these remnants date from the Viking era, about 1100 AD.

— *James Paul McMillan*

Further Readings

Diamond, J. (2005). *Collapse: How societies choose to fail or succeed.* New York: Viking Penguin.

Haywood, J. (2000). *Encyclopedia of the Viking age.* Singapore: Thames and Hudson.

Jones, G. (1991). *A history of the Vikings.* New York: Oxford University Press.

Sawyer, P. (1997). *The Oxford illustrated history of the Vikings.* New York: Oxford University Press.

Streissguth, T. (1999). *Life among the Vikings.* San Diego: Lucent Books.

Wilson, D. M. (1970). *The Viking achievement.* New York: Praeger.

Wooding, J. (1996). *The Vikings.* New York: Rizzoli International Publications.

VILLAGES

A village is a relatively stable human community, in terms of location and composition, that is generally

larger than a camp or dispersed hamlet but is smaller than a town or city. Some villages, however, only exist for a few months, as they represent a phase of an annual cycle (for example, the band villages of Kirghiz herders in central Asia). Although the term is commonly used for small agricultural communities, it can also be applied to communities that engage in fishing or other activities such as the production of handicrafts, or that have mixed economies; the latter, in fact, is increasingly the case in many parts of the world. Due to this diversity, it is not always easy to distinguish unequivocally a village from other types of communities.

Anthropologists have long debated the origin and growth of the village. Typical questions have been: Did the village arise because of settled agriculture with a degree of economic specialization, the advent of private proprietorship of land, growth of seigniorial power, or because of consolidation for mutual protection? Did some hamlets coalesce into villages while others did not? Until recently, the emergence of villages was regularly associated with the Neolithic Revolution (dated to about 10,000–12,000 years ago). The assumption, promoted by V. Gordon Childe's work, was that humans became more sedentary as they moved from food collection to food production because settled agriculture and the domestication of animals require close contact with fields and herds. As a result, agriculture and village life were considered to go hand in hand. Today many archaeologists have parted company with this model as new research and restudies of former key sites, such as Çatalhöyük, located in central Turkey and about 10,000 years old, point to a more nuanced and complex interpretation.

In southwest Asia, Natufian village sites dating to about 11,000 years ago provide good evidence for a preagricultural tradition of village life based on hunting and the collection of wild grains and nuts. Current archaeological work at Çatalhöyük, some of it spearheaded by Ian Hodder, suggests that this perhaps was an overgrown village without advanced agriculture. The people who inhabited the site depended to a large extent on wild plants and animals, even though they did tend some livestock and grew some crops. Similarly, Asikli, a Central Anatolian site about 1,000 years older than Çatalhöyük, was a large stable settlement with a population that relied mainly on hunting and gathering. In sum, in the Near East some villages emerged before agriculture or before agriculture became the main subsistence strategy. All of this suggests that the transition from foraging to domestication took various paths and that some peoples developed mixed economies that combined reliance on wild and cultivated foods (and, maybe, with periods of no cultivation). This transition, likewise, included various types of communities that reflected different degrees of mobility and population densities. Research in other areas of the world besides the Near East (for example, South America, Mesoamerica, North America, and China), has furthermore revealed that people domesticated plants well before farming villages were established. Therefore, though settled life and agriculture are related, they are not necessarily coterminous.

Yet, many of the early domesticators did become settled agriculturalists by about 10,500 years ago in the Near East, 7,000 years ago in China, and later in Africa and the Americas. On the whole, the early settlements they constructed were small and dwellings were situated in close proximity to each other, perhaps for sociability, defensive purposes, or both. Even though the expansion of many of these settlements—from hamlets to villages—roughly coincides with the rise of agriculture, it is not clear whether agriculture fueled settlement growth or whether other factors were involved. As the archaeology and ethnohistory of California and the Northwest coast of North America reveal, substantial housing can exist without food production.

Because villages were the prevalent type of community settlement in most of the world until the Industrial Revolution and the subsequent spread of urbanization, many social scientists of the 19th century regarded the village as a universal stage in human evolution. The scientific study of the village dates to that century, and it by and large centered on Feudal Europe and land tenure rules, systems of field rotation, the legal status of villages, the emergence of village fairs and markets, and the growth of towns. Sir Henry Maine (1822–1888), one of the early writers on this topic, attributed the emergence of villages to the evolution of more elaborate political structures, which in turn altered land ownership. Instead of searching for absolute theories of origins, which were quite popular in the 19th century, contemporary anthropologists concentrate on the structure, function, and networks of village communities and their links to regional, national, and global economic, political, and social processes. Neoevolutionary theorists, though, remain interested in village formation

Source: © iStockphoto/Kate Borland.

and its relation to social evolution, in particular, its relation to the evolution of human sociability, internal–external conflicts, leadership, and institutions of authority. Archaeologists still debate how best to document, archaeologically, village formation and its fissioning.

During much of the 20th century, anthropologists spent considerable time debating the nature of social relations within villages and between the village and the outside world. Were villages teeming with social tensions or did they have less social strife than towns and cities? Why did some villages seem more open to external influences whereas others appeared to shun them? Most of these studies were part of a broader concern over peasantries, culture change, and the impact of economic development in the Third World. These studies often established a contrast between traditional villages and modern or modernizing villages. The traditional village was considered subsistence-oriented, egalitarian, community-oriented, religious, and peaceful. Influenced by commercialization and commoditization, these villages were transformed into the modern type, which was characterized by dependency, socioeconomic stratification, individualism and competition, jealousy and strife. This characterization cannot be divorced from romantic images about village life and earlier, yet still influential, speculations about social evolution. Persuasion and egalitarianism, not coercion and stratification, have been seen as the rule in early village society due to conditions of low population density, which allowed for the option of fissioning when conflicts arose.

Some also attribute this depiction to a conceptual and methodological pitfall of classical anthropology, namely, to its great emphasis on the study of autonomous, small-scale societies, and to the transfer of concepts and methods designed for the study of such societies to the study of transitional and large-scale societies. Robert Redfield's earlier work among peasants in the village of Tepoztlán, Mexico, reflects this difficulty. In his later work, however, villages are no longer conceptualized as isolated and autonomous units but as part of a folk–urban continuum in which human communities range from simple to complex.

According to Redfield's later view, communities along this range exchange cultural traits and cultural brokers function as mediators between the different types of community and their traditions. What was lacking in Redfield's theory was an explanation for how macro political and economic processes shaped the various communities. Julian Steward's *The People of Puerto Rico* also attempted to deal with the methodological problems associated with the issues of scale, modernization, and social complexity. Perceiving villages as part societies, like Redfield, Steward—influenced by his views on cultural ecology—related village types to local ecological factors and to their degree of vertical and horizontal integration to the nation. Eric Wolf, influenced by Redfield's and Steward's work, similarly constructed a typology for peasant villages that was meant to emphasize degree of interaction with the outside world because he believed that the peasantry became more heterogeneous under the influence of the global economy. Wolf's classification had two main types, closed and open communities, besides other possibilities. In closed, corporate peasant communities, people labored primarily for subsistence instead of the market, and land was held communally. Also, there was a great deal of internal solidarity and homogeneity. In open communities peasants were drawn into the market and land was held individually; thus, individualism and strife were salient factors. Wolf's two main types fed directly into the dichotomy of traditional versus modern village even though he was cognizant of the processes at work.

Over the years various scholars—not just anthropologists but geographers, sociologists, and historians—have challenged the traditional versus modern typology. Several have argued that inequality, at times based on prestige, power, and access to nontangible ritual wealth, was part of village life in various areas even before contact with Westerners or the advent of mercantile capitalism and colonialism. Differential access to land and village labor—frequently conditioned by native social and symbolic constructs—at times contributed to inequality in some places, such as Java. Critics have also charged that if some households seemed to labor to benefit their community, it was because of an overlap of interests with those of the wider community and not because self-interest and individualism were absent. In addition, historical and archaeological work revealed that villages far removed from urban centers were often impacted by the political and economic activities of states (for example, 19th-century rural villages in Siam, present-day Thailand), a line of inquiry that Wolf paid much attention to during his later work. Actually, the interdependence between villages and quasi-urban and urban centers contributed to the structure and particulars of village life. Some villages, regarded as stable and identifiable units since time immemorial, were colonial creations. For instance, in Southeast Asia and Latin America, colonial powers combined and divided indigenous communities to create villages, facilitating control over labor, lands, and natural resources.

Villages remain the main type of rural settlement in much of Africa, Asia, and Latin America. Today, however, most villages maintain strong ties to one or more urban centers, are linked to the global market, and may contain diverse residents that migrated to the area. Televisions, radios, cell phones, computers, missionaries, tourists, traders, and nongovernmental organization (NGO) workers help maintain these connections; so do migrant labor arrangements and improvements in systems of transportation, the latter often encouraged by NGOs, foreign aid to developing countries, and the local government's (or residents') desire to embrace modernity, the global market, and the technological devices all of this brings. In remote places like Nepal, wireless Internet technology is being used to link remote villages and enable residents to sell goods online. Village members are also able to communicate with coresidents who are grazing yaks in distant locations far away from the village. Due to all of this, some scholars contend that modernization may actually lead to greater levels of political and economic participation in villages. Increasing economic differentiation and specialization, though fostering dependency, can promote cooperation. In addition, the recording of village census data and the construction of village schools, infirmaries, collective water pumps and storage tanks, among other projects, may be contributing to a coherence that was lacking or minimal in the past. In sum, modernization does not necessarily undermine a village's communal orientation, but may actually strengthen or create it.

In contemporary industrial and postindustrial nations the concept of the "village" remains important even if it is no longer part of everyday reality. Ideas about cultural and ethnic identity, place, history and change, economic production, and local political administration are wedded to the concept. Hence, the study of post-peasant villages in many areas (for

example, France, Italy, Japan, Spain, and Portugal) could yield significant theoretical and methodological insights for the study of contemporary ethnicity and imagined communities, historicity, culture change and continuity, and the evolution of institutions of local government.

In some parts of the United States, for example, New England and New York, the term *village* may refer to a unit of local government. Today, however, "the village" usually denotes the social and commercial hub of a town and is readily distinguished by its pleasing architecture, diverse shops and coffee houses, and pedestrian-friendly walkways. The term can also be used in whimsical ways (for example, "the punker's village"), to refer to a residential district within an inner city usually composed of people with similar cultural backgrounds or interests, such as Greenwich Village in New York City, or to conjure up romantic notions or feelings generally associated with ideal village life. In truth, many small towns in the United States, villages by most standards, have been absorbed by nearby cities, suburbs, and suburbs of suburbs (exurbia). The prevalence of a basically urban-industrial civilization, frequency of residential mobility, and the global market fuels this process of "villagephagy" in the United States and sustains our longing for "uncomplicated village life."

The desire to experience village life and its idealization are not new. During the mid-19th century, some newly rich Yorkshire industrialists (Titus Salt, Edward Ackroyd, and the Crossleys), concerned about the poor living conditions of their factory workers, promoted the idea and creation of "model villages" in England. They established the villages in the countryside because their proponents assumed that a good environment fostered good health and morals. These villages were small and were meant to be self-sufficient communities where people would work and live. Contemporary eco-villages, also known as sustainable villages, resemble these early model villages, including, for instance, the push for self-sufficiency that now has been reworked into the concept of sustainability. Eco-villages have sprung up in numerous places such as Western Europe, Australia, New Zealand, North America, and Central and Eastern Europe. They are located in both urban and rural areas and usually rely on renewable energy sources and eco-friendly architectural methods. The residents manage waste locally and engage in organic farming. For the most part, these villages support themselves via grants, donor agencies such as the European Union, tourism, summer schools and various workshops, festive events, and volunteerism. The extent to which eco-villages in post-Soviet bloc countries can be related to former workers' brigades and agricultural communes, and the mindset those arrangements fostered needs to be investigated.

The advent of computer networks has also enabled the creation of various electronic or cybervillages. Electronic villages can exist partially or entirely on cyberspace, depending on the activities of their "residents." The villages have emerged because local residents wish to communicate, build, and enhance relationships with each other through computers and the Internet. Thus, most electronic villages have a private e-mail component and public forums. Most also provide on-line information about local government agencies, housing, businesses, and community activities. The electronic meeting "place" is viewed as an addition to the community's physical places where folks can meet; people frequently meet in actual locations for social events and business transactions. Curiously, some of the most successful electronic villages in the United States are in smaller communities. A pressing need for contemporary anthropology is to understand the impact that these electronic villages have on local political and economic behaviors as well as on broader national trends. Another avenue of research would explore whether participation in electronic villages leads to changes in cultural models of friendship, intimacy and trust, accountability, community, and citizenship.

— *Lourdes Giordani*

Further Readings

Balter, M. (1998, November 20). Why settle down? The mystery of communities. *Science, 282,* 1442–1445.

Bandy, M. S. (2004). Fissioning, scalar stress, and social evolution in early village societies. *American Anthropologist, 106*(2), 322–333.

Gaia Trust. (2005). *What is an ecovillage?* Copenhagen, Denmark: Gaia Trust. Retrieved January 2, 2005, from http://www.gaia.org/ecovillage/gen.asp

Kaiser, J. (1999, April 9). Villages to join Internet-Without Wires. *Science, 284,* 219.

Rigg, J. (1994). Redefining the village and rural life: Lessons from South East Asia. *The Geographical Journal, 160*(part 2), 123–135.

Virchow, Rudolf Ludwig Karl (1821–1902)

Rudolf Ludwig Karl Virchow was born on the 13th of October, 1821 in Schivelbein, Pomerania, Prussia (part of Poland now), and he died on the 5th of September 1902 in Berlin. He was the only child of the treasurer Karl Christian Virchow and his wife Johanna Maria, née Hesse, who was taking care of the household and the well-being of their child.

First, he attended school in Schivelbein, and then he went to grammar school in Köslin until 1839. In the same year, he began to study medicine at the famous Pépinière in Berlin, which was a military university. In 1843, he was awarded the doctor of medicine and began to work as a military surgeon at the Charité, a famous hospital in Berlin. A year later, he was made assistant of Robert Froriep, and in 1845 he wrote his first articles, which dealt with (blood) clotting and leukemia in Froriep's *Neue Notizen.*

After finishing a further thesis (Habilitation) in 1847, he became Privatdozent, which implies the right to lecture (*venia legendi*) and can be compared to an associate professorship. In the same year, he and his friend Benno Reinhardt founded the journal *Archiv für pathologische Anatomie und Physiologie und für klinische Medizin* (Archives for Pathological Anatomy and Physiology, and for Clinical Medicine), which was later known as *Virchows Archiv.* He remained the editor until his death, and from 1852 onward (following the death of Reinhardt) he was the sole editor. For a short period of time (July 1848–June 1849), he was also in charge of the weekly magazine *Die medicinische Reform,* a journal he had founded together with Rudolf Leubuscher, and in which he already demanded that standardized medical laws for whole of Germany, a ministry for public health care, a medical academy, and a radical reform of the public health system. At that time, he also investigated a typhoid epidemic that had broken out in Upper Silesia. In the report that he wrote for the government, he suggested that a proper democracy and education for all is supposed to lead to freedom and well-being.

As Virchow was very active politically and always defending a liberal political position, he got into trouble with the government, and was eventually suspended from his post at the Charité. However, in the same year he was also offered the chair of pathological anatomy at the University of Würzburg, which was the first of that kind in Germany. A year later, he married Rose Mayer (1832–1913). Together they had three daughters and three sons.

Not only his private but also his professional life flourished during his 7 years in Würzburg, and in 1855 the notion of *Cellularpathologie* (cellular pathology) appears for the first time, and, together with it, the concept of a new pathology. His assistant in Würzburg was Ernst Haeckel.

In 1856, Virchow accepted the offer for a chair at the University of Berlin, and he also became the director of the newly founded pathological institute. Two years later he published his most important medical work entitled *Die Cellularpathologie in ihrer Begruendung physiologische und pathologische Gewebelehre.* He was elected to the Berlin City council in 1859, on which he remained active until his death. Two years later, he also became a member of the Prussian parliament, and he was one of the founders of the Deutschen Fortschrittspartei (another founding member was the famous historian and lawyer Theodor Mommsen). He was a relentless opponent in particular of Otto von Bismarck, with whom he even would have had a duel with pistols if the minister of war had not interfered. As a consequence of his political involvements, significant changes in the public health care system in Berlin took place, a sewage system was built, and a central water supply was provided. Berlin became one of the cleanest big cities in Europe. In addition, many other improvements were made, like the construction of four local hospitals, or the training of nurses independent of ecclesiastical organizations.

During the German–French war (1870–1871), Virchow organized hospital trains. In 1873, he became a member of the Academy of Arts. During that time, he dedicated himself further to the study of anthropology, taken in an extremely broad sense, as he holds that anthropology deals with the history and the future of humanity. He had already founded the *Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte* in 1869. At a conference in 1876 in Hamburg, he declared the goals and methods of modern anthropology in detail, and in the same year in Berlin, he gave a widely noted presentation about the anthropology of the Germans. It is interesting to note that, although he was sympathetic to Darwin's theories, he did not regard himself as a disciple of Darwin, as he explained in a speech in Munich in 1877. In addition, he also made some significant contributions to the field of archaeology, particularly in

Germany. However, together with Heinrich Schliemann, he also traveled to Troy in 1879, and because of his friendship with Schliemann and some adequate negotiations, Schliemann donated to the museum of ethnology in Berlin some of his immense treasures. From 1880 to 1893, Virchow was a member of the German Reichstag. In 1888, he traveled to Egypt together with Schliemann. At his 80th birthday, he received honors from all over the world, and in an expression of thanks he replied to all the honors he received in 1901. After fracturing the head of his femur when jumping off a tram in the Leipzigerstrasse in Berlin, he did not recover. He died on the 5th of September 1902 in Berlin.

During the 19th and parts of the 20th century, anthropology was a part of the discipline of medicine, which is the reason why it was often described as physical anthropology. Virchow also started to be concerned with anthropology via medicine. He was a humanist, and his humanism was based on the natural sciences, its authentic expression being anthropology. His understanding of anthropology was extremely broad, concerned with the whole of the human nature, which includes outer, objective as well as inner, subjective experiences. Regarding anthropology, his thinking was primarily concerned with the questions: What is the origin, and what will be the further development of human beings?

Before mentioning some of his work in anthropology, an overview of Virchow's method and his understanding of the natural sciences must be provided. Virchow had a particular theory of knowledge, which he presented in Stettin in 1863. According to this theory, scientists are concerned with facts rather than speculations, but he also stressed that it is important for them to be clear about the facts so that they can be interpreters. He regularly stressed the importance of the distinction between facts and speculations, or between knowledge and belief, and that it is necessary not to give too much weight to our speculations and not to use them for constructing a complete worldview. Facts can be reached by means of empirical experiments. Besides the relevance of the empirical data, Virchow stresses the importance of logic. Thereby, he does not refer to logic in an idiosyncratic sense, but rather to the Ancient, well-founded logic. All premises primarily need to be based on sense perceptions and experiences, but not on any kind of speculation. By means of logic, one can then infer further insights that, of course, are open to interpretation. Yet, one always has to be clear about what is an insight and what is a speculation, and one also should not yield to the temptation to construct a system on the basis of the interpretations of ones insights. The realm of consciousness cannot be investigated thus by natural scientists, as this area is connected too closely to the individual, and therefore one cannot get facts about the deeds of the consciousness.

Because Virchow thought that there is an inner connection between all aspects of the apparent realm, he tried to establish a scientific theory that is valid for all scientific branches. He referred to that theory as *Einheitswissenschaft,* unified science, whereby he meant that the same method was supposed to be applied in all natural sciences, as all of them are supposed to look for the same thing, namely the law of becoming, and he tried to apply that theory to medicine as well. Medicine, however, is not a simple natural science. Natural sciences are concerned with bodies only, whereas medicine is supposed to deal with the laws of body and mind, but also in a solely positivist manner. Therefore, it is the highest and most noble natural science. Virchow sees a medic as a modern type of natural philosopher.

He admits that he might be wrong concerning some specific details that he had put forward, but that it is his most basic conviction, and one which he can never abandon, that human nature is unified. The same laws of life can be found in a healthy as well as ill person because it is only the manifestation of the laws that is different. Therefore, one should no longer be concerned with physiological pathology, as that notion attributes a specific ontological status to diseases, but one should only be concerned with physiology whereby pathological physiology should be a specific field of physiology. Healing, in that case, means nothing but bringing about the normal conditions of life with which physiology is concerned. Pathology deals with the altered conditions of life, and therapy with the methods of retransforming them back to normal. Virchow's categories remind one of a scheme that can be found in more traditional types of medicine that distinguishes between theoretical and practical medicine whereby the theoretical field is divided up into physiology (*res naturales*), pathology (*res contra naturam*), and hygiene (*res non naturales*), and the practical field, which includes surgery (*Chirurgia*), pharmacy (*materia medica*), and dietetics (*Diaita*).

What was lacking so far was a theory of medicine, and by this he primarily meant a pathological physiology. Anatomy, therefore, could only be the entrance

hall to authentic medicine, which is the science of healing, which again had to be founded on a complete and holistic understanding of human beings whereby one enters the realm of anthropology—a realm that is the most basic part of the medical realm. Because the fundamental component of human beings as well as of other living things is the cell, according to Virchow, he dedicated a great amount of work to that field.

In 1858 in Karlsruhe, Virchow presented the insight that life is the deeds of a cell, and that the particularities of life are identical with the particularities of a cell. He postulated that life can be explained by reference to the anatomical and chemical composition of a substance because everything that happens in nature happens in a causal and necessary manner, and this law applies to both the organic as well as the inorganic realm. Yet Virchow also stressed that he was not a materialist.

Having clarified Virchow's scientific method and the relationship of anthropology to the other sciences, some of his anthropological findings should be mentioned. Originally, Virchow held that there is s direct link between the size of a skull and the cultural and intellectual state of development of humanity. In addition, he held that not only the size but also the aesthetic qualities of a skull are relevant for ones intellectual capacities. However, the more skulls he investigated, the more he doubted these positions. As he did not wish to put forward unfounded theories, he dedicated himself to collecting empirical data, which meant that Virchow had an enormous collection of skulls. From this data, Virchow inferred that there is a distinction between the biological and the cultural development of human beings—a position that was opposed to the evolutionism dominant in Britain. Virchow's theory was based on the thesis of the unchangingness of the human race, as defended by his former pupil, the anthropologist Julius Kollmann. However, in contrast to Kollmann he did not hold the absolute permanence of human beings, but claimed that human beings could not have developed from great apes during the period of time for which we have empirical data. The question concerning the origin of human beings can only be answered philosophically; however, it was his intention to deal only with theories that could be based on solid empirical data. In principle, he acknowledged the descent of human beings from great apes as a hypothesis.

— *Stefan Lorenz Sorgner*

Further Readings

Boyd, B. A. (1991). *Rudolf Virchow: The scientist as citizen.* New York: Taylor & Francis.

Rather, L. J. (1990). *Commentary on the medical writings of Rudolf Virchow: Based on Schwalbe's Virchow-Bibliographie, 1843–1901.* San Francisco: Jeremy Norman.

Virchow, R. L. K. (1971). *Cellular pathology as based upon physiological and pathological histology.* New York: Dover.

Virchow, R. L. K. (1985). *Collected essays on public health and epidemiology* (Vols. 1–2, L. J. Rather, Ed.). Canton, MA: Watson Publishing International.

Vörös, Győző (1972–)

Győző Vörös is an Egyptologist belonging to the new generation of Hungarian archaeologists. In spite of his young age (born in Pécs, Hungary, January 15, 1972), he became very accomplished and well known on an international level. Vörös has spent most of his professional life in Egypt, where he was working for the government of Egypt (1994–2004). Since 2004, he has led an excavation for the government of Cyprus.

He graduated from Lóránd Eötvös University of Sciences, Department of Egyptology, Budapest (1988–1993). He had two major scholarships, one in Rome (Gregoriana) and one in Jerusalem (Hebrew University). He also graduated from Péter Pázmány Catholic University, Faculty of Theology, Budapest (1990–1993). Because architecture is a major part of his interest, he continues his studies at Budapest University of Technology, Faculty of Architecture. Vörös holds an MA in Egyptology (1994) and a PhD in History of Architecture (2001). The title of his doctoral thesis was *The Temple Architecture of Ancient Egypt.*

Between 1994 and 1998, he was the director of the Hungarian Thoth Hill Mission in Thebes, at the mortuary temple of Pharaoh Sankhkare Montuhotep III. The excavations revealed the earliest stone temple in Egypt under the superstructure of the Middle Kingdom temple. He also discovered the burial place of Sankhkare Montuhotep III, between the cliffs of the hill.

Between 1998 and 2004, he worked as the director of Taposiris Magna, 45 km west of Alexandria on the Mediterranean coast. The excavations discovered the original sanctuary of the acropolis, with both the torso of the cultic statue and the sacrificial objects of the goddess Isis. In the meantime, he identified the scene of the Fortuna Primigenia mosaic in Praeneste, which depicts the Khoiak festival of Isis in Taposiris Magna. The Hungarian Mission has completed the excavations of the acropolis in 30-field-months.

Gyõzõ Vörös is one of the registered survivors of the Luxor terrorist attack, November 17, 1997.

Taposiris Magna (also called Abu Sir) is situated 45 kilometers to the west of Alexandria, on the coastal dune between the Mediterranean Sea and the freshwater Mareotis Lake. The ancient city and its acropolis were founded by Pharaoh Ptolemy II Philadelphos. Ninety years had passed between Evaristo Breccia's pioneering excavations in Taposiris Magna (1905–1907) and the Hungarian archaeological mission at the site (from 1998–2004). In the middle of the 20th century, Achille Adriani launched a significant program of restoration (1937–1939), as did Jasper Brinton after him (1945–1948), but neither project was completed. Although Adriani's and Brinton's groundwork was notable, neither of them began excavations at the acropolis because there was a general agreement that the acropolis of Taposiris Magna was an unfinished construction and that it had never operated as a temple. When the Hungarian team began the excavations, this view was so universally accepted that new lexicons and summaries written about Egyptian temple architecture would always mention "the unfinished and uninscribed temple of Taposiris Magna." This official academic position was based on the mistaken premise that the floor level to be found in the courtyard of the acropolis and covered with pavement stones (excavated by Breccia) is contemporaneous with the huge temenos wall surrounding it. This led scholars to conclude that the acropolis courtyard was never home to an inner sanctuary or shrine dedicated to a cultic statue.

Drawn and photographic documentation were gathered by the Hungarian excavations in the acropolis courtyard. The floor-level foundation of the pavement stones brought to light Roman coins and potteries, making it certain that they were looking at a layer that belonged to a later period of the acropolis. At the bottom of the filling, which was homogenous, with an average height of 80–90 cm, they found the imprint of the former sanctuary. In doing so, the Hungarian experts not only succeeded in proving that the acropolis was completed, but that they had reached a unique monument of architectural history. It transpired that a Hellenic shrine with Doric columns had once stood in the courtyard of the Egyptian-style acropolis with its pylon entrance and surrounding wall. Thanks to the imprint carved into the rock, to the remaining elements of the shrine (on one hand they came to light during their excavations, and on the other hand, 117 column drums can be found on top of the temenos wall), and to the surviving Greek architectural analogies, it can be fully reconstructed. As a result, Taposiris Magna has not only been put back on the map of ancient temple architecture, but it has been recognized as the only site of both Greek and Egyptian temple architecture yet to be fully excavated and reconstructed.

In addition to research in architecture and architectural history, the Vörös team also succeeded in presenting significant results concerning the cult of the former sanctuary. It became possible for them to prove that the acropolis was originally built in honor of the goddess Isis. The excavations brought to light torsos from the former cultic statue of the goddess carved out of black granite, as well as her sacred vessels, which her priests used in secret rituals. The cult of Isis spread across the entire Roman Empire.

Bearing in mind that Taposiris Magna was the biggest center of her cult in the Alexandria region—and so in Egypt as whole—it is no accident that in certain cities of the Imperium they not only began to worship the goddess, but also adopted the name of her cult's original location. It should be noted that sacrifices were made to the "Isis of Taposiris" on the Hellenic island of Delos just as they were by the italici in Faesulae (today: Fiesole), on a Tuscan hilltop overlooking present day Florence.

Since 2004, Vörös has been the director of the Hungarian Mission in Nea Paphos, Cyprus.

— *Adam Ruszinkó*

Further Readings

Vörös, G. (1998). *Temple on the pyramid of Thebes.* Budapest: Százszorszép.

Vörös, G. (2001). *Taposiris Magna I: Port of Isis.* Budapest: Egypt Excavation Society of Hungary.

Vörös, G. (2004). *Taposiris Magna II: 1998–2004.* Budapest: Egypt Excavation Society of Hungary.

Vygotsky, Lev Semenovich (1896–1934)

Lev Semenovich Vygotsky was one of the former Soviet Union's most important and influential psychologists. Although he died before he was 40, and his writings fell into disfavor by Stalin and were banned until 1956, he has left a lasting mark on both American and Continental scholars in numerous fields, from anthropology to cognitive science. His most famous books in English are *Thought and Language* (1986 [1934]), *Mind in Society* (1978), and *The Psychology of Art* (1971).

Vygotsky was born in 1896 in Orsha, near Minsk in today's Belarus. Although he was a bright student and graduated with a law degree from Moscow University in 1917, being a Jew in Tsarist Russia was an obvious liability, so he had to return home to teach literature in high school. While in Moscow, however, he also attended a free university taught by professors who were expelled from their teaching posts because of their politics. It was here that Vygotsky studied psychology, philosophy, and literature, all subjects he would put to use after a turning point in his life in 1924. That year he presented a paper at the All-Russian Psychoneurological Conference in Leningrad on the relationship of Pavlov's conditioned reflexes to human consciousness. He was then immediately invited to attend Moscow's Psychological Institute, where he submitted a dissertation on the psychology of the arts in 1925.

From 1925 until his death in 1934, Vygotsky worked incessantly, creating the bulk of his canon. He attacked not only practical problems facing the new Soviet state—such as educational reforms, illiteracy, and disability concerns—but also theoretical issues in the study of society, language, and cognition. He sought to find a way for the physiological or experimental psychologists—who were largely focusing on overt behavior—to meet with the phenomenologically or philosophically oriented psychologists—who were focusing on mental states.

Vygotsky concluded that all mental life is actually a product of social development. That is, instead of postulating, say, that children become enculturated by learning—or deciding or thinking—to conform to the social rules they see around them, Vygotsky saw society as preceding the individual by providing the conditions that allow individual thinking to even emerge in the first place. Individual consciousness, then, develops through contact with society, and is not a property an individual has in isolation. As Vygotsky wrote, "The mechanism for social behavior and the mechanism of consciousness are the same. . . . We are aware of ourselves, for we are aware of others. . . ." But these mental functions must be mediated, and Vygotsky saw tool use and the use of signs as the most essential ingredients of higher thought processes. Language, of course, is the most general of all semiotic systems, and was of special interest to Vygotsky.

But not only linguists and psychologists find refreshing approaches to old problems in Vygotsky's work. "Vygotsky managed . . . a unique approach that does not separate individuals from the socio-cultural setting in which they function. This integrative approach to social, semiotic, and psychological phenomena has substantial relevance today, a half century after his death."

— *James Stanlaw*

Further Readings

Daniels, H. (1996). *An introduction to Vygotsky.* London: Routledge.

Frawley, W. (1997). *Vygotsky and cognitive science.* Cambridge, MA: Harvard University Press.

Rieberm, R., & Robinson, D. (2004). *The essential Vygotsky.* New York: Plenum.

Wagner, Richard (1813–1883)

On May 22, 1813, Wilhelm Richard Wagner was born in Leipzig, Germany. He was destined to become both a supreme composer and accomplished conductor, as well as one of the towering geniuses of all time. As a child, he was especially interested in writing and the theater. Later, however, three memorable productions permanently determined his interest in music: Weber's romantic opera *Der Freischütz,* Beethoven's only opera *Fidelio,* and Beethoven's *Ninth Symphony* (particularly the choral fourth movement).

Wagner's artistic creativity was greatly influenced by Shakespeare and Beethoven. He admired Shakespeare's dramatic tragedies with their psychological orientation, and recognized Beethoven as both the master of the symphony and the founder of romantic music. Thus, by the age of 17, those elements that were to pervade his own works had already become established in his mind: music, poetry, drama, and romanticism with its emphasis on love and freedom.

While advocating political and social reforms to bring unity and freedom to the German people, Wagner himself lived in an elaborate manner that he seemed to require for his artistic creativity. He spent extravagant amounts of money on outfits of silk and velvet, magnificently furnished living quarters with thick carpets and drapes, and made extensive travels throughout Europe to take rest cures or visit wealthy supporters of his ideas. The musician also admired many beautiful women, and his frequent escapades caused more than one serious scandal in the conservative Catholic Bavaria of the 19th century.

Unfortunately, the lavish lifestyle that he demanded and to which he had become accustomed resulted in his having to leave Germany for France in 1839 to escape creditors. Although the operatic center of the world at that time was Paris, the city neither recognized nor appreciated his musical talents. In fact, he was even sent to debtor's prison. Yet while in Paris, Wagner did complete two major works: *Rienzi, der Letzte der Tribunen* (1840) and *Der fliegende Holländer* (1841). For subject matter, he had turned to historical situations and German legends.

In 1842, Wagner was finally allowed to return to Dresden. Back in Germany, he completed two new operas: *Tannhäuser, und der Sangerkrieg auf Wartburg* (1845) and *Lohengrin* (1848). His interest shifted to the struggle for German unification, and he even associated with the notorious anarchist Michael Bakunin during the ill-fated Dresden revolution. Because of his participation in this social uprising, he had to flee from Germany to Switzerland to escape arrest. At this time, the German composer Franz Liszt defended Wagner's works and later conducted the first performance of *Lohengrin* at the Weimar Court Theater on August 18, 1850.

While in Zurich and later in Tribschen near Lucerne, Wagner began a series of prose works expounding his own theory of opera and theater. Of particular importance is his book *The Art-Work of the Future* (1849). He himself conceived of the symphonic music-drama as a synthesis of the arts, referring to this unique union as the German artwork of the future. During these years of exile, Wagner was influenced by the philosophies of Ludwig Feuerbach and Arthur Schopenhauer. He also envisioned establishing a yearly opera festival for the performances of only his own works.

Since 1845, he had been working on presenting the Germanic sagas as a series of four music-dramas dealing with Teutonic mythology. It would be the greatest task of his life, requiring a convergence of the arts that would express universal themes that focus on the emergence of humankind.

Source: From the collection of H. James Birx. Photograph by Spencer Hinkle, Santa Clara, California.

In 1859, *Tristan und Isolde* appeared and revolutionized music in general and opera in particular. It was followed by *Der Meistersinger von Nürnberg* (1867), his only comic opera. Nevertheless, it seemed that his music for the great mythological *Ring* poem he had written would not be completed. Unfortunately, the composer again had monetary difficulties and feared his great plans would never materialize. Despite all his problems, Wagner was making major contributions to music and the theater: He enlarged the size of the orchestra, introduced new instruments of his own design, expanded the musical range for both singer and instrument, further developed the use of counterpoint and dissonance, strove for dramatic as well as poetic performances of his own works, and designed his own unique opera house (a theater with a sunken orchestra pit, no visual obstructions, tiered seats, and near-perfect acoustics—he modeled it after the classic Greek amphitheater).

In 1864, there occurred a remarkable turn of events. As his generous friend and royal patron, the young King Ludwig II of Bavaria now offered Wagner all the financial assistance needed to fulfill his extensive undertakings. Never again would the once-struggling composer lack support for his bold projects.

After 29 years, Richard Wagner's masterpiece appeared as *Der Ring des Nibelungen*. It remains the largest single musical work ever written and one of the supreme artistic achievements of Western civilization. The *Ring* cycle consists of four consecutive operas: *Das Rheingold* (1854), *Die Walküre* (1856), *Siegfried* (1869), and *Götterdämmerung* (1874). Together, these music-dramas tell an exciting story about Rhinemaidens, dwarfs, gods, giants, heroes, and the forces of nature. In general, one sees and hears the dramatic struggle between good and evil within a dynamic universe. To give musical unity to this vast work, Wagner perfected his use of leitmotifs within the symphonic structure of the four operas. The *Ring* cycle musical signatures represent characters, emotions, objects, or events; these leitmotifs also evolve as the story itself unfolds. In the romantic tetralogy, *Das Rheingold* comes closest to fulfilling the composer's desire to create an artistic unity of music, poetry, and drama.

Like Feuerbach, Wagner held man to be a product of and totally within natural history. Turning to the Germanic myths, he was now able to treat universal themes, as well as express the whole range of human psychological-emotional states. Wagner was also attracted to the following aspects of Schopenhauer's philosophy: will, process, necessity, pessimism, renunciation, and cosmic unity. However, Wagner did see love as the redeeming force from the pervasive evil in the world.

There are also elements of Darwin, Marx, and Freud in *Der Ring des Nibelungen* for, as this sweeping mythological cosmology evolves, it portrays the social and psychological struggle between good and evil: The stolen, twice-cursed magic ring passes through levels of existence and pivotal events, only to be returned to the Rhine River where it had originally been placed. Essentially, the *Ring* cycle is an artistic expression of those major ideas that emerged in the 19th century and then dominated the 20th century, that is, the evolution and extinction of life forms, the ongoing conflicts among different social groups, and the psychosexual motivation of human thought and behavior.

For Wagner, *Der Ring des Nibelungen* was a unified artwork, the result being a total experience for the operagoer. The music mirrors the unconscious elements, while the drama itself represents the unfolding events of the story on the level of consciousness. The final result is a complex universe of feelings and emotions. The first complete performance of the *Ring* cycle was given at Bayreuth, Germany, in August

1876. In the history of opera, it was a tremendous success, but it was also, unfortunately, a financial disaster. Nevertheless, this work remains an unequalled achievement in Western culture.

It may be argued that Alberich's ugliness set the whole Ring cycle in motion, as it resulted in his rejection by the Rhinemaidens and, consequently, his stealing the lump of magic gold. (Interestingly enough, no single character in the Ring cycle physically appears in each of the four music-dramas.) The last word in the cycle is "ring," spoken by Hagen just before his drowning, but we never see Alberich die. Evil still lurks in the world. Of course, if this mythic reality is circular, then a new cycle will begin. In fact, this cycle may not have been the first one to have occurred.

In 1882, Wagner's sacred festival music-drama *Parsifal* was first presented in Bayreuth (it was never intended to be performed elsewhere). With this opera, the great composer had given to the world his last marvelous work. Unlike the pagan *Ring* operas, *Parsifal* embodies Buddhist and Christian symbolism as well as mysticism. The atheist Friedrich Nietzsche himself, who had once seen Wagner as the incomparable German artist but criticized the composer's growing nationalism and theatrical orientation, now rejected his all-too-obvious religious orientation in *Parsifal.* In fact, this glaring difference between Wagner and Nietzsche resulted in the abrupt break of their friendship, although there was probably a subjective element in the criticism from the still unrecognized, unappreciated philosopher.

Richard Wagner's theories and operas have had an enormous influence on music and theater. He has fascinated such diverse individuals as Thomas Mann, Arthur Rackham, George Bernard Shaw, Sir Georg Solti, Richard Strauss, and Arturo Toscanini. Each summer the Bayreuth Festival is a living monument to Wagner's awesome vision and spectacular success.

— H. James Birx

Further Readings

Cooke, D. (1992). *I saw the world end: A study of Wagner's* Ring. Oxford: Oxford University Press.
Culshaw, J. (1967). *Ring resounding.* New York: Viking.
Culshaw, J. (1978). *Wagner: The man and his music.* New York: Metropolitan Opera Guild.
Donington, R. (1984). *Wagner's* Ring *and its symbols.* New York: Faber & Faber.
Kitcher, P., & Schacht, R. (2004). *Finding an ending: Reflections on Wagner's ring.* Oxford: Oxford University Press.
Magee, B. (2001). *The Tristan chord: Wagner and philosophy.* New York: Metropolitan Books.
May, T. (2004). *Decoding Wagner: An invitation to his world of music drama.* Pompton Plains, NJ: Amadeus Press.
Shaw, G. B. (1967). *The perfect Wagnerite.* Mineola, NY: Dover.

Wallace, Alfred Russel (1823–1913)

The independent codiscoverer, with Charles Darwin, of the principle of evolution by natural selection, Wallace was born near Usk, Wales. Even as he trained for a career as a surveyor, Wallace developed a lively interest in natural history, and after he moved to England in 1844 a fortunate meeting with another amateur naturalist, Henry Walter Bates, led to organizing a joint expedition to the Amazon Basin (1848–1853) to collect natural history specimens. Tragedy struck on the way home when the ship on which Wallace was traveling caught fire and his collections were lost; but the books that resulted from Wallace's explorations caught the attention of the Royal Geographical Society, which, along with insurance monies, helped fund a further expedition to the Malay Archipelago (broadly, Indonesia) in 1854–1862.

This proved to be one of the great natural historical explorations of all time. Among many other observations, Wallace noted that the 3,000-mile-long archipelago could be divided into two distinct biogeographical regions, the "Oriental" fauna to the west of a line (known now as "Wallace's Line") bisecting the archipelago between the adjacent islands of Lombok and Bali being substantially distinct from the Australasian fauna to its east. Wallace's resulting book, *The Geographical Distribution of Animals* (1876), became a founding document of the discipline of biogeography.

During his Indonesian travels Wallace also refined an evolutionary view of life's diversity that he had been nurturing ever since reading Robert Chambers's

anonymous work *Vestiges of the Natural History of Creation* (1844). In 1855 he published a paper titled *On the Law Which Has Regulated the Introduction of New Species,* in which colleagues recognized some of the ideas that Charles Darwin had been privately developing for some time; and in 1858, during a malarial attack on the island of Ternate in the South Moluccas, he conceived a fully rounded notion of evolution by what we now know as natural selection. He immediately wrote this up as a manuscript titled *On the Tendency of Varieties to Depart Indefinitely from the Original Type* and sent it to Darwin himself.

This of course created a quandary for Darwin, who wrote to a colleague that "If Wallace had had my manuscript sketch written out in 1844 he could not have made a better short abstract!" The problem of priority in the authorship of the concept of evolution by natural selection was rapidly resolved by the simultaneous presentation of Wallace's manuscript and some extracts from Darwin's published work to the Linnaean Society of London on July 1, 1858. Surprisingly in retrospect, this event seems to have passed largely unnoticed, and it was not until the next year, when Darwin's hastily written work *On the Origin of Species* was published, that everyone sat up and took notice.

Following his return to England in 1862, Wallace wrote industriously, producing a stream of insightful books (one of them, with typically self-effacing modesty, entitled *Darwinism* [1899]). However, the rest of his career was lived very much in Darwin's shadow, and despite being awarded various honors, Wallace never fully received the recognition due him. Indeed, for the entire remainder of his long life he was unable to secure a professional appointment.

A staunch advocate of natural selection in all other areas, Wallace nonetheless had difficulty discerning how this concept related to human evolution. In hindsight, Wallace's perception in this matter may actually be seen as quite penetrating; but his choice of supernatural guidance as an alternative mechanism for the emergence of the unique human consciousness brought disapprobation in his own time and since. Although perhaps justifiable in this limited instance, such disapproval unfortunately continues, a century later, to cast a disproportionate shadow over this great scientist's reputation.

— *Ian Tattersall and Kenneth Mowbray*

Further Readings

Camerini, J. R. (Ed.). (2002). *The Alfred Russel Wallace reader: A selection of writings from the field.* Baltimore: The Johns Hopkins University Press.

Raby, P. (2001). *Alfred Russel Wallace: A life.* Princeton, NJ: Princeton University Press.

Shermer, M. (2002). *In Darwin's shadow: The life and science of Alfred Russel Wallace.* New York: Oxford University Press.

Wallace, Anthony F. C. (1923–)

Anthony F. C. Wallace, born April 15, 1923, is a Canadian-born American anthropologist and historian best known for his work in community studies and ethnohistory, particularly social changes triggered by technological change. He received a PhD in 1950 from the University of Pennsylvania in Philadelphia where he taught from 1951 to 1988.

Wallace's book *The Death and Rebirth of the Seneca* (1970) is a classic ethnohistorical study. The book highlights an Iroquois cultural revitalization in the 1800s following acute stress on Iroquois culture. The Iroquois were experiencing social and cultural collapse. The book focuses on Handsome Lake, the Seneca prophet who began preaching to the Iroquois after the Creator spoke to him following a miraculous recovery in the face of death. Handsome Lake had a series of visions in which the Creator gave instructions to the Iroquois to adapt their culture to farming and to practice the values of temperance, peace, land retention, and morality. Wallace traces Handsome Lake's journey preaching to the Iroquois. The Code of Handsome Lake is still practiced today in Iroquois communities in Canada and the United States. Wallace was interested in how cultures adapted and changed in the wake of immense pressure caused by technological change.

His most important work is *Rockdale: The Growth of an American Village in the Early Industrial Revolution* (1978), for which he received the Bancroft Prize in 1979. The book links technological changes to the structure of community.

Wallace developed the concept of *mazeway* in reference to cognitive maps. The idea was elaborated in his writings on religion, social change, and revitalization. Wallace's book *Religion: An Anthropological View* (1966) is a classic in the field. He writes that

religion is "a set of rituals, rationalized by myth, which mobilizes supernatural powers for the purpose of achieving or preventing transformation of state in man and nature."

Ethnohistorians have shown how *now* is a social concept of time and the study of social life is a study of change over time. Here, Wallace offers insight to his view of history:

> Everyone in every culture lives in some sort of historical time, though it might not be perceived in the same way an outside observer sees it. It's an interesting question, "When is Now?" "Now" can be drawn from some point like this hour, this day, this month, this lifetime, or this generation. "Now" can also have occurred centuries ago; things like unfair treaties, the Trail of Tears, and the Black Hawk War, for instance, remain part of the "Now" from which many Native Americans view their place in time today. Human beings respond today to people and events that actually occurred hundreds or even thousands of years ago.
>
> — *Simon Brascoupé*

Further Readings

Swatos, W. H. (Ed.). (2005). Wallace, Anthony F. C. In *Encyclopedia of religion and society.* Retrieved from http://hirr.hartsem.edu/ency/WallaceAFC.htm

Wallace, A. F. C. (1998). In "An Interview with Anthony F. C. Wallace," by Robert S. Grumet. *Ethnohistory, 45*(1), 127.

Wallerstein, Immanuel (1930–)

Immanuel Wallerstein was born in New York in 1930. He attended Columbia University where he received his BA in 1951, his MA in 1954, and his PhD in 1959. He then continued to lecture at Columbia until 1971. Wallerstein became a Professor of Sociology at McGill University in 1971 and in 1976 he joined the Department of Sociology at the State University of New York (SUNY) in Binghamton. During his career as a sociologist, historian, and philosopher, Wallerstein lectured across the nation and around the world. He was the head of the Fernand Braudel Center for the study of Economics, Historical Systems, and Civilization. He also held the position of Directeur d'etudes associe at the Ecole des Hautes Etudes en Sciences Sociales in Paris. Wallerstein was president of the International Sociological Association from 1994–1998 and was the chair of the International Gulbenkian Commission on the Resurrecting of the Social Sciences from 1993–1995. He retired in 1999.

In 1974, Wallerstein published his political economy theory of modern world system. World-system theory asserts that worldwide division of labor is not formed by political or cultural boundaries, but by different social structures and member groups. These groups are self-contained within boundaries and held together by constant tension, which may at any time destroy the system. Wallerstein argues that there have only been two different types of world-systems: a world empire and capitalism. A world empire relies on political and military control. Capitalism relies on economic factors to maintain control. In capitalist society, the bourgeois capitalists from the core regions, primarily Europe and America, exploit the proletarians of the periphery, who provide the raw materials necessary for production. In this system there is also a semiperiphery, which contains areas that are exploiting others while at the same time being exploited themselves. Wallerstein claims that a third world-system, a socialist world government, may arise, in which division of labor would be determined by both political and economic factors.

Wallerstein's theory of world systems examines colonialism, postcolonialism, and political discourse. It contributes to the historical context of anthropological analysis in its examination of the alienation of labor. In his examination of the history of the development of global capitalism, Wallerstein acknowledges its negative effects on noncapitalist peoples. Global capitalism is sustained by unequal exchange. Wallerstein argues that the wealth of some nations cannot occur without the poverty of other nations. Due to Wallerstein's intellectual leadership, many more political economy theories emerged in the late 20th century, reflecting a broader intellectual disenchantment with the philosophical foundations of Western society. Immanuel Wallerstein contributed to the intensity with which anthropologists began to reflect on the role of sociocultural anthropology in academia and the world.

— *Brianna C. Berner*

Further Readings

Wallerstein, I. (1991). *Geopolitics and geoculture: Essays on the changing world-system.* New York: Cambridge Press.

Wallerstein, I. (1999). *The end of the world as we know it: Social science for the twenty-first century.* Minneapolis: University of Minnesota Press.

Wallerstein, I. (2004). *Alternatives: The United States confronts the world.* Boulder, CO: Paradigm.

War, Anthropology of

War is armed combat (fighting with weapons) between warriors or soldiers from two different political communities. This definition puts emphasis on learning to use weapons because learning to use weapons is socialization for armed combat. Warfare by definition is differentiated from other forms of killing—those that occur within political communities; these are, namely, homicide, political assassination (unless it is the leader of another polity), feuding, capital punishment, dueling, and human sacrifice. The study of war should focus upon pairs of political communities or pairs of alliances (of course, a single political community could be at war with an alliance). The warfare that occurs over a period of time between two rival entities (political communities or alliances) constitutes a "warfare system." An intergroup relations approach is useful in analyzing warfare systems: how relationships between polities influence relationships within polities and how these in turn influence relationships between polities. Each warfare system is unique.

Examination of the best-known warring societies makes it clear that warfare systems are so different that their comparison as wholes is difficult. Famous warring societies in the ethnographic record include the Alaskan Eskimo, Andamanese, Balona, Cherokee, Cheyenne and Sioux, Dani, Figi, Higi, Iban, Ifugao and Kalinga, Iroquois and Huron, Jivaro, Kofyar, Kwakiutl, Māori, Maring, Mohave, Montenegro, Mundurucu, Murngin, Navaho, Nuer and Dinka, Pima and Papago, Tausug, Tibetans, Tiwi, Tonga, Waorani, Western Apache, Yanamamo, Yoroba, and Zulu. Archaeologically known warring societies include the Aztec, Easter Islanders, Greek Hoplites, Inca, Maya (once considered peaceful), Moche, Samurai Japan, Shang Chinese, Sumerians, and Zapotec. For comprehensive bibliographies see Divale (1973) and Ferguson (1988).

Anthropologists who study war have found that war is a near universal; it occurs with great frequency at all levels of sociopolitical complexity. Societies without war are rare. Even societies without war may be part of a *warfare system.* For example, a hunting–gathering people such as the peaceful Semai of Southeast Asia have been attacked so frequently that they have become a refugee group or enclaved people. The two most common reasons why a few societies are peaceful are that, at the time they were studied, they had been conquered and become a dependent native people or they had long lived in an isolated area or been recently driven to one. Otterbein found four such societies in his cross-cultural study of war: Copper Eskimo, Dorobo, Tikopia, and Toda.

Hunting–gathering bands have been erroneously considered by numerous anthropologists to be peaceful. The belief is held so widely that it can be called a myth. Numerous cross-cultural studies, however, have shown that the percentage of warring bands ranges from 75–92%. This result is based on a review of six cross-cultural studies, two of which focused on bands. Peaceful hunter-gatherers, thus, are only 8–25% in these samples. The myth of the peaceful band grew out of evolutionary or developmental theory that arose in the Foundation Period (c. 1850–c. 1920), flourished during the Classical Period (c. 1920–c. 1960), and persisted to the present.

To dissect warfare systems it is necessary to select several key variables or dimensions. The goals of the combatants or the reasons that the military organizations or polities go to war are appropriately examined first. Comparative studies have identified four goals or causes of war: defense (including revenge), plunder (including spouse capture), prestige (for individuals and polity), and political control (which includes either hegemonic or territorial control). These studies show that defense and revenge are universal, if war is present. Defense and revenge are universally found because those who are attacked must respond in some manner: fight, flee, or surrender. And fight, if able, is the first response. The aggressors are likely to attack for one to three reasons: sustenance, sites, or spouses (the plunder goal)—the three *S*s of war. Resources, including (according to may cultures) women, are seized, or land is taken for hunting territories, fields for crops, or habitation sites. The goals form a Guttman scale with plunder being more important than prestige; in other words, where

prestige is found plunder is also, but where plunder is found prestige may not be. Thus material reasons for war, although not universal, are nevertheless more commonly found than prestige reasons. Thus, the sequence is defense– revenge, plunder, prestige, and political control. The four goals are related to level of political complexity. Indeed, only centralized political systems go to war for political control.

A second dimension is the composition of the military organization. How much training have the combatants had? Are the weapons used in armed combat hunting weapons or are they specialized weapons that require specialized training, often used in conjunction with other combatants? Otterbein has distinguished between nonprofessional and professional military personnel on the basis of whether they are part-time or full-time. The vast majority of small-scale societies (bands, tribes, and chiefdoms) have military organizations composed only of nonprofessionals, although some tribes and chiefdoms have full-time personnel. The backbone of nonprofessional military organizations is likely to be fraternal interest groups or localized groups of related males. On the other hand, the military organizations of states will most likely be composed of professionals. Officers are usually members of the upper class of the society. The commander-in-chief is usually the monarch. Commoners become full-time through conscription. If going to war is successful, the seized resources are likely to go almost entirely to the officers, the upper class, and the ruler. Fortified capitals and palaces are likely to follow. At this level of political complexity, defeat of a political community usually results in slavery of the commoners and execution of the upper class and royalty.

A third dimension is tactics. Basic tactics include ambushes, line battles, and sieges. Ambushes encompass two types of formations: surrounding enemy (in camp or settlement) or laying trap (along a path or road). "A detailed analysis of numerous cases over the past 30 years suggests that the ambush is probably used by all warring societies" (Otterbein). Ambush is perhaps a universal. Line battles may be arranged battles (the time and place negotiated in advance) or encounter battles. An attempted ambush may turn into an encounter battle if the intended victims detect the attacking military organization and stand their ground. For example, the Pearl Harbor attack was a successful ambush, but the attack on Midway Island was detected and the advancing Japanese navy was attacked and defeated. Sieges occur when the military organization of the inhabitants of a settlement, large or small, fortify and defend the settlement and the attackers devise means to overcome the defenses.

As noted, comparing warfare systems is difficult. There seems, however, to be "a two-component warfare pattern for bands and tribes (ambushes and lines) and a two-component warfare pattern for chiefdoms and states (battles and sieges)" (Otterbein). These two basic patterns appear to have separate origins.

A fourth dimension is gender relations. Political scientist Jonathan Goldstein in a survey of archaeologically and ethnographically known societies found, in spite of great differences in the manner in which war is waged, that gender relations were consistent across cultures. Men were the warriors, women seldom were. He reviews various theories and concludes that although the greater size and strength of men is a factor, the necessity of having role differentiation in a society leads to a classification of men as defender– providers and women as caretakers and food preparers. Men are socialized into the former role, women the latter. In combat men denigrate their opponents by classifying them in the female role.

Of the many theories of war proposed by anthropologists, cultural anthropologists seem to prefer five. They are efficient or proximate cause theories (for a review of theories see Otterbein). The goals of war theory has already been described. *Innate aggression theory,* although strongly attacked in the 1960s and 1970s, has a resiliency that keeps it alive. Cultural anthropologists of the time thought they had refuted the theory that war was in our genes. Studies in sociobiology since 1975 and observations of chimpanzee bands attacking one another have given renewed emphasis to the idea that perhaps the common ancestor of both early man and the chimps was a Killer Ape. *Frustration–aggression theory* also has never died. Perhaps the most acceptable version is that a "challenge elicits aggressive response." A challenge is a frustration. It is typically a challenge to either or both the individual man's status within a group or to his access to women or to other important resources, such as food and shelter. Sustenance, sites, and spouses, recall, seem to be the three basic reasons for war. Fraternal interest groups, the key component in nonprofessional military organizations, have been shown to be responsible for internal war. This social structural approach arose out of research on feuding.

Military preparation itself also seems to be a significant factor in generating warfare.

— *Keith F. Otterbein*

See also **Feuding; War, Archaeology of**

Further Readings

Ember, C. (1978). Myths about hunter–gatherers. *Ethnology, 17,* 439–448.

Goldstein, J. (2001). *War and gender: How gender shapes the war system and vice versa.* Cambridge: Cambridge University Press.

Kelly, R. C. (2000). *Peaceful societies and the origin of war.* Ann Arbor: University of Michigan Press.

Otterbein, K. F. (1977). *Comparative cultural analysis.* New York: Holt, Rinehart and Winston.

Otterbein, K. F. (Ed). (1994). *Feuding and warfare: Selected works of Keith F. Otterbein.* Langhorne, PA: Gordon and Breach.

Otterbein, K. F. (1999a). Clan and tribal conflict. In Lester R. Kurtz (Ed.), *Encyclopedia of violence, peace, and conflict.* San Diego, CA: Academic Press.

Otterbein, K. F. (1999b). A history of research on warfare in anthropology. *American Anthropologist, 101,* 794–805.

Otterbein, K. F. (2004). *How war began.* College Station, TX: Texas A&M Press.

War, Archaeology of

The study of warfare in prehistory is a specialty of its own embedded within the anthropology of war. To study prehistoric warfare requires knowledge of the conceptual and theoretical ideas set forth in the entries for "Feuding" and "War, Anthropology of," as well as an awareness of how to apply this knowledge to the archeological record. Because warfare is distinct from violence and feuding, which occur within political communities, the first task of the archaeologist is to identify the polities within a region and attempt to ascertain their relationships to each other. The notion of a *warfare system* is useful here. Hence, a regional approach is preferable to a focus upon a single site. In taking a regional approach, the archaeologist will determine settlement location and movement, which settlements have expanded and which have contracted in size, and which have fissioned and which have coalesced. This is a first step toward developing an understanding of whether intergroup relations were peaceful or hostile.

Determining the presence of warfare from archaeological finds is complicated—indeed, evidence for armed combat (weapons) and homicides (projectile points in bones) may or may not be indications of warfare. What follows is an attempt to give some guidelines. Finding burials with weapons suggests a warrior class; mass graves of homicide victims of both sexes and all ages suggests a surprise attack upon a village; mutilated bodies suggest torture and execution, acts performed upon members of the polity by other members. Special purpose weapons, body armor, and drawings of combat on walls or pottery vessels indicate the presence of warriors or soldiers and military organizations; general purpose weapons, such as spears and bows and arrows, may indicate only the presence of hunting and self-defense. Walls surrounding settlements and settlements located on a hill or in a place that is difficult to find and approach suggest the presence of warfare; hidden homesteads suggest fear of attacks connected to feuds; fortified houses, compounds, and neighborhoods indicate fear of crime, attacks, or of an uprising against the upper or ruling class. A burned settlement may indicate warfare; burned houses, an uprising.

The application of these guidelines to the archaeological record gives evidence that warfare occurred in a number of regions before the rise of agriculture: hunting and gathering bands in the Upper Paleolithic, Northern Australia, and the Archaic of North America engaged in armed combat on occasion. Upper Paleolithic cave paintings depict figures with darts (perhaps launched with spear throwers) or spears protruding from them (executions or battle casualties) as well as warriors shooting projectile weapons at each other (line battles). Projectile points in pelvic bones have been found at a number of sites, the earliest being 20,000 years ago. Burials, including mass burials, of individuals with projectile points lodged in them have been found along the Nile. This is evidence for warfare 14,000 years ago. In Northern Australia, rock art spanning thousands of years depicts three phases of armed combat, from individual combat with boomerangs or spears to battles between 20 to 30 warriors on a side. In North America, numerous skeletons have been uncovered that bear evidence that these early arrivals to the New World were killed with weapons. Kennewick Man had several healed wounds and a spear point embedded in his pelvis. At the Grimes Burial Shelter, a young man died as a result of being stabbed in his chest with a

knife. In Western Tennessee, six individuals were killed with projectile weapons.

As more and more archaeological sites are excavated, the evidence for early armed combat increases. Hunting weapons, spear throwers and bows and arrows, appear to have served as weapons both in the hunt and in war. It also appears that the frequency of lethal encounters increased through time, probably due to increasing population, increasing encounters between bands, and perhaps increasing competition for resources. Large game animals were on the decline in both Europe and North America during this period due to overhunting and climate change.

Shifting to those regions where agriculture arose—the Near East, North China, Mesoamerica, and Peru—presents a different picture: No evidence of warfare is found at the earliest sites. For example, at Abu Huryea (9500 BCE–5000 BCE) on the Upper Euphrates settled gatherers acquired crops and became farmers. The settlement grew to six thousand inhabitants. Yet, during this 4,500 year period there is no evidence for warfare. Only one skeleton with an embedded projectile point was found by archaeologists. Even the famous walls of Jericho were first constructed in a region that presents no other evidence of warfare (8300 BCE), an observation that has led some archaeologists to conclude that the walls were not fortifications. In the four regions where pristine or primary states arose, warfare appears to be absent in the earliest archaeological sequences. Specifically, in Mesopotamia warfare does not occur until the Uruk period; in North China, the Longshan period; for the Zapotec of Mesoamerica, the Rosario period; and for the Chavin of Peru warfare does not arise. When warfare did arise in these regions it was late in the Inchoate Early State stage. These early states attacked and conquered other states within a region of culturally similar peoples speaking the same language—internal war. In the Typical Early State stage culturally different peoples were attacked—external war.

The presence of warfare in regions with hunters and gatherers and the absence of warfare in regions of early agriculturalists creates a conundrum. War appears to have disappeared. The absence of warfare in those regions where the first states arose means that villages did not conquer other villages, creating chiefdoms; and chiefdoms did not conquer chiefdoms, creating states. The conquest theory of the origin of the state is not valid.

A solution to this conundrum has been proposed by Otterbein; namely, there are two separate origins for war. He identifies two types of military organizations, one that developed perhaps two million years ago, certainly by 20,000 years ago, and a second that developed 5,000 years ago. The former is the nonprofessional military organization, based on fraternal interest groups, and the latter the professional, full-time personnel, military organization. Otterbein argues that warfare declined and disappeared in some regions, those regions where large game animals were hunted to extinction. This created settled gatherers who proceeded to domesticate crops in nonwarfare environments. Only after centralized political systems had arisen, along with professional military organizations, did states embark on wars of conquest.

Theories of warfare preferred by archaeologists focus on underlying causes and consequences. Three are favored, creating a limited theoretical pallet available to the archaeologist who is attempting to explain what happened in the past. A favorite theory for many years is the recognition that culture contact leads to diffusion of material culture, specifically weapons, and often the knowledge of how to produce the items. The donor culture may also undergo change, a process known as acculturation. The diffusion–acculturation approach remains a mainstay for archaeologists. Theories featuring the physical environment include sophisticated ecological models, the view that population pressure leads to competition over scarce resources (CSR theory), and recognition that civilizations often come to a catastrophic end because of earthquakes, el Niños, or an ice age. Theories of cultural evolution are also commonly used. The developmental theory of the origin and rise of warfare from no war, to ritual war, to state-level warfare is an example, as is the conquest theory of the origin of the state.

— Keith F. Otterbein

Further Readings

Fagan, B. (1999). *Floods, famines, and emperors: El Niño and the fate of civilizations.* New York: Basic Books.

Haas, J. (1982). *The evolution of the prehistoric state.* New York: Columbia University Press.

Kelly, R. C. (2000). *Peaceful societies and the origin of war.* Ann Arbor: University of Michigan Press.

Moore, A. T. M., Hillman, G. C., & Legge, A. J. (Eds.). (2000). *Village on the Euphrates: From foraging to farming at Abu Hureyra.* Oxford: Oxford University Press.

Otterbein, K. F. (1997). The origins of war. *Critical Review, 2,* 251–277.
Otterbein, K. F. (2003, December). The archaeology of war: An alternative view. *Anthropology News,* p. 9.
Otterbein, K. F. (2004). *How war began.* College Station, TX: Texas A&M Press.

Washburn, Sherwood L. (1911–2000)

American physical anthropologist Sherwood Washburn's greatest contribution to the field of anthropology was promoting genetics to explain both human variation and as an acting guideline for the basis of a *New Anthropology* (1951). He was also instrumental in both the fields of primatology and forensic anthropology. Born in Cambridge, Massachusetts, to a highly educated and religious family, Washburn's intellectual capabilities and naturalism were encouraged at an early age. Although the young Washburn showed no interest in theology, his father Henry Bradford Washburn, dean of the Episcopal Theological School, encouraged him to explore other academic interests. Cultivating his youthful interests in zoology, and then biology, would later be instrumental in his synthesized anthropological approach. Among the foundational schools of Buckingham, Belmont, and Groton, the director of Belmont, Herber Howe, was a source of particular encouragement and support for Washburn's scientific interests in genetics. Besides his studies while still in high school, he also worked and gained valuable experience at the Harvard Museum of Comparative Zoology. This association with Harvard would accumulate into both an academic and professional relationship, whereby he eventually received both his BA (1935) and PhD (1940) in anthropology. With the profound influence of Harvard's faculty, particularly that of professors Cline, Hooton, Tozzer, and Ward, Washburn's scientific and theoretical framework would solidify and greatly benefit anthropology.

During his professional career, Washburn taught at Harvard, Columbia Medical School, the University of Chicago, and the University of California, Berkeley. With an aggressive and resolved demeanor, he brought both his experience and his wide knowledge base to the classroom. Stressing the scientific method, open to new scientific evidence and dialogue among all scientists, the resulting dynamic approach would both improve and expedite scientific advancements in all fields of science. As this perspective was applied to the field of anthropology, the resulting inquiry would lead him to the conception of a *New Physical Anthropology.* Besides this theoretical perspective, contributions made by his experiments are also impressive. Due to the nature of his experimentation, the impressive significance of his work with primate anatomy, the effects of paralysis of facial muscles, the significance of muscles for bone growth, and general muscle–bone relationships, the substantial and invaluable knowledge becomes overlooked or minimized. The ethical concerns aside, the information gained during his intellectual pursuits involving anatomy and primate behavior has benefited anthropology. He published an impressive collection of articles and served as a profound book editor. Washburn's most noted publications include *Thinking About Race* (1945), *Social Life of Early Man* (1961), *Classification and Human Evolution* (1963), *Perspectives on Human Evolution* (1968), and *Ape Into Man: A Study of Human Evolution* (1974). Although retired from the halls of academia at the time of his death, Washburn's influence and contributions to physical anthropology remains noteworthy.

Washburn's contributions, as a reflection of his perspectives, encompass a wide array of scientific research and related disciplines. With scientific rigor and rational thought based upon available evidence, Washburn entered the field of anthropology during an unsavory time when anthropology held a less than scientific view of human variation. Although today race is considered a social construct, the influences of Hooton concerning eugenics and purity of races was profound during those days, however misguided and erroneous these views had become. Furthermore, Washburn felt that the application of craniometry and morphology to classify human populations were both outdated and erroneous. Nevertheless, Washburn's interest in genetics led him to understand human variation in terms of genetic populations. This perspective concerning outdated techniques held by physical anthropologists was expressed in his call for a reconstruction of anthropology. Perhaps with foresight concerning the fracturing of the traditional four field approach to anthropology (fifth field when including applied anthropology), Washburn's conceptualization for anthropology's move toward the area of biology would provide a solid foundation, including for the areas of culture.

Although conceived and expressed as a discipline-wide approach, this focus of interest accumulated into the subdiscipline of biological anthropology.

Stemming from his biological perspective within an evolutionary framework, Washburn sought to both establish our own species' relationship among the primates and also to use primate's expressed behavior as essential characteristics of our common hominid ancestors. In this manner, he held that the field of primatology was a practical method to accomplish these ends. In an evolutionary framework, the relationship among the primates holds the key understanding to our origin and ancestral behavior. Using the method of DNA hybridization given by biology, supported by both immunology and molecular methods, he stated that all apes share a common ancestor, whereby the human primate is closer to the chimpanzee and then gorilla. The orangutan and, to a greater extent, the gibbon, are more distant than either chimp or gorilla. When establishing this relationship, the more distant or primitive the relationship becomes the more apt the behavior will reflect that of our shared common ancestors (for example, australopithecines). His interest in primates was not new, although previously anatomy and not behavior had been the point of focus.

Viewing primatology as a subdiscipline of biological anthropology, his research into behavior of primates led to understanding the biological or physiological underpinning of aggressive behavior. Extending this concept in an evolutionary perspective, this aggressive behavior from a functional perspective had contributed to the sustaining concept of *Man the Hunter*. By observing the adaptive behavior of baboons in different contexts (for example, remote verses interaction with humans), Washburn saw that behavior reflected the perception and dynamics of group action. In this manner, it can easily be applied to the environmentally motivated behavior of, for example, the australopithecines. Working in unison, the behavior of these bipedal hominids must have been organized in a way for them to survive being surrounded by large carnivores. Reflective of baboon behavior and circumstance, the ratio between hominid to carnivore is not sufficient to support the commonly held belief that our ancestors were primarily scavengers.

Similar to the assessment of australopithecines, the abilities of Neandertals become a central point in question. Proceeding from the assumption that hominid taxonomy is beyond genetic analysis, Washburn's biological approach to anthropology does possess some frailties; yet his understanding of anatomy's form and function allows for an interpretative stance. For example, although Neandertal's expressed behavior (art and burial) may be considered human, the degree of behavioral complexity (nonmaterial) becomes doubtful. This complexity is expressed in the nature of language. In Washburn's opinion, the complex features of language are essential to behavior. Because cranial capacity does not reflect intelligence, the language of the Neandertals was probably not comparable with modern *Homo sapiens*. At this point, the only indication of behavioral differences remains in the complexities of their respective material culture. Failure to deal with the fossil record appears to be the most problematic aspect of his anthropological approach. Although contributing to primatology and relating these factors to hominid evolution are astounding, the strength of his contributions involved his experiments within an anthropological and evolutionary framework.

Advancements from his experiments at both Columbia and Chicago, although controversial, remain to be scientifically valued. While at Columbia, Washburn's experiments revealed the influencing factors in the development of the mammalian skull. Washburn uncovered the influence of muscles and nerves on bone development: For example, premature closure of the sagittal suture in human beings results in a change in the length, breadth, and height of the cranium. In contrasting these experiments with his previous graduate research involving gibbons for Carpenter during the Shultz's Asiatic Primate Expedition, Washburn's interest in locomotion (bone, muscle, and joint operations) could be satisfied by his ability to dissect and study these primates. From these invaluable experiences, the relationship of muscles, cartilage, and bone become evident when comparing and contrasting our species and other primates within a functional framework (for example, hyoid bone in vocalization and muscles involved in facial expressions). At Chicago University, Washburn proceeded with experimentations to find out about skull growth. With two contending theories about growth, the first theory states that growth is at the sutures, and the second contends growth on the outside with inside absorption. Washburn's experimentations with pigs yield results that confirmed both processes are present. The results expressed that animals with thin skulls primarily developed at the sutures, whereas thick-skulled animals primarily developed on the outside with inside

absorption. This combination of processes can also be applied to the growth of brow ridges. If applied to different parts of the cranium (for example, nuchal crest), it becomes apparent how plastic and complex these features are in their composition.

Furthermore, Washburn used the same approach to the development and implementation of scientific evaluations for the emerging field of forensic anthropology. Being well versed in anatomy and biology, Washburn's keen eye for detail and understanding of population and gender differences resulted in the creation of ischio-pubic index for the determination of sex and race of skeletal remains. Utilizing these points of view, the emergence of a considerably enriched foundational perspective of forensic anthropology is unquestionable.

In the final analysis of his professional and academic contributions, Sherwood Washburn made great contributions to the field of anthropology. Scientific inquiry tempered with critical thought and a broad base of knowledge allowed for his greatest achievements. Anatomy, biology, and a sense of mechanical aptitude were the driving force behind his academics. Relating this information within an evolutionary perspective, Washburn's conception for anthropology brought a renewed direction and possibilities. Influencing the emerging fields of primatology, biological anthropology, and forensics, his methods, experiments, and theoretical foundation provided a solid foundation for the future of anthropology. As for the future generations of our species, and perhaps responding against views held by Hooton, Washburn held that education was the deciding factor to promote an equitable social system. He stressed the critical need for up-to-date material that complemented an involved teaching method that invoked personal meaning or purpose. Through this process of education, especially the teaching of evolutionary theory within an anthropological framework, future generations could both express our humanity and understand our species within a dynamic universe.

— David Alexander Lukaszek

Further Readings

De Vore, I. (1992). An interview with Sherwood Washburn. *Current Anthropology, 33*(4), 411–423.

Washburn, S. (1961). *Social life of early man.* New York: Wenner-Gren Foundation for Anthropological Research.

Washburn, S. (1963). *Classification and human evolution.* New York: Viking Fund.

Washburn, S. (1968). *Perspectives on human evolution.* New York: Holt, Rinehart and Winston.

Washburn, S. (1974). *Ape into man: A study of human evolution.* New York: Little Brown & Company.

Washburn, S. (1975). Ecology and Australopithecine taxonomy. *American Anthropologist, 77*(3), 618.

Washburn, S. (1978). *Human evolution: Biosocial perspectives.* Menlo Park, CA: Benjamin Cummings.

Washburn, S. (1983). Evolution of a teacher. *Annual Review of Anthropology, 12,* 1–24.

Washoe

Washoe is a female chimpanzee (*Pan troglodytes troglodytes*) known for bringing insight into animal cognition, communication, and social complexity with her capacity for communicating via American Sign Language (ASL). Washoe was born in West Africa in 1965. It is suspected that she was taken to animal dealers after her mother was killed by hunters. Washoe was bought by the U.S. Air Force space program. Two University of Nevada scientists, Drs. Beatrix and Allen Gardner, visited the laboratory and recruited Washoe for their own research. The 10-month-old chimp was brought to the Gardner's Reno, Nevada, home and taught ASL. The Gardners named her Washoe Pan satyrus after Washoe County, Nevada. Washoe was cross-fostered in the Gardner home, living like a human child. She learned to eat with a fork, drink from a cup, dress herself, use a toilet, play with dolls, and look at picture books.

Washoe is credited with being the first nonhuman to acquire a human language. Using imitation, encouraged babbling, instrumental conditioning, and other techniques, Washoe began learning how to sign for basic objects such as food. After 51 months of training, Washoe had acquired approximately 132 ASL signs or "words." She used the signs for classes of referents, rather than simply for specific exemplars. For example, Washoe used the sign "open" to ask for various objects to be opened such as doors, cupboards, and jar lids. She also understood more signs than she produced or used.

In September 1967, a graduate research assistant, Roger Fouts, began working with Washoe. In 1970, the decision was made to send Washoe to the University of

Washoe

Source: Photograph courtesy of the Chimpanzee and Human Communication Institute.

Oklahoma with Fouts and his wife, Deborah. In 1980, they moved again, this time to Central Washington University (CWU) where Washoe joined the Chimpanzee and Human Communication Institute (CHCI). At CWU, Washoe became the matriarch of a small group of young chimpanzees who had also been cross-fostered and taught ASL. The chimpanzees in Washoe's new family included Moja, Tatu, and Dar. Loulis was a later addition and became Washoe's adopted son. Loulis was the only chimpanzee in Washoe's family that was not cross-fostered or taught ASL by humans. Instead, Loulis learned ASL from the other chimpanzees, especially Washoe. Washoe molded Loulis's hands into specific signs that Loulis eventually used himself. As an infant, Loulis acquired and used approximately 47 signs.

The researchers at CHCI have gathered evidence in support of the notion that chimpanzees have the capacity for human language. Notwithstanding, there have been numerous studies and publications on this controversial topic, with many researchers arguing that chimpanzees are incapable of human language. Regardless of these claims, research with Washoe continues. Currently, a staff of 45 graduate and undergraduate students, along with Roger and Deborah Fouts, are working to learn more about Washoe and her family. Much of the data are taken from video recordings. All research conducted at the institute is at the will and interest of the chimpanzees. Studies are halted and sometimes cancelled all together if the chimpanzees do not want to participate.

— Lisa M. Paciulli and Stephanie N. Brown

See also **Ape Cognition; Ape Language; Chimpanzees**

Further Readings

Central Washington University. (n.d.). *Washoe biography.* Retrieved September 25, 2004, from The Chimpanzee and Human Communication Institute website: http://www.cwu.edu/~cwuchci/bios/washoe_bio.htm

Fouts, R. S. (1973). Acquisition and testing of gestural signs in four young chimpanzees. *Science, 180*(4089), 978–980.

Fouts, R., & Mills, S. T. (1997). *Next of kin: My conversations with chimpanzees.* New York: HarperCollins.

Gardner, R. A., & Gardner, B. T. (1969). Teaching sign language to a chimpanzee: A standardized system of gestures provides a means of two-way communication with a chimpanzee. *Science, 165*(3894), 664–672.

Gardner, R. A., & Gardner, B. T. (1975). Early signs of language in child and chimpanzee. *Science, 187*(4178), 752–753.

Gardner, B. T., & Gardner, R. A. (1985). Signs of intelligence in cross-fostered chimpanzees. *Philosophical Transactions of The Royal Society B: Biological Sciences, B 308,* 159–176.

Linton, M. L., Bronowski, J., & Bellugi, U. (1970). Washoe the chimpanzee. *Science, 169*(3943), 328.

Marx, J. L. (1980). Ape-language controversy flares up. *Science, 207*(4437), 1330–1333.

Wegener, Alfred (1880–1930)

Alfred Lothar Wegener was born on the 1st of November 1880 in Berlin, and he died at the end of November 1930 in Greenland. His parents were preacher and orphanage director Dr. Richard Wegener and Anna Wegener, nee Schwarz. He was the youngest of their five children. In 1899, he took his school-leaving exam from the Köllnischen Gymnasium in

Berlin, and directly went on to University of Heidelberg to study the natural sciences, and in particular astronomy. Later he attended the Universities of Innsbruck and Berlin, and he successfully defended his doctoral thesis on November 24, 1904, at the University of Berlin (magna cum laude). For the following 2 years, like his brother Kurt, he was assistant at the Aeronautischen Observatorium Lindenberg. Together with his brother Kurt, he set the world record for the longest-lasting balloon trip in 1906. In the same year, he made acquaintance with the well-known meteorologist Wladimir Köppen. From 1906 to 1908, he took part in a Danish expedition to Greenland organized by Mylius-Erichsen. In 1909, he handed in a further thesis (*Habilitation*) at the University of Marburg, and became *Privatdozent* there, which implies the right to lecture (*venia legendi*) and can be compared to an associate professorship. From 1917 to 1919 he was a Professor in Marburg. In 1911, his well known book *Thermodynamik der Athmospäre* appeared. On January 6, he gave his first presentation dealing with the continental drift theory at a meeting of the geological society in Frankfurt am Main. His complete theory concerning continental drift can be found in his most important book entitled *Die Entstehung der Kontinente und Ozeane,* which came out in 1915. From 1912 to 1913, he took part in another Danish Greenland expedition organized by J. P. Koch whereby they crossed the North of Greenland. After his return he married Wladimir Köppen's daughter, Else Köppen, who he met for the first time 5 years earlier when she was 16. He subsequently participated in World War I as a reserve officer (1914–1918). From 1919 to 1924 he was departmental manager of the German Seewarte in Hamburg, as a successor to his father-in-law, and also Professor at the University of Hamburg. Together with Wladimir Köppen, he published *Die Klimate der geologischen Vorzeit* in 1924, the year when he became a Professor of Geophysics and Meteorology at the University of Graz. He kept that Professorship until his early death in 1930. In 1926, a major symposium entitled "Theory of Continental Drift" took place in New York. Wegener himself did not participate in it, but contributed an article to the Conference Proceedings. In 1929, Alfred Wegener himself organized a preexpedition to the West of Greenland, to make some preparations and research for the main expedition the following year, which he planned, organized, and led himself. It was supposed to enable him to undertake his most important Polar research, but from the very beginning the expedition had to deal with many unforeseen problems. During the expedition, in November 1930, Alfred Lothar Wegener died, most probably of a heart attack due to bodily overexertion.

Wegener's most important contribution to science was the development of the first complete theory of continental drift. In a letter to his future wife in 1910, Wegener wrote that he noted that the east coast of South America and the west coast of Africa look as if they used to be connected in earlier times, and that he wished to dedicate further thought to this idea. He did not refer to the shape of the contemporary coastlines but the margins of the precipice in the deep sea. An American study falsely claims that later researchers found this out. Wegener, of course, was not the first to note the similarity of the coastlines: Others had already noticed this a long time before the 20th century (for example, Francis Bacon and Alexander von Humboldt). However, Wegener was the first to put forward a complete hypothesis that dealt with the whole earth. In his most important book, *Die Entstehung der Kontinente und Ozeane,* he described in detail the hypothesis of the wandering mainlands, or the theory of continental drift. The other main theory concerning the history of the earth is that the mainlands have always been where they are now, only the flooding of some coastlines have brought about small temporary alterations.

Wegener based his theory on the following traditional understanding. Continents and the ocean floor consist of two types of earth's crust. Continents are based on lighter (*Sial*), the grounds of the oceans on heavier (*Sima*) stones—a distinction that is still valid today. Like ice floes, continents are supposed to swim on the heavier layers of Sima. As both Sial and Sima are solid bodies, a special explanation for the movement is needed. Wegener claimed that the following two forces are at work. First, the *flight from the poles force* explains the movement towards the equator, and second, the *tidal rubbing* would be responsible for the drifting to the west of the continents. However, Wegener also realized that these two forces are not sufficient. In the first edition of his book about the origin of the continents he mentioned that it is too early to try to answer this question, and in the fourth edition he admitted that the "Newton of the continental drift theory" has not arrived yet. In 1929, he briefly referred to convectional streams in the magmatic subsoil as a relevant force—this force is still regarded as the most efficient today.

After World War II in the United States, the theory of the plate tectonics became dominant. As this hypothesis is a type of continental drift theory, Wegener's research,

which was nearly forgotten by then, became central again. The research undertaken in that context confirmed many aspects of Wegener's theory. For example, both refer to a supercontinent (named Pangaea by Wegener) that was present in the Late Paleozoic era (about 250 million years ago), which first broke and then drifted apart. However, concerning the details the two theories also differ significantly. For instance, it is not the mainlands that wander, but rather the plates that enclose not only continents but also large parts of the sea.

— *Stefan Lorenz Sorgner*

Further Readings

Schwarzbach, M. (1986). *Alfred Wegener: The father of continental drift. With an introduction to the English Edition by Anthony Hallam.* Madison, WI: Science Tech.

Wegener, A. L. (1966). *The origins of continents and oceans* [John Biram, Trans.). Mineola, NY: Dover.

Weidenreich, Franz (1873–1948)

German-Jewish physical anthropologist and anatomist Franz Weidenreich was known for his evaluation and interpretation of *Sinanthropus pekinensis.* Born in Endenkoben, Germany, Weidenreich developed an interest in skeletal structure and bipedal locomotion. Educated at several universities, Weidenreich received his MD from the University of Strasbourg (1899) and remained to teach anatomy. Shortly after graduation, he was appointed as an anatomy professor for the University of Heidelberg (1919). With developing interest in anthropology, Weidenreich left his position at Heidelberg for anthropology at the University of Frankfurt (1928–1933). Because of Germany's growing discontent toward citizens of Jewish descent, he left in 1934 for the United States. His association with the University of Chicago and the American Museum of Natural History would fall short of his accomplishments at the Peking Union Medical College.

As Director of the Cenozoic Laboratory of the Peking Union Medical College, Weidenreich continued the research on *Sinanthropus pekinensis* established by both previous directors Davidson Black and Pierre Teilhard de Chardin. The greatest contribution was his detailed analysis of the fossil material recovered from the Western Hills of Zhoukoudian. Though the original fossils were missing, lost, or destroyed during World War II, Weidenreich's monographs (1936–1941) based on the evidence collected serve as a critical point in the process of reconstructing hominid phylogeny. Weidenreich continued to lecture and published articles and books based on his perspective. The most popular was his publication *Apes, Giants, and Man* (1946).

With each new hominid discovery, the exact relationship among these forms to the origin of *Homo sapiens* becomes a point of inquiry. In this intellectual spirit, Weidenreich addressed this perspective concern with Sinanthropus, Pithecanthropus, and Neandertal man, of which his terms Archanthropine and Paleoanthropine applies. According to Weidenreich, the hominid evidence must be considered holistically, regardless of time, extinction, or proximate distance. Morphological unity is a key concept. When considering these hominid forms, including their variations, there appears to be a gradual evolutionary line without any serious gaps or multilinear directions. This is due to the idea of the primitivity of traits. However, the key and essential traits that are considered primitive can be erroneous or misleading. Nevertheless, Weidenreich, as with Teilhard de Chardin, believed that the representatives of both Sinanthropus and Pithecanthropus (as reflected by the Neandertals) should be designated as *Homo* based upon these morphological similarities and burial habits. Because there is a fluid motion from one phase of human evolution to the next (discounting any sudden appearances), these phases in human evolution have experienced taxonomical extinction but continue to exist in their "extended" relatives.

In Weidenreich's publication *Apes, Giants, and Man* (1964), gradualism, as seen in Darwinian evolution, depicts this process of blending of physical characteristics (for example, phenotypic expressions). Hominid morphology indicates 10 evolutionary phases of Hominidae. Of these 10 phases, five phases are *Archanthropinae* (most primitive), three *Paleoanthropine*, and two *Neoanthropinae.* The Archanthropinae consists of *Gigantopithecus, Meganthropus, Pithecanthropus* (*erectus, robustus,* and *soloensis*), *Sinanthropus,* and *Java* forms found in East Asia. Paleoanthropinae are represented by Rhodesian man, Neandertalians, and Weimar-Ehringsdorf of Africa, Asia, and Europe. The last phase, the Neoanthropinae

phase, is found in the Pacific islands, Asia, Africa, and Europe. They are represented by various Wodjak group, Choukoutien group, Boskos, and Cro-Magnon groups; along with their modern groups of Australian, Mongoloid, African, and Eurasian, respectively. These three phases represents the descent of modern *Homo*. When these phases are contrasted with the four groups (horizontal differentiation)—for example, Australian, Mongoloid, African, and Eurasian—the evidence illustrates the incompleteness of the fossil record. This fact withstanding, the morphological evidence would suggest that each group evolved in different parts of the world or regionally and at different rates.

Although a gradualist perspective of evolution may not be a taxonomical issue, Weidenreich's interpretation of fossil evidence is a source of debate. As depicted in his phases of evolution, each hominid, though extinct, had its basis on the main stem of the phylogenetic tree. According to the available evidence, Weidenreich places both *Pithencanthropus* and *Sinanthropus* as the most primitive Neandertal group. From this stage, the next phase of human evolution is seen by *Homo solonesis*. This phase is directly descended from the previous *Pithencanthropus/Sinanthropus* phase. The remaining Neandertals represented by Spy and Ebringdorf specimens are an indication of variation. Proceeding from these phases, intermediary *Homo* and fossil *Homo* (represented by the Piltdown "specimen" prior to its exposure as a hoax) would lead directly, although regionally, to modern *Homo*. Based upon this view, Weidenreich stated that *Pithecanthropus erectus* should be called *Homo erectus javanesis, Sinanthropus pekinesis* should be called *Homo erectus pekinensis,* and *Homo soloensis* should be classified as *Homo Neandertalensis soloensis.*

The preceding interpretation of the evidence, for Weidenreich, allows for the transitional phase from Neandertals to modern *Homo* via regional evolution. Differing rates of evolution would allow for the conformity of the evidence. Even when considering the evolution of the human braincase, the known fossil stages all fall into the same pattern of expansion and direction. However, not all segments of Neandertal phase fit into this pattern, specifically the European Neandertals. The descent of modern Europeans from European Neandertals becomes highly questionable. Though not totally ruling regional descent improbable, evidence suggested that the latest stage of *Homo sapiens Europeans* probably developed in West or central Asia and migrated to Europe during the last Glacial Period. For Weidenreich, the exact nature or fate of European Neandertals becomes moot. The variation seen within this regional scheme does not discount direct descent but allows for various *racial braches* of human evolution to develop. His depiction of the regional descent of *Pithecanthropus* to *Homo soloensis* to Cohuna Man and ending with Australian serves to illustrate such a view.

Though regionalism has gained acceptance, variable rates of evolution with racial connotations have severe philosophical implications. It would be certain that Weidenreich did not have this racial implication in mind when developing his theoretical framework. For Weidenreich, human variations, although based on a common ancestor, had developed under different environmental factors that influenced their respective development. From this categorization, it becomes possible that the term of "advanced" within a cultural context fosters the social construct that we deem as being race. *Race*, as a loaded term, is erroneous and misleading. Today, our species is held as one species with variations at the phenotypic level. Race is a social construct. This view withstanding, the contributions made by Weidenreich are substantial. His eye for detail and leadership had secured information concerning one part of human evolution that would have been lost. Weidenreich's unique interpretation of the evidence and reconstructing of hominid phylogeny gives anthropology one of many views concerning human origin. Although direct descent in regional evolution is problematic at best, including various independent forms of parallel evolution, Weidenreich's evaluation of the characteristics that are *Homo* serves as a point of critical reflection. It is his *spirit de corps* that allows the evidence to determine our defining quality: an evolving ontology without predestined teleology.

— David Alexander Lukaszek

Further Readings

Birx, H. J. (1988). *Human evolution.* Springfield, MO: Charles C Thomas.

Rightmire, G. P. (1988). *Homo erectus* and later middle Pleistocene humans. *Annual Review of Anthropology, 17,* 239–259.

Weidenreich, F. (1937). The relationship of Sinanthropus Pekinensis to Pithecanthropus,

Javanthropus, and Rodesian man. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland, 67,* 51–65.
Weidenreich, F. (1940). Some problems dealing with ancient man. *American Anthropologist, 42*(3), 375–383.
Weidenreich, F. (1943). The "Neandertal man" and the ancestors of "Homo sapiens." *American Anthropologist, 45*(1), 39–48.
Weidenreich, F. (1947). Facts and speculation concerning the origin of *Homo sapiens. American Anthropologist,, 49*(2), 187–203.

Wells, H. G. (1866–1946)

Herbert George Wells was a novelist, prophet, and gadfly, one of the 20th-century's most multitalented thinkers. Born on September 21, 1866, in modest circumstances in Bromley, Kent, Wells narrowly avoided a life of penury and obscurity in the drapery trade his mother planned for him. He studied at the Normal School of Science at South Kensington (now the Royal College of Science and part of the University of London) under T. H. Huxley, and taught for a while, before being able to earn a living as a writer. His first published writing was a series of what were then known as scientific romances, now known as science fiction. The best of these works, *The Time Machine* (1895), *The Island of Dr Moreau* (1896), *The Invisible Man* (1897), and *The War of the Worlds* (1898) remain classics in their field to this day.

Common wisdom says that these works represent Wells at his best, but his writing career lasted another 45 years, and included some very significant books. After the scientific romances, Wells moved on to novels about life, the best of which were *Kipps* (1905), *Ann Veronica, Tono-Bungay* (both 1909), *The History of Mr. Polly* (1910), and *The New Machiavelli* (1911). These novels can be read as insightful stories about human interaction and for the specific insights into the mores of Edwardian England. Wells then moved on to what he later called his prig novels: *Marriage* (1912), *The Passionate Friends* (1913), and *The Wife of Sir Isaac Harman* (1913). Less successful as novels, these books revolved around ideas of social reform and personal commitment to living one's life fully and in the public interest.

As it did for most people of his generation, the onset of World War I produced a new range of conflicts that Wells felt the need to explore. While being suspicious of patriotism, Wells deeply loved England, and his wartime books, both fiction and nonfiction, reflected this tension. The best of his wartime works were *Mr. Britling Sees it Through* (1916) and *The Undying Fire* (1919). The war also brought on a short phase of quasimystical religiosity, expounded in *God the Invisible King* (1917), although Wells soon tired of that approach and returned to what he called in his autobiography "the sturdy atheism of my youth."

After the war, Wells embarked on a series of what have been called textbooks for the world. They were the hugely popular *Outline of History* (1920), *The Science of Life* (1931), and *The Work, Wealth, and Happiness of Mankind* (1932). Each of these was very influential, despite a generally poor reception from the academic community. Wells hoped these books would become tools by which people took control of their destiny and worked cooperatively toward a new planetary humanism.

Largely in the service of this vision Wells produced a steady stream of novels. The most outstanding works from the interwar years were *Christina Alberta's Daughter* (1925), a study of the dangers of succumbing to transcendental fantasies; *Mr. Blettsworthy on Rampole Island* (1928), a black-humored dystopia about the breakdown of the Edwardian consensus about progress; and *The Bulpington of Blup* (1932), a comic look at human pretensions. *Mr. Blettsworthy,* in particular, deserves much more recognition than it has received, not least because it anticipated better-known dystopias like Aldous Huxley's *Brave New World* (1932).

Wells also became known in his capacity as a prophet of the modern age. He foresaw, for instance, trends such as the abolition of distance, nuclear war, suburbia, committed relationships outside marriage, even the Internet. He was also a strong proponent of the conservation of natural resources half a century before this became part of the cultural mainstream. Against this, as late as 1927, he was oddly unable to see much future for radio.

It is often claimed by Wells's detractors that he ended his days deeply disillusioned with the scientific rationalism he had spent his life advocating. His last work *Mind at the End of Its Tether* (1945) is usually cited in this respect. This claim, however, is unjustified, because Wells was never the uncritical rationalist his critics make him out to be. Since his earliest

scientific romances, Wells had been ambivalent about the power of science. Indeed, the strength of those works lies largely in his powerful articulation of this tension. Wells's career was an ongoing reflection about humankind's capacity to use responsibly the power that science was handing it. This underlies the lasting appeal of his science fiction, and reappears periodically, as in *Mr. Blettsworthy.* What the reader gets in *Mind at the End of Its Tether* is Wells's pessimistic and realistic strands interweaving with each other, with his more optimistic strand playing second fiddle.

There is another important sense in which the charge of Wells as a lapsed rationalist misses the point. Early in his career Wells was influenced by William James and later in his career by Friedrich Nietzsche, both stern critics of uncritical rationalism. Wells never arrived at a settled conclusion about Nietzsche. Earlier works like *A Modern Utopia* (1905) suggest the influence of Nietzschean ideas of the Overman. But these concepts were later jettisoned in favor of a cautious meliorism. The transition can be seen in Wells's 1938 novel *Star Begotten,* which discussed Nietzsche without arriving at any clear conclusion. And in his 1942 work *The Conquest of Time,* Wells spoke of the Afterman, a product of conscious renewal in the service of a nobler future for all.

Wells continued to produce engaging work until the last year of his life, highlights being *The Brothers* (1938), *The Outlook for Homo Sapiens* (1939), and *You Can't Be Too Careful* (1941), his last novel. During World War II, he was instrumental in composing a Universal Declaration of Human Rights, which exerted an influence on Eleanor Roosevelt's work to formulate the United Nations Declaration of Human Rights. Wells died on August 13, 1946.

— *Bill Cooke*

Further Readings

Smith, D. (1986). *H. G. Wells: Desperately mortal.* New Haven, CT: Yale University Press.

Wells, H. G. (1934). *Experiment in autobiography.* London: Victor Gollancz & Cresset.

Wells, H. G. (1942). *The conquest of time.* London: Watts & Co.

Wells, H. G. (1945). *Mind at the end of its tether.* London: Heinemann.

West, G. (1930). *H. G. Wells: A sketch for a life.* London: Gerald Howe.

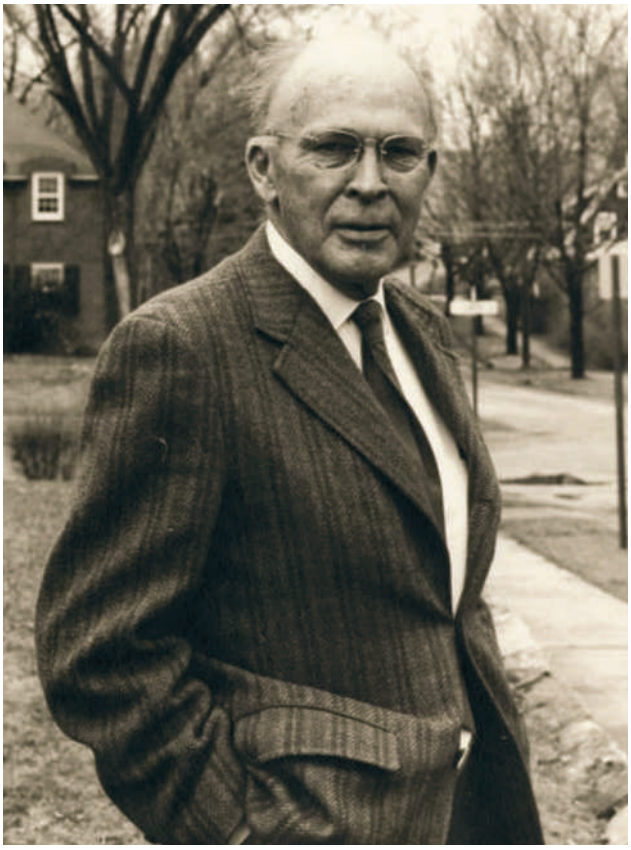
White, Leslie A. (1900–1975)

Leslie White was an American cultural anthropologist known for his neo-evolutionary viewpoint. White was born in Salida, Colorado, on January 19, 1900 and planned a career in the natural sciences before joining the Navy during World War I. This experience had a profound effect on him shifting his interests from the natural to the social sciences. Following the war, he enrolled at Louisiana State University where he stayed for two years before transferring to Columbia University where he received a master's degree in psychology. White completed his doctorate at the University of Chicago under Edward Sapir and Fay Cooper-Cole.

White accepted an appointment at the University of Buffalo in 1927. Following a visit to a nearby Seneca Indian Reservation, White read Lewis Henry Morgan's *League of the Iroquois.* Morgan's evolutionary ideas resonated with White and he read the works of other evolutionary theorists including Herbert Spenser and Edward B. Tylor. White joined the faculty of the University of Michigan following the retirement of Julian Steward in 1930. Despite tensions with other faculty and administration, he stayed at Michigan until his retirement in 1970. During his tenure, the institution was transformed into one of the leading centers for anthropological teaching and research in the country.

White became a prolific writer while at Michigan, publishing *The Science of Culture* (1949), *The Evolution of Culture: The Development of Civilization to the Fall of Rome* (1959), and *The Concept of Culture* (1973). *The Science of Culture* is widely regarded as White's most important work and outlines his ideas about the relationship between culture, culturology (the scientific study of culture), and cultural evolution. According to White, the primary force in cultural evolution is technology and a culture advances as "the amount of energy harnessed per capita per year increases or as the efficiency or means of controlling energy is increased." As technology becomes more efficient (and more energy is harnessed), the social structure and ideological norms of the society change accordingly.

In addition to his writings on evolution, White continued his lifelong interest in Lewis Henry Morgan and wrote several volumes on Morgan's research and life. These include *Excerpts From the*



Source: Courtesy, Bentley Historical Library, University of Michigan.

European Travel Journal of Lewis H. Morgan (1937) and *Pioneers in American Anthropology: The Bandelier-Morgan Letters 1837–1883* (1940). He was also an avid field researcher who published several monographs including *The Acoma Indians* (1932), *The Pueblo of San Felipe* (1932), and *The Pueblo of Santa Ana, New Mexico* (1942).

White retired from the University of Michigan in 1970. Following his retirement, White moved to Santa Barbara and continued writing at the University of California. On March 31, 1975, he died of a heart attack. White will be remembered as a "neo-evolutionist" who reintroduced the concept of evolution into anthropological theory.

— *Christina B. Rieth*

Further Readings

Bohannan, P., & Glazer, M. (1988). *High points in anthropology.* New York: Alfred A. Knopf.

Marcus, G. E., & Fischer, M. M. J. (1986). *Anthropology as cultural critique: An experimental moment in the human sciences.* Chicago: University of Chicago Press.

Morgan, L. H. (1960). *The league of the Iroquois.* New York: Corinth Books.

Service, E. (1976). Leslie Alvin White 1900–1975. *American Anthropologist, 78,* 612–617.

White, L. A. (1949). *The science of culture: A study of man and civilization.* New York: Farrar, Straus, and Giroux, Inc.

White, L. A. (1973). *The concept of culture.* Minneapolis: Burgess Publishing Company.

White, Timothy D.

Timothy D. White received his PhD from the University of Michigan and concerned himself with integrative biology, physical anthropology, and human evolutionary studies. He is a man who wears many hats: He has performed many important roles relating to his profession as a highly recognized anthropologist and has made significant contributions to hominid evolution. In addition, he is a professor at the renowned University of California at Berkeley, a curator for a museum, and a gifted researcher who is connected with the study of fossils relating to early primates. He is also associated with the Laboratory for Human Evolutionary Studies, which is an international center for research and training. It is thus quite understandable that his professional activities have brought him national and international recognition as a distinguished contributory scholar.

Dr. White is primarily interested in human evolution. He emphasizes fieldwork in his research and attempts to secure information about early hominid skeletal remains. For a long time Dr. White has pursued his quest for professional knowledge in East Africa, where he and his associates have analyzed early fossils for the valuable information that they can provide about our past. He has worked with a team conducting investigations relating to studies of his interest and their efforts have been quite successful.

White has made at least three important discoveries and findings: *Ardipithecus ramidus*, famous for its historical ancestry; *Australopithecus garhi*, where stone tools were found with the fossils; and at the end of the 1990s, Dr. White discovered three *Homo*

sapiens skulls. The discovery of the stone tools with *Australopithecus garhi* is valuable because it relates to the eating habits of early primates and may have affected their physical development. His research has also suggested that primates used tools more than 2 million years ago.

White's discoveries are important for a number of reasons but certainly because of what they have revealed about the early origins of mankind. Of course, they also have value in that they create interest in his subject matter for others and encourage scholars and research specialists to pursue additional study about the subject.

— *William E. Kelly*

Further Readings

White, T. D. (1991). *Human osteology.* San Diego: Academic Press.

White, T. D. (1992). *Prehistoric cannibalism at Mancos.* Princeton, NJ: Princeton University Press.

White, T. D. (2000). A view on the science: Physical anthropology and the millennium. *American Journal of Physical Anthropology, 113,* 287–292.

White, T. D. (2003). Early hominids—Diversity or distortion? *Science, 299,* 1994–1996.

White, T. D., Asfaw, B., DeGusta, D., Tilbert, H., Richards, G. D., Suwa, G. & Howell, F. C. (2003). Pleistocene *Homo sapiens* from Middle Awash, Ethiopia. *Nature, 423,* 742–747.

Whitehead, Alfred North (1861–1947)

Alfred North Whitehead had a long and illustrious career spanning more than 60 years spread out over two centuries. Although Whitehead's contributions to anthropology are indirect and came principally toward the end of his life, his observations on the connections between nature and the human spirit were informed by a long lifetime of varied pursuits in fields ranging from mathematics to a sort of proto-theology. Whitehead's life is frequently broken down into three periods: Cambridge, London, and Harvard. It was during the Harvard period that Whitehead made contributions closest to the field of anthropology.

An Englishman by birth, Whitehead distinguished himself early in life as a mathematician of the first order. From 1885 to 1910, he taught at Trinity College in Cambridge, where he was the professor of a young Bertrand Russell. Russell would later go on to collaborate with Whitehead—as a colleague—on the monumental *Principia Mathematica.* While teaching in London from 1910 to 1924, Whitehead shifted the focus of his efforts somewhat to the more practical concerns of education, especially as they related to the working class. Even while fully occupied with teaching as various administrative duties, Whitehead managed to continue his impressive scholarly output, publishing three major treatises during this period.

Whitehead's Harvard period represented a sharp break from his past activities. Whitehead was 63 years old when, in 1924, he accepted a position as a professor of philosophy at Harvard University. In addition to leaving his native country for the United States, Whitehead was now entering into a field in which he had no formal training—philosophy. As one might expect, however, the general background that Whitehead had accumulated during what was already an extremely impressive academic and scholarly career, combined with his prodigious intellectual talents, made the transition a smooth one.

In 1925, Whitehead published *Science and the Modern World,* in which he advanced the thesis that philosophy was rightly regarded as "the critic of abstractions." That is, philosophy should do more than merely remain comfortably ensconced in the realm of theory. As the critic of abstractions, philosophy must find a way to get beyond a worldview that assumes that the human mind cannot penetrate into the mysteries of nature as anything but an objective, dispassionate observer. While *Science and the Modern World* provides a schematic view of what such a philosophy might look like, it was in his magnum opus, *Process and Reality,* published in 1929, that Whitehead gave a full exposition of what would come to be called "process philosophy." Whitehead himself referred to his system as the "philosophy of organism."

Central to this system is Whitehead's notion of *actual occasion.* Whitehead describes an actual occasion as a process of becoming, as the coming together of the totality of a person's life experiences, particularly those in the recent past, which Whitehead refers to as *concrescence.* A human being is the totality of its experience, its concrescence. Whitehead's view thus resembles Sartre's concept of *facticity* (the sum total

of a person's experiences) and Heidegger's notion of *Dasein* (literally "being there" or, less literally, "human existence").

— *Daniel Horace Fernald*

Further Readings

Whitehead, A. N. (1929). *Process and reality.* Cambridge: Cambridge University Press.
Whitehead, A. N. (1966). New York: The Free Press.
Whitehead, A. N. (1995). In *The Cambridge dictionary of philosophy.* Cambridge: Cambridge University Press.

Whorf, Benjamin Lee (1897–1941)

Benjamin Lee Whorf was a chemical engineer, a linguist, and an anthropologist. He pursued his interest in anthropology and linguistics as an avocation. While working as a fire prevention engineer (inspector), he developed an interest in linguistics, pursued in off hours and on business trips. Through his initial independent research and his later collaboration with well-known scholars such as Edward Sapir, Whorf made substantial and significant contributions to the fields of linguistics and anthropology.

Whorf's primary area of interest in linguistics was the study of Native American and Mesoamerican languages. In the late 1920s, Whorf began to correspond with noted scholars in anthropology, archaeology, and linguistics. In 1931, while still employed as a fire prevention engineer, he enrolled as a graduate student at Yale University in order to study under the noted anthropologist and linguist, Edward Sapir. While at Yale, Whorf began to study the Hopi language under the supervision of Sapir. Whorf and Sapir were interested in the relationship between language and human thinking, specifically how language can shape our thoughts.

Whorf developed a theory in collaboration with Sapir that became known as the Sapir-Whorf Hypothesis. It dealt primarily with the way that language affects thought. Whorf posited that the structure of a human being's language influences the manner in which a person understands reality and behaves with respect to it. Whorf held that "all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar or in some way can be calibrated." Thus, for example, Whorf believed that speakers of Chinese dissect nature and the universe differently from Western speakers. Similarly, American Indians, Africans, and the speakers of many other languages would have a still different dissection of nature.

While at Yale, Whorf received many prestigious appointments in recognition of his important contributions to linguistics and anthropology. Yale appointed Whorf an Honorary Research Fellow in Anthropology in 1936, awarded him the Sterling Fellowship in 1937, and named him a Lecturer in Anthropology from 1937 to 1938. Although he did not pursue linguistics as a full-time profession, Whorf published his ideas on linguistics not only in major scholarly journals such as *Language* and the *American Anthropologist* but also in journals read by lay audiences. In forums such as MIT's *Technology Review* and *Main Currents in Modern Thought,* he wrote essays and reviews on a wide variety of topics.

Whorf's work did not become widely known in academic circles until the posthumous publication of his writings in the 1950s. In the 1960s, linguistic theories such as those proposed by Noam Chomsky focused on the universality of language and were therefore critical of Whorf's principle of linguistic relativity. However, advances in cognitive psychology and anthropological linguistics in the 1980s and 1990s created renewed interest in the ideas expressed in the Sapir-Whorf Hypothesis.

— *Patricia E. Erickson*

See also **Cultural Anthropology; Linguistics; Sapir, Edward; Sapir-Whorf Hypothesis**

Further Readings

Saporta, S. (Ed.). (1966). *Psycholinguistics: A book of readings.* New York: Holt, Rinehart and Winston.
Whorf, B. L. (1962). *Language, thought, and reality: Selected writings of Benjamin Lee Whorf.* Cambridge, MA: The M.I.T. Press.

Williams, Raymond (1921–1988)

Raymond Williams was one of the foremost public intellectuals of the 20th century. As a social theorist

and cultural critic, he had a major influence on various fields, including anthropology, literary criticism, media studies, and history. Born into a working-class family in Wales, his academic career led him to Cambridge and Oxford. He was a driving force behind some of the major institutions of modern leftist scholarship, such as the *New Left Review* and the Birmingham Centre for Contemporary Cultural Studies. Like other neomarxist scholars, he was centrally concerned with the relationship between material and symbolic production, objective structures and subjective ideologies. Many of his books, such as *Culture and Society, The Long Revolution, Problems in Materialism and Culture,* and *Marxism and Literature,* share the common thread of interrogating the increasingly fuzzy boundary between the classical Marxist categories of "base" and "superstructure."

Much of Williams's work took as a starting point Gramsci's seminal writings on hegemony. Williams viewed hegemony as a complex and contradictory process, rather than a uniform, static structure. He explored the limits and cracks in hegemony as well as its dominating power, and stressed that hegemony is never complete, but must constantly be defended and modified as it accommodates the perennial challenges to its encompassing authority. Still, evaluating the potential of such challenges for social transformation is no simple task. How may citizens distinguish between the alternative and the truly oppositional, the emergent counterhegemonic strains and the residual traces of prior social formations, given that countercultural forms and impulses are marginalized, selected, co-opted, incorporated, and even produced by hegemony itself?

Williams characterized his theoretical perspective as "cultural materialism" (not to be confused with the cultural materialism of Marvin Harris). In line with his view of culture as a productive process, he saw ideology as not only manifested in thought but also embodied in people's lived experience. Similarly, he stressed the nature of language as material practice, the terrain on which formative social processes are played out. In this sense, language itself—including writing and other technologies of communication—is among the determining forces that drive social change.

In line with the historical significance he attributed to language, part of Williams' contribution to social science were his genealogies of the "keywords" of Western thought, including that most fundamental to the discipline of anthropology: *culture.* By following culture's historical meanderings from the material, developmental implications of *cultivate* and *agriculture,* to the elite connotations of "high culture," Williams illustrated the function of words as reference points for collective conceptions of society, and thus for the reproduction (and transformation) of social formations. He argued for a view of concepts not as static entities, but as problems, "historical movements that are still unresolved"—in which case we should not simply respond to their "sonorous summons," but rather attempt to "recover the substance from which their forms were cast."

Despite his own intense engagement with "high culture" (as theorist, critic, novelist, and playwright), his working-class origins were essential to his intellectual trajectory, and he was deeply engaged in British radical politics. Indeed, he strove in his writings and his actions to forge theoretical linkages between culture and politics, and to argue for the importance of the cultural realm in political activism.

— Aurolyn Luykx

Further Readings

Eagleton, T. (Ed.). (1989). *Raymond Williams: Critical perspectives.* Boston: Northeastern University Press.

Williams, R. (1975). *Keywords: A vocabulary of culture and society.* London: Fontana.

Williams, R. (1977). *Marxism and literature.* London and New York: Oxford University Press.

Williams, R. (1980). *Problems in materialism and culture: Selected essays.* London: Verso.

Wilson, Edward O. (1929–)

Edward O. Wilson was born in Alabama on June 10, 1929. He grew up with an early interest in and utter fascination with the natural world. As he recalls, this enchantment began in the seventh year of his life when he spent the summer at Paradise Beach, near Pensacola, Florida. Wilson wandered the shores and tidal pools of the beach for hours on end, day after day, always in search of creatures to study and possibly capture. He was always searching for something more gigantic than his imagination could conceive. Ironically, a childhood accident left him blind in his right eye, which was an important point in his

decision to be a scientist and study tiny insects he could look at closely with his good eye: namely, ants.

Wilson is known by many titles, such as research scientist, environmental activist, ethical philosopher, and entomologist. He began his distinguished career by receiving his BS from the University of Alabama in 1949, and his MS in 1950 and his PhD in 1955 from Harvard University. He has spent much of his career as a professor at Harvard University and is presently a Pelligrino University research Professor and Honorary Curator of Entomology at Harvard's Museum of Comparative Zoology.

Wilson's early work focused on island biogeography. With R. H. MacArthur, Wilson published a theoretical explanation for the uneven distribution of species on islands. The basis of this theory depends on a balance between immigration of new species and the extinction of existing species. The main findings of this research that islands closer to the mainland will have increased biodiversity, as compared to islands at a greater distance, have become important to biodiversity conservation efforts. It has also been applied to management strategies for patchy ecosystems on mainlands that survive development but show a decrease in biodiversity.

Wilson is well known for his studies in entomology, especially myrmecology, the study of ants. He has made groundbreaking discoveries in regard to the biological basis of behavior in these social insects and applied them to the social behaviors of other animals. He was one of the first scientists to apply sociobiological theory to humans, positing that there are biological underpinnings to human behavior that have been selected for by evolution and are passed on through human genes. He even received the National Medal of Science in 1977 for his contributions.

Wilson's theories were heavily criticized and he was accused of subscribing to reductionism and genetic determinism. There is a well-known incident that occurred at the 1978 annual meeting of the American Association for the Advancement of Science. While Wilson was preparing to give a lecture, demonstrators charged him, poured a pitcher of ice water over his head, and said, "Wilson, you're all wet." Many people believe the idea that there is a genetic basis to human behavior to be morally reprehensible. It is often said that sociobiology is an excuse for the less desirable conditions, which humans impose on each other. However, it more obviously purports the understanding of such behaviors will more likely result in the ability to change them rather than perpetuate them.

Sociobiology's theories are now widely accepted as part of the biological and environmental explanations for the complexity of human behaviors, such as altruism or helping those who are not related with no apparent benefit to oneself. Wilson's 1975 publication *Sociobiology* has been widely accepted as one of the most important works dedicated to the study of animal behavior and has been instrumental to the evolution of the controversial theories of *Sociobiology* as applied to human behavior. Today, the discipline of sociobiology has developed into Evolutionary Psychology.

Wilson is known as "the father of biodiversity" and has spent much of the latter part of his career bringing the importance of every living species to the forefront of public attention with his presentations and publications. He is acutely aware of the detrimental effects of human habitation of the earth and as an active environmentalist. As a gifted writer, Wilson has published several books tolling the benefits of conservation and stewardship of the earth's natural resources. He dedicates much of his efforts toward enlightening others on the benefits of biodiversity and the reality that many species of plants and animals are going extinct every day.

Wilson believes that one of the main issues humanity must conquer is to raise the standard of living for the poorer countries of the world while doing as little damage to the surrounding environments as possible. By 2100, Wilson believes human impact on the natural world will be less extreme because population growth will subside. However, there is also the "bottleneck" effect of population growth accompanied by dwindling resources, which must be overcome. Essentially, the human population must pass through a time of turmoil before being able to see the benefit of conserving what is left.

Wilson is optimistic that this is possible. He believes the world will understand the benefits of biodiversity before it is too late. He likes to state statistics based on the amount of "free" resource services used by humans. He also advocates the preservation of biodiversity based on the fact that new plants and animals are still being discovered, some of which are found to have naturally occurring chemical and genetic compounds that may be helpful to humans through medical and agricultural innovation. Wilson states that it is in the interest of our own species' survival to preserve the life and habitat of all others.

Wilson serves on the Board of Directors of Conservation International, the American Museum of Natural History, and The Nature Conservancy. Wilson has received many awards and honors for his work including Pulitzer Prizes in 1978 and 1990, the International Prize of Biology from Japan in 1993 and The National Audubon Society's Audubon Medal in 1995. In 1998, Wilson gave a presentation to the U.S. Senate to support the Act to Save America's Forest, which is a bill that would conserve the biodiversity of the federal forest system and purports the inherent importance of all living things. His profound conservation ethic is delivered in a philosophical and scientific approach that engages his readers and lecture audiences. He has an infallible belief in the connection between humanity and nature, which has permeated his work for more than four decades and continues to influence young scientists and naturalists across the globe. His obviously emotional pleas for conservation have been heralded as a scientifically fueled and truly sincere approach to the preservation of the natural world.

— *Jackie L. Orcholl*

Further Readings

Wilson, E. O. (1992). *The diversity of life.* Cambridge: Harvard University Press.

Wilson, E. O. (1994). *Naturalist.* New York: Warner Books.

Wilson, E. O. (1998). *Consilience: The unity of knowledge.* New York: Alfred A. Knopf.

Wilson, E. O. (2000). *Sociobiology: A new synthesis, 25th anniversary edition.* Cambridge: The Belknap Press of Harvard University Press.

Wissler, Clark (1870–1947)

Clark Wissler was an influential American anthropologist, although his impact on anthropological theory is often overlooked. Many of Wissler's ideas on culture area, culture pattern, universal culture pattern, and age and area distribution of cultural traits are still in use by anthropologists today. However, Wissler is rarely cited for his contributions to these theories. While Wissler is often dismissed as one of Franz Boas's less famous students, he only took a few classes from Boas. His advisor was James McKeen Cattell, a psychologist, and Wissler actively promoted ideas that contradicted Boas's approach. Therefore, he was not in Boas's circle of students.

Wissler is particularly notable for being the first American anthropologist to address the issue of defining *culture.* He pointed out some aspects of culture that are today viewed as basic to understanding the concept of culture, including the idea that culture includes that which is learned, such as norms and ideas.

One of Wissler's most influential theories was his development of the culture area approach. Although this approach existed to some extent before Wissler, he was the first to apply it to research on Native American communities, thereby turning it into a practical and applicable theoretical approach to comparing different cultures and examining culture change. Wissler's culture area concept was that cultures could be grouped on the basis of the degree to which they shared cultural traits. Wissler's other theories include the *age-area hypothesis*, which is the term Wissler uses to explain his belief that cultural traits could be dated based on their distribution. Wissler also developed ideas on the spread of culture as well as the inherent nature of culture in all humans.

Wissler's legacy to anthropology is debatable. Some anthropologists believe Wissler's theoretical achievements in anthropology have been highly influential and unfairly overlooked, while others argue that Wissler's research had a racist nature, citing as evidence his book *Man and Culture* (1923). They believe that this explains his lower level of status within the discipline today.

Wissler was schooled in psychology, having earned his bachelor's and master's degrees at Indiana University in 1897 and 1899, respectively. He continued his studies in psychology, earning a PhD at Colombia University in 1901. While Wissler was working on his master's degree, he also taught psychology at Ohio State University. In 1902, he was hired as an assistant in ethnology at the American Museum of Natural History before taking over for Boas as curator. Wissler remained in his position as curator of the Department of Anthropology until 1942. At the same time, he taught anthropology part-time at Columbia University (1903–1909). Upon leaving his position at the museum, Wissler went to Yale University, where he worked in psychological research from 1924–1931 before becoming an anthropology professor from 1931–1940.

During Wissler's time at the museum, he led and directed numerous studies on Native Americans. Wissler published numerous books and articles on his research. He is credited with making the Northern Plains one of the most well known areas in ethnographic research at the time. He is also notable for developing the collections of the American Museum of Natural History.

— *Kristine McKenzie Gentry*

Further Readings

Wissler, C. (1929). *An introduction to social anthropology.* New York: H. Holt and Company.

Wissler, C. (1957). *The American indian: An introduction to the anthropology of the new world.* Gloucester, MA: P. Smith.

Wissler, C. (1989). *Indians of the United States.* New York: Anchor Books.

Witch Doctor

Witch doctor, also sometimes *witchman,* is an unfortunate term created by English speakers during colonial times in Africa to refer originally to healers using supernatural means, but it became a generic term for any sort of traditional healer anywhere, regardless of what methods were employed or what affliction was treated. It reflects a time when the label *witchcraft* was applied pejoratively to any supernatural practice or belief system that appeared radically different from the observer's custom, in spite of efforts by anthropologists to specify meanings. Early 20th-century anthropologists used the label witch doctor for specialists who treated victims of witchcraft, or who sought to cleanse alleged witches of their unwanted powers, especially when the healer used methods similar to those ascribed to witches. An early and influential usage of the term was by E. E. Evans-Pritchard in his classic 1937 work on Zande witchcraft, wherein he defines witch doctors as "diviners who are believed to diagnose and combat witchcraft in virtue of medicines which they have eaten, by certain dances, and by leechcraft" (this latter term is an archaic English synonym for medical healing, from the era when physicians employed bloodletting; its use by colonial-era anthropologists continued because healing methods worldwide often include sucking an offensive substance from the body of the patient). Some scholars attempted to justify the term by showing that the specialist may be well-trained, insightful, and effective, like Michael Gelfand's sympathetic 1965 study of the Shona *nganga.* In 1978, George Foster and Barbara Anderson, in their book about "the new field of medical anthropology," distinguished between "the shaman with his direct contact with the spirit world, and the witch doctor (to use an outmoded but still useful term from the African literature) with his magical powers." But all such usages of the label are inadequate because they confuse witchcraft, sorcery, magic, spirit invocation, shamanism, and other beliefs and practices, and thus give no precise meaning to the term.

A great variety of traditional practices have been variously designated by the label witch doctor. Some referents and synonyms are medicine man (or woman), native doctor, diviner, prophet, shaman, healer, curer, spiritualist, herbalist, exorcist, and others. The label used may denote a general category of specialist (e.g., healer), or it may be a role term, indicating the dominant method employed by the specialist (for example, diviner, exorcist, or herbalist). Priests and shamans are highly trained specialists, distinguished by different techniques and different sociocultural contexts, but both perform a number of situational roles, in any of which the label witch doctor might be applied. Traditional healers typically draw from a wide stock of spiritual, mystical, material, and psychological methods, and may combine several in a specific treatment.

The witchcraft Evans-Pritchard referred to is a specific phenomenon found around the world in settled societies: It is an invisible evil power that vests itself in certain people, and thence moves freely among the "bush" and the world of spirits and its human host. It works in mystical ways. The power enables its bearer to leave his or her body, change form, fly, and work directly upon its target, and this can be done without magic or spiritual assistance. Wherever the belief exists, there will be specialists who combat it, and many of them, too, work in mystical ways. In many parts of Africa the witch doctor works through specially developed sensory perception; he may be called a "smeller" of witches, using the native term that means both olfactory and extrasensory perception. Among the Bachama of Nigeria witches are located and engaged in battle by a special fraternity of

men who have demonstrated an ability to "see" into the spirit world; their "sight" works through invisible apertures at the center of the forehead and the occiput.

Regarding medicine men, it should be understood that *medicine* is an English term expropriated in colonial times to refer to any substance or technique, including ritual, that has power to change the state of someone or to protect people against outside influence, acting as an amulet. It may be specified as "good" or "bad" medicine. Sometimes we may encounter the English word "poison" referring to such means used with negative intent. And so *medicine man* is an imprecise and not very useful label.

A job of the specialist healer, which might give him the title witch doctor, is to counter sorcery. Sorcery generally means one of two individual acts of antisocial manipulation of the supernatural: spirit invocation and command, or harmful magic. The specialist healer might invoke a benevolent spirit and send it to do battle with the evil one sent by the sorcerer, a method employed in South and Southeast Asia; or he might work countermagic, aiming to deflect or nullify the magic the sorcerer has employed, and protect his client with amulets. Just as sorcery "works" through the victim's psychology—the best example being the "Voodoo Death" syndrome described by Walter Cannon in 1942—the antisorcery of the witch doctor works by convincing the patient that the evil influence is gone. As Cannon and others reported, relief may be rapid and dramatic. Both sorcery-induced illness and magical relief work through the same physiological mechanisms as operate in the placebo effect.

A shaman is a unique specialist, well described by anthropologists, found typically in small-scale mobile societies of Asia and early Europe and throughout the Americas. The English word derives from a term in the language of the Evenk, a Siberian Tungus-speaking tribe; it designates a status achieved after long study and apprenticeship, mastery of an altered state of consciousness called ecstasy, and successful completion of a period of deprivation and hardship resulting in profound personal transformation, the famous "vision quest." The shaman is in charge of the social, spiritual, and physical health of his people; he is politician, psychological counselor, and religious leader, as well as curer of diseases. Many of his decisions are made after consulting with spirits through ecstasy. In this state the shaman's soul leaves his body and journeys to the realm of whatever spirit is sought for advice or bargaining regarding the human problem for which the shaman is seeking resolution. The shaman's ecstatic state may be enhanced by ingestion of some psychotropic drug, and during his ecstatic flight, the shaman's body may behave in bizarre ways—trembling, twitching, frothing at the mouth, and so forth; it may be these factors that attracted the label witch doctor. Today the label *shaman* has lost its original specificity and is applied popularly and by anthropologists to any religious specialist anywhere whose techniques include entering an altered state of consciousness.

Spirit possession is another type of altered state of consciousness employed by medical specialists, in which a spiritual entity enters a person's body and takes control of it and all its faculties. Spirit mediums and cult priests may actively seek possession by particular spirits to acquire esoteric knowledge and guidance in curing human afflictions. Possession states commonly manifest in behavior alarming to Western observers, like convulsive jerking, frothing at the mouth, rolling back of the eyeballs, and glossolalia, all of which might justify the label witch doctor.

A patient's ailment may be diagnosed as demonic possession, in which case the healer takes on the role of exorcist and employs any of a variety of means to lure or scare the possessing spirit out of the patient's body. Many cultures distinguish between calm, orderly culture and wild, chaotic nature and believe that harmful possessing spirits are wild things of nature that can be successfully countered by invocation of even wilder and stronger things. The most effective remedies may include a variety of offensive materials and behaviors, such as fearsome masquerades embodying powerful nature spirits; magical enhancements of foul effluvia or body parts of dangerous animals; and techniques such as heating, chilling, beatings, or other inflictions of pain to render the patient's body an uncomfortable abode for the possessing spirit. Any such methods might stimulate application of the pejorative label witch doctor.

Really, the label witch doctor combines implications of ignorance and backwardness. It is uninformative, and it should not be used by anthropologists or any serious students of culture.

— *Phillips Stevens, Jr.*

Further Readings

Evans-Pritchard, E. E. (1937). *Witchcraft, oracles, and magic among the Azande.* Oxford: Clarendon Press.

Foster, G. M., & Anderson, B. G. (1978). *Medical anthropology.* New York: John Wiley & Sons.

Gelfand, M. (1965). *Witch doctor: Traditional medicine man of Rhodesia.* New York: Frederick A. Praeger.

Witchcraft

The term *witchcraft* is used in a great number of ways, to refer to supernatural beliefs and practices that the user considers evil or dangerous. Some of its many meanings are confusing, and its use is frequently pejorative, and unless it is carefully defined by its user it can be quite misleading. But it is the best term for a set of beliefs that ethnology has revealed to be nearly universal and that has great significance for anthropology and social psychology. So the student should take great care to understand exactly what the user means by the term, and to separate its many popular meanings from its anthropological ones.

Popularly, witchcraft can mean any of the many meanings of magic, most often with negative connotation (for example, "black magic"); or of sorcery; or specialized forms of divination, such as dowsing ("water witching"); or anything "occult." It has been applied to any of the African-based syncretistic magical or spiritual beliefs found in the American South and the Caribbean, including individual beliefs and full-fledged religious systems, such as *mojo,* conjure, voodoo, *obeah, Vodou, Santería,* and so forth. It can refer to Wicca or other neo-pagan religious systems. It can mean satanism, or anything deemed satanic or inspired by Satan. It can mean romantic attraction, or irresistible fascination, or any power to confuse or make things appear differently, often as "witchery." Often its use reveals more about the attitude of its user than its referent.

Among anthropologists, too, there is considerable variation in application of the term witchcraft. Some anthropologists in recent times have examined Wicca and other neo-pagan organizations, some of whose adherents refer to themselves as witches and their religion as witchcraft; but this is a recent phenomenon and belongs under the heading of alternative religions. It will not be discussed in this essay.

By witchcraft most anthropologists mean a set of beliefs in an evil power that vests itself in adult people and empowers them to do a variety of fantastic and terrible things. Unlike magic and sorcery, the power is not learned but innate, lodged within the body of the witch. Ethnology has found this belief system to operate in most of the world's cultures and throughout recorded history. It reached its most elaborate manifestation in medieval Europe; but without its Christian trappings, the medieval European witch is nearly identical to witches of Africa, Asia, Oceania, and the Americas. There are variations on some of the features: For instance, the power may be sought, and acquired through specific means; or it may be inherited through family bloodlines; or it may develop spontaneously and work without its bearer's knowledge. The power may be activated by negative emotion, or it may be always active, energized by its own evil. It is generally available to both men and women, although women predominate in witchcraft suspicions worldwide. The witch is such a bizarre conception that it took anthropology some time to recognize its distribution and its significance; once it did, ethnographic and explanatory studies increased exponentially, and today the anthropological and historical literature on witchcraft is enormous.

Witchcraft in Anthropology

The distinction between two types of human supernatural evil was recognized in the early 1900s, but elaborations on these two types, and recognition of their near-universality, developed later. Pioneering credit ought to go to Reo Fortune, whose 1932 study of male sorcery and female witchcraft beliefs on the Melanesian island of Dobu was the first detailed ethnographic account. But Fortune's report of a society so rife with suspicion and mistrust that members fled to escape supernatural retribution was received by English audiences with skepticism, and it was not until three decades later that his conclusions were affirmed. In his foreword to Fortune's book, Bronislaw Malinowski indicated the widespread fear of sorcery and witchcraft among the neighboring Trobriand and other islands, and said that he was then working on "the full account of Trobriand sorcery"; and we could imagine that he might have intervened and established for Melanesia a place as the type site for the anthropology of witchcraft studies. But Malinowski apparently did not finish that work,

and subsequent studies of these phenomena in the South Seas came much later. In 1935, the International African Institute's journal *Africa* published a special issue on witchcraft (Vol. 8, No. 4), with an introduction by Edward Evan Evans-Pritchard, and in 1937 Evans-Pritchard published his great work, *Witchcraft, Oracles, and Magic among the Azande.* The Zande case and "African witchcraft" became the standards by which subsequent studies were measured, and remain so today.

For the next two decades African witchcraft was a central focus of the structural-functional school of British anthropology. Some important representative works are collected in Max Marwick's *Witchcraft & Sorcery: Selected Readings* (1970, 1982) and John Middleton and E.H. Winter's *Witchcraft and Sorcery in East Africa* (1963). The war years obscured the important work of American anthropologist Clyde Kluckhohn, who recorded similar beliefs among the Navaho; an early edition of his *Navaho Witchcraft* was published by Harvard in 1944. But it was not until other studies appeared, like Jane Belo's *Bali: Rangda and Barong* (1949), Beatrice Whiting's *Paiute Sorcery* (1950), and Richard Lieban's *Cebuano Sorcery* (1967, Philippines), that it became clear that the distinctions between sorcery as learned technique and witchcraft as innate power were widespread, possibly universal. Striking similarities were seen between traditional ("primitive") witchcraft beliefs and those that characterized the terrible Christian witch-hunts of late medieval Europe. Several historians successfully applied anthropological perspectives to aspects of European witch beliefs.

Attributes of the Witch

Witches in each region have their own unique traits, but there are twelve attributes that characterize the witch wherever it appears. In this discussion it should be understood that *witch* refers to the power which may or may not be material, and which may work in the human world or in a separate, mystical dimension.

1. *Social subversion.* Witches are angry and spiteful and dedicated to the overthrow of orderly human society.
2. *Nocturnal activity.* Witches may operate in daytime, but they are most active at night.
3. *Transformation.* The witchcraft power can transform itself into the form of any animal, or bird, or another human form, or into invisibility.
4. *Flight.* The witch can fly, in the form of its bearer or an alter, and it can travel at great speed. The power can leave its human body behind as it goes off on its mission of mischief; or it can fly to another location in any form including the form of its bearer, so a person can be in two places at once.
5. *The familiar.* The witch may have a spirit or animal pet or companion that can share the power, and that can accompany the witch or be sent by the witch on its own evil errand.
6. *The "Sabbat."* Witches of a community meet together periodically, for an orgy of forbidden behavior, and to develop new strategies for social subversion. Because Jews were the first group to be collectively demonized as witches in Europe, the Hebrew word came to be used for the witches' gathering. The Sabbat is usually held at night at a known time and place, a wild dangerous place or a place of death, a cemetery or cremation site, a place people fear to go.
7. *Spread of disease.* Witches are universally blamed for epidemics, especially fatal diseases of unknown etiology.
8. *Abduction of children.* Witches everywhere are fond of little children, and seek to steal them (or their souls) away.
9. *Illicit sexual behavior.* Witches engage in whatever sexual behavior is considered abnormal and wrong by the society (e.g., incest, pedophilia, homosexuality, bestiality, public nudity, or bizarre sexual stimulations and positions). The agenda of the Sabbat often includes a sexual orgy, among the witches and with their human victims.
10. *Ritual murder.* At the Sabbat witches ritually kill their victims, usually with knives, and in very bloody fashion.
11. *Cannibalism and vampirism.* Witches eat the flesh and drink the blood of their human victims, either during personal attacks upon them in their homes, or after sexually and otherwise tormenting them at the Sabbat.
12. *Association with death.* Witches are always somehow associated with death, in at least four ways: they kill, they meet in a place of death, they use

corpses for food or for their terrible potions, and a myth of the origin of witches may say that the original power was first given to people in a Faustian bargain by a god of mortality.

Some variations on these attributes are widespread in specific regions. Christian conceptions of witches in medieval Europe had all 12 attributes; foremost among several specific details was that they were agents of Satan. Also, medieval European witches most often flew on some sorts of mounts, either fantastic creatures, male goats, or broomsticks. In sub-Saharan Africa, the witchcraft power is often located in a specific substance in the body; a fatty or tumor-like growth that can be discerned through autopsy; or animal teeth or a ball of metal or hair, or even a live snake, any of which had been swallowed by the witch, or developed mystically within its body. Also in sub-Saharan Africa witches walk upside down, a reflection of the general belief that witches embody the opposite of human norms. As elsewhere, the genitals are the locus of dangerous power, and social nudity is bad; African witches appear naked at the Sabbath. And when they fly, African witches often emit jets of fire from their anuses and armpits.

Similarity between certain attributes of witches and shamans in Asia and the Americas have been noted: transformation, flight, and working with familiars. The fact that shamans can work sorcery is not notable, as this is a learned skill open to anyone. But the combination of sorcery and witchcraft practiced by some shamans is unique. In his classic 1963 article "The Sorcerer and His Magic" (originally published in French, 1949), Claude Lévi-Strauss described how shamans could use their powers for evil purposes, in what later came to be known as "dark shamanism." A collection of writings on this theme was compiled in 2004 by Neil Whitehead and Robin Wright in their book, *In Darkness and Secrecy: The Anthropology of Assault Sorcery and Witchcraft in Amazonia.*

Variants on the Theme: Were-Animals, and The Evil Eye

Belief in the ability of certain people to transform themselves into animals, also called *shape-shifting* and the animal counterpart a *were-animal* (from Old English *wer,* man), is widespread in world ethnology and may be a cultural universal. It is a defining feature of witches and shamans, but it exists in other cultural contexts as well. Werewolves and vampires combine other features of the witch, specifically nocturnal behavior and desire for human flesh and blood, and they can be understood as regional variants on the witch–familiar theme.

The phenomenon known as Evil Eye is a clear variant on the witchcraft theme. This is a belief in an antisocial power that develops in some people, even without their knowledge. The power passes through the gaze, but it can just emanate from the bearer's body. It is stimulated by envy or anger, but as it is an evil power it may act with no emotional trigger. Babies, sick, elderly, and otherwise frail people are most vulnerable; but, like witchcraft, Evil Eye can infect livestock, and can cause general misfortune. Perhaps everywhere people believe that evil can be transmitted through the eyes, but Evil Eye is an institution with specific characteristics and remedies, and can coexist with full-fledged witchcraft in some areas. It seems to have originated in the Middle East and is indigenous to the Mediterranean fringe, from whence it spread throughout Europe and across the Atlantic through European cultural influence.

Defense and Remedy

Defenses against the activities of witches are similar to those against demonic spirits and the mystical forces projected by sorcery. Magical power can be harnessed and manipulated, and powerful amulets are generally effective against all such evil influences. Representations of horns are widely used as anti-witchcraft devices; Italians wear little gold horns, *cornuti,* on necklaces, against the Evil Eye. In times of relative calm, witchcraft is stimulated by antisocial human emotions, envy, and anger, and so if witchcraft is diagnosed as the cause of some problem, people in some competitive relationship with the afflicted may be the first suspected. The most effective remedy is for the witch to confess and withdraw the spell. Most frequently the witch cannot be located, and a specialist, earlier termed a "witch doctor," may be engaged to exorcise the witchcraft power and cleanse the afflicted persons and their surroundings.

Witches are a fact of social life, and it may be deemed necessary to conduct periodic anti-witchcraft rituals throughout a community. In some societies special organizations of psychically gifted people can sense the presence of witches or evil spirits through

some specially enhanced perceptual mechanism, such as attributed to the "witch smellers" of Central and East Africa. In the kingdom of Bachama of northeastern Nigeria, members of a secret society of men "see" witches through a conceptual organ at the forehead and the occiput. Identifying the witch is the most important step; driving it out with specially empowered spears or poisons is then easily accomplished. Or, powerful spirits may be invoked and embodied in fearsome witch-cleansing masquerades aimed at scaring witches away, such as the Nupe *ndako-gboya,* the Senufo *Kunugbaha,* and a variety of horned or tusked anti-evil masks, some of which breathe smoke and fire; or witches may be periodically propitiated, as in the Yoruba *Gẹlẹdẹ* or the Balinese *Rangda* masquerades. If a witch is detected, he or she may undergo a ritual of exorcism to remove the power from his or her body. In Africa this may require a spoken pronouncement and ritual spitting, or vomiting of the witchcraft substance, by the witch. Like sorcery, witchcraft "works" by means of the victim's psychology, specifically the placebo effect, and culture-specific cures for witchcraft-inflicted diseases may have dramatic results.

Explanations

Through the 20th century the most common explanations for witchcraft beliefs, suspicions, and accusations were framed in terms of social and psychological functions. Like sorcery, witchcraft has been shown to serve various social control functions: lest they be suspected of witchcraft, people are careful to mind the norms of social propriety. Uncivil people, people who accrue extra wealth and do not share, people who avoid participation in social events, might be suspected. And, as Monica Wilson pointed out in her 1951 paper, "Witch Beliefs and Social Structure," witchcraft provides a handy and logical explanation for social misfortune in cosmological systems in which chance and coincidence have no place. Witchcraft answers the questions, "Why me?" and "Why just then?"

A paradoxical fact of society is that social living generates tensions. In his appreciation of Evans-Pritchard's great work in 1944, the British social anthropologist Max Gluckman famously said, "If a sociologist can find where charges of witchcraft in a particular society fall, he can almost reconstruct the social relationships of the society." Social analysts have shown that regular patterns of witchcraft (or sorcery) suspicion and accusation can be demarcated, according to the nature of social relationships. Relationships characterized by tension or competition are most likely to generate suspicion. Respect for the magical and social power of speech tends to deter suspicions from being verbalized in open accusation until there is credible evidence. It has been shown also that suspicions increase during times of stress; and as stress increases, accusations also increase, as less evidence is required for credibility, and the classic scapegoating function of witchcraft is demonstrated. The prevalence of witchcraft suspicions is a barometer of social stress; Max Marwick called it a "social strain-gauge."

If stress remains high and some general sense of deprivation becomes prevalent, a group of people within the society might be blamed; they might be demonized in various ways, and a witch-hunt might be launched against them. The witch-hunt is a specific type of social persecutory movement. Its instigations and expectations, even its means, are like a revitalization movement turned inward. It might be temporarily cathartic for the perpetrators, proving a distraction; but its results can be socially devastating.

In a 1989 paper, James Brain noted that witchcraft beliefs are absent or unimportant, and sorcery beliefs weak, in small-scale, mobile societies with egalitarian values and little material property, like hunter–gatherers and pastoralists. By contrast, among sedentary indigenous peoples witchcraft beliefs are likely to be strong. Social fission is an inherent quality of nomadic societies, explained as a response to limited resources; Brain suggests that through the same mechanisms people escape the kinds of social tensions that generate witchcraft suspicions.

It should also be noted that among some reconstituted societies with syncretistic cultural systems, sorcery is present but witches are likely to be absent or only vestigial. Among African-based cultures in the Caribbean and South America, numerous African cultural elements are easily discernible, but the witch is notably absent. The social fears that find their focus in the witch are present, but are dispersed among other dangerous denizens of the night. There are shape-shifters; child-stealing, cannibalistic, and blood-sucking creatures; and a variety of mysterious sinister societies that meet in forbidding places at night; but there is no single creature that embodies all of the twelve attributes of the ethnological or historical witch. A possible explanation lies in another possibly

unique aspect of African witchcraft: It may be a marker of social membership. Each culture has its own form of witchcraft, which runs in the veins or is passed on among its own members exclusively. Among Bachama, for example, the witchcraft power is *mwito.* A person with long continuous ancestral links in the patrilineage is said to be *ji-bato ka mwito,* of the patrilineage with the potential for witchcraft; a person who traces his ancestry to someone who was adopted into the patrilineage is *ji-bato a mwito,* of the patrilineage but without the unique Bachama marker, hence possibly ineligible for inheritance of some important title. It may be that the unique blood-borne social marker was lost in the horrendous social devastation of the slave trade, and no acceptable substitute was possible in the construction of new organized societies in the New World.

Explanations for some witch fears have been found in neurobiology. An unusually terrifying nightmare, of the sort called a "night terror," accompanied by sleep paralysis, might explain widespread reports of nocturnal attacks by witches and vampires who intrude into the bedroom and bear down on the terrified but paralyzed victim. The sufferer feels enervated and drained in the morning, which strengthens his conviction that some of his life force has been removed.

Explanations in terms of social and psychological function are situational; they may not indicate origin. The relatively new field of evolutionary psychology proposes that some behaviors and beliefs might be shaped by evolutionary biology, and is thereby rephrasing some explanations that anthropology has suggested for a long time. Today the highly productive brain sciences may confirm some such suggestions about the attributes of the witch, enumerated above. Some of these reflect universal cultural traits, and some can be seen as having adaptive value. Mary Douglas described witchcraft as "the standardized nightmare of a group," and indeed, some of the twelve attributes of the witch embody deep human fears. Some seem clear: Attribute (1), social subversion, is the universal suspicion that generates conspiracy theories and witch hunts. It derives from the we–other social attitude that characterizes all coherent societies, and attribute (6), the secret gathering, is related. Attribute (2), fear of the night, is universal, and sensible. Attribute (8), abduction of children, reflects the universal instinctual reaction of alarm that all adults exhibit at the threat of harm to children. Attribute (9), sexuality, is central to the condition of being human, and a central social issue in all cultures. Issues of deviant sexuality arouse visceral reaction in people. Attribute (11), cannibalism and vampirism, is universally deeply repugnant. Attribute (12), the awareness of death, is central to the human condition; it is a basic concern of all religions, and the fact of death is elaborately accommodated in all societies. Some of the other attributes are not so clearly fundamental to humanity, but they are suggestive: (3) and (4), the ideas of transformation and flight, characterize children's fantasies and adult myths everywhere, and are the stuff of dreams; (5), the familiar, may be a projection of people's universal relationships with animal pets; (7), epidemics, are socially and psychologically devastating, and are threats to the continuance of society; and (10), the universal civil sanction against murder, is clearly socially adaptive, and the idea of ritual murder is obscene sacrilege of the sort that generates rage in people.

Suggestions that these components of witch beliefs are rooted in fundamental human fears are strengthened by the fact that many of them are the stuff of conspiracy theories that emerge throughout history, allegations of the "blood libel" and other unthinkably terrible deeds made by one group against another; and most of them can be discerned in the fears of bloodthirsty satanic cults that swept Christian areas of the entire world in the 1980s and early 1990s, and still crop up occasionally. The satanists were alleged to do everything witches do, with three general exceptions: transformation, sharing of their power with familiars, and flight; but warnings from some fundamentalist Christian organizations did allege that Satan had empowered his servants with specific personal demonic spirits.

Witchcraft Today

It would be expected that as the education, religion, and technology of industrial societies permeate the traditional world, witchcraft beliefs would die. But for several apparent reasons witchcraft and related beliefs have continued in the modern world. One reason is that the agents of change rarely addressed traditional witchcraft beliefs specifically, simply assuming that their inherent falsity would become clear in modernization; another is that witchcraft answers questions that the new cosmologies, which accept chance and coincidence, cannot answer; another set of reasons is found in the visceral, instinctive fears expressed in

witchcraft's composite attributes, which are triggered into unthinking social action in situations of extreme anxiety (i.e., the witch may be a natural human phenomenon).

And, modernization is not systemic: It affects only parts of cultural systems, leaving the others to react. Corrupt governments, civil wars, ecological change, and epidemic disease have exacerbated poverty in Third World areas. Rapid globalization presents confounding new mysteries to people, rural and urban, bringing strange new values and drastically altering traditional social systems. Financial dealings via the Internet result in rapid and inexplicable wealth for some, and new ventures and risks for many. Witchcraft provides explanations that people can understand. In their 1998 Max Gluckman Memorial Lecture (published in the *American Ethnologist,* 1999), Jean and John Comaroff described new urban realities surrounding "occult economies" in South Africa. These beliefs, actually resurrections of old ones, include invisible hordes of zombie laborers, and a brisk and lucrative trade in specific human body parts, sought for their magical power and supplied by ritual murders, commonplace in the anonymous squalor of cities. Fears of various spells of sexual impotency, including "penis-snatching," have affected men in several West African cities in recent decades.

It is axiomatic in anthropology that witches become more important in situations of rapid social change. Traditional witchcraft beliefs have been expressed in murderous regional witch-hunts in South Africa and Indonesia, and local ones in South America and areas of the former Soviet Union, all in the decade of the 1990s. New expressions of the old beliefs have pervaded traditional areas today, stimulated by unprecedented social problems. Urban homelessness is now common, but is a relatively new phenomenon in African cities, and homeless people are frequently the targets of witch-hunting mobs. Hard economic realities have shrunk kinship systems in modern times, and today brutal armed conflicts and AIDS have killed enormous numbers of adults in Africa. A result is an unsettling new social phenomenon: orphans. Traditionally only adults could be witches, and children were the favorite victims of witches. But today some new and terrible realities of childhood, including abduction for slavery, involving both hard labor and sexual slavery, and for conscription into rebel armies as child-soldiers, and the formation of gangs of homeless urban street children, have all contributed to the emergence of disturbing new beliefs in child-witches.

We might be reminded of the famous statement by George Lyman Kittredge, in his great work, *Witchcraft in Old and New England* (1929): "The belief in witchcraft is the common heritage of humanity. It is not chargeable to any particular time, or race, or form of religion."

— Phillips Stevens Jr.

Further Readings

Ciekawy, D., & Geschiere, P. (Eds.). (1998). Containing witchcraft: Conflicting scenarios in postcolonial Africa. *African Studies Review, 41,* 3.

Comaroff, J., & Comaroff, J., (Eds.). (1993). *Modernity and its malcontents: Ritual and power in postcolonial Africa.* Chicago: University of Chicago Press.

Evans-Pritchard, E. E. (1937). *Witchcraft, oracles and magic among the Azande.* Oxford: Clarendon Press.

Marwick, M. (Ed.). (1982). *Witchcraft and sorcery: Selected readings* (2nd ed.). Harmondsworth, England: Penguin Books.

Moore, H. L., & Sanders, T. (Eds.). (2001). *Magical interpretations, material realities: Modernity, witchcraft and the occult in postcolonial Africa.* London: Routledge.

Siegel, J. T. (2001). Suharto, Witches. *Indonesia, 71,* 27–78.

Stephen, M. (Ed.). (1987). *Sorcerer and witch in Melanesia.* New Brunswick, NJ: Rutgers University Press.

Stevens, P., Jr. (1996). Sorcery and witchcraft. In D. Levinson & M. Ember (Eds.), *Encyclopedia of cultural anthropology* (pp. 1225–1231). New York: Henry Holt.

Walker, D. E., Jr. (Ed.). (1989). *Witchcraft and sorcery of the American native peoples.* Moscow, ID: University of Idaho Press.

Wolf, Eric Robert (1923–1999)

Eric Robert Wolf spent his professional career defining and expanding issues such as peasant society, state formation, development of capitalism, and colonial expansion. He worked extensively to unite political anthropology, economic anthropology, and historical

sociology. He worked with the Marxist concept of *modes of production* as a conceptual tool in studying the historical and materialist consideration of a people in the cultural and ecological adaptations to a changing environment. Modes of production were looked at in a cultural ecological setting, and as a specific adaptation to a particular social and physical environment. Interconnecting relations with other cultures in different environmental settings was a modification of this adaptation. Particularly important to Eric Wolf was the interconnection between Europe and the rest of the world after the late 1400s. In anthropology, current ethnic history is the histories of peoples already impacted by European society, even if indirectly.

Through comparative studies, Wolf examined peoples of Latin America and the Caribbean that combined Marx's concept of modes of production with Julian Steward's cultural ecological adaptations. This developed a working model of world markets and imperialism with a history of colonialism and United States economic domination of the region.

Wolf helped define peasant societies by comparing them to both business farms and tribal production. A peasant farm is defined as a subsistence-based rural household economy. The surplus of a peasant farm supports a nonproducing elite. In his *Peasant Wars of the Twentieth Century,* Wolf outlined the central role played by middle-size peasant families in these struggles.

Eric Robert Wolf, in *Europe and the People Without History,* classified historical cultures into three basic modes of production: kin-ordered, tributary, and capitalist. Kin-ordered relates band and tribal societies or stateless societies. In tributary modes of production, the direct producers possess the means of production. The elite expropriates the surplus product by political or other types of noneconomic means. All precapitalist states were tributary. Asiatic is an example of a strong (centralized) tributary state, whereas feudal is a weaker one (decentralized); these two replace one another over time. Europe, from the 16th through the 18th centuries, was not capitalist, but a mercantile tributary (centralized) state. Capitalism emerged in England in the late 18th century. The capitalists enlisted labor under capitalism through the buying of labor power by the capitalists, leaving the workers with nothing left to sell but this labor power. Liberal political revolution, the industrial revolution, and free trade came together in England in part because of its unique history and its geography so that it became the homeland of capitalism and divided the world into sections to meet the interests of the British capitalist.

In *Envisioning Power: Ideologies of Dominance and Crisis,* Eric Wolf investigated the history of ideas, power, and culture and how they interact. Wolf argues that power is important in shaping cultural evolution. Ideology incorporates power but ideas reflect cultural input. Belief about power and actual power converge through culture. Societies face tensions posed by ecological, social, political, economic, or emotional crises, and they utilize conceptual answers that use commonly unique, historically rooted, cultural understandings. In case studies of the Kwakiutl Indians of the Northwest Pacific Coast, the Aztecs of pre-Hispanic Mexico, and National Socialist Germany, Wolf analyzes how the ruling ideology, together with power, sanction the significant relationships that govern social labor.

— *Michael Joseph Francisconi*

See also **Marx, Karl; Political Anthropology**

Further Readings

Wolf, E. R. (1966). *Peasants.* Englewood Cliffs, NJ: Prentice Hall.

Wolf, E. R. (1969). *Peasant wars of the twentieth century.* New York: Harper and Row.

Wolf, E. R. (1982). *Europe and the people without history.* Los Angeles: University of California Press.

Wolf, E. R. (1999). *Envisioning power: Ideologies of dominance and crisis.* Los Angeles: University of California Press.

Wolfian Perspective in Cultural Anthropology

Eric Wolf viewed culture as a web of relations, constantly changing over time. Power on the endpoints of the relationships is unequal, so that European merchants, for example, altered political arrangements in West Africa by trading guns for slaves, but relationships are mutually causal, and change extends in both directions. Nor is this a matter of change being imposed by the West on previously ahistorical cultures; there are

no ahistorical cultures, and the human world has always been a relational network, although there have been moments of dramatic change, such as the expansion of European capitalism after 1400. The method of anthropology, then, has to take this into account: Although ethnographic or archaeological research may be local in time and space, and sensitive to the richness and density of this immediate case, it should be mindful of wider connections and their dynamic, temporal character. Likewise even the "local" is constructed and reconstructed out of changing relationships over time.

Wolf's approach represented a significant break with the main line of development of American cultural anthropology. Evolutionary theories of the 19th and 20th centuries, which influenced Wolf, largely addressed change over time as abstract recategorization from one stage to the next, rather than a mutual dynamic of differentiated but interconnected systems. Direct and indirect historical approaches had a place in anthropology, such as tracing of diffusion of culture traits across space (and putatively through time), but such work was consciously antiquarian and mostly ignored issues such as mercantile capitalism, migratory labor, European colonialism, missionization, and so forth. Instead, what was generally thought of as progress in social and cultural anthropology involved striving for the essence of an isolated culture, whether through culture and personality, functionalism, deep interpretation of meaning, ecological self-regulating systems, and so forth.

The contrast with these approaches helps us understand Wolf's method. A mistaken impression is that he exclusively addressed the impact of European capitalism and colonialism on passive local populations. He did emphasize such issues to critique their neglect in anthropology. But his method, above all, sought connections and relationships, with a strong role for local processes in the broader world system. He began with a broadly Marxist approach to humans, emphasizing productive and reproductive activity within nature. Hence, there was always a component of ecological anthropology in his work, involving local environments though not envisioned as bounded or devoid of social relations of exchange and power (notably, Wolf helped begin the field of political ecology). Labor in nature was organized through social relations, which in turn required symbolic definition; thus, work and exchange of its products might be constructed around relations between symbolically defined juniors and seniors, women and men, or lords and peasants. Again, there was considerable space for immediate personal relations and social structure, as well as much room for exploring key symbolic constellations. Finally, he conceived of such relationships as always involving unequal power, and he stressed attention to power in a discipline that often neglected its presence.

To understand core relationships, Wolf outlined three general modes of production, drawing on the Marxist tradition, but not in orthodox or scriptural fashion. The *kin-ordered mode* encompasses mobilization of labor and the distribution of its products based on ideas about kinds of and relations between people. The *tributary mode* involves political domination and surplus transfer from subordinates to superordinates based ultimately on force; it encompasses cases from fragmented feudalism to centralized pre-capitalist states. The *capitalist mode* of production emerges with the alienation of commodities from direct producers, including the creation of wage labor, the person as saleable commodity her- or himself. Although these modes take the form of a typology, Wolf was not interested in narrow questions of labeling or rigid definitions. Rather, he saw them as pointing to key vectors of reproduction and change in networks of relationships. He constantly strived to turn static systems into dynamic and contingent processes, so that social organization is actually "organizing" that is never complete, and symbolism is not just a meaning system in itself, but constant communication (indeed, repetition) of meanings and codes through social relations.

Certain relations have unusual potentials for expansion and for overriding or orchestrating other relations, and Wolf was particularly interested in them. This is distinctive, for generally anthropologists have focused on marginal and subordinated cultural settings. Early in his career, he explored the formation of the nation as a complex, hierarchical process of key symbols and actors organizing diverse regional sets of relations. Much of his work was dedicated to exploring the enormously dynamic force of capitalism, which he considered as having both unifying and differentiating tendencies. His final work, in turn, explored ideologies produced by elites during periods of increasing crisis in their rule, finding in these situations clues to the relationship between explicit ideologies and their broader cultural ground. Because Wolf paid attention to those processes that strove toward dominance, he is often understood as ignoring resistance and agency, but it is

of course necessary to keep in mind dynamics in both directions, and his own ethnographic and case-study work was superior in this regard.

The intellectual scene of anthropology has changed considerably, in part because of Wolf's own challenge to it. There is now wide recognition that cultures do not form reified, integrated, and isolated wholes, that culture does not just "exist" but is produced within social relations, often involving power, and it is now fashionable for ethnographers to study processes that span multiple sites. However, it is worth considering the continued relevance of the Wolfian method in this supposedly postmodern period. There is often a sense that modernity or postmodernity alone has resulted in fluidity and contingency. But as Wolf's arguments make clear, this is a constant result of the relationality of human life, although we must concede that contemporary technologies have increased the speed of connecting processes. There is, on the other hand, a tendency to endlessly question essences and reifications, which at a certain point becomes altogether vaporous as well as archly intellectual. This neglects Wolf's point about the groundedness of prosaic material and symbolic activity in the world, for lived experience is often redundant and essentializing in an incomplete way.

This is not to say that Wolf's work is above critique. His focus on capitalism is justified, given its powerful causal drive, but there is a good case for addressing multiple systems of domination, such as gender and sexuality. His concept that all human relations involve power, while penetrating, puts an excessive emphasis on power alone and summons up a limited portrait of humanity (as do parallel arguments by French philosopher Michel Foucault); we need more space for phenomena such as integral work, creativity, release, and love. Wolf himself was a humanist and politically engaged anthropologist, but we need critical attention to the political-ethical implications of these theories of omnipresent power.

— Josiah McC. Heyman

Further Readings

Heyman, J. M. (2005). Eric R. Wolf's political ethical humanism, and beyond. *Critique of Anthropology, 25,* 13–25.

Schneider, J. (1995). Introduction: The analytic strategies of Eric R. Wolf. In J. Schneider & R. Rapp (Eds.), *Articulating hidden histories: Exploring the influence of Eric R. Wolf* (pp. 3–30). Berkeley: University of California Press.

Wolf, E. R. (1974). *Anthropology.* New York: W. W. Norton. (Original work published 1964)

Wolf, E. R. (1982). *Europe and the people without history.* Berkeley: University of California Press.

Wolf, E. R. (1999). *Envisioning power: Ideologies of dominance and crisis.* Berkeley: University of California Press.

Wolf, E. R. (2001). *Pathways of power: Building an anthropology of the modern world.* Berkeley: University of California Press.

Women and Anthropology

In all four fields of anthropology (Cultural, Archaeology, Linguistics, and Physical Anthropology) women have made significant contributions to establishment and growth of the field. In addition to providing role models for future generations, the earliest women in the field pioneered pivotal studies, generating new questions and venues for research. The discussion of women in anthropology is closely intertwined with the development of the feminist movement, as it is with the debate on gender equity. Early pioneers set the stage for later developments. These women have constructed the heritage of anthropology and at the same time have become mentors and advocates for future women in the field.

Early Pioneers in Cultural and Linguistic Anthropology

A pioneer in American ethnology, Matilda Coxe Evans Stevenson (1849–1915) was the first woman to work in the American Southwest, focusing on the Zuni. A vocal advocate for women's professional equity in anthropology, Evans Stevenson also became a supporter for Native American reform. She and Alice Cunningham Fletcher (1838–1923), a fellow anthropologist who advocated for both Native American reform and education, lobbied Congress for protection of Native ruins. Although the bill failed, it is considered the prototype of the Lacey Act of 1906.

Continuing Evans Stevenson's work in the American Southwest was Elsie Clews Parsons (1874–1941), a

cultural anthropologist and folklorist, known for work among the Hopi and Pueblo tribes and early work in Black folklore. Parsons believed folklore was a key to understanding a culture, and that anthropology was a vehicle for social change. An outspoken feminist and social critic, Parsons has the distinction of being the first female president of the American Anthropological Association (1940).

Parsons was influential in promoting women in the field. She is known to have financed Gladys Amanda Reichard's (1893–1955) work on Navajo society. Reichard, a cultural and linguistic anthropologist, is the first woman to highlight the importance of women's roles and perspectives in gaining a complete understanding of any culture. One of Reichard's students, Eleanor Burke Leacock (1922–1987), became an important member of the second wave of feminism that developed in anthropology.

In 1921, Parsons encouraged her student (and friend), Ruth Fulton Benedict (1887–1949), to become an anthropologist. Benedict is widely known for her book *Patterns of Culture* (1934) in which she uses cultural relativism to understand behaviors said to appear in every human society. Parsons introduced Benedict to Franz Boas at Columbia University, where Benedict also met (and taught) Margaret Mead (1901–1979; discussed below), Vera Dourmashkin Rubin (1911–1985; founder of the Research Institute for the Study of Man), and Edward Sapir.

During her time at Columbia, Benedict worked with Ella Cara Deloria (1888–1971), who was also teaching there. Deloria was a Yankton Dakota, and was known for her linguistic and ethnographic work with the Sioux nations. During this time, there were many women working with Native American Tribes. Carobeth Tucker Laird (1895–1983), an American ethnographer and linguist known for her efforts to preserve Chemehuevi language and mythology provided the scholarship with some early work in this region. In addition to Laird, Frances Theresa Densmore (1867–1957) was a pioneer American ethnomusicologist known for her recordings and publications on North American Indian music. The ethnographic study of Native American textiles was conducted by Lila Morris O'Neale (1886–1948). One of the earliest medical anthropologists working with Native American patients was Dorothea Cross Leighton (1908–1989). Leighton argued that White physicians' ignorance of native culture had a negative impact on Native American patients. She has the distinction of being the first president of the Society for Medical Anthropology.

Anthropologists working outside of the United States include women like Hortense Powdermaker (1896–1970), who had diverse and wide-ranged interest of research and is well known for her 1966 book, *Stranger and Friend: The Way of an Anthropologist.* Another key figure in early anthropology is Margaret Mead (1901–1979), who conducted research on child rearing and personality in Samoa, New Guinea, and Bali. In Bali she pioneered the use of photography for anthropological research, taking more than 30,000 photographs of the Balinese. A prolific writer, Mead wrote 44 books and more than 1,000 articles and also held prominent positions in various organizations and received numerous awards, including being one of the first female anthropologists elected to the National Academy of Sciences (Mead shared this honor with Frederica de Laguna, who is discussed below).

Early Black Pioneers in Cultural Anthropology

One of the first Black women in the field, Ellen Irene Diggs (1906–1998) conducted research focusing on African influences on Cuban culture. Another major figure in the history of African American women in anthropology is Vera Mae Green (1928–1982), a social and applied anthropologist known best for her study of family and ethnic relations in the Dutch Antilles and the United States. She served as director of the Mid-Atlantic Council for Latin American Studies, as convener of the Quaker Anthropologists, was active in the Society for Applied Anthropology, and as president of the Association of Black Anthropologists.

Early Pioneers in Archaeology and Physical Anthropology

In the subfields of archaeology and physical anthropology, early examples of pioneering women include Esther Boise Van Deman (1862–1937), an archaeologist working on Roman Architecture; and Margaret Alice Murray (1863–1963), a British scholar and specialist in Egyptian hieroglyphics who, in 1895, was the first woman permitted to conduct her own excavation at the Temple of the Goddess Mut at Karnak, Egypt.

Well-known specialist of the Near East, Gertrude Margaret Lowthian Bell (1868–1926), was a British archaeologist, writer, and government official. She traveled extensively and, from 1899 to 1914, made several archaeological expeditions in the Middle East, and published her photographs, sketches, and travel logs. A contemporary of Bell's, Harriet Boyd Hawes (1871–1945) was the first archeologist to discover and excavate a Minoan settlement on Crete.

Also working in the Old World was Gertrude Caton-Thomson (1888–1985). Caton-Thomson excavated extensively in the Old World. Caton-Thompson initiated a survey of the northern Fayum with geologist Elinor Gardner (b. 1892). Later, that same team, accompanied by Freya Stark (1893–1993), began the first systematic excavation in the Yemini Protectorate. As one of her last projects, Caton-Thompson excavated and directed stratigraphic studies of architectural remains in Zimbabwe.

It was under Caton-Thomson's direction in Zimbabwe that Kathleen Kenyon (1906–1978) first excavated. Kenyon had worked with Sir Mortimer Wheeler and through his training learned the importance of stratigraphic excavations. She first introduced this method of excavation in the Near East at the site of Samaria (1931–1933). Her focus on stratigraphy at Jericho made the site the example for the Kenyon-Wheeler method of excavation.

Archaeologists working in the Americas include women like Frederica Annis Lopez de Leo de Laguna (1906–2004), ethnologist and archaeologist, who is known for her pioneering work in Northwest North America in Alaskan prehistory. A contemporary of hers, Hannah Marie Wormington (1914–1997), was an American archaeologist noted for her study of Paleo-Indians in the Southwest. Wormington was the first female president of the Society for American Archaeology (1967).

Another first was Dorothy Annie Elizabeth Garrod (1892–1969), who was the first woman to do research in Paleolithic archeology and to study early humans. Through her research in the British Upper Paleolithic, she correlated faunal remains and climactic and ecological conditions of ancient times. Garrod was the first woman recipient of the Gold Medal of the Society of Antiquaries of London.

Mary Douglas Nicol Leakey (b. 1913), a British paleoanthropologist, is renowned for her discovery at Olduvai Gorge in 1959, where she discovered the 1,750,000-year-old skull of Zinjanthropus (later reclassified *Australopithecus boisei*), which first showed the great antiquity of hominids in Africa. At Laetoli, Tanzania, she discovered the 3,750,000-year-old jaws and teeth of a *Homo* species (1975) and the 3,600,000-year-old fossilized footprints of a bipedal hominid (1979). Mary Leakey's second son's wife, Meave Leakey (b. 1942), continues in the tradition of the Leakey family's work in paleoanthropology. In 1995, she and her team described a new hominid species *Australopithicus anamensis,* and in 2001, another new species, *Kenyanthropus platyops.*

Three of the most famous primatologists, labeled "Leakey's Angels" (referring to Dr. Louis Leakey and his influence on their research) include: Dian Fossey (1932–1985), a noted primatologist who dedicated her life to studying and protecting the mountain gorillas in the Virunga Mountain region in Rwanda, Africa. The second, Biruté Mary F. Galdikas (b. 1946) devoted her life to the study of orangutans; and the third, Jane Goodall (b. 1934), has earned recognition for her work with chimpanzees. Each of these women not only contributed significantly to primatology, but also set up foundations for the continued study and protection of the wildlife of the regions they work in. Currently, work on baboons is conducted by Barbara B. Smuts and Shirley C. Strum, each working with baboon populations on male–female relationships, sex roles, and aggression.

Feminist Anthropology

The issue of women in anthropology was not one of empirical value, but rather of representation. Women were always discussed in ethnographic works, but the manner varied based on the author.

Feminist anthropology may be traced in three temporal movements. The first wave of feminism (1850–1920) refers to the inclusion of women's voices in ethnographies, and providing the female perspective on events. Key figures in this movement were Elsie Clews Parsons, Alice Fletcher, and Phyllis Kayberry. The second wave (1920–1980) focused on the separation of the concepts of sex and gender, sex being defined biologically, and gender, culturally. Margaret Mead was a key player in this wave, as well as Eleanor Leacock. By the 1970s, feminist scholars such as Lucy Slocum argued to deconstruct the androcentric and Eurocentric biases in anthropology, and were joined by other anthropologists like Michelle Rosaldo, Louise Lamphere, Gayle Rubin, and Sherry

Ortner, who continued to question the construction of gender in society. The third wave (1980–present) moved beyond the biological distinctions of sex to acknowledge the cultural variations on that concept as well. This brought forth topics such as reproduction and sexuality, queer studies, and gender and the state. Third-wave feminism emerged from a space within postmodernism that allowed for the recognition that not all women have the same universal needs; and issues of class, race, ethnicity, socioeconomic status, and so forth are also important characterizations for understanding humanity.

Gender Equity in Anthropology

Women in anthropology today continue to struggle to achieve equity, which include access to resources for research and publications, and equal opportunity for job candidacy. Groups such as the Council on the Status of Women in Anthropology (COSWA) monitor the status of women in the discipline by providing attention to sexual harassment, part-time employment, and issues of productivity assessment that are crucial for issues of promotion and tenure.

— *Uzma Z. Rizvi*

See also **Anthropology of Women; Benedict, Ruth; Boas, Franz; Fossey, Dian; Galdikas, Biruté Mary F.; Goodall, Jane; J. Leakey, Louis S. B.; Leakey, Mary; Leakey, Meave Epps; Mead, Margaret; Sapir, Edward; Smuts, Barbara B.; Strum, Shirley C.**

Further Readings

Gacs, U., Khan, A., McIntyre, J., & Weinberg, R. (1988). *Women anthropologists: Selected biographies.* New York: Greenwood Press.

Golde, P. (Ed.). (1986). *Women in the field: Anthropological experiences* (2nd ed.). Berkeley: University of California.

Leonardo, M. (Ed). (1991). *Gender at the crossroads of knowledge: Feminist anthropology in the postmodern era.* Berkeley: University of California Press.

Sacramento Anthropological Society. (1983). *Women in anthropology: Symposium papers 1979 and 1980, 16.* Sacramento, CA: Sacramento Anthropological Society.

Women's Studies

Women's Studies examines the scholarship and theory on the history, status, contributions, and experiences of women in diverse cultural communities, and on the significance of gender as a social construct and as an analytical category. Women's Studies challenges the gendered knowledge base that was assumed to be universal. As an interdisciplinary course of study, Women's Studies encourages the appreciation and understanding of gender as the basis of social relations of power, individual and collective identity, and the fabric of meaning and value of society. It is a study that is academic and activist. The activism component of Women's Studies comes from its political roots in feminism, a product of late 1960s women's liberation movements called the *Second Wave.* Feminism refers to the commitment to actively engage in political and social change that promotes equality in all aspects of life for those who are historically subordinated and oppressed by gender, race, ethnicity, sexuality, religion, disability, or other differences. The term *feminism* originated in 19th-century France and combines the French word for woman, *femme,* with the suffix meaning political position, *ism.* According to feminist historians, the French used *feminism* as it referred to those who defended the cause of women. During the 1ate 1960s and 1970s, women took up the expression as it was associated with the work of the French philosopher Simone De Beauvoir, whose classic work *The Second Sex* (1949) was one of the early texts that considered how women have been thought about, and how women can think about themselves. The word *gender* refers to the socially constructed set of attitudes and behaviors usually organized as masculine or feminine. On an international basis, the heightened awareness of gender as a social construction was a result of the many activities by governments and organizations during the United Nations Decade on Women (1975–1985) and the UN-sponsored Fourth World Conference on Women held in Beijing (2000). During Beijing Plus 5, thousands of women from across the globe conferred around issues of feminism, the state of material conditions of women and girls, and the growth of women's and gender studies. According to the National Council for Research on Women, there are more than 300 centers in 80 countries that focus on women's issues and gender equality, and many of those units are located

in universities. However, the majority of Women's Studies departments and programs in higher education are found in the United States. As a contributing field of inquiry to women's studies, feminist anthropology incorporates the perspectives of feminism in its contribution to the study of the meanings and relationships of gender across the subfields of the discipline, following and influencing the paradigmatic shifts in intellectual inquiry and directing social policy.

Second Wave Feminism

In the late 1960s and early 1970s, Women's Studies courses appeared in colleges across the United States, with the first academic units founded in 1974 at San Diego State University and University of Maryland. The groundswell of interest came from the social movements of the times—Women's Liberation, the Civil Rights Movement, Black Power, Native American and La Raza–Chicano–Latino movements, and the 1960s student unrest and protests against the United States' involvement in South East Asia. This time period marks the rise of what is called the Second Wave of feminism. Over time these forces of social change were joined by the activism on behalf of Asian Americans and gay, lesbian, transgender, and bisexual rights groups. At the very outset, however, Women's Studies contested the gendered system as institutionalized in places of higher learning, but also opposed the prevailing ideology of culture and society in which the dominant message was that the human experience equals male experience. One hundred years of struggle on behalf of women's rights and issues were necessary to the founding of Women's Studies as academic units in higher education.

In the United States, feminism as a form of activism on behalf of women's rights began in the mid-19th century with a women's rights convention held in 1848 at Seneca Falls, New York. Among the grievances identified at Seneca Falls were the equal treatment of women and men under the law and voting rights for women. These goals were fraught with racial and class contradictions, as proponents assumed that these objectives implied that only White, middle-class women could claim equality and enfranchisement. On another plane of existence and activism were the Black women who were part of the abolitionist movement. As Carla Peterson notes, these women traveled throughout the northern part of the United States "insisting on their right to preach the gospel, to lecture, and to write on such topics as religious evangelisms, abolitionism, moral reform, temperance and women's rights." Among this group were Maria Stewart, Jarena Lee, Mary Ann Shadd Cary, Frances Ellen Watkins Harper, and a former enslaved woman who took the name of Sojourner Truth. In her anti-slavery, pro-woman's speech during a Woman's Convention in Akron, Ohio, in 1851, Sojourner Truth used the legendary phrase "Ain't I a Woman?" in claiming her rights of emancipation and enfranchisement. Following the Civil War, Susan B. Anthony, Elizabeth Cady Stanton, and Lucy Stone, among others, focused on gaining voting rights for women and formed the National Woman Suffrage Association. In 1896, the National Association of Colored Women was formed, bringing together more than 100 Black women's clubs. Leaders in this group were Josephine St. Pierre Ruffin, Mary Church Terrell, Ida B. Wells-Barnett, and Anna Julia Cooper. As a unified force, the National Association of Colored Women agitated for equal rights and the vote for all women across the color line. Typical of the racial divisions of the society, even suffrage parades mirrored this situation, exemplified when Ida B. Wells-Barnett was not allowed to accompany the Illinois contingent but was instead delegated to march at the end of the entire procession. Nevertheless, it was not until 1919 that the federal suffrage amendment, originally written by Susan B. Anthony in 1850, passed both the House of Representatives and the Senate and was sent to the states for ratification. On August 26, 1920, the 19th Amendment to the United States Constitution, granting women the right to vote, became law. Historian Rosalyn Terborg-Penn looked at the ways that United States Commonwealth territories acted on the passage of the 19th Amendment. Among Puerto Rican women, women's suffrage was political leverage to fight economic oppression. Labor organizer Genera Pagen, a Puerto Rican and United States citizen, demanded the right to vote once the 19th Amendment had been ratified. As a New York resident, she could vote, but not as a woman on the island of Puerto Rico. Although the women's suffrage amendment passed in the Puerto Rican legislature in 1929, it enfranchised only literate women, the significant majority of whom were members of the White elite, leaving women of color to continue their suffrage struggle. In 1935, all women, regardless of race or literacy level, were enfranchised in the U.S. Virgin Islands.

During the 1930s, the Women's Bureau of the Department of Labor was formed to collect information about women in the workplace, and 10 years later the dissemination of contraceptive information through the mail is no longer classified as obscene. In 1935, Mary McLeod Bethune organized the National Council of Negro Women, a coalition of black women's groups that lobbied against job discrimination, racism, and sexism. There were still mixed messages about women and work. Throughout the Depression, a great deal of propaganda told women, meaning White women, that entering the workforce took jobs away from men. Men were the idealized breadwinners for households and families. During World War II, similar to efforts during World War I, women were implored to work in heavy industry and in other nontraditional areas of employment, a history that is documented in the film *The Life and Times of Rosie the Riveter*. In the postwar era, women were told that work away from the home was unfeminine and harmful to family life. These prescriptive measures only applied to middle-class White women. The poor and working class Whites, immigrants, and women of color could not often afford not to work outside of the home, as their income was a necessity for their own and their family's survival. Nonetheless, middle-class women disregarded the long-standing customs and steadily entered the workforce. It was not until 1961, during John F. Kennedy's presidency, that the federal government concerned itself with gender inequality, particularly in employment practices. A Presidential Commission documented the substantial discrimination against women in the workplace and made specific recommendations for improvement, including fair hiring practices, paid maternity leave, and affordable childcare. The disclosure of the levels of sexism within the society on institutional, social, and cultural levels in the 1960s through 1970s accelerated the Women's Liberation movement that eventually gave rise to the Second Wave of Feminism. This Second Wave took hold of the minds and politics of the people in the United States and elsewhere in the world. The establishment of Women's Studies as an academic and activist program was one feminist outcome that moved society toward embracing the ideal of gender equality.

In the first instance, Women's Studies challenged the content and form of education on all institutional levels, but particularly in higher education. It was not uncommon for girls to strive for traditional occupations, such as teaching on a kindergarten–12 level, nursing, and secretarial work, whereas boys were encouraged to focus on areas in mathematics and the sciences. As Women's Studies scholars note, there was a tendency to reward girls who were compliant and passive rather than assertive and inquisitive. Furthermore, because it was men who historically exercised authority in educational institutions, especially in the postsecondary levels, they determined what were valid fields of inquiry and the legitimate methods of analysis and research. This was the situation that women scholars and activists faced in bringing the study of women into the academy. Theirs was a different agenda than the one in place. Not only were women's scholarly contributions placed at the center in the learning process, but also individual women's lives and experiences were made important aspects of this knowledge. The feminist slogan "The personal is political" was embedded in the educational process, as traditional domains of what was considered "female" and "male" were understood as a process of the gendered system that was socially constructed and institutionalized on the basis of the designated sex. Margaret Mead's (1935) study in New Guinea distinguished gender, womanhood, and manhood from sex as a biological concept. The gender of a member of a society had implications for the division of labor, including domestic labor, and the regulation of sexuality. Furthermore, the differential valuation of male over female, called sexism, was deemed "natural" at best, "God given" at worst. In the United States and many other cultures, patriarchy is the ideological political construct. This means men dominate women, thereby what is masculine is more highly valued than that associated with women. This ideology is the foundation of Western theories of thought and institutionalized in the three major religious practices of the world, Judaism, Christianity, and Islam. Furthermore, gender is at the heart of these socioreligious systems, feeding into issues of procreation, marriage, family, birth control, abortion, sexuality, homosexuality, and other main debates in Women's Studies.

As an interdisciplinary course of study, Women's Studies relies on the scholarship emanating from its own domain and that produced in other fields of inquiry. Equally influential were the political divisions within the Second Wave of the feminist movement. In the early years, scholars—particularly the critics of both the academic and political aspects of

the women's movement—viewed Women's Studies and feminism as a single, unified approach. This was never the case, as the plurality of feminisms is one of its discursive strengths. However, there were at least four political perspectives identified with Women's Studies and feminism during the 1960s and 1970s: They were liberal feminists, Marxist feminists, socialist feminists, and radical feminists. These strains of thought bridged the viewpoints coming from different contributing disciplines and political groups at the time. *Liberal feminism* viewed gender inequality as a form of discrimination. Many mainstream programs, including those aimed at ending sex discrimination in the workplace, took this position. For *Marxist feminists* gender inequality was rooted in hierarchy of social class. *Socialist feminists* noted that gender oppression cuts across social class boundaries. Finally, for *radical feminists,* gender inequality was rooted in the nature of traditional heterosexual interpersonal relationships in both the private and public sphere. Some radical feminists advocate separatism and recommended women-only spaces, free of male domination. For well over a decade these four early positions were taken up individually and in combination. Overall and in an assortment of ways, each set of early theories ignored or sidestepped the significance of historical, sociological, and cultural differences among various groups of women in the United States and often offered very inaccurate and paternalistic representations of women's lives in other regions of the globe. As paradigms shifted and, more importantly, Women's Studies scholars and activists engaged in self-criticism, the range of established theories was thoroughly analyzed and examined for various shortcomings and exclusionary practices.

One of the significant pieces that challenged 1970s feminist scholarship based in the United States and the west was Chandra Talpade Mohanty's scathing essay "Under Western Eyes" (1984). That influential article charged that the universal images of "Third World Women" constructed a reductive and homogeneous notion of what she called *Third World difference*. According to Western feminists at the time, women constituted a coherent group with identical interests and desires, regardless of class, ethnic or racial background, or contradictions implying a notion of gender or sexual difference or even a patriarchy that was universal. The oppressed Third World Woman from the underdeveloped regions of the globe was defined as bound by traditions of religion and family, unsophisticated, not conscious of her rights, illiterate, backwards, and sometimes revolutionary. This image of "the other," meaning non-White, non-Western women, possessed all of the seemingly negative attributes just listed. The Third World difference provided a binary, predicated on assumptions that Western women were liberated, secular, and in control of their own lives. Paraphrasing the title of a popular text of the time, sisterhood was far from being global.

The question still remains for Women's Studies academics on how to include all of the voices and experiences of women. Feminist scholars Carole McCann and Seung-Kung Kim note that feminist theories provide intellectual tools with which to examine the injustices they confront and build arguments to support their particular demands for change. On the basis of this knowledge, the seemingly overwhelming job left to do includes developing strategies for resisting subordination and to improve women's lives. Some of the questions that feminist theorists respond to include: How are women subordinated as women? How can we understand the ways in which specific events might be part of social oppression based on sex, rather than unique individual misfortunes? How can we be sure that we have clear understandings of oppressive situations? How can women resist subordination? How should we work for changes that will improve women's lives? In what arenas of life should we focus efforts for change? What kinds of changes are needed? How is women's subordination as women connected to related oppressions based on race, ethnicity, nationality, class, and sexuality? These questions rest on ontology, epistemology, and politics, as the ultimate goal for feminist theories is to help make sense of women's situations and effect change. Overall, Women's Studies, like the women's movement itself, is deepening, refining, and broadening its scope of understanding of how gender inequality operates, how it intersects with other systems of domination wherever they are found, and how to make some universal claim. Women's lives and experiences are located in context on local (indigenous and regional) and global (transnational) levels. How those in positions of power and privilege differentially subordinated and oppressed women by class, race, ethnicity, sexuality, disability, and other distinctions that may be marked and unmarked continues to engage feminist scholarship throughout the world.

Differing Experiences Within Women's Studies

One of the ways that feminist scholars explored the differences and commonalities of women's experiences was to examine how this occurs in what particular situations. As anthropologist Johnnetta B. Cole remarked in her classic piece "Commonalities and Differences" (1986), "while oppression of women knows no limitations, we cannot therefore, conclude that the oppression of all women is identical." Intersectionality highlights how social groups are positioned within unjust power. According to Patricia Hill Collins (2004), a group's history and location can be seen as points of convergence within structural, hierarchical, and changing power relations. An example of how this underlies everyday life in 21st-century middle-class America is in the use of the term *JAP*. Jewish women, like women throughout the United States, are "trying to find their own paths and their own voices." What better way to deter a strong woman than to label her a *princess*? Calling her a princess diminishes her and negates her ambition and her success. Further, the total phrase underscores stereotyping of Jewish women and men. The term *JAP*, therefore, is a code word that symbolically articulates anti-Semitic messages. It is connected with women, the Jewish American *Princess,* because women are achieving in many arenas of the society that threaten many men, Jews and Christians alike.

Over the years, a growing body of literature illustrates the complexity of women's lives across the various boundaries that divide and bind them. The power of an interdisciplinary approach allows scholars and activists to use their particular focus in consort with other methods in addressing these issues. Poets and cultural producers have led the way to illustrate what appears in their lives. Gloria Anzaldua's prophetic essay "La Conciencia de la Mestiza" speaks in multiple voices. Written in Spanish and English, it addresses the multiple identities of Chicana–Chicano life, the mestiza—products of Native American and Mexican—situated in the United States. She writes,

> I am possessed by a vision . . . that we have taken back or uncovered our true faces, our dignity and self-respect. Seeing the Chicana anew in light of her history. I seek an exoneration, a seeing through the fictions of white supremacy, a seeing of ourselves in our true guises and not as the false racial personality that has been given to us and that we have given to ourselves. I seek our woman's face, our true features the positive and the negative seen clearly free of the tainted biases of male dominance.

Audre Lorde, a Black woman warrior, mother of two children, educator, Poet Laureate of the State of New York, lesbian, and activist described what was critical for the future: "We must recognize differences among women who are our equals, neither inferior nor superior, and devise ways to use each others' difference to enrich our visions and our joint struggles." These calls for understanding commonalities via understanding the differences became a benchmark in postmodern thinking in feminist discourse, bridging the humanities and the social sciences. Sociologist Chela Sandoval (1990) advocates "a theory and method of oppositional consciousness" that denies any one ideology or identity as the final answer. In this democratizing practice, ideologies and identities move freely, engaging one or another, or several at the same time. In a similar vein, Egyptian feminist Nawal El Sawaadi argued,

> men and women everywhere have struggled against foreign invaders and economic and cultural oppression. They make distinction between their minds and bodies. Dissidence is a natural phenomenon in human life. We are all born dissident and creative. Dissident people liberate themselves from fear and they pay a price for this process of liberation.

Actions taken by women on their own behalf or as a member of a group are ways of challenging the status quo and are an actual method of the oppressed. An early declaration of lesbian politics and identity in the United States by Charlotte Bunch (1972) addressed the source of oppression faced by women who personally reject heterosexual sex. The lesbian threatens the ideology of male dominance in its most individual and common form. By challenging patriarchy, a sex–gender system in which men dominate women and that which is considered masculine is more highly valued than that which is considered feminine, lesbians confront homophobia on cultural grounds and in societal institutions. In the volume *This Bridge We Call Home,* Max Valerio explains his transformation physically, mentally, and spiritually

from female to male. He buried his male gender identity for years by cross-dressing and identifying as a lesbian and entered same-sex relationships. After undergoing surgeries and medical treatment, Valerio slowly emerged as a man, a transsexual person who now sympathized with feminist and lesbian issues, but identifies with transgender concerns and that particular community. Gayatri Gopinath questions universality of the Queer Nation as a counterhegemonic model of transgression and resistance. The concept of the Queer Nation does not fully address the limitations of citizenship faced by many queers of color. The term *queer* is gender-neutral shorthand that signifies a range of alternative sexual activities and sensibilities in a way that lesbian or bisexual or gay do not. Addressing circumstances of queer south Asians in the diaspora, "citizenship," queer or otherwise, is not something that they can ever take for granted. Queers of color, in various diasporic settings, enact a complicated navigation of state regulatory practices and multiple national spaces. Queer South Asian practices are evidenced in popular cultural forms, such as *bhangra,* folk music originally from the Punjabi province of India. Bhangra has been transformed through other musical performances of the African diaspora, such as house, reggae, and rap, in counterpublic spaces in New York, London, and Toronto. These transgressive activities might be acts of resistance to hetero-normative practices and ideology, but they are also particular to the histories and situations of queers of color who interact on multiple levels of society.

Sexuality of whatever form—heterosexual, gay, lesbian, bisexual, transgender—all calls to question gender role expressions. The ideological hetero-normative, male-dominant construct puts a stamp on the way a society and culture perceives and orders certain experiences. Symbols of society give meaning to objects, including colors; words housed in the prevailing ideology construct reality. Images—a medium of expression—depend on the symbolic association of the perceiver gradually shaping his or her reality. Images of women influence conduct and the cultural representation that govern the behavior of others. Signaled in language, gestures, and actions of the dominant discourse, Women's Studies contests the prevailing notions and images of women across the commonalities and differences that are sources of oppression.

Images, Bodies, and Symbols

The media constructed an image signifying the threat of the Women's Liberation movement to United States society. This image was the "bra burning" by feminists who protested the 1968 Miss American Pageant. But, in fact, there was not one bra burned at that event. During the protest, a 10-point proclamation of issues and concerns were presented to the press outlining what that pageant really represented, which was the "ideal" woman artificially constructed for commercial purposes. What this media invention, "the bra burner," created was a heightened awareness of how women's bodies were objectified in the culture through all kinds of media and mythologies. The brassiere, a 20th-invention made popular by the Maidenform Corporation, controlled and contoured a woman's body into a shape that she did not necessarily possess but perhaps desired to have so as to be attractive and beautiful. "The beauty myth" permeates United States culture as women seek this physical ideal to be successful and to attract men. Standards of beauty vary from culture to culture and change over time, but in the United States, the prevailing notions of beauty emphasize being young, thin, White, and Anglo-Saxon. There are thriving businesses in liposuction, intestinal bypass surgery, gastric stapling, and jaw wiring to achieve the ideal body. In addition, there are eating disorders that bridge the physical with the psychological needs to fulfill expectations of what makes one beautiful in the eyes of society. As a symbol of femininity, beauty standards are controlled by the images that govern behavior. Nellie Wong conveys the power of this beauty myth in her poem, "When I Was Growing Up": "When I was growing up, I read magazines and saw movies, blonde movie stars, white skin, sensuous lips and to be elevated, to become a woman, a desirable woman, I began to wear imaginary pale skin." Like the Chinese Nellie Wong, other women of color could not fit that ideal either. Images of stereotypes, degrading ideologies of race, ethnicity, and social class were all interwoven in the racism faced by women of color in the United States. Noliwe Rooks studied the constructs and history of how Black women perceived notions of beauty and what they need to meet the ideal: "The presence of blackness precludes gender identification as well as the possibility of femininity for African American women. The beauty standard here is not merely proximity to

whiteness but whiteness itself." Continuing this conversation, Leith Mullings remarked, "The mammy and jezebel stereotypes, evoked at different historical periods and applied to women of different ages and phenotypes, are variations of the Madonna/whore dualism." The "hot woman" image persisted for African Americans that also included the stereotype of the tragic mulatto Jezebel. As a product of sexual aggression on the part of her progenitor, the tragic mulatto was presumed to be promiscuous, thereby continuing a set of behaviors as an almost genetic predisposition. Another version of this stereotype is the "Latin spitfire," whose fiery temperament was caused by mixed-race parentage. Throughout most of the 20th century, the servile, defeminized Mammy, whose media image appeared as Aunt Jemima on pancake boxes, still conveyed images of the faithful, obedient domestic. African American women working outside of the home, often in servant roles, were vulnerable to sexual exploitation. In a similar situation, Euro-American working class women who worked outside of the home also became symbolic of "whorish behavior." Stigmatizing the subordinate also functions to constrain women of the dominant group. "Women, who by accident or design threaten the hierarchy of the social order are labeled 'bad women.'" Who are those bad women? They are women engaged in the struggle against oppression in their own location and on the transnational levels where movements of people, ideas, and resources cross national boundaries. No longer is the label "Third World Women" applicable, as feminist activists and scholars from the global South (including marginalized groups in the North) represent themselves in global forums and form linkages, networks, and alliances within a global civil society. They are the ones El Sadaawi acknowledged as the time-honored dissidents who have always struggled against oppression.

Women's Studies validates the potential for change in society, it challenges the assumptions that women's inferior status is natural, biologically determined, uncontested, and consistent throughout the history of humankind. Because women live in so many different social, economic, cultural, and political circumstances, there is no best strategy for change, but hope is an underlying theme of such activities.

— *A. Lynn Bolles*

Further Readings

Cott, N. (1986). *The grounding of modern feminism.* New Haven, CT: Yale University Press.

El Saawadi, N. (1997). *The Nawal El Saadawi reader.* London: Zed Press.

Kesselman, A., McNair, L. D., & Schniedewind, N. (Eds.). (1995). *Women images and realities.* Mountain View, CA: Mayfield.

Lorde, A. (1984). *Sister outsider.* Trumansburg, NY: The Crossing Press.

McCann, C., & Kim, S. K. (Eds.). (2003). *Feminist theory reader.* New York: Routledge Press.

Mohanty, C. T. (2003). *Feminism without borders.* Durham, NC: Duke University Press.

Richardson, L., Taylor, V., & Whittier, N. (Eds.). (2004). *Feminist frontiers* (6th ed.). Boston: McGraw Hill.

Sandoval, C. (2000). *The methodology of the oppressed.* St. Paul, MN: University of Minnesota Press.

Terborg-Penn, R. (1995). Through an African feminist theoretical lens. In V. Shepherd, B. Brereton, & B. Bailey (Eds.), *Engendering history.* New York: St. Martin's Press.

Valerio, M. W. (2002). "Now that you're a white man": Changing sex in a postmodern world. In G. Anzaldua & A. Keating (eds.), *This bridge we call home.* New York: Routledge.

Work and Skills

Work is the labor, task, or duty that is one's accustomed means of livelihood. Anthropologists among social scientists have debated the significance of work in industrial and nonindustrial societies. In anthropology, emphasis is given to the association of the work concept to pertinent social relationships.

Skills are learned powers of competence, developed aptitudes, or abilities. Skills develop in areas of art, technology, language, and other forms of perception and expression. By analyzing skills and the processes that bring skills about, dichotomies, such as those that exist between art and science and high and low technology, may be overcome. Nevertheless, the extension of human skills through technology has resulted in the historical withdrawal of people from the production processes and in changes in the types of needed skills.

Source: © iStockphoto/Ran Plett.

A contrast between the values driving work patterns in "Western" and "non-Western" societies often has been made in the field, following the writing of Max Weber, Émile Durkheim, and Karl Marx and Frederick Engels. Marx and Engels emphasized the evolution of modes of production, or the ways raw materials are converted into commodities through labor. Émile Durkheim's concept of division of labor differentiates work, morals, and law in organic solidarity societies that stand in contrast to the likeness of work and consciousness in primitive mechanical solidarity societies. Weber emphasized social values and traced the rise of a capitalist economy to the Puritan determination to work and do good deeds. Subsequent economic and political ecology approaches have emphasized exploitative labor practices, hegemonic ideologies, socioeconomic differentiation, and globalization. In the moral economy, internal statuses are seen as more egalitarian. Lay concepts about the alleged laziness of indigenes follow ethnocentric notions, and are successfully countered in anthropology through cultural relativism and understanding the embeddedness of economies in social and religious practices and beliefs.

Marshall Sahlins makes a case that the activities that individuals and communities perform are embedded in their social relations, roles, and statuses. Similarly, Tim Ingold argues there is no need for the specialized concepts of work and workers among hunter–gatherers and other nondifferentiated societies. Ingold redefines work in such contexts as task orientation. Work is life for foragers, and the relevant distinctions made are not between work and nonwork, but between different types of activities, such as farming, weaving, child rearing, and so forth. Task orientations are carried out through skills.

Hunter–gatherers can develop finely tuned skills at reading animal signs and tracks, moving silently during the hunt, butchery for full use of the prey, as

well as identification of edible and nonedible plants. Shamans and religious leaders in traditional societies have tremendous oratory skills. Skill at communication is an important ability for social leaders in nonindustrial societies, including the ability to memorize, recall, and manipulate genealogies and ancestral spirits to produce favorable outcomes. Apprentices are engaged in the process of learning skills.

Whereas some anthropologists view human technological development as a driver of human social evolution, others have pointed out that many of the skills important in nonindustrialized societies are equally as important in industrial ones. The social atomization of families in modern state societies may be a manifestation of the dependency on mechanical devices and technological proficiency rather than the deterioration of skills.

— *John P. Ziker*

Further Readings

Durkheim, E. (1933). *Émile Durkheim on the division of labor in society.* New York: Free Press.

Ingold, T. (2000). *The perception of the environment: Essays on livelihood, dwelling, and skill.* London: Routledge.

Weber, M. (1958). *The protestant ethic and the spirit of capitalism.* New York: Scribner.

X

Xenophanes

Xenophanes was a Greek Presocratic philosopher, poet, rhapsode, and social and religious critic. Born circa 570 BC in the Ionian city of Colophon, Xenophanes spent a long life of "traveling counselor" and wanderer about the western Greek provinces, mainly in Sicily, once for a time associated with Elea on the Italian southwest coast, where he reputedly became the precursor or perhaps even the founder of the Eleatic school of philosophy with his famous student Parmenides. He was then for decades a celebrated teacher in the Pythagorean school and died circa 478 BC in Syracuse. He wrote in verses and most of his philosophical poems, which have survived in a considerable body of fragments, present his satirical standpoint. He was critical of many traditional religious worldviews as presented by Homer and Hesiod, based on the teachings of the Milesian philosopher–scientists (Thales, Anaximander, and Anaximenes), whom he admired and sought to follow. Xenophanes himself was deeply involved in some natural science observations and speculations, mostly in meteorology. From here he derived his ontology, according to which the "clouds" (*nephos*) form the substance from which many natural phenomena come, and thus the explanatory principle analogous to water, air, or earth in other Milesian natural philosophers. The main targets of his poetic ridicule were polytheism and anthropocentrism of Greek mythology. His philosophical idea that there is a changeless, motionless, and eternal "One" has found its expression in the novel conception of divinity (the idea of "one greatest god"). Thus Xenophanes is one of the first monotheists and even pantheists, and a religious reformer who considered traditional mythology ethically corrupted and cognitively wrong. His was the remark that "humans have made gods according to their own image" but he urged humans to stop thinking of gods as humanlike, and of themselves and the Earth as the center of the universe. His famous argument was that if horses or oxen or lions had hands and could produce works of art, they too would represent the gods after their own fashion. Through and following the reforming of popular religious thinking, he aimed at reforming human social life in the name of its greater stability, well-being, and deeper ethical value (e.g., he opposed useless luxuries and honors paid to sportsmen, although he advocated the censorship of poets). Xenophanes also introduced several important epistemological ideas, such as that knowledge must be broader than what we actually perceive. We can hardly grasp that nature of things, which is beyond our direct observation. To act, however, human beings necessarily use their opinions as if they were the truth. This is traditionally interpreted as skepticism toward human abilities, both perceptual and conceptual, to know a real truth. Thus Xenophanes previewed Plato with the distinction between knowledge and opinion. Xenophanes represents one of the most important figures in the way of human and anthropological thought from *mythos* to *logos*.

— *Emil Visnovsky*

Further Readings

Guthrie, W. K. C. (1962–1978). *A history of Greek philosophy.* Cambridge: Cambridge University Press.

Kirk, G. S., Raven, J. E., & Schofield, M. (1983). *The presocratic philosophers.* Cambridge: Cambridge University Press.

Lesher, J. H. (1992). *Xenophanes of colophon: Fragments—A text and translation with commentary.* Toronto: University of Toronto Press.

Xenophobia

In the modern world, the diversity of cultures on this planet becomes more evident when seen in the process of globalization. Both internal and external conflict during this process is certain, whereby overt and covert actions threaten a population's autonomy, sovereignty, and nationalistic state. The resulting psychological state becomes that of xenophobia. Xenophobia is the psychological reaction of an individual who has a fear or contempt response to anything that is culturally foreign. This reaction can manifest itself from extreme isolationism to extreme aggression. When viewing the process of globalization and multiculturalism in an evolutionary framework, the resulting xenophobia may be viewed as a natural response to cultural incursion. Preservation, as will be seen, is a result of acute perception and successful behavioral adaptation.

Although some psychologists and philosophers, including natural theologians, would be reluctant to admit the pivotal role that biology has on human behavior, the unfolding potentiality of the DNA results in the adaptive behavioral response on both an individual and social level. When viewing an individual as evolutionary chance, the adaptive behavioral responses can be understood in terms of an Evolutionary Stable Strategy. Any behavior that would tend to increase the chance to reproduce successfully would be opted. When expanded to the level of a population, individual cost–benefit analysis would dictate behavioral action. Although similarities in phenotypic expressions (for example, genetic distance) would be a strong motivating factor for group behavior, reciprocal altruism seen at large-scale populations would be influenced by cultural factors that extend beyond close kin-based social systems. Xenophobia becomes an actuality of these intense egoistic tendencies transferred into a population.

Understanding the cultural expressions for this psychological phenomenon is the key for behavioral modification. Although complete modification sought by proponents of multiculturalism can distract from the main issues, the significance of cultural determinates for the individual becomes an integral part of shared group cognition. Although the cultural history of our species can be seen in the archaeological record, these remnants can be seen as a physical representation of active *memes.* In short, *memes* are bits of cultural information that are transmitted from individual to individual. These memes take the form of ideas, languages, and their physical extensions. Through the process of imitation, memes have modified the way by which our species exist. Modifications from these memes, which has resulted in genetic variation, gave rise to opportunity for our species to populate the globe. Within historical time, small remote populations of our hominid ancestors would eventually give way to civilization and the development of the state.

With the advent of civilization, our species probably experienced the greatest qualitative and quantitative degree of the xenophobic phenomenon. Although nomadic populations would experience a small degree of xenophobia (for example, in justification of territorial disputes), civilization constructively used the phenomenon as an internal control. Building upon natural tendencies found within our species, each population's values, expressed in folk, moray, laws, and mythology, creates the deep-seated feeling of nationalism. Nationalism does not only act as a cohesive force, but the guiding level by which the xenophobia is allowed to express itself, defining citizenship and civic duty.

With the expanding social structure and greater encompassing cultural ideologies, individual identity is taken from and contributed back to the social structure. Geographic location, genetic distance, and enculturation become central to group acceptance. When viewed politically, it becomes a question of citizenship. Expressed in terms of a political social contract, the importance of citizenship becomes evident: Acknowledgment of an individual by a political body brings inherent social benefits and obligations. The underlying structure of the cultural base of the nation-state, by which was created and sustains political structure, becomes a pivotal reliance for the differentiated individuals in a population group. Essentially, the individual views others as part of an extended family; not foreigner, but countryman. In the midst of environmental uncertainty, where personal mortality becomes highly probable, having citizen status becomes beneficial. However, citizenship does have a price. Defending and supporting the state against enemies, both internal and external, can be overwhelming; yet, the cost–benefit analysis gives greater weight for political unity. Examples can be seen in the historical analysis of the Greek city-states and the Roman Empire. The two examples show the

extremes, the Greek based on geographic location and the Roman based on the acceptance of Roman ideals and culture.

Taking a cue from social constructs, especially seen during the classical period, the development of these united groups creates two distinct categories: *us* and *them*. During the creation of these ethnocentric ideals, the outsider is considered to be subservient and inferior. Reflexivity being critical in the psychological development of the self, marginal individuals (for example, slave and lower class) accept the social status. Reinforcements, both negative and positive, continue to regulate and subjugate those whom society has deemed unworthy. Although citizenship is a positive step for those who are disenfranchised, social and cultural acceptance rarely succeed. For the most part, citizenship does provide a meager means for social mobility. In this manner, when people of marginal status acquire dominant values, there is a greater degree for social advancements. This in turn will increase the chances for survival. Accounting for the nature of these biases within social dynamics is the key to our sociobiological behavior of our present and future interactions.

The sociopolitical experiment created by the founders of the United States was a quantum leap forward from the traditional political and ethnic systems of continental Europe and England. Although the original 13 colonies claimed to be Englishmen proper, the combination of both financial and intracultural xenophobia by England had caused rapid deterioration and open conflict. The imperialistic impetus may have reduced xenophobia to flirtation with novelty, yet any action that would directly challenge the sociopolitical structure would be suppressed. As the United States gained independence, internal xenophobia would continue to express itself in both political ideologies and civil law, just as it did in the former mother country, England.

With the creation of a country where opportunities and social mobility were possible, an influx of immigrants (especially during the 20th century) from different cultural backgrounds gave the country a unique identity. However, these segments of populations remained "separate but equal" in the name of toleration. Discrimination and violence (for example, slavery and religious fervor) set the tone for sanctions against those that would deviate from the norm. In this manner, xenophobia could be extended to the puritan ideals concerning religiosity (for example, including sexuality and the occult). Even in the light of newly gained civil freedoms, the cultural flexibility of what was considered to be "American" was from the multicultural ideal. American culture did have a unique flavor that set it apart from its European counterpart; yet the social stratification reflected, to varying degrees, the internal xenophobic reaction. This would remain throughout the development of the United States. However, through liberal and active legislation, the embracing of pluralism and soon-to-be multiculturalism posed as an interesting variable within the social experiment.

The best solution considered for the xenophobic reaction is education. A proponent of cultural pluralism, the psychologist William James (1842–1910) rejected the basis of xenophobia and ethnocentrism as a Darwinian model of social selection. Viewing his public activism, James sought equality for those who were subjected to racist or discriminatory practices. James believed that through education, an environmental factor, the impressions upon the mind could reduce or offset the cultural impressions that occurred during early development. This in turn would reduce or eliminate xenophobic behavior or habits. The degree to which the habit would change is not predictable, due to the weight of individualism within the realm of pragmatism.

Considering this perspective, especially in light of an evolutionary framework, James's framework must incorporate basic principles of evolutionary thought. James accepted theses basic principles. In this view, natural selection and sexual selection created the basis of the diversity of life. Although he acknowledged the role of religion in an individual's life, the origin of our species' social structure was without divine or Aristotelian structure. Viewing social selection as reflecting dominant group values, the resulting ethnicity is seen as an adaptation in progress for the selected group. Although there are many internal contradictions within his philosophical view, the equality in weight of each culture depicted his view of pluralism. This would be extended into areas of moral or ethical views.

In an attempt to reconcile Darwinian evolution with some form of cultural relativism, James, as well as John Dewey, viewed each culture with a sense of understanding. Although rejecting the notion of superiority of one culture at the expense of another, every culture can be seen as reflecting the mode of production by which each society operates. Development,

as depicted by growing complexity, still retained the evolutionary perspective; yet there was a given commonality or uniting ties among populations of the world. James warned against romanticizing the "noble savage" and more simplistic lifestyles: He valued them with compassion, but gave the more complex and advanced societies an elevated status among pluralistic cultures. Essentially, each stage of social evolution reflected or retained some essence of previous stages within their evolutionary past. In modern societies, these valued perspectives would be modified or subjected to the process of alienation. Just as seen by the philosophy of Karl Marx (1818–1883), this alienation can manifest itself in various forms of conflict. With social conflict eminent, the role and existence of xenophobia appears to be certain.

As the United States experiences the trials and tribulations of a growing republic, multicultural policies and social integration attempts reflect more of a utopian ideal than a reflection of our species' social structure. Even though race is understood as being a social construct, the cost–benefit analysis based on phenotypic expressions (whether they are inclusive) is real. Cultural expressions are equally, if not more, important in the psychological stability of a population group. Even though culture and genetic distance do have a great effect upon behavior (reciprocal altruism), sexual selection does have great importance in the "desirability factor" of the process of reproduction. Granting the selective power exhibited in the social realm, individual genetic fitness and expressed variation appear to operate on a more determinate level. The behavior expressed on this level is beyond the confines of culture. Deviants from the sociocultural norm will receive sanctions. The cultural rules become more complex if new cultural variants are added within the population. The resulting xenophobic reactions are patterns of behavior reinforced to ensure the survival of a closely knitted genetic group. Although xenophobic actions can be reduced by diffusion across minor degrees of cultural variation, differences will be seen if independent and distinct states are united. This will be seen within the European Union.

To offset the economic and political power of the United States, the European Union used the same constitutional provisions enacted by the founders of the United States. Acknowledging the American political genius reflected by the creators of this unique document, the European community has attempted to unite the diverse populations and their respective cultural backgrounds. Plagued by centuries of war and strife, a peaceful union among conflicting ideologies seems impossible, yet practical. Can the segmented genetic populations of Europe that are separated by language, customs and traditions, and philosophies unite? Will old rivalries and imperialistic tendencies that support the prevalent economic structure impede the process of uniting? Although our species must remain optimistic and the desire for peace remains strong, the suggestive power of both history and mythology (including religion) will be a source of conflict and present an immovable barrier. When calculating the cost–benefit analysis, the degree of reciprocity will be questioned. Considering the cultural relevance and genetic distance, will the countries of economic and military prowess surrender their sovereignty and position for the rest of the European community? Other than a gesture of good will, the welfare of the industrialized countries will always take precedence over other less advanced or economically sound countries. Any threats to the stability of said country, external or internal, will result in an inversion to a degree of nationalism and xenophobia. Internally and externally, these problems will continue to be present within the mainstream dominant culture.

In order not to oversimplify or underestimate the structure of the European Union, the problems facing Europe are unlike those facing the United States. The United States is dominated by one language (not yet official), tradition (combined), and inclusive geographic location. More importantly, the sovereign states share a common history and growth, perhaps a sense of manifest destiny (1841–1848). The roles of the state and federal governments are clearly defined and practical. Even if multiculturalism is not central to the issues at hand, the resulting empathy is serving as a process of further uniting and seeking out cultural universals among many particulars. Unlike the United States, the European Union does not have a common language, custom, or a sense of cultural unity. In the area of civic history, known past aggressions and alliances serve only to strain the relations among countries in the union, producing mistrust and civil discord. These diverging facts make the attempted union problematic. Unless a union of culture, including language, is attempted, the process of unification will be impossible. There must be recognition of the underlying philosophical role concerning cultural adaptation.

Taking an evolutionary view of xenophobia, the hidden biases steeped within culture are evident. The smaller the population of a group, the greater the degree of xenophobia for cultural purity will be seen in the face of cultural incursion. Additionally, the use of natural recourses becomes another factor in the cost–benefit analysis faced by ethnic groups. Although phobias are considered irrational, the emotional sediment shared at a group level is legitimized politically, sometimes religiously. Whether the results are discrimination or a "holy war" of terror, the xenophobic actions have consequences in the global theater.

As a republic, the United States has shown great restraint toward those who display aggressive xenophobia actions. Attacks upon the sovereignty of the United States (September 11) are a declaration of war. Covert actions coupled with religious fervor sets the tone of future conflicts. This reality, in conjunction with a political socialistic "pie in the sky" mentality, creates a disjunction whereby the enemy and treason can flourish. Were the following statements xenophobic or statement of fact? Although a political statement is certain (conservative or liberal), xenophobic underpinnings are present in form of nationalistic ideology. It is easy to see how such statements can arouse emotional sediment. These alarming words, however functional and necessary they may be, can increase xenophobic reactions in others. In terms of individuality, these actions are not only justified but are beyond moral qualifications. Survival is essential, not optional.

The quandary that faces our species has been the subject for philosophers for centuries. Defining humanity in terms of ontology and teleology has given our species a start into understanding ourselves in relation to the world. Refinements in science have brought new insights into the human predicament. Advancements in biology and the cognitive sciences continue to redefine humanity. Perhaps accepting common values and traditions can be the beginning of reducing xenophobia, but its elimination will require something more critical than education. As evolution produced the question, evolution may someday give the answer.

— *Edward Anthony Lukaszek*

Further Readings

Banton, M. (1996). The cultural determinates of xenophobia. *Anthropology Today, 12*(2), 8–12.

Coser, L. (1977). *Masters of sociological thought.* New York: Brace Publisher.

Hjerm, M. (2001). Education, xenophobia, and nationalism: A comparative analysis. *Journal of Ethnic and Migration Studies, 27*(1), 37–62.

Lopreato, J. (1990). From social evolutionism to biocultural evolutionism. *Sociological Forum, 5*(2), 187–212.

Miller, L. (1979). William James and twentieth century ethnic thought. *American Quarterly, 31*(4), 533–555.

Monteith, M., & Winters, J. (2002). Why we hate. *Psychology Today, 35*(3), 44–48.

Nielsen, F. (1994). Sociobiology and sociology. *Annual Review of Sociology, 20,* 267–303.

Singer, P. (1982). Ethics and sociobiology. *Philosophy and public affairs, 11*(1), 40–64.

Yabarana Indians

The Yabarana are an Orinoquian indigenous group of Amazonas State, Venezuela. Most live along the banks of the Parucito River in villages with a male leader or in the town of San Juan de Manapiare. But the Parucito River is their stronghold. The Indigenous Census of 1992 reported a total of 319 Yabarana, a figure that may not be accurate as that census was fraught with conceptual and methodological difficulties. The previous census (1982) listed 155 Yabarana. Although linguistic, cultural, and historical specifics place the group within the broader Carib-speaking family, contemporary Yabarana are the product of ethnogenesis that led to the merging of neighbors and refugees. The various ethnonyms used for them echo this story, (for example, Wökiare, Yawarana, and Orechicana).

The Yabarana have intermarried with members of nearby groups such as Piaroa, Panare, Ye'kuana, Hiwi, and a handful of non-Indians. However, Piaroa–Yabarana marriages are the most common. Due to this and the fact that the Piaroa dominate the area demographically, many Yabarana speak or understand Piaroa. But few Yabarana speak their own language even though they can understand it. Their language may not survive unless a concerted effort is made to revitalize and maintain it.

Depopulation played a major role in their transformation. Its impact on Yabarana sociocultural beliefs and practices must be understood in the context of the colonial history of the region, which included, among other events, the introduction of foreign diseases (for example, measles), slave raiding by the ancient Caribs, changes in native leadership structure as a response to the colonial situation, and the transformation of indigenous villages and work patterns as forest crop extractors, missionaries, and government officials penetrated the region. A major transformative event was the rubber boom, which in Venezuela dates from the second half of the 19th century to the middle of the 20th. Due to the demand for labor, members of various native groups—including the Yabarana—were relocated along the Orinoco, Siapa, Casiquiare, and Río Negro rivers during this period. Consequently, most Yabarana have only a fragmentary knowledge of their former ritual practices and elaborate oral tradition. But out of these fragments, and the fact that most Yabarana have always inhabited the same general area, a collective sense of history and identity emerged. Today this collective history and identity is reinforced by the threat that cattle ranchers, non-Indian immigrants to the area, and prodevelopment policies pose to their lands. Like other Venezuelan Indians, the Yabarana's political participation has increased not only because of land tenancy disputes, but because Venezuela's new constitution (1999) grants them unprecedented rights. One of San Juan de Manapiare's recent mayors, Benjamín Pérez, is partly Yabarana and identifies strongly with the group.

Yabarana subsistence practices include slash-and-burn horticulture, with bitter manioc as the staple crop, fishing, hunting, and the gathering of some wild foods such as palm fruits. Men are the primary providers of fish, although women also contribute, generally with smaller species. Men and women will use fishhooks and participate in *barbasco* (fish poison) fishing trips; however, fishing with bows and arrows or harpoons is considered a male pursuit. The men hunt and collect most of the wild honey by smoking the bees out of their hives. Today most hunting involves the use of shotguns (associated with men) and flashlights or lanterns for nighttime

hunting. Formerly men employed the blowgun, spear, the bow and arrow, and a variety of hunting traps for small and large animals. Hunting, particularly of larger game, has decreased as animal populations decline. Both men and women work in the gardens but men fell the trees when a new garden site is cleared and women do most of the weeding and harvesting. Some, mostly the men, work for local nonindigenous Venezuelans (known as *criollos*) and cattle ranchers on a seasonal or temporary basis. A handful of women have done maid's work while in San Juan de Manapiare or while employed by a ranch, yet most do not sustain these activities because they have their own families to care for.

Yabarana family structure is fluid and most nuclear family units include one or more near relatives on at least a temporary basis. Extended families were common in the past (the late 1940s or early 50s). Cross-cousin marriage was customary and remains an accepted practice, though it is difficult—given the small population size—for the Yabarana to find mates within their own group. Bride service was traditional, and today some sons-in-law perform modified versions of it. For instance, a son-in-law will work for a local rancher but will visit his in-laws when he is off duty and bring them commercial goods or help them with house repair or garden work or other chores. Although Yabarana parents are more accommodating about this than in the past, they are adamant about the need for couples to support their offspring. Recalcitrant sons-in-laws and daughters-in-law are relentlessly chastised, particularly by mothers-in-law.

Today the Yabarana no longer have shamans, although most have some knowledge about medicinal plants and a handful know how to perform love magic and other rituals. Most believe in a universe populated by a variety of spirit beings even when they profess some knowledge of Christianity. Their oral tradition attributes the makeup of the world as we know it to the actions of various characters, in particular to the brothers Mayowaca and Ochi and their adventures. They were exposed to Christianity by Catholic and Evangelic missionaries in the multiethnic town of San Juan de Manapiare. The Catholic Church maintains a mission and school in that town and offers regular masses, yet most Yabarana do not attend church services and only complete basic schooling. When the services of a shaman are needed (for example, a person gets sick because the master of an animal species took revenge for some breach), they seek out shamans from other groups (for example, the Piaroa). Diseases deemed curable with Western medicines are generally treated at the infirmary in San Juan de Manapiare. This flexibility has no doubt contributed to their survival.

— *Lourdes Giordani*

See also **Venezuela**

Further Readings

Coppens, W. (1998). *Yawarana history (XVI century to 1957)*. Caracas: Apostolic Vacariate of Puerto Ayacucho.

Giordani, L. (1997). *Imagining who we were, believing who we are: Ethnogenesis among the Yabarana Indians of Venezuela.* Ann Arbor, MI: UMI.

YAGANES

Since the early European-natives encounters, two main groups were identified in the southernmost region of the archipelago of Tierra del Fuego. Those groups were the *Yaganes,* or *Yámanas,* in the region of the Beagle Channel and the *Alakalufes,* in the southwestern Chilean archipelagos (the Pacific Ocean end of the Strait of Magallanes). Yaganes are usually known as *Yaghans,* after an erroneous designation. There is still uncertainty among students of Fueguian natives of the accuracy of their names, origins, and the boundaries separating their territories; nevertheless, their lifestyle and economies seemed to have differed only slightly. Some scholars recognized only a linguistic difference between these two groups. Both Yaganes and Alakalufes are known for their nomadic characteristics, a mobility attributed to their canoe lifestyle. Their way of life could have conditioned their stature, as they were shorter than the rest of the aborigines in the area.

Canoes were used to travel along the shores or from one island to another for the provision of food from both marine and littoral natural resources. This is the reason why they spent half the year sailing. Usually, the whole family traveled together with their belongings, which consisted of weapons, food, and tools. Anthropological evidence in the region indicates that the southern foragers of Tierra del Fuego

carried a basic tool kit that included large projectile points, scrapers, wedges, and harpoons that were used for fishing and hunting. The most common prey were the seals, which were also the most important nutritional resource. Additionally, birds, fish, shellfish, and *guanaco* or *huemul,* only when available, were consumed. Mushrooms and berries complemented their alimentation. Yaganes did not have the technology needed to regularly capture cetaceans. They could take advantage of this resource only when a whale stranded on the beach. This situation was among the few that generated contact with their neighbors, the *Onas* and the *Haush.* Also, the sharing of the prey manifested solidarity between the aborigine groups in the immediate area.

The basic social unit was the family. Family members equally shared the responsibility of food provision. Families were related to each other, but for the most part Yámanas and Alakalufes alike lived in isolation. They had temporary campsites on the channel's shores, particularly during hostile meteorological conditions or when youngsters were inducted in religious ceremonies similar to the Onas's social induction rituals. Due to the severe climatic conditions in which they lived, some authors claim that Yaganes carried fire aboard the canoe to keep warm, particularly since they wore negligible clothing (a custom that led to Charles Darwin's misjudgment of Fueguians utter primitivism). Indeed, researchers suggest that this group, instead of experiencing cultural archaism, had an excellent ecological adaptation to the environment primarily based on a selective hunting strategy of seals. This strategy not only allowed the animal population to remain stable over time but also to secure the main source of their energy intake. Some anthropologists suggest that the reduction of seals due to European sealer activity in the area might have triggered the change in natives' food consumption to the detriment of their health and well-being.

— *M. Fernanda Astiz*

See also **Onas; Tierra del Fuego**

Further Readings

Briones, C., & Lanata, J. L. (Eds.). (2002). *Archeological and anthropological perspectives on the native peoples of Pampa, Patagonia, and Tierra del Fuego to the nineteenth century.* Westport, CT: Bergin & Garvey.

Yanomamo

As one of the most famous of all cultures in anthropology and beyond, the Yanomami are ethnographic celebrities. They are a large population of indigenous people living in a vast area of some 192,000 square kilometers in the Amazon rain forest. The heart of their homeland is the Sierra Parima, part of the Guyana Highlands, the mountainous divide between the watersheds of the two most famous rivers of the Amazon region, the Orinoco and the Amazon itself. Their territory overlaps the border between northwestern Brazil and southeastern Venezuela. Some 21,000 Yanomami reside in 363 scattered communities that range in size from 30 to 90 individuals with a few reaching more than 200 in size. Although very little archaeological research has been conducted in the area, two other independent lines of evidence, linguistics and blood group genetics, indicate that the Yanomami have been a separate population for 2,000 years. Their language remains classified as independent, unrelated to any others on the continent of South America.

Surely among the reasons for their survival for millennia is one of the most outstanding attributes that distinguishes this unique culture, reciprocity. It is a pivotal social principle applied in almost every aspect of their daily life, and most commonly through kindness, sharing, cooperation, and camaraderie. However, this principle is also applied in resolving disputes, occasionally even through violence between individuals, groups, or villages. In various ways reciprocity extends beyond ordinary life to their relationships with the spiritual component of their world as well. For example, every Yanomami hunter has a counterpart in the form of an animal spirit in the forest that he cannot kill without seriously endangering himself. The unity, interconnectedness, and interdependence of all life is a fundamental tenet of the religion and philosophy of the Yanomami, another expression of reciprocity.

The Yanomami world is intensely intimate, socially and ecologically. Traditionally people dwell together in a big, palm leaf thatched, communal, round house with a large open central plaza. Their egalitarian society is structured primarily along lines of kinship. In this communal shelter, the hammocks of each nuclear or extended family are arranged around a hearth along the back perimeter. Each village is

Source: © TribalPhoto.com.

relatively autonomous politically with a charismatic headman who can lead only by persuasion in developing a consensus. There is no chief or other authority uniting more than one community, let alone Yanomami society as a whole, although alliances with several other villages are common for economic, social, and political purposes. In Yanomami society the units of residence, kinship, and politics are not isomorphic, but overlap in diverse, complex, and fluid ways. This dynamic is mirrored by the subsistence economy that entails almost daily forays into the surrounding forest for gardening, hunting, fishing, and gathering. Accordingly, individuals accumulate an extensive detailed knowledge of the ecology of their habitat from such regular intimate experience.

Yanomami society successfully adapted to the diverse *terra firme* (interfluvial) forest ecosystems within its territory for two millennia. They developed an ecologically sustainable society in terms of their low population density; limited interest in material culture; high mobility; rotational subsistence economy; environmental knowledge; and worldview, values, and attitudes. They practice a rotational system of land and resource use not only in their shifting or swidden farming, but also in their hunting, fishing, and gathering. The last three activities emphasize extensive trekking several times a year when they may camp in the forest for a week to a month or so at a time. Their environmental knowledge includes well over a hundred species of wild plants that they use for food, medicinal, and other purposes. Furthermore, their worldview, values, and attitudes usually help promote respect for nature. For instance, they have a system of extensive prohibitions on consuming certain animal species, some of which apply to everyone in the community whereas others are specific to individual circumstances. These food taboos reduce pressure on prey species. Thus, after millennia of use the forest and its wildlife remain intact. The sustainability of traditional Yanomami society is no romantic illusion.

The ancestral homeland of the Yanomami is a region of high biological diversity in several respects: tropical rain forest ecosystems; altitudinal zonation and other variations in climate, soils, and biota from lowlands to highlands; *tepuis;* and *refugia. Tepuis,* or *inselbergs,* are isolated tabletop mountains that are like islands of biological evolution with relatively high species endemicity. *Refugia* are areas of relict forest surviving from periods of wet and dry climatic oscillations during the Pleistocene. For environmentalists and others concerned with Amazonian ecosystems and biological diversity, the optimum route for conservation would be the continued survival and welfare of the Yanomami and other indigenous societies.

Until recently, Yanomami territory was also a refuge in two other respects, political and cultural. The Yanomami may have retreated to the core of their territory in the Sierra Parima to escape slave raids from adjacent Carib neighbors during the colonial period. They are one of the unique indigenous cultures remaining in the Amazon, part of the cultural diversity of this region that is increasingly endangered through serious violations of the human rights of the indigenous peoples by some colonists, miners, ranchers, government agents, military, missionaries, anthropologists, tourists, and other foreigners.

Although not generally recognized, the Yanomami in Brazil and Venezuela have been influenced in varying ways and degrees for centuries at least indirectly

by Western "civilization," and sometimes even by direct contact on the margins of their territory. However, only since the 1970s have they progressively become an endangered people, first as the result of the construction of the Northern Perimeter highway that penetrated 225 kilometers into the southern portion of their traditional territory, and since the mid-1980s by the invasion of tens of thousands of illegal gold miners, initially in Brazil, and then more recently also hundreds infiltrating into Venezuela. This cannot be labeled with euphemisms such as cultural contact, acculturation, cultural change, or even catastrophic cultural change—rather clearly in effect it amounts to ecocide, ethnocide, and genocide.

One of the most serious threats of all to the Yanomami in the past two decades has been placer mining, although mainly in Brazil. It is conducted on the land surface by washing away alluvial sediments along river and stream banks with high-pressure hoses and through dredging the bottom of rivers. This causes deforestation, game depletion and displacement, biodiversity reduction, mercury and other pollution, river and stream bank destruction and siltation, and fishery degradation. Subsistence and sport hunting by gold miners, and noise from airplanes and gold mining machinery all combine to degrade the habitat of game and fish as well as deplete and displace their populations. Obviously this has deleterious effects on the animal protein resources, nutrition, health, and disease resistance of local Yanomami communities. Some Yanomami go hungry and even beg for food from the miners, something unknown in their traditional society. For the first time, Yanomami are experiencing poverty and inequality. Other detrimental new practices are introduced such as alcohol abuse and prostitution. Consequently, every aspect of Yanomami society, culture, and ecology is in effect attacked at all levels.

Introduced disease is certainly the most serious immediate threat to all Yanomami. In Brazil, at least 15% of the Yanomami population has already died, mostly as a result of epidemic diseases introduced by the gold miners: tuberculosis, venereal diseases, and even AIDS. The incidence of previously existing diseases, such as malaria and onchocerciasis (African river blindness), has markedly increased as well. Although this medical emergency has long been recognized, and was even predicted in advance of the earlier road construction, the Brazilian and Venezuelan governments have consistently failed to provide adequate medical assistance for the Yanomami. However, the efforts of the Pro-Yanomami Commission in Brazil together with the French organization called Doctors With Out Borders have brought more medical assistance to some Yanomami communities. Unfortunately, there are no comparable efforts in Venezuela, although the situation appears to be less dire.

There have been homicides and even mass murders of Yanomami by gold miners that were subsequently investigated and documented. For instance, the Hashimu massacre involved a series of events from June through August of 1993. The 12 victims included women, children, and elderly. Several of the bodies were mutilated and some even decapitated.

The miners have brought prostitution that spreads diseases. They have also introduced trade goods that can trigger competition and aggression among Yanomami. They have even given Yanomami shotguns, perhaps to win over friends in areas where they mine. The negative effects on the Yanomami of venereal disease, competition for trade goods, and shotguns may sometimes be inadvertent, or sometimes even intentional.

Although the number of miners in Yanomami territory has declined substantially in recent years from a high of around 40,000 in 1987, there are still regular invasions each dry season. Moreover, changes in the national and regional economies, increases in the price of gold, or discoveries of new kinds of minerals could easily and quickly lead to catastrophic explosions of the mining population at any time in the future with grave consequences for the Yanomami.

Since the 1980s, the territory of the Yanomami nation in the country of Brazil has been turned, in effect, into killing fields because of the illegal invasion of many thousands of gold miners with a multitude of negative health, social, and environmental consequences. However, this disturbing human tragedy is not simply an inadvertent result of the activity of the miners and those who support and profit from their activity. It is also clearly the direct result of the failure of the state and provincial governments of Brazil and Venezuela to adequately protect and promote the human rights of the Yanomami, even though both countries have joined in numerous international agreements on human rights and also have significant protections specified in their own constitutions and laws. After decades of a mixture of governmental apathy, incompetence, corruption, and even complicity,

all of which is well documented in numerous sources, the Yanomami are an endangered society. They will continue to be threatened, unless the international community marshals a much more concerted, systematic, forceful, and sustained initiative on their behalf.

Anthropologists are part of the international community, and some, such as those who are members of the American Anthropological Association, are supposed to follow a formal code of professional ethics that assigns first priority to the welfare of the host community in research. Furthermore, anthropologists have knowledge of some 500 years of recurrent historical trends in situations in which Western "civilization" made war against indigenous societies. From a diversity of sources the profession also has access to substantial specific knowledge about Yanomami culture and ecology as well as the continuing crisis they suffer. Anthropology in the United States and other countries has its own organizations and contacts with relevant governmental and nongovernmental organizations. In short, anthropologists already possess sufficient knowledge to act on behalf of social and environmental justice for the Yanomami. Yet, with few outstanding exceptions, anthropologists individually and collectively have been grossly negligent in this regard.

By now more than three-dozen anthropologists have worked with the Yanomami in various areas and ways for widely different lengths of time. For instance, the eminent Yanomami ethnographer, Jacques Lizot, actually lived with them for more than a quarter of a century. By now more than 60 books have been published about the Yanomami, albeit with diverse approaches, coverage, quality, and accuracy. With so many different anthropologists publishing this much on the Yanomami for more than a century, it is feasible to compare accounts to identify points of agreement, presumably indicative of ethnographic reality, and other points of disagreement, reflecting the individual ethnographer's interpretation, idiosyncrasies, biases, and other phenomena. For example, only a couple of these dozens of authors are obsessed with the violence in Yanomami society to the extent of exaggeration and distortion as well as to the neglect of the violence committed by outsiders against the Yanomami: Ettore Biocca and Napoleon Chagnon. Another important consideration that has yet to receive much systematic research attention is the fact that there is tremendous variation in the geography, ecology, economy, culture, and history among the some 363 Yanomami villages scattered over the enormous area of 192,000 square kilometers. Communities are located from the Orinoco lowlands into the Guyana highlands within an altitudinal range of 250 to 1,200 meters above sea level.

It is also feasible to identify historical trends in Yanomami studies (Yanomamalogy). The orientation of anthropological research among the Yanomami has evolved to emphasize more humanitarian, applied, and advocacy work in recent decades. Starting in the late 18th century, various explorers and naturalists like Alexander von Humboldt published anecdotal accounts of brief encounters with the Yanomami. Much later this stage was followed during the 1960s and 1970s by salvage ethnography, an attempt to systematically describe as much about Yanomami culture and life as possible. This was guided by the assumption that, as a supposedly "primitive" people surviving from a previous stage of cultural evolution, the Yanomami were destined for extinction in the face of civilization and "progress," or at least for profound cultural change through acculturation and assimilation. The first comprehensive ethnography on the Yanomami was published by Louis Cocco in 1971 after he had lived with them as a Salesian missionary for 15 years. Already at this time there was enough research on the Yanomami by various investigators to allow Cocco to include a whole section on the history of Yanomami studies.

During the 1980s, research on the Yanomami in Venezuela became more problem-oriented, much of it focusing on the causes of their so-called warfare and related issues. Actually the most intense form of Yanomami inter-village aggression is more akin to the famous blood feud between the Hatfield and McCoy families in the Appalachian Mountains between Kentucky and Virginia from 1882 to 1890. In any case, the extended debate about the causes of aggression in Yanomami society was over competing sociobiological and ecological explanations proposed mainly by Napoleon Chagnon and Marvin Harris, respectively. Until Brian Ferguson's subsequent meticulous ethnohistorical research, the Yanomami were falsely treated as some kind of a pristine isolate. In addition, the consequences on aggression and other aspects of their society of the movement of some villages to the lowlands in pursuit of trade goods and other Western resources were mostly ignored. Furthermore, there is no scientific or other justification in affording

internal aggression in Yanomami society so much attention while largely, if not entirely, ignoring aggressive external forces that clearly threaten their survival, welfare, and rights as fellow human beings.

Simultaneously in Brazil, however, with the dire consequences of road construction and then mining in the southern territory of the Yanomami, research in that country shifted in emphasis from basic to applied and advocacy work as exemplified by the heroic efforts of anthropologists like Bruce Albert, Gale Goodwin Gomez, Alcida Ramos, and Kenneth Taylor, among others. In Venezuela, where the situation was not as grave and urgent, basic research persisted. However, the controversy over the allegations of serious violations of professional ethics and of the human rights of the Yanomami on the part of Napoleon Chagnon and associates made in Patrick Tierney's controversial book in late 2000 have aroused increased concern with social responsibility and relevance in anthropological research in both Venezuela and Brazil. Accordingly, many no longer consider it justifiable to collect scientific data merely to feed careerism and the vague promise of contributing to human knowledge. Such egocentric work not only dehumanizes the host communities in which the research is conducted, but the researcher as well. The Yanomami and the profession deserve far better.

Fortunately, the Yanomami themselves are increasingly working to sustain their self-determination and other human rights, territorial integrity, and ethnic identity, as well as to meet their own medical, educational, political, and other needs. For instance, one of their leaders, Davi Kopenawa Yanomami, has traveled internationally to publicize their situation and needs. He has addressed organizations such as the British House of Commons and the United Nations. Some schools in Yanomami communities in Brazil are teaching computer literacy with equipment provided by donations raised by Cultural Survival, Inc. It may well be just a matter of time before there are even Yanomami trained as anthropologists documenting their own culture and critically assessing what others have published about their society. Thus, although Yanomami face many serious threats because of the failures of the state and provincial governments of Brazil and Venezuela in protecting and advancing their human rights, they are not merely passive victims of cultural contact and change, but increasingly active agents in struggling to determine their own future. The only anachronism is those racist and ethnocentric outsiders who continue to view them as primitive, worthy only as a source of scientific data and not of voicing their own opinions—including opinions about anthropologists. The Yanomami are neither noble nor ignoble savages, but rather they are fellow human beings with a distinctive culture. Indeed, the word *Yanomami* simply means human being.

— *Leslie E. Sponsel*

See also **Brazil; Human Rights and Anthropology; Human Rights in the Global Society; Law and Anthropology; Venezuela**

Further Readings

Borofsky, R. (2005). *Yanomami: The fierce controversy and what we can learn from it.* Berkeley, CA: University of California Press.

Chagnon, N. A. (1997). *Yanomamo.* New York: Harcourt Brace College.

Cooco, L. (1972). *Iyewei-Teri: Quince años entre los Yanomamos* [Fifteen years among the Yanomamos]. Caracas, Venezuela: Libreria Editorial Salesiana.

Ferguson, R. B. (1995). *Yanomami warfare: A political history.* Santa Fe, NM: School of American Research Press.

Lizot, J. (1985). *Tales of the Yanomami: Daily life in the Venezuelan forest.* New York: Cambridge University Press.

Ramos, A. R. (1995). *Sanuma memories: Yanomami ethnography in times of crisis.* Madison, WI: University of Wisconsin Press.

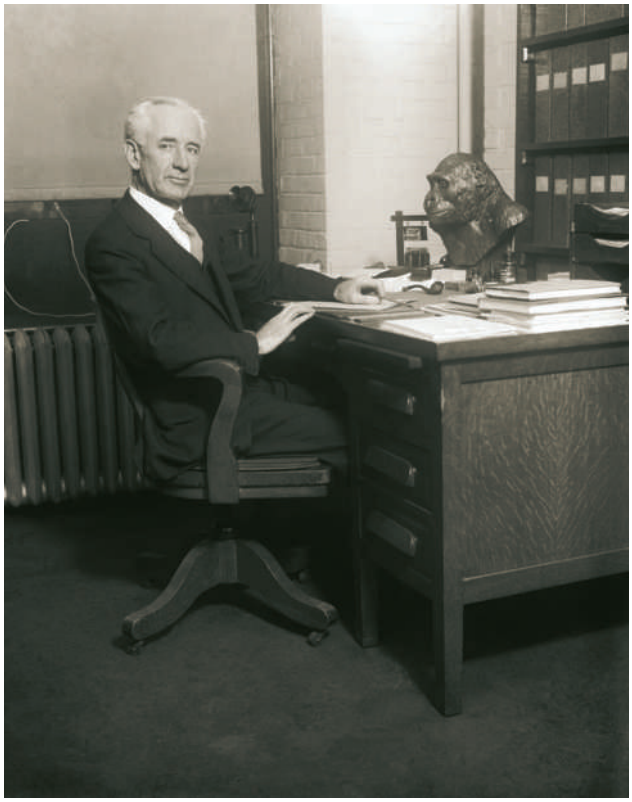
Rocha, J. (1999). *Murder in the rain forest: The Yanomami, the gold miners, and the Amazon.* London, UK: Latin American Bureau.

Smole, W. J. (1976). *The Yanomama Indians: A cultural geography.* Austin, TX: University of Texas Press.

Tierney, P. (2001). *Darkness in El Dorado: How scientists and journalists devastated the Amazon.* New York: W. W. Norton & Co.

Yerkes, Robert M. (1876–1956)

Robert Mearns Yerkes was an American psychobiologist who was among the most influential psychologists of the early 20th century. Although perhaps best known for his eugenic beliefs and role in the



Source: © Bettmann/CORBIS.

implementation of psychological tests for the United States Army in World War I, his most notable accomplishments were in nonhuman primate research. The Yerkes Primate Center is the world leader in research on great apes.

Yerkes was born on a farm outside of Breadysville, Pennsylvania, and described this setting as ideal. During a childhood battle with scarlet fever, which claimed the life of his younger sister, Yerkes developed a close relationship with the family doctor and was inspired to enter a career in medicine. The support of his uncle allowed Yerkes to attend Ursinus College in Pennsylvania. From there, he entered Harvard University for a second bachelor's degree to help him prepare for graduate study. A suggestion by Josiah Royce, a philosophy professor and friend, was influential in Yerkes's decision to study comparative psychology. Yerkes completed his doctorate in 1902, and in 1905, married Ada Watterson. The couple had two children. Yerkes remained at Harvard teaching comparative psychology until World War I.

While teaching, Yerkes involved himself in research dealing with the learning abilities of animals. In 1911, he developed the first multiple-choice test for animals. The test consisted of rows of boxes and was designed to test abstract abilities. During subsequent testing, the animal had to remember which boxes contained food. Yerkes also collaborated with many of his distinguished colleagues. With John B. Watson, Yerkes developed an instrument to test color vision in animals using monochromatic light. With John D. Dodson, Yerkes developed the Yerkes-Dodson Law. The law states that an optimum level of motivation exists for every task. A U-shaped curve illustrates the relationship between arousal and performance of mice in a test involving compartmented boxes. Yerkes and Dodson found that excessive levels of motivation could be a deterrent for completing certain tasks. Other early research projects included studies on turtles, kittens, frogs, and various invertebrates. Early texts published by Yerkes included a review of mutant mice characteristics, *The Dancing Mouse* (1907), and a textbook, *Introduction to Psychology* (1911).

Prior to World War I, Yerkes established himself as a leader in the study of human intelligence. In 1915, he revised the Stanford-Binet Intelligence scales that were designed to assess the cognitive and intellectual abilities of persons from age two to twenty-three. Yerkes was elected president of the American Psychological Association in 1916 and was chief of the Division of Psychology under the office of the United States Surgeon General in 1917.

A presidential proclamation in April 1917 involved Yerkes in the war effort. He became the chair of a committee charged with testing army recruits. A team of 40 psychologists including Henry Goddard, Lewis Ternman, and Walter Bingham worked under Yerkes, and together they developed the Army Alpha and Army Beta tests. The alpha test is a written measurement of intelligence, whereas the beta test is a pictorial test for the large numbers of illiterate recruits. Although not employed until late in the war, the tests were used to classify approximately 1.75 million men. Alpha test results were used to select the majority of commissioned war officers, as well as to discharge thousands of others deemed unfit to serve.

The army tests were a turning point for the developing field of human intelligence testing. Unlike the Stanford-Binet test, the alpha and beta tests could be administered to groups, decreasing the amount of time, personnel, and costs to the government. The widespread use of these tests lead to the popularization of public and private sector testing. Over time, however, the tests became extremely controversial as

they were used to find (nonexistent) racial differences in intelligence. They were also used as proof of the supposed fall in overall intelligence of Americans.

Yerkes was against the idea of social Darwinism. Instead, he favored a eugenic view, believing that society could be improved through selective breeding for specific traits. His belief was solidified through studies of chimpanzee colonies at the Yale Laboratories.

Yerkes's fascination with nonhuman primates began when he was a graduate student. Throughout his time at Harvard, he took several steps to develop a facility where studies on great apes (chimpanzees, bonobos, gorillas, and orangutans) could be conducted. Yerkes's interest in primates lead him to purchase chimpanzees for himself, as well as spend time studying them in California and Cuba. Together with the president of Yale University, James Rowland Angell, a plan was developed to begin an Institute of Psychology at Yale. With funding from the Rockefeller and Carnegie Foundations, the Yale Laboratories for Primate Biology opened in 1930 in Orange Park, Florida. The institution was later named the Yerkes National Primate Research Center and is currently at Emory University in Atlanta.

Yerkes Primate Center was the first to demonstrate that chimpanzees could be successfully bred and studied in captivity. Research conducted at the center included the social and sexual behavior of chimpanzees as well as their learning and intellectual abilities. Yerkes's primate research lead to a dozen books including *Almost Human* (1925) and *Chimpanzees: A Laboratory Colony* (1943), as well as coauthored texts such as *Chimpanzee Intelligence and Its Vocal Expressions* (1925) with B.W. Learned and *The Great Apes* (1929) with his wife, Ada. Yerkes published his autobiography in 1930 and retired from Yale University in 1944.

Yerkes served as chairman of the Research Information Service of the National Research Council from 1919–1924. He was also head of the council's Commission on the Problems of Sex through 1947. In 1954, Yerkes was awarded the Gold Medal from the New York Zoological Society in recognition of his pioneering work in the field of psychobiology. He was a Fellow of the American Academy of Arts and Sciences, as well as a member of the National Academy of Science, the American Philosophical Society, the Society of Mammalogists, and the American Society of Naturalists, of which he was elected president in 1938. Although Robert Mearns Yerkes died on February 3, 1956, at the age of 79, his contributions to the fields of animal behavior, learning, and cognition; captive breeding; intelligence testing; and psychology and psychobiology will live on for some time.

— Lisa M. Paciulli and Tera L. Fong

See also **Chimpanzees; Gorillas; Intelligence; Primatology; Psychology and Genetics**

Further Readings

Dewsbury, D. A. (2000). *Encyclopedia of psychology.* New York: Oxford University Press.

Plucker, J. A. (2004). Robert Mearns Yerkes. *Human intelligence: Historical influences, current controversies, teaching resources.* Retrieved May 16, 2005, from http://www.indiana.edu/~intell/yerkes.shtml

R. M. Yerkes Dies: Psychologist, 79. (1956, February 5). *New York Times.*

Strickland, B. B. (2001). *Gale encyclopedia of psychology* (2nd ed.). Farmington Hills, MI: Gale Group.

Yerkes, R. M. (1926). *The mind of a gorilla.* Worchester, MA: Clark University.

Yerkes, R. M. (1934). *Modes of behavioral adaptation in chimpanzee to multiple-choice problems (Comparative psychology monographs).* Baltimore: Johns Hopkins Press.

Yerkes, R. M. (1982). *Psychological examining in the United States army.* Milwood, NY: Kraus Reprint.

ROBERT M. YERKES

Psychologist Robert Yerkes is usually associated with his work on nonhuman primates, which has extensively expanded the field of biological anthropology. In 1930, Yerkes established the Yale Laboratories of Primate Biology, which was renamed the Yerkes Laboratory of Primate Biology. In 2002, the National Institute of Health designated Yerkes as one of eight national research centers on primates.

Whereas Yerkes's work as a primatologist has been well documented, his work in the field of intelligence testing is less well known. While serving as president of the American Psychological Association, Yerkes was asked to develop an intelligence test to classify army recruits during World War I. The Committee on the Psychological Examination of Recruits, which also included Lewis Terman (1877–1956), a pioneer in the field of intelligence testing, developed a test that was ultimately administered to 2 million army recruits, assigning them to A, B, C, D, and E groups.

Although the army intelligence test was criticized by those who doubted its validity and by those who argued that it was undemocratic, the work of Yerkes and his colleagues spawned a new industry. Intelligence testing spread to businesses that used the tests in hiring, promoting, and transferring employees. The American education system employed intelligence testing as a means of tracking students, placing them in groups of students with similar abilities. Proponents of eugenics seized on intelligence testing as a way to "prove" the inability of certain individuals to perform at what was considered "normal" levels. Armed with test results, eugenics advocates argued that such individuals should not be allowed to reproduce because of potential harm to the human race.

In 1921, a scholarly survey determined that definitions of intelligence should encompass the areas of higher-level abilities, the ability to learn, and the ability to adapt to environmental changes. By 1986, intelligence scholars had refined the definition of intelligence to focus on the ability to adapt to desired cultural values. Since the 1980s, the field of intelligence testing has grown rapidly with new tests being developed and existing tests being revamped to examine particular aspects of intelligence such as verbal and spatial abilities, inductive reasoning, and memory. The most commonly used tests are the Wechsler Intelligence Scale for Children, the Stanford-Binet Intelligence Scale, and Kaufman's Assessment Battery for Children. Intelligence tests now offer clinicians and educators a variety of testing methods to design treatment and programs based on particular needs. Critics of new intelligence testing methods argue that although intelligence testing has expanded in quantity, the quality of the tests has not been measurably improved.

— Elizabeth Purdy

Yeti

Yeti is the mysterious giant bipedal creature of the eternal snows of the Himalayas.

The yeti (*yeh-teh*) has always been a part of the cosmology of Lamaistic Buddhist peoples of the Himalayas, who class it as not quite human yet more than human, and keep relics of it in monasteries. As early as the 1830s, "westerners" in Nepal began to bring back tales of the creature under the name "Abominable Snowman," but it was not until 1951 that these really achieved international fame with the publication of a photograph by two mountaineers, Eric Shipton and Michael Ward, of a footprint in the snow, taken on the Menlung Glacier at 5,500 meters (18,000 feet). The footprint was about 50 cm long and 33 cm wide, with a large hallux and second toe, and three small side toes; and a second photo showed a whole trail of footprints leading into the distance.

In 1958 a Texas oilman, Tom Slick, obtained the mummified hand of a yeti in a monastery in Nepal and smuggled it out of the country. Two years later, Edmund Hillary, the "conqueror of Everest" in the 1953 expedition, was permitted to borrow a scalp from a monastery for scientific investigation. Other relics were examined in Himalayan locales but not taken for study.

There are similar beliefs in giant hairy bipeds in mountainous regions elsewhere, such as the *almasty* of the Caucasus, *almas* of Mongolia, *yeren* of Sichuan, and *sasquatch* ("Bigfoot") of western North America. The Russian cryptozoologist Boris Porschnev argued that many of them are surviving Neandertals, whereas the American anthropologist Grover Krantz favored the explanation that Bigfoot and yeti, at least, are relict populations of *Gigantopithecus*. There is also a dwarf hairy biped, *orang pendek* (literally "short person"), in Sumatra.

It would be nice to be able to report that at least one of these creatures had been discovered and classified. Alas. The Slick "hand" proved to be the paw of a snow leopard (*Panthera uncia*); the Hillary "scalp" was the shoulder skin of a serow (*Capricornis sumatraensis*). Even the Shipton–Ward footprint photos are in question. Ward later admitted that the trail (in the second photo) was not associated with famous single footprint, but was from a yak. A journalist, Peter Gillman, discovered that Shipton had a reputation as a hoaxer, and noted that the footprint in the photo had incongruities, indicating that it had been "improved." The one item that is still arguable is a film of a "Bigfoot" taken in 1967 by Roger Patterson and Bob Gimlin in northern California. Some have declared the film authentic, others that it is a hoax; the speed at which the film was shot is unknown, which has not helped. There is even a claim, by Hollywood director John Landis, that it was someone wearing one of the gorilla suits made by John Chambers for the original (1968) film of *Planet of the Apes.*

At the moment it does not appear that there is acceptable evidence for the existence of yeti and friends, though there are still plenty of earnest seekers for it. It is especially unfortunate that any reality that may be behind the stories has tended to get buried under a mass of forgery.

— *Colin Groves*

See also **Sasquatch**

Y-STR DNA

Y-STR is a relatively new term for geneticists, becoming common in DNA literature in the second half of the 1990s. The *Y* stands for the male chromosome, which, as a reproducing cell, does not recombine. *STR* is an abbreviation for short tandem repeat. Compared to other polymorphisms (different forms of the same trait), STR refers to faster-mutating polymorphisms such as microsatellites.

For an unknown reason, short sequences of DNA repeat themselves, with the number of repeats varying. The analysis of diverse polymorphisms with different rates of mutation and different numbers of repeats allows analysis of nonrecombining parts of the Y chromosome. This has helped provide more knowledge of human evolution of males just as mtDNA analysis provides knowledge about female evolution.

Analysis of the Y chromosome has grown dramatically in recent years, along with a large increase in the number of polymorphic markers (an identifiable piece of DNA) available for analysis. There are now about 150 Y-STR loci that may provide analytical information, although only a small number is usually used because of economic reasons.

The use of polymorphisms for genetic analysis became available after Kary Mullis, in 1983, discovered the way to get a very small section of DNA containing a gene or a fragment from a genome to reproduce itself exponentially, thus being able to provide a sufficient amount of DNA for analysis. Mullis received a Nobel Prize in Chemistry in 1993 for developing this method, the polymerase chain reaction (PCR).

From an academic perspective, geneticists and anthropologists have applied this new knowledge to study the origin, dispersal, and distribution of modern humans, the sequential settlement of Polynesia, and numerous other similar topics. From an applied perspective, forensics and genealogy have become major areas of research. The technique for forensic DNA fingerprinting was introduced in 1984 by Alex Jeffreys. For both forensic and genealogical research, a number of positions (markers) on the DNA chain are tested, and a number is provided for each marker on the basis of the number of STRs. A list of numbers is referred to as a *haplotype,* regardless of the number of markers used. The more markers two men share, usually the closer they relate genetically.

Forensics frequently has used only six markers, which generally means that only one man out of every one million men randomly chosen will have a specific haplotype. The selection is similar in principle to most lottery drawings. This technique is especially good for excluding some suspects. However, most geographical areas do not have a random distribution of haplotypes, so there has been a push to increase the number of markers used. In genealogical research, a much larger number of markers is used. There is a nine-marker Y-STR database, maintained by the Institute of Legal Medicine in Berlin that, near the end of 2004, had more than 26,000 male DNA samples from more than two hundred sites in different parts of the world. Commercial companies now test men for their haplotypes, for genealogical purposes. In the United States,

the largest firm is Family Tree DNA in Houston, Texas, which tests 37 markers.

— *Abraham D. Lavender*

Further Readings

Bosch, E., et al. (1999). Variation in short tandem repeats is deeply structured by genetic background on the human Y chromosome. *American Journal of Human Genetics, 65,* 1623–1638.

Institute of Legal Medicine. (2004). *Y chromosome haplotype reference database.* Retrieved November 21, 2004, from the Berlin, Germany Institute of Legal Medicine, Charite, University of Medicine, Berlin Web site: http://www.yhrd.org

Kleiman, Y. (2004). *DNA and tradition: The genetic link to the ancient Hebrews.* New York: Devora.

Zafarraya Cave

Zafarraya is a Mousterian site located within the El Boquete de Zafarraya (The Zafarraya Pass) of the Sierra Tejeda Mountains in the northeastern portion of the Malagá province of southern Spain, near the border of the town of Alcaucin. Five layers of archaeological material typed to the Mousterian were identified during initial excavations (1980–1983) by Cecilio Barroso-Ruiz and P. Medina Lara. An expanded excavation of the site by Barroso-Ruiz and Jean-Jacques Hublin in 1992 provided human and faunal remains, as well as typical Mousterian artifacts characterized by classic Levallois techniques. Hominid material recovered from the site includes one nearly complete mandible as well as isolated teeth and postcranial fragments. Zafarraya is notable for its secure dating of Neandertal occupation to approximately 33 kya—and likely occupation as late as 27 kyr—providing an example of one of the latest known surviving Neandertal populations.

The most diagnostic specimen from the site is a nearly complete mandible (specimen no. 8698). This specimen has a number of features similar to other late surviving Neandertals. Some notable features include teeth that are small in relation to the height of the mandibular corpus, anterior teeth that are large in relation to the postcanine teeth, a vertical symphysis with a mental trigone and moderate mental eminence, mental foramina positioned under P4, a retromolar space, and a relatively broad ascending ramus. Additional material excavated at the site include a second, burnt mandible, a partial femur, a partial innominate, and isolated teeth. Except for isolated teeth discovered in the upper levels, the hominid material was discovered in association with a hearth on the lowest deposits in the cave. This material also shows varying degrees of Neandertal affinity, though several features of the partial femur and innominate may link the material to later Upper Paleolithic modern humans, possibly providing evidence of continuity with later European populations.

The archaeological and faunal material from the site reveal several important features. Approximately 90% of the faunal material recovered are identified as *Capra ibex pyraneica,* a local subspecies of goat, which may indicate specialized hunting or scavenging. However, predator fauna has also been recovered, so these predators may largely be responsible for collecting the material. No detailed taphonomic report has been published on the material. The faunal material is also important in dating the site. Bone samples were used in radiocarbon tests, and teeth samples were used in uranium-series dating. Teeth directly associated with the Neandertal remains in the lower level gives a thorium-uranium (Th/U) date of 33,400 years ago, material from the upper level gives a radiocarbon date of 29,800 B.P. and a Th/U date of 27,000 B.P., and material from the middle level gives a radiocarbon date of 31,800 and Th/U date of 31,700 years ago. These dates confirm that Zafarraya is one of the latest surviving Neandertal sites currently known.

The lithic material discovered from all layers is distinctly Mousterian, indicating that the population exploiting the cave may not have been exposed to more advanced Neandertal or anatomically modern human Upper Paleolithic blade technologies that were in use across much of Europe at the time. Zafarraya is one of a number of late surviving Neandertal sites located on the Iberian Peninsula that lack any Upper Paleolithic materials. The persistence of Neandertal populations in this area exhibiting a lack of Châtelperronian or early technologies, as well as the lack of early modern

human sites in the area, led to the development of the *Ebro Frontier model.* This model states that the Ebro river basin in northern Spain acted as a biogeographical barrier to the spread of technologies and peoples into the Iberian, allowing the late survival of distinct Neandertal populations.

The Zafarraya site is significant as a representative of one of the latest securely dated Neandertal occupations, and represents one of the best-known sites in the cul-de-sac of Iberia, which may have been the last holdout for the European Neandertals.

— Christopher David Kreger

Further Readings

Barroso-Ruiz, C. (1984). Le gisement mousterian de la grotte du Boquete de Zafarraya (Alcaucin-Andalouise) [The Mousterian deposits from Zafarraya cave]. *L'Anthropologie, 88,* 133–134.

Hublin, J.-J, Barroso-Ruiz, C., Medina Lara, P., Fontugne, M., & Reyss, J.-L. (1995). The Mousterian site of Zafarraya (Andalucía, Spain): Dating and implications on the Palaeolithic peopling process of Western Europe. *C. R. Acad. Sci. Paris Series, 2a*(321), 931–937.

Schwartz, J. H., & Tattersall, I. (2002). *The human fossil record: Volume 1—Terminology and craniodental morphology of genus* Homo *(Europe).* New York: Wiley-Liss.

Wolpoff, M. H. (1999). *Paleoanthropology.* Boston: McGraw-Hill.

ZANDE

The Zande (or Azande, using the Zande plural prefix *a-*) are popular in anthropological literature thanks to the works of prominent British ethnographer, E. E. Evans-Pritchard. They are well known for the brilliant political success of their noble clans, their Trickster tales, their music, and especially for their beliefs in witchcraft, magic, and oracles.

The Zande live along the Nile-Congo watershed in the very center of Africa. Numbering between 500,000 and 800,000, they live in the three modern-day countries of Congo (ex-Zaire), Sudan, and Central African Republic. Most of Zandeland is rolling savanna crossed with streams along which dense forests grow. The year is broken up into a summer dry season and a winter rainy season with the constantly warm temperatures to be expected just a few degrees north of the equator.

The Zande practice shifting agriculture; the main crops are eleusine millet, sweet potatoes, cassava, peanuts, squash, and various greens. Families work garden plots within a few miles of their village. They also hunt, fish, and collect termites, fruit, yams, and other wild foods. The typical Zande meal is a very consistent porridge made of either millet or cassava, served with meat or vegetable sauce. Millet or cassava beer is popular and plays an important role in ceremonial feasts and rituals.

Families used to live in scattered homesteads grouped loosely around a prince's court. Today however, as a result of colonial edicts, villages have been located along roads and market towns have sprung up at the old courts of kings. Clan membership passes through the father's line, and although it has become rare since the arrival of European and American missionaries, polygyny was common. Each wife had her own hut in a common courtyard. Bridewealth—ceremonial spears in the past, money or domestic goods today—seals the marriage contract.

Politics

In the early 1700s, two noble clans began consolidating political power and expanding into new territories, resulting in about a dozen kingdoms. A kingdom consisted of a royal court, ruled by a Vungara or Bandia king, who then sent his sons or loyal commoners to serve as governors of his provinces.

The Zande-speaking Vungara clan originated near modern-day Rafai (along the Chinko river) and expanded eastward, slowly assimilating neighboring groups, who then adopted Zande language and customs. In his book *Azande History and Political Institutions,* Evans-Pritchard argues that the Vungara were able to take political advantage of the surplus resulting from the recent development of agriculture. The Vungara kings and princes, by using permanent battalions of young warriors and the temporary labor of adult men to work their fields, and also by receiving tribute from the surrounding area, were able to control a very large amount of food, which they then redistributed in a way that strengthened their authority. The Vungara courts assured stability, military protection, and justice for peoples that until then had

been small-scale, autonomous groups. Food was given generously to feed the courtiers, the battalions and their leaders, and commoners who came to the court for redress of wrongs or with requests. Perhaps most importantly, the kings gave bridewealth (in the form of marriage spears) to anyone who asked. They also gave wives to loyal governors, military leaders, and others who had shown them great service or loyalty. The Vungara thus established a political stronghold in the region by being strong but also by being generous. The rulers and subjects benefited mutually: The Vungara depended on their subjects for warriors, labor, and tribute; the subjects in turn benefited from their generosity, protection, and courts of justice. It was this system that allowed the Vungara to evolve to a ruling clan, and to bring social hierarchy to peoples who until then had been small, autonomous, egalitarian groups. Wars were fought not so much to expand territory as to gain subjects, who would then contribute to building up the kingdom. The Vungara kingdoms, which included peoples of various ethnic groups, were very unstable, and a 20-year period saw a new set of kingdoms; the Vungara princes, especially in the newer, easternmost regions, were each other's worst enemy.

At about the same time, and in the same way, the Ngbandi-speaking Bandia clan migrated north from south of the Uele River and formed the kingdoms of Bangassou, Rafai, and Hilou in western Zandeland; the Bandia rulers adopted the language and customs of the Zande- and Nzakara-speakers they ruled. Eric de Dampierre underscores the effective use of the traditional system of kinship and alliance by the Bandia. The Bandia were foreigners and needed to get into the good graces of the local Nzakara and Zande population. They did this by supplying wives not to their relatives but to their subjects. Women went from being exchanged by lineage elders to being distributed by Bandia rulers. By controlling the circulation of women, the Bandia developed clienteles at the expense of the traditional, egalitarian lineage system. Gradually, allegiance replaced alliance. Residence was no longer based on kin groupings, but on client groupings. Unlike the Vungara kingdoms, the Bandia kingdoms in western Zandeland were very stable. Annual wars were fought not to expand territory or to incorporate more subjects into the kingdoms, but to bring back women and girls to give away as wives to subjects as they pleased.

Zande (and Nzakara) kings maintained standing armies and received Arab traders and European explorers at their royal courts, which were social and political centers of a blossoming Zande civilization, complete with bodyguards, courtiers, and harp-playing minstrels. The more-or-less simultaneous arrival of Belgian, French, and British colonizers at the end of the 19th century disrupted the dynamics of the kingdoms. As treaties were signed (and a few Vungara kings forcefully deposed), European military officers, administrators, and traders penetrated Zandeland, and were soon followed by Christian missionaries. Colonial governments undermined the authority of the royal clans by allowing dissatisfied subjects to apply to European-style courts for redress and by putting a halt to military expeditions. The Vungara expansion was halted, and the Bandia were no longer able to distribute women as needed to maintain their authority.

Belief System

Evans-Pritchard's book *Witchcraft, Oracles, and Magic Among the Azande* (1937) is a classic in and outside of anthropology. Zande beliefs in witchcraft have often been used as an example of primitive beliefs. Evans-Pritchard's use of the terms *witchcraft, magic,* and *sorcery,* based on the Zande concepts, has been widely followed by other anthropologists.

The Zande believe that illness, death, and other misfortunes are usually due to the ill will of a fellow human rather than coincidence or bad luck. For the Zande, two types of causes merge to cause misfortune. The *sensitive* cause is visible, and is on the level of common sense; the *mystical* cause is invisible and explains why a particular person suffered a particular misfortune in a particular place at a particular time. For example, if a buffalo gores a man, the sensitive cause is the buffalo, and Zande will agree that the victim died because a buffalo gored him. But the buffalo would not have killed the man if a mystical cause had not put him in its path.

Witchcraft (*mangu*) is the most common mystical cause. Witchcraft is an inherited organic substance in the abdomen of some men and women that is awakened by greed, jealousy, spite, and other such emotions. Typical consequences of witchcraft are crop failure, unsuccessful hunting, a house fire, a hunting accident, illness, and death. If a misfortune occurs, especially if it is ongoing, the victim's family seeks out the witch in order to have him or her withdraw, or "cool" the witchcraft. They do this through oracles, which are objects that give yes–no answers to questions

posed. The most effective oracle was a poison used on chickens; the oracle operator would drop a few drops of poison into its mouth while asking a yes–no question about the alleged witch. If the chicken died, the answer was "yes"; if it lived, the answer was "no," according to how the question was phrased. The termite oracle calls for two branches to be inserted into a termite mound overnight. If the branch on the left comes out cleaner than the one on the right, the answer is "yes," and vice-versa. Once the oracle reveals the witch, the family presents its accusation. A man or woman accused of witchcraft generally claims innocence, takes a sip of water and blows it out, and states that if it were his or her witchcraft which was causing the illness, the organ would now remain cool and the harmful influence would end. Zande are less interested in finding out who among them is a witch than finding the witchcraft responsible for ongoing illness or bad luck.

Another mystical cause that can trigger misfortune is magic. The Zande word *ngua* has several English translations: plant, tree, stick, wood, medicine, drug, poison, and magic. The Zande can name over three hundred plant varieties, most of which are used to make medicines for common aches and illnesses. They make no distinction between a plant's "real" versus "magical" effects. Plants are used in a more magical sense to protect property (such as to protect a house from burglary during its owner's absence), for good luck while hunting, and to ensure good health (by protecting from witchcraft). The Zande believe that some people also use plants to cause illness or misfortune. It is this harmful magic or sorcery that, along with witchcraft, is cited as a cause of death and misfortune. It seems probable that magic has long been increasing in variety and in importance among the Zande, and that "bad magic," in particular, is relatively new. Closed magic associations, or *secret societies,* proliferated in Zandeland at the turn of the last century; they were not condoned by the noble clans, and they were declared illegal by colonial governments. Furthermore, while, in the past, a witch guilty of murder was executed or made to pay compensation, it became the rule to use vengeance magic to kill a witch who has caused the death of a kinsman.

Witch doctors (*abinza*) were men (and, exceptionally, women) who, through plants, acquired the power to discern witchcraft. Those who desired to become witch doctors went through a long apprenticeship in which they learned which plants to eat and how to prepare them properly. At the request of a head of household, two or more witch doctors would hold a public séance to clear the air of witchcraft. By dancing the wild *avure* dance to frenzied drumming, they were able to see witchcraft. Witch doctors prophesied and made revelations about witchcraft, but they were not considered as reliable as the poison or termite oracles. It could therefore be said that witch doctors had a greater role in collectively stymieing and reducing the threat of witchcraft than in revealing or punishing actual cases of witchcraft. Oracles and magic are private acts, and must be kept hidden from others, lest witchcraft interfere with their efficacy. Witch doctors, on the contrary, held their séances in public, before crowds, actively seeking out witchcraft in order to thwart it, and were not at all threatened by it. Thus, a unique function of theirs was to publicly acknowledge the existence of witchcraft and actively fight against it.

The ancestors, too, influence the lives of the living. Long after a person dies, when no one alive remembers him or her, the soul merges with a collectivity of ancestors' souls called *atoro.* They are often blamed for such misfortunes as epidemics or droughts, which affect the whole village rather than individuals who may have inspired ill will in a neighbor who happened to be a witch. Most families have a sort of altar (*tuka*) to the ancestors where they make offerings, such as the first fruits of harvest, to keep the ancestors appeased.

Finally, there is a Zande word, *mbori,* for a supreme being or power. Evans-Pritchard argued (and more recent research concurs) that the term only recently came to refer to a supreme being akin to the Christian God, and that "Fate" might have been a better translation for the term than "God." *Mbori* is very common in Zande names, such as Mboriundare, which could be translated as "Fate be good to me" or "God help me," depending on the translator. If no other mystical cause for misfortune or death can be found, and especially in the case of the death of an elderly man or woman, the Zande may simple say it was *mbori* who decided it was that person's time to die; in other words, it was fate, or it was God's will.

Trickster Tales

The Zande are veritable oral artists. Their tales, songs, proverbs, and daily rhetoric reveal enjoyment of language, incredible improvisational skill, and cleverness in using metaphorical allusions and double entendres.

The largest category of "oral literature" is *sangbature,* or tales of the Trickster. There are hundreds of versions of the tales, although most storytellers use the same few dozen episodes, weaving them together differently at each telling. The hero's name is Ture, which literally means "spider," and he has been called a Trickster because of his cleverness mixed with gluttony and a penchant for getting himself into trouble, often with hilarious consequences. The Trickster tales are actually *chantefables,* or narrative mixed with song. The Trickster tales are generally not etiological (that is, they do not explain why something is the way it is), nor are they moral lessons. They are told only in the evening, and include ritualized openings and endings. There is never any mention of witchcraft in the tales; and although magic abounds, it is not typical Zande magic (for protection or vengeance), but instead magical means to accomplish extraordinary feats.

A second category of tales is *pa-anya,* or animal fables, which differ from Trickster tales by their length (they are very short), the absence of Ture, the absence of song, and their etiological bent. Animal fables explain some feature of the animal world, such as why ants and termites fight each other, why leopards have spots, or why monkeys live in trees.

Finally, one of the most impressive verbal arts of the Zande is their use of hundreds of proverbs (*sanza*), which have literal meanings but also hidden meanings that vary according to the speaker and the situation. The Zande use this roundabout way of speaking through proverbs to insult, criticize, tease, or accuse, which they can then later deny doing. This is especially important in a society in which offensive remarks can result in witchcraft. Many of the proverbs refer to animals and show the Zande's intimate knowledge of wildlife.

Music

The Zande are expert musicians, both instrumental and vocal. The Zande five-string harp (*kundi*) is world-renowned; it uses a pentatonic scale and often features a beautifully sculpted head on the end of the bow. The harpist plays intricate rhythms while simultaneously and ingeniously improvising words to a song. The songs are extremely poetic; in fact, harp-players should actually be called poets who accompany their poems with their instrument. Harpists were common at the courts of kings and princes, the equivalent of minstrels in European royal courts. But since the demise of the kingdoms and the courts, the harp has lost its popularity in favor of the more dance-oriented xylophone.

— *Margaret Buckner*

See also **Evans-Pritchard, Edward; Witchcraft; Witch Doctor**

Further Readings

Evans-Pritchard, E. E. (1937). *Witchcraft, oracles, and magic among the Azande.* Oxford: Clarendon Press.

Evans-Pritchard, E. E. (1967). *The Zande trickster.* Oxford: Clarendon.

Evans-Pritchard, E. E. (1971). *Azande history and political institutions.* Oxford: Clarendon.

Zapotecs

The Zapotec are an ethnic group that has long inhabited modern Oaxaca in Mexico. The ancient Zapotec produced one of Mesoamerica's earliest civilizations, replete with cities, monumental architecture, writing and calendrical systems, accomplished artisans, complex sociopolitical organization, and far-reaching economic ties. Contemporary Zapotec peoples refer to their ancestors as *binni gula'sa'* (or *Ben 'Zaa*), the Cloud People, and in doing so stress the vibrant role of the past in their present-day lives. Similarly, *binni sa,* or *binni za,* which translates as "the type of people we are," is also used. This term offers a desirable alternative to *Zapotec,* which is a Nahuatl-derived word and thus an externally imposed category.

Predicated upon linguistic evidence, scholars have argued that the Zapotec and Mixtec, another ethnic group of Mexico, split from one another as early as 3700 BC. By approximately 1500 BC, the Zapotec most likely occupied areas in present-day Oaxaca. The fertile Valley of Oaxaca long served as the heartland of Zapotec civilization. Communities were established throughout the valley's three arms, the best-known being San Jose Mogote and Tierras Largas in the Etla subvalley. At the end of the Rosario phase (ca. 700–500 BC), settlement in the valley's arms dramatically declined. This decline coincides with initial occupation of Monte Albán. Scholars have

argued that the center, which would become the Zapotec capital, was established by a confederation of elites. Cultural elements and material remains distinguishable as ethnically Zapotec crystallized between 400 BC and AD 100.

Monte Albán is situated atop a 400-meter mountain at the junction of the Oaxaca Valley's three arms. There is no known natural source of water, suggesting that the location was selected as a consequence of physical centrality, political strategy, and military defense. The center's inhabitants carved agricultural and domestic terraces from the mountain's slope, and they leveled its top. To meet the growing center's sustenance demands, Monte Albán's inhabitants developed the surrounding piedmont via intensive canal irrigation. By the Monte Albán II period (ca. 200 BC–AD 100), an administrative hierarchy, palace structures, royal tombs, and monuments depicting conquest were all in evidence at the center. It is this last attribute that informs our understanding of the methods used to consolidate the Oaxaca Valley. The emergence of the Zapotec state appears to have been wedded with violence. Architecture and iconography at Monte Albán underscore the need for defense and success in conquest. Fortifications ring the hilltop city, and stone slabs carved with naked, mutilated, and slain individuals adorn the eastern wall of Building L. These images were originally identified as *danzantes* (dancers), and most likely represent prisoners, who were of Zapotec ethnicity, captured during military campaigns. Such evidence suggests that, even in antiquity, the Zapotec were by no means a unified ethnic group.

During this time, Zapotec influence reached beyond the borders of the valley's three arms. A Zapotec presence at the central Mexican site of Teotihuacán is particularly noteworthy. Ceramic wares and tombs in Monte Albán styles suggest that the Zapotec had established an Oaxaca Barrio, and maintained a politically autonomous and amicable relationship with Teotihuacános. Such amicability does not seem to characterize interactions between the Zapotecs and other foreigners. Iconography associated with Building J at Monte Albán provides evidence of these aggressive interactions. "Conquest slabs," carved with place glyphs and inverted human heads, were inset into the external façade of the building. Scholars have argued that these images represent foreign communities conquered or colonized by the Zapotec.

By AD 800, authority held by the Zapotecs of Monte Albán had waned, as did the city's population numbers. Elsewhere in the Oaxaca Valley, other Zapotec centers increased in importance and size, such as Zaachila and Mitla. Joyce Marcus has noted that during this period the Zapotec experienced a shift from political centralization to balkanization, in which power was divided amongst numerous, competing centers. By the Postclassic period (ca. AD 1000), defensive response and not offensive strategizing characterized military force, as the Zapotec resisted political expansion by first the Mixtec and later the Mexica (more commonly known as the Aztec).

At the time of Spanish Conquest in 1519, political and linguistic fragmentation between the different Zapotec groups of the highlands, the valley, the coast, and the isthmus had occurred. European conquerors and chroniclers, however, treated diverse native peoples as a homogenous ethnic group—*indios*—in their policies and literary descriptions. In 1528, King Carlos V bestowed upon Hernán Cortés, famed conqueror of Mexico, an *encomienda* that encompassed large portions of the Oaxaca Valley and the Isthmus of Tehuantepec. As Marquesado del Valle, Cortés controlled these lands' resources, including its indigenous labor pool. In the colonial aftermath, forced servitude and—more prominently—the spread of Old World disease for which native peoples had no natural immunity dramatically reduced the number of Zapotec peoples. Moreover, Dominican missionaries were strongly opposed to the Zapotec's animistic religious practices. In particular, Zapotec rituals invoked the spirits of deceased ancestors, paid respect to supernatural beings like Lightning (*Cociyo*) and Clouds (*Zaa*), imbued all animate objects with the vital force *pée* ("wind," "breath," or "spirit"), and sanctified natural landscape features like caves and mountains.

Despite population loss and forced conversion to Christianity, the Zapotec did not succumb easily to European dominance. Through the centuries, numerous resistance movements flourished as Zapotecs from distinct regions unified. This resistance was at times overtly violent, as well as more covert in that the Zapotec continued with religious practices deemed idolatrous and forbidden by the Church. Zapotec identity was maintained within villages, which were composed primarily of peasants and characterized by their isolation and conservative attitudes. These communities actively and effectively

opposed colonizers' political and socioeconomic changes. Subsistence strategies continued to include fishing, hunting, small-scale agriculture, maize cultivation, and salt collecting, and artisans persisted in their production of native crafts. Modernization and capitalism, which significantly restructured sociopolitical organization and economic structures, has not dampened ethnic solidarity. Rather, by drawing on components of Zapotec identity, represented as ancient and long-standing, politicians and intellectuals have been active in implementing social change and reviving cultural practices. Indeed for contemporary Zapotec peoples, the past is power.

— *Pamela L. Geller*

See also **Mexico**

Ziggurats

A common feature in ancient Mesopotamian cities, a ziggurat was a square or rectilinear terraced platform with a temple at its summit. A stairway or ramp led from the ziggurat's base to the temple, the residence of the city's patron deity. Ziggurats vary in form and style; some of the largest and best-understood ziggurats have been excavated at Aššur, Babylon, Eridu, Nippur, Ur, and Uruk in modern Iraq. Genesis 11: 1–9 figuratively describes the construction of the Tower of Babel, widely believed to be the ziggurat of Babylon, called Etemenanki, "the house of heaven and earth's foundation."

Large and well-organized teams of workers were required to lay the ziggurat's mudbricks that made up its core. Buttresses dressed the ziggurat's exterior, adding structural support and a decorative element. Drainage systems built into the ziggurat countered the deteriorating effects of rainfall on mudbrick. The ziggurat was a palimpsest of earlier building versions that were incorporated within the most recent innovation; archaeologists who excavate ziggurats work to reconstruct the buildings' multiple construction phases.

Although platformed ziggurats first appeared in the fifth millennium BCE, classic terraced ziggurats were constructed in major Mesopotamian cities starting in the late third millennium. In general, ziggurats are separated into southern "Babylonian" and northern "Assyrian" regional styles. The earlier southern style displayed a rectilinear foundation oriented along the cardinal points and a series of staircases leading up and around the structure to the shrine. The later northern style exhibited square foundations whose corners were often not aligned according to the cardinal points. Northern ziggurats were incorporated into triple-platformed temple complexes. Typically, a ramp led to a courtyard on the first platform, a temple on the second, and, finally, the ziggurat on the final platform. Examples of the southern tradition were constructed at Ur, Uruk, and Nippur, whereas northern traditions were found at Khorsabad, Aššur, and Tell er-Rimah.

Despite the variability in regional form, the ziggurat's function was reserved for religious purposes. The city's patron god or gods lived in the temples where attendants cared for them and oversaw the temple's daily operations. Mesopotamian kings saw the construction and repair of ziggurats as their divine right to exercise, calling on their constituents to dedicate time and resources to the building. The ziggurat remains a symbol of Mesopotamian architectural achievement and a measure of Mesopotamian society's dedication to its religion.

— *Benjamin W. Porter*

See also **Babylon; Mesopotamian Civilization; Pyramids; Ur**

Further Readings

Jacobsen, T. (1976). *The treasures of darkness: A history of Mesopotamian religion.* New Haven: Yale University Press.

Roaf, M. (1990). *Cultural atlas of Mesopotamia and the ancient Near East.* New York: Facts on File.

Saggs, H. W. F. (1995). *Babylonians.* London: British Museum Press.

Zinjanthropus boisei

Zinjanthropus is an extinct hominin discovered by Mary Leakey in 1959 at Olduvai Gorge, Tanzania. The name *Zinjanthropus* literally means "East African Man." The specimen for which the species *Zinjanthropus boisei* was named (OH5, or Olduvai Hominind 5) is also

known as "Nutcracker man" because of its extremely large postcanine teeth (molars and premolars). *Zinjanthropus boisei* was later reclassified as *Australopithecus boisei (A. boisei)* because of its similarities to South African robust australopithecines. Some scientists have advocated reclassifying it to the genus *Paranthropus,* a sister taxon to *Australopithecus.*

The fossil preserves a nearly complete cranium of an adult male. Its brain size is about 530 cubic centimeters (cc), which is larger than the average chimpanzee (390 cc) but much smaller than the average human (1400 cc). The most impressive aspects of this skull are the characters associated with its massive jaws and postcanine teeth. These teeth are nearly four times the size of those of modern humans, although the hominins themselves were much smaller. Associated with these large teeth are large jaws to house them. The skull presents a bony crest on the top for attaching large chewing muscles. In addition, it possesses wide cheekbones that flare out to allow the passage of these muscles. As a result the face is somewhat dished-out in profile. These adaptations to heavy chewing, together with tooth wear and chipping, have been interpreted as evidence that *A. boisei* was a specialized feeder with a diet composed mostly of hard, low-quality foods.

Since the original discovery of OH5, many more fossils of this species have been discovered. They are found primarily in Ethiopia, Tanzania, and Kenya in East Africa. The OH5 fossil has been dated to approximately 1.8 million years, but the species to which it belongs (*A. boisei*) spans 2.3 (from Omo, Ethiopia) to 1.2 million years (Olduvai Gorge, Tanzania). About 1.2 million years ago the species disappears from the fossil record. Many scientists believe their extinction is linked to overspecialization to a particular environment. They hypothesize that when the environment changed the species could not survive. However, recent analyses have suggested that, in fact, *A. boisei* (like *Homo habilis*) was a generalized feeder and that other explanations need to be invoked to explain their extinction.

The OH5 specimen was originally considered by Louis Leakey to represent a human ancestor. Later, after the discovery in 1960 of a less robust hominin also from Olduvai (*Homo habilis*), it was reassigned to an evolutionary side branch in human prehistory. Earlier, some scientists believed the East African *A. boisei* to be male representatives of the South African *A. robustus* (also a large-toothed hominin). When both males and females of *A. boisei* were found in East Africa this hypothesis, known as the Single Species Hypothesis, was discarded. It is now accepted that more than one hominin species lived at the same time and there was great diversity in early hominin evolution. The exact evolutionary relationship between *A. boisei* and other early hominin species is still debated within paleoanthropology. However, most paleoanthropologists agree that *A. boisei* was an extinct hominin side branch that did not contribute to later human evolution.

— Shara E. Bailey

See also **Australopithecines; Leakey, Louis S. B.; Leakey, Mary D.; Leakey, Maeve Epps; Leakey, Richard E. F.**

Further Readings

Tobias, P. (Ed.). (1967). *The cranium and maxillary dentition of Australopithecus (Zinjanthropus) boisei.* Cambridge: Cambridge University Press.

Walker, A., Leakey, R. E. (1988). The evolution of *Australopithecus boisei.* In F. E. Grine (Ed.), *Evolutionary history of the "robust" Australopithecine* (pp. 247–258). New York: Aldine de Gruyter.

Wood, B. A. (1988). Are 'robust' australopithecines a monophyletic group? In F. E. Grine (Ed.), *Evolutionary history of the "robust" Australopithecine* (pp. 269–284). New York: Aldine de Gruyter.

Wood, B. A., & Strait, D. S. (2004). Patterns of resource use in early *Homo* and *Paranthropus. Journal of Human Evolution, 46,* 119–162.

ZOOARCHAEOLOGY

Zooarchaeology is the study of human beings and their relationship to nonhuman animals. Research in this area involves the analysis of animal remains (also called *faunal* remains or *archaeofauna*) from archaeological sites, such as bone from amphibians, mammals, reptiles, birds, and fish, and shellfish such as lobster and mollusks.

Animals have probably always played an important role in our biological and cultural development. Evidence from archaeological sites around the world demonstrate that animal resources such as meat, fat,

blood, marrow, and other edible parts were nutritionally important. Secondary products—fur, wool, hides, bones, teeth, and shells—provided materials that we used for clothing, shelter, and making tools.

As human populations grew, we became increasingly dependent on animals for companionship, protection, and work-related activities. Animals are well-known from cave paintings, hieroglyphics, and the archaeological record as being critical components in commerce and warfare. As this dependence grew, we domesticated many wild varieties of animals. This changed animals genetically, but, in addition, we selected certain artificial traits to, for example, increase milk or wool production. We also selected some behavioral changes. The wolf is a good case in point, as we consider it the ancestor of today's domesticated dog. It seems that, over the past 14,000 years, human beings have bred all of the current breeds of dog for a variety of tasks related to our endeavors and our lives.

Zooarchaeologists are interested in analyzing animals to examine

- paleoenvironments and environmental change
- the technologies or techniques that humans use to hunt or capture their prey
- the nutritional values of animals
- the origins of animal domestication
- the development of animal breeds
- how animals fit into the economic, social, and belief systems of ancient societies
- the formation of archaeological sites (taphonomy) and associated archaeofaunal assemblages

Archaeofauna are often ideal for study because their remains can preserve well, even in sites dating back tens of thousands of years. Under special circumstances, bones and other tissues may become mineralized or preserved as fossils that date back millions of years. When investigated by trained archaeologists, these remains can provide vital clues to the past environment and how human beings may have interacted with animals or exploited them.

When faunal remains are discovered, zooarchaeologists usually proceed with identifying the particular animal to species if possible, their frequency within the assemblage, and whether there are some parts of the animal that preserves better than others (called *preservation bias*). The zooarchaeologist will also want to measure the remains to help identify the animal to gender or taxa and determine if any changes were occurring over time, examine the bones for evidence of butchery, and—using chemical, genetic, or isotopic techniques—to discover evolutionary relationships and dietary preferences. In this way, archaeologists can better understand human-animal relationships over time.

— *Scott M. Fitzpatrick*

Further Readings

Grayson, D. K. (1984). *Quantitative zooarchaeology: Topics in the analysis of archaeological fauna.* Orlando: Academic Press.

O'Connor, T. (2000). *The archaeology of animal bones.* College Station: Texas A&M University.

Reitz, E. J., & Wing, E. S. (1999). *Zooarchaeology.* Cambridge: Cambridge University Press.

Zoos

A zoological garden is an establishment housing collections of both wild and domestic animals that are exhibited to the public. Zoos reflect the curiosity and intrigue of humankind toward our animal kingdom. Zoos also reflect our responsibility as a species to promote conservation through education and make an attempt to manage our globe by studying the species within. Modern trends include perfecting husbandry techniques for many exotic species and carefully managing captive breeding programs. A key focus of zoos is the breeding of endangered species in captivity, while meticulously managing their gene pools, functioning as a modern "Noah's Ark." Zoos are capable of sustaining viable populations of endangered species, even after the animals have disappeared from the wild.

The current trend in zoos is to display animals in simulated natural environments. This provides a more beneficial environment for the resident animals, while also immersing the public in many unique ecosystems, such as an African Savannah. Most large cities currently have zoological reserves, and many serve as centers of research for conservation and the study of exotic animals. Centers of research include London (Regents Park), New York City (The Bronx Zoo), San

Source: © iStockphoto/Kevin Tate.

Francisco (San Francisco Zoo), Paris (Jardin des Plantes, Jardin d'Acclimatation, and Bois de Boulogne), Honolulu (The Honolulu Zoo), Melbourne (Royal Melbourne Zoological Gardens), Rome (Zoological Garden of Rome), and Berlin (Tiergarten). A zoo can be a municipality owned by the city, privately owned, or managed by a nonprofit zoological society or a combination of several. For example, the Honolulu Zoo is owned by the City and County of Honolulu, but also has a nonprofit branch, the Honolulu Zoological Society, to assist its efforts in conservation and education.

The purpose of a zoo has many facets, including entertainment, education, conservation, research, and captive breeding programs. In the past, zoos were only looked at as a source of entertainment. The current focus of zoos has become much more complex. A zoo's responsibility is multifaceted, including research on rare and endangered species, conservation efforts on all continents, and education of the public to increase people's awareness of global issues and responsibilities. The American Association of Zoological Parks and Aquariums (AZA), founded in 1924, is the main accreditation body in North America and the Pacific. With 214 accredited institutions and more than 6,000 members, AZA supports the advancement of zoos and aquariums, holding zoos to high standards, as well as managing captive breeding programs. The AZA has the profound potential to promote and fund conservation and education efforts, benefiting both species and habitat conservation. The Honolulu Zoo is an accredited AZA member, reflecting high zoological standards in its mission statement: "to foster an appreciation of our living world, with an emphasis on tropical ecosystems, by serving as a center for environmental education, biology study, and recreation and conservation activities."

The practice of keeping wild animals in captivity is an ancient idea. Stone tablets found in the Sumerian city of Ur, dated to around 2300 BC, document the establishment and management of the earliest known animal park. In ancient Egypt, wild animals were regarded as objects of wealth, and were presented as gifts to the pharaohs. Around 1500 BC, the pharaoh Tuthmosis III (1501–1447 BC) imported many animals to Egypt and maintained his own collection. Queen Hatshephut, his stepmother, organized expeditions to capture wild animals. In 1490 BC, Queen Hatshephut sent an expedition to the coast of present-day Somalia, bringing back monkeys and exotic birds for the royal animal park.

The Greeks preferred wild birds to mammals. However, when the Greeks invaded India, they were greatly impressed by the elephants' capacity to be trained to work or fight, and they promptly drafted the elephant for war. Alexander the Great maintained collections of both African and Indian elephants, bears, monkeys, and other exotic animals, in tribute to the countries his army vanquished. In time, he established what was possibly the first public zoo. In the third century BC, Alexander joined Aristotle and began the first scientific studies of captive animals.

Up until the 19th century, little had changed in western zoos. Most zoos were still the privilege of the nobility and wealthy. Poor knowledge of animal husbandry and natural history led to poor living conditions and shortened lives for zoo animals. Animals were kept in zoos for human amusement and were symbols of power and status. The evolution of a more modern zoo began in France under the reign of Louis XIV at Versailles in 1664. He began to display animals arranged together in more natural groupings and

attended closely to their physical needs. His legacy continues through to today. After the French revolution, the collection was sent to the Jardin des Plantes, a botanical garden in Paris. This union created the Jardin des Plantes Zoological Gardens in 1793. The Jardin gained an international reputation as a place of science and knowledge, and prompted Sir Stamford Raffles and other British gentlemen to create a nonprofit zoological collection in London. In 1826, the Zoological Society of London was created.

When Darwin set out on his voyage in 1837 on HMS *Beagle*, as the naturalist on the boat he collected a huge amount of specimens for the Zoological Society of London. The collection included birds from the Galapagos Islands, which Darwin first thought was a mismatch assembly of warblers, grosbeaks, orioles, and finches. Upon inspection by an ornithologist at the Zoological Society of London, the birds were determined to all be new species of finches. This astonishing find in part led Darwin to his theory of evolution. Our inquisitory nature has led us to capture and study the animals around us throughout history. As more and more species become endangered in the modern world, the living DNA found in our zoological institutions has become invaluable to conserving the genetic diversity of our world.

Today's zoos have the opportunity to play a vital role in the survival and maintenance of endangered species worldwide. Through captive breeding programs, rare animals can be brought back from the edge of extinction. Enormous improvements in enclosure design, appreciation and awareness of species natural history, and animal management techniques, have led to highly successful breeding rates for a variety of species. These high reproduction rates have led to a surplus of animals within the zoo system. Surplus animals create challenges in the use of space and resources and have led to a need to focus on breeding protocols. The goal of every captive breeding program is to maintain the genetic diversity of a species by coordinating all participating facilities to make beneficial reproductive decisions. Every captive breeding program has both a national and international studbook system that manages this task. The ISIS (International Species Information System) and the IZY (International Zoo Yearbook) are two databases used to manage captive stock.

Throughout history wild animals have been kept for human amusement and enjoyment. Zoos are a place where people can visit to satisfy their curiosity and view specimens of an exotic nature. The past few decades have brought about a new responsibility for zoos. Human activity has considerably reduced the earth's biodiversity. Wide-scale pollution, human overpopulation, habitat destruction, and the unrestricted use of natural resources have led to the disappearance of many species.

Today zoos focus on the conservation of endangered animals and the education of the public in conservation and environmental issues. Each year the world's zoos are visited by hundreds of millions of people, from all areas of society and all ages. Many of the people who visit have little contact with nature, and zoos provide a means for all to experience the biodiversity of the planet. The main attraction will always be the wild animals. These exotic species are the hook that grabs the public's attention, and allows zoos to convey knowledge of pressing conservation issues to the public. With the support of the public, zoos can successfully fund their efforts and create change, whether it be purchasing acres for a sanctuary or raising money for game reserve management. Each small step does make a difference. The modern zoo is a repository of living DNA, a Noah's ark, and can in some cases have the capacity to actually turn back the tide of destruction.

Zoos have always been an important source of biological knowledge. They have been instrumental in the development of anatomy, morphology, classification, and natural history data. Research undertaken in zoos includes studies on animal behavior, veterinary medication, appropriate husbandry, and physiology of countless wild species. This knowledge benefits captive animals, and also provides a better understanding of wild populations.

Scientific study of animals is vital both in captive and wild settings. The knowledge obtained from wild research can help both the conservation and management of wild populations and the development of successful husbandry techniques. In return, zoos work with universities and colleges to carry out detailed studies that would be difficult to perform in wild settings. The zoo environment contains a vast array of knowledgeable collaborators, all focused on the successful management of species in captivity and the wild.

The greatest hope for species survival is through education. We need people to understand the global situation, not just what is in their back yard. Through education, the public can understand that there are massive interconnected changes happening in all

global ecosystems. Tropical rain forests are disappearing at an alarming rate, escalating global warming, which is in turn melting the icecaps in the Arctic and Antarctic. Every action has a consequence. Our forests are being destroyed at a phenomenal rate; we cannot continue to survive at our current rate of destruction. It is not hard to comprehend the real danger of mass extinction.

Every country has three forms of wealth: material, cultural, and biological. Biodiversity has the potential to produce new medicines and chemicals that can benefit all of humankind. Biodiversity also has the potential to produce profound amounts of money from ecotourism. Poor countries are finding that nature reserves and game parks can make more money than farmland. Societies must begin to invest in native species as a financial resource: not as food, but as a source of ecotourism, providing a profitable and sustainable resource. Ecotourism and biodiversity are the true hopes for the future, especially in developing countries. Zoos can assist local governments globally to replenish lost populations and promote conservation.

Zoos have to foster a sense of community, a sense of global interconnection, where we recognize and embrace our neighbors on other continents. We must acknowledge the diverse conservation issues that global societies face and focus on sustainable solutions. Zoos can set a precedent to aggressively manage what we have left. We can reach out in our own communities, and through the efforts of zoos, bring people together.

— *Gregory Scott Hamilton*

Further Readings

American Zoo and Aquarium Association. (2004). Retrieved November 22, 2004, from http://www.aza.org/

Hahn, E. (1990). *Animal gardens or zoos around the world.* Annandale-on-Hudson, NY: Begos & Rosenberg.

Koebner, L. (1994). *Zoo book: The evolution of wildlife conservation centers.* New York: Tom Doherty.

Mann, C. C., & Plummer, M. L. (1995). *Noah's choice: The future of endangered species.* New York: Alfred A. Knopf.

Page, J. (1990). *Zoo: The modern ark.* Toronto: Key Porter Books.

Ward, P. (1994). *The end of evolution: On mass extinctions and the preservation of biodiversity.* New York: Bantam.

ZOOS

The nature of zoos changed dramatically over the course of the 19th and 20th centuries and the debate over their future still continues to excite contrasting passions. Zoos have been conceptualized as concrete expressions of lasting tensions between the wilderness and civilization, science and popular culture, education and entertainment. The recreational purpose of the early zoos has been complemented with the more respectable aims of preserving endangered species and promoting natural appreciation in visitors.

The urbanization of North America and Europe made zoos increasingly popular in the 18th and 19th centuries. Imperialism and scientific explorations brought a diversity of animal and plant specimens from distant and exotic regions, and industrial advances enabled the construction of elaborate enclosures. During the 20th century, zoos strove to attain the status of cultural institutions, and they progressively stressed ecological themes, thus leading to the exhibition of animals in more natural surroundings and a stronger emphasis on the role of conservation. Yet, in spite of these efforts to claim educational respectability and to promote their contributions to conservation, zoos are still perceived by large sectors of the public as a source of recreation and as animal displays. Rates of visitors to zoos continue to increase and zoo administrators argue that the pedagogical and recreational aims are not self-contradicting because, by getting people's attention through entertainment, zoos stimulate them to learn more.

Despite their stated noble aims, zoos have had their reputations challenged by a number of problematic issues. First among these arguments is the impact of zoos on the lives of their animals. Conservation may be a legitimate concern, yet critics argue that once an animal enters a zoo, it is effectively dead. Deprived of their ecological contexts, animals become mere carriers of DNA waiting to be copied. Reintroductions of species to the wild have been few in number and of limited success. In addition, the majority of animals in most zoos are not endangered and the choice of species to exhibit concentrates on large, fashionable

mammals. Considerable debate also continues to focus on the ethics of keeping wild animals in captivity and this has led to efforts to improve the animals' living conditions. Some zoos, such as Seattle's Woodland Park Zoo, have tried to raise their standards of living with the concept of "landscape immersion," where people and animals are surrounded by carefully replicated natural habitats. As David Hancocks suggests in his study *A Different Nature* (2002), zoos should move away from being mere warehouses of living creatures and educate people about natural systems, biodiversity, and the pressing need for the preservation of all species, not only the most beautiful or popular ones.

— **Luca Prono**

Zulu

The largest Black ethnic group in South Africa is the Zulu, whose population stands at about nine million. The Zulu have a relatively brief history as an independent group. The term *Zulu* refers to the Nguni speaking people in KwaZulu Natal in South Africa. The Zulu are a branch of the southern Bantu, who have close ethnic, linguistic, and cultural ties with other groups in the area such as the Xhosa and the Swazi.

Although the Zulu are the largest Black ethnic group in South Africa, they are the least Christianized group there. That did not keep the Zulu from using millenarian Christian rhetoric to advance their cause: Chief Mangosuthu Buthelezi's Inkatha Freedom Party's campaign slogan during the 1994 democratic election was "The last shall be first." Buthelezi thus claimed a sacred origin for Zulu nationalism, freely using Christian terms promising a divine destiny.

Buthelezi's slogan is in the Zulu tradition of using religion to strengthen Zulu nationalistic objectives. The rise of the Zulu and their consolidation of power and resistance to British power and later to other ethnic groups in the New South Africa follow a common pattern of the union of religious ideas with nationalistic ones. This pattern forms the outline of this article.

History

Early Period

In the early 19th century, the Nguni, under Shaka, united the Zulu clan of the Nguni with other Nguni people in Natal, forming the Zulu nation. Shaka used his clan name, Zulu, for the united peoples. Through expansive conquest and use of new principles of warfare, Shaka formed the powerful Zulu Empire.

Shaka was born about 1787 to the Zulu clan of the Nguni, and his father was a Zulu chieftain. Shaka had a turbulent childhood. His parents split up when he was about 6 years old. When he was around 15, his mother's people, the Langeni clan, drove him and his mother out. They found refuge with the Dietsheni clan. This clan belonged to the Mtetwa people, a very powerful group. Shaka stayed with the Mtetwa as a warrior until his father died in 1816 and he became the Zulu chief.

It was at this time that Shaka showed his military skill. He reorganized the military in such a way as to change warfare from a series of skirmishes into a bloody ordeal. Swords replaced spears, leading to close-quarter fighting. Shaka developed new tactics: He divided the army into four parts and trained each unit to surround the enemy. In a brief time, he had built up his Empire.

Historically, the Zulu were farmers who kept large herds of cattle. They kept up the size of these herds through cattle raids. During the 19th century, European settlers fought the Zulu, taking grazing and water resources from them. The Zulu had little option but to hire themselves out for labor on European farms or in urban areas. Shaka's heirs had little time to enjoy the fruits of their conquest. They found themselves battling with Boer settlers migrating north into Natal. These Boers, Dutch descendants who were farmers, were moving away from British settlers and their government, a movement called The Great Trek. Dingane, the Zulu chief, ambushed Boers moving through his territory, killing around 500 people. This massacre occurred in 1838. Andries Pretorious, a Boer general, retaliated at the Battle of Blood River, killing about 3,000 Zulus. In 1840, the Boer intruded into Zulu domestic politics, resulting in the toppling of Dingane and the rise to power of Mpande, who became a vassal of the Boer republic of Natal.

Anglo-Zulu Wars

When the British succeeded the Boers as rulers of Natal in 1843, they found Mpande's son, Cetshwayo, to be opposed to their interests. In 1878, he refused to accept an ultimatum to submit to British rule. Great Britain reacted to this refusal by attacking Zululand in 1878. Although the Zulu inflicted serious defeats on them, the British conquered the Zulu in July 1879. In 1897, the Zulu successfully annexed Zululand because of their continued resistance to British rule and the number of raids they staged against the British.

The Anglo-Zulu War began on January 11, 1879. The British sent about 15,000 troops into Zululand. There were about 7,000 British regulars, 7,000 conscripted African troops, and about 1,000 colonial volunteers. The attack took place at the sacred time of the First Fruits festival. Cetshwayo had his entire army of about 30,000 assembled at Lundy for the festival. He attacked and defeated the British and then sued for peace. He had refrained from killing civilians and invading Natal.

The Zulu inflicted the greatest defeat that any European army had ever encountered at the hands of an African force. Almost every soldier died. The British refused to allow any peace to be negotiated and sought revenge. In July 1879, they burned Lundy, the royal homestead, and captured the king.

There was a close relationship between the power of the Zulu king, religion, and military organization. Shaka built on both Zulu religion and the sacred nature of the chief to supplement his military reorganizations. So powerful did he make the Zulu people and their military that the Zulu came close to driving the British from Natal and caused great discontent in Great Britain regarding the colonial endeavor in South Africa.

Zulu religion stresses the age-grade system, the importance of cattle, and the importance of matrilineal ties. These ties stretch back to ancestors from whom the elders descend and whose authority they wield. The belief system centers on ancestor worship, and this strengthens ties in the group and the power of the king. The king is in charge of all magic, rainmaking, and other significant rights, all of which activities increase his power.

Shaka's heirs as priests and shamans as well as sacred people commanded a great deal of respect. They were able to harass the British and Boers until the end of the 19th century and have proved a force to be reckoned with during the end of White rule in South Africa. Much of their cohesion has come from their knowledge of their traditional customs and religion. Their reverence for the old and willingness to adapt to changing times, a part of their tradition, has enabled them to continue as an essential part of South Africa's future.

Religious Ideas

There is a close relationship between Zulu religious ideas and their prowess in war. The Zulu have a belief in a Supreme Being, called *Unkulunkulu*. Some scholars argue that the term originally referred to the first man. In any case, Zulu use the term to refer to the Ancient One who has created all things and who is also the ancestor of humans. This Ancient One organized human societies. Additionally, the Zulu use the term "Lord of heaven" or "Chief in the Sky." This term refers to a Storm God.

There are also other supernatural agents, including animal spirits and sacred snakes, that aid in rainmaking. They also have a female spirit, *Inkosazana*. Inkosazana aids in the growing of corn. There are rituals, performed by young women in the spring, to celebrate her power.

In common with other related peoples, the Zulu regard the chief as the symbol of tribal unity. The chief is a priest and sorcerer. He is the ruler and lawgiver of his people. He is also general and source of wealth. Under Shaka, the king became godlike. Simply put, he was a sacred being before whom his people prostrated themselves. He was a demigod and passed on this persona to his heirs.

Despite these views, people could and did abandon the king: Coups could take place, even civil wars. For example, the king's enemies assassinated Shaka. Provocation for these actions had to be great and both the Boers and the British learned how to foment and abet such provocation.

The First Fruits festival is an important ceremonial time for the Zulu. It is a time of the gathering of a large number of people. Diviners, herbalists, and other ritual specialists gather, and the sense of unity of the power of the king was enhanced by these ritual ceremonies.

Christianity came into Zululand in 1835 with Christian missionaries of many denominations. In 2000, about 50% of the people were Christians. Most of these people belong to African Independent Churches. However, there are Zulu Catholics,

Anglicans, members of the Dutch Free Church, and other Christian denominations. Most of these Christians also observe traditional religious practices along with Christian ones. Thus, the nationalistic notions of traditional religion get absorbed into Christianity in the Zulu area.

— *Frank A. Salamone*

See also **Postcolonialism; Tswana Bantu**

Further Readings

Beck, R. B. (2000). *The history of South Africa.* Westport, CT: Greenwood Press.

Chidester, D. (1997). *African traditional religion in South Africa: An annotated bibliography.* Westport, CT: Greenwood Press.

Davenport, T. R. H. (1998) *The birth of a New South Africa.* Toronto: University of Toronto Press.

Elphick, R., & Davenport, T. R. H. (1997). *Christianity in South Africa: A political, social, and cultural history.* Berkeley: University of California Press.

Gluckman, M. (1963). *Order and rebellion in tribal Africa: Collected essays, with an autobiographical introduction.* New York: Free Press of Glencoe.

Gorman, G. E., & Homan, R. (Eds.). (1986). *The sociology of religion: A bibliographical survey.* New York: Greenwood Press.

Gump, J. O. (1994). *The dust rose like smoke: The subjugation of the Zulu and the Sioux.* Lincoln: University of Nebraska Press.

Keto, T. C. (1977). Race relations, land and the changing missionary role in South Africa: A case study of the American Zulu mission. *The International Journal of African Historical Studies, 10*(4), 600–627.

Krige, E. J. (1936) *The social system of the Zulus.* London: Longman, Green.

Zuni Indians

The Amerindians known as the Zuni, Zuñi, or Aashiwi (as they call themselves) number slightly more than 10,000. Their 640-square-mile reservation is located in the valley of a tributary of the Little Colorado River high in the rugged plateau country of western New Mexico. The main village, or Zuni Pueblo, known to its inhabitants as *Halona Itiwan'a,* "Middle Ant Hill of the World," is situated on land that has been continuously occupied by them for at least 900 years and legally granted to them by the King of Spain in 1689.

Culturally, the Zunis are similar to other Pueblo groups. They have been described as the most traditional and most widely known of all the Southwestern Indian groups. Their social organization is matrilocal, with many exogamous matrilineal clans. The Zuni language is classified by linguists as a separate linguistic stock, called Zunian, which is distinct from the languages spoken by all the other Pueblos and the nearby Navajo and Apache.

Zunis trace their ancestry to the builders of the ruins of Mesa Verde, Chaco Canyon, and Canyon de Chelly. These settlements flourished in the 10th through the 12th centuries. No one knows exactly when Zuni Pueblo itself was settled, but it is known to have been well established when the Spanish arrived in 1539. In 1680, the Zunis joined with their pueblo neighbors in an uprising against the Spanish. Although the uprising was successful, by 1692 the Spanish reasserted their authority with acts of legendary brutality. During the uprising the Zuni withdrew into the surrounding mountains and returned to the valley after the reconquest. They soon rebuilt their multistoried pueblo of flat stone and adobe with tall outer walls. On the grounds immediately outside these walls they created gardens, laid out in a waffle pattern to preserve the river water they used in irrigation. Beans, melons, onions, cilantro, and chili flourished in these gardens.

Their multistoried dwellings were built around courtyards with narrow alleys that allowed passage throughout the town. These courtyards were the main sites of religious dances. Also important to Zuni ceremonial life were *kivas,* small rooms within the pueblo where members of medicine societies held meetings and performed rituals. During public kachina dances participants dressed in costumes that included special clothing and paint, carried rattles and other noise-makers, and wore large sculpted masks that identified the dancers with ancestors as well as with characters in Zuni cosmology.

For two centuries after the Pueblo uprising, the Zuni continued a yearly cycle of farming, herding, and hunting, together with religious ceremonies. Spanish friars maintained a presence at Zuni and made many political and economic demands on the

Source: Courtesy, Wikipedia.

Pueblo. The year before Mexican independence, which came in 1821, the mission was abandoned. At the end of the Mexican War, in 1848, Zuni Pueblo became incorporated into the United States, and in 1877 federal officials created the Zuni Reservation. In 1881 the Santa Fe Railroad reached Gallup, bringing a new era of non-Indian settlement. Missionaries and traders arrived, encouraging the Zunis to convert to Christianity and to raise cattle. In so doing, they introduced religious pluralism and a cash economy. Despite these radical changes, the fact that the Spaniards gave the Zuni legal title to their land, long before there was a United States, has proven to be important in their cultural survival. Throughout the American period, Zuni has been recognized as a sovereign nation existing within the boundaries of the United States.

Beginning at the end of the 19th century, Zuni Pueblo served as a living laboratory for a generation of anthropologists who documented this pre-industrial society while simultaneously defining a new profession. Some believed it would quickly disappear, especially the collectors. But salvage ethnologists believed that they could rescue Zuni culture from the inevitable pollution that would come about from contact with American culture. Over a period of several decades, archaeologists and ethnographers collected thousands of Zuni artifacts, which they placed in the Smithsonian Institution in Washington, DC. They also produced a large body of rather speculative literature about Zuni culture before contact with the outer world.

Today Zunis are writing self-descriptions, whereas archaeologists and ethnographers have meanwhile realized that they are enmeshed in the narratives they themselves tell about other cultures. This recognition has created a shift in methodology whereby they use their everyday social skills in simultaneously experiencing, observing, and recording their own and others' interactions in real geographical space and historical time.

Although the Zuni economy is currently based primarily on cottage industries, mainly arts and crafts, some Zunis have found other employment in Gallup, New Mexico, and Flagstaff, Arizona. Forest firefighting brings additional income into the community, as do ranching, tribal-government employment, truck farming, cattle raising, and sheep herding. Zunis are bilingual, speaking their native language at home and English elsewhere. Some Zuni elders also speak Spanish, as well as other Pueblo languages and Navajo.

In the years since World War II, the Pueblo of Zuni has spread out from its center at Halona. Today a Zuni hospital, operated jointly by the BIA and the tribal government, and a branch of the University of New Mexico are located in the village. Modern building materials have taken the place of stone and adobe, two- and three-bedroom single-storied stand-alone homes spread out from the center of the village, and house trailers dot the landscape, providing inexpensive housing for young people. The choice of trailers instead of houses is dictated by the fact that they are the only kind of housing the banks in Gallup will finance because they can be moved off the reservation if a purchaser defaults on a loan. At the same time, the

tribal government is rebuilding the central plaza in the form of a more traditional multistoried pueblo. Although the village today suffers from the social ills common to rural small towns in America, the Zunis have managed to retain their land, their religion, their language, and their culture.

— *Barbara Tedlock*

See also **Native North American Religions; Native Peoples of the United States; Navajo**

Further Readings

Crampton, C. G. (1977). *The Zunis of Cibola.* Salt Lake City: University of Utah Press.

Tedlock, B. (1992). *The beautiful and the dangerous: Encounters with the Zuni Indians.* Albuquerque: University of New Mexico Press.

Tedlock, D. (1999). *Finding the center: The art of the Zuni storyteller.* Lincoln: University of Nebraska Press.

MASTER BIBLIOGRAPHY

Abbott, A. (2000). Indian ritual and belief: The keys of power. New Delhi: Manohar. Bhattacharya, N. N. (1975). Ancient Indian rituals and their social contents. New Delhi: Manohar Book Service.

Abdallatif, T. F., Mousa, S. E., & Elbassiony, A. (2003). Geophysical investigation for mapping the archaeological features at Qantir, Sharquiya, Egypt. Archaeological Prospection 10, 27–42.

Abdel-Massih, E. T., Melika, Fr. M. M., & Michail, Fr. R. S. (1982). The divine liturgy of St. Basil the Great. Troy, MI: St. Mark Coptic Orthodox Church.

Academy of Sciences, Mongolian People's Republic. (1990). Information Mongolia. New York: Pergamon.

Achebe, C. (1986). *The world of the Ogbanje.* Enugu, Nigeria: Fourth Dimension.

Ackerman, R. (1987). *J. G. Frazer and his work.* Cambridge: Cambridge University Press.

Ackril, J. L. (1981). *Aristotle, the philosopher.* Oxford: Oxford University Press.

Acropolis Restoration Project, Government of Greece website: http://ysma.culture.gr/english/index.html

Adams, R. E. W. (1991). Prehistoric Mesoamerica (rev. ed.). Norman: University of Oklahoma Press.

Adams, W. Y. (1998). *The philosophical roots of anthropology.* Stanford, CA: CSLI.

Adkins, L., & Adkins, R. A. (1994). Handbook to life in ancient Rome. New York & Oxford: Oxford University Press.

Adler, M. A. (Ed.). (1996). *The prehistoric pueblo world A. D. 1150–1350.* Tucson: University of Arizona Press.

Adler, P. A., & Adler, P. (2002). *Constructions of deviance: Social power, context, and interaction.* Belmont, CA: Wadsworth.

Adler, P., & Barnard, N. (1992). *African majesty: The textile art of the Ashanti and Ewe.* London: Thames & Hudson.

Adovasio, J. M., & Page, J. (2002). The first Americans: In pursuit of archaeology's greatest mystery. New York: Modern Library.

Agar, M. (1994). Language shock: The culture of conversation. New York:William Morrow.

Agar, M. H. (1985). *Speaking of ethnography.* Beverly Hills, CA: Sage.

Ager, D. (1993). *The new catastrophism.* New York: Cambridge University Press.

Agrawal, D. P., & Kharalwal, J. S. (2003). Bronze and Iron Ages in South Asia. New Delhi: Aryan Books International.

Aguilar, M. (Ed.). (1998). *The politics of age and gerontocracy in Africa: Ethnographies of the past andmemories of the present.* Lawrenceville, NJ: Africa World Press.

Agustí, J., & Moyà-Solá, S. (1987). Sobre la identidad del fragmento atribuido a *Homo sp.* de Venta Micena (Orce, Granada). *Estudios Geológicos, 45,* 535–538.

Agyeman, J., Bullard, R. D., & Earthscan, B. E. (Eds.). (2003). *Just sustainabilities: Development in an unequal world.* Cambridge: MIT Press.

Aiello, L., & Dean, C. (1990). *An introduction to human evolutionary anatomy.* San Diego: Academic Press.

Akazawa, T., Aoki, K., & Bar Yosef, O. (Eds.). (1998). *Neandertals and modern humans in Western Asia.* New York: Plenum Press.

Akkermans, P., & Schwartz, G. (2004). *The archaeology of Syria: From complex Huntergatherers to early urban societies (c. 16,000–300 BC).* Cambridge: Cambridge University Press.

Albanese, C. L. (2002). *Reconsidering nature religion.* Harrisburg, PA: Trinity Press International.

Albarella, U. (Ed.). (2001). *Environmental archaeology: Meaning and purpose.* London: Kluwer.

Albert, S., & Cattell, M. (1994). *Old Age in global perspective.* New York: G. K. Hall.

Alberts, B., Johnson, A., Lewis, J., Raff, K., Roberts, K., & Walter, P. (2002). *Molecular biology of the cell* (4th ed.). New York: Garland.

Albritton, C. C. Jr. (Ed.). (1975). *Benchmark papers in geology* (Vol. 13). Stroudsburg, PA: Dowden, Hutchinson & Ross.

Alcock, J. (2001). *The triumph of sociobiology.* Oxford: Oxford University Press.

Alekshin,V. A. (1983). Burial customs as an archaeological source. *Current Anthropology, 24*(2), 137–149.

Allan, J. (2005). *Persian steel: Masterpieces of Iranian art.* London: I. B. Tarus.

Allen, C. (2002). *Blood narrative: Indigenous identity in American Indian and Māori literary and activist texts.* Durham, NC: Duke University Press.

Allen, C. J. (1988). *The hold life has: Coca and Cultural Identity in an Andean community.* Washington DC: Smithsonian Institution Press.

Allen, J., & White, J. P. (1989). The Lapita homeland: Some new data and an interpretation. *Journal of the Polynesian Society, 98,* 129–146.

Allen, J. (1999). *Middle Egyptian: An introduction to the language and culture of hieroglyphics.* Cambridge: Cambridge University Press.

Allen, V. L. (1970). *Psychological factors in poverty.* Chicago: Markham.

Alliare, Y., & Firsirotu, M. E. (1984). Theories of organizational culture. *Organizational Science, 5*(3), 193–226.

Alligood, K. T., Sauer, T. D., & Yorke, J. A. (1996). *Chaos: An introduction to dynamical systems.* New York: Springer.

Allison, H. (1990). *Kant's theory of freedom.* Cambridge: Cambridge University Press.

Allman, J. (1999). *Evolving brain.* New York: Scientific American Library.

Allman, J., & Victoria Tashjian,V. (2000). "*I will not eat stone": A women's history of colonial Asante.* Portsmouth, NH: Heinemann.

Almond, G., Powell, B., Strøm, K., & Dalton, R. J. (2004). *Comparative politics: A theoretical framework.* Lexington, MA: Addison Wesley Longman, Inc.

Alterman, L., Doyle, G. A., & Izard, M. K. (Eds.). (1995). *Creatures of the dark: The nocturnal prosimians.* New York: Plenum.

Altermann, L. W., & Corcoran, P. (Eds.). (2002). *Precambrian sedimentary environments.* Oxford: Blackwell.

Alters, B. J., & Alters S. M. (2001). *Defending evolution: A guide to the creation/evolution controversy.* Boston: Jones & Bartlett.

Altmann, A. (1998). *Foraging for survival: Yearling baboons in Africa.* Chicago: University of Chicago Press.

Altmann, J. (1980). *Baboon mothers and infants.* Cambridge, MA: Harvard University Press.

Altmann, S., & Altmann, J. (1970). *Baboon ecology: African field research.* Chicago: University Chicago Press.

Alvard, M. (Ed.). (2004). *Socioeconomic aspects of human behavioral ecology.* Amsterdam: Elsevier.

American Anthropological Association. (1998). *Code of Ethics of the American Anthropological Association.* Washington, DC: Author.

American Association of University Women. (1997). *Affirmative action* [position paper]. Washington, DC: Author.

Amick, D. S. (Ed.). (1999). *Folsom lithic technology: Explorations in structure and variation* (Archaeological Series No. 12). Ann Arbor, MI: International Monographs in Prehistory.

Amit-Talai,V., & Wulff, H. (Eds.). (1995). *Youth cultures: A cross-cultural perspective.* New York: Routledge.

Andersen, G. (Ed.). (2004). *Reinventing the museum: Historical and contemporary perspectives on the paradigm shift.* Walnut Creek, CA: AltaMira.

Andersen, M. L., & Taylor, H. (2000). *Sociology understanding a diverse society.* Belmont, CA: Wadswoth/ Thompson Learning.

Anderson, A. (1991). The chronology of colonization in New Zealand. *Antiquity, 65,* 767–795.

Anderson, A. (2004). *An introduction to Pentecostalism.* Cambridge, UK: Cambridge University Press.

Anderson, B. R. O'G. (1991). *Imagined communities: Reflections on the origin and spread of nationalism.* New York: Verso.

Anderson, D. G. (2000). *Identity and ecology in Arctic Siberia: The number one reindeer brigade.* Oxford: Oxford University Press.

Anderson, M. & Halpin, M. (Eds.), (2000). *Potlatch at Gitsequkla: William Beynon's 1945 field notebooks,* Vancouver, BC: University of British Columbia Press.

Anderson, P. (1999). Complexity theory and organizational science. *Organization Science, 10*(3) 216–232.

Anderson, R. L., & Field, K. L. (Eds.). (1993). *Art in small-scale societies: Contemporary readings.* Englewood Cliffs, NJ: Prentice Hall.

Andrist, R. (1964). *The long death: The last days of the Plains Indians.* New York: Macmillan.

Angrosino, M. V. (2002). *Doing cultural anthropology: Projects for ethnographic data collection.* Prospect Heights, IL:Waveland Press.

Anson, B. (1970). *The Miami Indians.* Norman: University of Oklahoma Press. (Reprinted in 1999)

Anton, J. (1969). Human excellence. In P. Kurtz (Ed.), *Moral problems in contemporary society* (pp. 116–34). Englewood Cliffs, NJ: Prentice Hall.

Antoni, C. (1962). *From history to sociology: The transition in German historical thinking.* London. Merlin Press.

Apel, K. (1998). *Aueinandersetzungen* (*Debates*). Frankfurt-am-Main: Suhrkamp.

Appadurai, A. (Ed.). (1986). *The social life of things: Commodities in cultural perspective.* Cambridge: Cambridge University Press.

Appadurai. A. (1996). *Modernity at large: Cultural dimensions of globalization.* Minneapolis: University of Minnesota Press.

Applebaum, H. A. (Ed.). (1984). *Work in market and industrial societies.* Albany: State University of New York Press.

Applebaum, H. A. (Ed.). (1984). *Work in non-market and transitional societies.* Albany: State University of New York Press.

Archer, M. (2000). *Being human: The problem of agency.* Cambridge: Cambridge University Press.

Archer, M. (2003). *Structure, agency, and the internal conversation.* Cambridge: Cambridge University Press.

Archer, M., Bhaskar, R., Collier, A., Lawson, T., & Norrie, A. (1998). (Eds.). *Critical realism: Essential readings.* London & New York: Routledge.

Archibugi, D. (1993). The reform of the U. N. and cosmopolitan democracy: A critical review. *Journal for Peace Research, 3*(3).

Ardell, D. B., & Langdon J. G. (1989). *Wellness, the body, mind, and spirit.* Dubuque, IA: Kendall/Hunt.

Ardrey, R. (1963). *African genesis: A personal investigation into the animal origins and nature of man.* New York: Delta Books.

Ardrey, R. (1966). *The territorial imperative.* New York: Atheneum.

Ardrey, R. (1970). *The social contract: A personal inquiry into the evolutionary sources of order and disorder.* New York: Atheneum.

Arendt, H. (1976). *The origins of totalitarianism.* San Diego, CA: Harcourt Brace Jovanovich. (Original work published 1951)

Arens, W. (1979). *The man-eating myth: Anthropology and anthropophagy.* New York: Oxford University Press.

Arens, W. (1986). *The Original Sin: Incest and its meaning.* New York: Oxford University Press.

Arhin, K. (Ed.). (1993). *The life and work of Kwame Nkrumah.* Trenton, NJ: African World Press.

Aristotle. (1962). *Nicomachean ethics* (M. Ostwald, Trans.). Indianapolis and New York: Bobbs-Merrill.

Aristotle. (1995). Nichomachean ethics and politics. In S. M. Cohen, P. Curd, & C. D. C. Reeve (Eds.), *Readings in Ancient Greek philosophy: From Thales to Aristotle.* Indianapolis, IN: Hackett.

Aristotle. (1996). *The politics* (T. J. Saunders, Trans.). Oxford: Oxford University Press.

Arlotto, A. (1972). *Introduction to historical linguistics.* Boston: Houghton Mifflin.

Arnold, C. (1996). *Stories in stone: Rock art pictures of early Americans.* Boston, MA: Clarion Books.

Arnold, J. R., & Libby, W. F. (1951). Radiocarbon dates. *Science, 113,* 111–120.

Arnold, M. (1869). *Culture and anarchy: An essay in political and social criticism.* London: Smith, Elder.

Arnold, S. J. (1983). Morphology, performance, and fitness. *American Zoologist, 23,* 347–361.

Arnould, E., Price, L., & Zinkhan, G. (2002). *Consumers.* Boston: McGraw-Hill.

Arsuaga, J. L. (2002). *The Neanderthal's necklace: In search of the first thinkers.* New York: Four Walls Eight Windows.

Arsuaga, J. L., & Martínez, I. (2005). *The chosen species: The long march of human evolution.* Malden, MA: Blackwell.

Arsuaga, J. L., Carretero, J. M., Lorenzo, C., Garcia, A., Martínez, I., & Bermúdez de Castro, E. (1997). Size variation in Middle Pleistocene Humans. *Science,* 2777, 1086–1088.

Arsuaga, J. L., Martínez, I., Gracia, A., Carretero, J. M., & Carbonell, E. (1993). Three new human skulls from the Sima de los Huesos Middle Pleistocene site in Sierra de Atapuerca, Spain. *Nature, 362,* 534–537.

Arutyunov, S. (1993). Adaptivnoie znachenie kulturnogo polimorfizma [Adaptive meaning of cultural polymorphism]. *Etnograficheskoe obozrenie 3,* 41–56.

Asad, T. (1972). Market model, class structure and consent: A reconsideration of swat political organization. *Man,* New Series, *7*(1), 74–94.

Asch, T., Chagnon, N., & Neel, J. (1971). *Yanomama: A multidisciplinary study.* Washington, DC: U. S. Atomic Energy Commission Film.

Asfaw, B., White, T., Lovejoy, O., Latimer, B., Simpson, S., & Suwa, G. (1999). *Australopithecus garhi:* A new species of early hominid from Ethiopia. *Science, 284,* 629–635.

Ash, M. G. (1995). *Gestalt psychology in German culture, 1890–1967.* New York: Cambridge University Press.

Ashbourn, J. (2003). *Practical biometrics: From aspiration to implementation (Springer professional computing).* New York: Springer-Verlag.

Ashcroft, B., Griffiths, G., & Tiffin, H. (Eds.) (1995). *The post-colonial studies reader.* London: Routledge.

Assmuth, L. (1997). *Women's work, women's worth: Changing lifecourse in highland Sardinia.* Helsinki: Finnish Anthropological Society, Transactions No. 39.

Atran, S. (1998). Folk biology and the anthropology of science: Cognitive universals and cultural particulars. *Behavioral and Brain Sciences, 21,* 547–609.

Audi, R. (Ed.). (1995). *The Cambridge dictionary of philosophy.* Cambridge: Cambridge University Press.

Auel, J. M. (1980). *Clan of the cave bear.* New York: Crown.

Auel, J. M. (1983). *The valley of horses.* New York: Crown Publishers.

Auel, J. M. (1985). *The mammoth hunters.* New York: Crown Publishers.

Auel, J. M. (1990). *Plains of passage.* New York: Crown Publishers.

Auel, J. M. (2002). *The shelters of stone.* New York: Crown Publishers.

Aufderheide, A. C. (2003). *The scientific study of mummies.* Cambridge, UK: Cambridge University Press.

Aufrère, L. (1940). *Figures de préhistoriens: Boucher de Perthes.* Paris: Leroux Presses Universitaires.

Augé, M. (Ed.). (1975). Initiation au vocabulaire de la parenté. *Les domaines de la parenté* (pp. 7–57). Paris: Maspero.

Augé, M., & Herzlich, C. (1995). *The meaning of illness: Anthropology, history, and sociology.* New York: Harwood Academic Publishers.

Augusta, K. (1984). *Legends and myths in spiritual India.* Delhi, India: Discovery Publishing House.

Auletta, K. (1982). *The underclass.* New York: Random House.

Avise, J. C. (1994). *Molecular markers, natural history, and evolution.* New York: Chapman & Hall.

Axelrod, R. (1997). *The complexity of cooperation.* Princeton, NJ: Princeton University Press.

Axelrod, R., & Hamilton, W. D. (1981). The evolution of cooperation. *Science, 211,* 1390–1396.

Baba, M. L. (1998). Creating a global community of practicing anthropologists. *Human Organization 57*(3), 315–318.

Babbie, E. (2002). *The basics of social research* (2nd ed.). Belmont, CA:Wadsworth.

Babcock, B., & Parezo, N. (1988). *Daughters of the desert: Women anthropologists and the Native America Southwest, 1880–1980.* Albuquerque: University of New Mexico Press.

Babuta, S., & Bragard, J.-P. (1985). *Evil.* London: Weidenfeld & Nicolson.

Backus, G., Parker, R., & Constable, C. (1996). *Foundations of geomagnetism.* Cambridge: Cambridge University Press.

Bacquart, J.-B. (2002). *The tribal arts of Africa.* New York: Thames & Hudson.

Baer, H. A. (2001). *Biomedicine and alternative healing systems in America: Issues in class, race, ethnicity, and gender.* Madison: University of Wisconsin Press.

Baer, R. D., Bustillo, M., Lewis, H., Perry, W., Romeo, D., Slorah, P., & Willis, C. (1995). Applied anthropology: From the classroom to the community. *Human Organization 54*(3), 325–329.

Bagolini, B., & Schiavo, F. L. (Eds.). (1996). *The Copper Age in the Near East and Europe.* Forli, Italy: International Congress of Prehistoric and Protohistoric Sciences.

Bahn, P. G. (1996). *The Cambridge illustrated history of archaeology.* Cambridge: Cambridge University Press.

Bahn, P. G. (1998). *The Cambridge illustrated history of prehistoric art.* Cambridge, UK: Cambridge University Press.

Bahn, P. G. (Ed.) (1999). The Cambridge Illustrated History of Archaeology. Cambridge: Cambridge University Press.

Bahn, P., & Flenley, J. (2003). *The enigmas of Easter Island: Island on the edge.* New York: Oxford University Press.

Bahn, P., & Rosenfeld, A. (Eds.). (1991). *Rock art and prehistory.* Oxford: Oxbow Books.

Bahn, P., & Vertut, J. (2001). *Journey through the Ice Age.* Berkeley: University of California Press.

Bailey, F. G. (1969). *State gems and spoils.* New York: Schocken Books.

Bailey, G., & Peoples, J. (2002). *Essentials of cultural anthropology.* Belmont, CA: Wadsworth.

Baillie, J. (2000). *Hume on morality.* London/New York: Routledge.

Baker, A. (2004). *The Viking.* Hoboken, NJ: John Wiley.

Baker, H. D. R. (1979). *Chinese family and kinship.* New York: Columbia University Press.

Bakker, H. (1992). Introduction. In H. Bakker (Ed.), *The sacred centre as the focus of political interest* (pp. vii–xi). Groningen, The Netherlands: Egbert Forsten.

Balaam, D. N., & Veseth, M. (2005). *Introduction to international political economy* (3rd Ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Baldwin, D. (1985). *Economic statecraft.* Princeton NJ: Princeton University Press.

Balée, W. (1994). *Footprints of the forest: Ka'apor Ethnobotany—the historical ecology of plant utilization by an Amazonian people.* New York: Columbia University Press.

Balee, W. (Ed.). (1998). *Advances in historical ecology.* New York: Columbia University Press.

Balick M. J., & Cox, P. A. (1996). *Plants, people, and culture: The science of ethnobotany.* New York: The Scientific American Library.

Balikci, A. (1970). *The Netsilik Eskimo.* Garden City, NY: Natural History Press.

Bamberger, J. (1974). The myth of matriarchy: Why men rule in primitive society. In M. Z. Rosaldo & L. Lamphere (Eds.), *Woman, culture and society.* Stanford: Stanford University Press.

Banh, P. G. (1995). Cave art without the caves. *Antiquity, 69,* 263.

Banks, J. (1994). *Teaching strategies for ethnic studies* (3rd ed.). Boston: Allyn & Bacon.

Banks, J. A. (1997). *Educating citizens in a multicultural society.* New York: Teachers College Press.

Banks, M., & Morphy, H. (Eds.). (1997). *Rethinking visual anthropology.* New Haven, CT: Yale University Press.

Banning, E. B. (2002). *Archaeological survey.* New York: Kluwer Academic/Plenum.

Banton, M. (1996). The cultural determinates of xenophobia. *Anthropology Today, 12*(2), 8–12.

Baradat, L. P. (2002). *Political ideologies: Their origins and impact* (8th ed.). Englewood Cliffs, NJ: Prentice Hall.

Bard, K. (Ed.). (1999). *Encyclopedia of the archaeology of Ancient Egypt.* London: Routledge.

Barfield, T. (Ed.). (1997). *The dictionary of anthropology.* Oxford, UK: Basil Blackwell.

Barfield, T. J. (1989). *The perilous frontier: Nomadic empires and China.* Oxford, UK: Basil Blackwell.

Barkan, S. E. (2001). *Criminology: A sociological understanding.* Upper Saddle River, NJ: Prentice Hall.

Barker, J. H. (1993). *Always getting ready: Upterrrlainarlut: Yup'ik Eskimo subsistence in southwest Alaska.* Seattle: University of Washington Press.

Barker, J. H., & Barker, R. (1993). *Always getting ready, Upterrlainarluta: Yup'Ik Eskimo subsistence in southwest Alaska.* Seattle: University of Washington Press.

Barker, P. (1993). *Techniques of archaeological excavation* (3rd ed.). London and New York: Routledge.

Barkow, J. H., Cosmides, L., & Tooby, J. (1992). *The adapted mind.* New York: Oxford University Press.

Barkow, J., Cosmides, L., & Tooby, J. (Eds.). (1992). *The adapted mind. Evolutionary psychology and the generation of culture.* New York: Oxford University Press.

Barnard, A. (2000). *History and theory in anthropology.* New York: Cambridge University Press.

Barnard, A. (2000). *Social anthropology: A concise introduction for students.* Taunton, MA: Studymates.

Barnard, A. (2004). Mutual aid and the foraging mode of thought: Re-reading Kropotkin on the Khoisan. *Social Evolution and History, 3*(1), 3–21.

Barnes, J. (1995). *The Cambridge companion to Aristotle.* Cambridge: Cambridge University Press.

Barnett, T., & Whiteside, A. (2002). *AIDS in the 21st century: Disease and globalization.* New York: Palgrave Macmillan.

Barnouw, V. (1977). *An introduction to anthropology: Ethnology.* Homewood, IL: Dorsey Press.

Baron, R. A., & Richardson, D. R. (1994). *Human aggression.* New York: Plenum Press.

Bar-Oz, G. (2005). *Epipaleolithic subsistence strategies in the Levant: A zooarchaeological perspective.* Leiden: Brill.

Barrett, L., Dunbar, R., & Lycett, J. (2001). *Human evolutionary psychology.* London: Palgrave Macmillan.

Barrett, L., Dunbar, R., & Lycett, J. (2002). *Human evolutionary psychology.* New York: Palgrave.

Barroso-Ruiz, C. (1984). Le gisement mousterian de la grotte du Boquete de Zafarraya (Alcaucin-Andalouise) [The Mousterian deposits from Zafarraya cave]. *L'Anthropologie, 88,* 133–134.

Barrow, J. (1990). *The world within the world.* Oxford: Oxford University Press.

Barrow, J., & Tipler, F. (1986). *The anthropic cosmological principle.* New York: Oxford University Press.

Bartholomew, R. (1995). *Audacious women.* Salt Lake City, UT: Signature Books.

Barua, P. S. K. (1994). *Buddhist thought and meditation in the nuclear age.* Taipei, Taiwan: Corporate Body of the Buddha Educational Foundation.

Bar-Yosef, O. (1980) Prehistory of the Levant. *Annual Review of Anthropology, 9,* 101–133.

Bar-Yosef, O., & Gopher, A. (Eds.). (1997). *An early Neolithic Village in the Jordan Valley, Part I: The archaeology of Netiv Hagdud.* Cambridge, MA: Peabody Museum of Archaeology and Ethnography, Harvard University and American School of Prehistoric Research.

Bar-Yosef, O., & Valla, F. R. (Eds.). (1991). *The Natufian culture in the Levant.* Ann Arbor, MI: International Monographs in Prehistory.

Bass, B., & Jefferson, J. (2003). *Death's acre: Inside the legendary forensic lab—The Body Farm—where the dead do tell tales.* New York: Putnam.

Bass, W. M. (1987). *Human osteology: A laboratory and field manual.* Columbia: Missouri Archaeological Society.

Basso, K. (1996). *Wisdom sits in places: Landscape and language among the western Apache.* Albuquerque: University of New Mexico Press.

Bates, D. G. (2005). *Human adaptive strategies: Ecology, culture, and politics* (3rd ed.). Boston: Allyn & Bacon.

Bates, D. G., & Lees, S. (1990). The ecology of cumulative change. In E. Moran (Ed.), *The ecosystem concept in anthropology* (2nd ed., pp. 247–278). Ann Arbor: University of Michigan Press.

Bates, D. G., & Rassam, A. (2001). *Peoples and cultures of the Middle East* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Bates, R. H. (1981). *Markets and states in tropical Africa.* Los Angeles: University of California Press.

Bateson, G., & Mead, M. (1942). *Balinese character.* New York: New York Academy of Sciences.

Bateson, M. C. (1984). *With a daughter's eye: A memoir of Margaret Mead and Gregory Bateson.* New York: William Morrow.

Baudrillard, J. (1983). *Simulations.* New York: Semiotext(e).

Baudrillard, J. (1988). *America* (Chris Turner, Trans.). New York: Verso.

Bauer, J., & Bell, D. (Eds.). (1999). *The East Asian challenge for human rights.* Cambridge, UK: Cambridge University Press.

Bauman, R. (1977). *Verbal art as performance.* Rowley, MA: Newbury House.

Bauman, Z. (1993). *Intimations of postmodernity.* New York: Routledge.

Beardsley, Monroe. (1966). *Aesthetics from classical Greece to the present: A short history.* New York: Macmillan.

Beattie, J. (1964). *Other cultures.* New York: Free Press.

Beatty, J. (1995). *Principles of behavioral neuroscience.* Dubuque, IA:Wm. C. Brown.

Beck, L. W. (1960). *A commentary on Kant's critique of practical reason.* Chicago: University of Chicago Press.

Beck, R. B. (2000). *The history of South Africa.* Westport, CT: Greenwood Press.

Becker, G. S. (1990). *The economic approach to human behavior.* Chicago: University of Chicago Press.

Becker, G. S. (1992, December 9). *The economic way of looking at life* (Nobel lecture). Chicago: Department of Economics, University of Chicago.

Becker, H. (1963). *Outsiders: Studies in the sociology of deviance.* New York: Free Press.

Begun, D. (2003). Planet of the apes. *Scientific American, 289*(2), 74–83.

Begun, D. R. (2002). European hominoids. In W. C. Hartwig (Ed.), *The Primate Fossil Record* (pp. 339–368). Cambridge: Cambridge University Press.

Begun, D. R., Ward, C. V., and Rose, M. D. (1997). *Function, phylogeny, and fossils: Miocene hominoid evolution and adaptations.* New York: Plenum Press.

Behar, R., & Gordon, D. (1996). *Women writing culture.* Berkeley: University of California Press.

Behar, R., & Gordon, M. (Eds.). (1995). *Women writing culture.* Berkeley: University of California Press.

Behrensmeyer, A. K., & Hill, A. P. (Eds.). (1988). *Fossils in the making: Vertebrate taphonomy and paleoecology.* Chicago: University of Chicago Press.

Behrensmeyer, A. K., Damuth, J. D., DiMichele, W. A., Potts, R., Sues, H.-D., & Wing Scott, L. (1992). *Terrestrial ecosystems through time: Evolutionary paleoecology of terrestrial plants and animals.* Chicago: University of Chicago Press.

Beiser, F. C. (Ed.). (1993). *The Cambridge companion to Hegel.* Cambridge: Cambridge University Press.

Bekoff, M., Allen, C., & Burghardt, G. M. (2002). *The cognitive animal.* Cambridge, MA: MIT Press.

Belfer-Cohen, A., & Hovers, E. (1992). In the eye of the beholder: Mousterian and Natufian burials in the Levant. *Current Anthropology, 33,* 463–471.

Belize UNESCO Commission. (1991). *Characters and caricatures in Belizean folklore.* Belize: Author.

Bell, C. (1997). *Ritual: Perspectives and dimensions.* New York: Oxford University Press.

Bell, D. (1993). *Communitarianism and its critics.* Oxford: Oxford University Press.

Bell, D. (2000). *The end of ideology: On the exhaustion of political ideas in the fifties* (rev. ed.). Cambridge, MA: Harvard University Press. (Original work published 1960)

Bell, P. A., Green, T. C., Fisher, J. D., & Baum, A. (1996). *Environmental psychology.* Orlando, FL: Harcourt Brace.

Bell, S., & Coleman, S. (Eds.). (1999). *The anthropology of friendship.* New York: Berg.

Bell, V. (1993). *Interrogating incest: Feminism, Foucault, and the law.* New York: Routledge.

Bellingham, D., Whittaker, C., & Grant, J. (1992). *Myths and legends: Viking, Oriental, Greek.* London: New Burlington Books.

Bellwood, P. (1979). *Man's conquest of the Pacific: The prehistory of Southeast Asia and Oceania.* New York: Oxford University Press.

Ben Rafael, E. (1997). *Crisis and transformation: The kibbutz at century's end.* Albany: State University of New York Press.

Benedict, J. (2003). *No bone unturned: The adventures of a top Smithsonian forensic scientist and the legal battle for America's oldest skeletons.* New York: HarperCollins.

Benedict, R. (1934). *Patterns of culture.* Boston: Houghton Mifflin.

Benedict, R. (1934/1959). *Patterns of culture.* New York: Mentor Books.

Benfey, P. (2004). *Genomics.* New York: Prentice Hall.

Bengtsson, T., & Saito, O. (Eds.). (2000). *Population and economy: From hunger to modern economic growth.* New York: Oxford University Press.

Bennett, C. L., Beukens, R. P., Clover, M. R., Elmore, D., Gove, H. E., Kilius, L., et al. (1978). Radiocarbon dating with electrostatic accelerators: Dating of milligram samples. *Science, 201,* 345–347.

Bennett, J. W. (1998). Applied and action anthropology: Ideological and conceptual aspects with a supplement: The career of Sol Tax and the genesis of action anthropology. In J. W. Bennett, L. A. Despres, & M. Nagai (Eds.), *Classic anthropology: Critical essays, 1944–1996* (pp. 315–358). New Brunswick, NJ: Transaction.

Bennett, M., & Sani, F. (Eds.). (2004). *The development of the social self.* New York: Psychology Press.

Ben-Rafael, E. (1994). *Language, identity, and social division.* New York: Oxford University Press.

Bentley, G. R., Jasienska, G., & Goldberg, T. (1993). Is the fertility of agriculturalists higher than that of nonagriculturalists? *Current Anthropology, 34,* 778–785.

Benton, M. J. (2003). *When life nearly died: The greatest mass extinction of all time.* New York: Thames & Hudson.

Ben-Zvi, Y. (2003). National appropriations and cultural evolution: The spatial and temporal U. S. of Lewis Henry Morgan's Native America. *Canadian Review of American Studies, 33,* 211–229.

Bereroglu, B. (2001). *Political sociology: A comparative/historical approach* (2nd Ed.). Dix Hills, NY: General Hall.

Beresford, M. W., & Hurst, J. (1991). *Wharram Percy: Deserted medieval village.* New Haven, CT: Yale University Press.

Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the sociology of knowledge.* Garden City, NY: Doubleday.

Berggren, W. A., & Van Couvering, J. A. (Eds.). (1984). *Catastrophes and earth history.* Princeton, NJ: Princeton University Press.

Bergman, B. (1996). *In defense of affirmative action.* New York: Basic Books.

Bergson, H. (1928). *Time and free will: An essay on the immediate data of consciousness* (R. L. Pogson, Trans.). New York:Macmillan.

Bergson, H. (1983). *Creative evolution* (A. Mitchell, Trans.). Lanham, MD: University Press of America. (Original work published 1911)

Bergson, H. (1998). *Creative evolution.* Mineola, NY: Dover. (Original work published 1907)

Bergson, H. (1998). *Creative evolution.* Mineola, NY: Dover. (Original work published 1907)

Bergson, H. (1998/1907). *Creative evolution.* Mineola NY: Dover.

Bergson, H.-L. (1998/1907). *Creative evolution.* New York: Dover Publications.

Berlin, B., & Berlin, E. A. (2004). Community autonomy and the Maya ICBG project in Chiapas, Mexico: How a bioprospecting project that should have succeeded failed. *Human Organization 63,* 472–486.

Berlin, B., & Kay, P. (1969). *Basic color terms: Their universality and evolution.* Berkeley: University of California Press.

Berlin, I. (1996). *Karl Marx: His life and environment* (4th ed.). Oxford, UK: Oxford University Press.

Berman, C. H. (2000). *The Cistercian evolution: The invention of a religious order in twelfth-century Europe.* Philadelphia: University of Pennsylvania Press.

Bermúdez de Castro, J. M., Arsuaga, J. L., Carbonell, E., Rosas, A., Martínez, I., & Mosquera, M. (1997). A hominid from the Lower Pleistocene of Atapuerca, Spain: Possible ancestor to Neandertals and modern humans. *Science, 276,* 1392–1395.

Bernal, J. D. (1954). *Science in history.* London: Watts.

Bernard P., Hunt, A. S., & Hogarth, D. G. (1900). *Fayûm towns and their papyri.* London: Egypt Exploration Fund.

Bernard, A. (2000). *History and theory in anthropology.* New York: Cambridge University Press.

Bernard, H. R. (1988). *Research methods in cultural anthropology.* Newbury Park, CA: Sage.

Bernard, H. R. (2000). *Social research methods: Qualitative and quantitative approaches.* Thousand Oaks, CA: Sage.

Bernard, H. R. (2001). *Research methods in anthropology: Qualitative and quantitative approaches* (3rd ed.). Walnut Creek, CA: AltaMira.

Bernstein, B. (1971). *Class, codes, and control: Theoretical studies towards a sociology of language.* New York: Schocken Books.

Berry, P., & Wernick, A. (Eds.). (1992). *Shadow of spirit: Postmodernism and religion,* New York: Routledge.

Berry, S. S. (2000). *Chiefs know their boundaries: Essays on property, power, and the past in Asante, 1896–1996.*

Bertman, S. (2003). *Handbook to life in ancient Mesopotamia.* New York: Facts on File.

Berwick, D. (1992). *Savages: The life and killing of the Yanomami.* London: Hodder and Stoughton.

Best, E. (1954). *Spiritual and mental concepts of the Māori* (Dominion Museum Monograph No. 2). Wellington, New Zealand: R. E. Owen.

Best, E. (1996). *Tuhoe: The children of the mist* (2 vols.). Auckland, New Zealand: Reed Books. (Original work published 1925)

Bever, E. (1996). *African Americans and civil rights: From 1619 to the present.* Phoenix, AZ: Oryx Press.

Bhaskar, R. (1975). *A Realist theory of science.* London: Verso.

Bhaskar, R. (1989). *Reclaiming reality.* London: Verso.

Bhattacharya, N. N. (1999). *The Indian mother goddess.* New Delhi:Manohar Book Service.

Bibikov, S. N. (1969). Nekotorye aspekty paleoeconomicheskogo modelirovaniya paleolita [Some aspects of palaeoeconomic modelling of Paleolithic]. *Sovetskaya Archeologia, 4,* 5–22.

Bickerton, D. (1990). *Language and species.* Chicago IL: University of Chicago Press.

Bickerton, D., & Calvin, W. (2000). *Lingua ex machina: Reconciling Darwin and Chomsky with the human brain.* Cambridge, MA: MIT Press.

Biddle, M. (2004). Winchester. In P. Bogucki & P. J. Crabtree (Eds.), *Ancient Europe 8000 B. C.-A. D. 1000: Encyclopedia of the barbarian world* (Vol. 2, pp. 501–507). New York: Scribners.

Bierstedt, R. (1970). *The social order* (3rd ed.). New York: McGraw Hill.

Binford, L. R. (1978). *Nunamiut ethnoarchaeology.* New York: Academic Press.

Binford, L. R. (1981). *Bones: Ancient men and modern myths.* New York: Academic Press.

Binford, L. R. (1983). *In pursuit of the past.* New York: Thames & Hudson.

Binford, L. R. (2001). *Constructing frames of reference: An analytical method for archaeological theory build using hunter-gatherer and environmental data sets.* Berkeley: University of California Press.

Bingham, A. M. (1989). *Portrait of an explorer: Hiram Bingham, discover of Machu Picchu.* Ames: Iowa State University Press.

Bingham, H. (1948). *Lost city of the Incas.* New York: Athenium.

Bingham, H. (1951). *Lost city of Machu Picchu and its builders.* London: Phoenix House.

Bingham, H. (1979). *Machu Picchu, A citadel of the Incas.* New York: Hacker Arts Books.

Bininda-Emonds, O. R. P., Gittleman, J. L., & Kelly, C. K. (2001). Flippers versus feet: Comparative trends in aquatic and non-aquatic carnivores. *Journal of Animal Ecology, 70,* 386–400.

Bird, C., Conrad, P., & Fremont, A. (Eds.). (1999). *Handbook of medical sociology* (5th ed.). Englewood Cliffs, NJ: Prentice Hall.

Birren, J. E. (Ed.). (1996). *Encyclopedia of gerontology: Age, aging and the aged.* San Diego: Academic Press.

Birx, H. J. (1984). *Theories of evolution.* Springfield IL: Charles C Thomas.

Birx, H. J. (1988). *Human evolution.* Springfield, IL: Charles C Thomas.

Birx, H. J. (1991). *Craniometry of the Orchid Site Ossuary, Fort Erie, Ontario.* Buffalo, NY: Persimmon Press.

Birx, H. J. (1991). *Interpreting evolution: Darwin & Teilhard de Chardin.* Amherst, NY: Prometheus Books.

Birx, H. J. (2000, October/November). Nietzsche & evolution. *Philosophy Now, 29.*

Biskamp, D. (2003). *Magnetohydrodynamic turbulence.* Cambridge: Cambridge University Press.

Bisson, M. S., De Barros, P., Holl, A. F. C., & Childs, S. T. (2000). *Ancient African metallurgy: The sociocultural context.* Walnut Creek, CA: AltaMira.

Black, D. (1933). *Geological memoirs: Fossil man in China.* Peiping. China: Geological Survey and the Section of Geology of the National Academy of Peiping.

Blackburn, S. (1999). *Think: A compelling introduction to philosophy.* Oxford: Oxford University Press.

Blackburn, S. H., et al. (1989). *Oral epics in India.* Berkeley: University of California Press.

Blacking, J. (1973). *How musical is man?* Seattle: University of Washington Press.

Blackmore, S. J. (1999). *The meme machine.* Oxford, UK: Oxford University Press.

Blades, B. S. (1999). Aurignacian settlement patterns in the Vézère Valley. *Current Anthropology 40,* 712–719.

Blades, B. S. (2001). *Aurignacian lithic economy: Ecological perspectives from southwestern France.* New York: Kluwer Academic/Plenum.

Blair, G. A. (1992). *Energeia and entelecheia: "Act" in Aristotle.* Ottawa, Canada: University of Ottawa Press.

Blake, E., & Knapp, A. B. (Eds.). (2005). *The archaeology of Mediterranean prehistory.* Oxford: Basil Blackwell.

Blanc, S. C. (1994). *Urban children in distress: Global predicaments and innovative strategies.* Grey, Switzerland: Gordon & Breach.

Bloch, M. (1983). *Marxism and anthropology: The history of a relationship.* Oxford, UK: Oxford University Press.

Bloch, M., & Parry, J. (1982) *Death and regeneration of life.* Cambridge: Cambridge University Press.

Bloom, H. (1999). *George Orwell's Animal Farm: Modern critical interpretations.* Philadelphia: Chelsea House.

Bloomfield, L. (1933). *Language.* New York: Henry Holt.

Blum, D. (2002). *Love at Goon Park: Harry Harlow and the science of affection.* Cambridge, MA: Perseus.

Blumenbach, J. F. (1969). *On the natural varieties of mankind.* New York: Bergman.

Blunt, W. (1971). *The compleat naturalist: A life of Linnaeus.* New York: Viking.

Boas, F. (1928). *Anthropology and modern life.* New York: Norton.

Boas, F. (1940). *Race, language, and culture.* New York: Free Press.

Boas, F., & Powell, J. W. (1991). Introduction. In F. Boas, J. W. Powell, & P. Holder (Eds.), *The handbook of American Indian languages and Indian linguistic families of America north of Mexico.* Lincoln: University of Nebraska Press.

Boaz, F. (1975). *Kwakiutl culture as reflected in mythology.* Millwood, NY: Kraus Reprint.

Bock, P. (1999). *Rethinking psychological anthropology.* Prospect Heights, IL: Waveland.

Bock, P. K. (Ed.). (1970). *Culture shock: A reader in modern cultural anthropology.* New York: Knopf.

Bodley, J. H. (1997). *Cultural anthropology: Tribes, states, and the global system.* Mountain View, CA: Mayfield.

Bodley, J. H. (2000). *Anthropology and contemporary human problems* (4th ed.). Mountain View, CA:

Bodley, John H. (1999). *Victims of progress* (4th ed.). Mountain View, CA: Mayfield.

Boehm, C. (1984). *Blood revenge: The anthropology of feuding in Montenegro and other tribal societies.* Lawrence: University of Kansas Press.

Boesch, C. (2000). *Behavioral diversity in chimpanzees and bonobos.* Cambridge, UK: Cambridge University Press.

Boesch, C., & Hohmann, G. (Eds.). (2002). *Behavioural diversity in chimpanzees and bonobos.* Cambridge: Cambridge University Press.

Boesch, C., Gottfried, H., & Marchant, L. F. (2002). *Behavioural diversity in chimpanzees and bonobos.* Cambridge: Cambridge University Press.

Boesch, Christophe, & Boesch-Achermann, Hedwige. (2000). *The chimpanzees of the Tai Forest.* New York: Oxford University Press.

Boggs, C. (1985). *The two revolutions: Antonio Gramsci and the dilemmas of Western Marxism.* Cambridge, MA: South End Press.

Boggs, S., Jr. (2001). *Principles of sedimentology and stratigraphy* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.

Bohannan, P. (1957). *Justice and judgment among the Tiv.* London: Oxford University Press.

Bohannan, P. (1957). *Justice and law among the Tiv.* London: Oxford University Press.

Bohannan, P. (1963). *Social anthropology.* Holt, Rinehart & Winston.

Bohannan, P., & Glazer, M. (1988). *High points in anthropology.* New York: Alfred A. Knopf.

Boldurian, A. T., & Cotter, J. L. (1999). *Clovis revisited: New perspectives on Paleoindian adaptations from Blackwater*

Draw, New Mexico. Philadelphia: University of Pennsylvania, University Museum.

Bolle, R. M., Connell, J. H., Pankanti, S., Ratha, N. K., & Senior A. W. (2003). *Guide to biometrics.* New York: Springer.

Bongaarts, J. (1997). The role of family planning programs in contemporary fertility transitions. In G. W. Jones, J. C. Caldwall, R. M. Douglas, & D'Souza (Eds.), *The continuing demographic transition.* Oxford: Oxford University Press.

Bongaarts, J., & Bulatao, R. (2000). *Beyond six billion: Forecasting the world's population.* Washington DC: National Academic Press.

Bongioanni, A., & Croce, M. S. (Eds.). (2001). *The treasures of Ancient Egypt from the Cairo Museum.* New York: Universe.

Bonvillain, N. (1998). *Women and men: Cultural constructs of gender.* Upper Saddle River, NJ: Prentice Hall.

Bookchin, M. (1981). *The ecology of freedom.* Palo Alto, CA: Cheshire Books.

Booth, A., Shelley, G., Mazur, A., Tharp, G., & Kittok, R. (1989). Testosterone and winning and losing in human competition. *Hormones and Behavior, 23,* 556–571.

Bordes, F. (1980). Levallois debitage and its variants. *Bulletin of the Society for Prehistoric France, 77,* 45–49.

Borges, J. L. (1999). *Everything and nothing* (D. A. Yates, Trans.). New York: New Directions.

Bornemann, F. (1982). *P. Wilhelm Schmidt S. V. D. 1868–1954.* Rome: Apud Collegium Verbi Divini.

Borofsky, R. (2004). *Yanomami: The fierce controversy and what we can learn from it.* Berkeley: University of California Press.

Borofsky, R. (2005). *Yanomami: The fierce controversy and what we can learn from it.* Berkeley: University of California Press.

Bosch, E., et al. (1999). Variation in short tandem repeats is deeply structured by genetic background on the human Y chromosome. *American Journal of Human Genetics, 65,* 1623–1638.

Bostrom, N. (2002). *Anthropic bias: Observation selection effects in science and philosophy.* London: Routledge.

Botha, R. P. (2003). *Unravelling the evolution of language.* Oxford, UK: Elsevier.

Bottenheim, J. W. (2002). An introduction to the ALERT 2000 and SUMMIT 2000 Arctic research studies. *Atmospheric Environment 36,* 2467–2469.

Bottero, J. (2001). *Everyday life in ancient Mesopotamia.* Baltimore, MD: Johns Hopkins University Press.

Boucher de Perthes, J. (1847). *Antiquitès celtiques antèdiluviennes. Mèmoire sur l'industrie primitive et les arts à leur origine.* Paris: Treutel et Wurtz.

Bourdieu, P. (1977). Case study: Parallel-cousin marriage. In *Outline of a theory of practice.* Cambridge, UK: Cambridge University Press.

Bourdieu, P. (1977). *Outline of a theory of practice* (Richard Nice, Trans.). Cambridge, UK: Cambridge University Press. (Translation of *Esquisse d'une théorie de la pratique, précéde de trois études d'ethnologie kabyle,* 1973)

Bourdieu, P. (1977). *Reproduction in education, society, and culture.* London: Sage.

Bourdieu, P. (1987). *Distinction: A social critique of the judgement of taste* (Richard Nice, Trans.). Cambridge, MA: Harvard University Press.

Bourdieu, P., with Wacquant, L. (1992). *An invitation to reflexive sociology.* Chicago: University of Chicago Press.

Boutros-Ghali, B. (1992). *An agenda for peace: Preventive diplomacy and peace keeping.* New York: United Nations Press.

Bouvier, L., & Bertrand, J. (1999). *World population: Challenges for the 21st century.* Santa Ana, CA: Seven Locks Press.

Bowen, J. R. (2004). *Religion in practice: An approach to the anthropology of religion* (2nd ed.). Needham, MA: Allyn & Bacon.

Bowie, F. (2000). *The anthropology of religion.* Oxford: Blackwell.

Bowker, G. (2003). *Inside George Orwell, A biography.* New York: Palgrave MacMillan.

Bowler, J. M. (2003). New ages for human occupation and climate change at Lake Mungo, Australia. *Nature, 421,* 837–840.

Bowler, P. (1992). *The non-Darwinian revolution.* Baltimore & London: Johns Hopkins University Press.

Bowler, P. J. (1990). *Charles Darwin: The man and his influence.* Cambridge: Cambridge University Press.

Boyd, F. W. (1990). Towards a conceptual framework for environmental archaeology: Environmental archaeology as a key to past environment. *Circaea,* 7, 63–79.

Boyd, R., & Richerson, P. J. (2005). *The origin and evolution of cultures.* New York: Oxford University Press.

Boyd, R., & Silk, J. B. (2003). *How humans evolved* (3rd ed.). New York: Norton.

Boyer, P. (2001). *Religion explained: The evolutionary origins of religious thought.* New York: Basic Books.

Boyle, K. (2004). *Arc of justice: A saga of race, civil rights, and murder in the jazz age.* New York: Henry Holt.

Boyle, N. (2000). *Goethe: The poet and the age* (3 vols.). New York: Oxford University Press.

Brace, C. L. (1963). Structural reduction in evolution. *American Naturalist, 97,* 39–49.

Brace, C. L. (1964). The fate of the "classic" Neandertals: A consideration of hominid catastrophism. *Current Anthropology, 5*(1), 3–43.

Brace, C. L. (1995). *The stages of human evolution.* Englewood Cliffs, NJ: Prentice Hall.

Brace, C. L. (2005). *Race is a four-letter word: The genesis of the concept.* Oxford, UK: Oxford University Press.

Bradie, M. (1986). Assessing evolutionary epistemology. *Biology & Philosophy, 1,* 401–459.

Bradie, M. (1994). *The secret chain: evolution and ethics, SUNY series in philosophy and biology.* New York: *SUNY* Press.

Bradley, R. (1998). *The significance of monuments: On the shaping of human experience in Neolithic and Bronze Age Europe.* New York: Routledge.

Braidwood, L. S. (1953). *Digging beyond the Tigris.* New York: H. Schuman.

Braidwood, L. S., et al. (Eds.). (1983). *Prehistoric archeology along the Zagros Flanks.* Chicago: Oriental Institute of the University of Chicago.

Braidwood, R. J. (1937). *Mounds in the plain of Antioch: An archaeological survey* (University of Chicago Oriental Institute Publications,Vol. 68). Chicago: University of Chicago Press.

Braidwood, R. J. (1962). *Courses toward urban life.* New York: Academic Press.

Braidwood, R. J. (1967). *Prehistoric men.* Glenview, IL: Scott Foresman.

Braidwood, R. J., & Braidwood, L. (1950). Jarmo: A village of early farmers in Iraq. *Antiquity 24,* 189–195.

Braidwood, R. J., & Howe, B. (1960). Prehistoric investigations in Iraqi Kurdistan. *Studies in Ancient Oriental Civilizations (31).* Chicago: University of Chicago Press.

Brandewie, E. (1983). *Wilhelm Schmidt and the origin of the idea of God.* New York: University Press of America.

Brandewie, E. (1990). *When giants walked the earth: The life and times of Wilhelm Schmidt, SVD.* Fribourg, Switzerland: University Press.

Brass, M. (2003). Tracing the origins of the ancient Egyptian cattle cult. In A. Eym & C. A. Bennett (Eds.), *A Delta-man in Yebu: Occasional volume of the Egyptologists' electronic forum* (No. 1. pp. 101–110). Parkland, FL: Universal Publishers.

Bremmer, D. (2002). *Does stress damage the brain? Understanding trauma-related disorders from a mind-body perspective.* New York: Norton.

Brereton, D. P. (2004). Preface for a critical realist ethnology, Part I: The schism and a realist restorative. *Journal of Critical Realism, 3,* 77–102.

Brettell, C. B., & Hollifield, J. (Eds.). (2000). *Migration theory: Talking across disciplines.* London: Routledge.

Brettell, C. B., & Sargent, C. F. (Eds.). (1993). *Gender in cross-cultural perspective.* Englewood Cliffs NJ: Prentice Hall.

Breuil, H. (1965). *The men of the Old Stone Age (Palaeolithic & Mesolithic).* New York: St. Martin's. Original work published 1951.

Breuil, H. (1979). *Four hundred centuries of cave art.* New York: Hacker Art Books. (Original work published 1952)

Brian, D. (1996). *Einstein: A life.* New York:Wiley.

Briggs, D., & Crowther, P. R (Eds.). (1993). *Palaeobiology: A synthesis.* Cambridge: Blackwell.

Briggs, J. (1970). *Never in anger: Portrait of an Eskimo family.* Cambridge, MA: Harvard University Press.

Briggs, J. L. (1991). Expecting the unexpected: Canadian Inuit training for an experimental lifestyle. *Ethos, 19,* 259–287.

Briggs, J. L. (1998). *Inuit morality play: The emotional education of a three-year-old.* New Haven, CT: Yale University Press and St. John's:Memorial University, ISER Books.

Bright, J. (1981). *A history of Israel.* Philadelphia: Westminster Press.

Bright, M. (2000). *Gorillas: The greatest apes.* London: Toucan Books.

Brink, P. (1976). *Transcultural nursing: A book of readings.* Englewood Cliffs, NJ: Prentice Hall.

Brinton, C., Christopher, J. B., & Wolff, R. L. (1957). *Modern civilizations in history of the last five centuries.* Upper Saddle River, NJ: Prentice Hall.

Briones, C., & Lanata, J. L. (Eds.). (2002). *Archeological and anthropological perspectives on the native peoples of Pampa, Patagonia, and Tierra del Fuego to the nineteenth century.* Westport, CT: Bergin & Garvey.

Broderick, A. H. (1963). *Father of prehistory–The Abbé Henri Breuil: His life and times.* New York:William Morrow.

Brooker, P. (2000). *Nondemocratic regimes: Theory, government, and politics.* Houndmills, UK: Macmillan.

Brooks, S. T. (1970). Theodore D. McCown, 1908–1969. *American Journal of Physical Anthropology, 32,* 165–166.

Broome, R. (2002). *Aboriginal Australians: Black responses to white dominance, 1788–2001.* St. Leonards, Australia: Allen & Unwin.

Broude, G. (1994). *Marriage, family and relationships: A cross-cultural encyclopedia.* Santa Barbara, CA: ABC-CLIO.

Brown, C. H. (1999). *Lexical acculturation in Native American languages.* Oxford, UK: Oxford University Press.

Brown, G. S. (2005). *Toussaint's clause: The founding fathers and the Haitian revolution.* Jackson: University of Mississippi Press.

Brown, J. (1955). *Kierkegaard, Heidegger, Buber, & Barth.* New York: Collier Books.

Brown, J. E. (1953). *The sacred pipe: Black Elk's account of the seven rites of the Oglala Sioux.* Norman: University of Oklahoma Press.

Brown, L. R., Gardner, G., & Halweil, B. (1999). *Beyond Malthus: Nineteen dimensions of the population challenge.* New York: Norton.

Brown, M. F. (1986). *Tsewa's gift: Magic and meaning in an Amazonian society.* Washington, DC: Smithsonian Institution Press.

Brown, M. F. (2003). *Who owns native culture?* Cambridge, MA: Harvard University Press.

Brown, T. A. (2002). *Genomes.* Hoboken, NJ: Wiley.

Brown, W. M., George, M., Jr., & Wilson, A. C. (1979). Rapid evolution of mitochondrial DNA. *Proceedings of the National Academy of Sciences USA, 76,* 1967–1971.

Browne, D. M. (2002). *The Nascas.* Oxford, UK: Basil Blackwell.

Browne, E. J. (1996). *Charles Darwin: Voyaging.* Princeton, NJ: Princeton University Press.

Browne, E. J. (2003). *Charles Darwin: The power of place.* Princeton, NJ: Princeton University Press.

Brubaker, R. (2004). *Ethnicity without groups.* Cambridge, MA: Harvard University Press.

Bruce, C. R. (Ed.). (1999). *The essential writings of Raja Rammohan Ray.* New Delhi: Oxford University Press.

Brues, A. (1977). *People and races.* Prospect Heights, IL:Waveland Press.

Bruner, J. (1999). *The culture of education.* Cambridge, MA: Harvard University Press.

Brunet, M., Guy, F., Pilbeam, D., Mackaye, H. Likius, A., Ahounta, D., et al. (2002). A new hominid from the Upper Miocene of Chad Central Africa. *Nature, 418,* 145–151.

Brunn, O., & Odgaard, O. (Eds.). (1996). *Mongolia in transition: Old patterns, new challenges.* Richmond, UK: Curzon Press.

Bruno, G. (1964). *Cause, principle, and unity.* New York: International Publishers.

Bruno,V. J. (1996). *The Parthenon: Illustrations, introductory essay, history, archeological analysis, criticism* (2nd ed.). New York: Norton.

Brunvand, J. (1998). *The study of American folklore* (4th ed.). New York: W. W. Norton.

Bryan, E. H. Jr., & Emory, K. P. (1986). *The natural and cultural history of Honaunau, Kona, Hawai'i.* Honolulu, HI: Bernice Pauahi Bishop Museum.

Bub, J. (1997). *Interpreting the quantum world.* Cambridge, UK: Cambridge University Press.

Buber, M. (2000). *I and Thou.* New York: Scribner.

Buchanan, A., Brock, D. W., Daniels, N., & Wikler, D. (2000). *From chance to choice. Genetics and justice.* Cambridge: Cambridge University Press.

Buck, C. D. (1988). *A dictionary of selected synonyms in the principal Indo-European languages.* Chicago: University of Chicago Press. (Original work published 1949)

Buckser, A., & Glazier, S. D. (Eds.). (2003). *The anthropology of religious conversion.* Lanham, MD: Rowman & Littlefield.

Buechel, E. S. J. (1974). *Rosebud and Pine Ridge photographs, 1922–1942.* El Cajon, CA: Grossmont College Development Foundation.

Buffetaut, E. (1987). *A short history of vertebrate palaeontology.* Kent: Croon Helm.

Buikstra, J. E., & Ubelaker, D. H. (1994). *Standards for data collection from human skeletal remains.* Fayetteville: Arkansas Archeological Survey.

Bullard, R. (2000). *Dumping in Dixie: Race, class and environmental quality.* Boulder, CO: Westview Press.

Bullock, A. (1985). *The humanist tradition in the West.* London & New York: Thames & Hudson.

Bunge, M. (2001). *Philosophy in crisis.* Amherst, NY: Prometheus.

Burch, E. S. (1998). *The Inupiaq Eskimo nations of northwest Alaska.* Fairbanks: University of Alaska Press.

Burger, R. 1995. *Chavin and the Origins of Andean Civilization.* London: Thames and Hudson.

Burger, R. L., & Salazar, L. C. (2004). *Machu Picchu: Unveiling the mystery of the Incas.* New Haven, CT: Yale University Press.

Burgers, C. (2003). *The age of Stonehenge.* Edison, NJ: Castle Books.

Burgess, S. M., & Van Der Maas, E. M. (Eds). (2002). *The new international dictionary of Pentecostal and charismatic movements,* (Rev. Ed.). Grand Rapids, MI: Zondervan.

Burke, J., & Ornstein, R. (1997). *The axemaker's gift: Technology's capture and control of our minds and culture.* New York: Putnam Books.

Burland, C., Nicholson, I., & Osborne, H. (1970). *Mythology of the Americas.* London: Hamlyn Publishing.

Burniske, R. W., & Monke, L. (2001). *Breaking down the digital wall: Learning to teach in a post-modern world.* Albany: State University of New York Press.

Burston, W. H., & Thompson, D. (1967). *Studies in the nature and teaching of history.* London: Routledge & Kegan Paul.

Bushmeat Crisis Task Force. (2000, April). *The role of the logging industry* (Fact sheet). Silver Spring, MD: Author.

Bushnell, J. (1976). The Art of Practicing Anthropology. In M. V. Argrosino (Ed.), *Do applied anthropologists apply anthropology?* (pp. 10–16). Athens: University of Georgia Press.

Buss, D. M. (1999). *Evolutionary psychology. The new science of the mind.* Boston, MA: Allyn & Bacon.

Butler, J. (2005). *Forensic DNA typing: Biology, technology, and genetics behind STR* markers (2nd ed.). New York: Academic Press.

Butzer, K. W. (1976). *Early hydraulic civilization in Egypt: A study in cultural ecology.* Chicago: University of Chicago Press.

Byers, A. M. (2004). *The Ohio Hopewell episode: Paradigm lost, paradigm gained.* Akron: University of Akron Press.

Byers, S. N. (2002). *Introduction to forensic anthropology: A textbook.* Boston: Allyn and Bacon.

Bynon, T. (1977). *Historical linguistics.* Cambridge: Cambridge University Press.

Byrne, D. (1998). *Complexity theory and the social sciences.* New York: Routledge.

Byrne, R. (1995). *The thinking ape.* Oxford, UK: Oxford University Press.

Caccone A., & Powel, J. R. (1989). How closely are humans related to other primates? DNA divergence among hominids. *Evolution 43*, 925–942. The Great Ape Trust of Iowa, http://www. iowagreatapes. org/primates/

Caffrey, M. M. (1989). *Ruth Benedict: A stranger in this land.* Austin: University of Texas Press.

Cahn, C. (Ed.). (2002). *Roma rights.* New York: International Debate Education Association.

Calhoun, C., LiPuma, E., & Postone, M. (1993). *Bourdieu: Critical perspectives.* Chicago: University of Chicago Press.

Callahan, D. (1995). Bioethics. In W. T. Reich (Ed.), *Encyclopedia of bioethics* (Rev. ed.,Vol. 2, pp. 247–256). New York:Macmillan Library Reference.

Calvin, W. H. (1983). *The throwing Madonna: Essays on the brain.* New York: McGraw-Hill.

Calvin, W. H. (1994). The emergence of intelligence. *Scientific American, 271*(4), 100–107.

Cambridge Dictionary of Philosophy. (1995). Cambridge: Cambridge University Press.

Camerini, J. R. (Ed.). (2002). *The Alfred Russel Wallace reader: A selection of writings from the field.* Baltimore: The Johns Hopkins University Press.

Cameron, K. N. (1995). *Dialectical materialism and modern science.* New York: International Publishers.

Campbell, B. G., & Loy, J. D. (2000). *Humankind emerging* (8th ed.). Boston: Allyn & Bacon.

Campbell, D. (1960). Blind variation and selective retention. Creative thought as in other knowledge processes. *Psychological Review, 67,* 380–400.

Campbell, D. T. (1965). Variation and selective retention in socio-cultural evolution. In H. R. Barringer, G. I. Blanksten, & R. W. Mack (Eds.), *Social change in developing areas: A reinterpretation of evolutionary theory* (pp. 19–49). Cambridge, MA: Schenkman.

Campbell, G. L. (2000). *Compendium of the world's languages* (2nd ed.). London: Routledge.

Campbell, J. (1995). *Understanding John Dewey.* Chicago: Open Court.

Campbell, L. (2004). *Historical linguistics: An introduction* (2nd Ed.). Cambridge, MA: MIT Press.

Campbell, S. F. (2002). *The art of kula.* Oxford: Berg.

Cannon, G. (1990). *The life and mind of Oriental Jones.* New York: Cambridge University Press.

Cannon, G. (1991). *The life and times of Oriental Jones: Sir William Jones, the father of modern linguistics.* Cambridge, UK: Cambridge University Press.

Cantwell, A. E., Friedlander, E., & Tramm, M. L. (Eds.). (2002). *Ethics and anthropology: Facing future issues in human biology, globalism, and cultural property.* New York: New York Academy of Sciences.

Caplan, P. (Ed.). (1995). *Understanding disputes: The politics of argument.* Oxford: Berg.

Caplan, P., & Caplan, P. (Eds.). (2003). *Ethics of anthropology. Debates and dilemmas.* Oxford: Routledge.

Capps, W. H., & Tonsing, E. F. (Eds.). (1976). *Seeing with a native eye: Essays on Native American religion.* New York: Harper & Row.

Capra, F. (1982). *The turning point.* New York: Simon & Schuster.

Capra, F. (1996). *The web of life: A new synthesis of mind and matter.* New York: HarperCollins.

Capra, F. (2003). *The hidden connections.* London: Flamingo.

Caputo, J. D. (1987). *Radical hermeneutics.* Indianapolis: Indiana University Press.

Capuzzi, D., & Gross D. R. (1999). *Counseling and psychotherapy.* Upper Saddle River, NJ: Prentice Hall.

Caravan, J. M. (1999). *Gorillas: A portrait of the animal world.* New York: Todtri.

Carbonell, E., Bermúdez de Castro, J. M., Arsuaga, J. L., Díez, J. C., Rosas, A., Cuenca-Bescós, G., Sala, R., et al. (1995). Lower Pleistocene Hominids and artifacts from Atapuerca-TD6 (Spain). *Science, 269,* 826–830.

Carbonell, E., Bermúdez de Castro, J. M., Arsuaga, J. L., Díez, J. C., Rosas, A., Cuenca-Bescós, G., Sala, R., et al. (1995). Lower Pleistocene hominids and artifacts from Atapuerca-TD6 (Spain). *Science, 269,* 826–830.

Cardozo, B. N. (1949). *The nature of the judicial process.* New Haven, CT: Yale University Press.

Carlin, R. (1987). *Man's earliest music: The world of music.* New York: Facts on File.

Carlson, E. (2001). *The unfit: A history of a bad idea.* New York: Cold Spring Harbor Laboratory Press.

Carnegie, A. (1962). *The gospel of wealth and other timely essays.* (E. C. Kirkland, Ed.). Cambridge, MA:

Carniero, R. L. (1970). A theory of the origins of the state. *Science*, *169,* 733–738.

Caro, D. H. J., Schuler, R. S., & Sethi, A. S. (1987). *Strategic management of technostress in an information society.* Lewiston, NY: Hogrefe.

Carpenter, C. R. (1964). *Naturalistic behavior of nonhuman primates.* University Park: Pennsylvania State University. [Note: Carpenter's major primate ield study reports and several reviews are reprinted in this volume]

Carroll, J. B. (1955). *The study of language.* Cambridge, MA: Harvard University Press.

Carroll, Noël (Ed.). (2000). *Theories of art today.* Madison: University of Wisconsin Press.

Carroll, R. L. (1997). *Patterns and processes of vertebrate evolution.* Cambridge: Cambridge University Press.

Carson, R. (1962). *Silent Spring.* Boston: Houghton Mifflin.

Carson, R. (1989). *The sea around us* (Special ed.). New York: Oxford University Press.

Carson, R. (1998). *The sense of wonder.* (Reprint ed.). New York: HarperCollins.

Carson, R. (2002). *Silent spring* (40th anniv. ed.). New York: First Mariner Books.

Carter, A. (2000). Analytical anarchism: Some conceptual foundations. *Political Theory, 28*(2), 230–253.

Carter, F. (1976). *The education of Little Tree.* Albuquerque: University of New Mexico Press.

Carter, H. L. (1987). *The life and times of Little Turtle.* Urbana: University of Illinois Press.

Cartmill, M. (1972). Arboreal adaptations and the origin of the order primates. In R. Tuttle (Ed.), *Functional and evolutionary biology of primates,* pp. 97–122. Chicago: Aldine-Atherton.

Cartmill, M. (1974). Pads and claws in arboreal locomotion. In F. A. Jenkins (Ed.), *Primate locomotion,* pp. 45–83. New York: Academic Press.

Cartmill, M. (1974). Rethinking primate origins. *Science, 184,* 436–443.

Carver, T. (1987). *A Marx dictionary.* Cambridge, UK: Polity.

Carver, T. (Ed.). (1991). *The Cambridge companion to Marx.* Cambridge, UK: Cambridge University Press.

Casey C., & Edgerton, R. (Eds.). (2005). *Companion to psychological anthropology.* Oxford: Blackwell.

Cassells, E. S. (1997). *The archaeology of Colorado* (Rev. ed.). Boulder, CO: Johnson Books.

Cassidy, M. L., & Lee, G. R. (1989). The study of polyandry: A critique and synthesis. *Journal of Comparative Families Studies, 20,* 1–11.

Castile, G. P., & Bee, R. L. (Eds.). (1992). *State and reservation: New perspectives on federal Indian policy.* Tucson: University of Arizona Press.

Castleton, K. (1987). *Petroglyphs and pictographs of Utah,* Vols. 1 and 2. Salt Lake City: University of Utah Press.

Cate, C. (2005). *Friedrich Nietzsche.* New York: Overlook Press.

Caton-Thompson, G. (1934). *The desert Fayum* (2 vols.). London: Grenfell.

Caufield, C. (1996). *Masters of illusions: The World Bank and the poverty of nations.* New York: Henry Holt.

Cauquelin, J. (2003). *The Aborigines of Taiwan.* London: Routledge/Curzon.

Cavadish, R. (Ed.). (1993). *Mythology: An illustrated encyclopedia.* Boston: Little, Brown.

Cavalli-Sforza, L. L. (2000). *Genes, peoples and languages.* Berkeley: University of California Press.

Cavalli-Sforza, L. L., & Cavalli-Sforza, F. (1995). *The great human diasporas: The history of diversity and evolution.* Reading, PA: Addison-Wesley.

Cavalli-Sforza, L. L., Menozzi, P., & Piazza, A. (1994). *The history and geography of human genes.* Princeton, NJ: Princeton University Press.

Cavanagh, B. (1982). *Music of the Netsilik Eskimo: A study of stability and change.* Ottawa, Canada: National Museums of Canada.

Cazden, C. B. (1992). *Whole language plus: Essays on literacy in the United States and New Zealand.* New York: Teachers College Press.

Cazden, C. B. (2001). *Classroom discourse: The language of teaching and learning* (2nd ed.). Portsmouth, NH: Heinemann.

Cazden, C. B., John,V. P., & Hymes, D. (Eds.). (1972). *Functions of language in the classroom.* New York: Teachers College Press.

Cazeneuve, J. (1972). *Lucien Lévy-Bruhl* (P. Rivière, Trans.). New York: Harper & Row.

Cech, T. (1986). RNA as an enzyme. *Scientific American, 255*(5), 64–75.

Cela-Conde, C. J., & Ayala, F. J. (2003). Genera of the human lineage. *Proceedings of the National Academy of Sciences, 100,* 7684–7689.

Central Washington University. (n. d.). *Washoe biography.* Retrieved September 25, 2004, from The Chimpanzee and Human Communication Institute website: http://www.cwu.edu/~cwuchci/bios/washoe_bio.htm

Chadwick, A. (1994). Citizens of the U. N. system in a changing world. In Yoshikazu Sakamoto (Ed.), *Global transformation: Challenges to the state, system.* Tokyo: United Nations Press.

Chagnon, N. (1979). Is reproductive success equal in egalitarian societies? In N. Chagnon & W. Irons (Eds.), *Evolutionary biology and human social behavior.* North Scituate, MA: Duxbury.

Chagnon, N. (1996). *Yanomamö* (5th ed.). Fort Worth, TX: Harcourt Brace.

Chagnon, N. A. (1967). Yanomamo social organization and warfare. In M. Fried, M. Harris, & R. Murphy (Eds.), *War: The anthropology of armed conflict and aggression.* New York: Natural History Press.

Chagnon, N. A. (1997). *Yanomamo* (5th ed.). Fort Worth, TX: Harcourt, Brace, Jovanovich.

Chagnon, N. A. (1997). *Yanomamo: The last days of Eden* (5th ed.). San Diego: Harcourt, Brace, Jovanovich.

Chagnon, N. A., & Hames, R. (1979). Protein deficiency and tribal warfare in Amazonia: New data. *Science, 203*(4383), 10–15.

Chakrabarti, D. K. (2004). *Indus civilization sites in India: New discoveries.* Bombay: Marg.

Chambers, E. (1996). Practicing anthropology. In D. Levinson & M. Ember (Eds.), *Encyclopedia of cultural anthropology* (pp. 1009–1014). New York: Henry Holt and Company.

Chambers, J. K. (2003). *Sociolinguistic theory.* Oxford, UK: Blackwell.

Champman, A. (1986). *Los Selk´Nam, la vida de los onas.* Buenos Aires: Emecé Editores.

Chan, W.-T. (1963). *A source book in Chinese philosophy.* Princeton, NJ: Princeton University Press.

Chance, N. (1966). *The Eskimo of North Alaska.* New York: Holt, Rinehart & Winston.

Chang, K. C. (1986). *The archaeology of ancient China.* New Haven, CT: Yale University Press.

Chapais, B., & Berman, C. M. (Eds.). (2004). *Kinship and behavior in primates.* Oxford: Oxford University Press.

Chatterjee, P. (1993). *Nationalist thought and the colonial world: A derivative discourse.* Minneapolis: University of Minnesota Press.

Chatters, J. C. (2000). The recovery and first analysis of an early Holocene human skeleton from Kennewick, Washington. *American Antiquity, 65*, 291–316.

Chatters, J. C. (2001). *Ancient encounters: Kennewick Man and the first Americans.* New York: Simon & Schuster.

Chatty, D., & Colchester, M. (2002). *Conservation and mobile indigenous peoples: Displacement, forced settlement and sustainable development.* New York: Berghahn.

Chaudhuri, N. C. (1974). *Scholar extraordinary: The life of the professor the Rt. Hon. Friedrich Max Muller.* London: Chatto & Windus.

Chaudhuri, S. (Ed.). (1980). *Proceedings of the Asiatic Society: 1784–1800, 1.* Calcutta: Asiatic Society.

Chayanov, A. V. (1966). *The theory of peasant economy.* D. Thorner, B. Kerblay, & R. E. F. Smith (Eds.). Homewood, IL: Irwin.

Chayanov, A. V. (1986). *The theory of peasant economy.* Madison: University of Wisconsin Press.

Chekwas, S. (1994). *Ogbanje: Son of the gods.* Long Island City, NY: Seaburn Books.

Cheney, D. L., & Seyfarth, R. M. (1990). *How monkeys see the world.* Chicago, IL: University of Chicago Press.

Cheng-hwa, T. (1992). *Archaeology of the P'eng-huIslands.* Institute of History and PhilologyAcademia Sinica, Special Publications, No. 95. Taipei: Taiwan, R. O. C.

Cheyette, B., & Marcus, L. (1998). *Modernity, culture, and "the Jew."* Cambridge, UK: Polity Press.

Chick, G., & Dong, E. (2003, April 6–8). Possibility of refining the hierarchical model of leisure constraints through cross-cultural research. *Proceedings of the 2003 Northeastern Recreation Research Symposium,* Bolton Landing, NY.

Chidester, D. (1997). *African traditional religion in South Africa: An annotated bibliography.* Westport, CT: Greenwood Press.

Childe,V. G. (1951). *Man makes himself.* New York: New American Library of World Literature. (Original work published 1936).

Childe,V. G. (1980). *Prehistoric communities of the British Isles.* New York: Arno Press.

Chiseri-Strater, E., & Sunstein, B. S. (1997). *Fieldworking: Reading and writing research.* Upper Saddle River, NJ: Blair Press.

Chitkara, M. G. (1999). *Encyclopedia of Buddhism: A world faith.* New Delhi, India: APH.

Chivers, D. J. (1974). *The Siamang in Malaya: A field study of a primate in tropical rain forest.* Basel, Switzerland: S. Karger.

Chodorow, N. (1978). *The reproduction of mothering.* Berkeley: University of California Press.

Chomsky, N. (1957). *Syntactic structures.* The Hague, Netherlands: Mouton.

Chomsky, N. (1965). *Aspects of the theory of syntax.* Cambridge: MIT Press.

Chomsky, N. (1968). *Language and mind.* New York: Harcourt Brace Jovanovich.

Chomsky, N. (1975). *Reflections on language.* New York: Pantheon.

Chomsky, N. (1986). *Knowledge of language.* New York: Praeger.

Chomsky, N. (1995). *The minimalist program.* Cambridge: MIT Press.

Chomsky, N. (2000). *New horizons in the study of language and mind.* New York: Cambridge University Press.

Chomsky, N., & Halle, M. (1968). *The sound pattern of English.* New York: Harper & Row.

Chopra, P. N. (Ed.). (1983). *Contribution of Buddhism to world civilization and culture.* New Delhi, India: Chand.

Chrisman, N. J., & Maretzki, T. W. (Eds.). (1982). *Clinically applied anthropology: Anthropologists in health science settings.* Dordrecht, Holland: D. Reidel.

Christensen, P., & James, A. (2000). *Research with children: Perspectives and practices.* London and New York: Routledge/Falmer.

Christiansen, M. H., & Kirby, S. (Eds.). (2003). *Language evolution: The states of the art.* Oxford, UK: Oxford University Press.

Christie, A. (1983). *Chinese mythology.* Feltham, UK: Newess Books.

Chukwuemeka, I. (2001). *The naked gods.* Ibadan, Nigeria: University Press.

Chun, A. (2000). *Unstructuring Chinese society.* Amsterdam: Harwood.

Church, W. (1994). Early occupations at Gran Pajatén. In *Andean Past, 4,* 281–318. (Latin American Studies Program, Cornell University, Ithaca, NY)

Ciekawy, D., & Geschiere, P. (Eds.). (1998). Containing witchcraft: Conflicting scenarios in postcolonial Africa. *African Studies Review, 41,* 3.

Ciochon, R. L., Olsen J., & James, J. (1990). *Other origins: The search for the giant ape in human prehistory.* New York: Bantam Books.

Ciochon, R. L., Piperno, D. R., & Thompson, R. G. (1990). Opal phytoliths found on the teeth of the extinct ape *Gigantopithecus blacki:* Implications for paleodietary studies. *Proceedings of the National Academy of Sciences, 87,* 8120–8124.

Clark, A. M. (1996). *Who lived in this house? A study of Koyukuk River semi subterranean houses.* Hull, Quebec: Canadian Museum of Civilization.

Clark, I. F., & Cook, B. J. (1994). *Perspectives of the earth.* Canberra: Australian Academy of Science.

Clark, J. E., & Collins, M. B. (Eds.). (2002). *Folsom technology and lifeways* (Lithic Technology Special Publication No. 4). Tulsa, OK: University of Tulsa Department of Anthropology.

Clark, J. E., & Pye, M. E. (Eds.). (2000). *Olmec art and archaeology in Mesoamerica.* Washington, DC: National Gallery of Art.

Clark, J., & Herdrich, D. (1993). Prehistoric settlement systems in Eastern Tutuila, American Samoa. *Journal of the Polynesian Society, 102,* 147–186.

Clark, W. E. L. G. (1971). *The antecedents of man,* 3rd edition. Chicago: Quadrangle Books.

Clarke, R. J. (1999). Discovery of complete arm and hand of the 3.3 million year old *Australopithecus* skeleton from Sterkfontein. *South African Journal of Science, 95*(11/12), 477–480.

Clarke, W. C. (1971). *Place and people: An ecology of a New Guinea community.* Berkeley: University of California Press.

Cleveland, H. (1990). The management of peace. *GAO Journal, 11,* 11–13.

Clifford, J., & Marcus, G. E. (1986). *Writing culture: The poetics and politics of ethnography.* Berkeley: University of California Press.

Cloninger, C. R. (2004). *Feeling good: The science of well-being.* Oxford: Oxford University Press.

Clottes, J. (2002). *World rock art.* Los Angeles: Getty Publications.

Cochion, R. L., & Fleagle, J. G. (1987). *Primate evolution and human origins.* New York: Aldine de Gruyter.

Cockburn, T. A. (Ed.). (1998). *Mummies, disease, and ancient cultures.* Cambridge, UK: Cambridge University Press.

Cockell, C. (2003). *Impossible extinction: Natural catastrophes and the supremacy of the microbial world.* Cambridge: Cambridge University Press.

Cocks, R. (1988). *Sir Henry Maine: A study in Victorian jurisprudence.* New York: Cambridge University Press.

Codrington, R. H. (1891). *The Melanesians: Studies in their anthropology and folklore.* Oxford, UK: Clarendon.

Coe, M. D. (2005). *The Maya* (7th ed.). London: Thames & Hudson.

Coe, M. D., Diehl, R. A., Friedel, D. A., Furst, P. T., Reilly, F. K., Schele, L., et al. (1995). *The Olmec world: Ritual and rulership.* Princeton, NJ: The Art Museum, Princeton University.

Coggins, C., & Shane, O. C. (Eds.). (1984). *Cenote of sacrifice: Maya treasures from the sacred well at Chichén Itzá.* Austin: University of Texas Press.

Cohen, A. K. (1997). A general theory of subcultures. In K. Gelder & S. Thornton (Eds.), *The subcultures reader* (pp. 44–54). London: Routledge.

Cohen, C., & Hublin, J.-J. (1989). *Boucher de Perthes: Les origines romantiques de la préhistoire.* Paris: Belin.

Cohen, L. (2000). *No aging in India.* Berkeley: University of California Press.

Cohen, M. R. (1931). Justice Holmes and the nature of law. *Columbia Law Review, 31,* 352–367.

Cohen, S. (2003). *The wrong men: America's epidemic of wrongful death row convictions.* New York: Carroll & Graf.

Cohen, Y. A. (1974). Culture as adaptation. In Y. A. Cohen (Ed.), *Man in adaptation: The cultural present.* Chicago: Aldine.

Cohen, Y. A. (1974). *Man in adaptation: The cultural present* (2nd ed.). Chicago: Aldine.

Coico, R., Sunshine, G., & Benjamini, E. (2003). *Immunology fifth edition: A short course.* New York: Wiley.

Coimbra-Filho, A. F., & Mittermeier, R. A. (Eds.). (1981). *Ecology and behavior of neotropical primates.* Rio de Janeiro: Academia Brasiliera de Ciencias.

Colbert, M. (1942). *Kutkos Chinook Tyee.* Boston MA: D. C. Heath and Company.

Cole, D., & Chaikin, I. (1990). *An iron hand upon the people: The law against the potlatch on the northwest coast.* Vancouver/Toronto: Douglas & McIntyre; Seattle, WA: University of Washington Press.

Collier, A. (1994). *Critical realism: An introduction to Roy Bhaskar's philosophy.* London: Verso.

Collier, R. (1995). *Combating sexual harassment in the workplace.* Buckingham, PA: Open University Press.

Collins, M. B. (1999). *Clovis blade technology.* Austin: University of Texas Press.

Collins, R. (1994). *Four sociological traditions.* New York: Oxford University Press.

Collis, J. (1997). *The European Iron Age.* London and New York: Routledge.

Comaroff, J. L. (1980). *The meaning of marriage payments.* London: Academic Press.

Comaroff, J., & Comaroff, J., (Eds.). (1993). *Modernity and its malcontents: Ritual and power in postcolonial Africa.* Chicago: University of Chicago Press.

Comas, J. (1969). *Historia sumaria de la Associacion de Americana de Antropologos Fisicos 1928–1968.* Corboda, Mexico: Instituto National de Antropologia e Historia.

Comrie, B. (Ed.). (1990). *The world's major languages.* New York: Oxford University Press.

Cone, J. H. (1991). *Martin & Malcom & America: A dream or a nightmare.* New York: Orbis Books.

Conkey, M. W., Soffer, O., Stratmann, D., & Jablonski, N. G. (Eds.). (1997). *Beyond art: Pleistocene image and symbol.* Memoirs of the California Academy of Sciences;Wattis symposium series in Anthropology, 23.

Conklin, B. (2001). *Consuming grief: Compassionate cannibalism in an Amazonian society.* Austin: University of Texas Press.

Conley, J. M., & O'Barr, W. M. (1998). *Just words: Law language and power.* Chicago: University of Chicago Press.

Connell, R. W. (1995). *Masculinities.* Berkeley: University of California Press.

Conner, J. K. (2003). Artificial selection: A powerful tool for ecologists. *Ecology, 84,* 1650–1660.

Conniff, R. (2002). Kon artist? *Smithsonian, 33*(4), 26.

Conroy, G. (1990). *Primate evolution.* New York: Norton.

Conroy, G. C. (2005). *Reconstructing human origins.* New York: W. W. Norton.

Constantinescu, C. S. (1995). Melanin, melatonin, melanocyte-stimulating hormone, and the susceptibility to autoimmune demyelination: A rationale for light therapy in multiple sclerosis. *Medical Hypotheses, 45,* 455–458.

Cooco, L. (1972). *Iyewei-Teri: Quince años entre los Yanomamos* [Fifteen years among the Yanomamos]. Caracas,Venezuela: Libreria Editorial Salesiana.

Cook, B., & Turner, F. (1999). *Biopoetics: Evolutionary explorations in the arts.* Lexington: Paragon Books.

Cook, S. (2004). *Understanding commodity cultures: Explorations in economic anthropology with case studies from Mexico.* Lanham: Rowman & Littlefield Publishers.

Cook, V., & Newson, M. (1996). *Chomsky's universal grammar: An introduction* (2nd ed.). Oxford: Blackwell.

Cooke, B. (2004). *The gathering of infidels: A hundred years of the Rationalist Press Association.* Amherst, NY: Prometheus Books.

Cooke, D. (1992). *I saw the world end: A study of Wagner's* Ring. Oxford: Oxford University Press.

Coomaraswamy, A. K. (1985). *Buddha and the gospel of Buddhism.* New Delhi, India:Munshiran Manohar Lal Publishers.

Coon, C. S. (1977). Overview. *Annual Review of Anthropology, 6,* 1–10.

Coon, C. S. (1981). *Adventures and discoveries.* Upper Saddle River, NJ: Prentice Hall.

Coon, C. S. (1982). *Racial adaptations.* Chicago: Nelson Hall.

Cooper, B. M. (1995). Women's worth and wedding gift exchange in Maradi, Niger, 1907–89. *Journal of African History 36,* 121–141.

Cooper, E. (1972). *A history of pottery.* New York: St. Martin's Press.

Cooper, J. M. (1935). Lafitau. In E. R. A. Seligman & A. S. Johnson (Eds.), *Encyclopedia of the social sciences* (Vol. 9, p. 12). New York: Macmillan.

Coote J., & Shelton, A. (Eds.). (1992). *Anthropology, art, and aesthetics.* Oxford: Oxford University Press.

Coppens, W. (1998). *Yawarana history (XVI century to 1957).* Caracas: Apostolic Vacariate of Puerto Ayacucho.

Coppens, Y., & Senut, B. (Eds.). (1993). *Origine(s) de la Bipédie chez les Hominidés.* Paris: CNRS Cahiers de Paleoanthropologie.

Corballis, M. (1991). *The lopsided ape: Evolution of the generative mind.* New York: Oxford University Press.

Corballis, M. (1999). Phylogeny from apes to humans. In M. C. Corballis & S. E. G. Lea (Eds.), *The descent of mind: Psychological perspectives on hominid evolution* (pp. 40–70). New York: Oxford University Press.

Corballis, M. C. (2002). *From hand to mouth: The origins of language.* Princeton, NJ: Princeton University Press.

Corbey, R. (2005). *The metaphysics of apes: Negotiating the animal-human boundary.* Cambridge: Cambridge University Press.

Cordell, L. S. (1997). *Archaeology of the Southwest* (2nd ed.). San Diego, CA: Academic Press.

Cornwall, A., & Lindisfarne, N. (1994). *Dislocating masculinity: Comparative ethnographies.* London: Routledge.

Corsaro, W. (2003)."*We're friends, right?" Inside kids' cultures.* Washington, DC: Joseph Henry Press.

Corsi, P., & Weindling, P. (1984). The reception of Darwinism in France, Germany, and Italy. A comparative assessment. In D. Kohn (Ed.), *The Darwinian heritage: A centennial retrospective* (pp. 683–729). Princeton, NJ: Princeton University Press.

Coser, L. (1977). *Masters of sociological thought.* New York: Brace Publisher.

Cosgrove, P. (2001). *Australia: The complete encyclopedia.* Buffalo, NY: Firefly Books.

Cosmopoulos, M. B. (Ed.). (2004). *The Parthenon and its sculptures.* Cambridge: Cambridge University Press.

Cott, N. (1986). *The grounding of modern feminism.* New Haven, CT: Yale University Press.

Coulmas, F. (1999). *The Blackwell encyclopedia of writing systems.* London: Blackwell Publishers.

Council for Aboriginal Reconciliation and ATSIC. (1992). *Aboriginal people of Tasmania.* Canberra: Commonwealth of Australia.

Counihan, C., & Van Esterik, P. (Eds.). (1997). *Food and culture.* London: Routledge.

Cousteau, J. (1985). *The ocean world.* New York: Abrams.

Cousteau, J. (2004). *The silent world.* New York: National Geographic Adventure Classics.

Cousteau, J., & Sivirine, A. (1983). *Jacques Cousteau's Calypso.* New York: Abrams.

Coutts, H. (2001). *Art of ceramic.* New Haven: Yale University Press.

Cove, J. J. (1995). *What the bones say: Tasmanian aborigines, science, and domination.* Ottawa: Carleton University Press.

Cowan, C. W., & Watson, P. J. (1992). *The origins of agriculture: An international perspective.* Washington, DC: Smithsonian.

Cowan, G. (1993). *The People v. Clarence Darrow: The bribery trial of America's greatest lawyer.* New York: Time Books.

Cowan, J. G. (1997). *Elements of the Aborigine tradition.* London: Thorsons/Element.

Cowan, J. K., Dembour, M. B., & Wilson, R. A. (Eds.). (2001). *Culture and rights: Anthropological perspectives.* New York: Cambridge University Press.

Cowan, S. (Ed.). (1976). *We don't live in snow houses now: Reflections of Arctic Bay.* Ottawa, Canada: Canadian Arctic Producers.

Coward, H. (1995). *Population, consumption, and the environment: Religious and secular responses.* Albany: State University of New York Press.

Cowlishaw, G. (2004). *Blackfellas, whitefellas, and the hidden injuries of race.* Malden, MA: Blackwell.

Cowlishaw, G., & Dunbar, R. (2000) *Primate conservation biology.* Chicago: University of Chicago Press.

Cox, H. (1995). *Fire from Heaven: The rise of Pentecostal spirituality and the reshaping of religion in the twenty-first century.* Reading, MA: Addison-Wesley.

Crabtree, P. J. (Ed.). (2000). *Medieval archaeology: An encyclopedia.* New York: Garland.

Crafts, S. D., Cavicchi, D., Keil, C., & Music in Daily Life Project. (1993). *My music.* Middletown, CT: Wesleyan University Press.

Crampton, C. G. (1977). *The Zunis of Cibola.* Salt Lake City: University of Utah Press.

Cranor, C. F. (Ed.). (1994). *Are genes us? The social consequences of the new genetics.* New Brunswick, NJ: Rutgers University Press.

Craw, R. C., Grehan, J. R., & Heads, M. J. (1999). *Panbiogeography: Tracking the history of life.* New York: Oxford University Press.

Crawford, H. (2004). *Sumer and the Sumerians* (2nd ed.). Cambridge, UK: Cambridge University Press.

Crawford, M. H. (1998). *The origins of Native Americans. Evidence from anthropological genetics.* Cambridge: Cambridge University Press.

Crawford, P. I., & Turton, D. (1992). *Film as ethnography.* New York:Manchester University Press.

Creswell, J. (2002). *Research design: Qualitative, quantitative, and mixed method approaches.* Thousand Oaks, CA: Sage.

Crocker, J. C., & Sapir, J. D. (Eds.). (1977). *The social use of metaphor.* Philadelphia: University of Pennsylvania Press.

Croizat, L. (1958). *Panbiogeography.* Caracas, Venezuela: Author.

Croizat, L. (1964). *Space, time, form: The biological synthesis.* Caracas,Venezuelas: Author.

Cronk, L., Chagnon, N., & Irons, W. (Ed.). (2000). *Adaptation and human behavior: Evolutionary foundations of human behavior.* New York: Aldine de Gruyter.

Crosby, D. A. (2002). *A religion of nature.* Albany: State University of New York Press.

Crosby, T. (1907). Among the An-Ko-Me-Nums. In C. Lillard (Ed.), W*arriors of the North Pacific* (pp. 63–124). Victoria, Canada: Sono Nis Press.

Crow, J. F., & Dove, W. F. (Eds.). (2000). *Perspectives on genetics: Anecdotal, historical, and critical commentaries, 1987–1998.* Madison: University of Wisconsin Press.

Crow, T. J. (Ed.). (2002). *The speciation of modern Homo sapiens.* Oxford: Oxford University Press.

Crusius, T. W. (1991). *Philosophical hermeneutics.* Urbana, IL: National Council of Teachers of English.

Crystal, D. & Quirk, R. (1964). *Systems of prosodic and paralinguistic features in English.* Berlin & New York: Walter de Gruyter.

Crystal, D. (1987). *Cambridge encyclopedia of language.* New York: Cambridge University Press.

Culhane-Pera, K.,Vawter, D. E., Xiong, P., Babbitt, B., & Solberg, M. M. (Eds.). (2003). *Clinical and ethical case stories of Hmong families and Western providers.* Nashville, TN: Vanderbilt Press.

Cullen, R. (2003, February). Testimony from the Iceman. *Smithsonian,* pp. 42–50.

Culler, J. (1985). *Saussure.* Ithaca, NY: Cornell University Press.

Culshaw, J. (1967). *Ring resounding.* New York: Viking.

Culshaw, J. (1978). *Wagner: The man and his music.* New York:Metropolitan Opera Guild.

Cunliffe, B. (2002). *The extraordinary voyage of Pytheas the Greek.* New York:Walker & Company.

Cunliffe, B. (2003). *The Celts: A very short introduction.* Oxford: University Press.

Cunliffe, B. W. (1991). *Iron Age communities in Britain: An account of England, Scotland, and Wales from the seventh century B. C. until the Roman conquest* (3rd ed.). London: Routledge.

Curd, M., & Cover, J. A. (1998). *Philosophy of science: The central issues.* New York: Norton.

Curry, G. E. (Ed.). (1996). *The affirmative action debate.* Cambridge, MA: Perseus Books.

Curtis, R., & Aguirre, B. (Eds.). (1993). *Collective behavior and social movements.* Needham Heights, MA: Allyn & Bacon.

Cutler, A. (2003). *The seashell on the mountaintop: A story of science, sainthood, and the humble genius who discovered a new history of the earth.* New York: Penguin Books.

Cutter, S., Renwick, H. L., & Renwick, W. (1991). *Exploitation, conservation, preservation* (2nd ed.). New York: John Wiley.

Cziko, G. A., & Campbell, D. T. (1990). Comprehensive evolutionary epistemology bibliography. *Journal of Social and Biological Structures, 13*(1), 41–82.

D'Andrade, R. (1995). *The development of cognitive anthropology.* Cambridge: Cambridge University Press.

D'Aout, K., Aerts, P., DeClercq, D., DeMeester, K., & Van Elsacker, L. V. (2002). Segment joint angles of hind limb

during bipedal and quadrupedal walking of the bonobo *(Pan paniscus). American Journal of Physical Anthropology, 119,* 37–51.

D'Aquili, E. G., & Newberg, A. B. (1999). *The mystical mind: Probing the biology of religious experience.* Minneapolis, MN: Fortress Press.

D'Espagnat, B. (1995). *Veiled reality.* Reading, MA: Addison-Wesley.

Daegling, D. J. (2004). *Bigfoot exposed: An anthropologist examines America's enduring legend.* New York: Altamira Press.

Dales, G. F., & Kenoyer, J. M. (1986). *Excavations at Mohenjo Daro, Pakistan: The pottery.* Philadelphia: University Museum Publications.

Dall, W. H. (1877). On succession in the shell-heaps of the Aleutian Islands. *Contributions to North American Ethnology, 1,* 41–91.

Dalrymple, G. B., & Lanphere, M. A. (1969). *Potassium argon dating.* San Francisco, CA: W. H. Freeman.

Dalton, G. (1969). Theoretical issues in economic anthropology. *Current Anthropologist, 10,* 63–102.

Daltroy, T. N. (2002). *The Incas.* Oxford: Blackwell.

Daly, M., & Wilson, M. (1988). *Homicide.* New York: Aldine de Gruyter.

Damas, D. (2002). *Arctic immigrants, Arctic villagers: The transformation of Inuit settlement in the Central Arctic.* Montreal, Canada: McGill-Queen's University Press.

Damasio, A. R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness.* New York: Harcourt International.

Dandridge, R. (1995). *The development of cognitive anthropology.* Cambridge: Cambridge University Press.

Dange, S. A. D. (1967). *Legends in the Mahabharat with a brief survey of folk tales.* Delhi, India:Motilal Banagardi Dass.

Daniel, G. (1976). *150 years of archaeology.* Cambridge, MA: Harvard University Press.

Daniélou, A. (1964). *Hindu polytheism.* New York: Bollingen Foundation.

Daniels, P. T., & Bright, W. (Eds.). (1996). *The world's writing systems.* New York: Oxford University Press.

Danilevsky, N. (1995). *Russia and Europe.* St. Petersburg, Russia: Glagol.

Darrow, C. (1932). *The story of my life.* New York: Grossett's Universal Library.

Dart, R. (1956). The myth of the bone-accumulating hyena. *American Anthropologist, 58,* 40–62.

Dart, R. (1958). Bone tools and porcupine gnawing. *American Anthropologist, 60,* 715–724.

Dart, R. (1960). The bone tool-manufacturing ability of *Australopithecus prometheus. American Anthropologist, 62,* 134–143.

Dart, R. (1982). *Adventures with the missing link.* Philadelphia: Institutes for the Achievement of Human Potential.

Darwall, S. (Ed.). (2003). *Deontology.* Oxford: Blackwell.

Darwin, C. (1859). *On the origin of species.* London: John Murray.

Darwin, C. (1871). *The descent of man* (2 vols.). London: John Murray.

Darwin, C. (1887/1958/2000). *Autobiography.* Amherst, MA: Prometheus Books.

Darwin, C. (1997). *The descent of man* (2nd ed.). Amherst, NY: Prometheus Books. (Original work published 1871).

Darwin, C. (2000). *Autobiography.* Amherst, NY: Prometheus Books. (Original work written May–August 1876, first published in 1887, first unexpurgated edition published 1958)

Darwin, C. (2000). *The voyage of the* Beagle. Amherst, NY: Prometheus Books. (Original work published 1839)

Darwin, F. (Ed.). (1958). *Autobiography of Charles Darwin and selected letters.* New York: Dover.

Das, T. K. (1999, March 18). *The impact of net culture on mainstream societies: A global analysis.* http://in.arxiv.org/abs/cs.CY/9903013

Das,V. (2000). *Structure and cognition: Aspects of Hindu caste and ritual.* New Delhi: Oxford University Press.

Das,V. (Ed.). (2003). *The Oxford India companion to sociology and social anthropology.* New Delhi: Oxford University Press.

Daubenmier, J. M. (2003). The Meskwaki and Sol Tax: Reconsidering the actors in action anthropology (Iowa). *Dissertation Abstracts International 64*(06A), 394.

Dauenhouer, N. & Marks, R. (1990). *Haa Tuwunaagu Yis, for Healing Our Spirit Tlingit Oratory.* Seattle: University of Washington Press.

Davenport, T. R. H. (1998) *The birth of a New South Africa.* Toronto: University of Toronto Press.

David, N., & Kramer, C. (2001). *Ethnoarchaeology in action.* Cambridge, UK: Cambridge University Press.

Davids, R. (1996). *The pyramid builders of Ancient Egypt.* London: Routledge.

Davids, T. W. R. (2000). *Dialogues of the Buddha.* Delhi, India:Motilal Banarsidass.

Davidson, K. (1999). *Carl Sagan: A life.* New York: John Wiley & Son.

Davie, M. R. (1963). *William Graham Sumner: An essay of commentary and selections.* New York: Crowell.

Davies, A. G., & Oates, J. F. (Eds.). (1994). *Colobine monkeys: Their ecology, behaviour, and evolution.* Cambridge: Cambridge University Press.

Davies, K. (2001). *Cracking the genome: Inside the race to unlock human DNA.* Baltimore: Johns Hopkins University Press.

Davies, P. (1995). *Are we alone? Philosophical implications of the discovery of extraterrestrial life.* New York: HarperCollins.

Davies, W. (2001). *Healing ways: Navajo health care in the twentieth century.* Albuquerque: University of New Mexico Press.

Davis, H. B. (1978). *Toward a Marxist theory of nationalism.* New York: Monthly Review.

Davis, J. (1994). *Mother tongue: How humans create language.* Secaucus, NJ: Carol.

Davis, M. (1982). *Computability and unsolvability.* New York: Dover.

Davis, W. (1988). Hallucinogenic plants and their uses in traditional societies. In A. Podolefsky & P. J. Brown (Eds.), *Applying anthropology.* CA:Mayfield Publishing Company.

Davis-Floyd, R. E., & Sargent, C. (1997). *Childbirth and authoritative knowledge: Cross-cultural perspectives.* Berkeley: University of California Press.

Davis-Floyd, R., & Dumit, J. (1998). *Cyborg babies: From techno-sex to techno-tots.* New York: Routledge.

Davis-Floyd, R., & St. John, G. (1998). *From doctor to healer: The transformative journey.* New Brunswick, NJ: Rutgers University Press.

Davis-Floyd, R., Pigg, S. L., & Cosminsky, S. (Eds.). (2001). Daughters of time: The shifting identities of contemporary midwives [special triple issue]. *Medical Anthropology, 20*(2–4).

Davison, G., Hirst, J., & MacIntyre, S. (2001). *The Oxford companion to Australian history.* Oxford: Oxford University Press.

Dawkins, R. (1976). *The selfish gene.* New York: Oxford University Press.

Dawkins, R. (1982a). *The extended phenotype: The gene as the unit of selection.* San Francisco: Freeman.

Dawkins, R. (1982b). Replicators and vehicles. In King's College Sociobiology Group (Eds.), *Current problems in sociobiology* (pp. 45–64). Cambridge, UK: Cambridge University Press.

Dawkins, R. (1983). *The extended phenotype: The long reach of the gene.* Oxford, UK: Oxford University Press.

Dawkins, R. (1989). *The selfish gene.* Oxford and New York: Oxford University Press.

Dawkins, R. (1995). *River out of Eden.* New York: Basic Books.

Dawkins, R. (1996). *Climbing Mount Improbable.* New York: Norton.

Dawkins, R. (1996). *The blind watchmaker.* New York: Norton.

Dawkins, R. (1998). *Unweaving the rainbow.* New York: Houghton Mifflin.

Dawkins, R. (1999). *The extended phenotype.* Oxford: Oxford University Press.

Dawkins, R. (2004). *The ancestors' tale: A pilgrimage to the dawn of life.* London:Weidenfeld & Nicolson.

Dawkins, R., & Ward, L. (1996). *River out of Eden: A Darwinian view of life.* New York: HarperCollins.

Daya, K. (1991). *Indian philosophy: A counterperspective.* New Delhi: Oxford University Press.

Dayan, J. (1995). *Haiti, history, and the gods.* Berkeley and Los Angeles: University of California Press.

de Angulo, G. (1995). *The old coyote of Big Sur.* Berkeley, CA: Stonegarden Press.

de Angulo, J. (1953). *Indian tales.* New York: Hill & Wang.

de Angulo, J. (1990). *Indians in overalls.* San Francisco: City Lights Books.

de Bary, W. T. (1960). *Sources of Chinese tradition.* New York: Columbia University Press.

de Bary, W. T., Chan, W.-T., & Watson, B. (1960). *Sources of Chinese tradition.* New York: Columbia University Press.

de la Cadena, M. (2000). *Indigenous Mestizos: The politics of race and culture in Cuzco, Peru 1919–1991.* Durham, N. C. : Duke University Press.

de Lumley, H. (1969). *Une Cabane Acheuléenne dans la Grotte du Lazaret* (Nice) [An Acheulean hut in Lazaret Cave]. *Mémoires de la Société Préhistorique Française, 7.*

de Lumley, H. (1976). Grotte du Lazaret. In *Sites paléolithiques de la région de Nice et grottes de Grimaldi* (9th UISPP meeting, pp. 53–75). Nice, France: Union Internationale des Sciences Pré et Protohistoriques.

De Roy, T. (2000). *Galapagos: Islands born of fire.* London: Warwick House.

de Saussure, F. (1974). *Course in general linguistics* (Wade Baskin, Trans.). London: Fontana/Collins.

De Schlippe, P. (1956). *Shifting cultivation in Africa.* London: Routledge & Kegan Paul.

De Vore, I. (1992). An interview with Sherwood Washburn. *Current Anthropology, 33*(4), 411–423.

De Waal, F. (1989). *Peacemaking among primates.* Cambridge, MA: Harvard University Press.

De Waal, F. (1990). *Peacemaking among primates.* Cambridge, MA: Harvard University Press.

De Waal, F. (1996). *Good natured: The origins of right and wrong in humans and other animals.* Cambridge, MA: Harvard University Press.

De Waal, F. (1997). *Bonobo, the forgotten ape.* Berkeley: University of California Press.

De Waal, F. (2000). *Chimpanzee politics: Power and sex among apes.* Baltimore: Johns Hopkins University Press.

De Waal, F. (2001). *The ape and the sushi master, cultural reflections of a primatologist.* New York: Basic Books.

De Waal, F. (2002). *Tree of origin: What primate behavior can tell us about human social evolution.* Cambridge, MA: Harvard University Press.

De Waal, F. (2003). *My family album: Thirty years of primate photography.* Berkeley: University of California Press.

De Waal, F. B. M. (1997). *Bonobo: The forgotten ape.* Berkeley: University of California Press.

De Waal, F. B. M. (2001). *Tree of origin: What primate behavior can tell us about human social evolution.* Cambridge: Harvard University Press.

De Waal, F. B. M. (2005). *Our inner ape: A leading primatologist explains why we are who we are.* New York: Riverhead Books.

Deacon, H. J., & Deacon, J. (1999). *Human beginnings in South Africa: Uncovering the secrets of the Stone Age.* Cape Town, South Africa: David Philip.

Deacon, T. W. (1997). *The symbolic species.* New York: Norton.

Dean, B., & Levi, J. M. (Ed.). (2003). *At the risk of being heard: Identity, indigenous rights, and postcolonial states.* Ann Arbor: University of Michigan Press.

Dean, K. (1993). *Taoist ritual and popular cults of southeast China.* Princeton, NJ: Princeton University Press.

Debaine-Francfort, C. (1999). *The search for ancientChina.* New York: Harry N. Abrams, Inc.

Debenidetti, C. (1990). *Give peace a chance.* Syracuse, NY: Syracuse University Press.

DeBoer, W. R. (1986). Pillage and production in the Amazon: A view through the Conibo of the Ucayali Basin, eastern Peru. *World Archaeology, 18,* 231–246.

DeBoer, W. R. (2004). Little Bighorn on the Scioto: The Rocky Mountain connection to Ohio Hopewell. *American Antiquity, 69*(1), 85–107.

Decker, S. H., & Van Winkle, B. (1996). *Life in the gang: Family, friends, and violence.* New York: Cambridge University Press.

Degler, C. N. (1991). *In search of human nature. The decline and revival of Darwinism in American social thought.* New York: Oxford University Press.

DeGrood, D. H. (1965). *Haeckel's theory of the unity of nature.* Boston: Christopher.

Dehaene, S., Duhamel, J.-R., Hauser, M. D., & Rizzolatti, G. (Eds.). (2005). *From monkey brain to human brain.* Cambridge, MA: MIT Press.

DeJong, P., & Berg, I. K. (1998). *Interviewing for solutions.* Pacific Grove, CA: Brooks/Cole.

Delagnes, A., Brugal, J.-P., Feibel, C., Kibunjia, M., Mourre,V., & Texier, P.-J. (1999). Early hominid stone tool production and technical skill 2.34 Myr ago in West Turkana, Kenya. *Nature, 399,* 57–60.

Deloria, E. (1998). *Speaking of Indians* (Introduction by V. Deloria Jr). Lincoln: University of Nebraska Press. (Original work published 1944).

Deloria,V. Jr. (1969). *Custer died for your sins: An Indian manifesto.* New York:Macmillan.

Deloria,V. Jr. (1995). *Red earth, white lies: Native Americans and the myth of scientific fact.* New York: Scribner.

Delson, E. (Ed.). (1985). *Ancestors: The hard evidence.* New York: Alan R. Liss.

Delson, E., Tattersall, I., van Couvering, J. A., & Brooks, A. S. (Eds.). (2000). *Encyclopedia of human evolution and prehistory.* New York: Garland.

Delson, E., Tattersall, I.,Van Couvering, J., & Brooks, A. S. (Eds.). (2000). *Encyclopedia of human evolution and prehistory* (2nd ed.). New York: Garland.

DelVecchio Good, C., James, M-J., Good, B., & Becker, A. E. (2002). The culture of medicine and racial, ethnic, and class disparities in health care. Supplement to Brian D. Smedley, Adriennne Y. Stith, & Alan Nelson (Eds.), *Unequal treatment: Confronting racial and ethnic disparities in health care.* Washington, DC: National Academies Press.

DeMallie, R. (1980). Ella Cara Deloria. In B. Sicherman (Ed.), *Notable American women, the modern period: A bibliographical dictionary* (pp. 183–185). Cambridge, MA: Harvard University Press.

DeMallie, R. J. Jr. (1982). The Lakota Ghost Dance: An ethno-historical account. *Pacific Historical Review, 51,* 385–405.

Denbow, J. (1999). Heart and soul: Glimpses of ideology and cosmology in the iconography of tombstones from the Loango Coast of Central Africa. *Journal of American Folklore, 112,* 404–423.

Dennett, D. C. (1984). *Elbow room.* Massachusetts: Boston: MIT Press.

Dennett, D. C. (1987). *The intentional stance.* Boston: MIT Press.

Dennett, D. C. (1991). *Consciousness explained.* New York: Back Bay Books.

Dennett, D. C. (1993). *Brainstorms.* Boston: MIT Press.

Dennett, D. C. (1995). *Darwin's dangerous idea: Evolution and the meanings of life.* New York: Simon & Schuster.

Denno, D. (1985). *Biological, psychological, and environmental factors in delinquency and mental disorders.* Westport, CT: Greenwood Press.

Denzin, N., & Lincoln, L. (Eds.). (1994). *Handbook of qualitative research.* Thousand Oaks, CA: Sage.

Deraniyagala, S. U. (1992). *The prehistory of Sri Lanka: An ecological perspective* (2 vols.). Colombo, Sri Lanka: Department of the Archaeological Survey, Government of Sri Lanka.

Des Chene, M. (1996). Symbolic anthropology. In D. Levinson & M. Ember (Eds.), *Encyclopedia of cultural anthropology* (pp. 1274–1278). New York: Holt.

Desai, G. (2001). *Subject to colonialism: African self-fashioning and the colonial library.* Durham, NC: Duke University Press.

DeSalle, R., & Yudell, M. (2005). *Welcome to the genome: A user's guide to the genetic past, present, and future.* Hoboken, NJ: Wiley.

DeSantis, L. (2001). Culture reorientation of registered nurse students. *Journal of Transcultural Nursing, 12*(4), 310–318.

Desjarlais, R., Eisenberg, L., Good, B., & Kleinman, A. (Eds.). (1995). W*orld mental health: Problems and priorities in low income countries.* Oxford: Oxford University Press.

Deutscher, I. (1973). *Marxism in our time.* Palo Alto, CA: Ramparts Press.

Devall, B., & Sessions, G. (1985). *Deep ecology.* Salt Lake City, Utah. Peregrine Smith.

Devereux, G. (1961). *Mohave ethnopsychiatry.* Washington, DC: Smithsonian Institution, Government Printing Office.

Devereux, G. (1961). Two types of modal personality models. In B. Kaplan (Ed.), *Studying personality cross-culturally* (pp. 227–241). Evanston, IL: Row, Peterson.

DeVore, I. (Ed.). (1965). *Primate behavior: Field studies of monkeys and apes.* New York: Holt, Rinehart & Winston.

DeVore, I., & Eimerl, S. (1965). *The primates.* New York: Life Natural Library, Time.

DeVore, I., & Lee, R. B. (Eds.). (1968). *Man the hunter.* Chicago: Aldine.

DeVore, I., & Lee, R. B. (Eds.). (1976). *Kalahari hunter-gatherers.* Cambridge, MA: Harvard University Press.

DeVries, R., van Teijlingen, E., Wrede, S., & Benoit, C. (Eds.). (2001). *Birth by design: Pregnancy, maternity care, and midwifery in North America and Europe.* New York: Routledge.

DeWalt, K. M., & DeWalt, B. R. (2001). *Participant observation: A guide for fieldworkers.* Walnut Creek, CA: AltaMira.

Dewar, E. (2001). *Bones: Discovering the first Americans.* New York: Carroll & Graf.

Dewey, J. (1956). *The child and the curriculum* and *the school and society* (Combined ed.). Chicago:

Dewey, J. (1958/1925). *Experience and nature.* New York: Dover Publications.

Dewey, J. (1965). *The influence of Darwin on philosophy and other essays in contemporary thought.* Bloomington: Indiana University Press.

Dewsbury, D. A. (2000). *Encyclopedia of psychology.* New York: Oxford University Press.

Di Leonardo, M. (1991). *Gender at the crossroads of knowledge: Feminist anthropology in the postmodern era.* Berkeley: University of California Press.

Di Leonardo, M. (1998). *Exotics at home: Anthropologies, others, American modernity.* Chicago: University of Chicago Press.

Diamond, J. (1992). *The third chimpanzee: The evolution and future of the human animal.* New York: HarperCollins.

Diamond, J. (1997). *Why is sex fun?: The evolution of human sexuality.* New York: Basic Books.

Diamond, J. M. (1992). *The third chimpanzee: The evolution and future of the human animal.* New York: Perennial.

Diamond, J. M. (1999). *Guns, germs, and steel: The fates of human societies.* New York: Norton.

Diamond, J. M. (2004). *Collapse: How societies choose to fail or succeed.* New York: Viking.

Diamond, S. (Ed.). (1978). *Culture in history: Essays in honor of Paul Radin.* New York: Octagon Books.

Díaz Martínez, A. (1969). *Ayacucho: Hambrey Esperenza.* [Ayacucho: Hunger and hope]. Ayacucho, Peru: Ediciones Waman Puma.

Diaz, C. F. (2001). *Multicultural education in the 21st century.* New York: Longman.

Diaz, C. F., Massialas, B. G., & Xanthopoulos, J. A. (1999). *Global perspectives for educators.* Boston: Allyn & Bacon.

Dibble, H. L., & Mellars, P. (1992). *The Middle Paleolithic: Adaptation, behavior, and variability.* Philadelphia: University of Pennsylvania.

Dick, S. J. (1996). *The biological universe: The Twentieth-century extraterrestrial life debate and the limits of science.* Cambridge, UK: Cambridge University Press.

Dickie, G. (1997). *Introduction to aesthetics: An analytic approach.* Oxford, UK: Oxford University Press.

Dickinson, O. (1994). *The Aegean Bronze Age.* Cambridge: Cambridge University Press.

Dickstein, M., (Ed.) (1998). *The revival of pragmatism.* Durham, NC: Duke University Press.

Diels, H., & Kranz, W. (1996). Protagoras. *Die Fragmente der Vorsokratiker* (Vol. II, Sec. 80. pp. 253–271). Zurich: Weidmann.

Diels, H., & Kranz, W. (1996). Xenophanes. *Die Fragmente der Vorsokratiker* (Vol. I, Sec. 21, pp. 113–139). Zurich: Weidmann.

Dietler, M., & Hayden, B. (Ed.). (2001). *Feasts: Archaeological and ethnographic perspectives on food, politics, and power.* Washington, DC: Smithsonian Institution Press.

Dietler, M., & Hayden, B. (Eds.). (2001). *Feasts: Archaeological and ethnographic perspectives on food, politics, and power.* Washington, DC: Smithsonian Institution Press.

Diggins, J. P. (1994). *The promise of pragmatism: Modernism and the crisis of knowledge and authority.* Chicago, IL: University of Chicago Press.

Dillehay, T. D. (2000). *The settlement of the Americas: A new prehistory.* New York: Basic Books.

Dincauze, D. F. (2000). *Environmental archaeology: Principles and practice.* Cambridge: Cambridge University Press.

Dinneen, F. P. (1967). *An introduction to general linguistics.* New York: Holt, Rinehart & Winston.

Diop, C. A. (1996). *Towards the African renaissance, essays in culture & development* (1946–1960). Egbuna P. Modum, trans. London: Karnak House.

Dixon, D. (1988). *The new dinosaurs: An alternative evolution.* New York: HarperCollins.

Dobzhansky, T. (1937). *Genetics and the origin of species.* New York: Columbia University Press.

Dolgin, J. L., Kemnitzer, D. S., & Schneider, D. M. (Eds.). (1977). *Symbolic anthropology: A reader in the study of symbols and meanings.* New York: Columbia University Press.

Dolukhanov, P. M., Kozlowski, S. K., & Kozlowski, J. K. (1980). *Multivariate analysis of Upper Palaeolithic and*

Mesolithic stone assemblages. Warsaw-Kraków, Poland: Panstwowe wydawnictwo naukowe.

Dominguez-Rodrigo, M., et al. (2001). Woodworking activities by early humans: A plant residue analysis on Acheulian stone tools from Peninj (Tanzania). *Journal of Human Evolution, 40,* 289–299.

Donham, D. (1999). *History power, ideology: Central issues in Marxist anthropology.* Berkeley: University of California Press.

Donington, R. (1984). *Wagner's* Ring *and its symbols.* New York: Faber & Faber.

Donovan, S. K. (Ed.). (1991). *The processes of fossilization.* London: Belhaven Press.

Dorson, M. (1999). *History of British folklore: The British folklorists, a history* (Vol. 1). London & New York: Routledge.

Dos Santos, T. (1970). The structure of dependence. *American Economic Review, 60*(May), 231–236.

Dosse, F. (1997). *History of structuralism* (Vols. I and II). Minneapolis: University of Minnesota Press.

Doty, W. G. (1986). *Mythography: The study of myths and rituals.* Tuscaloosa: University of Alabama Press.

Douglas, M. (1966). *Purity and danger. An analysis of the concepts of pollution and taboo.* London: Routledge & Kegan Paul.

Douglas, M. (1966). *Purity and danger: An analysis of the concepts of pollution and taboo.* London: Routledge & Kegan Paul.

Douglas, M. (1970). *Natural symbols: Explorations in cosmology.* New York: Vintage Books.

Douglas, M., & Isherwood, B. (Ed.). (1979). *The world of goods: Towards an anthropology of consumption.* New York: Routledge.

Douglass, A. E. (1920). Evidence of climatic effects in the annual rings of trees. *Ecology, 1*(1), 24–32.

Dover, G. A. (2000). *Dear Mr. Darwin.* Berkeley: University of California Press.

Downes, D. (1982). *Understanding deviance.* Oxford: Clarendon Press.

Downey, R. (2000). *The riddle of the bones: Politics, science, and the story of Kennewick Man.* New York: Copernicus.

Dowson, T. A. (1998). Rock art: Handmaiden to studies of cognitive evolution. In C. Renfrew & C. Scarre (Eds.), *Cognition and material culture: The archaeology of symbolic storage* (pp. 67–76). Cambridge:McDonald Institute for Archaeological Research.

Doyle, P. (1996). *Understanding fossils: An introduction to invertebrate palaeontology.* Bath: John Wiley & Sons.

Drake, F., & Sobel, D. (1992). *Is anyone out there: The scientific search for extraterrestrial intelligence.* New York: Delacorte.

Duany, W., & Duany, J. (2000). Genesis of the crisis in the Sudan. In J. Spaulding & S. Beswick (Eds.) *White Nile, black blood.* Trenton, NJ: The Red Sea Press.

Dubisch, J. (1981)."You are what you eat": Religious aspects of the health food movement. In S. P. Montague & W. Arens (Eds.), *The American dimension: Culture myths and social realities* (2nd ed., pp. 115–127). Palo Alto, CA: Mayfield.

DuBois, C. (1944). *The people of Alor: A social–psychological study of an East Indian island.* Minneapolis: University of Minnesota Press.

Dubois, E. (1896). On Pithecanthropus erectus: A transitional form between man and the apes. *The Journal of the Anthropological Institute of Great Britain and Ireland, 25,* 240–255.

Dubois, E. (1937). On the fossil human skulls recently discovered in Java and Pithecanthropus Erectus. *Man, 37,* 1–7.

DuBois, T. A. (1999). *Nordic religions in the Viking Age.* Philadelphia: University of Pennsylvania Press.

Duff, A. (1993). *Māori: The crisis and the challenge.* Auckland, New Zealand: HarperCollins.

Duffy, K. (1976). *Pygmies of the rain forest* [video]. Santa Monica, CA: Pyramid Film & Video.

Duffy, K. (1984). *Children of the forest: Africa's Mbuti Pygmies.* Prospect Heights, IL: Waveland.

Duffy, K. (1986). The Mbuti Pygmies: Past, present, and future. *Anthroquest, 34.*

Duffy, M. P., & Gillig, S. E. (2004). *Teen gangs: A global view.* Westport, CT: Greenwood Press.

Dumont, L. (1970). *Homo Hierarchicus.* Chicago: University of Chicago Press.

Dumont, L. (1971). *Introduction à deux théories d'anthropologie sociale. Groupes de filiation et alliance de mariage.* Paris:Mouton.

Dunn, J. T. (1948). *The true, moral, and diverting tale of The Cardiff Giant, or, The American Goliath.* Cooperstown, NY: Farmers'Museum.

Dupanloup, I., Pereira, L., Bertorelle, G., Calafe, F. Prata, M. J., Amorim, A., et al. (2003). A recent shift from polygyny to monogamy in humans is suggested by the analysis of worldwide Y-chromosome diversity. *Journal of Molecular Evolution, 57,* 85–97.

Dupre, L. (2004). *The Enlightenment & the intellectual foundations of modern culture.* New Haven, CT: Yale University Press.

Durand, G. (1999). *The anthropological structures of the imaginary.* Brisbane, Australia: Boombana.

Duranti, A. (1997). *Linguistic anthropology.* New York: Cambridge University Press.

Durkheim, É. (1915). *The elementary forms of the religious life* (J. W. Swain, Trans.). London: George Allen & Unwin.

Durkheim, É. (1933). *Émile Durkheim on the division of labor in society.* New York: Free Press.

Durkheim, É. (1965). *The elementary forms of the religious life.* New York: Free Press. (Original work published 1915)

Durkheim, É. (1983/1997). *The division of labor in society.* New York: Free Press.

Durrenberger, E. P. (Ed.). (1984). *Chayanov, peasants, and economic anthropology.* Orlando, FL: Academic Press.

Dwyer, K. (1991). *Arab voices.* Berkeley: University of California Press.

Dyen, I., & Aberle, D. F. (1974). *Lexical reconstruction: The case of the proto-Athapaskan kinship system.* Cambridge, UK: Cambridge University Press.

Dyke, N. (1990). Cultures, communities and claims: Anthropology and Native studies in Canada. *Canadian Ethnic Studies, 22*(3), 40–55.

Dyson, F. (1999). *Origins of life* (rev. ed.). Cambridge, UK: Cambridge University Press.

Dyson-Hudson, R., & Dyson-Hudson, N. (1980). Nomadic pastoralism. *Annual Review of Anthropology, 9,* 15–61.

Eagan, G. (1989). *The skilled helper.* Pacific Grove, CA: Brooks/Cole.

Eagen, J. (2002). *The Aymara of South America.* Minneapolis, MN: Lerner.

Eagleton, T. (1991). *Ideology: An introduction.* London, New York: Verso.

Eagleton, T. (2000). *The idea of culture.* Oxford, UK: Blackwell.

Eagleton, T. (Ed.). (1989). *Raymond Williams: Critical perspectives.* Boston: Northeastern University Press.

Earle, T. K. (1997). *How chiefs come to power: The political economy in prehistory.* Stanford: Stanford University Press.

Eastland, T. (1997). *Ending affirmative action: The case of colorblind justice.* New York: Basic Books.

Easton, D., Gunnell, J. C., & Graziano, L. (Eds.). (1991). *The development of political science: A comparative survey.* New York: Routledge.

Eck, D. (1998). *Darsan: Seeing the divine image in India* (3rd ed.). New York: Columbia University Press.

Edelman, M. (1999). *Peasants against globalization: Rural social movements in Costa Rica.* Stanford: Stanford University Press.

Edey, M. A., & Johanson, D. C. (1992). *Blueprints: Solving the mystery of evolution.* New York: Little Brown.

Edgar, A., & Sedgwick, P. (Eds.). (2002). *Cultural theory. The key concepts.* London: Routledge.

Edwards, E. S. (1961). *The pyramids of Egypt.* Harmondsworth, UK: Penguin.

Edwards, W. N. (1967). *The early history of palaeontology.* Kettering: British Museum of Natural History.

Egenter, N. (1986, September). Software for a soft prehistory; Structural history and structural ergology as applied to a type of universally distributed "soft industry": Sacred territorial demarcation signs made of nondurable organic materials. In *Archaeological "objectivity" in interpretation* (Vol. 2). [Precirculated papers]. The World Archaeological Congress, Southampton and London. Southampton, UK: Allen & Unwin.

Egenter, N. (1990). Evolutionary architecture: Nestbuilding among higher apes. *International semiotic spectrum of the Toronto semiotic circle, 14* (September), 1–4.

Egenter, N. (1992). *Architectural anthropology—Research Series: vol. 1. The present relevance of the primitive in architecture* (trilingual ed. : English-French-German). Lausanne, Switzerland: Editions Structura Mundi.

Egenter, N. (1994). *Architectural anthropology—Semantic and symbolic architecture: An architectural-ethnological survey of one hundred villages of Central Japan.* Lausanne, Switzerland: Editions Structura Mundi.

Egenter, N. (1994). Semantic architecture and the interpretation of prehistoric rock art: An ethno-(pre-) historical approach. *Semiotica, 100,* 2/4, 201–266.

Egenter, N. (2001). The deep structure of architecture: Constructivity and human evolution. In Mari-Jose Amerlinck (Ed)., *Architectural anthropology* (pp. 43–91). Westport CT: Bergin & Garvey.

Ehrlich, P. R., Dobkin, D. S., & Wheye, D. (1988). *The birder's handbook: A field guide to the natural history of North American birds.* New York: Simon & Schuster.

Ehrlich, P., & A. Ehrlich. (1990). *The population explosion.* New York: Simon & Schuster.

Eibl-Eibesfeldt, I. (1975). *Ethology: The biology of behavior* (2nd ed.). New York: Holt, Rinehart & Winston.

Eicher, J., Johnson, K., & Torntore, S. J. (2003). Fashion foundations: Early writings on fashion and dress. New York: Burg.

Eickelman, D. F. (2001). *The Middle East and Central Asia: An anthropological approach* (4th ed.). Englewood Cliffs, NJ: Prentice Hall.

Eigen, M., & Winkler, R. (1981). *Laws of the game: How the principles of nature govern chance.* New York: A. A. Knopf.

Eigen, M., & Winkler-Oswatitsch, R. (1992). *Steps toward life: A perspective on evolution.* Oxford, UK: Oxford University Press.

Eiseley, L. (1957). Neandertal man and the dawn of human paleontology. *Quarterly Review of Biology, 32*(4), 323–329.

Eisenstein, E. (1983). *The printing revolution in Early Modern Europe.* New York: Cambridge University Press.

El Guindi, F. (2004). *Visual anthropology: Essential method and theory.* Walnut Creek, CA: Alta Mira Press.

El Saawadi, N. (1997). *The Nawal El Saadawi reader.* London: Zed Press.

Eldredge, N. (Ed.). (2000). *The triumph of evolution and the failure of creationism.* New York: Freeman.

Eldridge, N., & Gould, S. J. (1972). Punctuated equilibria: An alternative to phyletic gradualism. In T. J. M. Schopf (Ed.), *Models in paleobiology* (pp. 82–115). San Francisco: Freeman, Cooper.

Eliade, M. (1952). Images et symboles. *Essais sur le symbolisme magico-religieux.* Paris: Gallimard Coll.

Eliade, M. (1959). *The sacred and the profane: The nature of religion.* New York: Harcourt, Brace.

Eliade, M. (1963). *Patterns in comparative religion.* New York: World Publishing.

Eliade, M. (1972). Shamanism: Archaic techniques of ecstasy (W. R. Trask, Trans.). Princeton, NJ: Princeton University Press.

Eliade, M. (1974). *Le Chamanisme et les techniques archaïques de l'exstase.* Paris: Payot.

Eliade, M. (1979). *Patterns in comparative religion.* London: Sheed & Ward.

Eliade, M. (1979). *The forge and the crucible: The origins and structure of alchemy.* Chicago: University of Chicago Press.

Elkin, A. P. (1954). *The Australian Aborigines: How to understand them.* Sydney, Australia: Angus & Robertson.

Eller, C. (2000). *The myth of matriarchal prehistory. Why an invented past won't give women a future.* Boston: Beacon Press.

Ellis, A. (1995). *Better, deeper, and more enduring brief therapy.* New York: Brunner/Mazel.

Ellis, W. D. (1974). *A source book of Gestalt psychology.* London: Routledge & Kegan Paul.

Ellul, J. (1964). *The technological society.* New York: Vintage.

Elphick, R., & Davenport, T.R.H. (1997). *Christianity in South Africa: A political, social, and cultural history.* Berkeley: University of California Press.

Eluère, C. (1993). *The Celts: Conquerors of ancient Europe.* New York: Abrams.

Ember, C. (1978). Myths about hunter–gatherers. *Ethnology, 17,* 439–448.

Ember, C. R., & Ember, M. (2004). *Cultural anthropology* (11th ed.). New Jersey: Pearson Prentice Hall.

Ember, M., & Ember, C. (Eds.). (2004). *Encyclopedia of medical anthropology.* Dordrecht, The Netherlands: Kluwer.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). Writing ethnographic fieldnotes. Chicago: University of Chicago Press.

Emmons, G. T. (1991). *The Tlingit Indians.* F. de Laguna (Ed.). London and Seattle, WA: University of Washington Press.

Encyclopedia of Philosophy. (1967). New York: Collier MacMillan Publishers.

Endicott, K. (1979). *Batek negrito religion: The worldview and rituals of a hunting and gathering people of peninsular Malaysia.* Oxford: Clarendon Press.

Engelbrecht, W. E. (1971). A stylistic analysis of New York Iroquois pottery. (Doctoral dissertation, University of Michigan, 1971). *University Microfilms International.*

Engelbrecht, W. E. (2003). *Iroquoia: The development of a native world.* Syracuse, NY: Syracuse University Press.

Engelbrecht, W. E., & Grayson, D. K. (Eds.). (1978). *Essays in Northeastern anthropology in memory of Marian E. White. Occasional Publications in Northeastern Anthropology, 5.*

Engels, F. (1975). *Origin of the family, private property, and the state.* New York: International Publishers.

Engels, F. (1977). *Dialectics of nature.* New York: International Publishers Engels, F. (1978). *Anti-during.* New York: International Publishers.

Engineer, A. A. (1992). *The rights of women in Islam.* London: Hurst.

Enochs, R. A. (1996). *The Jesuit Mission to the Lakota Sioux: Pastoral theology and ministry, 1886–1945.* Kansas City, MO: Sheed & Ward.

Epstein, A. L. (1992). *In the midst of life.* Berkeley: University of California Press.

Erickson, P. A., & Murphy, L. D. (2003). *A history of anthropological theory* (2nd ed.). Peterborough, Canada: Broadview Press.

Escobar, A. (1995). *Encountering development: The making and unmaking of the Third World.* Princeton, NJ: Princeton University Press.

Etkin, N. L. (1993). Anthropological methods in ethnopharmacology. *Journal of Ethnopharmacology 38,* 93–104.

Etler, D. A. (1996). The fossil evidence for human evolution in Asia. *Annual Review of Anthropology, 25,* 275–301.

Evans, S. T. (1992). The productivity of maguey terrace agriculture in Central Mexico during the Aztec period. In T. W. Killion (Ed.), *Gardens of prehistory: The archaeology of settlement agriculture in greater Mesoamerica* (pp. 92–115). Tuscaloosa: University of Alabama Press.

Evans-Pritchard, E. E. (1937). *Witchcraft, oracles and magic among the Azande.* Oxford: Clarendon Press.

Evans-Pritchard, E. E. (1940). *The Nuer: A description of the modes of livelihood and political institutions of a Nilotic People.* Oxford: Oxford University Press.

Evans-Pritchard, E. E. (1949). *The Sanusi of Cyrenaica.* Oxford, UK: Clarendon.

Evans-Pritchard, E. E. (1951). *Kinship and marriage among the Nuer.* Oxford: Oxford University Press.

Evans-Pritchard, E. E. (1956). *Nuer religion.* Oxford: Oxford University Press.

Evans-Pritchard, E. E. (1965). *Theories of primitive religion.* Oxford, UK: Clarendon Press.

Evans-Pritchard, E. E. (1967). *The Zande trickster.* Oxford: Clarendon.

Evans-Pritchard, E. E. (1971). *Azande history and political institutions.* Oxford: Clarendon.

Eve, R. A. (1990). *The creationist movement in modern America.* Boston: Twayne.

Ewens, W. J., & Grant, G. R. (2005). *Statistical methods in bioinformatics: An introduction (Statistics for biology and health)* (2nd ed.). New York: Springer.

Ewers, J. C. (1958). *The Blackfeet: Raiders on the northwestern Plains.* Norman: University of Oklahoma Press.

Fa, J. E., & Lindberg, D. G. (Eds.). (1996). *Evolution and ecology of macaque societies.* Cambridge: Cambridge University Press.

Fa, J. E., & Lindburg, D. G. (Eds.). (1996). *Evolution and ecology of macaque societies.* Cambridge, UK: Cambridge University Press.

Fabre, J.-H. (1920). *Social Life in the insect world* (B. Miall, Trans.). London: T. F. U.

Fagan, B. (1999). *Floods, famines, and emperors: El Niño and the fate of civilizations.* New York: Basic Books.

Fagan, B. M. (1996). *The Oxford companion to archaeology.* Oxford: Oxford University Press.

Fagan, B. M. (1999). *Archaeology: A brief introduction* (7th ed.). Englewood Cliffs, NJ: Prentice Hall.

Fagan, B. M. (2004). Retrospect (But certainly not a necrology!). *Antiquity, 78,* 173–183.

Fagan, B. M. (2005). *A brief history of archaeology: Classical times to the twenty-first century.* Upper Saddle River, NJ: Pearson Prentice Hall.

Fagan, B. M. (2005). *World prehistory: A brief introduction,* 6th ed. Upper Saddle River: Pearson Prentice Hall.

Fagan, Brian M. *1998 People of the Earth, 9th Edition.* New York: Longman.

Falk, D. (1997). Brain evolution in females: An answer to Mr. Lovejoy. In L. Hager (Ed.), *Women in human evolution.* London: Routledge, 114–136.

Falk, D. (2000). *Primate diversity.* New York: W. W. Norton.

Falk, D., & Seguchi, N. (2006). Professor C. Loring Brace: Bringing physical anthropology ("kicking and screaming") into the 21st century! In Derek Brereton (Ed.), M*ichigan Discussions in Anthropology* (Vol. 16).

Falk, J. H., & Dierking, L. D. (2000). *Learning from museums: Visitor experiences and the making of meaning.* Walnut Creek, CA: AltaMira.

Farber, M. (1967). *Phenomenology and existence: Toward a philosophy within nature.* New York: Harper Torchbooks.

Farber, M. (1968). *Basic issues of philosophy: Experience, reality, and human values.* New York: Harper Torchbooks.

Farber, M. (1968). *Naturalism and subjectivism.* Albany: State University of New York Press.

Farber, P. L. (1998). *The temptations of evolutionary ethics.* Berkeley: University of California Press.

Fardon, R. (1999). *Mary Douglas: An intellectual biography.* New York: Routledge.

Farganis, J. (Ed.). (2004). *Readings in social theory: The classic tradition to post-modernism.* New York: McGraw Hill.

Farlax Inc. (2004). *Native American Church.* The FreeDictionary.com. Retrieved May 19, 2005 from http://encyclopedia. thefreedictionary. com

Farlow, J. O., & Brett-Surman, M. K. (Eds.). (1997). *The complete dinosaur.* Bloomington: Indiana University Press.

Farmer, P. (1999). *Infections and inequalities: The modern plagues.* Berkeley: University of California Press.

Farmer, P. (2003). *Pathologies of power: Health, human rights, and the new war on the poor.* Berkeley: University of California Press.

Farmer, P. E. (2003). *Pathology of power.* Berkeley: University of California Press.

Farnsworth, P. (Ed.). (2001). *Island lives: Historical archaeologies of the Caribbean.* Tuscaloosa: University of Alabama Press.

Farr, J., & Seidelman, R. (Eds.). (1993). *Discipline and history: Political science in the United States.* Ann Arbor, MI: University of Michigan Press.

Faser, A. (1995). *The Gypsies.* Oxford, UK: Basil Blackwell.

Fash, W. L. (2001). *Scribes, warriors and kings: The city of Copan and the ancient Maya* (rev. ed.). London: Thames & Hudson.

Fasold, R. (1990). *Sociolinguistics of language.* Oxford: Blackwell.

Faulkner, R. O. (1998). *The ancient Egyptian pyramid texts.* Oxford: Oxford University Press.

Feagle, J. (1999). *Primate adaptation and evolution* (2nd ed.). San Diego, CA; Academic Press.

Feder, K. L. (2000). *The past in perspective: An introduction to human prehistory.* Mountain View, CA: Mayfield.

Feder, K. L. (2002). *Frauds, myths, and mysteries: Science and pseudoscience in archaeology* (4th ed.). Boston: McGraw-Hill.

Feder, K. L. (2005). *Frauds, myths, and mysteries: Science and pseudoscience in archaeology.* New York: McGraw-Hill.

Fedigan, L. M., & Asquith, P. J. (Eds.). (1991). *The monkeys of Arashiyama.* Albany: State University of New York Press.

Fedigan, L. M., Fragaszy,D. M., & Visalberghi, E. A. (2004). The *complete capuchin: The biology of the genus Cebus.* Cambridge: Cambridge University Press.

Feijoo, M. del C., & Gogna, M. (2002). Women in the transition to democracy: Argentina's mothers of the Plaza de Mayo. In D. B. Heath (Ed.), *Contemporary cultures and societies of Latin America* (3rd ed., pp. 375–383). Prospect Heights, IL:Waveland Press.

Feil, E. (1986). *Religio: die Geschichte eines neuzeitlichen Grundbegriffs vom Frühchristentum bis zur Reformation.* Göttingen, Germany: Vandenhoeck & Ruprecht.

Fein, H. (1984). *Scenarios of genocide: Models of genocide and critical responses.* London: Westview Press.

Feinberg, J., & Hyman, G. (1980). *Philosophy of law.* Belmont, CA: Wadsworth.

Feinberg, R. (Ed.). (1995). *Seafaring in the contemporary Pacific Islands: Studies in continuity and change.* DeKalb, IL: Northern Illinois University Press.

Feinberg, R., & Ottenheimer, M. (Eds.). (2001). *The cultural analysis of kinship: The legacy of David M. Schneider.* Urbana: University of Illinois Press.

Feintuch, B. (Ed.). (1988). *The conservation of culture: Folklorists and the public sector.* Lexington: University of Kentucky Press.

Feldman, D. A., & Miller, J. W. (Eds.). (1998). *The AIDS crisis: A documentary history.* Westport, CT: Greenwood Press.

Fenton, W. N. (1969). J. F. Lafitau (1681–1746): Precursor of scientific anthropology. *Southwestern Journal of Anthropology, 25*(2), 173–187.

Fenton, W. N. (1974). Joseph-François Lafitau, S. J. (1681–1746). In *Dictionary of Canadian biography* (Vol. 3, pp. 334–338). Toronto: University of Toronto Press.

Ferguson, C. A. (1996). *Socio-linguistic perspectives* (T. Huebner, Ed.). Oxford: Oxford University Press.

Ferguson, R. B. (1995). *Yanomami warfare: A political history.* Santa Fe: School of American Research Press.

Ferguson, R. B. (2001). Materialist, cultural and biological theories on why Yanomami make war. *Anthropological Theory, 1*(1), 99–116.

Ferguson, R. B., & Whitehead, N. L. (Eds.). (1992). *War in the tribal zone: Expanding states and indigenous warfare.* Seattle: University of Washington Press.

Fernandes (Eds.), *Anthropologists at work: An introductory Reader* (2nd ed.). Cambridge, UK: Pearson.

Fernández-Jalvo, Y., Díez, J. C., Bermúdez de Castro, J. M., Carbonell, E., & Arsuaga, J. L. (1996). Evidence of early cannibalism. *Science, 271,* 277–278.

Fernández-Kelly, M. P. (1983). *For we are sold, I and my people: Women and industry in Mexico's frontier.* Albany: State University of New York Press.

Fernando, S. (2003). *Cultural diversity, mental health, and psychiatry: The struggle against racism.* London: Brunner/Routledge.

Fernea, E. (1965). *Guests of the sheik.* Garden City, NY: Doubleday/Anchor.

Ferraro, G. (2003). *Cultural anthropology.* Belmont, CA:Wadsworth.

Ferraro, K. F. (Ed.). (1990). *Gerontology: Perspectives and issues.* New York: Springer.

Ferrie, H. (1997). An interview with C. Loring Brace. *Current Anthropology 38*(5), 851–869. Reprinted by permission of C. Loring Brace.

Ferris, T. (2000). *Life beyond earth.* New York: Simon & Schuster.

Fersh, S. (Ed.). (1974). *Learning about peoples and cultures.* Evanston, IL:McDougal, Littell.

Fetterman, D. M. (1989). *Ethnography step by step.* Newbury Park, CA: Sage.

Feuerbach, L. (1980). *Thoughts on death and immortality.* Berkeley: University of California Press.

Feuerbach, L. (1986). *Principles of the philosophy of the future.* Indianapolis: Hackett.

Feuerbach, L. (1989). *The essence of Christianity.* Amherst, NY: Prometheus Books.

Fichte, I. H. (Ed.). (1971). *Fichtes* werke (11 vols.). (Reprint of the 19th-century edition). Berlin: Walter de Gruyter.

Fiedel, S. J. (1999). Older than we thought: Implications of corrected dates for Paleoindians. *American Antiquity 64,* 95–115.

Fields, E. (2001). *Cutting down the trees and sowing seeds: A social history of costal Guinea, 2000 BCE to 1889 CE.* Doctoral dissertation, University of Pennsylvania, Department of History.

Fienup-Riordan, A., Kaplan, L. D., & Silook, S. (2001). *Inupiaq and Yupik people of Alaska.* Anchorage, Alaska Geographic Society.

Fine, A. (1996). *The shaky game: Einstein, realism and the quantum theory* (2nd ed.). Chicago: University of Chicago Press.

Fingarette, H. (1972). *Confucianism: The secular as sacred.* New York: Harper & Row.

Finn, J. L. (1998). *Tracing the veins: Copper, culture, and community from Butte to Chuquicamata.* Berkeley: University of California Press.

Finnegan, R. (1970). *Oral literature in Africa.* Oxford, UK: Clarendon.

Finnegan, R. (1992). *Oral poetry: Its nature, significance and social context.* Bloomington: Indiana University Press.

Finney, B. (2003). *Sailing in the wake of the ancestors: Reviving Polynesian voyaging.* Honolulu, HI: Bishop Museum Press.

Finney, B. R. (1973). *Polynesian peasants and proletarians.* Cambridge, MA: Schenkman.

FirHammond, D. (1970). Magic: A problem in semantics. *American Anthropologist, 72,* 1349–1356.

Firmin, J.-A. (2002). *The equality of the human races.* Champagne: University of Illinois Press.

Firth, R. (1956). *Human types: An introduction to social anthropology.* New York: Barnes & Noble. (Original work published 1938)

Firth, R. (1966). *Malay fishermen: Their peasant economy.* Hamdon, CT: Archon Books. (Original work published 1946)

Firth, R. (1970). *Rank and religion in Tikopia.* London: Allen & Unwin.

Firth, R. (1973). *Symbols: Public and private.* Ithaca, NY: Cornell University Press.

Firth, R. (Ed.). (1957). *Man and culture: An evaluation of the work of Malinowski.* London: Routledge & Kegan Paul.

Firth, R. T. (1995). *Religion: A humanist approach.* New York: Routledge.

Fischer, A. (Ed.). (1995). *Man and sea in the Mesolithic.* Oxford, UK: Oxbow Books.

Fischer, M. M. J. (1980). *Iran: From religious dispute to revolution.* Cambridge, MA: Harvard University Press.

Fischer, S. (2004). *Modernity disavowed: Haiti and the cultures of slavery in the age of revolution.* Durham, NC: Duke University Press.

Fisher, R. A. (1930). *The genetical theory of natural selection.* Oxford: Clarendon Press.

Fishman, J. A. (Ed.). (1971). *Advances in the sociology of language use,* Vol. 1: *Basic concepts, theories, and problems: Alternative approaches.* The Hague, Netherlands: Mouton.

Fishman, S. B. (2000). *Jewish life and American culture.* Albany: State University of New York Press.

Fiske, S., & Chambers, E. (1996). The inventions of practice. *Human Organization, 55*(1), 1–12.

Fitton, J. L. (2002). *Peoples of the past: Minoans.* London: British Museum Press.

Flannery, K. V., & Marcus, J. (2000). Formative Mexican chiefdoms and the myth of the "mother culture." *Journal of Anthropological Archaeology, 19*(1), 1–37.

Flannery, R. (1939). *An analysis of coastal Algonquian culture.* Washington, DC: Catholic University of America Press.

Flannery, T. (2002). *The future eaters: An ecological history of the Australian lands and people.* Berkeley, CA: Grove Press.

Fleagle, J. G. (1999). *Primate adaptation and evolution* (2nd ed.). New York: Academic Press.

Flew, A. (1989). *An introduction to Western philosophy: Ideas and arguments from Plato to Popper.* London: Thames & Hudson.

Flood, G. (2004). *An introduction to Hinduism.* New Delhi: Cambridge University Press.

Flood, G. (Ed.). (2003). *The Blackwell companion to Hinduism.* Stirling, UK: University of Stirling.

Fluehr-Lobban, C. (2004). *Islam societies in practice* (2nd ed.). Gainesville: University Press of Florida.

Fluehr-Lobban, C. (Ed.). (2003). *Ethics and the profession of anthropology: Dialogue for ethically conscious practice.* Walnut Creek, CA: Alta Mira Press.

Fogelson, R. D. (1989). The ethnohistory of events and nonevents. *Ethnohistory, 36*(2), 133–147.

Folan, W. J. (1978). Coba, Quintana Roo, Mexico: An analysis of a prehispanic and contemporary source of *sascab. American Antiquity, 43*, 79–85.

Folan, W. J., Fletcher, L. A., & Kintz, E. R. (1979). Fruit, fiber, bark and resin. The social organization of a Maya urban center: Coba, Quintana Roo, Mexico. *Science, 204*, 697–701.

Folan, W. J., Kintz, E. R., & Fletcher, L. A. (1983). *Coba. A classic Maya metropolis.* New York: Academic Press.

Foley, D. E. (1991). The Fox Project: A reappraisal. *Current Anthropology, 40,* 171–191.

Foley, W. A. (1997). *Anthropological linguistics: An introduction.* Oxford, UK: Blackwell.

Foltz, R. C. (Ed.). (2003). *Worldviews, religion, and the environment.* Belmont, CA:Wadsworth/Thomson Learning.

Fomin, E. S. D. (1998). *Slave settlements in the Banyang country, 1800–1950.* Buea, Cameroon: University of Buea.

Foner, N. (Ed.). (2003). *American arrivals: Anthropology engages the new immigration.* Santa Fe, NM: School of American Research Press.

Ford, B. (1995). *Searching for King Tut.* New York: W. H. Freeman.

Formoso, B. (Ed.). (1996). *The link with nature and divine mediations in Asia.* Providence, RI: Berghahn Books.

Fortes, M. (1949). *The web of kinship among the Tallensi.* London: Oxford University Press.

Fortes, M., & Evans-Pritchard, E. E. (1940). *African political systems.* Oxford: Oxford University Press.

Fortey, R. (1998). *Life: A natural history of the first four billion years of life on earth.* New York: Alfred A. Knopf.

Fossey, D. (1983). *Gorillas in the mist.* Boston: Houghton Mifflin.

Foster, G. M., & Anderson, B. G. (1978). *Medical anthropology.* New York: John Wiley & Sons.

Foster, J. B. (2000). *Marx's ecology: Materialism and nature.* New York: Monthly Review.

Foucault, M. (1988–1990). *The history of sexuality* (3 vols.). New York: Vintage Books/Random House.

Foucault, M. (1995). *Discipline and punish.* New York: Vintage Books/Random House.

Foucault, M. (1998). *Madness and civilization.* New York: Vintage Books/Random House.

Foundation, S. (1994). *The U. N. system and NGOs: New relationships for a new era?* Twenty-fifth U. N. Issues Conference, Muscatine, Iowa.

Fouts, R. (1997). *Next of kin.* New York:William Morrow.

Fouts, R. S. (1973). Acquisition and testing of gestural signs in four young chimpanzees. *Science, 180*(4089), 978–980.

Fouts, R., & Mills, S. T. (1997). *Next of kin: My conversations with chimpanzees.* New York: HarperCollins.

Fouts, Roger, & Mills, Stephen. (1997). *Next of kin.* New York: William Morrow.

Fowler, B. (2001). *Iceman.* Chicago: University of Chicago Press.

Fowler, J. (1997). *Hinduism: Beliefs & practices.* Brighton, UK: Sussex Academic Press.

Fowler, J. (1999). *Humanism: Beliefs and practices.* Brighton, UK: Sussex Academic Press.

Fox Keller, E. (1992). *Secrets of life: Essays on language, gender and science.* London: Routledge.

Fox, K. (2002). *The big bang theory: What it is, where it came from, and why it works.* New York:Wiley.

Fox, R. (1984). *Kinship and marriage: An anthropological perspective.* Harmondsworth, UK: Penguin.

Fox, R. G. (Ed.). (1991). *Recapturing anthropology: Working in the present.* Santa Fe, NM: School of American Research Press.

Francis, G. (1883). *Inquiries into human faculty.* London: Macmillan.

Francis, G. (1908). *Memories of my life.* London: Methuen.

Francis, G. (1985). *Essays in eugenics* (Reprint of London, Eugenics Education Society). New York: Garland. (Original work published 1909)

Francisconi, M. J. (1998). *Kinship, capitalism change: The informal economy of the Navajo, 1868–1995.* New York: Garland.

Franco, B. (1990). *The Cardiff Giant: A hundred year old hoax.* Cooperstown, NY: New York State Historical Association.

Frängsmyr, T. (Ed.). (1984). *Linnaeus: The man and his work.* Berkeley: University of California Press.

Frank, A. G. (1967). *Capitalism and the underdevelopment in Latin America.* New York: Monthly Review.

Franke, K. (2001). Reine Rasse [Pure Race]. *Der Spiegel, 29,* 128–134.

Franklin, S., & Ragone, H. (1997). *Reproducing reproduction: Kinship, power, and technological innovation.* Philadelphia: University of Pennsylvania Press.

Franzen, J. L. (1985). What is *Pithecanthropus dubius* Koenigswald, 1950? In E. Delson (Ed.), *Ancestors: The hard evidence* (pp. 221–226). New York: Alan R. Liss.

Frazer, J. G. (1911). *The Golden Bough: A study in magic and religion* (3rd ed., 12 vols.). New York: Macmillan.

Freedman, M. (1966). *Chinese lineage and society.* London: Athlone.

Freedman, M. (Ed.). (1967). *Social organization: Essays presented to Raymond Firth.* Chicago: Aldine.

Freedman, S. G. (2000). *Jew vs. Jew: The struggle for the soul of American Jewry.* New York: Simon &

Freeland, W. (1981). Functional aspects of primate grooming. *Ohio Journal of Science, 81, 4,* 173–177.

Freeman, D. (1983). *Margaret Mead and Samoa: The making and unmaking of an anthropological myth.* Canberra: Australian National University Press.

Freeman, D. (1999). *The fateful hoaxing of Margaret Mead: A historical analysis of her Samoan research.* Boulder, CO: Westview Press.

Freeman, M., & Jacques, C. (1999). *Ancient Angkor.* Trumbull, CT:Weatherhill.

Freeman, S., & Herron, J. C. (2001). *Evolutionary analysis.* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Freilich, M., Raybeck, D., & Shavishinsky, J. (Eds.). (1991). *Deviance: Anthropological perspectives.* New York: Bergin and Garvey.

Freud, S., & Strachey, J. (1962). *The ego and the id (the standard edition of the complete psychological works of Sigmund Freud)* W. W. Norton.

Freud, S., Strachey, J. & Gay, P. (1989). *Civilization and its discontents.* W. W. Norton.

Freud, S., Strachey, J. & Gay, P. (1989). *The future of an illusion.* W. W. Norton.

Fried, M. H. (1960). On the evolution of social stratification and the state. In S. Diamond (Ed.), *Culture in history: Essays in honor of Paul Radin* (pp. 713–731). New York: Columbia University Press.

Fried, M. H. (1967). *The evolution of political society: An essay in political anthropology.* New York: Random House.

Friedan, B. (1963). *The feminine mystique.* Harmondsworth: Penguin.

Friedl, E. (1978, April). Society and sex roles. *Human Nature,* 68–75.

Friedman, J. (Ed.). (2003). *Globalization, the state, and violence.* Walnut Creek, CA: AltaMira.

Friedrich, C. J., & Brzezinski, Z. K. (1965). *Totalitarian dictatorship and autocracy* (2nd ed.). Cambridge, MA: Harvard University Press.

Friedrich, P. (1970). *Proto-Indo-European trees.* Chicago, IL: University of Chicago Press.

Frison, G. C. (1978). *Prehistoric hunters of the High Plains.* New York: Academic Press.

Fritts, H. C. (1976). *Tree rings and climate.* New York: Academic Press.

Fromm, E. (1941). *Escape from freedom.* New York: Holt, Rinehart & Winston.

Fromm, E. (1947). *Man for himself: An inquiry into the psychology of ethics.* New York: Rinehart.

Fromm, E. (1950). *Psychoanalysis and religion.* New Haven, CT: Yale University Press.

Fromm, E. (1955). *The sane society.* New York: Reinhardt.

Fromm, E. (1956). *The art of loving.* New York: Harper & Row.

Fromm, E. (1959). *Sigmund Freud's mission: An analysis of his personality and influence.* New York: Harper & Row.

Fromm, E. (1984). *The working class in Weimar Germany.* (B. Weinberger, Trans.). Cambridge: Harvard University Press.

Fruzzetti, L., & Ostor, A. (1990). *Culture and change along the Blue Nile.* Boulder, CO: Westview Press.

Fuentes, A., & Wolfe, L. D. (2002). *Primates face to face.* Cambridge, UK: Cambridge University Press.

Fulbrook, M. (1995). *Anatomy of a dictatorship: Inside the GDR.* New York: Oxford University Press.

Furedi, F. (1997). *Population and development: A critical introduction.* New York: St. Martin's.

Fuyuyma, D. (1983). *Science on trial: The case for evolution.* New York: Pantheon.

Gabucci, A. (Ed.). (2001). *The Colosseum* (M. Becker, Trans.). Los Angeles: Getty Museum.

Gacs, U., Khan, A., McIntyre, J., & Weinberg, R. (1988). *Women anthropologists: Selected biographies.* New York: Greenwood Press.

Gaines, A. D. (1992). *Ethnopsychiatry: the cultural construction of professional and folk psychiatries.* Albany, NY: State University of New York Press.

Gaines, A. D., & Hahn, R. A. (Eds.). (1982). Physicians of western medicine: Five cultural studies. *Culture, Medicine and Psychiatry, 6*(3).

Galanti, G.-A. (2004). *Caring for patients from different cultures* (3rd ed.). Philadelphia: University of Pennsylvania Press.

Galdikas, B. M. F., & Briggs, N. (1999). *Orangutan odyssey.* New York: Harry N. Abrams.

Galdikas, B. M. F. (1995). *Reflections of Eden: My years with the orangutans of Borneo.* Boston: Little/Brown.

Galdikas, B. M. F. (2005). *Great ape odyssey.* New York: Harry N. Abrams.

Galdikas, B. M. F. (Ed.). (2001). *All apes great and small.* New York: Kluwer Academic.

Gale, M. R. (2001). *Lucretius and the didactic epic.* London: Bristol Classical Press.

Gallaudet Research Institute. (2002–2003). *Regional and national Statistics.* Washington, DC: Gallaudet University Press.

Galt, A. H., & Smith, L. J. (1976). *Models and the study of social change.* New York: John Wiley.

Galton, F. (1990). *Hereditary genius: An inquiry into its laws and consequences.* New York: Peter Smith.

Gamble, C. (1991). The social context for European Paleolithic art. *Proceedings of the Prehistoric Society, 57,* 1.

Gamble, C. (1999). Gibraltar and the Neandertals 1848–1998. *Journal of Human Evolution, 36,* 239–243.

Gandhi, M. K. (2001). *The story of my experiments with truth: An autobiography* (M. Desai, Trans.). Ahmedabad, India: Navajivan. (Original work published 1927)

Gannon, P. J., Holloway, R. L., Broadfield, D. C., & Braun, A. R. (1998). Asymmetry of chimpanzee planum temporale: Humanlike pattern of Wernicke's brain language area homolog. *Science, 279,* 220–222.

Gans, H. J. (1995). *The war against the poor.* New York: Basic Books.

Garanger, J. (1967). Archaeology and the Society Islands. In G. A. Highland, R. W. Force, A. Howard M. Kelly, & Y. H. Sinoto (Eds.), *Polynesian culture history: Essays in honor of Kenneth P. Emory,* Special Publication No. 56 (pp. 377–396). Honolulu, HI: Bernice P. Bishop Museum.

Garbarino, M. S., & Sasso, R. F. (1994). *Native American heritage.* IL: Waveland Press.

Garber, P. (1997). One for all and breeding for one: cooperation and competition as a tamarin reproductive strategy. *Evolutionary Anthropology 5,* 187–199.

Gardner, B. T., & Gardner, R. A. (1985). Signs of intelligence in cross-fostered chimpanzees. *Philosophical Transactions of The Royal Society B: Biological Sciences, B 308,* 159–176.

Gardner, H. (1993). *Multiple intelligences: Theory in practice.* New York: Basic Books.

Gardner, R. A., & Gardner, B. T. (1969). Teaching sign language to a chimpanzee: A standardized system of gestures provides a means of two-way communication with a chimpanzee. *Science, 165*(3894), 664–672.

Gardner, R. A., & Gardner, B. T. (1975). Early signs of language in child and chimpanzee. *Science, 187*(4178), 752–753.

Gardner, R. Allen, Gardner, Beatrix T., & Van Cantfort, Thomas E. (Eds.). (1986). *Teaching sign language to chimpanzees.* Albany: State University of New York Press.

Gargett, R. H. (1989). Grave shortcomings: The evidence for Neandertal burial. *Current Anthropology, 30,* 157–190.

Garrard, E. (2002). Evil as an explanatory concept. *The Monist 85,* 320–336.

Garraty, J. A. (1990). *The Columbia history of the world.* New York: Columbia University Press.

Garry, J., & Rubino, C. (Eds.). (2001). *Facts about the world's languages.* New York: H. W. Wilson.

Gatti, H. (1999). *Giordano Bruno and renaissance science.* Ithaca, NY: Cornell University Press.

Gaur, A. (1992). *A history of writing.* New York: Cross River Press.

Gavron, D. (2000). *The kibbutz: Awakening from utopia.* Lanham, MD: Rowman & Littlefield.

Gaw, A. (2001). *Cross-cultural psychiatry.* Washington, DC: American Psychiatric Association.

Gay, P. (1998). *Freud: A life for our time.* W. W. Norton & Company.

Gayon, J. (1998). *Darwinism's struggle for survival: Heredity and the hypothesis of natural selection.* Cambridge, UK: Cambridge University Press.

Gearing, F. O. (1970). *The face of the Fox.* Chicago: Aldine.

Gebo, D. L. (1996). Climbing, brachiation and terrestrial quadrupedalism: Historical precursors of hominid bipedalism. *American Journal of Physical Anthropology 101,* 55–92.

Geck, E. (1968). *Johannes Gutenberg.* Berlin: Briider Hartmann.

Gee, H. (2001). *Deep time: The revolution in evolution.* London: Fourth Estate.

Geertz, C. (1963). *Agricultural involution: the processes of ecological change in Indonesia.* Berkeley: University of California Press.

Geertz, C. (1968). *Islam observed.* New Haven, CT: Yale University Press.

Geertz, C. (1973). *The interpretation of culture: Selected essays.* New York: Basic Books.

Geertz, C. (1983). *Local knowledge: Further essays in interpretive anthropology.* New York: Basic Books.

Geertz, C. (2000). *Available light: Anthropological reflections on philosophical topics.* Princeton, NJ: Princeton University Press.

Geertz, C. (2004). What is a state if it is not a sovereign? Reflections on politics in complicated places. *Current Anthropology, 45*(5).

Gelb, I. J. (1963). *A study of writing.* Chicago, IL: University of Chicago Press.

Gelfand, M. (1965). *Witch doctor: Traditional medicine man of Rhodesia.* New York: Frederick A. Praeger.

Gell-Mann, M. (1994). *The quark and the jaguar: Adventures in the simple and the complex.* New York: W. H. Freeman.

Gellner, E. (1988). *Plough, sword, and book: The structure of human history.* Chicago, IL: University of Chicago Press.

Gellner, E. (Ed.). (1980). *Soviet and Western anthropology.* New York: Columbia University Press.

Gelman, S. A. (2003). *The essential child: Origin of essentialism in everyday thought.* Oxford: Oxford University Press.

George-Kaneentiio, D. (2000). Iroquois culture & commentary. Sante Fe, NM: Clear Light.

Gershenhorn, J. (2004). *Melville J. Herskovits and the racial politics of knowledge.* Lincoln: University of Nebraska Press.

Geselowitz, M. N. (2004). Origins of Iron production. In P. Bogucki & P. J. Crabtree, *Ancient Europe 8000 B. C.-A. D. 1000: Encyclopedia of the barbarian world* (Vol. 2, pp. 164–167). New York: Scribner.

Ghurye, G. S. (1957). *Caste and class in India.* Bombay: Popular Book Depot.

Gibbs, L. (1982). *Love Canal: My story.* Albany: State University of New York Press.

Gibert, J., Campillo, D., Arqués, J. M., García- Olivares, E., Borja, C., & Lowenstein, J. M. (1997). Hominid status of the Orce cranial fragment reasserted. *Journal of Human Evolution, 30,* 1–15.

Gibson, M. A. (Ed.). (1997). Ethnicity and school performance: Complicating the immigrant/involuntary minority typology. Theme issue of *Anthropology and Education Quarterly, 28*(3).

Giddens, A. (1987). *Sociology: A brief but critical introduction* (2nd ed.). New York: Harcourt Brace Jovanovich.

Giddens, A. (1987). Structuralism, post-structuralism and the production of culture. In A. Giddens & J. Turner (Eds.), *Social theory today.* Stanford CA: Stanford University Press.

Giddens, A. (Ed.). (1972). *Émile Durkheim: Selected writings.* New York: Cambridge University Press.

Giere, R. N., & Richardson, A. W. (Ed.). (1997). *Origins of logical empiricism.* Minneapolis: University of Minnesota Press.

Gilbert, M. J. (2002). *Principles and recommended standards for cultural competence education of health care professionals.* Los Angeles: California Endowment.

Gilchrist, R. (1994). *Gender and material culture: The archaeology of religious women.* New York: Routledge.

Gilchrist, R. (1999). *Gender and archaeology: Contesting the past.* London and New York: Routledge.

Gilkey, L. (1985). *Creationism on trial: Evolution and God at Little Rock.* Minneapolis, MN: Winston.

Gill, G. W., & Rhine, S. (1990). *Skeletal attribution of race.* Albuquerque: University of New Mexico: Maxwell Museum of Anthropology.

Gilles D. (1983). *Nietzsche and philosophy.* New York: Columbia University Press.

Gilles, D., & Guattari F. (1987). A thousand plateaus: Capitalism and schizophrenia. Minneapolis University of Minnesota Press.

Gilles, D., & Guattari, F. (1983). *Anti-Oedipus: Capitalism and schizophrenia.* Minneapolis: University of Minnesota Press.

Gillespie, J. H. (1991). *The causes of molecular evolution.* New York: Oxford University Press.

Gilligan, C. (1982). *In a different voice: Psychological theory and women's development.* Cambridge, MA: Harvard University Press.

Gillispie, C. (1996). *Genesis and geology. A study in the relations of scientific thought, natural theology, and social opinion in Great Britain, 1790–1850.* Cambridge, MA: Harvard University Press.

Gilpin, R. (1981). *War and change in world politics.* New York: Cambridge University Press.

Gil-White, F. J. (2001). Are ethnic groups biological "species" to the human brain? *Current Anthropology, 42,* 515–554.

Gimbutas, M. (1982). *The goddesses and gods of Old Europe: 6500–3500 BC: Myths and Cult Images.* Berkeley: University of California Press.

Gingrich, A., & Fox, R. (2002). *Anthropology, by comparison.* New York: Routledge.

Ginsberg, B. (1986). *The captive public.* New York: Basic Books.

Ginsburg, F., & Rapp, R. (Eds.). (1995). *Conceiving the new world order: The global politics of reproduction.* Berkeley: University of California Press.

Giordani, L. (1997). *Imagining who we were, believing who we are: Ethnogenesis among the Yabarana Indians of Venezuela.* Ann Arbor, MI: UMI.

Gittins, D. (1993). *The family in question. Changing households and familiar ideologies* (2nd ed.). London: Macmillan.

Giuliano, P. (1991). *Darwin in Italy: Science across cultural frontiers* (Rev. ed., R. B. Morelli, Trans.). Bloomington: Indiana University Press.

Givnish, T. J., & Sytsma K. J. (1997). *Molecular evolution and adaptive radiation.* Cambridge: Cambridge University Press.

Givón, T. (1979). *On understanding grammar.* New York: Academic Press.

Gladding, S. (2002). *Family therapy: History, theory, and practice.* Upper Saddle River, NJ: Prentice Hall.

Gladding, S. T., & Newsome, D. (2004). *Community and agency counseling.* Upper Saddle. River, NJ: Prentice Hall.

Gladwin, T. (1970). *East is a big bird: Navigation and logic on Puluwat Atoll.* Cambridge, MA: Harvard University Press.

Glaser, B. G., & Strauss, A. E. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago: Aldine.

Glazier, S. D. (2005). *Anthropology of religion: A short introduction.* Oxford: One World.

Glazier, S. D., & Flowerday, C. A. (2003). *Selected readings in the anthropology of religion: Theoretical and methodological essays.* Westport, CT: Praeger.

Gleik, J. (1987). *Chaos: Making a new science.* New York: Viking.

Glenn, M., & Cords, M. (Eds.). (2002). *The guenons: Diversity and adaptation in African monkeys.* New York: Kluwer Academic/Plenum.

Glieck, J. (1987). *Chaos: Making of a new science.* New York: Penquin Books.

Glover, J. (2003). *Geological journeys: From artifacts to zircon.* The Geological Society of Australia.

Gluckman, M. (1954). *Rituals of rebellion in South-East Africa* (The Frazer Lecture 1952). Manchester, UK: University Press.

Gluckman, M. (1955). *The judicial process among the Barotse of northern Rhodesia.* Manchester, UK: University Press for the Rhodes–Livingston Institute.

Gluckman, M. (1962). *Order and rebellion in tribal Africa: Collected essays with an autobiographical introduction.* Glencoe, IL: Free Press.

Gluckman, M. (1963). *Order and rebellion in tribal Africa: Collected essays, with an autobiographical introduction.* New York: Free Press of Glencoe.

Gluckman, M. (1965). *Politics, law, and ritual in tribal society.* New York: Mentor Books.

Gluckman, M. (1982). *Custom and conflict in Africa.* Oxford: Oxford University Press.

Gmelch, G. (1989). Baseball magic. In A. C. Lehmann & J. E. Myers (Eds.), M*agic, witchcraft, and religion: An anthropological study of the supernatural* (2nd ed., pp. 295–301). Mountain View, CA: Mayfield.

Godelier, M. (1978). Infrastructures, societies and history. *Current Anthropology 19*(4), 763–771.

Godfrey, L. (Ed.). (1983). *Scientists confront creationism.* New York: Norton.

Godfrey, L. R., & Cole, J. R. (1986). Blunder in their footsteps. *Natural History, 95*(8), 4–12.

Goehring, J. E. (1999). *Ascetics, society, and the desert: Studies in Egyptian monasticism.* Harrisburg, PA: Trinity Press International.

Goffman, E. (1959). *The presentation of self in everyday life.* Garden City, NY: Anchor.

Goffman, E. (1974). *Frame analysis.* New York: Harper Colophon Books.

Goicoechea, D., Luik, J., & Madigan, T. (Eds.). (1991). *The question of humanism: Challenges and possibilities.* Amherst, NY: Prometheus Books.

Göksu, H. Y. (1991). *Scientific dating methods.* New York: Kluwer.

Golde, P. (1970). *Women in the field.* Chicago: Aldine.

Golde, P. (Ed.). (1986). *Women in the field: Anthropological experiences* (2nd ed.). Berkeley: University of California.

Goldin, L., (Ed.). (2000). *Identities on the move: Transnational processes in North America and the Caribbean Basin.* Austin: University of Texas Press.

Goldman, L. R. (1999). From pot to polemic: Uses and abuses of cannibalism. In L. R. Goldman (Ed.), *The anthropology of cannibalism* (pp. 1–26). Westport, CT: Bergin & Garvey.

Goldscheider, C. (2001). *Israel's changing society: Population, ethnicity, & development.* Boulder, CO: Westview.

Goldschmidt, R. B. (1940). *The material basis of evolution.* New Haven, CT: Yale University Press.

Goldschmidt, W. R. (Ed.). (1959). *The anthropology of Franz Boas: Essays on the centennial of his birth.* Menasha, WI: American Anthropological Association Memoirs.

Goldstein, D. M. (2003). *Laughter out of place: Race class, violence and sexuality in a Rio shantytown.* Berkeley: University of California Press.

Goldstein, J. (2001). *War and gender: How gender shapes the war system and vice versa.* Cambridge: Cambridge University Press.

Goldstein, M. (1992). When brothers share a wife. In E. Angeloni (Ed.), *Anthropology 92/93Fifteenth Edition* (pp. 109–112). Guilford, CT: Dushkin.

Goldstein, M. C. When brothers share a wife. *Natural History, 96,* 38–49.

Gonzalez, R. J. (2004). *Anthropologists in the public sphere: Speaking out on war, peace and American power.* Austin: University of Texas Press.

Good, B. J. (1994). *Medicine, rationality, and experience: An anthropological perspective.* Cambridge: Cambridge University Press.

Good, B. J., & DelVecchio Good, M-J. (1999)."Parallel sisters":Medical anthropology and medical sociology. In C. Bird, P. Conrad, & A. Fremont (Eds.), *Handbook of medical sociology,* 5th ed. (pp. 377–388). Englewood Cliffs, NJ: Prentice-Hall.

Good, K., with D. Chanoff. (1991). *Into the heart: One man's pursuit of love and knowledge among the Yanomami.* New York: Simon & Schuster.

Good, M. D., Brodwin, P. E., Good, B. J., & Kleinman, A. (Eds.). (2002). *Cultural assessment in clinical psychiatry.* Washington, DC: American Psychiatry Association.

Goodall, H. L. (2000). *Writing the new ethnography.* Walnut Creek, CA: Alta Mira.

Goodall, J. (1986). *In the shadow of man.* Boston: Houghton Mifflin.

Goodall, J. (1986). *The chimpanzees of Gombe: Patterns of behavior.* Cambridge, MA: Belknap Press, Harvard University Press.

Goodall, J. (1999). *Reason for hope: A spiritual journey.* New York: Warner Brothers.

Goodall, J. (2000). *Africa in my blood, an autobiography in letters, the early years.* New York: Houghton Mifflin.

Goodall, J. (2000). *In the shadow of man.* New York: Houghton Mifflin Company.

Goodall, J. (2001). *Beyond innocence, an autobiography in letters, the later years.* Houghton Mifflin.

Goode, E. (2004). *Deviant behavior.* Upper Saddle River, NJ: Prentice Hall.

Goode, W. J. (1963). *World revolution and family patterns.* New York: Free Press.

Goode, W. J. (1963). *World revolution and family patterns.* New York: Free Press of Glencoe.

Goode, W. J. (1964). *The family.* Englewood Cliffs, NJ: Prentice Hall, Inc.

Goode, W. J. (1965). *Women in divorce.* New York: Free Press.

Goodenough, W. H. (1988). George Peter Murdock's contributions to anthropology: An overview. *Behavior Science Notes, 22,* 1–9.

Goodenough, W. H. (Ed.). (1964). *Explorations in cultural anthropology: Essays in honor of George Peter Murdock.* New York: McGraw–Hill.

Goodman, M. (1962). Immunochemistry of the primates and primate evolution. *Annals of the New York Academy of Sciences, 102,* 219–234.

Goody J. (1983). The spiritual and the natural. In *The development of family and marriage in Europe* (pp. 194–221). Cambridge, UK: Cambridge University Press.

Goody, J. (1962). *Death, property, and the ancestors.* Stanford, CA: Stanford University Press.

Goody, J. (1976). *Production and reproduction: A comparative study of the domestic domain.* Cambridge, UK: Cambridge University Press.

Goody, J. (1983). Kin groups: Clans, lineages and *lignages.* In J. Goody & L. Roper (Eds.), *The development of family and marriage in Europe* (pp. 222–239). Cambridge: Cambridge University Press.

Goody, J. (1983). *The development of family and marriage in Europe.* Cambridge, UK: Cambridge University Press.

Goody, J., & Tambiah, S. J. (1973). *Bridewealth and dowry.* Cambridge: Cambridge University Press.

Goold, G. P. (Ed.). (1972). *Diogenes Laertius: Lives and opinions of eminent philosophers* (Rev. ed., R. D. Hicks, Trans.). Cambridge, MA: Harvard University Press.

Gore, A. (1992). *Earth in the balance.* New York: Houghton Mifflin.

Gore, R. (2000). People like us. *National Geographic, 198,* 90–118.

Gorman, G. E., & Homan, R. (Eds.). (1986). *The sociology of religion: A bibliographical survey.* New York: Greenwood Press.

Gosse, E. (1890). *The life of Philip Henry Gosse.* London: K. Paul, Trench, Trübner.

Gosse, E. (1970). *Father and son.* London: Penguin Books. (Original work published 1907)

Gosse, P. H. (1998). *Omphalos: An attempt to untie the geological knot.* Woodbridge, CT: Ox Bow Press.

Gott, R. (2004). Cuba: *A new history.* New Haven, CT: Yale University Press.

Gotthelf, A., & Lennox, J. G. (Eds.). (1987). *Philosophical issues in Aristotle's biology.* Cambridge: Cambridge University Press.

Gottlieb, A. (2000). *The dream of reason.* London: Viking.

Gottlieb, R. S. (Ed.). (2004). *This sacred Earth: Religion, nature, environment* (2nd ed.). New York: Routledge.

Gouinlock, J. S. (2004). *Eros and the good.* Amherst, NY: Prometheus Books.

Gould, J. G., & Marler, P. (1987). Learning by instinct. *Scientific American, 256*(1), 74–85.

Gould, J. L. (1982). *Ethology: The mechanisms and evolution of behavior.* New York: Norton.

Gould, J. L. (1982). *Ethology: The mechanisms and evolution of behavior.* New York: Norton.

Gould, J. L., & Gould, C. G. (1995). *The honey bee* (2nd ed.). New York: Freeman.

Gould, J. L., & Gould, C. G. (1999). *The animal mind* (2nd ed.). New York: Freeman.

Gould, J. L., & Keeton, W. T. (1996). *Biological science* (6th ed.). New York: Norton.

Gould, R. A. (2000). *Archaeology and the social history of ships.* Cambridge: Cambridge University Press.

Gould, S. J. (1977). *Ontogeny and phylogeny.* Cambridge, MA: Harvard University Press.

Gould, S. J. (1981). *The mismeasure of man.* New York: Norton Press.

Gould, S. J. (1996). *The mismeasure of man, revised and expanded.* New York: Norton.

Gould, S. J. (1997). Nonoverlapping magisteria. *Natural History, 106*(2), 16–22.

Gould, S. J. (2002). *The structure of evolutionary theory.* Cambridge, MA: Belknap/Harvard University Press.

Gould, S. J. (Ed.). (2001). *The book of life.* New York: Norton.

Gradstein, F. M., Ogg, J. G., & Smith, A. G. (in press). *A geologic time scale 2004.* Cambridge: Cambridge University Press.

Graebner, F. (1924). *Das weltbild der primitiven: Eine untersuchung der urformen weltanschaulichen denkens bei.* Munich, Germany: E. Reinhardt.

Graebner, F. (1931). Causality and culture. In V. F. Calverton (Ed.), *The making of man* (pp. 421–428). New York: Modern Library.

Gragson, T. L., & Blount, B. G. (Eds.). (1999). *Ethnoecology: Knowledge, resources, and rights.* Athens: University of Georgia Press.

Gramly, R. M. (1990). *Guide to the Paleo-Indian artifacts of North America.* Buffalo, NY: Persimmon Press.

Gramsci, A. (1971). *Selections from the Prison Notebooks* (Q. Hoare & G. Nowell, Eds., Trans. By N. Smith). London: Lawrence & Wishart.

Gräslund, B. (1987). *The birth of prehistoric chronology: Dating methods and dating systems in nineteenth-century Scandinavian archaeology.* Cambridge: Cambridge University Press.

Graur, D., & Wen-hsiung, L. (2000). *Fundamentals of molecular evolution* (2nd ed.). Sunderland, MA: Sinauer.

Gray, J. (1995). *Enlightenment's wake: Politics and culture as the close of modern age.* London: Routledge.

Gray, P. (2003). *Indigenous activism in the Russian far east: The Chukotko case.* Cambridge: Cambridge University Press.

Graymont, B. (1988). *The Iroquois.* New York: Chelsea House.

Grayson, D. K. (1984). *Quantitative zooarchaeology: Topics in the analysis of archaeological fauna.* Orlando: Academic Press.

Great Ape Project Census (2001). www.greatapeproject.org Grolimond, G. (2004). *Alarming study reveals chimpanzee extinction crisis.* . Montreal, Canada: Jane Goodall Institute of Canada.

Green, E. C. (1999). *Indigenous theories of contagious disease.* Walnut Creek, CA: Alta Mira.

Green, G., & Sobo, E. J. (2000). *The endangered self: Managing the social risk of HIV.* London: Routledge.

Green, J. (2004). *Maritime Archaeology: A technical handbook,* 2nd ed. Amsterdam: Elsevier.

Green, R. C. (1996). Settlement patterns and complex society in the Windward Society Islands: Retrospective commentary from the 'Opunohu Valley, Mo'orea. In M. Julien, M. Orliac, & C. Orliac, (Eds.), *Mémoire de Pierre, mémoire d'homme: Tradition et archéologie en Océanie* (pp. 209–228). Paris: Publications de la Sorbonne.

Green, R. C. (1998). Rapanui origins prior to European contact: The view from Eastern Polynesia. In P. Vargas (Ed.), *Easter Island and East Polynesian prehistory* (pp. 87–110). Santiago: Universidad de Chile.

Greenberg, J. B. (1989). *Blood ties: Life and violence in rural Mexico.* Tucson: University of Arizona Press.

Greenberg, J. H. (1963). *Languages of Africa.* Bloomington: Indiana University Press.

Greenberg, J. H. (1987). *Language in the Americas.* Stanford, CA: Stanford University Press.

Greenberg, J. H. (Ed.). (1966). *Universals of language* (2nd ed.). Cambridge: MIT Press.

Greenberg, S. (1950). *The infinite in Giordano Bruno.* New York: King's Crown Press.

Greene, B. (1999). *The elegant universe.* New York: Norton.

Greenfield, S., & Droogers, A. (Eds.). (2001). *Reinventing religions: Syncretism and transformation in Africa and the Americas.* New York: Rowman and Littlefield.

Greenhalgh, S. (1996). The social construction of population science: An intellectual, institutional, and political history of twentieth-century demography. *Comparative Studies in Society and History, 38*(1), 26–66.

Greenman, E. F. (1932). Origin and development of the burial mound. *American Anthropologist, 34,* 286–295.

Greenspan, S. I., & Shanker, S. G. (2004). *The first idea: How symbols, language, and intelligence evolved from our primate ancestors to modern humans.* New York: Da Capo Press.

Gregor, T. A., & Gross. D. R. (2004). Guilt by association: The culture of accusation and the American Anthropological Association's investigation of *Darkness in El Dorado. American Anthropologist, 106,* 687–698.

Greksa, L. P. (2002). Population growth and fertility patterns in an Old Order Amish settlement. *Annals of Human Biology, 29,* 192–201.

Greksa, L. P., & Korbin, J. E. (2002). Key decisions in the lives of the Old Order Amish: Joining the church and migrating to another settlement. *Mennonite Quarterly Review, LXXVI,* 373–398.

Griffin, D. R. (1976). *The question of animal awareness.* New York: Rockefeller University Press.

Griffin-Pierce, T. (2000). *Native peoples of the Southwest.* Albuquerque: University of New Mexico Press.

Grim, J. A. (Ed.). (2001). *Indigenous traditions and ecology: The interconnections of cosmology and community.* Cambridge, MA: Harvard University Press.

Grimal, N. (1992). *A history of Ancient Egypt.* Oxford: Blackwell.

Grimes, R. L. (1982). *Beginnings in ritual studies.* Washington, DC: University Press of America.

Grimshaw, A. (2001). *The ethnographer's eye: Ways of seeing in anthropology.* Cambridge: Cambridge University Press.

Grinker, R. R. (2000). *In the arms of Africa: The life of Colin M. Turnbull.* Chicago: University of Chicago Press.

Grondin, J. (1994). *Introduction to philosophical hermeneutics.* New Haven, CT: Yale University Press.

Gropper, R. C. (1975). *Gypsies in the city.* Princeton, NJ: Darwin Press.

Gross, P., & Levitt, N. (1994). *Higher superstition: The academic left and its quarrels with science.* Baltimore, MD: Johns Hopkins University Press.

Grousset, R. (1970). *The empire of the Steppes* (N. Walford, Trans.). New Brunswick, NJ: Rutgers University Press.

Groves, C. (1989). *A theory of human and primate evolution.* New York: Oxford University Press.

Groves, C. (2001). *Primate taxonomy.* Washington, DC: Smithsonian Institution Press.

Growdon. J., & Rossor, M. (Eds.). (1998). *Blue books of practical neurology series: The dementias.* Woburn, MA: Butterworth Heinemann.

Gruenbein, D. (2001, June 23). Mir Darwins Augen [With Darwin's Eyes]. *Frankfurter Allgemeine Zeitung, Bilder und Zeiten,* p. 1.

Grupe, G., Christiansen, K., Schröder, I., & Wittwer-Backofen, U. (2005). *Anthopologie.* Berlin, Germany: Springer.

Guenther, A. (1976). *Criminal behavior and social systems.* Chicago: Rand McNally.

Guerrón-Montero, C. (2002). Esclavitud y Relaciones Interétnicas entre Afro-panameños Coloniales y Afro-antillanos en Panamá (Siglo XIX). *Revista Cultural Lotería, 442*(3): 79–96.

Guirand, F. (Ed.). (1959). *Larousse Mythologie Générale.* London: Batchworth.

Gulliver, P. H. (1979). *Disputes and negotiations: A cross-cultural perspective.* New York: Academic Press.

Gump, J. O. (1994). *The dust rose like smoke: The subjugation of the Zulu and the Sioux.* Lincoln: University of Nebraska Press.

Gunn, C., Liffick, M., & Mathis, J. (2001). *Biologicaldiversity 2001: Chimpanzee.* http://www.earlham.edu/~mathijo/chimp. htm

Gunther, H. F. K. (1927). *The racial elements of European history.* London:Methuen.

Gupta, A., & Ferguson, J. (Eds). (1997). *Culture power place: Explorations in critical anthropology.* Durham, NC: Duke University Press.

Gupta, S. (1974). *A simple study of sociology.* Delhi: Ajanta Prakashan.

Guth, A. (1997). *The inflationary universe: The quest for a new theory of cosmic origins.* Reading, MA: Helix.

Guthrie, W. K. C. (1962–1978). *A history of Greek philosophy.* Cambridge: Cambridge University Press.

Gutiérrez, R. (1995). Chaco ethnography, the case of the Tapietés of the Pilcomayo. *Magazine of the National Museum of Ethnography and Folklore, La Paz, Bolivia, 6,* 74–106.

Gutmann, M. (1997). Trafficking in men: The anthropology of masculinity. *Annual Review of Anthropology, 26,* 385–409.

Gutmann, M. (Ed.). (2003). *Changing men and masculinities in Latin America.* Durham, NC: Duke University Press.

Guyer, P. (Ed.). (1992). *The Cambridge companion to Kant.* Cambridge, UK: Cambridge University Press.

Gwynne, M. A. (2003). *Anthropology career resources handbook.* Boston: Allyn & Bacon.

Haack, S. (2003). *Defending science—Within reason.* Amherst, NY: Prometheus Books.

Haas, J. (1982). *The evolution of the prehistoric state.* New York: Columbia University Press.

Haas, J. (Ed.). (1990). *The anthropology of war.* Cambridge: Cambridge University Press.

Habermas, J. (1981). *Theorie des kommunikativen handelns* (*Theory of Communicative Activity*). Frankfurt-am-Main: Suhrkamp.

Haddon, A. C. (1934). *History of anthropology.* London: Watts & Co.

Haddon, A. C., & Hornell, J. (1975). *Canoes of Oceania.* Honolulu, HI: Bishop Museum Press.

Haeckel, E. (1878). *Freedom in science and teaching.* London: C. Kegan Paul.

Haeckel, E. (1892). *Monism as connecting religion and science: The confession of faith of a man of science.* London: Adam & Charles Black.

Haeckel, E. (1904). *The wonders of life: A popular study of biological philosophy.* New York:Harper & Brothers.

Haeckel, E. (1905). *Last words on evolution.* New York: Peter Eckler.

Haeckel, E. (1992). *The riddle of the universe* (Introduction by H. James Birx). Amherst, NH: Prometheus Books.

Hafez, S. (2001). *Naguib Mahfuz—The Cairo trilogy: Palace talk, palace of desire, sugar street.* New York: Everyman's Library.

Hagelberg, E. (2003). Recombination or mutation rate heterogeneity? Implications for mitochondrial Eve. *Trends in Genetics, 19,* 84–90.

Haggar, R. G. (1959). *Pottery through the ages.* Edinburgh: W. & J. Mackay & Co. Ltd.

Haglund, W. D., & Sorg, M. H. (Eds.). (2002). *Advances in forensic taphonomy: Method, theory, and archaeological perspectives.* Boca Raton, FL: CRC Press.

Hahn, E. (1990). *Animal gardens or zoos around the world.* Annandale-on-Hudson, NY: Begos & Rosenberg.

Hahn, R. A. (1995). *Sickness and healing. An anthropological perspective.* New Haven, CT: Yale University Press.

Haile Selassie, Y. (2001). Late Miocene hominids from the Middle Awash, Ethiopia. *Nature, 412,* 178–181.

Hailman, J. P. (1967). *An introduction to animal behavior: Ethology's first century.* Englewood Cliffs, NJ: Prentice Hall.

Halal, W. E. (2004, March–April). The intelligent Internet. *The Futurist, 38.* http://www. wfs. org/futcontma04. htm

Haldane, J. B. S. (1932). *The causes of evolution.* London: Longman, Green.

Hall, E. S. (1975). *The Eskimo storyteller: Folktales from Noatak, Alaska.* Knoxville: University of Tennessee Press.

Hall, M. (1996). *Archaeology Africa.* Cape Town, South Africa: David Philip.

Hall, R. L. (1997). *An archaeology of the soul: North American Indian belief and ritual.* Urbana: University of Illinois Press.

Hall, T. W., & Pilgrim, R. (Eds.). (1985). *Religion.* San Francisco: Harper & Row.

Hallam, A. (1973). *A revolution in the earth sciences.* Oxford: Oxford University Press.

Hallam, T. (2004). *Catastrophes and lesser calamities: The causes of mass extinctions.* Oxford: Oxford University Press.

Halliday, M. A. K. (1978). *Language and social semiotic.* Baltimore, MD: University Park Press.

Halper,V. (2004). Trinket to talisman: Contemporary charms. *Metalsmith 24*(5), 32–39.

Halperian, R. (1994). *Cultural economics past and present.* Austin: University of Texas Press.

Halperin, R. H. (1988). *Economies across cultures.* London: Macmillan.

Hamada, T., & Jordan, A. (1990). Cross-cultural management and organizational culture. *Studies in Third World Societies, 32.*

Hamer, D. (2004). *The God gene: How faith is hardwired into our genes.* New York: Doubleday.

Hammel, E. A. (1968). *Alternative social structures and ritual relations in the Balkans.* Englewood Cliffs, NJ: Prentice Hall.

Hammoudi, A. (1985). Substance and relation: Water rights and water distribution in the Drâ Valley. In A. E. Mayer (Ed.), *Property, social structure, and law in the modern Middle East.* Albany: State University of New York Press.

Hand, E. S. C. (1927). *Polynesian religion* (Bulletin No. 34). Honolulu, HI: Bernice P. Bishop Museum.

Handwerker, H. P. (2001). Child abuse and the balance of power in parental relationships: An evolved domain-independent mental mechanism that accounts for behavioral variation. *American Journal of Human Biology, 13,* 679–689.

Hannerz, U. (1980). *Exploring the city: Inquiries towards an urban anthropology.* New York: Columbia University Press.

Hannigan, J. A. (1995). *Environmental sociology: A social constructionist perspective.* New York: Routledge.

Hansen, C. (1992). *A Daoist theory of Chinese thought: A philosophical interpretation.* New York: Oxford University Press.

Hanson, F. A., & Hanson, L. (Eds.). (1990). *Art and identity in Oceania.* Honolulu: University of Hawaii Press.

Haraway, D. (1983). Signs of dominance: From a physiology to a cybernetics of primate society, C. R., Carpenter, 1930–1970. *Studies in the History of Biology, 6,* 129–219.

Haraway, D. (1989). *Primate visions: Gender, race and nature in the world of modern science.* London: Routledge.

Hardman, M. J. (Ed.). (1981). *The Aymara language in its social and cultural context: Essays on aspects of Aymara language and culture.* Gainesville: University Presses of Florida.

Hargrove, C. M. (2002). Heritage tourism. *CRM, 1,* 10–11.

Haring, D. G. (Ed.). (1956). *Personal character and cultural milieu* (3rd ed.). Syracuse, NY: Syracuse University Press.

Harkin, M. E. (Ed.). (2004). *Reassessing revitalization movements: Perspectives from North America and the Pacific Islands.* Lincoln: University of Nebraska Press.

Harlow, H. (1958). *Biological and biochemical bases of behavior.* Madison: University of Wisconsin Press.

Harlow, H. (1979). *The human model: Primateperspectives.* New York:Wiley.

Harnad, S. (1980). Ashley Montagu biographical essay. *International Encyclopedia of the Social Sciences, 18,* 535–537.

Harner, M. J. (1998, December). *Science, shamanism, and spirits.* Paper presented at the 97th Annual Meeting of the American Anthropological Association, Philadelphia, PA: Harper & Brothers.

Harper, P. S. (Ed.). (2004). *Landmarks in medical genetics: Classic papers with commentaries.* New York: Oxford University Press.

Harrell, S. (Ed.) (2001). *Ways of being ethnic in southwest China.* Seattle: University of Washington Press.

Harrington, M. (1962). *The other America.* New York: Macmillan.

Harris, D. R. (Ed.). (1994). *The archaeology of V. Gordon Childe: Contemporary perspectives.* Chicago: University of Chicago Press.

Harris, M. (1964). *Patterns of race in the Americas.* New York:Walker.

Harris, M. (1968). *The rise of anthropological theory: A history of theories of culture.* New York: Thomas Y. Crowell.

Harris, M. (1974). *Cows, pigs, wars, and witches.* New York: Random House.

Harris, M. (1977). *Cannibals and kings.* New York: Random House.

Harris, M. (1979). *Cultural materialism: The struggle for a science of culture.* New York: Random House.

Harris, M. (1985). *Good to eat.* New York: Simon & Schuster.

Harris, M. (1993). *Cultural materialism: The struggle for a science of culture.* New York: Vintage Books.

Harris, M. (1998). *Theories of culture in post-modern times.* Walnut Creek, CA: AltaMira Press.

Harris, M. (2001). *The rise of anthropological theory.* Walnut Creek, CA: AltaMira Press.

Harris, M., & Johnson, O. (2002). *Cultural anthropology* (5th ed.). Boston: Allyn & Bacon.

Harris, R. (1987). *Reading Saussure: A critical commentary on the "cours de linguistique générale."* London: Duckworth.

Harrison, G. A., Tanner, J. M., Pilbeam, D. R., & Baker, P. T. (1988). *Human biology: An introduction to human evolution, variation, growth, and adaptability.* Oxford: Oxford University Press.

Harrison, R. (1989). *Signs, songs, and memory in the Andes: Translating Quechua language and culture.* Austin, TX: University of Texas Press.

Harrisson, B. (1986). *Pusaka: Heirloom jars of Borneo.* Oxford, UK: Oxford University Press.

Harrisson, B. (1987). *Orang-utan.* Oxford, UK: Oxford University Press.

Harrisson, B. (1995). *Later ceramics in South-East Asia: Sixteenth to twentieth centuries.* Oxford, UK: Oxford University Press.

Hartmann, R. K., Bindereif, A., Schon, A, & Westhof, E. (2005). *Handbook of RNA biochemistry.* New York: John Wiley.

Hartwig, W. C. (Ed.). (2002). *The primate fossil record.* Cambridge, UK: Cambridge University Press.

Harvey, G. (1997). *Contemporary paganism.* Washington Square, NY: New York University Press.

Hassan, Y. F. (1974). *Tabaqat daif Allah* (2nd ed.). Khartoum: University of Khartoum.

Hastings, A. (1997). *The construction of nationhood: Ethnicity, religion, and nationalism.* Cambridge: Cambridge University Press.

Hastings, R. J. (1987). New observations on Paluxy tracks confirm their Dinosaurian origin. *Journal of Geological Education, 35,* 4–15.

Hatch, E. (1973). *Theories of man & culture.* New York: Columbia University Press.

Hauck, S. A. (1986). *Extinction and reconstruction of Aleut music and dance.* Doctoral dissertation, University of Pittsburg. Ann Arbor, MI: University Microfilms International.

Hauptman, L. M. (1986). *The Iroquois struggle for survival: World War II to red power.* Syracuse, NY: Syracuse University Press.

Hauser, M. D., Chomsky, N., & Tecumseh Fitch, W. (2002). The faculty of language: What is it, who has it, and how did it evolve? *Science, 298,* 1569–1579.

Haviland, W., Fedorak, S., Crawford, G., & Lee, R. (2005). *Cultural anthropology* (2nd Canadian ed.). Montreal, Canada: Nelson.

Hawass, Z. (2004). *Hidden treasures of Ancient Egypt.* Washington, DC: National Geographic Society.

Hawking, S. (1988). *A brief history of time: From the big bang to black holes.* Toronto, Canada: Bantam.

Hawkins, G. S., & White, J. B. (1988). *Stonehenge decoded.* New York: Hippocrene Books.

Hayden, R. M. (1996). Imagined communities and real victims: Self-determination and ethnic cleansing in Yugoslavia. *American Ethnologist, 23,* 783–801.

Haynes, G. (2002). *The early settlement of North America: The Clovis era.* New York: Cambridge University Press.

Headland, T. N. (Ed.). (1992). *The Tasaday controversy: Assessing the evidence.* Washington DC: American Anthropological Association.

Headland, T. N., Pike K. L., & Harris, M. (Eds.). (1990). *Emics and etics: The insider/outsider debate.* Newbury Park, CA: Sage.

Heath, S. B. (1972). *Telling tongues: Language policy in Mexico, colony to nation.* New York: Teachers College Press.

Heath, S. B. (1983). *Ways with words: Language, life, and work in communities and classrooms.* Cambridge, MA: Cambridge University Press.

Heath, S. B., & Smyth, L. (1999). *ArtShow: Youth and community development.* Washington, DC: Partners for Livable Communities.

Hebdige, D. (1979). *Subculture: The meaning of style.* London: Methuen.

Hedrick, P. (2003). Hopi Indians, "cultural" selection, and albinism. *American Journal of Physical Anthropology, 121,* 151–156.

Heer, J. (1996, April). Marshall McLuhan and the politics of literary reputation. *Literary Review of Canada,* p. 23.

Hegel, G. W. F. (1979). *Phenomenology of spirit* (A. V. Miller, Trans.). Oxford: Oxford University Press.

Heidegger, M. (1962). *Being and time.* San Francisco: Harper/Collins.

Heidenreich, C. A. (1978). Huron. In B. Trigger (Ed.), *Handbook of North American Indians: Vol. 15. Northeast.* Washington, DC: Smithsonian Institution.

Heilbroner, R. L. (1980). *Marxism: For and against.* New York: Norton.

Heimann, J. M. (1999). *The most offending soul alive: Tom Harrisson and his remarkable life.* Honolulu: University of Hawai'i Press.

Heims, S. J. (1991). *Constructing a social science for postwar America: The cybernetics group.* Cambridge: MIT Press.

Heine, B. (1985). The mountain people. Some notes on the Ik of northern Uganda. *Africa, 55,* 3–16.

Henig, R. M. (2000). *The monk in the garden: The lost and found genius of Gregor Mendel, the father of genetics.* Boston: Houghton Mifflin.

Henle, M. (1971). *The selected papers of Wolfgang Köhler.* New York: Liveright Publishing.

Henry, D. O. (1989). *From foraging to agriculture: The Levant at the end of the Ice Age.* Philadelphia: University of Pennsylvania Press.

Hensel, C. (1996). *Telling our selves: Ethnicity and discourse in southwestern Alaska.* New York: Oxford University Press.

Henshilwood, C. S., & Marean, C. (2003). The origin of modern human behavior. *Current Anthropology, 44,* 627–652.

Herdt, G. H. (1981). *Guardians of the flutes: Idioms of masculinity.* New York: McGraw-Hill.

Herdt, G. H. (1984). *Ritualized homosexuality in Melanesia.* Berkeley, CA: University of California Press.

Herman, A. (1997). *The idea of decline in Western history.* New York: Free Press.

Herman, A. L. (1976). *The problem of evil and Indian thought.* Delhi, India: Motilal Banarsidass.

Hernández Castillo, R. A. (2001). *Histories and stories from Chiapas: Border identities in southern Mexico.* Austin: University of Texas Press.

Hersen, M., et al. (Eds.). (2004). *Comprehensive handbook of psychological assessment: Vol. 1. Intellectual and neuropsychological assessment.* Hoboken, NJ:Wiley.

Hershkovitz, P. (1971). *Living New World monkeys (platyrrhini): With an introduction to primates.* Chicago: University of Chicago Press.

Hershkovitz, P. (1977). *Living New World monkeys* (platyrrhini) *with an introduction to the primates* (Vol. 1). Chicago: University of Chicago Press.

Herskovits, M. J. (1938). *Acculturation: The study of culture contact.* New York: Augustin.

Herskovits, M. J. (1952). *Economic anthropology: A study in comparative economics.* New York: Knopf.

Herskovits, M. J. (1953). *Franz Boas: The science of man in the making.* New York: Scribners.

Herskovits, M. J. (1959). Past developments and present currents in ethnology. *American Anthropologist 61*, 389–398.

Herskovits, M. J. (1962). *The human factor in changing Africa.* New York: Knopf.

Herskovits, M. J. (1964). *Cultural dynamics.* New York: Knopf.

Herskovits, M. J., & Herskovits, F. S. (1958). *Dahomean narrative: A cross-cultural analysis.* Evanston, Il: Northwestern University Press.

Hertz, R. (1960). A contribution to the study of the collective representation of death (R. & C. Needham, Trans.). In R. Needham (Ed.), *Death and the right hand.* Glencoe, IL: Free Press. (Original work published in French, 1907)

Hertzberg, A., & Hirt-Manheimer, A. (1998). *Jews: The essence and character of a people.* San Francisco: HarperCollins.

Herz, N., & Garrison, E. (1998). *Geological methods for archaeology.* Oxford: Oxford University Press.

Hess, D. J., &. DaMatta, R. A. (Eds.). (1995). *The Brazilian puzzle: Culture on the borderlands of the Western world.* New York: Columbia University Press.

Hester, T. R., Shafer, H. J., & Feder, K. L. (1997). *Field methods in archaeology.* Mountain View, CA: Mayfield.

Hewitt de Alcántara, C. (1984). *Anthropological perspectives on rural Mexico.* London: Routledge & Kegan Paul.

Heyerdahl, T. (1950). *Across the Pacific by raft.* New York: Rand McNally.

Heyerdahl, T. (1971). *The Ra expeditions.* New York: Doubleday.

Heyerdahl, T. (1974). *Fatu Hiva.* New York: Doubleday.

Heyerdahl, T. (1981). *The Tigris expedition.* New York: Doubleday.

Heyman, J. M. (2005). Eric R. Wolf 's political ethical humanism, and beyond. *Critique of Anthropology, 25,* 13–25.

Hiatt, L. R. (1980). Polyandry in Sri Lanka: A test case for parental investment theory. *Man, 15,* 583–598.

Hick, J. (2005). *An interpretation of religion: Human responses to the transcendent* (2nd ed.). New Haven, CT: Yale University Press.

Hickerson, N. P. (2000). *Linguistic anthropology* (2nd ed.). Fort Worth, TX: Harcourt College Publishers.

Hickman, L. (Ed.). (1998). *Reading Dewey Interpretations for a postmodern generation.* Bloomington and Indianapolis: Indiana University Press.

Hickman, L., & Alexander T. M. (Eds.). (1998). *The essential Dewey* (2 vols.). Bloomington and Indianapolis: Indiana University Press.

Higgs, E. S. (Ed.). (1972). *Papers in economic prehistory.* Cambridge: Cambridge University Press.

Hill, J. (2002). Made from bone: Trickster myths, musicality, and social constructions of history in the Venezuelan Amazon. In G. Schrempp & W. Hansen (Eds.), M*yth: A new symposium* (pp. 72–78). Bloomington: Indiana University Press.

Hill, J. D., &. Santos-Granero, F. (Eds.). (2002). *Comparative Arawakan histories: Rethinking language family and culture area in Amazonia.* Urbana: University of Illinois Press.

Hill, K., & Hurtado, A. M. (1996). *Ache life history: The ecology and demography of a foraging people.* New York: Aldine de Gruyter.

Hilton, J. L., & von Hippel, W. (1996). Stereotypes. *Annual Review of Psychology, 47,* 237–271.

Himmelfarb, G. (1962). *Darwin and the Darwinian revolution.* New York: Norton.

Himmelfarb, G. (2004). *The roads to modernity: TheBritish, French, and American Enlightenments.* New York: Knopf.

Hine, D. C., & Thompson, K. (1998). *The history of black women in America: Shining thread of hope.* New York: Broadway Books.

Hinnebusch, T. J. (1979). Swahili. In T. Shopen (Ed.) *Languages and their status* (pp. 209–293). Cambridge, MA: Winthrop.

Hinshaw, R. H. (1980). Anthropology, administration, and public policy. *Annual Review of Anthropology,* 9, 497–545.

Hinton, A. L. (Ed.). (2000). *Annihilating difference: The anthropology of genocide.* Berkeley: University of California Press.

Hinze, S. W., Atwood D. G., Lerner A. J., & Whitehouse, P. J. (1999). An interdisciplinary response to the Reagan Center Report on women and AD. A*lzheimer Disease and Associated Disorders, 13,* 183–186.

Hiorth, F. (1996). *Introduction to humanism.* Pune, India: Indian Secular Society.

Hirsch, E., & O'Hanlon, M. (Eds.). (1995). *The anthropology of landscape: Perspectives on place and space.* Oxford: Clarendon Press.

Hirst, P. Q. (1979). *On law and ideology.* Atlantic Highlands, NJ: Humanities Press.

Hittman, M. (1997). *Wovoka and the ghost dance.* Lincoln: University of Nebraska Press.

Hjerm, M. (2001). Education, xenophobia, and nationalism: A comparative analysis. *Journal of Ethnic and Migration Studies, 27*(1), 37–62.

Hobbes, T. (1988). *The leviathan.* Amherst, MA: Prometheus.

Hobbes, T. (1998). *Leviathan* (J.C.A. Gaskin, Ed.). Oxford: Oxford University Press. (Original work published 1651)

Hock, H. H. (1991). *Principles of historical linguistics* (2nd ed.). Berlin, Germany: Mouton de Gruyter.

Hock, H. H. (1991). *Principles of historical linguistics* (2nd ed.). New York: Mouton de Gruyter.

Hockett, C. F. (1985). Distinguished lecture: F. *American Anthropologist, 2,* 263–281.

Hockey, J., & James, A. (2003). *Social identities across the life course.* New York: Macmillan.

Hodgen, M. T. (1964). *Early anthropology in the sixteenth and seventeenth centuries.* Philadelphia: University of Pennsylvania Press.

Hodgen, M. T. (1971). *Early anthropology in the sixteenth and seventeenth centuries.* Philadelphia: University of Pennsylvania Press.

Hodgson, D. (2001). *Once intrepid warriors: Gender, ethnicity, and the cultural politics of Maasai development.* Bloomington: Indiana University Press.

Hoebel, E. A. (1940). *The political organization and law-ways of the Comanche Indians.* Menasha, WI: American Anthropological Association, and Contribution of the Laboratory of Anthropology.

Hoebel, E. A. (1949). *Man in the primitive world: An introduction to anthropology.* New York: McGraw-Hill.

Hoebel, E. A. (1954). *The law of primitive man: A study in comparative legal dynamics.* Cambridge, MA: Harvard University Press.

Hoebel, E. A. (1960). *The Cheyennes: Indians of the Great Plains.* New York: Holt, Rinehart & Winston.

Hoebel, E. A., & Llewellen, K. N. (1941). *The Cheyenne way: Conflict and law in primitive jurisprudence.* Norman: University of Oklahoma Press.

Hoeningswald, H. (1960). *Language change and linguistic reconstruction.* Chicago: University of Chicago Press.

Hofstadter, R. (1944). *Social Darwinism in American thought.* Boston: Beacon Press.

Holden, C. (2003). Isotopic data pinpoint Iceman's origin. *Science, 302,* 759–761.

Hole, F. (Ed.). (1987). *The archaeology ofWestern Iran: Settlement and society from prehistory to the Islamic conquest.* Washington, DC: Smithsonian Institution.

Holliday,V. T. (1997). *Paleoindian geoarchaeology of the southern high plains.* Austin: University of Texas Press.

Hollimon, S. (1997). The third gender in native California: Two-spirit undertakers among the Chumash and their neighbors. In C. Claassen & R. Joyce (Eds.), W*omen in prehistory: North America and Mesoamerica* (pp. 173–188). Philadelphia: University of Pennsylvania Press.

Holloway, R. L., Broadfield, D. C., & Yuan, M. S. (2004). *The human fossil record,* Vol. 3: *Brain endocasts.* New York: Wiley-Liss.

Holm, B. (1965). *Northwest Coast Indian art: An analysis of form.* Seattle: University of Washington Press.

Holtzman, J. (2001). The food of elders, the "ration" of women: Brewing, gender, and domestic processes among the Samburu of northern Kenya. *American Anthropologist, 103*(4), 1041–1058.

Holy, L. (Ed.). (1987). *Comparative anthropology.* Oxford: Blackwell.

Honigman, J. J. (1976). *The development of anthropological ideas.* Homewood, IL: Dorsey Press.

Hoopes, D. S. (1980). *Intercultural education.* Bloomington, IN: Phi Delta Kappa Educational Foundation.

Hoover, J. W. (1937). Navajo land problems. *Economic Geography, 13,* 281–300.

Hoover, K. R., & Donovan, T. (2003). *The elements of social scientific thinking* (8th ed.). Belmont, CA: Wadsworth.

Hopwood, D. (1982). *Egypt: Politics and society 1945–1981.* London: Allen & Unwin.

Horton, R. (1960). A definition of religion and its uses. *Journal of the Royal Anthropological Institute of Great Britain and Ireland, 90,* 201–226.

Horwitz, A. V., & Scheid, T. L. (1999). *A handbook for the study of mental health.* Cambridge: Cambridge University Press.

Hourani, A. (1991). *A history of the Arab peoples.* Cambridge: Harvard University Press.

Housley, R. A., & Coles, G. (Eds.). (2004). *Atlantic connections and adaptations: Economies, environments, and subsistence in lands bordering the North Atlantic.* Oxford: Oxbow Monographs.

Howard, J. (1984). *Margaret Mead: A life.* New York: Simon & Schuster.

Howe, J. (1998). *A people who would not kneel: Panama, the United States and the San Blas Kuna.* Washington, DC: Smithsonian Institution Press.

Howell, B. (Ed.). (1990). *Cultural heritage conservation in the American South.* Athens: University of Georgia Press.

Howell, F. C. (1965). *Early man.* New York: Time.

Howell, F. C. (Ed.). (1963). *African ecology and human evolution.* Chicago: Aldine.

Howells, W. W. (1948). *The heathens: Primitive man and his religion.* Garden City, NY: Doubleday. (Reprinted by Sheffield Publishing)

Hrdlicka, A. (1904). *Directions for the collecting information and specimens for physical anthropology.* Washington, DC: Government Printing Office.

Hrdlicka, A. (1907). *Skeletal remains suggesting or attributing to early man in North America.* Washington, DC: Government Printing Office.

Hrdlicka, A. (1936). *The coming of man from Asia in the light of recent discoveries.* Washington, DC: Smithsonian Institute.

Hublin, J.-J, Barroso-Ruiz, C., Medina Lara, P., Fontugne, M., & Reyss, J.-L. (1995). The Mousterian site of Zafarraya (Andalucía, Spain): Dating and implications on the Palaeolithic peopling process of Western Europe. *C. R. Acad. Sci. Paris Series, 2a*(321), 931–937.

Huck, G. J., & Goldsmith, J. A. (1995). *Ideology and linguistic theory: Noam Chomsky and the deep structure debates.* London: Routledge.

Huff, R. C. (2002). *Gangs in America.* Thousand Oaks, CA: Sage.

Huffman, O. F. (2001). Geologic context and age of the Perning/Mojokerto *Homo erectus,* East Java. *Journal of Human Evolution, 40,* 353–362.

Hufford, D. J. (1998, December). *The priority of local observation and local interpretation in evaluating "the spirit hypothesis."* Paper presented at the 97th Annual Meeting of the American Anthropological Association, Philadelphia, PA.

Hufford, M. (Ed.). (1994). *Conserving culture: A new discourse on heritage.* Urbana: University of Illinois Press.

Hughes, A. J. (1963). *East Africa: Kenya, Tanzania, Uganda.* Baltimore: Penguin.

Hughes, G. (1984). *The art of jewelry.* New York: W. H. Smith.

Hughes, H. S. (1952). *Oswald Spengler, A critical estimate.* New York: Scribner.

Hull, D. L. (1988). *Science as a process: An evolutionary account of the social and conceptual development of science.* Chicago: University of Chicago Press.

Hulme, P., & Whitehead, N. L. (Eds.). (1992). *Wild majesty: Encounters with Caribs from Columbus to the present day: An anthology.* Oxford: Oxford University Press.

Hume, D. (2000). *A treatise on human nature: Being an attempt to introduce the experimental method of reasoning into moral subjects* (D. F. Norton & M. J. Norton, Eds.). Oxford/New York: Oxford University Press. (Original work published 1739–1740)

Hume, D. (2003). *A treatise of human nature* (D. F. Norton & M. J. Norton, Eds.). Oxford: Oxford University Press.

Humphrey, A. P., & Smith, P. K. (1987). Rough and tumble, friendship, and dominance in school children: Evidence for continuity and change with age. *Child Development,* 58.

Humphrey, C. R., Lewis, T. L., & Buttel, F. H. (2003). *Environment, energy, and society: Exemplary works.* Belmont, CA: Wadsworth.

Humphrey, C., & Sneath, D. (1999). *The end of nomadism? Society, state, and the environment in Inner Asia* (Central Asia Book Series). Durham, NC: Duke University Press.

Humphrey, C., & Sneath, D. (Eds.). (1996). *Culture and environment in Inner Asia* (2 vols.). Cambridge, UK: White Horse Press.

Hunter, D. E., & Whitten, P. (Eds.). (1976). *Encyclopedia of anthropology.* New York: Harper & Row.

Huntington, R., & Metcalf, P. (1991). *Celebrations of death: The anthropology of mortuary ritual.* Cambridge: Cambridge University Press.

Huntington, S. P. (1981). *American politics: The promise of disharmony.* Cambridge and London: Belknap Press/ Harvard University Press.

Huntington, S. P. (1991). *The third wave: Democratization in the late twentieth century.* Norman: University of Oklahoma Press.

Huntington, S. P. (1996). *The clash of civilizations and the remaking of world order.* New York: Simon & Schuster.

Hurwit, J. M. (2004). *The Acropolis in the age of Pericles.* Cambridge: Cambridge University

Hutchinson, J. (Ed.). *Essays on crop plant evolution.* (1965). Cambridge: Cambridge University Press.

Hutchinson, S. (1996). *Nuer dilemmas: Coping with money, war, and the state.* Berkeley: University of California Press.

Huteson, P. R. (2002). *Legends in wood, stories of the totems.* Tigard, OR: Greatland Classic Sales.

Huxley J. (1992). *Evolutionary humanism.* Buffalo, NY: Prometheus Books.

Huxley, J. (1957). *New bottles for new wine: Essays.* London: Chatto & Windus.

Huxley, J. S. (1942). *Evolution: The modern synthesis.* London: Allen and Unwin.

Hyatt, M. (1990). *Franz Boas: Social activist.* New York: Greenwood Press.

Hyerle, D. (1996). *Visual tools for constructing knowledge.* Alexandria,VA: Association for Supervision and Curriculum Development.

Hyman, L. (1975). *Phonology: Theory and analysis.* New York: Holt, Rinehart and Winston.

Hymes, D. (Ed.). (1964). *Language in culture and society: A reader in linguistics and anthropology.* New York: Harper & Row.

Ianni, F., & Storey, E. (1993). *Cultural relevance and educational issues: Readings in anthropology and*

Ikels, C., & Beall, C. (2000). Age, aging and anthropology, In R. Binstock & L. George (Eds.), *The handbook of aging and the social sciences* (5th ed., pp. 125–139) San Diego, CA: Academic Press.

Inalcik, H., & Quataert, D. (1994). *An economic and social history of the Ottoman Empire, 1300–1914.* Cambridge: Cambridge University Press.

Ingold, T. (1994). Introduction to culture. In T. Ingold (Ed.), *Companion encyclopaedia of anthropology* (pp. 329–349). London: Routledge.

Ingold, T. (2000). *The perception of the environment: Essays on livelihood, dwelling, and skill.* London: Routledge.

Ingold, T. (Ed.). (1988). *What is an animal?* London: Unwin & Hyman.

Inlow, J. K., & Restifo, L. L. (2004). Molecular and comparative genetics of mental retardation. *Genetics, 166,* 835–881.

International Chimpanzee Chromosome 22 Consortium. (2004). DNA sequence and comparative analysis of chimpanzee chromosome 22. *Nature, 429,* 382–388.

Irons, W. (1975). *The Yomut Turkmen: A study of social organization among a Central Asian Turkicspeaking population* (Anthropology Paper No. 58). Ann Arbor: University Michigan, Museum of Anthropology.

Irwin, G. (1992). *The prehistoric exploration and colonisation of the Pacific.* Cambridge: Cambridge University Press.

Irwin, L. (Ed.). (2000). *Native American spirituality: A critical reader.* Lincoln: University of Nebraska Press.

Isaac, G. (1977). *Olorgesailie: Archaeological studies of a Middle Pleistocene lake basin in Kenya.* Chicago: University of Chicago Press.

Isaac, R. J. (1976). *Israel divided: Ideological politics in the Jewish State.* Baltimore: Johns Hopkins University Press.

Isbell, W. H., & McEwan, G. F. (Eds.). (1991). *Huari administrative structure: Prehistoric monumental architecture and state government.* Washington DC: Dumbarton Oaks.

Isbister, J. (2003). *Promises not kept.* Bloomfield, CO: Kumarian Press.

Ives, John W. (1990). *A theory of Northern Athapaskan prehistory.* Boulder, CO:Westview Press; Calgary: University of Calgary Press.

Jablonski, N. G., & Chaplin, G. (2000). The evolution of human skin coloration. *Journal of Human Evolution, 39,* 57–106.

Jackendoff, R. (2002). *Foundations of language: Brain, meaning, grammar, evolution.* Oxford, UK: Oxford University Press.

Jackson, B. D. (1923). *Linnaeus.* London: Witherby.

Jackson, E. T., & Kassam, Yusuf (Eds.). (1998). *Knowledge shared: Participatory evaluation in development cooperation.* West Hartford, CT: Kumarian Press.

Jackson, M. H. (1993). *Galapagos: A natural history.* East Lansing:Michigan State University Press.

Jackson, M. N., & Lashley, M. E. (Eds.). (1994). *African Americans and the new policy consensus: Retreat of the liberal state?* Westport, CT: Greenwood Press.

Jackson, R. L. (1999). *The negotiation of cultural identity: Perceptions of Europeans and African Americans.* Westport, CT: Praeger.

Jacobs, B., & Kain, P. (2003). *Essays on Kant's anthropology.* Cambridge, UK: Cambridge University Press.

Jacobs, J. A. (1984). *Reversals of the Earth's magnetic field.* Bristol: Adam Hilger Ltd.

Jacobsen, T. (1976*). The treasures of darkness: A history of Mesopotamian religion.* New Haven: Yale University Press.

Jacques D. (1978). *Writing and difference.* Chicago: University of Chicago Press.

Jacques D. (1989). *Introduction to Husserl's origin of geometry.* Lincoln: University of Nebraska Press.

Jacques D. (1997). *Of grammatology.* Baltimore: Johns Hopkins University Press.

Jacques, C. (1997). *Angkor: Cities and temples.* London: Thames & Hudson.

James, A. (1989). *Lapps: Reindeer herders of Lapland.* Vero Beach, FL: Rourke.

James, A., & James, A. (2004). *Constructing childhood: Theory, policy, and social practice.* Houndmills, UK, and New York: Palgrave Macmillan.

James, A., & Prout, A. (1997). *Constructing and reconstructing childhood: Contemporary issues in the sociological study of childhood.* London: Falmer Press.

James, E. O. (1999). *The ancient gods.* London: Orion Publishing Group.

James, N., & Fox, J. (1968). *The riddle of the Incas: The story of Hiram Bingham and Machu Picchu.* New York: Hawthorn Books.

James, T. G. H. (2001). *Howard Carter: The path to Tutankhamun.* Cairo: American University in Cairo Press.

James, W. (1979). *Pragmatism and the meaning of truth.* Cambridge, MA: Harvard University Press.

James,V. (1995). *Ancient sites of Hawai'i.* Honolulu HI: Mutual Publishing. National Park Service, Department of the Interior (1975). *Master plan for City of Refuge National Historical Park, Hawaii.* San Francisco, CA: Author.

Jameson, F. (2000). Postmodernism, or the logic of late capitalism. In *The Jameson Reader* (pp. 188–232). Oxford, UK: Blackwell.

Jansonius, J., & McGregor, D. C. (Eds). (1996). *Palynology: Principles and applications.* American Association of Stratigraphic Palynologists Foundation.

Jarvie, I., & Pralong, S. (Eds.). (2003). *Popper's open society after fifty years: The continuing relevance of Karl Popper.* London and New York: Routledge.

Jean, G. (1992). *Writing: The story of alphabets and scripts.* London: Thames and Hudson.

Jenkins, F. A., Jr. (Ed.) (1974). *Primate locomotion.* New York: Academic Press.

Jenkins, J. H., & Barrett, R. (Eds.). (2003). *Schizophrenia, culture, and subjectivity: The edge of experience.* Cambridge: Cambridge University Press.

Jenkins, L. (2000). *Biolinguistics: Exploring the biology of language.* Cambridge, UK: Cambridge University Press.

Jenks, C. (2005). *Subculture: The fragmentation of the social.* Thousand Oaks, CA: Sage.

Jennings, F. (1984). *The ambiguous Iroquois empire.* New York: Norton.

Jepsen, G. L., Mayr, E., & Simpson, G. G. (Eds.). (1949). *Genetics, paleontology, and evolution.* Princeton, NJ: Princeton University Press.

Jett, S. C. (1978). The origins of Navajo settlement patterns. *Annals of the Association of American Geographers, 68,* 351–362.

Jevec, A., & Potter, L. (2001). The Navajo code talkers: A secret World War II memorandum. *Social Education, 65,* 262–268.

Jian, B., Xunzheng, S., & Hua, H. (2001). *A concise history of China.* Oxford: University Press of the Pacific.

Jobling, M. A., Hurles, M. E., & Tyler-Smith, C. (2004). *Human evolutionary genetics: Origins, peoples, and disease.* New York: Garland.

Jochelson, W. (1966). *History, ethnology, and anthropology of the Aleut.* Oosterhout, The Netherlands: Anthropological Publications.

Jochim, C. (1986). *Chinese religions: A cultural perspective.* Englewood Cliffs, NJ: Prentice Hall.

Joel, D. (1997). *Mapping the mind.* Toronto, Canada: Carol Publishing.

Johanson, D. C., & Edey, M. (1981). *Lucy: The beginnings of humankind.* New York: Simon & Schuster.

Johanson, D. C., & Shreeve, J. (2000). *Lucy's child: The discovery of a human ancestor.* New York: Avon.

Johanson, D. C., Johanson, L., & Edgar, B. (1994). *Ancestors: In search of human origins.* New York: Villard Books.

Johanson, D., & Edgar, B. (1996). *From Lucy to language.* New York: Simon & Schuster.

Johns, A. (1998). *The nature of the book.* Chicago: University of Chicago Press.

Johns, T. A. (1990). *With bitter herbs they shall eat it: Chemical ecology and the origins of human diet and medicine.* Tucson: University of Arizona Press.

Johnsen, L. (2002). *The complete idiot's guide to Hinduism.* Indianapolis, IN: Alpha Books.

Johnson, A. W., & Earle, T. K. (1987). *The evolution of human societies: From foraging group to agrarian state.* Stanford, CA: Stanford University Press.

Johnson, E. (1978). *Legends, traditions, and laws of the Iroquois, or Six Nations and history of the Tuscarora Indians.* Lockport, NY: Union Printing.

Johnson, E. H. (1974). *Crime, correction, and society.* Homewood, IL: Dorsey Press.

Johnson, H. (1966). *Sociology: A systematic introduction.* Bombay, India: Allied.

Johnson, K. (1997). *Jaguar wisdom.* Minneapolis, MN: Llewellyn.

Johnson, P. (1999). *The civilization of Ancient Egypt* New York: HarperCollins.

Johnson, W. R. (2000). *Lucretius and the modern world.* London: Duckworth.

Johnston, W. (Ed.). (2000). *Encyclopedia of monasticism.* Chicago: Fitzroy Dearborn.

Jonaitis, A. (Ed.). (1991). *Chiefly feasts: The enduring Kwakiutl potlatch.* Seattle: University of Washington Press; New York: American Museum of Natural History.

Jonardon, G. (2001). *Philosophy in classical India.* London: Routledge.

Jones, F. W. (1918). *Arboreal man.* London: Arnold.

Jones, F. W. (1929). *Man's place among the mammals.* London: Arnold.

Jones, M. (2002). *The molecule hunt: Archaeology and the search for ancient DNA.* New York: Arcade.

Jones, N. C., & Pevzner, P. A. (2004). *An introduction to bioinformatics algorithms (Computational molecular biology).* New York: MIT Press.

Jones, R. R. (1997). *An ethnohistory of Coptic monasticism.* Doctoral dissertation, Wayne State University, Detroit, MI.

Jones, S., Martin, R., & Pilbeam, D. (1992). *The Cambridge encyclopedia of human evolution.* Cambridge: Cambridge University Press.

Jordan, A. (2003). *Business anthropology.* Prospect Heights, IL:Waveland.

Jordan, B. (1993). *Birth in four cultures: A crosscultural investigation of childbirth in Yucatan, Holland, Sweden, and the United States* (4th ed.). Prospect Heights, OH: Waveland Press.

Jorde, L. B., Carey, J. C., Bamshad, M. J., & White, R. L. (2005). *Medical genetics.* St. Louis, MO: C. V. Mosby.

Jorgensen, J. G. (1990). *Oil age Eskimos.* Berkeley: University of California Press.

Joseph, B. D., DeStephano, J., Jacobs, N. G., & Lehiste, I. (Eds.). (2003). *When languages collide: Perspectives on language conflict, language competition, and language coexistence.* Columbus: Ohio State University Press.

Joukowsky, M. S. (1996). *Early Turkey : An introduction to the archaeology of Anatolia from prehistory through the Lydian Period.* Dubuque, IA: Kendall/Hunt.

Joukowsky, M. S. (Ed.) (2002). Petra: A royal city unearthed. *Near Eastern Archaeology, 65*(4).

Jung, C. C. (1970). Mysterium coniunctionis: An inquiry into the separation and synthesis of psychic opposites in alchemy. *The Collected Works of C. G. Jung* (Vol. 14). Princeton: Princeton University Press.

Kaeppler, A. L. (1953). Ceremonial mask: A Melanesian art style. *Journal of Polynesian Society, 25,* 118–138.

Kahl, G. (2004). *The dictionary of gene technology. Genomics, transcriptoms, proteomics* (3rd ed.). Weinheim, Germany: Wiley-VCH.

Kahn, C. (1979). *The art and thought of Heraclitus.* Cambridge: Cambridge University Press.

Kaiser, C. B. (1991). *Creation and the history of science.* Grand Rapids, MI: Eerdmans.

Kalweit, H. (1992). *Shamans, healers, and medicine men.* Boston: Shambhala.

Kan, S. (2001). The "Russian Bastian" and Boas or why Shternberg's *The social organization of the Gilyak* never appeared among the Jessup Expedition Publications.

Kant, I. (1999). *Practical philosophy* (M. J. Gregor, Ed.). Cambridge: Cambridge University Press.

Kapadia, K. M. (1958). *Marriage and family in India* (2nd ed.). Bombay: Oxford University Press.

Kapadia, K. M. (1958). *Marriage and family in India* (2nd ed.). Bombay: Oxford University Press.

Kaplan, G., & Rogers, L. J. (2000). *The orangutan.* Cambridge: Perseus.

Kappeler, P. M. (Ed.). (2000). *Primate males: Causes and consequences of variation in group composition.* Cambridge: Cambridge University Press.

Karakostas, V. (2004). Forms of quantum nonseparability and related philosophical consequences. *Journal for General Philosophy of Science, 35,* 283–312.

Kardiner, A. (1945). *The psychological frontiers of society.* Westport, CT: Greenwood.

Kardiner, A., & Linton, R. (1939). *The individual and his society: The psychodynamics of primitive social organization.* New York: Columbia University Press.

Kardiner, A., & Preble, E. (1961). *They studied man.* Cleveland OH: World Publishing.

Kardiner, A., Linton, R., DuBois, C., & West, J. (1945). *The psychological frontiers of society.* New York: Columbia University Press.

Karenga, M. (2002). *Introduction to black studies* (3rd ed.). Los Angeles: Sinakore University Press.

Karim, W. J. (1992). *Women and culture: Between Malay Adat and Islam.* Boulder, CO: Westview Press.

Karsh, E., & Mahler, G. (1994). *Israel at the crossroads: The challenge of peace.* London: British Academic Press.

Kates, R. W., Hyden, G., & Turner B. L. II. (1993). *Population growth and agricultural change in*

Katz, L. D. (Ed.). (2000). *Evolutionary origin of morality: Cross-disciplinary perspectives.* Exeter, UK: Imprint Academic.

Kauffman, S. A. (1995). *At home in the universe: The search for laws of self-organization and complexity.* New York: Oxford University Press.

Kavanaugh, G. (Ed.). (2000). *Making histories in museums.* New York: Continuum International.

Kay, R. F., Ross, C., & Williams, B. A. (1997). Anthropoid origins. *Science, 275,* 797–804.

Kayano, S. (1978). *Ainu no Mingu* [The tools and instruments of the Ainu]. Tokyo: Ainu no Mingu Kanko Rendo Iinkai.

Kearney, M. (1996). *Reconceptualizing the peasantry: Anthropology in global perspective.* Boulder, CO: Westview Press.

Keatinge, R. W. (Ed.). (1998). *Peruvian prehistory: An overview of Pre-Inca and Inca Society.* Cambridge: Cambridge University Press.

Kedia, S., & van Willigen, J. (Eds.). (in press). *Applied anthropology: Domains of application.* Westport, CT: Greenwood.

Keen, I. (2004). *Aboriginal economy and society: Australia at the threshold of colonisation.* Melbourne, NY: Oxford University Press.

Kehoe, A. B. (1989). *The ghost dance: Ethnohistory and revitalization.* New York: Holt, Rinehart & Winston.

Kehoe, A. B. (2000). *Shamans and religion: An anthropological exploration in critical thinking.* Prospect Heights, IL: Waveland.

Keil, C. (1979). *Tiv song: The sociology of art in a classless society.* Chicago: University of Chicago Press.

Keil, C., & Feld, S. (1994). *Music grooves.* Chicago: University of Chicago Press.

Keil, C., Keil, A., & Blau, D. (1996). *Polka happiness.* Philadelphia: Temple University Press.

Keith, A. (1929 [1915]). *The antiquity of man.* London: Williams & Norgate.

Keith, A. (1948). *Autobiography.* London: Watts & Co.

Kell, K. T. (1966). Folk names for tobacco. *Journal of American Folklore, 79,* 590–599.

Keller, H., Poortinga, Y. H., & Schölmerich, A. (Eds.). (2002). *Between culture and biology. Perspectives on ontogenetic development.* Cambridge: Cambridge University Press.

Kellner, L. (1963). *Alexander von Humboldt.* London: Oxford University Press.

Kelly, R. C. (2000). *Peaceful societies and the origin of war.* Ann Arbor: University of Michigan Press.

Kelly, R. L. (1995). The foraging spectrum: Diversity in hunter-gatherer lifeways. Washington, DC: Smithsonian Institution Press.

Kelsea, J., & Vivian, R. G. (1995). *Guide to American Indian museums and cultural centers of Arizona.* Tucson: University of Arizona.

Kelsey, J. (1995). *The New Zealand experiment: A world model for structural adjustment.* Auckland, New Zealand: Auckland University Press.

Kemp, B. (1994). *Ancient Egypt: Anatomy of a civilization.* London: Routledge.

Kemp, M. (2004). *Leonardo.* Oxford, UK: Oxford University Press.

Kennedy, K. A. R. (1997). McCown, Theodore D(oney) (1908–1969). In F. Spencer (Ed.), *History of physical anthropology* (2nd ed., pp. 627–629). New York: Garland.

Kennedy, K. A. R. (2000). *God-apes and fossil men: Paleoanthropology of South Asia.* Ann Arbor: University of Michigan Press.

Kennedy, K. A. R., & Brooks, S. T. (1984). Theodore D. McCown: A perspective on a physical anthropologist. *Current Anthropology, 25,* 99–103.

Kennedy, K. A. R., & Deraniyagala, S. U. (1989). Fossil remains of 28,500 year-old hominids from Sri Lanka. *Current Anthropology, 30,* 394–399.

Kennedy, K. A. R., & Zahorsky, J. L. (1995). Trends in prehistoric technology and biological adaptations: New

evidence from Pleistocene deposits at Fa Hien Cave, Sri Lanka. *South Asian Archaeology, 2,* 839–853.

Kennedy, K. A. R., Sonakia, A., Chiment, J., & Verma, K. K. (1991). Is the Narmada hominid an Indian *Homo erectus? American Journal of Physical Anthropology, 86,* 475–496.

Kenoyer, J. M. (1998). *Ancient cities of the Indus Valley civilization.* Karachi, Pakistan: Oxford University Press and American Institute of Pakistan Studies.

Kent, S. (Ed.). (1998). *Gender in African prehistory.* Walnut Creek, CA: Alta Mira Press.

Kenyon, W. A. (1986). *Mounds of sacred earth: Burial mounds of Ontario.* Toronto, Canada: University of Toronto Press.

Kerns,V. (2003). *Scenes from the high desert: Julian Steward's life and theory.* Urbana: University of Illinois Press.

Kesselman, A., McNair, L. D., & Schniedewind, N. (Eds.). (1995). *Women images and realities.* Mountain View, CA: Mayfield.

Keto, T. C. (1977). Race relations, land and the changing missionary role in South Africa: A case study of the American Zulu mission. *The International Journal of African Historical Studies, 10*(4), 600–627.

Kettlewell, H. B. D. (1952). Use of radioactive tracer in the study of insect populations (Lepidoptera). *Nature,* 170, 584–586.

Kettlewell, H. B. D. (1956). A résumé of investigations on the evolution of melanism in the Lepidoptera. *Proceedings. Royal Society of London.* (Series B). *Biological Sciences, 145,* 297–303.

Kevles, D. J. (1995). *In the name of eugenics: Genetics and the uses of human heredity.* Cambridge, MA: Harvard University Press.

Kevles, D. J., & Lappé, M. (1995). Eugenics. In W. T. Reich (Ed.), *Encyclopedia of bioethics* (Rev. ed., Vol. 2, pp. 765–777). New York: Simon & Schuster Macmillan.

Key, M. R. (1975). *Paralanguage and kinesics.* Metuchen, NJ: Scarecrow Press.

Khurt, A. (1995). *The ancient near east.* London: Routledge.

Kiel, L. D., & Elliot, E. (Eds.). (1996). *Chaos theory in the social sciences: Foundations and applications.* Ann Arbor: University of Michigan Press.

Kimbel, W. H., Rak, Y., & Johanson, D. C. (2004). *The skull of Australopithecus afarensis.* Oxford, UK: Oxford University Press.

Kimmel, M., & Messner, M. (1998). *Men's lives.* London: Allyn & Bacon.

Kimura, M. (1983). *The neutral theory of molecular evolution.* Cambridge: Cambridge University Press.

King, B. (1999). *The origins of language.* Santa Fe, NM: School of American Research Press.

King, M. (1985). *Being Pakeha: An encounter with New Zealand and the Māori renaissance.* Auckland, New Zealand: Hodder & Stoughton.

King, M. (2003). *The Penguin history of New Zealand.* Auckland, New Zealand: Penguin Books.

King, M. L., Jr. (1962). *Why we can't wait.* New York: Harper & Row.

King, P. J. (1998). The problem of evil. *Philosophical Writings, 9.*

King, R. (1999). *Indian philosophy: An introduction to Hindu and Buddhist thought.* Edinburgh, UK: Edinburgh University Press.

King, T. F. (1998). *Cultural resource laws and practice: An introductory guide.* Walnut Creek, CA: Alta Mira Press.

King, T. F. (2002). *Thinking about cultural resource management: Essays from the edge.* Walnut Creek, CA: Alta Mira Press.

Kinney, A. (2000). *Thomas Hobbes.* New York: Twayne.

Kintz, E. R. (1990). *Life under the tropical canopy: Tradition and change among the Yucatec Maya.* Fort Worth, TX: Holt, Rinehart & Winston.

Kinzey, W. G. (1997). *New world primates: Ecology evolution & behavior.* New York: Walter de Gruyter.

Kirch, P. V. (2000). *On the road of the winds: An archaeological history of the Pacific Islands before European contact.* Berkeley, CA: University of California Press.

Kirch, P. V., & Hunt, T. L. (Eds.). (1993). *The To'aga Site: Three millennia of Polynesian occupation in the Manu'a Islands, American Samoa.* Archaeological Research Facility Contribution No. 51. Berkeley: University of California.

Kirch, P. V., & Sahlins, M. (1992). *Anahulu: The anthropology of history in the kingdom of Hawaii.* Chicago: University of Chicago Press.

Kirch, P., & Hunt, T. (Eds.). (1997). *Historical ecology in the Pacific Islands.* New Haven, CT: Yale University Press.

Kirk, G. S. (1962). *Heraclitus: The cosmic fragments.* Cambridge: Cambridge University Press.

Kirk, G. S. (1974). *The nature of Greek myths.* London: Penguin Books.

Kirk, G. S., Raven, J. E., & Schofield, M. (1983). *The pre-Socratic philosophers.* Cambridge: Cambridge University Press.

Kirkpatrick, S. (1992). *Lord of Sipan: A true story of Pre-Inca tombs, Archaeology, and Crime.* New York: William Morrow & Co.

Kirmayer, L. J., & Minas, H. (2000). The future of cultural psychiatry: An international perspective. *Canadian Journal of Psychiatry, 45,* 438–446.

Kirsch, J. (2004). *God against the gods: The history of the war between monotheism and polytheism.* New York: The Penguin Group.

Kitchen, K. A. (1982). *Pharaoh triumphant: The life and times of Ramesses II, King of Egypt.* Warminster, UK: Aris & Phillips.

Kitcher, P., & Schacht, R. (2004). *Finding an ending: Reflections on Wagner's ring.* Oxford: Oxford University Press.

Klass, M. (1995). *Ordered universes: Approaches to the anthropology of religion.* Boulder, CO:Westview Press.

Klausner, S. Z., & Foulks, E. F. (1982). *Eskimo capitalist: Oil, politics, and alcohol.* Totowa, NJ: Allanheld, Osmun.

Klee, R. (1997). *The philosophy of science: Cutting nature at its seams.* New York: Oxford University Press.

Kleiman, D. G. (Ed.). (1978). *The biology and conservation of the Callitrichidae.* Washington, DC: Smithsonian Institution Press.

Kleiman, Y. (2004). *DNA and tradition: The genetic link to the ancient Hebrews.* New York: Devora.

Klein, R. (1999). *The human career: Human biological and cultural origins* (2nd ed.). Chicago: University of Chicago Press.

Klein, R. G., & Blake, E. (2002). *The dawn of human culture.* New York: Wiley.

Kleinman, A. & Good, B. (Eds.). (1985). *Culture and depression: Studies in the anthropology and crosscultural psychiatry of affect and disorder.* Berkeley: University of California Press.

Kleinman, A. (1988). *Rethinking psychiatry: From cultural category to personal experience.* New York: Free Press.

Kleinman, A. (1995). Writing at the margins: Discourse between anthropology and medicine. Berkeley: University of California Press.

Kleinman, A., & Good, B. J. (Eds.). (1985). *Culture and depression.* Berkeley: University of California Press.

Kleinman, A., Das, V., & Lock, M. (Eds.). (1997). *Social suffering.* Berkeley: University of California Press.

Klien, M. W., Kerner, H.-J., Maxson, C. L., & Weitekamp, E. G. M. (Eds.). (2001). *The Eurogang paradox: Street gangs and youth groups in the U. S. and Europe.* Dordrecht, Holland: Kluwer Academic.

Klossowski De Rola, S. (1997). *The golden game: Alchemical engravings of the seventeenth century.* New York: Thames & Hudson.

Klostermaier, K. K. (1989). *A survey of Hinduism.* Albany: State University of New York Press.

Kluckhohn, C. (1936). Some reflections on the method and theory of the Kulturkreislehre. *American Anthropologist, 38*(2), 157–196.

Kluckhohn, C. (1942). Navaho witchcraft. *Papers of the Peabody Museum of Archaeology and Ethnology, 22*(2). Cambridge, MA: Harvard University.

Kluckhohn, C. (1949). *Mirror for man: The relation of anthropology to modern life.* New York: McGraw Hill.

Kluckhohn, C. (1962). *Culture and behavior: The collected essays of Clyde Kluckhohn.* New York: Free Press.

Kluckhohn, C. (1985). *Mirror for man: The relation of anthropology to modern life.* Tucson: University of Arizona Press. (Original work published 1949)

Kluckhohn, C., Murray, H. A., & Schneider, D. M. (1953). *Personality in nature, society, and culture.*

Koch-Grünberg, T. (1979). *Del Roraima al Orinoco* (Vol. 1, F. de Ritter, Trans.). Caracas: Ediciones del Banco Central de Venezuela. (Original work published 1924)

Koeberl, C., Martinez-Ruiz, F. C., & Ruiz, F. M. (2003). *Impact markers in the stratigraphic record (impact studies).* New York: Springer-Verlag.

Koebner, L. (1994). *Zoo book: The evolution of wildlife conservation centers.* New York: Tom Doherty.

Koenig, B., & Marshall, P. (2004). Anthropology and bioethics. In S. G. Post (Ed.), *Encyclopedia of bioethics* (3rd ed., Vol. 1, pp. 215–225). New York: Macmillan Reference.

Koepping, K.-P. (1983). *Adolf Bastian and the psychic unity of mankind: The foundations of anthropology in nineteenth century Germany.* St. Lucia, Australia: University of Queensland Press.

Koerner, D., & LeVay, S. (2000). *Here be dragons: The scientific quest for extraterrestrial life.* Oxford, UK: Oxford University Press.

Köhler, J. (2002). *Zarathustra's secret: The interior life of Friedrich Nietzsche.* New Haven: Yale University Press.

Köhler, M., & Moyà-Solà, S. (1997). Ape-like or hominid-like? The positional behavior of *Oreopithecus bambolii* reconsidered. *Proceedings of the National Academy of Sciences, USA, 94,* 11747–11750.

Kohler, T. A., & Gumerman, G. J. (Eds.). (2000). *Dynamics in human and primate societies: Agent-based modeling of social and spatial processes.* New York: Oxford University Press.

Köhler, W. (1925). *The mentality of apes.* Trowbridge, UK: Redwood Press.

Köhler, W. (1969). *The task of Gestalt psychology.* Princeton, NJ: Princeton University Press.

Köhler, W. (1992). *Gestalt psychology: An introduction to new concepts in modern psychology.* New York: Liveright Publishing.

Kohlhoff, D. (1995). *When the wind was a river.* Seattle, WA: University of Washington Press in an association with Aleutian/Pribilof Islands Association, Anchorage, AK.

Kolata, A. L. (1996). *Valley of the spirits: A journey into the lost realm of the Aymara.* Hoboken, NJ:Wiley.

Kolb, B., & Whishaw, I. Q. (2000). *Human neuropsychology* (4th ed.). New York: Freeman/Worth.

Kolenda, P. (1981). *Caste, cult, and hierarchy.* Merrut, India: Folklore Institute.

Kollock, P., Blumstein, P., & Schwartz, P. (1994). Sex and power in interaction: Conversational privileges and duties. In J. O'Brien & P. Kollock (Eds.), *The production of reality: Essays and readings on social interaction.* Thousand Oaks, CA: Pine Forge.

Koopmann, H. (Ed.). (2001). *Thomas Mann Handbuch* (3rd ed.). Stuttgart, Germany: Kröner Verlag.

Koppers, W. (1952). *Primitive man and his world picture.* London: Sheed & Ward.

Koran (*c.* 632). In Micheline R. Ishay (Ed.), *The human rights reader* (pp. 41–42). New York: Routledge.

Korbin, J. (1987). Child maltreatment in crosscultural perspective: Vulnerable children and circumstances. In R. Gelles and J. Lancaster (Eds.), *Child abuse and neglect: Biosocial dimensions* (pp. 31–55). Chicago: Aldine.

Korbin, J. (1987). Child sexual abuse: Implications from the cross-cultural record. In N. Scheper-Hughes (Ed.), *Child survival: Anthropological perspectives on the treatment and maltreatment of children* (pp. 247–265). Dordrecht, Holland: D. Reidel.

Korbin, J. E. (1997). Culture and child maltreatment. In M. E. Helfer, R. Kempe, & R. Krugman (Eds.), *The battered child* (5th ed., pp. 29–48). Chicago: University of Chicago Press.

Korbin, J. E. (1998). "Good mothers," "babykillers," and fatal child maltreatment. In N. Scheper-Hughes & C. Sargent (Eds.), *Small wars: The cultural politics of childhood* (pp. 253–276). Berkeley: University of California Press.

Kordos, L. (2000). New results of hominoid research in the Carpathian Basin. *Acta Biologica Szegediensis, 44,* 71–74.

Kordos, L., & Begun, D. (2001). A new cranium of *Dryopithecus* from Rudabánya, Hungary. *Journal of Human Evolution, 41*, 689–700.

Kotun, D. (1998). *Abiku.* Pasadena, CA: Nepotist Books.

Kozak, D. (2000). Shamanisms: Past and present. In R. Scupin (Ed.), *Religion and culture: An anthropological focus.* Upper Saddle River, NJ: Prentice-Hall.

Kozlowski, J. K., & Otte, M. (1999). The formation of the Aurignacian in Europe. *Journal of Anthropological Research, 56,* 513–534.

Kragh, H. (1996). *Cosmology and controversy.* Princeton, NJ: Princeton University Press.

Kramer, J. (1996). *The politics of memory: Looking for Germany in the new Germany.* New York: Random House.

Kramer, S. N. (1967). *Cradle of civilization.* New York: Time–Life Books.

Kramnick, I. (Ed.). (1995). *Enlightenment reader.* Harmondsworth, UK: Penguin Books.

Krasner, S. (1976). State power and the structure of the international trading system. *World Politics 28*(April), 317–344.

Krause, S. J. (1964). *Essays on determinism in American literature.* Kent, OH: Kent State University Press.

Kraybill, D. B. (2001). *The riddle of Amish culture* (2nd ed.). Baltimore: Johns Hopkins University Press.

Krebs, J. R., & Davies, N. B. (Eds.). (1997). *Behavioural ecology: An evolutionary approach* (4th ed.). Oxford: Blackwell.

Kreis, K. M. (in press). *Lakotas, blackrobes, and holy women.* Lincoln: University of Nebraska Press.

Kremer-Marietti, A. (1987)."Positivist Anthropology." *Encylopedia of Library and Information Science.* New York: Marcel Dekker.

Kremer-Marietti, A. (1992). Measurement and principles. The structure of physical theories. *Revue Internationale de Philosophie, 3(182)* 361–375.

Kreps, G. M., Donnermeyer, J. F., & Kreps, M. W. (1994). The changing occupational structure of Amish males. *Rural Sociology, 59,* 708–719.

Krige, E. J. (1936) *The social system of the Zulus.* London: Longman, Green.

Krishnamurthy,V. (1989). *Essentials of Hinduism.* New Delhi: Narosa.

Kroeber, A. (1948). *Anthropology: Race, language, culture, psychology, prehistory* (2nd ed.). New York: Harcourt, Brace.

Kroeber, A. (1952). *The nature of culture.* Chicago: University of Chicago Press.

Kroeber, A. L. (1917). The superorganic. *American Anthropologist, 19*(2), 163–213.

Kroeber, A. L. (1931). The culture-area and age-area concepts of Clark Wissler. In S. A. Rice (Ed.), *Methods in social sciences* (pp. 248–265). Chicago: University of Chicago Press.

Kronenwetter, M. (1994). *The peace commandos.* New York: New Discovery Books.

Kropotkin, P. (1967). *Memoirs of a revolutionist.* Gloucester, MA: Peter Smith.

Kropotkin, P. (1967). *Mutual aid.* Boston: Extending Horizons.

Kropotkin, P. (1970) *Revolutionary pamphlets.* New York: Dover.

Kropotkin, P. (1989). *The conquest of bread.* Montreal, Canada: Black Rose.

Krzyzaniak, L., & Kobusiewicz, M. (Eds.). (1989). *Late prehistory of the Nile Basin and the Sahara.* Poznan, Poland: Poznan Archaeological Museum.

Kuban, G. (1986). A summary of the Taylor Site evidence. *Creation/Evolution, 6*(1), 10–18.

Kuhse, H., & Singer, P. (2001). (Ed.*). A companion to bioethics.* Oxford: Blackwell.

Kuklick, H. (1991). The *savage within: The social history of British Anthropology: 1885–1945.* Cambridge: Cambridge University Press.

Kulick, D., & Margaret, W. (Eds.). (1995). *Taboo: Sex, identity and erotic subjectivity in anthropological fieldwork.* New York: Routledge.

Kummer, H. (1968). *Social organization of hamadryas baboons.* Chicago: University of Chicago Press.

Kunstadter, P., Chapman, E. C., & Sabhasri, S. (Eds.). (1978). *Farmers in the forest.* Honolulu: University of Hawaii Press.

Kuntzsch, I. (1981). *A history of jewels and jewelry.* New York: St Martin's Press.

Kuper, A. (1982). Lineage theory: A critical retrospect. *Annual Review of Anthropology, 11,* 71–95.

Kuper, A. (1982). *Wives for cattle: Bridewealth and marriage in Southern Africa.* London: Routledge & Kegan Paul.

Kuper, A. (1983) *Anthropology and anthropologists: The modern British school.* London: Routledge.

Kuper, A. (1988). *The invention of primitive society.* London: Routledge.

Kuper, A. (1996). *Anthropology and anthropologists: The modern British school* (3rd ed.). London: Routledge.

Kuper, L. (1981). *Genocide: Its political use in the twentieth century.* New Haven, CT: Yale University Press.

Küppers, B.-O. (1985). *Molecular theory of evolution: Outline of a physico-chemical theory of the origin of life* (2nd ed.). Berlin: Springer.

Küppers, B.-O. (1990). *Information and the origin of life.* Cambridge: MIT Press.

Kurtz, D. V. (2001). *Political anthropology: Paradigms and power.* Boulder, CO: Westview.

Kurtz, P. (1986). *The transcendental temptation: A critique of religion and the paranormal.* Amherst, NY: Prometheus Books.

Kurtz, P. (1989). *Eupraxophy: Living without religion.* Amherst, NY: Prometheus Books.

Kutsche, P. (1997). *Field ethnography: A manual for doing cultural anthropology*. Englewood Cliffs, NJ: Prentice Hall.

Kuznar, L. A. (1997). *Reclaiming a scientific anthropology.* Walnut Creek, CA: Alta Mira.

Kwadwo, O. (2002). *A handbook on Asante culture.* Kumasi, Ghana: Cita Press.

La Barre, W. (1938). *The peyote cult.* New Haven, CT: Yale University Press.

La Barre, W. (1962). *They shall take up serpents: Psychology of a southern snakehandling cult.* Minneapolis: University of Minnosota Press.

La Barre, W. (1970). *The ghost dance: Origins of religion.* New York: Doubleday.

La Barre, W. (1991). *Shadow of childhood: Neoteny and the biology of religion.* Norman: University of Oklahoma Press.

Laclau, E., & Mouffe, C. (2001). *Hegemony and socialist strategy: Towards a radical democratic politics* (2nd ed.). London: Verso.

Ladefoged, P. (1975). *A course in phonetics.* New York: Harcourt Brace Jovanovich.

Lafitau, J.-F. (1974). *Customs of the American Indians compared with the customs of primitive times* (Vol. 48, W. N. Fenton & E. L. Moore, Trans.).

Lake, J. A. (1991). The order of sequence alignment can bias the selection of tree topology. *Molecular Biology and Evolution, 8,* 378–385.

Lakoff, R. (1975). *Language and women's place.* New York: Harper & Row.

Lamb, D. (2001). *The search for extraterrestrial intelligence: A philosophical inquiry.* New York: Routledge.

Lambert, J. E. (1998). Primate digestion: Interactions among anatomy, physiology, and feeding ecology. *Evolutionary Anthropology, 7,* 8–20.

Lambert, W. E., & Taylor, D. M. (1987). Language minorities in the United States: Conflicts around assimilation and proposed modes of accommodation. In W. A. van Horne (Ed.), *Ethnicity and language* (pp. 58–89). Madison: University of Wisconsin Press.

Lambin, E. F., Turner, B. L., Geist, H. J., Agbola S. B., Angelsen, A., Bruce, J. W., et al. (2001). The causes of land-use and land-cover change:Moving beyond the myths. *Global Environmental Change, 11,* 261–269.

Lamphere, L. (1993). Gladys Reichard among the Navajo. In N. Parezo (Ed.), *Hidden scholars: Women anthropologists and the Native American southwest* (pp. 157–181). Albuquerque: University of New Mexico Press.

Lancaster, W. (1997). *The Rwala Bedouin today* (2nd ed.). Prospect Heights, IL: Waveland.

Landau, E. (1993). *Sexual harassment.* New York: Walker and Co.

Landau, E. (1997). *The Sumerians.* Brookfield, CT: Millbrook Press.

Lande, R., & Arnold, S. J. (1983). The measurement of selection on correlated characters. *Evolution 37,* 1210–1226.

Lane, B. C. (2001). *Landscapes of the sacred: Geography and narrative in American spirituality.* Baltimore, MD: Johns Hopkins Press.

Lane, M. (1970). Introduction. *Structuralism: A reader.* London: Jonathan Cape.

Lane, R. E. (1962). *Political ideology: Why the American common man believes what he does.* New York: Free Press of Glencoe.

Langacker, R. W. (1973). *Language and its structure* (2nd ed.). New York: Harcourt Brace Jovanovich.

Langness, L. L. (2005). *The study of culture,* 3rd ed. Novato, CA: Chandler & Sharp.

Lansing, S. (1991). *Priests and programmers: Technologies of power in the engineered landscape of Bali.* Princeton, NJ: Princeton University Press.

Laporte, L. F. (2000). *George Gaylord Simpson: Paleontologist and evolutionist.* New York: Columbia University Press.

Lapsley, H. (1999). *Margaret Mead and Ruth Benedict: The kinship of women.* Amherst: University of Massachusetts Press.

Laqueur, T. (1990). *Making sex: Body and gender from the Greeks to Freud.* Cambridge, MA: Harvard University Press.

Largerwey, J. (1987). *Taoist ritual in Chinese society and history.* New York: Macmillan.

Larick, R., Ciochon, R. L., & Zaim, Y. (1999). Fossil farming in Java. *Natural History, 108,* 54–57.

Larraín, J. (1979). *The concept of ideology.* London: Hutchinson.

Larson, E. (1997). *Summer for the gods: The Scopes trial and America's continuing debate over science and religion.* New York: Basic Books.

Larson, E. J. (2004). *Evolution: The remarkable history of a scientific theory.* New York: Modern Library.

Lasaqa, I. (1984). *The Fijian people: Before and after independence.* Canberra: Australian National University Press.

Laslett, P. (Ed.). (1972). *Household and family in past time.* New York: Cambridge University Press.

Lathrap, D. W. (1970). *The upper Amazon.* Southampton, UK: Thames & Hudson.

Lattimore, O. (1940). *Inner Asian frontiers of China,* Vol. 21: *American Geographical Society research series.* New York: American Geographical Society.

Laur, J. (2002). *Angkor: An illustrated guide to the monuments.* Paris: Flammarion.

Lave, C. A., & March, J. G. (1975). *An introduction to models in the social sciences.* New York: Harper & Row.

Lawless, R., Sutlive,V., & Zamora, M. (Eds.). (1983). *Fieldwork: The human experience.* New York: Gordon & Breach.

Lawson, A. (1989). *Adultery.* New York: Basic Books.

Lawson, E. T. (2003). Agency and religious agency in cognitive perspective. In S. D. Glazier & C. A. Flowerday (Eds.), *Selected readings in the anthropology of religion: Theoretical and methodological essays* (pp. 99–106). Westport, CT: Praeger.

Layton, R. (1991). *The anthropology of art.* Cambridge: Cambridge University Press.

Le Gros Clark, W. E. (1959). *The antecedents of man.* Edinburgh: Edinburgh University Press.

Le Guyader, H. (2004). *Geoffroy Saint-Hilaire: A visionary naturalist* (M. Greene, Trans.). Chicago: University of Chicago Press.

Leach, E. (1973). Structuralism is social anthropology. In D. Robey (Ed.), *Structuralism: An introduction* (pp. 37–57). London:William Clowes.

Leach, E. (1976). *Culture and communication: The logic by which symbols are connected: An introduction to the use of structuralist analysis in social anthropology.* Cambridge: Cambridge University Press.

Leach, J. W., & Leach, E. (1983). *The kula: New perspectives on massim exchange.* Cambridge, UK: Cambridge University Press.

Leacock, E. (1954). The Montagnais "hunting territory" and the fur trade. *American Anthropologist, 56*(5) Part 2, Memoir 78.

Leacock, E. (1978). Women's status in egalitarian society: Implications for social evolution. *Current Anthropology, 19,* 139–164.

Leacock, E. (1981). *Myths of male dominance.* New York: Monthly Review Press.

Leakey, L. S. B. (1934). Some aspects of the Kikuyu tribe. *Man, 34,* 59.

Leakey, L. S. B. (1962). A new lower Pliocene fossil primate from Kenya. *Annals of the Magazine of Natural History (Series 13), 4,* 689–696.

Leakey, L. S. B. (1965a). A new species of genus *Homo* from Olduvai Gorge. *Current Anthropology, 6,* 424–427.

Leakey, L. S. B. (1965b). Recent discoveries of fossil hominids in Tanganyika: At Olduvai and near Lake Natron. *Current Anthropology, 6,* 422–424.

Leakey, M. (1983). *Africa's vanishing art: The rock paintings of Tanzania.* Garden City, NY: Doubleday.

Leakey, M. (1986). *Disclosing the past.* New York: McGraw-Hill.

Leakey, M. (1988). *Guide to Koobi Fora: The East Turkana fossil sites.* Nairobi: National Museums of Kenya.

Leakey, M. D. (1971). *Olduvai Gorge: Excavations in Bed I and II, 1960–1963.* Cambridge: Cambridge University Press.

Leakey, M. D. (1979). *Olduvai Gorge: My search for early man.* London: Collins.

Leakey, M. D. (1984). *Disclosing the past: An autobiography.* Garden City, NJ: Doubleday.

Leakey, M. D., & Harris, J. M. (Eds.). (1987). *Laetoli: A Pliocene site in northern Tanzania.* Oxford, UK: Clarendon.

Leakey, M. G., et al. (1995). New four-million-yearold hominid species from Kanapoi and Allia Bay, Kenya. *Nature, 376,* 565–571.

Leakey, M. G., Spoor, F., Brown, F. H., Gathogo, P. N., Kiarie, C., Leakey, L. N., & McDougall, I. (2001). New *Hominin genus* from Eastern Africa shows diverse middle pliocene lineages. *Nature, 310,* 433–440.

Leakey, R. (1978). *People of the lake: Mankind and its beginnings.* New York: Anchor.

Leakey, R. (1981). *The making of mankind.* New York: Dutton.

Leakey, R. (1982). *Human origins.* New York: Lodestar.

Leakey, R. (1994). *The origin of humankind.* New York: Basic Books.

Leakey, R., & Lewin, R. (1995). *The sixth extinction: Patterns of life and the future of humankind.* New York: Anchor Books.

Leakey, R. E. F. (1984). *One life: An autobiography.* Salem, MA: Salem House.

Leakey, R. E. F. (1994). *The origin of humankind.* New York: BasicBooks/HarperCollins.

Lear, L. (1997). *Rachel Carson: Witness for nature.* New York: Henry Holt.

LeBon, G. (1960). *The crowd: A study of the popular mind.* New York: Viking Press.

Lebra, W. (Ed.). (2000). *Cultural psychiatry and medical anthropology.* London: Athlone.

Lee, C., & Smagorinsky, P. (Eds.). (2000). *Vygotskian Perspectives on literacy research: Constructing meaning*

through collaborative inquiry. Cambridge, UK, New York: Cambridge University Press.

Lee, G. (1992). *The rock art of Easter Island: Symbols of power, prayers to the gods.* Los Angeles: Institute of Archaeology, University of California.

Lee, H. C., & Tirnady, F. (2003). *Blood evidence: How DNA is revolutionizing the way we solve crimes.* Cambridge: Perseus.

Lee, R. B. (1979). The !Kung San: Men, women and work in a foraging society. Cambridge, UK: Cambridge University Press.

Lee, R. B., & Devore, I. (Eds.). (1968). Man the hunter. Chicago: Aldine.

Leeds-Hurwitz, W. (2004). *Rolling in ditches with shamans: Jaime de Angulo and the professionalization of American anthropology.* Lincoln: University of Nebraska Press.

Leeming, D. A., & Leeming, M. A. (1995). *A dictionary of creation myths.* New York: Oxford University Press.

Lehmann, W. P. (1972). *Descriptive linguistics: An introduction.* New York: Random House.

Lehner, M. (1997). *The complete pyramids.* Thames and Hudson: London.

Lehner, P. N. (1996). *Handbook of ethological methods* (2nd Ed.). Cambridge, UK: Cambridge University Press.

Leisinger, K., Schmitt, K., & Pandya-Lorch, R. (2002). *Six Billion and counting: Population growth and food security in the 21st century.* Washington, DC: International Food Policy Research Institute.

Lekson, S. H. (1999). *The Chaco meridian: Centers of political power in the ancient Southwest.* Walnut Creek, CA: Alta Mira Press.

Leming, J. S. (1992). The influence of contemporary issues curriculum on school-aged youth. In G. Grant (Ed.), *Review of research in education* (Vol. 18, pp. 111–162). Washington, DC: American Education Research Association.

Lemon, A. (2000). *Between two fires.* Durham, NC: Duke University Press.

Lemonick, M. D. (1998). *Other worlds: The search for life in the universe.* New York: Simon & Schuster.

Lenin, V. I. (1939). *Imperialism: The highest stage of capitalism.* New York: International Publishers.

Lenin, V. I. (1947). *One step forward, two steps back.* Moscow: Progress Publishers.

Lenin, V. I. (1954a). *The agrarian program of social democracy in the First Revolution 1905–1907.* Moscow: Progress Publishers.

Lenin, V. I. (1954b). *Critical remarks on the national question: The right of nations to self-determination.* Moscow: Progress Publishers.

Lenin, V. I. (1956). *The development of capitalism in Russia.* Moscow: Progress Publishers.

Lenin, V. I. (1970a). *Left wing communism: An infantile disorder.* Peking, China: Foreign Language Press.

Lenin, V. I. (1970b). *Materialism and empiriocriticism.* Peking, China: Foreign Language Press.

Lenin, V. I. (1973). *What is to be done.* Peking, China: Foreign Language Press.

Lenkeit, R. E. (2004). *Introducing cultural anthropology.* New York: McGraw-Hill.

Leonard, S., & McClure, M. (2003). *Myth and knowing: An introduction to world mythology.* Boston: McGraw-Hill.

Leonardo, M. (Ed). (1991). *Gender at the crossroads of knowledge: Feminist anthropology in the postmodern era.* Berkeley: University of California Press.

Lepper, B. T., & Gill, J. (2000). The Newark Holy Stones. *Timeline, 17*(3), 16–25.

Lerner, E. (1994). *Cultural conflicts: Case studies in a world of change.* Portland, ME: J. Weston Walch.

Leroi, A. M. (2003). *Mutants: On genetic variety and the human body.* New York: Viking.

Leroi-Gourhan, A. (1975). The flowers found with Shanidar IV, a Neanderthal burial in Iraq. *Science 190,* 562–564.

Lesher, J. H. (1992). *Xenophanes of colophon: Fragments—A text and translation with commentary.* Toronto: University of Toronto Press.

Leslie C., & Young, A. (Eds.). (1992). In *Paths to Asian medical knowledge.* Berkeley: University of California Press.

Levinas, E. (1969). *Totality and infinity.* Pittsburgh, PA: Duquesne University Press.

Levinas, E. (1990). *Time and the Other.* Pittsburgh, PA: Duquesne University Press.

Levinas, E. (1998). *Otherwise than being.* Pittsburgh, PA: Duquesne University Press.

Levine, M. P. (1994). *Pantheism: A non-theistic concept of deity.* London: Routledge.

Levine, N. (1987). Fathers and sons: Kinship, value and validation in Tibetan Polyandry. *Man, 22*(2) 267–286.

Levine, N. (1988). *Dynamics of polyandry: Kinship domesticity, and population on the Tibetan Border.* Chicago, IL: Chicago UP.

Levine, N. (1997). Why polyandry fails: Sources of instability in polyandrous marriages. *Current Anthropology, 38*(3), 375–399.

LeVine, R. A., & Campbell, D. T. (1972). *Ethnocentrism: Theories of conflict, ethnic attitudes and group behavior.* New York: John Wiley.

Levine, R. M., & Crocitti, J. J. (Eds.). (1999). *The Brazil reader: History, culture, politics.* Durham, NC: Duke University Press.

Levinson, D. (1989). *Family violence in cross-cultural perspective.* Newbury Park, CA: Sage.

Levinson, D., & Malone, M. J. (1980). *Toward explaining human culture: A critical review of the findings of worldwide cross-cultural research.* New Haven, CT: HRAF Research Press.

Levinson, D., & Melvin, E. (Eds.). (1996). *Encyclopedia of cultural anthropology.* New York: Henry Holt.

Lévi-Strauss, C. (1949). Endogamy et exogamy. In *Les structures élémentaires de la parenté* (pp. 49–60). Paris: PUF.

Lévi-Strauss, C. (1949). Les structures élémentaires de la parenté. Paris: PUF.

Lévi-Strauss, C. (1962). *Le totémisme aujourd'hui.* Paris: PUF.

Lévi-Strauss, C. (1963a). *The elementary structures of kinship.* Boston: Beacon.

Lévi-Strauss, C. (1963b). *Structural anthropology* (Vol. I). New York: Basic Books.

Lévi-Strauss, C. (1968). *Structural anthropology.* London: Allen Lane.

Lévi-Strauss, C. (1968). *The way of the masks* (S. Modelski, Trans.). Seattle: University of Washington Press.

Lévi-Strauss, C. (1969). *The raw and the cooked.* New York: Harper & Row.

Lévi-Strauss, C. (1987). *Introduction to the work of Marcel Mauss* (F. Baker, Trans.). London: Routlege & Kegan Paul.

Lévi-Strauss, C. (1987). *The view from afar.* London: Penguin.

Levy, T. (Ed.). (1995). *The archaeology of society in the holy land.* New York: Facts on File.

Lévy-Bruhl, L. (1926). *How natives think.* London: George Allen & Unwin.

Lévy-Bruhl, L. (1931). *Primitive mentality.* Oxford, UK: Clarendon.

Lévy-Bruhl, L. (1966). *The "soul" of the primitive.* Chicago: Henry Regnery.

Lewellen, T. C. (1983). *Political anthropology: An introduction* (1st Ed.). South Hadley, MA: Bergin and Garvey.

Lewellen, T. C. (1995). *Dependency and development: An introduction to the Third World.* Westport, CT: Bergin & Garvey.

Lewellen, T. C. (2002). *The anthropology of globalization: Cultural anthropology enters the 21st century.* Westport, CT: Bergin & Garvey.

Lewellen, T. C. (2003). *Political Anthropology: An Introduction* (3rd Ed.). Westport, CT: Praeger.

Lewin, J. S. (2002). *An interactive guide to Cerén before the volcano erupted.* Austin: University of Texas Press. http://ceren. colorado. edu

Lewin, R. (1997). *Patterns in evolution.* New York: Scientific American Library.

Lewin, R. (2002). The old man of Olduvai Gorge. *Smithsonian, 33,* 82–88.

Lewin, R. (2004). *Principles of human evolution.* Victoria, Australia: Basil Blackwell.

Lewis, D. (1972). *We, the navigators.* Honolulu: University of Hawai'i Press.

Lewis, H. (1993). *Anthropologia.* Whitter, CA: Lewis Micropublishing.

Lewis, I. M. (1961). *A pastoral democracy: A study of pastoralism and politics among the Northern Somali of the Horn of Africa.* Oxford, UK: Oxford University Press.

Lewis, L. (1980). *The West Indian in Panama: Black Labor in Panama, 1850–1914.* Washington, DC: University Press of America.

Lewis, O. (1959). *Five families: Mexican case studies in the culture of poverty.* New York: Basic Books.

Lewis, P. H. (2002). *Guerillas and generals: The dirty war.* New York: Praeger.

Liapunova, R. G. (1996). *Essays on the ethnography of the Aleuts: At the end of the eighteenth and the first half of the nineteenth century* (J. Shelest, Trans., W. B. Workman & L. T. Black, ed. assist.). Fairbanks: University of Alaska Press.

Libby, W. F. (1946). Atmos 3He and radiocarbon from cosmic radiation. *Physical Review, 69,* 671–672.

Libby, W. F. (1951). Radiocarbon dates (part 2). *Science, 114,* 291–296.

Libby, W. F. (1955). *Radiocarbon dating.* Chicago: University of Chicago Press.

Libby, W. F. (1972). Radiocarbon dating, memories, and hopes. In *Proceedings of the 8th International Conference on Radiocarbon Dating* (pp. 27–43). Wellington: Royal Society of New Zealand.

Libby, W. F., Anderson, E. C., & Arnold, J. R. (1949). Age determination by radiocarbon content: World-wide assay of natural radiocarbon. *Science, 109,* 227–228.

Lieberman, L., Lyons, A., & Lyons, H. (1995). An interview with Ashley Montagu. *Current Anthropology, 36,* 835–844.

Lieberman, P. (1984). *The biology and evolution of language.* Cambridge, MA: Harvard University Press.

Lieberman, P. (2000). *Human language and our reptilian brain.* Cambridge, MA: Harvard University Press.

Lightfoot, D. (1982). *The language lottery: Toward a biology of grammars.* Cambridge: MIT Press.

Likosky, M. (Ed.). (2002). *Transnational legal processes: Globalization and power disparities.* New York: Butterworth.

Lilley, S. (1948). *Men, machines and history.* London: Cobbett.

Lim, M. M., Wang, Z., Olazabal, D. E., Ren, X., Terwilliger, E. F., & Young, L. J. (2004). Enhanced partner preference in a promiscuous species by manipulating the expression of a single gene. *Nature, 429,* 754–757.

Linden, E. (1986). *Silent partners: The legacy of the ape language experiments.* New York: Times Books.

Linden, S. J. (2003). *The alchemy reader: From Hermes Trismegistus to Isaac Newton.* New York: Cambridge University Press.

Lindsey, J. (1999). *The great apes.* New York: Friedman/Fairfax.

Lins, P. (2003). *Cidade de Deus.* Rio de Janeiro, Brazil: Andanzas.

Linton, A., & Wagley, C. (1971). *Ralph Linton.* New York: Columbia University Press.

Linton, M. L., Bronowski, J., & Bellugi, U. (1970). Washoe the chimpanzee. *Science, 169*(3943), 328.

Linton, R. (1945). *The cultural background of personality.* New York: Appleton-Century-Crofts.

Linton, R. (1947). *The cultural background of personality.* London: Routledge.

Linton, R. (1957). *Tree of culture.* New York: Alfred A. Knopf.

Lischer, R. (1997). *The preacher king: Martin Luther King, Jr. and the word that moved America.* New York: Oxford University Press.

Littleton, C. S. (1977). *The new comparative mythology: An anthropological assessment of the theories of Georges Dumezil.* Berkeley: University of California Press.

Liu, L., & Chen, X. (2003). *Early state formation in China.* London: Duckworth Press.

Liversidge, D. (1970). *Arctic exploration.* New York: Franklin Watts.

Livingston, J. C. (2001). *Anatomy of the sacred: An introduction to religion* (4th ed). Upper Saddle River, NJ: Prentice Hall.

Livio, M. (2000). *The accelerating universe: Infinite expansion, the cosmological constant, and the beauty of the cosmos.* New York: Wiley.

Lizot, J. (1985). *Tales of the Yanomami: Daily life in the Venezuelan forest.* New York: Cambridge University Press.

Llewellyn, K., & Hoebel, E. A. (1941). *The Cheyenne way.* Norman: University of Oklahoma Press.

Lloyd, B., and Gay, J. (Eds.). (1981). *Universals of human thought: Some African evidence.* Cambridge, UK: Cambridge University Press.

Lobban, R., Kramer, R. S., & Fluehr-Lobban, C. (2002). *Historical dictionary of the Sudan.* Lanham MD: Scarecrow Press.

Lock, M., Young, A., & Cambrosio, A. (Eds.). (2000). *Living and working with the new medical technologies: Intersections of inquiries.* Cambridge: Cambridge University Press.

Lohman, T. G., Roche, A. F., & Martorell, R. (Eds.). (1988). *Anthropometric standardization reference manual.* Champaign, IL: Human Kinetics.

Loizos, P. (1993). *Innovation in ethnographic film: From innocence to self-consciousness 1955–1985.* Chicago: University of Chicago Press.

Lomax, A. (1968). *Folk song style and culture* Washington, DC: American Association for the Advancement of Science.

Lommel, A. (1970). *Masks: Their meaning and function.* New York: Excalibur Books.

Lomnitz-Adler, C. (1992). *Exits from the labyrinth: Culture and ideology in the Mexican national space.* Berkeley: University of California Press.

López, J., & Potter, G. (2001). (Eds.). *After postmodernism: An introduction to critical realism.* London & New York: Athlone Press.

Lopreato, J. (1990). From social evolutionism to biocultural evolutionism. *Sociological Forum, 5*(2), 187–212.

Lorber, J. (1994). *Paradoxes of gender.* New Haven: Yale University Press.

Lorde, A. (1984). *Sister outsider.* Trumansburg, NY: The Crossing Press.

Lorenz, K. (1965). *Evolution and modification of behavior.* Chicago: University of Chicago Press.

Lorenz, K. Z. (1952). *King Solomon's ring.* New York: Thomas Crowell.

Lorenz, K. Z. (1967). *On aggression.* New York: Bantam.

Lorenz, K. Z. (1981). *The foundations of ethology.* New York: Springer-Verlag.

Lorenz, K. Z. (1996). *The natural science of the human species: An introduction to comparative behavioral research.* Cambridge: MIT Press.

Lorenz, K. Z., & Tinbergen, N. (1938). Taxis and instinctive action in the egg-retrieving behavior of the Greylag goose. In C. H. Schiller (Ed.), *Instinctive behavior* (pp. 176–208). New York: International Universities Press. (English translation published 1957)

Loughran, K. (2003). Jewelry, fashion, and identity: The Tuareg example. *African Arts, 36*(1), 52–65.

Lourandos, H. (1997). *Continent of hunter-gatherers: New perspectives in Australian prehistory.* Cambridge: Cambridge University Press.

Lovejoy, C. O. (1973). Human osteology: A laboratory and field manual of the human skeleton, by William M. Bass. *American Journal of Physical Anthropology, 39,* 324–325.

Lovejoy, C. O. (1974a) New perspectives on ape and human evolution, by Adriaan Kortlandt. *Current Anthropology, 15,* 434–435.

Lovejoy, C. O. (1974b) Primate locomotion. *Science, 184,* 679–681.

Lovejoy, C. O., Cohn, M. J., & White, T. D. (1999). Morphological analysis of the mammalian post-cranium: A developmental perspective. *Proceedings of the National Academy of Sciences USA, 96,* 13247–13252.

Lovelock, J. (1979). *Gaia: A new look at life on earth.* Oxford: Oxford University Press.

Lovelock, J. (1995). *The ages of Gaia: A biography of our living earth* (Commonwealth Fund Book Program Series). New York: Norton.

Low, B. S. (2000). *Why sex matters: A Darwinian look at human behavior.* Princeton, NJ: Princeton University Press.

Low, S. (Ed.). (1999). *Theorizing the city: The new urban anthropology reader.* New Brunswick, NJ: Rutgers University Press.

Lowie, R. (1937). *The history of ethnological theory.* New York: Holt, Rinehart & Winston.

Lubischer, J. (1988). *Baidarka as a living vessel: On the mysteries of the Aleut kayak builders.* Port Moody, Canada: Baidarka Society.

Lucas, C. (Ed.). (1990). *Sign language research: Theoretical issues.* Washington, DC: Gallaudet University Press.

Lucas, P. W., Darvell, B. W., Lee, P. K. D., Yuen, T. D. B., & Choong, M. F. (1998). Colour cues for leaf food selection by long-tailed macaques (*Macaca fascicularis*) with a new suggestion for the evolution of trichromatic colour vision. *Folia primatologica, 69,* 139–152.

Lucretius. (1969). *On the nature of things* (M. F. Smith, Trans.). Indianapolis, IN: Hackett.

Lucretius. (2001/1969). *On the nature of things.* (M. F. Smith Trans.). Indianapolis, IN: Hackett.

Lucy, J. A. (1992). *Language diversity and thought: A reformulation of the linguistic relativity hypothesis.* Cambridge: Cambridge University Press.

Lull, J. (2000). *Media, communication, and culture: A global approach,* 2nd Ed. New York: Columbia University Press.

Lumley, M.-A. de, & Sonakia, A. (1985). Premiere decouverte d'un *Homo erectus* sur le continent indien a Hathnora, dans la moyenne vallee de la Narmada. *L'Anthropologie, 89*(1), 13–61.

Lumsden, C. J., & Wilson, E. O. (1981). *Genes, mind, and culture: The coevolutionary process.* Cambridge, MA: Harvard University Press.

Lutz, W., Sanderson, W., & Scherbov, S. (Eds.). (2004). *The end of world population growth in the 21st century. New challenges for human capital formation and sustainable development.* Sterling VA: Earthscam.

Luykx, A. (1999). *The citizen factory.* Albany, NY: SUNY Press.

Lyell, C. (1873). *Principles of geology* (Vol. 1). New York: D. Appleton.

Lyman, R. L. (1994). *Vertebrate taphonomy.* Cambridge: Cambridge University Press.

Lynch, F. R. (1991). *Invisible victims: White males and the crisis of affirmative action.* New York: Praeger.

Lyon, P. J. (1974). *Native South Americans: Ethnology of the least known continent.* Prospect Heights, IL: Waveland Press.

Lyons, J. (1968). *Introduction to theoretical linguistics.* New York: Cambridge University Press.

Lyons, O., Mohawk, J. C., et al. (1992). *Exiled in the land of the free: Democracy, Indian nations, and the U. S. Constitution.* Sante Fe, NM: Clear Light.

Lyovin, A. V. (1997). *An introduction to the languages of the world.* New York: Oxford University Press.

MacDonald, G. F. (1990). *Ninstints: Haida World Heritage Site.* Vancouver, Canada: University of British Columbia Press in association with the U. B. C. Museum of Anthropology.

MacDougall, D. (1998). *Transcultural cinema.* Princeton, NJ: Princeton University Press.

MacDougall, D. (2004). *Frozen earth: The once and future story of ice ages.* Berkeley: University of California Press.

Macer, D. (2004). *The Human Genome Project* (Vol. 1). New York: Jai Press.

MacFall, R. P., & Wollin, J. C. (1983). *Fossils for amateurs.* New York: Van Nostrand Reinhold.

MacIntyre, A. (1981). *After virtue.* Notre Dame, IN: University of Notre Dame.

MacLean, P. (1990). *The triune brain in evolution.* New York: Plenum.

MacLeish, K. (1972, August). The Tasaday: Stone Age cavemen of Mindanao. *National Geographic,* pp. 219–248.

MacNeil, R., & Cran, W. (2005). *Do you speak American?* New York: Doubleday.

Macrae, C. N. et al. (1994). Stereotypes as energysaving devices: A peek inside the cognitive toolbox. *Journal of Personality and Social Psychology, 66*(1) 37–47.

Madan, T. N. (Ed.). (2004). *Religion in India.* New Delhi: Oxford University Press.

Maddin, R. (Ed.). (1988). *The beginnings of the use of metals and alloys.* Cambridge: MIT Press.

Maddox, G. L. et al. (Eds.). (2001). *The encyclopedia of aging* (3rd ed., Vol. 1, A–L). New York: Springer.

Magee, B. (1973). *Popper.* Glasgow: Fontana/Collins.

Magee, B. (1985). *Philosophy and the real world: An introduction to Karl Popper.* Chicago, IL: Open Court Publishing.

Magee, B. (2001). *The Tristan chord: Wagner and philosophy.* New York:Metropolitan Books.

Maine, H. S. (1886). *Popular government: Four essays.* New York: Henry Holt.

Maine, H. S. (1946). *Ancient law: Its connection with the early history of society and its relation to modern ideas* (with introduction by C. K. Allen). London: Oxford University Press.

Maine, Sir Henry. (1960). *Ancient law.* New York: Dutton.

Mair, L. (1969). *Witchcraft.* New York:McGraw-Hill.

Maisels, C. (1999). *Early civilizations of the Old World: The formative histories of Egypt, the Levant, Mesopotamia, India, and China.* New York: Routledge.

Majerus, M. E. N. (1998). *Melanism: Evolution in action.* New York: Oxford University Press.

Majerus, M. E. N. (1998). *Melanism: Evolution in action.* Oxford: Oxford University Press.

Majerus, M., Amos, W., & Hurst G. (1996). *Evolution: The four billion year war.* Edinburgh: Longman.

Makihara, M. (2004). Linguistic syncretism and language ideologies: Transforming sociolinguistic hierarchy on

Rapa Nui (Easter Island). *American Anthropologist, 106*(3), 529–540.
Malefijt, A. de Waal. (1974). *Images of man: A history of anthropological thought.* New York: Knopf.
Malefyt, T. D., & Moeran, B. (2003). *Advertising cultures.* New York: Berg.
Malinowski, B. (1922). *Argonauts of the western Pacific.* London: Routledge & Kegan Paul.
Malinowski, B. (1923). *Crime and custom in savage society.* Patterson, NJ: Littlefield, Adams.
Malinowski, B. (1935). *Coral gardens and their magic* (2 vols.). London: Allen & Unwin.
Malinowski, B. (1948). *Magic, science, and religion and other essays.* Glencoe, IL: Free Press.
Malinowski, B. (1954). *Magic, science and religion and other essays.* Garden City, NY: Doubleday Anchor Books.
Malinowski, B. (1961). *Argonauts of the western Pacific.* Bergenfield, NJ: E. P. Dutton.
Malinowski, B. (1976). *Crime and custom in savage society.* Totowa, NJ: Littlefield, Adams & Co.
Malinowski, B. (1989). *A diary in the strict sense of the term* (2nd ed.). Palo Alto, CA. : Stanford University Press.
Malthus, T. R. (2004). *An essay on the principle of population* (2nd ed., P. Appleman, Ed.). New York: Norton.
Mandelbaum, D. G. (Ed.). (1949). *Selected writings of Edward Sapir in language, culture, and personality.* Berkeley and Los Angeles: University of California Press.
Mander, J., & Goldsmith, E. (Eds.). (1996). *The case against the global economy.* San Francisco: Sierra Club Books.
Mange, E. J., & Mange, A. P. (1999). *Basic human genetics* (2nd ed.). Sunderland, MA: Sinauer.
Manhein, M. H. (1999). *The bone lady: Life as a forensic anthropologist.* New York: Penguin.
Mann, C. C., & Plummer, M. L. (1995). *Noah's choice: The future of endangered species.* New York: Alfred A. Knopf.
Mann, T. (1974). *Gesammelte Werke.* Frankfurt, Germany: S. Fischer Verlag.
Manson, W. C. (1986). Abram Kardiner and the neo-Freudian alternative in culture and personality. In G. W. Stocking (Ed.), M*alinowski, Rivers, Benedict and others* (pp. 72–94). Madison: University of Wisconsin Press.
Manson, W. C. (1988). *The psychodynamics of culture: Abram Kardiner and neo-Freudian anthropology.* New York: Greenwood.
Marable, M. (1997). *Black liberation in conservative America.* Boston: South End Press.
Marcus, G. E., & Fischer, M. J. (1986). *Anthropology as cultural critique: an Experimental moment in the human sciences.* Chicago: University of Chicago Press.
Marett, R. (1899). Preanimistic Religion. *Folk-Lore, 2,* 1–28.
Marett, R. (1909). *The threshold of religion.* Methuen: London.
Marett, R. R. (1900). *The threshold of religion.* London: Methuen.
Marett, R. R. (1912). *Anthropology.* New York: Henry Holt.
Marett, R. R. (1932). *Faith, hope, and charity in primitive religion.* New York: Macmillan.
Marett, R. R. (1934). The growth and tendency of anthropological and ethnological studies. *Man, 34,* 141–142.
Margolis, M. L., & Marx, A. (1977). *A history of the Jewish people.* New York: Atheneum.
Margulis, L., & Sagan, D. (1995). *What is life?* Berkeley: University of California Press.
Marinatos, N. (1993). *Minoan religion: Ritual, image, and symbol.* Columbia: University of South Carolina Press.
Mariolakos, I., & Mariolakos, D. (2004, 15–17 April). *The argon field in Arcadia, the sinkhole of Nestani Village, the God Poseidon and the Submarine Dini Springs in Argolic Gulf (Peloponnesus, Greece): A geomythological approach of the Poseidon Birth.* 10th Geol. Soc. Greece Congress, Thessaloniki, Greece.
Mariolakos, I., & Theocharis, D. (2003). Asopos River and the creation of Aegina and Salamis Islands (Saronic Gulf, Greece): A geomythologycal approach. In E. Fouache (Ed.), *The Mediterranean world environment and history* (pp. 305–311). Paris: Elsevier.
Markaryan, E. S. (1975). K ponimaniyu specifiki chelovecheskogo obschestva kak adaptivnoi sistemy [To the understanding of specificity of human society as adaptive system]. In A. D. Lebedev (Ed), *Geograficheskie aspekty ecologii cheloveka* [Geographic aspects of human ecology] (pp. 139–149). Moscow: Institut geografii AN SSSR.
Markoe, G., et al. (2003). *Petra rediscovered: Lost city of the Nabataeans.* New York: Harry N. Abrams.
Markowitz, H. (1987). Catholic mission and the Sioux: A crisis in the early paradigm. In R. DeMallie & D. Parks (Eds.), *Sioux Indian religion: Tradition and innovation.* Norman: University of Oklahoma Press.
Marks, J. (1995). *Human biodiversity: Genes, race, and history.* New York: Aldine de Gruyter Press.
Marks, J. (2000). Ashley Montagu, 1905–1999. *Evolutionary Anthropology, 9*(3), 111–112.
Marks, J. (2002). *What it means to be 98% chimpanzee.* Los Angeles: University of California Press.
Marks, J. (2003). *What it means to be 98% chimpanzee* (rev. ed.). Berkeley: University of California Press.
Marlar, R. A., Leonard, L., Banks, L., Billman, B. R., Lambert, P. M., & Marlar, J. E. (2000). Biochemical evidence of cannibalism at a prehistoric Puebloan site in southwestern Colorado. *Nature, 407,* 74–77.
Marshall, J. H. (Ed.). (1931). *Mohenjo-Daro and the Indus civilization: Being an official account of archaeological excavations at Mohenjo-Daro carried out by the government of India between the years 1922 and 1927.* London: A. Probsthain.

Marshall, L. (1961). Talking, sharing and giving: Relief of social tensions among the !Kung bushmen. *Africa, 31*, 231–249.

Marshall, L. (1976). The !Kung of Nyae Nyae. Cambridge, MA: Harvard University Press.

Martens, R., Vealey, R., & Barton, D. (1990). *Competitive anxiety in sport.* Champaign, IL: Human Kinetics.

Martin, A. J. (2001). *Introduction to the study of dinosaurs.* Malden, MA: Blackwell Science.

Martin, D. (2002). *Pentecostalism: The world their parish.* Oxford, UK: Blackwell.

Martin, J., & Frost, P. (1999). The organizational culture war games: A struggle for intellectual dominance. In S. Clegg & C. Hardy (Eds.), *Studying organization theory & method.* London, Sage.

Martin, M. (1990). *Atheism: A philosophical justification.* Philadelphia: Temple University Press.

Martin, R. A. (2004). *Missing links: Evolutionary concepts and transitions through time.* Sudbury, MA: Jones & Bartlett.

Martin, R. D. (1990). *Primate origins and evolution: A phylogenetic reconstruction.* Princeton, NJ: Princeton University Press.

Martin, R. D., Doyle, G. A., & Walker, A. C. (1974). *Prosimian biology.* London: Duckworth.

Martin, S., & Grube, N. (2000). *Chronicle of the Maya kings and queens: Deciphering the dynasties of the ancient Maya.* London: Thames & Hudson.

Martinez Sarasola, C. (1992). *Nuestros paisnos los indios. Vida, historia y destino de las comunidades indígenas en la Argentina.* Buenos Aires: Emecé Editores.

Martinich, A. P. (1997). *Thomas Hobbes.* New York: St. Martin's Press.

Marvin, F. S. (1937). *Comte: The founder of sociology.* New York: Wiley.

Marwick, M. (Ed.). (1982). *Witchcraft and sorcery: Selected readings* (2nd ed.). Harmondsworth, England: Penguin Books.

Marx, J. L. (1980). Ape-language controversy flares up. *Science, 207*(4437), 1330–1333.

Marx, K. (1973). *Grundrisse: Foundations of the critique of political economy* (Rough draft, M. Nicolaus, Trans). London: Penguin Books. (Original work published 1939)

Marx, K. (1974). *The ethnological notebooks of Karl Marx: Studies of Morgan, Phear, Maine, Lubbock.* (L. Krader, Transcriber and Ed.). Assen, Holland:

Marx, K. (1976). *Capital: A critique of political economy.* New York: New Left Review Press. (Original work published 1867)

Marx, K. (1988). *Economic and philosophical manuscripts of 1844* (M. Milligan, Trans.). Amherst, MA: Prometheus.

Marx, K. (1992). *Capital: A critique of political economy.* Harmondsworth, UK: Penguin.

Marx, K., & Engels, F. (1970). *The German ideology.* New York: International Publishers.

Marx, K., & Engels, F. (1975). *Collected works.* New York: International Publishers.

Marzano, R. J., Kendall, J. S., & Cochineal, C. (1999). *What Americans believe students should know.* Aurora, CO:Mid-Continent Regional Educational Laboratory.

Mascia-Lees, F. E., & Black, N. J. (2000). *Gender and anthropology.* Prospect Heights, IL:Waveland Press.

Maspero, H. (1981). *Taoism and Chinese religion* (F. A. Kierman, Jr., Trans.). Amherst: University of Massachusetts Press.

Massumi, B. (1987). Realer than real: The simulacrum according to Deleuze and Guattari. *Copyright, 1* 90–97.

Mathewson, K. (2000). Cultural landscape and ecology III: Foraging/farming, food, festivities. *Progress in Human Geography, 24,* 3.

Mathur, D. C. (1971). *Naturalistic philosophies of experience: Studies in James, Dewey and Farber against the background of Husserl's phenomenology.* St. Louis: Warren H. Green.

Matthews, F. H. (1977). *Quest for an American sociology: Robert E. Park and the Chicago School.* Montreal: McGill-Queen's University Press.

Mauss, M. (1967). *The gift: Forms and functions of exchange in archaic societies* (I. Cunnison, Trans., with an introduction by E. E. Evans-Pritchard). New York: Norton.

Mauss, M. (1972). *A general theory of magic* (R. Brain, Trans.). London: Routledge & Kegan Paul. (Original work published 1902–1903)

Mauss, M. (1979). *Sociology and psychology: Essays* (B. Brewster, Trans.). London: Routledge & Kegan Paul.

May, T. (2004). *Decoding Wagner: An invitation to his world of music drama.* Pompton Plains, NJ: Amadeus Press.

Maybury-Lewis, D. (Ed.). (1979). *Dialectical societies: The Gê and Bororo of central Brazil.* Cambridge: Harvard University Press.

Mayer, E. (2002). *The articulated peasant: Household economies in the Andes.* Boulder, CO: Westview Press.

Maynard Smith, J., & Szathmáry, E. (1999). *The origins of life: From the birth of life to the origins of language.* Oxford, UK: Oxford University Press.

Maynard-Smith, J. (1982). *Evolution and the theory of games.* Cambridge: Cambridge University Press.

Mayr, E. (1942). *Systematics and the origin of species.* New York: Columbia University Press.

Mayr, E. (1991). *One long argument: Charles Darwin and the genesis of modern evolutionary thought.* Cambridge, MA: Harvard University Press.

Mayr, E. (1998). *This is biology. The science of the living world.* (6th Ed.). Cambridge, MA: Harvard University Press.

Mayr, E., & Provine, W. B. (Eds.). (1980). *The evolutionary synthesis: Perspectives on the unification of biology.* Cambridge, MA: Harvard University Press.

Mayr, H. (1992). *A guide to fossils.* Princeton, NJ: Princeton University Press. (Original work published 1985, as *Fossilien: Uber 500 Verlagsgesellshaft in Farbe.* Munchen: BLV Verlagsgesellshaft mbH)

Mazur, A. (1985). A biosocial model of status in face-to-face primate groups. *Social Forces, 64,* 377–402.

McAdam, D. (1988). *Freedom summer.* New York: Oxford University Press.

McCann, C., & Kim, S. K. (Eds.). (2003). *Feminist theory reader.* New York: Routledge Press.

McCaskie, T. C. (2000). *Asante identities: History and modernity in an African village, 1850–1950.* Bloomington: Indiana University Press.

McClung de Tapia, E. (2000). Prehispanic agricultural systems in the basin of Mexico. In D. L. Lentz (Ed.), *Imperfect balance: Landscape transformations in the pre-Columbian Americas* (pp. 121–146). New York: Columbia University Press.

McCown, T. D. (1952). The training and education of the professional physical anthropologist. *American Anthropologist, 54,* 313–317.

McCown, T. D., & Keith, A. (1939). *The Stone Age of Mount Carmel: The fossil human remains from the Levalloiso–Mousterian* (2nd ed.). Oxford, UK: Clarendon.

McCown, T. D., & Kennedy, K. A. R. (1971). *Climbing man's family tree: A collection of writings on human phylogeny, 1699–1971.* Englewood Cliffs, NJ: Prentice Hall.

McCown, T. D., & Kennedy, K. A. R. (Eds.). (1972). *Climbing man's family tree: A collection of major writings on human phylogeny, 1699–1971.* Englewood Cliffs, NJ: Prentice Hall.

McCurdy, E. (2005). *The mind of Leonardo da Vinci.* New York: Dover.

McDonnell, J. A. (1991). *The dispossession of the American Indian, 1887–1934.* Bloomington: Indiana University Press.

McElhinny, M. W., & McFadden, P. L. (2000). *Paleomagnetism: Continents and oceans.* Academic Press.

McElhinny, M. W., & Merrill, R. T. (1983). *The earth's magnetic field: Its history, origin and planetary perspective.* Orlando, FL: Academic Press.

McFadden, S. (1991). *Profiles in wisdom: Native elders speak about the earth.* Santa Fe, NM: Bear & Co.

McFeat, T. (Ed). (2002). *Indians of the North Pacific coast: Studies in selected topics.* Seattle: University of Washington Press.

McGee, J. R., & Warms, R. L. (2004). *Anthropological theory: An introductory history.* Boston: McGraw-Hill.

McGee, J., & Warms, R. L. (Eds.). (2000). *Anthropological theory: An introduction,* 2nd ed. Mountain View, CA: Mayfield.

McGhee, G. R. Jr. (1996). *The Late Devonian mass extinction: The Frasnian/Famennian crisis.* New York: Columbia University Press.

McGovern, T. H., & Perdikaris, S. (2000, October). The Vikings' silent saga:What went wrong with the Scandinavian westward expansion. *Natural History, 109,* 50–56.

McGowan, C. (2001). *The dragon seekers: How an extraordinary circle of fossilists discovered the dinosaurs and paved the way for Darwin.* Cambridge, MA: Perseus.

McGrail, S. (2003). The sea and archaeology. *Historical Research, 76*(191), 1–17.

McGrane, B. (1989). *Beyond anthropology: Society and the other.* New York: Columbia University Press.

McGrew, William. (2004). *The cultured chimpanzees.* Cambridge, UK: Cambridge University Press.

McHenry, H. H. (1982). The pattern of human evolution: Studies on bipedalism, mastication, and encephalization. *Annual Review of Anthropology, 11,* 151–173.

McIntyre, D., & McKirdy, A. (2001). *James Hutton:The founder of modern geology (Scot's lives).* Edinburgh: National Museums of Scotland.

McKenzie, J. (1990). *The architecture of Petra.* London: Oxford University Press.

McKirahan, R. D. (1994). *Philosophy before Socrates.* Indianapolis, IN: Hackett.

McKnight, G. D. (1998). *The last crusade: Martin Luther King, Jr., the FBI, and the poor people's campaign.* Boulder, CO: Westview Press.

McKusick,V. A. (Ed.). (1978). *Medical genetic studies of the Amish.* Baltimore: Johns Hopkins University Press.

McLellan, D. (1977). *Friedrich Engels.* New York: Penguin Books.

McLellan, D. (1980). *The thought of Karl Marx: An introduction.* London: Macmillan.

McLuhan, M. (1964): *Understanding media.* New York: Mentor.

McLuhan, M., & Fiore, Q. (1968):*War and peace in the global village.* New York: Bantam. Minsky, M. (Ed.). (1968). *Semantic information processing.* Cambridge: MIT Press.

McNicoll, G. (1994). Institutional analysis of fertility. In K. Lindahl-Kiessing & H. Lundberg (Eds.), *Population, economic development, and the environment* (pp. 199–230). Oxford: Oxford University Press.

McPherson, R. (1947). *Navajo land, Navajo culture.* Norman: University of Oklahoma Press.

Mead, M. (1928). *Coming of age in Samoa.* New York: William Morrow.

Mead, M. (1934). *Patterns of culture.* Boston: Houghton Mifflin.

Mead, M. (1935/2001). *Sex and temperament in three societies.* New York: HarperCollins.

Mead, M. (1946). The cultural approach to personality. In P. L. Harriman (Ed.), *Encyclopedia of psychology* (pp. 477–488). New York: Philosophical Library.

Mead, M. (1956). *New lives for old: Cultural transformation–Manus, 1928–1953.* New York: Morrow.

Mead, M. (1959). *An anthropologist at work: Writings of Ruth Benedict.* Boston: Houghton Mifflin.

Mead, M. (1974). *Ruth Benedict.* New York: Columbia University Press.

Mead, M. (1975). *Growing up in New Guinea.* New York: William Morrow.

Mead, M., & Metraux, R. B. (1980). *Aspects of the present.* New York: William Morrow.

Meadow, R. H. (Ed.). (1991). *Harappa excavations 1986–1990: A multidisciplinary approach to third millennium urbanism.* Madison, WI: Prehistory Press.

Meadows, D., Randers, J., & Meadows, D. (2004). *Limits to growth: The 30-year update.* White River Junction, VT: Chelsea Breen.

Means, R. (1995). *Where white men fear to tread: The autobiography of Russell Means.* New York: St. Martin's.

Medicine, B. (1988). Ella Cara Deloria. In U. Gacs, A. Khan, J. McIntyre, & R. Weinberg (Eds.), Women anthropologists: A biographical dictionary (pp. 45–50). New York: Greenwood Press.

Medin, D. L., & Atran, S. (Eds.). (1999). *Folkbiology.* Cambridge: MIT Press.

Mednick, S. A., Gabrielli, W. F. Jr., & Hutchings, B. (1987.) Genetic factors in the etiology of criminal behavior. In S. A. Mednick, T. E. Moffitt, & S. A. Stack (Eds.), *The causes of crime: New biological approaches.* New York: Cambridge University Press.

Meggers, B. J. (1971). *Amazonia: Man and culture in a counterfeit paradise.* Chicago: Aldine.

Megill, A. (2002). *Karl Marx.* Lanham, MD: Rowman & Littlefield.

Mehan, H. (1993). Beneath the skin and between the ears: A case study in the politics of representation. In S. Chaiklin & J. Lave (Eds.), *Understanding practice: Perspectives on activity and context* (pp. 241–268). Cambridge, UK: Cambridge University Press. (Reprinted in A. U. L. Bradley et al. (Eds.). (2000). *Schooling the symbolic animal.* Boulder, CO: Rowman & Littlefield)

Mehan, H., Hertweck, A., & Meihls, J. L. (1986). *Handicapping the handicapped: Decision making in students' educational careers.* Stanford, CA: Stanford University Press.

Mehan, H., Villanueva, I., Hubbard, L., & Lintz, A. (1996). *Constructing school success: The consequences of placing low achieving students in high track classes.* Cambridge, UK: Cambridge University Press.

Meier, R. J. (2003). *The complete idiot's guide to human prehistory.* New York: Alpha Books.

Meikle, W. E. (1994). *Naming our ancestors: An anthology of hominid taxonomy.* Prospect Heights, IL: Waveland.

Meillassoux, C. (1981). *Maidens, meal, and money: Capitalism and the domestic community.* Cambridge: Cambridge University Press.

Meillassoux, C. (1986). *Anthropologie de l'esclavage: Le ventre de fer et d'argent.* Paris: Presses Universitaires de France.

Mellaart, J. (1967). *The earliest settlements in Western Asia.* Cambridge, UK: Cambridge University Press.

Mellars, P. (1996). *The Neandertal legacy: An archaeological perspective of western Europe.* Princeton: Princeton University Press.

Mellars, P., & Stringer, C. B. (Eds.). (1989). *The human revolution: Behavioural and biological perspectives on the origins of modern humans.* Edinburgh: Edinburgh University Press.

Menand, L. (2002). *The metaphysical club.* London: Flamingo.

Mendonsa, E. L. (2002). *West Africa: An introduction to its history, civilization, and contemporary situation.* Durham, NC: Carolina Academic Press.

Mendoza, R. G. (1995). *The acentric labyrinth: Giordano Bruno's prelude to contemporary cosmology.* Shaftsbury, UK: Element Books.

Menkhorst, P., & Knight, F. (2001). *A field guide to the mammals of Australia.* Oxford: Oxford University Press.

Mensching, G. (1959). *Die Religion: Erscheinungsformen, Strukturtypen und Lebensgesetze.* Stuttgart, Germany: Schwab.

Mernissi, F. (1991). *Women and Islam: An historical and theological enquiry.* Oxford, UK: Blackwell Press.

Merquior, J. G. (1986). *From Prague to Paris: A critique of structuralist and post-structuralist thought.* London: Verso.

Merriam, A. P. (1964). *The anthropology of music.* Evanston, IL: Northwestern University Press.

Merry, S. E. (1990). *Getting justice and getting even: Legal consciousness among working-class Americans.* Chicago: University of Chicago Press.

Merryman, J. H. (1969). *The civil law tradition.* Stanford, CA: Stanford University Press.

Mertens, R. (2004). Where the action was. *University of Chicago Magazine 96*(4), 30–35.

Merton, R. K. (1957). *Social theory and social structure.* Glencoe, IL: Free Press.

Messer, E. & Lambek, M. (Eds.). (1999). *Ecology and the sacred: Engaging the anthropology of Roy A. Rappaport.* Ann Arbor: University of Michigan Press.

Meyer, B., & Pels, P. (Eds.). (2003). *Magic and modernity: Interfaces of revelation and concealment.* Stanford, CA: Stanford University Press.

Meyers, E. (Ed.). (1997). *The Oxford encyclopedia of archaeology in the near east.* New York: Oxford University Press.

Meyers, P. (2000). *Hylobatidae.* http://www.animaldiversity.ummz.umich.edu/site/accounts/information/Hylobatidae.html

Mezzich, J. E., Kleinman, A., Fabrega, H., Jr., & Parron, D. L. (Eds.). (1996). *Culture & psychiatric diagnosis: A DSM-IV perspective.* Washington, DC: American Psychiatric Press.

Michel, P. H. (1973). *The cosmology of Giordano Bruno.* Ithaca, NY: Cornell University Press.

Mickelson, A. R. (2000). *Children on the streets of the Americas.* New York: Routledge.

Micklos, D., & Freyer, G. A. (2003). *DNA science: A first course* (2nd ed.). New York: Cold Spring Harbor Laboratory Press.

Middleton, D. R. (2002). *Exotics and erotics: Human cultural and sexual diversity.* Prospect Heights, IL: Waveland Press.

Middleton, J., & Tait, D. (1958). *Tribes without rulers: Studies in African segmentary systems.* London: Routledge & Kegan Paul.

Midgley, M. (1979). *Beast and man.* Ithaca, NY: Cornell University Press.

Miers, S., & Kopytoff, I. (Eds.). (1977). *Slavery in Africa: Historical and anthropological perspectives.* Madison: University of Wisconsin Press.

Mikhail B. (1983). *The dialogic imagination.* Austin: University of Texas Press.

Mikhail B. (1984). *Problems of Dostoevsky's poetics.* Manchester, UK:Manchester University Press.

Mikhail B. (1984). *Rabelais and his world.* Bloomington: Indiana University Press.

Miletski, H. M. (1999). *Mother-son incest: The unthinkable broken taboo.* Brandon, VT: Safer Society Press.

Miller, L. (1979). William James and twentieth century ethnic thought. *American Quarterly, 31*(4), 533–555.

Miller, M. E. (1996). *The art of Mesoamerica.* New York: Thames and Hudson.

Miller, M. E., & Martin, S. (2004). *Courtly art of the ancient Maya.* New York: Thames & Hudson.

Mills, C. W. (1959). *The sociological imagination.* New York: Oxford University Press.

Mills, M. A. (2003). *Identity, ritual, and state in Tibetan Buddhism: The foundations of authority in Gelukpa monasticism.* New York: Routledge–Curzon.

Mills, N., & Brunner, K. (2002). *The new killing fields.* New York: Basic Books.

Milton, K. (1982). *The foraging strategy of howler monkeys.* New York: Columbia University Press.

Minson, J. (1993). *Questions of conduct: Sexual harassment, citizenship, government.* New York: St. Martin's Press.

Mintz, S. W. (1974). *Caribbean transformations.* Chicago: Aldine.

Mintz, S. W. (1985). *Sweetness and power: The place of sugar in modern history.* New York: Viking.

Mintz, S. W. (1996). *Tasting food, tasting freedom: Excursions into eating, culture, and the past.* Boston: Beacon.

Mintz, S. W., & Price, R. (1992). *The birth of African-American culture: An anthropological perspective.* Boston: Beacon. (Original work published 1976)

Mirandola, G. P. D. (1965). *On the dignity of man: On being and the one: Heptaplus* (C. G. Wallis, P. J. W. Miller, & D. Carmichael, Trans.). Indianapolis: Bobbs-Merrill.

Miroslav, B. & Krejcí, J. (Eds.). (2001). *Abusir and Saqqara in the year 2000, supplement of Archív orientální.* Prague: Oriental Institute ASCR.

Mitchell, R. W., Thompson, N. S., & Miles, H. L. (Eds.). (1997). *Anthropomorphism, anecdotes, and animals.* Albany: State University of New York Press.

Mithen S. J. (Ed.). (1998). *Creativity in human evolution and prehistory.* London: Routledge.

Mithen, S. J. (1991). Ecological interpretations of Paleolithic art. *Proceedings of the Prehistoric Society, 57,* 1.

Mithun, M. (1999). *The languages of native North America.* Cambridge: Cambridge University Press.

Modell, J. S. (1983). *Ruth Benedict: Patterns of a life.* Philadelphia: University of Pennsylvania Press.

Mohanty, C. T. (2003). *Feminism without borders.* Durham, NC: Duke University Press.

Mohanty, J. N. (2000). *Classical Indian philosophy.* Lanham, MD: Rowman & Littlefield.

Mohen, J. (1999). *Megaliths, stones of memory.* New York: Harvey Abrams.

Molina, E. (1998). El polemico fósil de Orce: "falta de rigor o fraude" *El Escéptico, 1,* 73–76.

Molina, E. (2000). Evolution and "scientific" creationism in the earth sciences. Geological and paleontological arguments. In H. J. Birx & E. I. Kolchinsky (Eds.), *Science and society* (pp. 246–252). St. Petersburg: Russian Academy of Sciences.

Molnar, S. (2002). *Human variation: Races, types, and ethnic groups* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Momen, M. (1999). *The phenomenon of religion.* Oxford: One World.

Monod, J. (1970). *Chance and necessity: An essay on the natural philosophy of modern biology.* New York: Alfred A. Knopf.

Montaigne, M. (1965). *Michel de Montaigne: The complete essays of Montaigne* (D. Frame, Trans.). Stanford, CA: Stanford University Press.

Montaigne, M. (1983). *Michel de Montaigne: Travel journal* (D. Frame, Trans.). San Francisco: North Point Press.

Monteith, M., & Winters, J. (2002). Why we hate. *Psychology Today, 35*(3), 44–48.

Montgomery, G. M. (in press). Place, practice, and primatology: Clarence Ray Carpenter, primate communication and the development of field methodology, 1931–1945. *Journal of the History of Biology.*

Montgomery, S. (1991). *Walking with the great apes: Jane Goodall, Dian Fossey, Biruté Galdikas.* Boston: Houghton Mifflin.

Moon, S. J., Fryer, A. A., & Strange, R. C. (2005). Ultraviolet radiation: Effects on risks of prostate cancer and other internal cancers. *Mutation Research, 571,* 207–219.

Mooney, J. (1991). *The Ghost-Dance religion and the Sioux outbreak of 1890.* Lincoln: University of Nebraska Press.

Moore, A. T. M., Hillman, G. C., & Legge, A. J. (Eds.). (2000). *Village on the Euphrates: From foraging to farming at Abu Hureyra.* Oxford: Oxford University Press.

Moore, H. L., & Sanders, T. (Eds.). (2001). *Magical interpretations, material realities: Modernity, witchcraft and the occult in postcolonial Africa.* London: Routledge.

Moore, H., & Vaughn, M. (1994). *Cutting down trees. Gender, nutrition, and agricultural change in the northern province of Zambia, 1890–1990.* London: James Currey.

Moore, J. A. (2002). *From Genesis to genetics: The case of evolution and creationism.* Berkeley: University of California Press.

Moore, J. D. (2004). *Visions of culture: An introduction to anthropological theories and theorists,* 2nd ed. Walnut Creek, CA: AltaMira.

Moore, P. D., Webb, J. A., & Collinson, M. E. (1991). *Pollen Analysis.* Oxford: Blackwell Scientific Publications.

Moore, S. (1999). *Petroglyphs: Ancient language/sacred art.* Santa Fe, NM: Clearer Light.

Moore, S. F. (1978). *Law as process: An anthropological approach.* London: Routledge & Kegan Paul.

Moore, S. F. (Ed.). (2005). *Law and anthropology: A reader.* Malden, MA: Blackwell.

Moorehead, A. (1969). *Darwin and the* Beagle. New York: Harper & Row.

Morales, A. (Ed.). (2003). *Renascent pragmatism.* Aldershot, UK: Ashgate.

Moran, E. (1993). *Through Amazonian eyes: The human ecology of Amazonian populations.* Iowa City: University of Iowa Press.

Moran, E. F. (2000). *Human adaptability.* Boulder, CO: Westview Press.

Morell, V. (1995). *Ancestral passions: The Leakey family and the quest for humankind's beginnings.* New York: Simon & Schuster.

Morgan, E. (1972). *Descent of women.* London: Souvenir Press.

Morgan, E. (1982). *The aquatic ape.* London: Souvenir Press.

Morgan, E. (1990). *The scars of evolution.* London: Souvenir Press.

Morgan, E. (1994). *The descent of the child.* London: Souvenir Press.

Morgan, E. (1997). *The aquatic ape hypothesis.* London: Souvenir Press.

Morgan, L. H. (1901). *League of the Ho-de-no-sau-nee or Iroquois* (Vols. 1–2) (Herbert M. Lloyd, ed. & annotator). New York: Dodd, Mead. (Original work published 1851)

Morgan, L. H. (1962). *League of the Iroquois.* Secaucus, NJ: Citadel Press.

Morgan, L. H. (1963). *Ancient society: Researches in the lines of human progress from savagery through barbarism to civilization.* New York: Meridian Books. (Original work published 1877)

Morgan, L. H. (1964). *Ancient society.* Cambridge, MA: Belknap Press of Harvard University Press.

Morgan, L. H. (1994). *Ancient society.* Tucson: University of Arizona Press.

Morissonneau, C. (1978). Huron of Lorette. In B. Trigger (Ed.), *Handbook of North American Indians: Vol. 15. Northeast.* Washington, DC: Smithsonian Institution.

Morphy, H. (1991). *Ancestral connections: Art and an aboriginal system of knowledge.* Chicago: University of Chicago Press.

Morphy, H. (1995) Landscape and the reproduction of the ancestral past. In E. Hirsch & M. O'Hanlon (Eds.), *The anthropology of landscape: Perspectives on place and space* (pp. 184–209). Clarendon Press, Oxford.

Morris, D. (1996). *The human zoo* (reprint ed.). New York: Kodansha Globe.

Morris, D. (1997). *Intimate behavior: A zoologist's classic study of human intimacy* (reprint ed.). New York: Kodansha Globe.

Morris, D. (1999). *The naked ape: A zoologist's study of the human animal* (reprint ed.). Los Alamitos, CA: Delta.

Morrison, W. F. (1997). *Haadas history.* Unpublished manuscript.

Morton, A. (2004). *On evil.* New York: Routledge.

Moseley, M. E. (1992). *The Incas and their ancestors: The archaeology of Peru.* London: Thames & Hudson.

Mosley, M. E. (2001). *The Incas and their ancestors.* London: Thames and Hudson.

Mount, D. (2001). *Bioinformatics: Sequence and genome analysis.* New York: Cold Spring Harbor Laboratory Press.

Mountain, M., & Bowdery, D. (Eds.). (1999). *Taphonomy: The analysis of processes from phytoliths to megafauna.* Canberra: ANH Publications, Australian National University.

Movius, H. L. (1955). Recent research on early man in China. *American Anthropologist, 57,* 334–337.

Mowat, F. (1988). *Woman in the mist.* Boston: Warner Books.

Moyà-Solà, S., Köhler, M., & Rook, L. (1999). Evidence of hominid-like precision grip capability in the hand of the Miocene ape *Oreopithecus. Proceedings of the National Academy of Sciences, USA, 96,* 313–317.

Moynihan, D. P. (Ed.). (1968). *On understanding poverty: Perspectives from the social sciences.* New York: Basic Books.

Mulhern, F. (2000). *Culture/Metaculture.* London: Routledge.

Müller, F. M. (Ed.). (1867). *Chips from a German workshop: Essays on the science of religion I* (4 vols.). London: Longmans, Green.

Müller, F. M. (Ed.). (1878). *Lectures on the origin and growth of religion as illustrated by the religions of India.* London: Longmans, Green.

Müller, H. F., Hallidan, A. N., McCulloch, M. T., & Wartho, J. A. (2003). Origin and migration of the alpine Iceman. *Science, 302,* 862–865.

Muller, S. H. (1964). *The world's living languages: Basic facts of their structure, kinship, location, and number of speakers.* New York: Frederick Ungar.

Mulvaney, J., & Johann, K. (1999). *Prehistory of Australia.* St. Leonards, Australia: Allen & Unwin.

Mulvaney, J., & Kamminga, J. (1999). *Prehistory of Australia.* Washington DC: Smithsonian Books.

Munck, T. (2000). *Enlightenment: A comparative social history, 1721–1794.* London: Oxford University Press.

Murdock, G. P. (1949). *Social structure.* New York: Macmillan.

Murdock, G. P. (1951). *Outline of South American cultures. Behavioral science outlines* (Vol. 2). New Haven, CT: Human Relations Areas Files.

Murdock, G. P. (1957). World ethnographic sample. *American Anthropologist, 59,* 664–687.

Murdock, G. P. (1959). *Africa: Its peoples and their culture history.* New York: McGraw–Hill.

Murdock, G. P. (1965). *Culture and society.* Pittsburgh, PA: University of Pittsburgh Press.

Murdock, G. P. (1967). *Ethnographic atlas.* Pittsburgh, PA: University of Pittsburgh Press.

Murdock, G. P. (1981). *The atlas of world cultures.* Pittsburgh, PA: University of Pittsburgh Press.

Murowchick, R. (Ed.) (1994). *Cradles of civilization. China. Ancient culture, modern land.* Norman: University of Oklahoma Press.

Murphy, G. (1958). *Human potentialities.* New York: Basic Books.

Murphy, J. P. (1990). *Pragmatism from Peirce to Davidson.* Boulder, CO:Westview.

Murphy, M. F., & Margolis, M. L. (Eds.). (1995). *Science, materialism. and the study of culture: Readings in cultural materialism.* Gainesville: University Press of Florida.

Murphy, W. P. (1980). Secret knowledge as property and power in Kpelle Society: Elders versus youth. *Africa, 50*(2), 193–207.

Murray, D. J. (1995). *Gestalt psychology and the cognitive revolution.* New York: Wheatsheaf Books.

Murray, J. K. (1974). *Ella Deloria: A biographical sketch and literary analysis.* Doctoral dissertation, University of North Dakota.

Murti, T. R. V. (1998). *The central philosophy of Buddhism.* New Delhi: Harper/Collins.

Myers, J., Sweeney, T., & Witmer, J. M. (2000). The wheel of wellness counseling for wellness: A holistic model for treatment planning. *Journal of Counseling and Development, 78,* 251–266.

Myrdal, G. (1965). *Challenge to affluence.* New York: Vintage.

Nadel, J., & Camaioni, L. (Eds.). (1993). *New perspectives in early communicative development.* London: Routledge.

Nader, L. (1965). The anthropological study of law. *American Anthropologist, 67*(6, Part 2), 3–32.

Nader, L. (1990). *Harmony ideology: Justice and control in a Zapotec mountain village.* Stanford, CA: Stanford University Press.

Nader, L., & Todd, H. F., Jr. (1978). *The disputing process: Law in ten societies.* New York: Columbia University Press.

Nanda, S. (1994). *Cultural anthropology* (5th ed.). Belmont, CA: Wadsworth.

Nanda, S. (1999). *Gender diversity: Cross-cultural variations.* Prospect Heights, IL: Waveland Press.

Nanda, S., & Warms, R. L. (2004). *Cultural anthropology* (8th ed.). Belmont, CA:Wadsworth.

Napier, A. D. (1986). *Masks, transformation, and paradox.* Berkeley: University of California Press.

Napier, J. R. (1970). *The roots of mankind.* Washington, DC: Smithsonian Institution Press.

Napier, J. R. (1980). *Hands.* London: George Allen & Unwin.

Napier, J. R., & Napier, P. H. (1967). *A handbook of living primates.* London: Academic Press.

Napier, J. R., & Napier, P. H. (1985). *The natural history of the primates.* Cambridge, MA: MIT Press.

Narayanan, V. (2004). *Hinduism.* Oxford: Oxford University Press.

Narby, J., & Francis Huxley, F. (Eds.). (2001). *Shamans through time: 500 Years on the path to knowledge.* New York: Tarcher/Putnam.

Nardo, D. (2004). *Ancient Mesopotamia.* San Diego, CA: Gale Group/Thomson Learning.

Naroll, R. (1956). A preliminary index of social development. *American Anthropologist, 58,* 687–715.

Naroll, R. (1959). A tentative index of culture stress. *International Journal of Social Psychiatry, 5,* 107–116.

Naroll, R. (1962). *Data quality control.* New York: Free Press.

Naroll, R. (1966). Does military deterrence deter? *Transactions, 3,* 14–20.

Naroll, R. (1983). *The moral order: An introduction to the human situation.* Beverly Hills, CA: Sage.

Naroll, R., with Bullough, V. L., & Naroll, F. (1974). *Military deterrence in history: A pilot cross-historical survey.* Albany: State University of New York Press.

Naroll, R., with Cohen, R. (Eds.). (1970). *A handbook of method in cultural anthropology.* Garden City, NY: Natural History Press.

Nash, J. C. (1979). *We eat the mines and the mines eat us: Dependency and exploitation in Bolivian tin mines.* New York: Columbia University Press.

Nash, J. C. (1989). *From tank town to high tech: The clash of community and industrial cycles.* Albany: State University of New York Press.

Nash, J. C. (2001). *Mayan visions: The quest for autonomy in an age of globalization.* New York: Routledge.

Nash, J. C., & Fernández-Kelly, M. P. (Eds.). (1983). *Women, men, and the international division of labor.* Albany: State University of New York Press.

Nash, M. (1989) *The cauldron of ethnicity in the modern world.* Chicago: University of Chicago Press.

Nason, J. D. (1997). Beyond repatriation: Cultural policy and practice in the 21st century. In B. Ziff & P. Rao (Eds.), *Borrowed power: Essays on cultural appropriation* (pp. 291–312). New Brunswick, NJ: Rutgers University Press.

National Academy of Sciences, Committee on Science and Creationism. (1984). *Science and creationism: A view from the National Academy of Sciences.* Washington, DC: National Academy Press.

National Park Service. (2005). *Pu'uhonua O Honaunau National Historical Park.* Retrieved May 21, 2005 from ww. nps. gov.

National Research Council. (1993). *Understanding child abuse and neglect.* Washington, DC: National Academies Press.

Nazarea,V. (Ed.). (1999). *Ethnoecology: Situated knowledge/located lives.* Tucson: University of Arizona Press.

Neale, W. C., & Mayhew, A. M. (1983). Polanyi, institutional economics, and economic anthropology. In S. Ortiz (Ed.), *Economic anthropology: Topics and theories* (pp. 11–20).

Neass, A. (1989). *Ecology, community, and lifestyle. Outline of an ecosophy.* Cambridge: Cambridge University Press.

Neev, D., & Emery, K. O. (1995). *The destruction of Sodom, Gomorrah, and Jericho: Geological, climatological, and archaeological background.* New York: Oxford University Press.

Negnevitsky, M. (2002). *Artificial intelligence: A guide to intelligent systems.* New York: Addison-Wesley.

Nehring, W. M. (1999). Clinical genetics: An overview. *The Journal of Cardiovascular Nursing, 13,* 19–33.

Neich, R. (2001). *Carved histories: Rotorua Ngati Tarawhai woodcarving.* Auckland, New Zealand: Auckland University Press.

Neihardt, J. G. (1932). *Black Elk speaks: Being the life story of a holy man of the Oglala Sioux.* Lincoln: University of Nebraska Press.

Neill, S. D. (1993). *Clarifying McLuhan: An assessment of process and product.* Westport, CT: Greenwood.

Nell, O. (1975.) *Acting on principle. An essay on Kantian ethics.* New York: Columbia University Press.

Nelson, R., & Badger, M. O. (1987). *Make prayers to the raven.* [Video recording]. Fairbanks: KUAC. (Produced in collaboration with the people of the Koyukuk River, KUAC-TV, University of Alaska)

Nelson, S. (1997). *Gender in archaeology: Analyzing power and prestige.* Walnut Creek, CA: Alta Mira Press.

Nemet-Nejat, K. R. (1998). *Daily life in ancient Mesopotamia.* Westport, CT: Greenwood.

Netting, R. M. (1977). *Cultural ecology.* Menlo Park, CA: Benjamin/Cummings.

Netting, R. McC. (1993). Smallholders, householders, farm families, and the ecology of intensive, sustainable agriculture. Stanford, CA: Stanford University Press.

Netting, R. McC., Wilk, R. R., & Arnould, E. J. (Eds.). (1984). *Households: Comparative and historical studies of the domestic group.* Berkeley: University of California Press.

Neuman, L. (2003). *Social research methods: Quantitative and qualitative approaches* (5th ed.). Boston: Allyn & Bacon.

Neumann, E. (1954). *The origins and history of consciousness.* Bollingen Series XLII. New York: Pantheon Books.

Nevitt, B., & McLuhan, M. (Eds.). (1995). *Who was Marshall McLuhan?* Toronto: Stoddart.

Newberg, A., D'Aquili, E., & Rause, V. (2001). *Why God won't go away: Brain science and the biology of belief.* New York: Ballantine.

Newell, W. H. (1976), *Ancestors.* The Hague, the Netherlands:Mouton.

Newman, P., & Ratliff, M. (Eds.). (2001). *Linguistic fieldwork.* Cambridge, UK: Cambridge University Press.

Newman, T. W., & Sanford, R. M. (2001). *Cultural resources archaeology: An introduction* (U. S. Department of the Interior, National Park Service, Washington, DC). Walnut Creek, CA: Alta Mira Press.

Newman, T. W., & Sanford, R. M. (2001). *Practicing archaeology: A training manual for cultural resources archaeology.* Walnut Creek, CA: Alta Mira Press.

Newman, W. R. (2004). *Promethean ambitions: Alchemy and the quest to perfect nature.* Chicago: University of Chicago Press.

Newmeyer, F. J. (1986). *Linguistic theory in America.* San Diego: Academic Press.

NgCheong-Lum, R. (2000). *Fiji.* New York: Times Publishing Group.

Nicholl, C. (2004). *Leonardo da Vinci: Flights of the mind—A biography.* New York: Viking.

Nichols, D. L., & Frederick, C. D. (1993). Irrigation canals and chinampas: The development of hydraulic agriculture in the northern basin of Mexico. In V. Scarborough & B. L. Isaac (Eds.), *Economic aspects*

of water management in the prehispanic new world (pp. 123–150). Greenwich, CT: JAI Press.

Nichols, G. (1999). *Sedimentology & stratigraphy.* Malden, MA: Blackwell Science.

Nichols, M., & Goodall, J. (1999). *Brutal kinship.* New York: Aperture Foundation.

Nielsen, F. (1994). Sociobiology and sociology. *Annual Review of Sociology, 20,* 267–303.

Nielsen, K. (2001). *Naturalism and religion.* Amherst, NY: Prometheus.

Niemitz, C. (Ed.) (1984). *Biology of tarsiers.* Stuttgart: Gustav Fischer Verlag.

Nietzel, M., Bernstein, D., & McCauley, E. (1997). *Abnormal psychology.* Englewood Cliffs, NJ: Prentice Hall.

Nietzsche, F. (1993). *Thus spake Zarathustra* (Introduction by H. James Birx). Amherst, NH: Prometheus Books.

Nietzsche, F. (1999/1885). *Thus Spake Zarathustra.* New York: Dover Publications.

Niezen, R. (2000). *Spirit wars: Native North American religions in the age of nation building.* Berkeley: University of California Press.

Niezen, R. (2004). *A world beyond difference: Cultural identity in the age of globalization.* Oxford: Blackwell.

Nisbet, R. A. (1974). *The sociology of Émile Durkheim.* New York: Oxford University Press.

Nitecki, M. H., & Nitecki, D. V. (1993). *Evolutionary ethics.* Albany: State University of New York Press.

Nketia, J. H. K. (1981). The juncture of the social and the musical: The methodology of cultural analysis. *The World of Music, 23*(2), 22–39.

Nola, R. (2003). *Rescuing reason: A critique of antirationalist views of science and knowledge.* Dordrecht: Kluwer.

Nolt, S. M. (1992). *A history of the Amish.* Intercourse, PA: Good Books.

North, T. (1994). *The Internet and Usenet global computer networks.* Masters thesis, Curtin University of Technology, Perth, Australia.

Norton, D. F. (Ed.). (1993). *The Cambridge companion to Hume.* Cambridge: Cambridge University Press.

Nou, J. (1993). *Taj Mahal.* New York: Abbeville Press.

Novella, S., & DeAngelis, P. (2002). Cults. In M. Shermer (Ed.) & P. Linse (Contributing Ed.), *The skeptic encyclopedia of pseudoscience* (Vol. 1). Santa Barbara, CA: ABC-CLIO.

Nowak, R., Konstant, W., Nowak, R. M., Rylands, A., Mittermeier, R., & Walker, E. (1999). *Walker's primates of the world.* Baltimore: John Hopkins University Press.

Number, R. L. (1993). *The creationists: The evolution of scientific creationism.* Berkeley: University of California Press.

Nussbaum, M. C. (1990). Aristotelian social democracy. In R. B. Douglass, G. M. Mara, & H. S. Richardson (Eds.), *Liberalism and the good* (pp. 203–252). New York: Routledge.

Nussbaum, M. C. (1997). *Cultivating humanity: A classical defense of reform in liberal education.* Cambridge, MA: Harvard University Press.

O'Connor, T. (2000). *The archaeology of animal bones.* College Station: Texas A&M University.

O'Grady, W., Dobrovolsky, M., & Aronoff, M. (1989). *Contemporary linguistics.* New York: St. Martin's.

O'Hear, A. (1999). *After progress: Finding the old way forward.* London: Bloomsbury.

O'Meara, T. F. (1997). *Thomas Aquinas theologian.* South Bend, IN: Notre Dame University Press.

O'Neill, J. (1995). *The poverty of postmodernism.* New York: Routledge.

O'Riordan, T. (2001). *Globalism, localism, and identity: Fresh perspectives on the transition to sustainability.* London: Earthscan.

O'Toole, R. (1998). Friedrich Max Muller. In W. H. Swatos, Jr. (Ed.), *Encyclopedia of religion and society* (pp. 314–315). Walnut Creek, CA: AltaMira.

Oakes, L., & Gahlin, L. (Eds.). (2003). *Ancient Egypt.* New York: Barnes & Noble Books.

Oakley, K. P. (1949). *Man the Toolmaker.* London: British Museum (Natural History).

Oakley, K. P. (1972). *Man the tool-maker.* London: Trustees of the British Museum (Natural History).

Oakley, K. P., & Hoskins, C. R. (1950, March). New evidence on the antiquity of Piltdown man. *Nature, 165,* 379–382.

Oates, J. F., & Davies, A. G. (Eds.). (1994). *Colobine monkeys: Their ecology, behaviour, and evolution.* Cambridge, UK: Cambridge University Press.

Obeyesekere, G. (1968). Theodicy, sin, and salvation in a sociology of Buddhism. In E. R. Leach (Ed.), *Practical religion.* Cambridge, UK: Cambridge University Press.

Ogbu, J. (1978). *Minority education and caste: The American system in cross-cultural perspective.* New York: Academic Press.

Ogbu, J. (1999). Beyond language: Ebonics, proper English, and identity in a Black-American speech community. *American Educational Research Journal, 36*(2), 147–184.

Ogden, C. K., & Armstrong Richards, I. (1946). *The meaning of meaning* (8th ed.). New York: Harcourt Brace & World.

Ogden, D. (1999). *Polygamy, prostitutes and death: The Hellenistic dynasties.* London: Duckworth and the Classical Press of Wales.

Olson, B. (2003). The revolution in marketing apparel: A narrative ethnography. In T. Malefyt & B. Moeran (Eds.), *Advertising cultures.* Oxford, UK: Berg.

Olson, M. (2000). *Power and prosperity: Outgrowing communist and capitalist dictatorships.* New York: Basic Books.

Olson, S. (2002). *Mapping human history: Discovering the past through our genes.* Boston: Houghton Mifflin.

Omohundro, J. T. (1998). *Careers in anthropology.* Mountain View, CA:Mayfield.

Onor, S. O. (1994). *The Ejagham nation in the Cross River Region of Nigeria.* Ibadan, Nigeria: Kraft Books.

Opton, F. G. (1982). *Liberal religion: Principles and practice.* Buffalo, NY: Prometheus Books.

Ornstein, A. C., & Levine D. U. (2003). *Foundations of education.* New York: Houghton Mifflin.

Ortiz, A. (1969). *The Tewa world: Space,time, being and becoming in the Pueblo universe.* Chicago: University of Chicago Press.

Ortner, S. (1974). Is female to male as nature is to culture? In M. Rosaldo & L. Lamphere (Eds.), *Women, culture, and society* (pp. 67–87). Stanford, CA: Stanford University Press.

Ortner, S. B., & Whitehead, H. (Eds.). (1981). *Sexual meanings: The cultural construction of gender and sexuality.* New York: Cambridge University Press.

Osborne, T. (1998). *Aspects of Enlightenment.* London: UCL Press.

Osman, F. (1992). *Jihad: A legitimate struggle for human rights; The Muslim world: Issues and challenges.* Los Angeles:Multimedia Vera International.

Osman, F. (1994). *Shari'a in contemporary society: The dynamics of change in Islamic law.* Los Angeles: Multimedia Vera International.

Osterreich, S. A. (1991). *The American Indian Ghost Dance, 1870 and 1890: An annotated bibliography.* Westport, CT: Greenwood Press.

Oswalt, W. H. (1990). *Bashful no longer: An Alaskan Eskimo ethnohistory, 1778–1988.* Norman: University of Oklahoma Press.

Oswalt, W. H., & Neely, S. (1999). *This land was theirs: A study of Native Americans.* Mountain View, CA: Mayfield.

Othman, N. (1999). Grounding human rights arguments in non-Western culture: Shari'a and the citizenship rights of women in a modern Islamic state. In Joanne R. Bauer & Daniel A. Bell, *The East Asian challenge for human rights.* Cambridge, UK: Cambridge University Press.

Otte, M. (1995). The nature of Levallois. In H. L. Dibble & O. Bar-Yosef (Eds.), *The definition and interpretation of Levallois technology* (Monographs in World Prehistory, No. 23, pp. 117–124). Madison, WI: Prehistory Press.

Otterbein, K. F. (1977). *Comparative cultural analysis.* New York: Holt, Rinehart and Winston.

Otterbein, K. F. (1987). Raoul Naroll (1920–1985). *American Anthropologist, 89,* 136–142.

Otterbein, K. F. (1997). The origins of war. *Critical Review, 2,* 251–277.

Otterbein, K. F. (1999a). Clan and tribal conflict. In Lester R. Kurtz (Ed.), *Encyclopedia of violence, peace, and conflict.* San Diego, CA: Academic Press.

Otterbein, K. F. (1999b). A history of research on warfare in anthropology. *American Anthropologist, 101,* 794–805.

Otterbein, K. F. (2003, December). The archaeology of war: An alternative view. *Anthropology News,* p. 9.

Otterbein, K. F. (2004). *How war began.* College Station, TX: Texas A&M Press.

Otterbein, K. F. (Ed). (1994). *Feuding and warfare: Selected works of Keith F. Otterbein.* Langhorne, PA: Gordon and Breach.

Otto, R. (1925). *The idea of the holy: An inquiry into the non-rational factor in the idea of the divine and its relation to the rational.* London, New York: Milford, Oxford University Press.

Outram, D. (1995). *The Enlightenment.* Cambridge: Cambridge University Press.

Ovchinnikov, I. V., Gotherstrom, A., Romanova, G. P., Kharitonov, V. M., Liden, K., & Goodwin, W. (2000). Molecular analysis of Neandertal DNA from the northern Caucasus. *Nature, 404,* 490–493.

Oyama, S. (2000). *The ontogeny of information: Developmental systems and evolution.* Durham, NC: Duke University Press.

Padden, C., & Humphries, T. (2005). *Inside deaf culture.* Cambridge, MA: Harvard University Press.

Page, B. M., Ernst, W. G., & Coleman, R. G. (Eds.). (2000). Tectonic studies of Asia and the Pacific Rim: A tribute to Benjamin M. Page (pp. 1911–1997). *International Book Series, 3.* Geological Society of America.

Page, J. (1990). *Zoo: The modern ark.* Toronto: Key Porter Books.

Page, J. (1995). *The Brazilians.* New York: Addison-Wesley.

Palladino, M. (2005). *Understanding the Human Genome Project* (2nd ed.). New York: Benjamin Cummings.

Palmer, L. J. (2004). *Encyclopedia of DNA and the United States criminal justice system.* Jefferson, NC: McFarland.

Palmer, M., & Finlay,V. (2003). *Faith in conservation: New approaches to religions and the environment.* Washington, DC:World Bank.

Palmer, R. E. (1969). *Hermeneutics.* Evanston, IL: Northwestern University Press.

Palmer, R. R., Colton, J., & Kramer, L. (2002). *A history of the modern world* (9th ed.). New York: Knopf.

Palmqvist, P. (1997). A critical re-evaluation of the evidence for the presence of hominids in Lower Pleistocene times at Venta Micena, Southern Spain. *Journal of Human Evolution, 33,* 83–89.

Palombit, R. A. (1992). *Pair bonds and monogamy in wild siamang (Hylobates syndactylus) and whitehanded gibbon* (Hylobates lar) in *northern Sumatra.* Davis: University of California Press.

Pare, A. (1982). *On monsters and marvels* (J. L. Pallister, Trans.). Chicago: University of Chicago Press. (Original work published 1573)

Parezo, N. J. (1993). *Hidden scholars: Women anthropologists and the Native American Southwest.* Albuquerque: University of New Mexico Press.

Park, R. (1952). *Human communities: The city and human ecology.* Glencoe, IL: Free Press.

Park, R., E., Burgess, W., & McKenzie, R. D. (1925). *The city.* Chicago, IL: University of Chicago Press.

Park, T. K. (1992, March). Early trends toward class stratification: Chaos, common property, and flood recession agriculture. *American Anthropologist,* pp. 90–117.

Parker, P. M. (1997). *Linguistic cultures of the world: A statistical reference.* Westport, CT: Greenwood.

Parker, S. (1990). *The practical paleontologist.* London: Quarto.

Parker, W. (1996). *Educating the democratic mind.* Albany: State University of New York Press.

Parkin, D. J. (1985). *The anthropology of evil.* Oxford, UK: Blackwell.

Parkin, R., & Stone, L. (Ed.). (2003). *Kinship and family: An anthropological reader.* Oxford: Blackwell.

Parra, E. J., Kittles, R. A., & Shriver, M. D. (2004). Implications of correlations between skin color and genetic ancestry for biomedical research. *Nature Genetics, 36,* S54–S60.

Parsons, T. (1951). *The social system.* New York: Free Press.

Pascal, B. (1997). *The provincial letters.* Eugene, OR: Wipf and Stock Publishers.

Pascal, B. (1999). *Pensees and other writings.* Oxford: Oxford University Press.

Pascal, B. (2004). *Blaise Pascal: Thoughts, letters and minor works.* Whitefish, MT: Kessinger Publishing.

Paton, H. J. (1971). *The categorical imperative: A study in Kant's moral philosophy.* Philadelphia: University of Pennsylvania Press.

Patrick, A. (2002). *The most striking of objects: The totem poles of Sitka National Historical Park.* Anchorage, AK: U. S. Department of the Interior, Alaska Support Office, National Park Service and Sitka National Historical Park.

Patterson, F. (1981). *The Education of Koko.* New York: Holt, Rinehart, and Winston.

Patterson, F. (1985). *Koko's kitten.* New York: Scholastic.

Patterson, F. (1999). *Koko-Love! Conversations with a signing gorilla.* New York: Dutton Children's Books.

Patterson, F., & Cohn, R. H. (1988). *Koko's story.* New York: Scholastic.

Patterson, F., & Gordon, W. (1993). The case for the personhood of gorillas. In P. Cavalieri & P. Singer (Eds.), *The great ape project: Equality beyond humanity* (pp. 58–77). New York: St. Martin's.

Patterson, F., & Linden, E. (1981). *The education of Koko.* New York: Holt, Rinehart, & Winston.

Patterson, O. (1982). *Slavery and social death: A comparative study.* Cambridge, MA: Harvard University Press.

Paul, D. B. (1995). *Controlling human heredity: 1865 to the present.* Atlantic Highlands, NJ: Humanities Press.

Paul, H. W. (1974). Religion and Darwinism: Varieties of Catholic reaction. In T. F. Glick (Ed.), *The comparative reception of Darwinism* (pp. 403–436).

Pavlish, L. A., & Banning, E. B. (1980). Revolutionary developments in carbon-14 dating. *American Antiquity, 45*(2), 290–296.

Pavlish, L. A., & Litherland, A. E. (2003). Physics and archaeometry (Foreword, special issue). *Physics in Canada, 59,* 222–225.

Peacock, T., & Wisuri, M. (2002). *Ojibwe waasa inaabidaa: We look in all directions.* Afton: Afton Historical Society Press.

Peek, P. M. (Ed.). (1991). *African divination systems.* Bloomington: Indiana University Press.

Peel, J.D.Y. (1972). *Herbert Spencer on social evolution.* Chicago: University of Chicago Press.

Peers, L. (1994). *The Ojibwa of western Canada 1780–1870.* St. Paul: Minnesota Historical Society Press.

Peirce, C. S. (1934). Pragmatism and pragmaticism. C. Hartshorne & P. Weiss (Eds.), Collected Papers (Vol. 5). Cambridge, MA: Harvard University Press.

Perello, E. R. (1995). *El Abate Henri Breuil (1877–1961).* Madrid, Spain: Universidad Nacional de Educacion a Distancia.

Perez, L. A. Jr. (1995). *Cuba: Between reform and revolution.* New York: Oxford University Press.

Peristiany, J. (Ed.) (with Handman, M.-E.). (1989). *Le prix de l'alliance en Méditerranée.* Paris: Editions du Centre National de la Recherche Scientifique.

Perry, D. G., & Beussey, K. (1984). *Social development.* Englewood Cliffs, NJ: Prentice Hall.

Perry, D. R. (1986). *Life above the jungle floor.* New York: Simon & Schuster.

Perry, R. J. (2003). *Five key concepts in anthropological thinking.* Upper Saddle River, NJ: Prentice Hall/Pearson Education.

Perry, Richard L. (2003). *Five key concepts in anthropological thinking.* Upper Saddle River, NJ: Prentice Hall.

Perry, W. J. (1923). *The children of the sun: A study in the early history of civilization.* London: Methuen.

Persons, S. (1987). *Ethnic studies at Chicago, 1905–1945.* Urbana, IL: University of Illinois Press.

Peterson, D. (1989). *The deluge and the ark: A journey into primate worlds.* New York: Avon Books.

Peterson, T. (2002). *Linked arms.* Albany: State University of New York Press.

Pétonnet, C. (1979). *On est tous dans le brouillard.* Paris: Editions du CTHS.

Petrinovich, L. (2000). *The cannibal within.* New York: Aldine de Gruyter.

Pettifor, E. (2000). From the teeth of the dragon: *Gigantopithecus blacki.* In M. Scully (Ed.), *Selected*

readings in physical anthropology (pp. 143–149). Dubuque, IA: Kendall/Hunt.

Pfleidere, B., & Bibeau, G. (Eds.). (1991). *Anthropologies of medicine.* Wiesbaden, Germany: Vieweg & Sohn Verlag.

Pfungst, O. (1911). *Clever Hans.* New York: Holt, Rinehart & Winston.

Phelan, S. E. (2001). What is complexity science, really? *Emergence, 3*(1), 120– 36. Reynolds, R. G. (1979). *An adaptive computer model of the evolution of agriculture for hunter-gatherers in the Valley of Oaxaca, Mexico.* Ann Arbor: University of Michigan.

Phillips, P. (1980). *The prehistory of Europe.* Bloomington: Indiana University Press.

Phillips, S. H. (1995). *Classical Indian metaphysics.* Chicago: Open Court.

Pickering, M. (1993). *Auguste Comte: An intellectual biography* (Vol. 1). Cambridge: Cambridge University Press.

Piddington, R. O. (1960). *Action anthropology.* Wellington, New Zealand: Polynesian Society.

Pike, K. (1976). *Phonemics: A technique for reducing languages to writing.* Ann Arbor: University of Michigan Press.

Pike, K. L. (1967). *Language in relation to a unified theory of the structure of human behavior.* The Hague: Mouton.

Pink, S. (2001). *Doing visual ethnography: Images, media, and representation in research.* Thousand Oaks, CA: Sage.

Pinker, S. (1994). *The language instinct: How the mind creates language.* New York:William Morrow.

Pinker, S. (1999). *How the mind works.* New York: W. W. Norton & Company.

Pinker, S. (2002). *The blank slate: The modern denial of human nature.* New York: Viking.

Piot, P., & Coll Seck, A. M. (2001). International response to the HIV/AIDS epidemic: Planning for success. *Bulletin of the World Health Organization, 79,* 1106–1112.

Plato. (1971). *The collected dialogues of Plato.* (E. Hamilton & H. Cairns, Eds.). Princeton, NJ: Princeton University Press.

Plato. (1995). Republic. In S. M. Cohen, P. Curd, & C. D. C. Reeve (Eds.), *Readings in Ancient Greek philosophy: From Thales to Aristotle.* Indianapolis, IN: Hackett.

Plog, S. (1997). *Ancient peoples of the American Southwest.* New York: Thames & Hudson.

Plomin, R., DeFries, J. C., McClearn, G. E., & Rutter M. (1997). *Behavioral genetics.* (3rd ed.). New York: Freeman.

Plomley, B. (1993). *The Tasmanian aborigines.* Launceston, Australia: The Plomley Foundation.

Plotkin, H. C. (1994). *The nature of knowledge: Concerning adaptations, instinct, and the evolution of intelligence.* Harmondsworth, UK: Allen Lane/Penguin.

Plucker, J. A. (2004). Robert Mearns Yerkes. *Human intelligence: Historical influences, current controversies, teaching resources.* Retrieved May 16, 2005, from http://www.indiana. edu/~intell/yerkes. shtml

Polanyi, K. (1968). *Primitive, archaic, and modern economics.* Boston: Beacon Press.

Polednak, A. P. (1997). *Segregation, poverty, and mortality in urban African Americans.* New York: Oxford University Press.

Pontell, H. N. (2002). *Social deviance: Readings in theory and research.* Upper Saddle River, NJ: Prentice Hall.

Popa, R. (2004). *Between necessity and probability: Searching for the definition and origin of life.* Berlin, Germany: Springer.

Popper, K. (1945). *The open society and its enemies.* London: Routledge and Kegan Paul.

Popper, K. (1958). *The logic of scientific discovery.* London: Hutchinson.

Popper, K. (1972). *Objective knowledge: An evolutionary approach.* Oxford: Clarendon Press.

Popper, K. R. (1962). *The open society and its enemies* (Vol. 1). London: Routledge & Kegan Paul.

Porter, B. N. (2000). *One God or many? Concepts of divinity in the ancient world.* Chebeague, ME: Casco Bay Assyriological Institute.

Pospisil, L. (1973). E. Adamson Hoebel and the anthropology of law. *Law and Society Review, 7,* 537–559.

Possehl, G. L. (2002). *The Indus civilization: A contemporary perspective.* Walnut Creek, CA: Alta Mira Press.

Possehl, G. L. (2003). *The Indus civilization: A contemporary perspective.* Walnut Creek, CA: AltaMira Press.

Post S. G., & Whitehouse P. J. (Eds.). (1998). *Genetic testing for Alzheimer disease: Clinical and ethical issues.* Baltimore: Johns Hopkins University Press.

Post, S. G. (Ed.). (2004). *Encyclopedia of bioethics* (3rd ed.). New York: Macmillan.

Postgate, J. N. (1994). *Early Mesopotamia: Society and economy at the dawn of history.* New York: Routledge.

Postman, N. (1993). *Technopoly: The surrender of culture to technology.* New York: Vintage Books.

Powell, J. F. (2005). *First Americans: Race, evolution and the origin of native Americans.* Cambridge: Cambridge University Press.

Poyatos, F. (1993). *Paralanguage: A linguistic and interdisciplinary approach to interactive speech and sound.* Amsterdam: John Benjamins.

Poynter, M. (1997). *The Leakeys: Uncovering the origins of humankind.* Springfield, NJ: Enslow.

Prager, D., & Telushkin, J. (1981). *The nine questions people ask about Judaism.* New York: Simon & Schuster.

Preiswerk, R., & Perrot, D. (1978). *Ethnocentrism and history: Africa, Asia and Indian America in Western textbooks.* New York: Nok.

Premack, D. (1976). *Intelligence in ape and man.* Hillsdale, NJ: Lawrence Erlbaum.

Preuschoft, H. (1985). *The lesser apes: Evolutionary and behavioral biology.* Edinburgh: Edinburgh University Press.

Price, D. (2002). Interlopers and invited guests: On anthropology's witting and unwitting links to intelligence agencies. *Anthropology Today*, *18*(6),16–21.

Price, D. H. (2004). *Threatening anthropology: McCarthyism and the FBI's surveillance of activist anthropologists.* Durham, NC: Duke University Press.

Price, J. A. (1978). *Native studies: American and Canadian Indians.* Toronto: McGraw-Hill.

Price, L. J. (2001). The mismatch between anthropology graduate training and the work lives of graduates. *Practicing Anthropology, 23*(1), 55–57.

Price, M. L. (2003). *Consuming passions: The uses of cannibalism in late medieval and early modern Europe.* New York: Routledge.

Price-Mars, J. (1983). *So spoke the uncle.* Washington, DC: Three Continents Press.

Primavesi, A. (2000). *Sacred Gaia: Holistic theology and earth system science.* New York: Routledge.

Prince-Hughes, D. (2001). *Gorillas among us: A primate ethnographer's book of days.* Tucson: University of Arizona Press.

Principe, L. M., & Newman, W. R. (2001). Some problems with the historiography of alchemy. In A. Grafton & W. Newman (Eds.), *Secrets of nature: Astrology and alchemy in early modern Europe.* Cambridge: MIT Press.

Purves, D., Augustine, G., Fitzpatrick, D., Katz, L., LaMantia, A-S, McNamara, J., & William, S. M. (2001). *Neuroscience* (2nd ed.). Sunderland, MA: Sinauer.

Putnam, A. (1955). *Eight years with Congo Pygmies.* London: Hutchinson.

Putnam, H. (1987). *The many faces of pragmatism.* La Salle, IL: Open Court.

Putnam, S., & Carré, J. (2005). *Hormonal responses to competition in NCAA male hockey players.* Manuscript in preparation.

Pyatt, S. E. (1986). *Martin Luther King, Jr. : An annotated bibliography.* New York: Greenwood Press.

Pye, L. W. (1984). *China: An introduction* (4th ed.). Boston, MA: Little, Brown, and Company.

Quennell, P., et al. (Eds.). (1971). *The Colosseum.* New York: Newsweek.

Quilter, J. (1989). *Life and death at Paloma: Society and mortuary practices in a preceramic Peruvian village.* Iowa City: University of Iowa Press.

Qvortrup, J., Bardy, M., Sgritta, G., & Wintersberger, H. (Eds.). (1994). *Childhood matters: Social theory, practice, and politics.* Brookfield, VT: Avebury.

Rabinow, P. (1977). *Reflections on fieldwork in Morocco.* Berkeley: University of California Press.

Raby, P. (2001). *Alfred Russel Wallace: A life.* Princeton, NJ: Princeton University Press.

Rachels, J. (1991). *Created from animals: The moral implications of Darwinism.* New York: Oxford University Press.

Radcliffe-Brown, A. R. (1922). *The Andaman Islanders: A study in social anthropology.* Cambridge: Cambridge University Press.

Radcliffe-Brown, A. R. (1939). *Taboo.* Cambridge: University Press.

Radcliffe-Brown, A. R. (1952). *Structure and function in primitive societies.* New York: Free Press.

Radcliffe-Brown, A. R. (1964). *The Andaman Islanders.* New York: Free Press. (Original work published 1922)

Radcliffe-Brown, A. R. (1977). *The social anthropology of Radcliffe-Brown* (A. Kuper, Ed.). Boston: Routledge and Kegan.

Radford, A. (1988). *Transformational syntax: A first course.* Cambridge: MIT Press.

Radnitzky, G., & Bartley W. III. (Eds.). (1987). *Evolutionary epistemology, rationality, and the sociology of knowledge.* La Salle, IL: Open Court.

Rafert, S. (1996). *The Miami Indians: A persistent people 1654–1994.* Indianapolis: Indiana Historical Society.

Raftery, B., & Clint, T. (Eds.). (2001). *Atlas of the Celts.* Buffalo, New York: Firefly Books.

Raghavan, I. (Ed.). (2003). *The essential writings of Mahatma Gandhi.* New Delhi: Oxford University Press.

Rahman, F. (1982). *Islam and modernity.* Chicago: University of Chicago Press.

Ralph, J. R. (1993). *Northern protest: Martin Luther King, Jr., Chicago, and the civil rights movement.* Cambridge, MA: Harvard University Press.

Ramos, A. R. (1995). *Sanuma memories: Yanomami ethnography in times of crisis.* Madison: University of Wisconsin Press.

Randall, R. (1976). How tall is a taxonomic tree? Some evidence of dwarfism. *American Ethnologist, 3,* 545–546.

Rankin, H. D. (1987). *Celts and the classical world.* London: Croom & Helm.

Ranov, V. A. (1995). The Levallois paradox. In H. L. Dibble & O. Bar-Yosef (Eds.), *The definition and interpretation of Levallois technology* (Monographs in World Prehistory, No. 23, pp. 69–78). Madison, WI: Prehistory Press.

Rappaport, R. (1984). *Pigs for the ancestors: Ritual in the ecology of a New Guinea people.* New Haven, CT: Yale University Press.

Rappaport, R. A. (1979). *Ecology, meaning, and religion.* Richmond, CA: North Atlantic Books.

Rappaport, R. A. (1999). *Ritual and religion in the making of humanity.* New York: Cambridge University Press.

Rapport, N., & Overing, J. (2000). *Social and cultural anthropology: The key concepts.* London: Routledge.

Raup, D. M., & Stanley, S. M. (1971). *Principles of palaeontology.* San Francisco: Freeman.

Rawlins, R. G., & Kessler, M. J. (Eds.). (1986). *The Cayo Santiago macaques: History, behavior, and biology.* Albany NY: State University of New York.

Rawls, J. (1971). *A theory of justice.* Cambridge, MA: Belknap Press.

Rawls, J. (1999). *Theory of justice* (Rev. Ed.). Cambridge: Belknap Press of Harvard University Press.

Rawson, D. (1994). Democracy, socialism, and decline. In A. I. Samatar (Ed.)., *The Somali challenge from catastrophe to renewal.* Boulder, CO: Lynne Rienner.

Ray, D. J. (1980). *Artists of the tundra and the sea.* Seattle: University of Washington Press.

Reardon, J. (2004). *Race to the finish: Identity and governance in an age of genomic.* New York: Princeton University Press.

Redfield, R. (1930). *Tepoztlan: A Mexican village: A study of folk life.* Chicago: University of Chicago Press.

Redfield, R. (1941). *The folk culture of Yucatan.* Chicago: University of Chicago Press.

Redfield, R. (1953). *The primitive world and its transformations.* Ithaca, NY: Cornell University Press.

Redfield, R. (1956). *Peasant society and culture: An anthropological approach to civilization.* Chicago: University of Chicago Press.

Redfield, R. (1962). *The little community: And peasant society and culture.* Chicago: University of Chicago Press.

Redford, D. (2002). *The ancient gods speak: A guide to Egyptian religion.* Oxford: Oxford University Press.

Redman, C., James, S., Fish, P., & Rogers, D. (Eds.). (2004). *The archaeology of global change: The impact of humans on their environment.* Washington, DC: Smithsonian Institution Press.

Reed, P. F. (Ed.). (2000). *Foundations of Anasazi culture: The Basketmaker-Pueblo transition.* Salt Lake City: University of Utah Press.

Reed-Danahay, D. (2004). *Locating Bourdieu.* Bloomington: Indiana University Press.

Rees, M. (2000). *Just six numbers: The deep forces that shape the universe.* New York: Basic Books.

Rees, M., & Smart, J. (2001). *Plural globalities in multiple localities.* Lanham, MD: Rowman & Littlefield.

Reeves, N., & Taylor, J. H. (1993). *Howard Carter: Before Tutankhamun.* New York: Abrams.

Reichard, G. (1950). *Navaho religion: A study of symbolism.* New York: Bollingen Foundation.

Reid, H. (1999). *In search of the immortals: Mummies, death, and the after life.* London: Headline Book.

Reid, M. E. (2000). *Howlers and other new world monkeys.* Chicago: World Books.

Reines, A. J. (1987). *Polydoxy: Explorations in a philosophy of liberal religion.* Buffalo, NY: Prometheus Books.

Reiter, R. R. (1975). *Toward an anthropology of women.* New York: Monthly Review Press.

Reitz, E. J., & Wing, E. S. (1999). *Zooarchaeology.* Cambridge: Cambridge University Press.

Relethford, J. H. (2001). *Genetics and the search for modern human origins.* New York: Wiley-Liss.

Renfrew, C. (1988). *Archaeology and language: The puzzle of Indo-European origins.* New York: Cambridge University Press.

Renfrew, C., & Bahn, P. (1991). *Archaeology: Theories, methods, and practice.* London: Thames & Hudson.

Renfrew, C., & Zubrow, E. B. W. (Eds.). (1994). *The ancient mind: Elements of cognitive archaeology.* Cambridge: Cambridge University Press.

Rennie, B. S. (1996). *Reconstructing Eliade: Making sense of religion.* Albany: State University of New York Press.

Renrew, C., & Bahn, P. (2004). *Archaeology: Theory, methods, and practice.* London: Thames & Hudson.

Renshaw, J. (2002). *The Indians of the Paraguayan Chaco: Identity and economy.* Lincoln: University of Nebraska Press.

Renzetti, C. M., & Curran, D. J. (2001). *Theories of crime.* Boston: Allyn & Bacon.

Restak, R. (2001). *The secret life of the brain.* Washington, DC: Joseph Henry Press.

Reynolds, L. T., & Lieberman, L. (Eds.). (1996). *Race and other misadventures: Essays in honor of Ashley Montagu in his ninetieth year.* Dix Hills, NY: General Hall.

Ribeiro, D. (2000). *The Brazilian people: The formation and meaning of Brazil* (G. Rabassa, Trans.). Gainesville: University Press of Florida.

Rice, E. (1979). *Margaret Mead: A portrait.* New York: Harper & Row.

Richard, A. F. (1985). *Primates in nature.* New York: W. H. Freeman.

Richards, D. (1994). *Masks of difference: Cultural representations in literature, anthropology, and art.* New York: Cambridge University Press.

Richards, E. (2004). *The cost of shelter.* New York: IndyPublish.com

Richardson, J. (2004). *Nietzsche's new Darwinism.* Oxford: Oxford University Press.

Richardson, L., Taylor,V., & Whittier, N. (Eds.). (2004). *Feminist frontiers* (6th ed.). Boston: McGraw Hill.

Richter, D. K. (1992). *The ordeal of the longhouse: The peoples of the Iroquois League in the era of European colonization.* Chapel Hill: University of North Carolina Press.

Ricoeur, P. (1986). *Lectures on ideology and utopia* (G. H. Taylor, Ed.). New York: Columbia University Press.

Ricoeur, P. (1992). *Oneself as another* (K. Blamey, Trans.). Chicago: University of Chicago Press.

Ridington, R., & Hastings, D. [In' Aska] (1997). *Blessing for a long time: The sacred pole of the Omaha tribe.* Lincoln and London: University of Nebraska Press.

Ridley, M. (1993). *The red queen: Sex and the evolution of human nature.* New York: Penguin Books.

Ridley, M. (2003). *Nature via nurture.* London: Fourth Estate.

Ridley, M. (2004). *Evolution* (3rd ed.). Malden, MA: Blackwell.

Ridley, M. (Ed.). (1996). *The Darwin reader* (2nd ed.). New York: Norton.

Riel-Salvatore, J., & Clark, G. A. (2001). Grave markers. *Current Anthropology, 42,* 449–479.

Riel-Salvatore, J., & Clark, G. A. (2001). Middle and Early Upper Paleolithic burials and the use of chronotypology in contemporary Paleolithic research. *Current Anthropology, 42* (August- October), 449–479.

Rightmire, G. (1990). *The evolution of Homo erectus: Comparative anatomical studies of an extinct human species.* Cambridge: Cambridge University Press.

Rightmire, G. P. (1988). *Homo erectus* and later middle Pleistocene humans. *Annual Review of Anthropology, 17,* 239–259.

Rightmire, G. P. (1995). Geography, time, andspeciation in Pleistocene Homo. *South African Journal of Science, 91,* 451–454.

Rindos, D. (Ed.). (1984). *Origins of agriculture: An evolutionary perspective.* Orlando, FL: Academic Press.

Ripley, W. Z. (1919). *The races of Europe: A sociological study.* New York: D. Appleton.

Ritchie, W. A. (1993). *The archaeology of New York State.* Garden City, NJ: Purple Mountain Press.

Ritzer, G., & Goodman, D. J. (2003). *Sociological theory.* New York: McGraw-Hill.

Rival, L., & Whitehead, N. (Eds.). (2001). *Beyond the visible and the material: The Amerindianization of society in the work of Peter Rivière.* Oxford: Oxford University Press.

Rivière, P. (1969). *Marriage among the trio: A principle of social organization.* Oxford: Clarendon.

Roaf, M. (1990). *Cultural atlas of Mesopotamia and the ancient Near East.* New York: Facts on File.

Robbins, J. (2004). The Globalization of Pentecostal and Charismatic Christianity. *Annual Review of Anthropology, 33,* 117–143.

Robbins, M. M., Sicotte, P., & Stewart, K. J. (Eds.). (2001). *Mountain gorillas: Three decades of research at Karisoke.* Cambridge, UK: Cambridge University Press.

Robbins, R. H. (2001). *Cultural anthropology: A problem-based approach* (3rd ed.). Itaska, IL: F. E. Peacock.

Robbins, R. H. (2005). *Global problems and the culture of capitalism* (3rd ed.). Boston: Allyn & Bacon.

Roberts, P., & Irons-Georges, T. (Eds.). (2000). *Aging: Vol. I. Abandonment–injuries among the elderly.* Pasadena, CA: Salem Press.

Robertson, J. (Ed.). (2005). *Same-sex cultures and sexualities. An anthropological reader.* Oxford: Blackwell.

Robertson, R. (Ed.). (2002). *The Cambridge companion to Thomas Mann.* Cambridge, UK: Cambridge University Press.

Robins, R. H. (1997). *A short history of linguistics* (4th Ed.). London: Longman.

Robinson, A. (2002). *The man who deciphered Linear B: The story of Michael Ventris.* London: Thames & Hudson.

Robinson, T. M. (1987). *Heraclitus: Fragments.* Toronto, Canada: University of Toronto Press.

Rocha, J. (1999). *Murder in the rain forest: The Yanomami, the gold miners, and the Amazon.* London, UK: Latin American Bureau.

Roche, J., & McHutchison, M. (Ed.). (1998). *First fish first people: Salmon tales of the North Pacific Rim.* Seattle: University of Washington Press.

Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (Eds.). (1996). *Feminist political ecology.* New York: Routledge.

Rochester, J. M. (1993). Waiting for the millennium: U. N. and the future of world order. Columbia: University of South Carolina Press.

Rockefeller, S. (1991). *John Dewey: Religious faith and democratic humanism.* New York: Columbia University Press.

Roede, M., Wind, J., Patrick, J. M., & Reynolds,V. (Eds.). (1991). *The aquatic ape: Fact or fiction?* London: Souvenir Press.

Rogers, G. A. J., & Ryan, A. (1988). *Perspectives on Thomas Hobbes.* New York: Oxford University Press.

Rogers, R., Rogers, S., & Wendy, S. (1992). *Stories of childhood: Shifting agendas of child concern.* Toronto, Canada: University of Toronto Press.

Rogowski, R. (1989). *Commerce and coalitions: How trade affects domestic political alignments.* Princeton: Princeton University Press.

Róheim, G. (1974). *The riddle of the Sphinx: Or, human origins.* New York: Harper & Row.

Rohner, R. (1986). *The warmth dimension: Foundations of parental acceptance-rejection theory.* Beverly Hills, CA: Sage.

Rolland, N. (1995). Levallois emergence: Single or multiple? A review of the Euro-African record. In H. L. Dibble & O. Bar-Yosef (Eds.), *The definition and interpretation of Levallois technology* (Monographs in World Prehistory, No. 23, pp. 333–360). Madison, WI: Prehistory Press.

Romain, W. F. (2000). *Mysteries of the Hopewell: Astronomers, geometers, and magicians of the Eastern Woodlands.* Akron: University of Akron Press.

Romero-Herrera, A. E., Lehmann, H., Castillo, O., Joysey, K. A., & Friday, A. E. (1976). Myoglobin of the orangutan as a phylogenetic enigma. *Nature, 261,* 162–164.

Roosevelt, A. (Ed.). (1994). *Amazonian Indians from prehistory to the present.* Tucson: University of Arizona Press.

Rorty, A. O. (2001). *The many faces of evil.* New York: Routledge.

Rorty, R. (1982). *Consequences of pragmatism.* Minneapolis: Minnesota University Press.

Rosaldo, M., & Lamphere, L. (Eds.). (1974). *Women, culture and society.* Stanford: Stanford University Press.

Roschenthaler, U., & Chukwuezi, B. (1996). *Ejagham* (Heritage Library of African Peoples Central Africa). New York: Rosen.

Roscoe, W. (1998). *Changing ones: Third and fourth genders in Native North America.* London: Macmillan.

Rose, D. (1990). *Living the ethnographic life* (Qualitative Research Methods Series, 23). Newbury Park, CA: Sage.

Rose, D. B. (1992). *Dingo makes us human: Life and land in an aboriginal Australian culture.* Cambridge, Melbourne: Cambridge University Press.

Rose, M. D. (1994). Quadrupedalism in some Miocene catarrhines. *Journal of Human Evolution 26,* 387–411.

Rose, M. R., & Lauder, G. A. (Eds.). (1996). *Adaptation.* New York: Academic Press.

Rosen, L. (1989). *The anthropology of justice: Law as culture in Islamic society.* Cambridge, MA: Cambridge University Press.

Roskams, S. (2001). *Excavation* (Cambridge Manuals in Archaeology). Cambridge: Cambridge University Press.

Roskin, M. G., Cord, R. L., Medeiros, J. A. & Jones, W. S. (2002). *Political science: An introduction.* Upper Saddle River, NJ: Prentice Hall.

Rosman, A., & Rubel, P. G. (2004). *The tapestry of culture: An introduction to cultural anthropology.* New York: McGraw-Hill.

Rosner, M., Ben David, I., Avnat, A., Cohen, N., & Leviatan, U. (1990). *The second generation: Continuity and change in the kibbutz.* Westport, CT: Greenwood.

Ross, E. B. (Ed.). (1980). *Beyond the myths of culture: Essays in cultural materialism.* New York: Academic Press.

Rothfarb, E. (1998). *In the land of the Taj Mahal: The world of the fabulous Mughals.* New York: Henry Holt and Company.

Rousseau, J.-J. (1979). Discourse on the origin and foundation of the inequality among men. In J. H. Mason (Ed.), *The indispensable Rousseau.* London: Quartet Books.

Rousseau, J.-J. (1988). On the social contract, or principles of political right. In A. Ritter & J. C. Bondanella (Eds.), *Rousseau's political writings.* New York: Norton.

Rowe, D. C. (1994). *The limits of family influence. Genes, experience, and behavior.* New York: Guilford.

Rowe, J. H. (1945, January). Absolute chronology in the Andean area. *American Antiquity, X*(3), 265–284.

Rowe, J. H. (1946). Inca culture at the time of the Spanish conquest. In J. H. Steward (Ed.), *Handbook of South American Indians* (Vol. 2, pp. 183–330). Washington, DC: Smithsonian Institution.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Rowe, N. (1996). *The pictorial guide to the living primates.* Charlestown, RI: Pogonias Press.

Rubicz, R., Schurr, T. G., Babb, P. L., & Crawford, M. H. (2003). Mitochondrial DNA variation and the origins of the Aleuts. *Human Biology, 75,* 809–835.

Rubington, E., & Weinberg, M. (2004). *Deviance: The interactionist perspective.* Boston: Allyn & Bacon.

Ruby, J. (2000). *Picturing culture: Explorations of film and anthropology.* Chicago: University of Chicago Press.

Rüdiger, S. (2001). *Nietzsche: A philosophical biography.* New York: Norton.

Rudin, N., & Keith I. (2002). *An introduction to forensic DNA analysis* (2nd ed.). New York: CRC Press.

Rudolph, S. H., & Rudolph, L. I. (1983). *Gandhi, the traditional roots of charisma.* Chicago: University of Chicago Press.

Ruff, C. B. (1994). Morphological adaptation to climate in modern and fossil hominids. *Yearbook of Physical Anthropology, 37,* 65–107.

Ruff, C. B. (2002). Long bone articular and diaphyseal structures in Old World monkeys and apes 1: Locomotor effects. *American Journal of Physical Anthropology, 119,* 305–342.

Rumbaugh, D. M. (1972). *Evolution, ecology, behavior, and captive maintenance (gibbon and siamang).* Basel, Switzerland: S. Karger.

Rumbaugh, D. M. (1974). *Gibbon and siamang: Natural history, social behavior, reproduction vocalizations, prehension (Progress in Biochemical Pharmacology).* Basel, Switzerland: S. Karger.

Rumbaugh, D. M. (1977). *Language learning by a chimpanzee: The LANA project.* New York: Academic Press.

Rumbaugh, D. M., & Washburn, D. A. (2003). *Intelligence of apes and other rational beings.* New Haven, CT: Yale University Press.

Ruong, I. (1967). *The Lapps in Sweden* (A. Blair, Trans.). Stockholm: Swedish Institute for Cultural Relations With Foreign Countries.

Ruse, M. (1976). Charles Lyell and the philosophies of science. *British Journal for the History of Science, 9,* 121–131.

Ruse, M. (2001). *Mystery of mysteries: Is evolution a social construction?* Cambridge, MA: Harvard University Press.

Rush, J. A. (1996). Clinical anthropology: An application of anthropological concepts within clinical settings. Westport, CT: Prager.

Rushforth, S., & Upham, S. (1992). *A Hopi social history.* Austin: University of Texas Press.

Ruspoli, M. (1987). *The cave of Lascaux: The final photographs.* New York: Abrams.

Russell, D. A. (1969). A new specimen of *Stenonychosaurus* from the Oldman Formation (Cretaceous) of Alberta. *Canadian Journal of Earth Science, 6,* 595–612.

Russell, D. A. (1981). Speculations on the evolution of intelligence in multicellular organisms. In J. Billingham (Ed.), *Life in the universe: Proceedings of the Conference on Life in the Universe, NASA Ames Research Center, June 19–20, 1979* (pp. 259–275). Cambridge: MIT Press.

Russell, D. A., & Séguin, R. (1982). Reconstructions of the small Cretaceous theropod *Stenenychosaurus inequalis* and a hypothetical dinosauroid. *Syllogues, 37,* 1–43.

Russell, M. (2003). *Piltdown Man: The secret life of Charles Dawson & the world's greatest archaeological hoax.* Gloucestershire, UK: Tempus.

Russon, A. E., & Begun, D. R. (Eds.). (2004). *The evolution of thought.* Cambridge, UK: Cambridge University Press.

Rutter, N. W., & Catto, N. R. (Eds.). (1995). *Dating methods for quaternary deposits.* St. John's, Canada: Geological Association of Canada.

Ruvolo, M. (1997). Molecular phylogeny of the hominoids: Inferences from multiple independent DNA sequence data sets. *Molecular Biology and Evolution, 14,* 248–265.

Ruvolo, M., Disotell, T. R., Allard, M. W., Brown, W. M., & Honeycutt, R. L. (1991). Resolution of the African hominoid trichotomy by use of a mitochondrial gene sequence. *Proceedings of the National Academy of Science USA, 88,* 1570–1574.

Ryan, A. (1995). *John Dewey and the high tide of American liberalism.* New York: Norton.

Ryan, W., & Pittman, W. (1999). *Noah's flood. The new scientific discoveries about the event that changed history.* New York: Simon & Schuster.

Rylands, A. D. (Ed.). (1993). *Marmosets and tamarins: Systematics, behavior, and ecology.* Oxford, UK: Oxford University Press.

Rylands, A. D. (Ed.). (1993). *Marmosets and tamarins: Systematics, behavior, and ecology.* Oxford: Oxford University Press.

Sabloff, P. L. W. (2000). *NAPA Bulletin 20-Careers in anthropology: Profiles of practitioner anthropologists.* Arlington,VA: American Anthropological Association.

Sack, P., & Aleck, J. (Eds.). (1992). *Law and anthropology.* New York: New York University Press.

Sacramento Anthropological Society. (1983). *Women in anthropology: Symposium papers 1979 and 1980, 16.* Sacramento, CA: Sacramento Anthropological Society.

Sagan, C. (1980). *Cosmos.* New York: Random House.

Sagan, C. (1993). *The demon haunted world: Science as a candle in the dark.* New York: Random House.

Sagan, C. (1997). *Billions and billions: Thoughts on life and death at the brink of the millennium.* New York: Random House.

Sagan, C., & Shklovskii, I. S. (1966). *Intelligent life in the universe.* San Francisco: Holden-Day.

Saggs, H. W. F. (1995). *Babylonians.* London: British Museum Press.

Sagona, A. (1994). *Bruising the red earth: Ochre mining and ritual in aboriginal Tasmania.* Malaysia: Melbourne University Press.

Sahlins, M. (1974). *Stone Age economics.* New York: Aldine.

Sahlins, M. D. (1958). *Social stratification in Polynesia.* Seattle: University of Washington Press.

Sahlins, M. D. (1976). *The use and abuse of biology: An anthropological critique of sociobiology.* Ann Arbor: University of Michigan Press.

Sahlins, M. D., & Service, E. R. (Eds.). (1960). *Evolution and culture.* Ann Arbor: University of Michigan Press.

Said, E. (1978). *Orientalism.* New York: Random House.

Saladi, R. N., & Persaud, A. N. (2005). The causes of skin cancer: A comprehensive review. *Drugs Today, 41,* 37–53.

Salamone, F. A., & Adams, W. (Eds.). (1999). *Anthropology and theology: God, icons, and godtalk.* Lanham, MD: University Press of America.

Saliba, J. A. (1976). "*Homo religiosus*" *in Mircea Eliade: An anthropological evaluation.* Leiden, The Netherlands: Brill.

Salomon, F., & Urioste, G. L. (1991). *The Huarochiri Manuscript: A testament of ancient and colonial Andean religion.* Austin, TX: University of Texas Press.

Salvador, A. (2005). Coping with competitive situations in humans. *Neuroscience and Biobehavioral Reviews, 29,* 195–205.

Salzano, F. M., & Bortolini, M. C. (2002). *The evolution and genetics of Latin American populations.* Cambridge: Cambridge University Press.

Salzano, F. M., & Hurtado, A. M. (Eds.). (2004). *Lost paradises and the ethics of research and publication.* New York: Oxford University Press.

Salzman, P. C. (1999). *The anthropology of real life: Events in human experience.* Prospect Heights, IL: Waveland Press.

Salzman, P. C. (2000). *Black tents of Baluchistan.* Washington, DC: Smithsonian Institution Press.

Salzman, P. C. (2001). *Understanding culture: An introduction to anthropological theory.* Prospect Heights, IL:Waveland Press.

Salzman, P. C. (2004). *Pastoralists: Equality, hierarchy, and the state.* Boulder, CO: Westview.

Sampson, C. G. (1974). *The Stone Age archaeology of southern Africa.* New York: Academic Press.

Sanday, P. R. (2002). *Women at the center: Life in a modern matriarchy.* Ithaca, NY: Cornell University Press.

Sanders, W. T., & Marino, J. (1970). *New World prehistory.* New York: Academic Press.

Sanderson, S. K. (1990). *Social evolutionism: A critical history.* Cambridge, MA: Blackwell.

Sandler, S., Freedman, R. O., & Telhami, S. (1999). The religious-secular divide in Israeli politics. *Mideast Policy Council Journal, 6*(4).

Sandoval, C. (2000). *The methodology of the oppressed.* St. Paul, MN: University of Minnesota Press.

Saney, I. (2004). *Cuba: A revolution in motion.* Manitoba, Canada: Fernwood.

Sankhyan, A. A. (1997). Fossil clavicle of a middle Pleistocene hominid of the Narmada valley, India. *Journal of Human Evolution, 32,* 3–16.

Santangelo, A. (2001). *The anthropic grounds to culture* (plus *Addendum,* 2002). Milan, Italy: Editrice Sabaini.

Sapir, E. (1917). Do we need a "superorganic?" *American Anthropologist, 19*(3), 441–447.

Sapir, E. (1921). *Language, an introduction to the study of speech.* New York: Harcourt, Brace and Company.

Sapir, E. (1949). *Culture, language, and personality: Selected essays.* Berkeley: University of California Press.

Sapir, E. (1949). *Selected writings of Edward Sapir in language, culture, and personality* (G. Mandelbaum, Ed.). Berkeley: University of California Press.

Saporta, S. (Ed.). (1966). *Psycholinguistics: A book of readings.* New York: Holt, Rinehart and Winston.

Sarkar, S. (Ed.). (1996). *Logical empiricism at its peak: Schlick, Carnap, and Neurath,* New York: Garland.

Sartre, J.-P. (1996). *L'existentialisme est un humanisme* [Existentialism is a humanism]. Paris: Gallimard. (Original work published 1946)

Sassen, S. (1991). *The global city: New York, London, Tokyo.* Princeton, NJ: Princeton University Press.

Sasson, J. (Ed.). (1995). *Civilizations of the ancient near east.* New York: Schribner.

Satguru, S. S. (1997). *Dancing with Siva: Hinduism's contemporary catechism* (5th ed.). Kauai, HI: Himalayan Academy.

Saura Ramos, P. A. (1999). *Cave of Altamira.* New York: Harry N. Abrams.

Savage-Rumbaugh, E. S. (1986). *Ape language: From conditioned response to symbol.* New York: Columbia University Press.

Savage-Rumbaugh, E. S., Williams, S. L., Furuichi, T., & and Kano, T. (1996). Language perceived: Paniscus branches out. In W. C. McGrew and T. Nishida (Eds.), *Great apes societies* (pp. 173–195). Cambridge, UK: Cambridge University Press.

Savage-Rumbaugh, S., Shanker, S. G., & Taylor, T. J. (2001). *Apes, language, and the human mind.* Oxford: Oxford University Press.

Sayer, A. (2000.) *Realism and social science.* Thousand Oak, CA: Sage.

Scarf, M. (1987). *Intimate partners.* New York: Random House.

Scarr, D. (1984). *Fiji: A short history.* Laie, Hawaii: Institute for Polynesian Studies, Brigham Young University, Hawaii Campus.

Scarre, C. (1997). *Ancient civilizations.* New York: Longman.

Scarre, C. (Ed.). (2002). *Monuments and landscape in Atlantic Europe.* New York: Routledge.

Schaaf, G. (2004). Precious: Native jewelry by 20 living masters. *Native Peoples, 17*(6), 48–54.

Schaller, G. (1972). *Serengeti: A kingdom of predators.* New York: Knopf.

Schaller, G. B. (1963). *The mountain gorilla: Ecology and behavior.* Chicago: University of Chicago Press.

Schaller, G. B. (1965). *The year of the gorilla.* New York: Ballantine.

Schaller, G. B. (1977). *Mountain monarchs: Wild sheep and goats of the Himalaya.* Chicago: University of Chicago Press.

Schaller, G. B., et al. (1958). *The giant pandas of Wolong.* Chicago: University of Chicago Press.

Schapiro, M. (1994). *Theory and philosophy of art: Style, artist, and society.* New York: Braziller.

Scharff, R. (1995). *Comte after positivism.* Cambridge: Cambridge University Press.

Schebesta, P. (1933). *Among Congo Pygmies.* London: Hutchinson.

Schebesta, P. (1936). *My Pygmy and Negro hosts.* London: Hutchinson.

Schele, L., & Freidel, D. (1990). *A forest of kings.* New York: Morrow.

Scheper-Hughes, N. (Ed.). (1987). Child survival: Anthropological perspectives on the treatment and maltreatment of children. Dordrecht, Holland: D. Reidel.

Scheper-Hughes, N., & Carolyn S. (Eds.). (1998). *Small wars: The cultural politics of childhood.* Berkeley: University of California Press.

Schick, K. D., & Toth, N. (1993). *Making silent stones speak: Human evolution and the dawn of technology.* New York: Simon & Schuster.

Schiffer, M. B. (1996). *Formation processes of the archaeological record.* Salt Lake City: University of Utah Press.

Schilbrack, K. (Ed.). (2004). *Thinking through rituals: Philosophical perspectives.* New York: Routledge.

Schipper, K. (1993). *The Taoist body* (K. C. Duval, Trans.). Berkeley: University of California Press.

Schjellerup, I. (1997). *Incas and Spaniards in the conquest of Chachapoyas* (Series B, Gothenburg Archaeological Theses No. 7). Göteborg University, Sweden.

Schlanger, S. H. (Ed.). (2002). *Traditions, transitions, and technologies: Themes in southwestern archaeology.* Boulder: University Press of Colorado.

Schliemann, H. (1968). *Troy and its remains* (P. Smith Ed.). Manchester, NH: Ayer.

Schlosser, E. (2001). *Fast food nation: The dark side of the All-American meal.* New York: Houghton Mifflin.

Schmid, R. D. (2003). *Pocket guide to biotechnology and genetic engineering.* Weinheim, Germany: Wiley-VCH.

Schmidt, J. (Ed.). (1996). *What is Enlightenment? Eighteenth-century answers and twentieth-century questions.* Berkeley: University of California Press.

Schmidt, W. (1931). *The origin and growth of religion* London: Methuen.

Schmidt, W. (1939). *The culture historical method of ethnology: The scientific approach to the racial question.* New York: Fortuny's.

Schneider, D. M. (1968). *American kinship: A cultural account.* Englewood Cliffs, NJ: Prentice Hall.

Schneider, D. M. (1984). A *critique of the study of kinship.* Ann Arbor: University of Michigan Press.

Schneider, H. K. (1975). Economic development and anthropology. *Annual Review of Anthropology 4,* 271–292.

Schneider, J. (1995). Introduction: The analytic strategies of Eric R. Wolf. In J. Schneider & R. Rapp (Eds.), *Articulating hidden histories: Exploring the influence of Eric R. Wolf* (pp. 3–30). Berkeley: University of California Press.

Schoepf, B. G. (2001). International AIDS research in anthropology: Taking a critical perspective on the crisis. *Annual Review of Anthropology, 30,* 335–361.

Scholz, F. (2002). *Nomadism and colonialism: A hundred years of Baluchistan, 1872–1972.* Karachi, Pakistan: Oxford University Press.

Schreiber, K. J. (1992). *Wari imperialism in Middle Horizon Peru.* Ann Arbor: University of Michigan Museum of Anthropology.

Schrire, C. (1980). An inquiry into the evolutionary status and apparent identity of San huntergatherers. *Human Ecology, 8,* 9–32.

Schröder, J. (1998). Emergence: Non-deductibility or downward causation? *The Philosophical Quarterly, 48,* 433–452.

Schrödinger, E. (1992). *What is life? The physical aspect of the living cell.* Cambridge, UK: Cambridge University Press.

Schuchhardt, C. (1979). *Schliemann's discoveries of the ancient world* (E. Sellers, Trans.). New York: Avenel Books.

Schumar, W. (2004). Making strangers at home: Anthropologists studying higher education. *The Journal of Higher Education, 75*(1).

Schwartz J. H., & Tattersall, I. (2005). *The human fossil record: Vol. 3. Craniodental morphology of early hominids.* New York:Wiley-Liss.

Schwartz, J. H. (1988). *Orangutan biology.* New York: Oxford University Press.

Schwartz, J. H. (1993). *What the bones tell us.* New York: Henry Holt & Co.

Schwartz, J. H. (1999). *Sudden origins: Fossils, genes and the emergence of species.* New York: John Wiley & Sons.

Schwartz, J. H. (2004). *The red ape* (2nd ed.). New York: Basic Books.

Schwartz, J. H. (2004). *The red ape: Orangutans and human origins.* Boulder, CO: Westview Press.

Schwartz, J. H., & Tattersall, I. (2002). *The human fossil record, volume 1. Terminology and craniodental morphology of genus* Homo *(Europe).* New York: Wiley-Liss.

Schwartz, J. H., & Tattersall, I. (2003). *The human fossil record, volume 2. Craniodental morphology of genus* Homo *(Africa and Asia).* New York: Wiley-Liss.

Schwartzman, H. (1993). *Ethnography in organizations.* Newbury Park, CA: Sage.

Schwarz, H. P., & Dorner, F. (2003). *Karl Landsteiner and his major contributions to haematology.* Vienna, Austria: Baxter BioScience.

Schwarzbach, M. (1986). *Alfred Wegener: The father of continental drift. With an introduction to the English Edition by Anthony Hallam.* Madison, WI: Science Tech.

Scopes, J. T., & Presley, J. (1967). *Center of the storm: Memoirs of John T. Scopes.* New York: Holt Rinehart and Winston.

Scott, E. C., & Branch, G. (2003). Antievolutionism: Changes and continuities. *BioScience, 53,* 282–285.

Scott, J. (1985). *Weapons of the weak: Everyday forms of peasant resistance.* New Haven, CT: Yale University Press.

Scribner, S., & Cole, M. (1981). *The psychology of literacy.* Cambridge, MA: Harvard University Press.

Scupin, R. (2002). *Race and ethnicity: An anthropological focus on the United States and the world.* Upper Saddle River, NJ: Prentice Hall.

Searle, J. (1996). *The construction of social reality.* London: Penguin.

Seaton, C. (1996). *Altruism and activism.* Landham, MD: University Press of America.

Sedley, D. (1998). *Lucretius and the transformation of Greek wisdom.* Cambridge, UK: Cambridge

Seeley, R. R., Stephens, T. D., & Tate, P. (in press). *Anatomy and physiology* (7th ed.). New York: McGraw–Hill.

Segalen, M. (1972). *Nuptialité et alliance. Le choix du conjoint dans une commune de l'Eure.* Paris: Maisonneuve et Larose.

Segerstrale, U. (2000). *Defenders of the truth: The battle for science in the sociobiology debate and beyond.* Oxford: Oxford University Press.

Sellen, D. W., & Mace, R. (1997). Fertility and mode of subsistence: A phylogenetic analysis. *Current Anthropology, 38,* 878–889.

Senut, B., Pickford, M., et al. (2001). First hominid from the Miocene (Lukeino Formation, Kenya). *Académie des Sciences de París, Sciences de la Terre et des planetes, 332,* 137–144.

Service, E. (1976). Leslie Alvin White 1900–1975. *American Anthropologist, 78,* 612–617.

Service, E. R. (1962). *Primitive social organization: An evolutionary perspective.* New York: Random House.

Service, E. R. (1966). *The hunters.* Englewood Cliffs NJ: Prentice-Hall.

Service, E. R. (1975). *Origins of the state and civilization: The process of cultural evolution.* New York: Norton.

Setchell, J. M. (2003). *Field and laboratory methods in primatology: A practical guide.* Cambridge, UK: Cambridge University Press.

Setchell, J. M., & Curtis, D. J. (2003). *Field and laboratory methods in primatology.* Cambridge, UK: Cambridge University Press.

Shahrani, M. N., & Canfield, R. (Eds.). (1984). *Revolutions and rebellions in Afghanistan: Anthropological perspectives.* Berkeley: University of California Institute of International Studies.

Sharer, R. J. (1994). *The ancient Maya.* Stanford, CA: Stanford University Press.

Sharma, K. L. (1986). *Caste, class, and social movements.* Jaipur, India: Rawat.

Sharma, R. P. (1977). The problem of evil in Buddhism. *Journal of Dharma, 2.*

Sharma, U. M. (1973). Theodicy and the doctrine of karma. *Man, 8,* 347–364.

Sharp, A. (1956). *Ancient voyagers of the Pacific.* Wellington: Polynesian Society.

Shaul, D. L., & Furbee, N. L. (1998). *Language and culture.* Prospect Heights, IL: Waveland.

Shaw, G. B. (1967). *The perfect Wagnerite.* Mineola, NY: Dover.

Shaw, I. (Ed.). (2000). *The Oxford history of Ancient Egypt.* Oxford: Oxford University Press.

Shaw, I., & Nicholson, P. (2000). *Ancient Egyptian materials and technology.* Cambridge: Cambridge University Press.

Sheets, P. D. (1992). *The Cerén site: A prehistoric village buried by volcanic ash in Central America.* Fort Worth, TX: Harcourt, Brace, Jovanovich.

Sheets, P. D. (2002). *Before the volcano erupted: The ancient Cerén village in Central America.* Austin: University of Texas Press.

Shepard, K. (1991). The state of ethnohistory. *Annual Review of Anthropology 20,* 345–375.

Sheridan, T., & Parezo, N. (Eds.). (1996). *Paths of life: America Indians of the Southwest and Northern Mexico.* Tucson: University of Arizona Press.

Shermer, M. (2002). *In Darwin's shadow: The life and science of Alfred Russel Wallace.* New York: Oxford University Press.

Sherry, J., Jr. (1995). *Contemporary marketing and consumer behavior: An anthropological sourcebook.* Thousand Oaks, CA: Sage.

Shipman, P. (1981). *Life history of a fossil: An introduction to taphonomy and paleoecology.* Cambridge, MA: Harvard University Press.

Shipman, P. (2001). *The man who found the missing link.* New York: Simon & Schuster.

Shook, J. R. (Ed.). (2003). *Pragmatic naturalism and realism.* Amherst, NY: Prometheus.

Shorter, E. (1975). *The making of the modern family.* New York: Basic Books.

Shumaker, R. W., Beck, B. B., & Ellis, G. (2003). *Primates in question.* Washington, DC: Smithsonian Books.

Shweder, R. A., & Good, B. (Eds.). (2005). *Clifford Geertz by his colleagues.* Chicago: University of Chicago Press.

Sibley, C. G., & Ahlquist, J. E. (1983). Phylogeny and classification of birds based on the data of DNA–DNA hybridization. In R. F. Johnston (Ed.), *Current ornithology* (Vol. 1, pp. 245–292). New York: Plenum.

Sidky, H. (1997). Irrigation and the rise of the state in Hunza: A case for the hydraulic hypothesis. *Modern Asian Studies, 31,* 995–1017.

Sidky, H. (2004). *Perspectives on culture: A critical introduction to theory in cultural anthropology.* Upper Saddle River, NJ: Pearson Prentice Hall.

Sieber, S. A., & Mueller, F. H. (1941). *The social life of primitive man.* St. Louis, MO: B. Herder.

Siegel, J. T. (2001). Suharto, Witches. *Indonesia, 71,* 27–78.

Siegfried, T. (2002). *Strange matters: Undiscovered ideas at the frontiers of space and time.* Washington, DC: Joseph Henry Press.

Siliotti, A. (1998). *The discovery of Ancient Egypt.* Edison, NJ: Chartwell Books.

Silk, J. (2001). *The big bang* (3rd ed.). New York: Freeman.

Silver, D. (2003). *Introducing cyberculture.* http://www.com.washington.edu/rccs/intro.asp

Silver, S., & Miller, W. R. (1997). *American Indian languages: Cultural and social contexts.* Tucson: University of Arizona Press.

Silverman, H. (2002). *Ancient Nasca settlement and society.* Iowa City: University of Iowa Press.

Silverman, H. J., & Idle, D. (1985). *Hermeneutics deconstruction.* New York: New York University Press.

Simeone, W. E. (1995). *Rifles, blankets, and beads: Identity, history, and the Northern Athapaskan potlatch.* Norman, OK: University of Oklahoma Press.

Simon, J. (1981). *The ultimate resource.* Princeton, NJ: Princeton University Press.

Simon, J. (2000). *The great breakthrough and its cause.* Ann Arbor: University of Michigan Press.

Simons, R. C. & Hughes, C. C. (Eds.). (1985). *The culture-bound syndromes: Folk illnesses of psychiatric and anthropological interest.* Dordrecht: D. Reidel Publishing.

Simons, W. (2001). *Cities of ladies: Beguine communities in the medieval low countries, 1200–1565.* Philadelphia: University of Pennsylvania Press.

Simpson, C. (1995). *The splendid blond beast.* Monreo, ME: Common Courage Press.

Simpson, G. E. (1968). Assimilation. In D. Sills (Ed.), *International encyclopedia of the social sciences* (pp. 438–444). New York:Macmillan.

Simpson, G. E. (1973). *Melville J. Herskovits.* New York: Columbia University Press.

Simpson, G. G. (1944). *Tempo and mode in evolution.* New York: Columbia University Press.

Singer, M. (1961). A study of culture and personality: Theory and research. In B. Kaplan (Ed.), *Studying personality cross-culturally* (pp. 9–90). Evanston, IL: Row, Peterson.

Singer, M., & Amityville, H. B. (1995). *Critical medical anthropology.* New York: Baywood.

Singer, P. (1982). Ethics and sociobiology. *Philosophy and public affairs, 11*(1), 40–64.

Singh, Y. H. (1973). *Modernization of Indian tradition: A systematic study of social change.* Delhi: Thomson Press.

Sinor, D. (Ed.). (1990). *The Cambridge history of early Inner Asia.* Cambridge, UK: Cambridge University Press.

SIS Forum. (1991). *Are women and men equal before Allah?* [booklet series]. Kuala Lumpur, Malaysia: Author.

Siuruainen, E. (1977). *The Lapps in Finland: The population, their livelihood, and their culture.* Helsinki, Finland: Society for the Promotion of Lapp Culture.

Skelton, R. R., Mc Henry, H. M., & Drawhorn, G. M. (1986). Phylogenetic analysis of early hominids. *Current Anthropology, 27*(1), 21–43.

Skolimowski, H. (1992). *Living philosophy: Eco-philosophy as a tree of life.* London: Arkana.

Slawych, D. (1999). Aboriginal languages headed for extinction. *Wind Speaker, 16*, 9.

Slezkine, Y. (1991). The fall of Soviet ethnography 1928–38. *Current Anthropology 32*(4), 476–484.

Slobodin, R. (1978). *W. H. R. Rivers.* New York: Columbia University Press.

Sluka, J. A. (Ed.). (1998). *Death squad: The anthropology of state terror.* Philadelphia: University of Pennsylvania Press.

Smail, J. K. (2002). Remembering Malthus: A preliminary argument for a significant reduction in global human numbers. *American Journal of Physical Anthropology, 118*, 292–297.

Šmajs, J. (1997). *The threatened culture.* Brno: Dobromysl & Slovacontact.

Smalley, W. A. (1973). *Manual of articulatory phonetics.* South Pasadena, CA: William Carey Library.

Smelser, N. (1963). *Theory of collective behavior.* Glencoe, IL: Free Press.

Smith, A. (1776/1977). *An inquiry into the nature and causes of the wealth of nations.* Chicago: University of Chicago Press.

Smith, A. (1984). *The Glasgow edition of the works and correspondence of Adam Smith: Vol. I. The theory of moral sentiments.* Glasgow: Liberty Fund. (Original work published 1759)

Smith, A. (1992). *Pastoralism in Africa: Origins and development ecology.* London: Hurst and Company.

Smith, A. (2003). *The wealth of nations.* New York: Bantam Classic.

Smith, A. D. (2004). *The antiquity of nations.* Malden, MA: Polity Press.

Smith, B. (1999). *The emergence of agriculture.* New York: Freeman.

Smith, D. (1986). *H. G. Wells: Desperately mortal.* New Haven, CT: Yale University Press.

Smith, E. A., Mulder, M. B., & Hill, K. (2001). Controversies in the evolutionary social sciences: A guide for the perplexed. *Trends in Ecology and Evolution, 16*, 128–135.

Smith, F. H., & Spencer, F. (Eds.). (1984). *The origins of modern humans: A world survey of the fossil evidence.* New York: Alan R. Liss.

Smith, G. (2005). *The genomics age: How DNA technology is transforming the way we live and who we are.* New York: AMACOM.

Smith, G. E. (1915). *The Ancient Egyptians and the origin of civilization* (Rev. ed.). London: Harper.

Smith, G. E. (1923). *Essays on the evolution of man.* Oxford: Oxford University Press.

Smith, G. E. (1924). *Evolution of man: Essays.* London: Milford.

Smith, G. E. (1932). The industries of *Sinanthropus. Man, 32*, 7–10.

Smith, H. (1991). *The world's religions.* New York: Harper Collins.

Smith, H. G. (1974). *Ethno-historical report on the Omaha people: Commissions findings.* New York and London: Garland Publishing.

Smith, J. E. (1984). *Purpose and thought: The meaning of pragmatism.* Chicago, IL: University of Chicago Press.

Smith, J. E. (2004). *Biotechnology* (4th ed.). Cambridge/New York/Melbourne/Madrid/Cape Town: Cambridge University Press.

Smith, M. G. (1998). *The study of social structure.* New York: Research Institute for the Study of Man.

Smith, M. J. (2000). *Culture.* Buckingham, UK: Open University Press.

Smith, M. S. (1990). *The early history of God.* San Francisco: Harper & Row.

Smith, P. (2003). 40K–40Ar Dating in Archaeology. In L. A. Pavlish & A. E. Litherland (Eds.), "Physics and Archaeometry." Special issue of *Physics in Canada 59*(5), 257–262.

Smith, R. E. (1982). *Ethnohistoric study of Haida acculturation, Parts I, II, and III.* Nortorf, Germany: Volkerkundliche Arbeitsgemeinchaft.

Smith, T. (1995). *The island of the Anishnaabeg: Thunderers and water monsters in the traditional Ojibwe life-world.* Moscow: University of Idaho Press.

Smitz, P., Bain, C., & Bedford, N. (2004). *Australia.* Oakland, CA: Lonely Planet.

Smocovitis,V. B. (1996). *Unifying biology, the evolutionary synthesis, and evolutionary biology.* Princeton, NJ: Princeton University Press.

Smole, W. J. (1976). *The Yanomama Indians: A cultural geography.* Austin, TX: University of Texas Press.

Smuts, B. B. (1985). *Sex and friendship in baboons.* New York: Aldine.

Smuts, B. B. (1999). *Sex and friendship in baboons* (2nd ed.). Cambridge, MA: Harvard University Press.

Smyntyna, O. V. (2001). *Zonalnist rannyopervisnuch cultur: Doslidjennya, facty, hipotezy* [Zonal features of Early Prehistoric cultures: Investigations, facts, hypothesis]. Odessa, Ukraine: Astroprint.

Smyntyna, O. V. (2003). The Environmental approach to Prehistoric studies: Approaches and theories, *History and Theory: Studies in the Philosophy of History, 42*(4).

Snow, D. R. (1994). *The Iroquois.* Cambridge, MA: Blackwell.

Snyder, M. (1981). On the self-perpetuating nature of social stereotypes. In D. L. Hamilton (Ed.) *Cognitive processes in stereotyping and intergroup behavior.* New Jersey: Lawrence Erlbaum Associates.

Sober, E. (1984). *The nature of selection.* Cambridge: MIT Press.

Sober, E., & Wilson, D. S. (1998). *Unto others: The evolution and psychology of unselfish behavior.* Cambridge, MA: Harvard University Press.

Sobolik, K. D. (2003). *Archaeobiology: Archaeologist's toolkit.* New York: Alta Mira.

Social Science Education Consortium. (1972). *A preliminary review of the intercultural dimension in international/intercultural education, Grade K–14* (Publication #156). Boulder, CO: Social Science Education Consortium.

Soffer, O., & Praslov, N. D. (1993). *From Kostenki to Clovis: Upper Paleolithic-Paleo-Indian adaptations.* New York: Plenum Press.

Sokolovsky, J. (Ed.). (1997). *The cultural context of aging* (2nd ed.). New York: Bergin & Garvey.

Solecki, R. S. (1971). *Shanidar: The first flower people.* New York: Knopf.

Solomon, R. C. (2002). *Spirituality for the skeptic.* Oxford, UK: Oxford University Press.

Sonakia, A. (1984). The skull-cap of early man and associated mammalian fauna from Narmada valley alluvium, Hoshangabad area, Madhya Pradesh (India). *Records of the Geological Survey of India, 113*(6), 159–172.

Sørensen, M. (1998). Rescue and recovery: On historiographies of female archaeologists. In M. Diaz-Andreu & M. Sørensen (Eds.), *Excavating women: A history of women in European archaeology* (pp. 31–60). London: Routledge.

Sørensen, M. (2000). *Gender archaeology.* Cambridge: Polity Press.

Sorgner, S. L. (1999). Metaphysics without truth: On the importance of consistency within Nietzsche's philosophy. In N. Knoepffler, W. Vossenkuhl, S. Peetz, & B. Lauth (Eds.), M*uenchner Philosophische Beiträge.* Munich: Herbert Utz Verlag.

Spalding, D. (1993). *Dinosaur hunters: 150 years of extraordinary discoveries.* Toronto, Canada: Key Porter Books.

Spear, T., & Waller, R. (1993). *Being Maasai: Ethnicity and identity in East Africa.* Oxford, UK: James Currey.

Spencer, F. (1986). *Ecce homo: An annotated bibliographic history of physical anthropology.* New York: Greenwood Press.

Spencer, F. (1993). The rise of academic physical anthropology in the United States 1880–1980: A historical review. *American Journal of Physical Anthropology 56,* 353–364.

Spencer, F. (1997). *History of physical anthropology* (2 vols.). New York: Garland.

Spencer, F. (Ed.). (1982). *A history of American physical anthropology 1930–1980.* New York: Academic Press.

Spencer, F. (Ed.). (1997). *History of physical anthropology* (Vols. 1–2). New York: Garland.

Spencer, H. (1876/2002). *Principles of sociology.* Piscataway, NJ: Transaction.

Spencer, H. (1929). *The principles of sociology* (3 vols.). New York: Appleton.

Spencer, H. (1966). *The study of sociology.* Ann Arbor: University of Michigan Press.

Spencer, H. (1967). *The evolution of society: Selections from Herbert Spencer's principles of sociology* (R. L. Carneiro, Ed.). Chicago: University of Chicago Press.

Spencer, P. (1965). *The Samburu. A study of gerontocracy in a nomadic tribe.* Berkeley: University of California Press.

Spencer, P. (1973). *Nomads in alliance: Symbiosis and growth among the Rendille and Samburu of Kenya.* London: Oxford University Press.

Spencer, P. (1988). *The Maasai of Matapato: A study of rituals of rebellion.* Manchester, UK: Manchester University Press.

Spengler, O. (1918). *The decline of the west.* New York: Alfred A. Knopf.

Spengler, O. (1934). *The hour of decision.* New York: Alfred A Knopf.

Sperber, D. (1996). *Explaining culture.* Oxford, UK: Blackwell.

Sperling, S. (2000). Ashley Montagu (1905–1999). *American Anthropologist, 102,* 583–588.

Sperling, S. (2005). *Love forms the bones: Ashley Montagu biography.* New York: Oxford University Press.

Spier, L., Hallowell, A. I., & Newman, S. S. (Eds.). (1941). *Language, culture, and personality: Essays in memory of*

Edward Sapir. Menasha, WI: Sapir Memorial Publication Fund.

Spindler, K., Wilfing, H., Rastbichler-Zissernig, E., zur Nedden, D., & Nothdurfter, H. (Eds.). (1996). *Human mummies: A global survey of their status and the techniques of conservation,* Vol. 3: *The Man in the Ice.* New York: Springer.

Spivak, G. (1999). *A critique of postcolonial reason.* Cambridge, MA: Harvard University Press.

Spoehr, A. (1985). George Peter Murdock (1897–1985). *Ethnology, 26,* 307–317.

Sponsel, L. E. (1995). *Indigenous peoples and the future of Amazonia: An ecological anthropology of an endangered world.* Tuscon: University of Arizona Press.

Sponsel, L. E. (1998.) Yanomami: An arena of conflict and aggression in the Amazon." *Aggressive Behavior*, *24*(2), 97–122.

Sponsel, L. E. (2001). Advocacy in anthropology. In N. J. Smelser & P. B. Baltes (Eds.), *International encyclopedia of social and behavioral sciences* (Vol. 1, pp. 204–206). Oxford: Pergamon Press.

Spradley, J. (1980). *Participant observation.* New York: Holt, Rinehart, and Winston.

Spradley, J. (Ed.). (1972). *Culture and cognition: Rules maps, and plans.* San Francisco: Chandler Publishing Company.

Spradley, J. P. (1979). *The ethnographic interview.* Fort Worth, TX: Holt, Rinehart & Winston.

Spradley, J. P. (1980). *Participant observation.* New York: Holt, Rinehart & Winston.

Spradley, J., & McCurdy, D. (Eds.). (2003). *Conformity and conflict.* Boston: Allyn & Bacon.

Spring, J. (2000) *American education* (9th ed). Boston: McGraw-Hill.

Springer, S., & Deutsch, G. (1997). *Left brain right brain* (5th ed.). New York:W. H. Freeman.

Squire, C. (1975). *Celtic myth and legend: Poetry and romance.* Newcastle: Newcastle Publishing.

Squires, S., & Byrne, B. (Eds.). (2002). *Creating breakthrough ideas: The collaboration of anthropologists and designers in the product development industry.* Westport, CT: Bergin & Garvey.

St. John, S. Sir. (1889). *Hayti: or The Black Republic.* London: Smith, Elder.

Stachel, J. (1998). *Einstein's miraculous year.* Princeton, NJ: Princeton University Press.

Stamps, J. (1995). *Unthinking modernity: Innis, McLuhan, and the Frankfurt School.* Montreal: McGill–Queen's University Press.

Stanford, C. (2003). *Upright: The evolutionary key to becoming human.* Boston: Houghton Mifflin.

Stanish, C. (1994). The hydraulic hypothesis revisited: Lake Titicaca basin raised fields in theoretical perspective. *Latin American Antiquity, 5,* 312–332.

Stanley, D. (1997). *Cuba: Survival guide.* London, UK: Lonely Planet.

Stansky, P. (1983). *On Nineteen Eighty-Four.* Stanford, CA: Stanford Alumni Association.

Staples, R. (1999). *The black family.* Belmont, CA: Wadsworth.

Stark, M. (Ed.) (in press). *Archaeology of Asia.* Blackwell Publishers.

Starkloff, C. F. (2002). *Common testimony: Ethnology and theology in the customs of Joseph Lafitau.* St. Louis, MO: Institute of Jesuit Sources.

Starn, O. (1992). Missing the revolution: Anthropologists and the war in Peru. In G. E. Marcus (Ed.), *Rereading cultural anthropology* (pp. 152–180). Durham, NC: Duke University Press.

Starr, J., & Collier, J. F. (Eds.). (1989). *History and power in the study of law: New directions in legal anthropology.* Ithaca, NY: Cornell University Press.

Staub, E. (1989). *The roots of evil.* New York: Cambridge University Press.

Steadman, D. (1989). Extinction of birds in Eastern Polynesia: A review of the record and comparisons with other Pacific Island groups. *Journal of Archaeological Science, 16,* 177–205.

Stearns, S. C. (1992). *The evolution of life histories.* Oxford: Oxford University Press.

Stein, P. L., & Rowe, B. M. (2003). *Physical anthropology* (8th ed.). New York: McGraw-Hill.

Steiner, F. (1956). *Taboo.* London: Cohen & West.

Steiner, H. J., & Alston, P. (2000). *International human rights in context.* (2nd ed.). Oxford, UK: Oxford University Press.

Steinmetz, P. B. (1990). *Pipe, bible, and peyote among the Oglala Lakota: A study in religious identity.* Knoxville: University of Tennessee Press.

Steltenkamp, M. F. (1993). *Black Elk: Holy man of the Oglala.* Norman: University of Oklahoma Press.

Steltzer, U. (1984). *A Haida potlatch.* Seattle: University of Washington Press.

Steltzer, U. (1985). *Inuit: The north in transition.* Chicago: University of Chicago Press.

Stephen, M. (Ed.). (1987). *Sorcerer and witch in Melanesia.* New Brunswick, NJ: Rutgers University Press.

Stephens, S. (1995). *Children and the politics of culture.* Princeton, NJ: Princeton University Press.

Stephens, W. R. (2002). *Careers in anthropology: What an anthropology degree can do for you.* Boston: Allyn & Bacon.

Sterelny, K., & Griffiths, P. E. (1999). *Sex and death: An introduction to philosophy of biology.* Chicago: University of Chicago Press.

Sterelny, Kim. (2001). *Dawkins Vs. Gould: Survival of the fittest.* Cambridge: Totem Books.

Sternberg, R. J. (1997). The concept of intelligence and its role in lifelong learning and achievement. *American Psychologist, 52,* 1030–1037.

Steuart, J. (1966). *Inquiry into the principles of political economy.* Chicago, IL: Chicago University Press.

Stevens, P., Jr. (1996). Magic. In D. Levinson & M. Ember (Eds.), *Encyclopedia of cultural anthropology* (pp. 721–726). New York: Henry Holt.

Stevens, P., Jr. (1996). Sorcery and witchcraft. In D. Levinson & M. Ember (Eds.), *Encyclopedia of cultural anthropology* (pp. 1225–1231). New York: Henry Holt.

Steward, J. (1948). *The handbook of South American Indians.* Washington, DC: Smithsonian Institution.

Steward, J. H. (1955). *Theory of culture change: The methodology of multilinear evolution.* Urbana: University of Illinois Press.

Steward, J. H. (Ed.). (1967). *Contemporary in traditional societies* (3 vols). Urbana: University of Illinois Press.

Steward, J. H., & Faron, L. C. (1959). *Native peoples of South America.* New York: McGraw-Hill.

Stewart, I. (1989). *Does God play dice? The mathematics of chaos.* Cambridge, MA: Blackwell.

Stewart, W. N. & Rothwell, G. W. (1993). *Paleobotany and the evolution of plants.* Cambridge: Cambridge University Press.

Stiassny, M. L. J., Parenti, L. R., & Johnson, G. D. (Eds.). (1996). *Interrelationships of fishes.* San Diego, CA: Academic Press.

Stierlin, H. (2002). *Islamic art and architecture.* New York: Thames and Hudson.

Stigler, J., Shweder, R., & Herdt, G. (Eds.). (1990). *Cultural psychology essays on comparative human development.* Cambridge, UK: Cambridge University Press.

Stiner, M. C. (1994). *Honor among thieves: A zooarchaeological study of Neandertal ecology.* Princeton: Princeton University Press.

Stocking, G. W. (1982). *Race, culture, and evolution: Essays in the history of anthropology.* Chicago: University of Chicago Press.

Stocking, G. W. (1995). *After Tylor: British social anthropology, 1888–1951.* Madison: University of Wisconsin Press.

Stocking, G. W. (2000)."Do good, young man": Sol Tax and the world mission of liberal democratic anthropology. In R. Handler (Ed.) *Excluded ancestors, inventible traditions: Essays toward a more inclusive history of anthropology. History of anthropology* (Vol. 9, pp. 171–265). Madison: The University of Wisconsin Press.

Stocking, G. W. (Ed.). (1985). *Objects and others: Essays on museums and material culture.* Madison: University of Wisconsin Press.

Stocking, G. W. (Ed.). (1988). *Bones, bodies and behavior: Essays in biological anthropology, history of anthropology 5.* Madison: University of Wisconsin Press.

Stone, L., &. Lurquin, P. F. (2005). *A genetic and cultural odyssey: The life and work of L. Luca Cavalli-Sforza.* New York: Columbia University Press.

Stone. J. R. (2002). *The essential Max Muller: On language, mythology, and religion.* New York: Palgrave Macmillan.

Stowasser, B. E. (1992). *Women in the Qur'an: Traditions and interpretation.* New York: Oxford University Press.

Strachan, T., & Read, A. P. (2004). *Human molecular genetics* (3rd ed.). New York: Garland.

Strait, D., Grine, F., & Moniz, M. (1997). A reappraisal of early hominid phylogeny. *Journal of Human Evolution, 32,* 17–82.

Strasser, E., Fleagle, J. G., McHenry, H. M., & Rosenberger, A. (Eds.). (1998). *Primate locomotion: Recent advances.* New York: Plenum.

Strathern, M. (1972). *Women in between; Female roles in a male world: Mount Hagen, New Guinea.* London: Seminar Press.

Stratton, J. (2000). *Coming out Jewish: Constructing ambivalent identities.* London: Routledge.

Street, B. (1993). *Cross-cultural approaches to literacy.* Cambridge: Cambridge University Press.

Strickberger, M. W. (2000). *Evolution* (3rd ed.). Boston: Jones & Bartlett.

Strickland, B. B. (2001). *Gale encyclopedia of psychology* (2nd ed.). Farmington Hills, MI: Gale Group.

Strier, K. B. (2003). *Primate behavioral ecology* (2nd Ed.). Boston, MA: Allyn and Bacon.

Stringer, C. B., & Gamble, C. (1993). *In search of Neandertals.* New York: Thames & Hudson.

Stringer, C. B., Barton, N. E., & and Finlayson, J. C. (Eds.). (2000). *Neandertals on the edge.* Oxford: Oxbow Books.

Strum, S. C. (1987). *Almost human: A journey into the world of baboons.* New York: Random House.

Strum, S. C., & Fedigan, L. M. (Eds.). (2000). *Primate encounters: Models of science, gender, and society.* Chicago: University of Chicago Press.

Strum, S. C., Lindburg, D. G., & Hamburg, D. (Eds.). (1999). *The new physical anthropology: Science humanism, and critical reflection.* Upper Saddle River, N. J. : Prentice-Hall.

Studlar, D. T. (1996). *Britain: Decline or renewal?* Boulder, CO: Westview.

Stull, D., & Broadway, M. (2004). *Slaughterhouse blues: The meat and poultry industry in North America.* Belmont, CA: Thompson/Wadsworth.

Suay, F., Salvador, A., Gonzalez-Bono, E., Sanchis, C., Martinez, M., Simon,V. M., et al. (1999). *Psychoneuroendocrinology, 24,* 551–566.

Suchlicki, J. (1997). *Cuba: From Columbus to Castro and beyond* (4th ed.). Washington, DC: Brassey's.

Suchman, L. (1987). *Plans and situated actions: The problem of human-machine communication.* Cambridge, UK: Cambridge University Press.

Sudarkasa, N. (1996). *The strength of our mothers.* Trenton, NJ: Africa World Press.

Sugden, D. (1982). *Arctic and Antarctic: A modern geographical synthesis.* Totowa, NJ: Barnes & Noble Books.

Suggs, D. N., & Miracle, A. W. (Eds.). (1993). *Culture and human sexuality.* Pacific Grove, CA: Brooks/Cole.

Sullivan, L. E. (Ed.). (1989). *Native American religions: North America.* New York: Macmillan.

Sumner, W. (1971). *Sumner today: Selected essays of William Sumner, with comments by American leaders.* Westport, CT: Greenwood.

Sumner, W. G. (1906). *Folkways: A study of the sociological importance of usages, manners, customs mores and morals.* New York: Dover.

Sumner, W. G., & Keller, A. G. (1927). *The science of society* (4 vols). New Haven: Yale University Press.

Sun, Y. (1995). *The Chinese reassessment of socialism 1976–1992.* Princeton, NJ: Princeton University Press.

Sussman, D. (2000). *Ideas on complexity in systems: Twenty views.* Cambridge: MIT Engineering Systems Division.

Sussman, R. (1991). Primate origins and the evolution of angiosperms. *Journal of Primatology, 23,* 209–223.

Suzuki, D. T. (1964). *An introduction to Zen Buddhism* (with a foreword by C. G. Jung). New York: Grove.

Swain, T. (1993). *A place for strangers: Towards a history of Australian Aboriginal being.* Cambridge; New York: Cambridge University Press.

Swanton, J. R. (1975). *Contributions to the ethnology of the Haida* (Vol. 5, Pt. 1). New York: AMS Press.

Swartz, M. J., Turner,V., & Tuden, A. (Eds.). (1966). *Political anthropology* Chicago, IL: Aldine.

Swatos, W. H. (Ed.). (2005). Wallace, Anthony F. C. In *Encyclopedia of religion and society.* Retrieved from http://hirr. hartsem. edu/ency/WallaceAFC. htm

Sway, M. (1988). *Familiar strangers.* Urbana: University of Illinois Press.

Swisher, C. G., Curtis, H., & Lewin, R. (2000). *Java Man: How two geologists' dramatic discoveries changed our understanding of the evolutionary path to modern humans.* New York: Scribner.

Sykes, B. (2001). *The seven daughters of eve: The science that reveals our genetic ancestry.* New York: Norton.

Szalay, F. S., Novacek, M. J., & McKenna, M. C. (Eds.). (1993). *Mammal phylogeny: Mesozoic differentiation, multituberculates, monotremes, early therians, and marsupials.* New York: Springer-Verlag.

Szymanski, A. (1978). *The capitalist state and the politics of class.* Cambridge, MA: Winthrop.

Szymanski, A. (1981). *Logic of imperialism.* New York: Praeger.

Tainter, J., Renfrew, C., Ashmore, W., Gamble, C., & O'Shea, J. (Eds.). (1990). *The collapse of complex societies (new studies in archaeology).* Cambridge: Cambridge University Press.

Talmon, J. L. (1967). *Ideology and power in modern times.* New York: Judaica Press.

Tambiah, S. J. (1990). *Magic, science, religion, and the scope of rationality.* New York: Cambridge University Press.

Tannen, D. (1991). *You just don't understand: Women and men in conversation.* New York: Ballantine.

Tannenbaum, S. A. (1942). *Michel de Montaigne: A concise bibliography.* New York: S. A. Russell.

Tara'are, T. A. (2000). *History and traditions of Rarotonga* (R. Walter & R. Moeka'a, Eds.). Auckland, NZ: Polynesian Society.

Tarling, D. H. (1983). Palaeomagnetism: *Principles and applications in geology, geophysics and archaeology.* London: Chapman and Hall.

Tate, M. L. (1991). *The upstream people: An annotated research bibliography of the Omaha tribe.* Metuchen, NJ: The Scarecrow Press.

Tattersall, I. (1982). *The primates of Madagascar.* New York: Columbia University Press.

Tattersall, I. (1995). *The fossil trail.* Oxford: Oxford University Press.

Tattersall, I. (1995). *The last Neandertal: The rise, success and mysterious extinction of our closest human relatives.* New York:Macmillan.

Tattersall, I. (1998). *Becoming human: Evolution and human uniqueness.* New York: Harcourt Brace.

Tattersall, I., & Schwartz, J. H. (2000). *Extinct humans.* Boulder, CO: Westview.

Taussig, M. (1980). *The devil and commodity fetishism in South America.* Chapel Hill: University of North Carolina Press.

Tax, S. (1953). *Penny capitalism: A Guatemalan indian economy.* Washington, DC: Smithsonian Institute of Social Anthropology.

Tax, S. (1975). Action anthropology. *Current Anthropology, 16,* 514–517.

Tax, S. (Ed.). (1952). *Heritage of conquest: The ethnology of middle America.* New York: Coopers Square Publishers.

Taylor, B., (Ed.). (2005). *Encyclopedia of religion and nature.* New York: Continuum Press.

Taylor, C. (1977). *Hegel.* Cambridge: Cambridge University Press.

Tedlock, B. (1992). *The beautiful and the dangerous: Encounters with the Zuni Indians.* Albuquerque: University of New Mexico Press.

Tedlock, B. (1992). *Time and the highland Maya* (rev. ed.). Albuquerque: University of New Mexico Press.

Tedlock, D. (1983). *The spoken word and the work of interpretation.* Philadelphia: University of Pennsylvania Press.

Tedlock, D. (1996). *Popol Vuh* (rev. ed.). New York: Simon & Schuster.

Tedlock, D. (1999). *Finding the center: The art of the Zuni storyteller.* Lincoln: University of Nebraska Press.

Tedlock, D. (Trans.). (1985). *Popol vuh: The definitive edition of the Mayan book of the dawn of life and the glories of gods and kings.* New York: Simon & Schuster.

Teilhard de Chardin, P. (1975). *The phenomenon of man* (2nd ed.). New York: Harper & Row/Harper Colophon/Perennial Library. (Original work written 1938–1940, 1948)

Teleki, G. (1979). *Aerial apes: Gibbons of Asia.* Coward, UK: McCann & Geoghegan.

Teleki, G. (1979). *Aerial apes: Gibbons of Asia.* New York: Coward, McCann & Geoghegan.

Telushkin, J. (1991). *Jewish literacy: The most important things to know about the Jewish religion, its people, and its history.* New York: William Morrow.

Terborgh, J. (1983). *Five New World primates.* Princeton, NJ: Princeton University Press.

Terborg-Penn, R. (1995). Through an African feminist theoretical lens. In V. Shepherd, B. Brereton, & B. Bailey (Eds.), *Engendering history.* New York: St. Martin's Press.

Terkel, S. (1996). *People power.* New York; Lodestar Books.

Terrace, H. S. (1987). *Nim, a chimpanzee who learned sign language.* New York: Columbia University Press.

Terray, E. (1975). Class and class consciousness in an Abron kingdom of Gyaman. In M. Bloch (Ed.) *Marxist analyses and social anthropology* (pp. 85–135). London: Malaby Press.

Terrell, J. E. (1986). *Prehistory in the Pacific Islands.* Cambridge: Cambridge University Press.

Terry, R. (1970). Primate grooming as a tension reduction mechanism. *Journal of Psychology, 76,* 1, 129.

Theodoret. (1985). *A history of the monks of Syria by Theodoret of Cyrrhus* (with an introduction and notes by R. M. Price, Trans.). Kalamazoo, MI: Cistercian Publications.

Thomas, B. (1981). *The evolution of plants and flowers.* Eurobook.

Thomas, D. H. (2000). *Skull wars: Kennewick Man, archaeology, and the battle for Native American identity.* New York: Basic Books.

Thomas, E. M. (1989). *The harmless people.* New York: Random House.

Thomas, J. (1993). The politics of vision and the archaeologies of landscape. In B. Bender (Ed.), *Landscape politics and perspective* (pp. 19–48). Providence, RI: Berg.

Thomas, N. (1991). *Entangled objects: Exchange, material culture, and colonialism in the Pacific.* Cambridge. MA: Harvard University Press.

Thomas, N., & Humphrey, C. (1994). *Shamanism history and the state.* Ann Arbor: University of Michigan Press.

Thompson, J. E. S., Pollock, H. E. D., & Charlot, J. (1932). A preliminary study of the ruins of Coba, Quintana Roo, Mexico. *Publication 424, Carnegie Institution of Washington.*

Thompson, K. (1975). *Auguste Comte: The foundation of sociology.* New York: Wiley.

Thompson, P. (Ed.). (1995). *Issues in evolutionary ethics.* Albany: State University of New York Press.

Thompson, V. M. (1971). *The French Pacific Islands.* Berkeley: University of California Press.

Thomson, R. G. (1996). *Freakery: Cultural spectacles of the extraordinary body.* New York: New York University Press.

Thornton, M. V. (2003). *Potlatch people: Indian lives and legends of British Columbia.* Surrey: Hancock House Publisher LTD. ; Blaine, WA: Hancock House Publishers.

Thornton, R. (Ed.). (1998). *Studying Native America: Problems and perspectives.* Madison: University of Wisconsin Press.

Thrasher, F. M. (1927). *The gang: A study of 1,313 gangs in Chicago.* Chicago: University of Chicago Press.

Thurston, T. L. (2001). *Landscapes of power, landscapes of conflict: State formation in the South Scandinavian Iron Age.* New York: Kluwer Academic/Plenum.

Tierney, K. (1979). *Darrow, a biography.* New York: Fitzhenry & Whiteside.

Tierney, P. (2000, October 9). The fierce anthropologist. *New Yorker,* 50–61.

Tierney, P. (2001). *Darkness in El Dorado: How scientists and journalists devastated the Amazon.* New York: W. W. Norton.

Tiller,V. E. V. (1996). *Tiller's guide to Indian Country. Economic profiles of American Indian reservations.* Albuquerque: BowArrow.

Tillich, P. (1964). *Gesammelte Werke* [Collected works], *Vol. 5: Die Frage nach dem Unbedingten* [The question of the absolute]. Stuttgart, Germany: Evangelisches Verlags-Werk.

Tillich, P. (1988). *Hauptwerke* [Main works], *Vol. 5: Religiöse Schriften* [Writings on religions]. Berlin, New York: de Gruyter et al.

Tilly, C. (1979). Repertoires of contention in America and Britain, 1750–1830. In M. Zald & J. D. McCarthy (Eds.), *The dynamics of social movements.* New York: Little, Brown.

Tindale, N. B. (1974). *Aboriginal tribes of Australia: Their terrain, environmental controls, distribution, limits, and proper names.* Berkeley: University of California Press.

Tishkov,V. (1996). *Ethnicity, nationalism and conflict in and after the Soviet Union.* Thousand Oaks, CA: Sage.

Titus, P. (1997). *Marginality and modernity: Ethnicity and change in post-colonial Balochistan.* Karachi, Pakistan: Oxford University Press.

Tobias, P. (Ed.). (1967). *The cranium and maxillary dentition of Australopithecus (Zinjanthropus) boisei.* Cambridge: Cambridge University Press.

Tobias, P. V. (1976a). African hominids: Dating and, phylogeny. In G. Isaac & E. B. McCown (Eds.), *Human origins: Louis Leakey and the East African evidence.* Menlo Park, CA:W. A. Benjamin.

Tobias, P. V. (1976b). White African: An appreciation and some personal memories of Louis Leakey. In G. Isaac & E. B. McCown (Eds.), *Human origins: Louis Leakey and*

the East African evidence. Menlo Park, CA: W. A. Benjamin.

Todes, D. P. (1989). *Darwin without Malthus: The struggle for existence in Russian evolutionary thought.* New York: Oxford University Press.

Todorova, M. (1997). *Imagining the Balkans.* Oxford: Oxford University Press.

Toennies, F. (2001). *Community and civil society.* Cambridge: Cambridge University Press.

Toledo, V. (2002). Ethnoecology: A conceptual framework for the study of indigenous knowledge of nature. In J. R. Stepp, R. S. Wyndham, & R. K. Zarger (Eds.), *Ethnobiology and biocultural diversity* (pp. 511–522). Athens: University of Georgia Press.

Tomasello, M. (1999). *The cultural origins of human cognition.* Cambridge, MA: Harvard University Press.

Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition.* Cambridge, MA: Harvard University Press.

Tomasello, Michael, & Call, Josep. (1997). *Primate cognition.* New York: Oxford University Press.

Tong, D. (Ed.). (1998). *Gypsies.* New York: Garland.

Tooker, E. (1978). The league of the Iroquois: Its history, politics, and ritual. In B. Trigger (Ed.), *Handbook of North American Indians: Vol. 15. Northeast.* Washington, DC: Smithsonian Institution.

Tooker, E. (1994). *Lewis H. Morgan on Iroquois material culture.* Tucson: University of Arizona Press.

Toomela, A. (Ed.). (2003). *Cultural guidance in the development of the human mind.* Westport, CT: Ablex.

Toren, C. (1995). Sign into symbol, symbol as sign: Cognitive aspects of a social process. In P. Boyer (Ed.), *Cognitive aspects of religious symbolism* (pp. 147–164). Cambridge: Cambridge University Press.

Torrell, J.-P., & Royal, R. (1996). *Saint Thomas Aquinas: The person and his work.* Washington, DC: Catholic University of America Press.

Toth, N. (1985). The Oldowan reassessed: A close look at early stone artifacts. *Journal of Archaeological Science, 12,* 101–120.

Toulmin, S. (1972). *Human understanding.* Cambridge, UK: Cambridge University Press.

Townsend, P. (2000). *Environmental anthropology: From pigs to policies.* Long Grove, IL: Waveland Press.

Toynbee, A. J. (1935–1961). *A study of history* (12 vols.). London: Oxford University Press.

Tracy, K. (2002). *The secret story of polygamy.* Naperville, IL: Sourcebooks.

Trager, G. (1972). *Language and languages.* San Francisco: Chandler.

Traill, D. A. (1996). *Schliemann of Troy: Treasure and deceit.* New York: St. Martin's Press.

Traverse, A. (1988). *Paleopalynology.* Boston: Unwin Hyman.

Trevelyan, A. M. (2003). *Miskwabik, metal of ritual: Metallurgy in precontact eastern North America.* Lexington: University Press of Kentucky.

Trigger, B. (1982). Ethnohistory: Problems and prospects. *Ethnohistory, 29,* 1–19.

Trigger, B. G. (1980). *Gordon Childe: Revolutions in archaeology.* New York: Columbia University Press.

Trigger, B. G. (1989). *A history of archaeological thought.* Oxford: Cambridge University Press.

Trigger, B. G., Kemp, B. J., O'Connor, D., & Lloyd, A. B. (1983). *Ancient Egypt: A social history.* Cambridge: Cambridge University Press.

Trinkaus, E. (1978). Hard times among the Neandertals. *Natural History, 87,* 58–63.

Trinkaus, E. (1983). *The Shanidar Neandertals.* New York: Academic.

Trinkaus, E. (1991). The fossil human remains from Shanidar Cave, Iraq: Evolution and continuity among near-east late archaic humans. *Anthropologie, 95,* 535–572.

Trinkaus, E., & Shipman, P. (1992). *The Neandertals: Changing the image of mankind.* New York: Alfred A. Knopf.

Trish, S. J., & Wallace, M. B. (1994). *Dilemmas of development assistance: The what, why, and who of foreign aid.* Boulder, CO: Westview.

Troeltsch, E. (1962). Religion and church (1895). In *Gesammelte Schriften* [Collected works], *Vol. 2: Zur religiösen Lage, Religionsphilosophie und Ethik.* Aalen: Scientia.

Trouillot, M.-R. (1995). *Silencing the past: Power and the production of history.* Boston: Beacon Press.

Trowbridge, C. C. (1823). *Meearmear traditions.* Ann Arbor: University of Michigan Press. (Reprinted in 1938)

Trump, D. (2002). *Malta: Prehistory and temples.* Malta: Midsea Books.

Tseng, W.-S. (2001). *Handbook of cultural psychiatry.* San Diego, CA: Academic Press.

Tseng, W.-S., & Streltzer, J. (2004). *Cultural competence in clinical psychiatry.* Washington, DC: American Psychiatric Association.

Tu, W.-M. (1996). *Confucian traditions in East Asian modernity.* Cambridge, MA: Harvard University Press.

Tuck, J. A. (1978). Northern Iroquoian prehistory. In B. Trigger (Ed.), *Handbook of North American Indians: Vol. 15. Northeast.* Washington, DC: Smithsonian Institution.

Tucker, M. E. (2003). *Worldly wonder: Religions enter their ecological phase.* La Salle, IL: Open Court.

Turnbull, C. (1973). *The mountain people.* London: Jonathon Cape.

Turnbull, C. M. (1965a). *The Mbuti Pygmies: An ethnographic survey.* New York: Natural History Press.

Turnbull, C. M. (1965b). *Wayward servants: The two worlds of the African Pygmies.* New York: Natural History Press.

Turnbull, C. M. (1968). *The forest people.* New York: Simon & Schuster.

Turnbull, C. M. (1983). *The Mbuti Pygmies: Change and adaptations.* New York: Holt, Rinehart & Winston.

Turnbull, C. M. (1987). *The forest people.* New York: Simon & Schuster.

Turnbull, C. M. (1987). *The mountain people.* Riverside, NJ: Touchstone Books.

Turner V. W. (1996). *Schism and continuity in an African Society: A study of Ndembu Village Life.* Oxford: Berg.

Turner, C. G., & Turner, J. A. (1999). *Man corn: Cannibalism and violence in the prehistoric American Southwest.* Salt Lake City: University of Utah Press.

Turner, R., & Killian, L. (1987). *Collective behavior* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Turner, T. (1977). Transformation, hierarchy and transcendence: A reformulation of Van Gennep's model of the structure of rites of passage. In S. Moore & B. Myerhoff (Eds.), *Secular ritual* (pp. 53–70). Amsterdam: Van Gorcum.

Turner, T. (2001). *The Yanomami and the ethics of anthropological practice* (Latin American Studies Program Occasional Paper Series, Vol. 6). Ithaca, NY: Cornell University Press.

Turner, T. (Ed.). (2005). *Biological anthropology and ethics: From repatriation to genetic identity.* Albany: State University of New York Press.

Turner,V. (1967). Betwixt and between: The liminal period in rites de passage. In *The forest of symbols: Aspects of Ndembu ritual* (pp. 93–111). Ithaca: Cornell University Press.

Turner, V. (1974). *Dramas, fields, and metaphors: Symbolic action in human society.* Ithaca, NY: Cornell University Press.

Turner, V. W., & Bruner, E. M. (Eds.). (1986). *The anthropology of experience.* Urbana and Chicago: University of Illinois Press.

Tuttle, R. H., & Basmajian, J. V. (1974). Electromyography of forearm musculature in Gorilla and problems related to knuckle-walking. In F. A. Jenkins Jr. (Ed.), *Primate locomotion* (pp. 293–347). New York: Academic Press.

Tyler, D. E. (1994). The taxonomic status of "Meganthropus." In J. L. Franzen (Ed.), *100 years of* "Pithecanthropus"*: The Homo erectus problem* (pp. 115–121). Frankfurt, Germany: Courier Forschungsinstitut Seenckenberg.

Tyler, D. E. (1995). The current picture of hominid evolution in Java. *Acta Anthropologica Sinica, 14,* 313–323.

Tylor, E. (1871). *Primitive culture: Researches into the development of mythology, philosophy, religion, art, and custom* (2 vols.). London: J. Murray.

Tylor, E. B. (1871). *Primitive culture.* New York: Putnam.

Ucko, P. J., & Layton, R. (Eds.). (1999). *The archaeology and anthropology of landscape: Shaping your landscape.* London: Routledge.

Uebel, T. (1992). *Overcoming logical positivism from within.* Amsterdam: Rodopi.

Uhle, M. (1907). The Emeryville Shellmound. *University of California Publications in American Archaeology and Ethnology, 7,* 1–107.

Underhill, A. (2002). *Craft production and social change in northern China.* New York: Kluwer Academic Press.

United Nations; Department of Economic and Social Affairs; Population Division. (2002). *Population estimates and projections: 2002 revised highlights.* New York: Author.

Uspensky, B. (1968). *Principles of structural typology.* The Hague, Netherlands: Mouton

Vaggioli, D. F. (2000). *History of New Zealand and its inhabitants.* Dunedin, New Zealand: University of Otago Press. (Original work published 1896)

Valensi, L. (1981). Economic anthropology and history: The work of Karl Polanyi. In G. Dalton (Ed.), *Research in economic anthropology* (Vol. 4, pp. 3–12). Greenwich, CT: JAI Pre.

Valensi, P. (2000). The archaeozoology of Lazaret Cave (Nice, France). *International Journal of Osteoarchaeology, 10,* 357–367.

Valerio, M. W. (2002). "Now that you're a white man": Changing sex in a postmodern world. In G. Anzaldua & A. Keating (eds.), *This bridge we call home.* New York: Routledge.

Van Bergen, B. (2004). *Blombos Cave project.* Cape Town, South Africa: African Heritage Research Institute. Retrieved April 28, 2005, from http://www. svf.uib. no/sfu/blombos/The_Site. html

Van Binsbergen, W. M. J. (1984–2002). *Can anthropology become the theory of peripheral class struggle? Reflections on the work of Pierre-Philippe Rey.* Retrieved December 5, 2004, from http://www.shikanda.net/ethnicity/peripher. htm.

Van den Bosch, L. (2002). *Friedrich Max Müller: A life devoted to the humanities.* Leiden, The Netherlands: Brill.

Van Der Geest, S. (2004)."They don't come to listen": The experience of loneliness among older people in Kwahu, Ghana. *Journal of Cross-Cultural Gerontology, 19,* 77–96.

Van Der Leeuw, G. (1986). *Religion in essence and manifestation.* Princeton, NJ: Princeton University Press.

Van Gennep, A. (1960). *The rites of passage* (M. Vizedom & G. Caffe, Trans). Chicago: University of Chicago Press. (Original work published in French, 1908)

Van Gennep, A. (1960). *The rites of passage.* Chicago: University of Chicago Press.

Van Gorcum. (Original work published 1880–1882) Patterson, T. C. (2001). *A social history of anthropology in the United States.* Oxford, UK: Berg.

Van Maanen, J. (1988). *Tales of the field: On writing ethnography.* Chicago: University of Chicago Press.

Van Maanen, J. (1995). *Representation in ethnography.* Thousand Oaks, CA. : Sage.

Van Peer, P. (1992). *The Levallois reduction strategy* (Monographs in World Prehistory, No. 13). Madison, WI: Prehistory Press.

Van Peer, P. (1995). Current issues in the Levallois problem. In H. L. Dibble & O. Bar-Yosef (Eds.), *The definition and interpretation of Levallois technology* (Monographs in World Prehistory, No. 23, pp. 1–10). Madison, WI: Prehistory Press.

Van Schaik, C. P., & Janson, C. H. (Eds.). (2000). *Infanticide by males and its implications.* Cambridge: Cambridge University Press.

Van Schaik, C. (2004). *Among orangutans.* Cambridge, MA: Harvard University Press.

Van Willigen, J. (1987). *NAPA Bulletin 3-Becoming a practicing anthropologist: A guide to careers and training programs in applied anthropology.* Arlington,VA: American Anthropological Association.

Van Willigen, J., & Channa, V. C. (2004). *Law, custom, and crimes against women: The problem of dowry death in India.* In N. F. Bellantoni & L. L.

Vasey, D. E. (1992). *An ecological history of agriculture, 10,000 B. C. –10,000 A. D.* Ames: Iowa State University Press.

Vaughan, P. (1989). *The monogamy myth.* New York: Newmarket Press.

Vedder, A., & Weber, B. (2001). *In the kingdom of gorillas: Fragile species in a dangerous land.* New York: Simon & Schuster.

Venkatesh, S. A. (2000). *American project: The rise and fall of a modern ghetto.* Cambridge, MA: Harvard University Press.

Vermeersch, P. M., & Van Peer, P. (Eds.). (1990). *The Mesolithic in Europe.* Edinburgh, UK: John Donald.

Vigil, J. D. (2002). *A rainbow of gangs: Street cultures in the mega-city.* Austin: University of Texas Press.

Viker, K. S. (2000). Sufi brotherhoods in Africa. In N. Levtzion (Ed.), *History of Islam in Africa* (pp. 441–476). Athens: Ohio University Press.

Vincent, J. (1990). *Anthropology and politics: Visions, traditions, and trends.* Tucson: University of Arizona Press.

Vincent, J. (2002). *The anthropology of politics: A reader in ethnography, theory, and critique.* Malden, MA: Blackwell.

Vink, A. P. A. (1975). *Land use in advancing agriculture.* Berlin: Springer-Verlag.

Vitzthum, R. (1995). *Materialism.* Amherst, NY: Prometheus Books.

Vogt, F. (1975). *A history of ethnology.* New York: Holt, Rinehart, & Winston.

Voigt, J. H. (1967). *Max Muller: The man and his ideas.* Calcutta, India: Mukhopadhyay.

Von Hagen, A. (2002). Chachapoya iconography and society at Laguna de los Condores, Peru. In H. Silverman & W. Isbell (Eds.), *Andean archaeology II: Art, landscape and society* (pp. 137–155). New York: Kluwer Academic/Plenum.

Von Humboldt, A. (1810). *Vues des Cordilleres et monuments des peuples indigènes de l'amérique.* Paris: F. Schoell.

Von Humboldt, A. (1850–1859). *Cosmos: A sketch of a physical description of the universe.* New York:

Von Humboldt, A. (1971). *Researches concerning the institutions and monuments of the ancient inhabitants of America.* New York: Da Capo Press. (Original work published 1814)

Von Humboldt, A. (1988). *Political essay on the kingdom of New Spain.* Norman: University of Oklahoma Press. (Original work published 1811)

Von Humboldt, A., & Bonpland, A. (1818–1829). *Personal narrative of travels to the equinoctial regions of America, during the years 1799–1804* (Vols. 1-7). London: Longman, Hurst.

Von Koenigswald, G. H. R. (1954). "*Pithecanthropus,*" "*Meganthropus,*" and the Australopithecinae. *Nature, 173,* 795–797.

Von Wright, G. H. (1974). *Causality and determinism.* New York: Columbia University Press.

Vucinich, A. (1988). *Darwin in Russian thought.* Los Angeles: University of California Press.

Vyas, A. (1991). *Social stratification and third world countries.* Berkeley, CA: Folklore Institute.

Wagner, R. (1974). Are there social groups in the New Guinea Highlands? In M. Leaf (Ed.), *Frontiers of anthropology* (pp. 95–122). New York: Van Nostrand.

Wailoo, K. (2001). *Dying in the city of the blues: Sickle cell anemia and the politics of race and health.* Chapel Hill: University of North Carolina Press.

Wakin, E. (1992). *Anthropology goes to war: Professional ethics & the counterinsurgency in Thailand* (Monograph No. 7). Madison: University of Wisconsin Center for Southeast Asian Studies.

Walby, S. (1990). *Theorizing patriarchy.* Cambridge, MA: Basil Blackwell Inc.

Wald, B. (1990). Swahili and the Bantu languages. In B. Comrie (Ed.)., *The world's major languages* (pp. 991–1014). New York: Oxford University Press.

Waldmeir, P. (1997). *Anatomy of a Miracle.* New York: Norton.

Walens, S. (1981). *Feasting with cannibals: An essay on Kwakiutl cosmology.* Princeton, NJ: Princeton University Press.

Walker, A., & Shipman, P. (1996). *The wisdom of the bones.* London: Weidenfeld & Nicholson.

Walker, A., & Shipman, P. (1996). *The wisdom of the bones: In search of human origins.* New York: Vintage Books/ Random House.

Walker, A., Leakey, R. E. (1988). The evolution of *Australopithecus boisei.* In F. E. Grine (Ed.), *Evolutionary history of the "robust" Australopithecine* (pp. 247–258). New York: Aldine de Gruyter.

Walker, D. E., Jr. (Ed.). (1989). *Witchcraft and sorcery of the American Native peoples.* Moscow: University of Idaho Press.

Walker, G. (2003). *Snowball earth: The story of a maverick scientist and his theory of the global catastrophe that spawned life as we know it.* New York: Crown.

Walker, J. M., & Rapley, R. (Eds.). (2002). *Molecular biology and biotechnology* (4th ed.). Cambridge, UK: Royal Society of Chemistry.

Wallace, A. F. C. (1966). *Religion: An anthropological view.* New York: Random House.

Wallace, A. F. C. (1998). In "An Interview with Anthony F. C. Wallace," by Robert S. Grumet. *Ethnohistory, 45*(1), 127.

Waller, A. L. (1988). *Feud: Hatfields, McCoys, and social change in Appalachia, 1860–1900.* Chapel Hill: University of North Carolina Press.

Wallerstein, I. (1974). The rise and future demise of the world capitalist system: Concepts for comparative analysis. *Comparative Studies in Society and History, 16* (Sept.), 387–415.

Wallerstein, I. (1991). *Geopolitics and geoculture: Essays on the changing world-system.* New York: Cambridge Press.

Wallerstein, I. (1999). *The end of the world as we know it: Social science for the twenty-first century.* Minneapolis: University of Minnesota Press.

Wallerstein, I. (2004). *Alternatives: The United States confronts the world.* Boulder, CO: Paradigm.

Wallman, J. (1992). *Aping language.* Cambridge, UK: Cambridge University Press.

Walter, N. (1997). *Humanism: What's in the word.* London: RPA.

Wang, H. (1993). *The origins of Chinese characters.* Beijing: Sinolingua.

Wang, W. S.-Y. (1994). Glottochronology, lexicostatistics, and other numerical methods. In R. Asher (Ed.), *Encyclopedia of language and linguistics* (Vol. 3, pp. 1445–1450). New York: Pergamon Press.

Ward, P. (1994). *The end of evolution: On mass extinctions and the preservation of biodiversity.* New York: Bantam.

Ward, S. C., & Duren, D. L. (2002). Middle and Late Miocene African hominoids. In W. C. Hartwig (Ed.), *The primate fossil record* (pp. 385–397). Cambridge, UK: Cambridge University Press.

Ward, S., Brown, B., Hill, A., Kelley, J., & Downs, W. (1999). Equatorius: A new hominoid genus from the Middle Miocene of Kenya. *Science, 285*, 1382–1386.

Wardhaugh, R. (2002). *An introduction to sociolinguistics.* Malden, MA: Blackwell.

Washburn, S. (1961). *Social life of early man.* New York: Wenner-Gren Foundation for Anthropological Research.

Washburn, S. (1963). *Classification and human evolution.* New York: Viking Fund.

Washburn, S. (1968). *Perspectives on human evolution.* New York: Holt, Rinehart and Winston.

Washburn, S. (1974). *Ape into man: A study of human evolution.* New York: Little Brown & Company.

Washburn, S. (1975). Ecology and Australopithecine taxonomy. *American Anthropologist, 77*(3), 618.

Washburn, S. (1978). *Human evolution: Biosocial perspectives.* Menlo Park, CA: Benjamin Cummings.

Washburn, S. (1983). Evolution of a teacher. *Annual Review of Anthropology, 12,* 1–24.

Washburn, W. (1984). Ethical perspectives in North American ethnology. In J. Helm (Ed.), *Social contexts of American ethnology: Proceedings of the American Ethnological Society* (pp. 50–64). Washington, DC: American Anthropological Association.

Waters, M. (1994). *Modern sociological theory.* London: Sage.

Waters, M. C. (1990). *Ethnic options: Choosing identities in America.* Berkeley: University of California Press.

Watson, J. (2001). *The double helix: A personal account of the discovery of the structure of DNA.* New York: Touchstone.

Watson, J. B. (1924). Behaviorism. New York: People's Institute.

Watson, J. D. (2003). *DNA: The secret of life.* New York: Alfred A. Knopf.

Watson, J. L. (1980). Asian *and African systems of slavery.* Oxford, UK: Blackwell.

Watson, J. L., & Rawski, E. S. (1988). *Death ritual in late imperial and modern China.* Berkeley: University of California Press.

Watson-Gegeo, K. A., & Seaton, S. L. (Eds.). (1978). *Adaptation and symbolism: Essays on social organization.* Honolulu: University Press of Hawaii.

Watterson, B. (1998). *Women in Ancient Egypt.* Gloucestershire, UK: Sutton.

Waugh, P. (Ed.). (1994). *Postmodernism: A reader* London: Edward Arnold.

Wayman, J. L., Jain, A. K., Maltoni, D., & Maio, D. (2004). *Biometric systems: Technology, design and performance evaluation.* New York: Springer.

Webb, G. E. (1983). *Tree rings and telescopes: The scientific career of A. E. Douglass.* Tucson: University of Arizona Press.

Webb, S. (2002). *Where is everybody? Fifty solutions to the Fermi Paradox and the problem of extraterrestrial life.* New York: Copernicus/Springer-Verlag.

Weber, B., & Vedder, A. (2001). *In the kingdom of gorillas: Fragile species in a dangerous land.* New York: Simon & Schuster.

Weber, M. (1958). *The protestant ethic and the spirit of capitalism.* New York: Scribner.

Weber, M. (1958). *The religion of India.* New York: Free Press.

Wedel, W. R. (1961). *Prehistoric man of the Great Plains.* Norman: Oklahoma University Press.

Wegener, A. L. (1924). *The origin of continents and oceans.* New York: Dutton.

Wegener, A. L. (1966). *The origins of continents and oceans* [John Biram, Trans.). Mineola, NY: Dover.

Weidenreich, F. (1937). The relationship of Sinanthropus Pekinensis to Pithecanthropus, Javanthropus, and Rodesian man. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland, 67,* 51–65.

Weidenreich, F. (1940). Some problems dealing with ancient man. *American Anthropologist, 42*(3), 375–383.

Weidenreich, F. (1947). Facts and speculation concerning the origin of *Homo sapiens. American Anthropologist,, 49*(2), 187–203.

Weidrenreich, F. (1937). The relationship of Sinanthropus Pekinesis to Pithecanthropus, Javanthropus, and Rhodesian Man. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland, 67,* 51–65.

Weidrenreich, F. (1943). The Neanderthal man and the ancestors of *Homo sapiens. American Anthropologist, 45*(1), 39–48.

Weil, S. E. (1995). *Cabinets of curiosities: Inquiries into museums and their prospects.* Washington, DC: Smithsonian Institution.

Weinberg, R. A. (1989). Intelligence and IQ landmark issues and great debates. *American Psychologist, 44,* 98–104.

Weiner, A. B. (1977). Review of "Trobriand Cricket." *American Anthropologist, 79,* 506–507.

Weiner, J. (1995). *The beak of the finch: A story of evolution in our time.* New York: Vintage.

Weiner, S., Xu, Q., Goldberg, P., Liu, J., & Bar-Yosef, O. (1998). Evidence for the use of fire at Zhoukoudian, China. *Science, 281,* 251–253.

Weiner, W. S., Oakley, K. P., & Le Gros Clark, W. E. (1953, Nov.). *The solution of the Piltdown problem.* Bulletin of the British Museum (Natural History) Geology.

Weinsheimer, J. (1991). *Philosophical hermeneutics and literary theory.* New Haven, CT: Yale University Press.

Weishampel, D., Dodson, P., & Osmólska, H. (Eds.). (2004). *The dinosaurian* (2nd ed.). Berkeley: University of California Press.

Weismann, A. (1904). *The evolution theory* (2 vols.). London: Edward Arnold.

Wells, H. G. (1934). *Experiment in autobiography.* London: Victor Gollancz & Cresset.

Wells, H. G. (1942). *The conquest of time.* London: Watts & Co.

Wells, H. G. (1945). *Mind at the end of its tether.* London: Heinemann.

Wells, P. S. (Ed.). (1993). *Settlement, economy, and cultural change at the end of the European Iron Age: Excavations at Kelheim in Bavaria, 1987–1991.* Ann Arbor, MI: International Monographs in Prehistory.

Wells, S. (2002). *The journey of man: A genetic odyssey.* Princeton, NJ: Princeton University Press.

Welshon, R. (2004). *The philosophy of Nietzsche.* Montreal: McGill-Queen's University Press.

Wendorf, F., & Schild, R. (1976). *The prehistory of the Nile Valley.* New York: Academic Press.

Wendorf, F., Schild, R., et al. (Eds.). (2001). *Holocene settlement of the Egyptian Sahara (Volume 1): The archaeology of Nabta Playa.* London: Kluwer Academic/ Plenum Publishers.

Wendt, A. (2003). Why a world state is inevitable. *European Journal of Political Science, 9,* 491–542.

Wen-Hsiung, L. (1997). *Fundamentals of molecular evolution.* Sunderland, MA: Sinauer.

Wenzel, G. (1991). *Animal rights, human rights: Ecology, economy, and ideology in the Canadian Arctic.* Toronto, Canada: University of Toronto Press.

Wernhart, K. R. (1981). Kulturgeschichte und Ethnohistorie als Strukturgeschichte. In W. Schmied-Kowarzik & J. Stagl (Eds.), *Grundfragen der Ethnologie. Beiträge zur gegenwärtigen Theorien-Diskussion* (pp. 233–252). Berlin, Germany: Dietrich Reimer Verlag.

West, C. (1989). *The American evasion of philosophy: A genealogy of pragmatism.* Madison: University of Wisconsin Press.

West, G. (1930). *H. G. Wells: A sketch for a life.* London: Gerald Howe.

Westbrook, R. B. (1991). *John Dewey and American democracy.* Ithaca, NY: Cornell University Press.

Wheeler, J. A., & Zurek, W. H. (Eds.). (1983). *Quantum theory and measurement.* Princeton, NJ: Princeton University Press.

Wheeler-Voegelin, E., Blasingham, E. J., & Libby, D. (1974). *Miami, Wea, and Eel-River Indians of southern Indiana: An anthropological report.* New York: Garland.

Wheen, F. (2000). *Karl Marx: A life.* New York: Norton.

Whitby, B. (2003). *Artificial intelligence: A beginner's guide.* Oxford: OneWorld.

White, J. D. (2001). *Lenin: The practice and theory of revolution.* Houndmills, UK: Palgrave.

White, J. E. M. (1970). *Ancient Egypt.* New York: Dover.

White, L. (1959). *The Evolution of culture.* New York: McGraw-Hill.

White, L. (1987). *Ethnological essays.* Albuquerque: University of New Mexico Press.

White, L. A. (1949). *The science of culture: A study of man and civilization.* New York: Farrar, Straus, and Giroux, Inc.

White, L. A. (1959). *The evolution of culture: The development of civilization to the fall of Rome.* New York: McGraw-Hill.

White, L. A. (1973). *The concept of culture.* Minneapolis: Burgess Publishing Company.

White, M., & Ashton, N. (2003). Lower Paleolithic core technology and the origins of the Levallois method in North-Western Europe. *Current Anthropology, 44,* 599–609.

White, R. (2003). *Prehistoric art: The symbolic journey of humankind.* New York: Abrams.

White, R., Perrone, S., Guerra, C., & Lampugnani, R. (1999). *Ethnic youth gangs in Australia: Do they exist?* (Overview Report). Melbourne, Australia: Australian Multicultural Foundation.

White, S. H. (2000). Conceptual foundations of IQ testing. *Psychology, Public Policy, and Law, 6,* 33–43.

White, T. (2003). Early hominids—diversity or distortion? *Science, 299,* 1994–1997.

White, T. D. (1991). *Human osteology.* San Diego: Academic Press.

White, T. D. (1992). *Prehistoric cannibalism at Mancos.* Princeton, NJ: Princeton University Press.

White, T. D. (2000). A view on the science: Physical anthropology and the millennium. *American Journal of Physical Anthropology, 113,* 287–292.

White, T. D. (2003). Early hominids—Diversity or distortion? *Science, 299,* 1994–1996.

White, T. D., Asfaw, B., DeGusta, D., Tilbert, H., Richards, G. D., Suwa, G. & Howell, F. C. (2003). Pleistocene *Homo sapiens* from Middle Awash, Ethiopia. *Nature, 423,* 742–747.

Whitehead, A. N. (1929). *Process and reality.* Cambridge: Cambridge University Press.

Whitehead, A. N. (1978/1929). *Process and reality: An essay in cosmology.* In D. R. Griffin & D. W. Sherburne (Eds.). New York: Free Press.

Whitehead, A. N. (1995). In *The Cambridge dictionary of philosophy.* Cambridge: Cambridge University Press.

Whitehead, P, F., & Jolly, C. J. (2000). *Old World monkeys.* Cambridge, UK: Cambridge University Press.

Whitehead, P. F. (1993). Aspects of the anthropoid wrist and hand. In D. L. Gebo (Ed.), *Postcranial adaptation in nonhuman primates* (pp. 96–120). DeKalb, IL: Northern Illinois University Press.

Whitehead, P. F., & Larson, S. G. (1994). Shoulder motion during quadrupedal walking in *Cercopithecus aethiops:* Integration of cineradiographic and electromyographic data. *Journal of Human Evolution 26,* 525–544.

Whitehead, P. F., Sacco, W. K., & Hochgraf, S. B. (2005). *A photographic atlas for physical anthropology.* Englewood, CO: Morton.

Whitehouse, P. J., Gaines A. D, Lindstrom H., Graham J., & ADWG (Anthropology and Dementia Writing Group). (2004). Dementia in the anthropological gaze: Contributions to the understanding of age-related cognitive impairment. *The Lancet Neurology 3*(12).

Whitehouse, P. J., Maurer K., & Ballenger J. F. (Eds.). (2000). *Concepts of Alzheimer disease: Biological, clinical, and cultural perspectives.* Baltimore: Johns Hopkins University Press.

Whitehouse, R. (Ed.). (1998). *Introduction: Gender and Italian archaeology: Challenging the stereotypes.* London: Accordia Research Centre and Institute of Archaeology.

Whiteley, W. (1969). *Swahili: The rise of a national language.* London: Methuen.

Whiting, B., & Whiting, J. W. M. (1975). *Children of six cultures: A psycho-cultural analysis.* Cambridge, MA: Harvard University Press.

Whiting, J. W. M. (1988). George Peter Murdock (1897–1985). *American Anthropologist, 88,* 682–686.

Whiting, J., & Child, I. (1953). *Child training and personality: A cross-cultural study.* New Haven, CT: Yale University Press.

Whitley, D. S. (Ed.) (2001). *Handbook of rock art research.* New York: AltaMira Press.

Whittaker, C. R. (2004). *Rome and its frontiers: The dynamics of empire.* London and New York: Routledge.

Whitten, T. (1982). *The gibbons of Siberut.* London: J. M. Dent.

Whittle, A. (1996). *Europe in the Neolithic: The creation of new worlds.* Cambridge, UK: Cambridge University Press.

Whorf, B. (1956). *Language, thought, and reality.* New York: Wiley.

Whorf, B. L. (1962). *Language, thought, and reality: Selected writings of Benjamin Lee Whorf.* Cambridge, MA: MIT Press.

Wierzbecka, A. (1997). *Understanding cultures through their key words: English, Russian, Polish, German, and Japanese.* New York: Oxford University Press.

Wiessner, P. (1982). Risk, reciprocity and social influences on !Kung San economics. In E. Leacock & R. Lee (Eds.), *Politics and history in band societies* (pp. 61–84). Cambridge, UK: Cambridge University Press.

Wilczak, C., & Kennedy, K. A. R. (1998). Mostly MOS: Technical aspects of identification of skeletal markers in forensic anthropology. In K. Reichs (Ed.), *Forensic osteology* (2nd ed., pp. 461–490). Springfield, IL: Charles C Thomas.

Wilk, S. (1991). *Humanistic anthropology.* Knoxville: University of Tennessee Press.

Wilkinson, R. (2000). *The complete temples of Ancient Egypt.* London: Thames & Hudson.

Williams, B. F. (1989). A class act: Anthropology and the race to nation across ethnic terrain. *Annual Review of Anthropology, 18,* 401–444.

Williams, G. (1992). *Sociolinguistics: A sociological critique.* New York: Routledge.

Williams, G. C. (1966). *Adaptation and natural selection: A critique of some current evolutionary thought.* Princeton, NJ: Princeton University Press.

Williams, P. (2003). *Gypsy world* (C. Tihanyi, Trans.). Chicago: University of Chicago Press.

Williams, R. (1975). *Keywords: A vocabulary of culture and society.* London: Fontana.

Williams, R. (1977). *Marxism and literature.* London and New York: Oxford University Press.

Williams, R. (1980). *Problems in materialism and culture: Selected essays.* London: Verso.

Williams, W. (1992). *The spirit and the flesh: Sexual diversity in American Indian culture.* Boston: Beacon.

Willis, D. (1992). *The Leakey family: Leaders in the search for human origins.* New York: Facts on File.

Willis, M. (1996). *The Islamist challenge in Algeria: A political history.* New York: New York University Press.

Wills, W. H., & Leonard R. D. (Eds.). (1994). *The ancient southwestern community: Models and methods for the study of prehistoric social organization.* Albuquerque: University of New Mexico Press.

Wilmott, G. (1996). *McLuhan, or modernism in reverse.* Toronto: University of Toronto Press.

Wilmsen, E. N. (1989). *Land filled with flies: A political economy of the Kalahari.* Chicago: University of Chicago Press.

Wilmsen, E. N., & Denbow, J. R. (1990). Paradigmatic history of the San-speaking peoples and current attempts at revision. *Current Anthropology, 31*, 489–524.

Wilmsen, E. N., & Roberts, F. H. H. Jr. (1978). *Lindenmeier, 1934–1974: Concluding report on investigations* (Smithsonian Contributions to Anthropology No. 24). Washington, DC: Smithsonian Institution Press.

Wilson, D. J. (1999). *Indigenous South Americans of the past and present: An ecological perspective.* Boulder, CO: Westview Press.

Wilson, E. O. (1992). *The diversity of life.* Cambridge, MA: Harvard University Press.

Wilson, E. O. (1988). *On human nature.* Cambridge, MA: Harvard University Press.

Wilson, E. O. (1994). *Naturalist.* New York: Warner Books.

Wilson, E. O. (1998). *Consilience: The unity of knowledge.* New York: Vintage Books.

Wilson, E. O. (2000). *Sociobiology: The new synthesis.* Cambridge, MA: Harvard University Press.

Wilson, F. R. (1998). *The hand: How its use shapes the brain, language, and human culture.* New York: Pantheon Books.

Wilson, G. N. (2000). *Clinical genetics: A short course.* New York: Wiley-Liss. Boldurian, A. T., & Cotter J. L. (1999). *Clovis revisited.* Philadelphia: University of Pennsylvania Museum.

Wilson, L. D. D. (1980). *Argillite: Art of the Haida.* North Vancouver, Canada: Hancock House.

Wilson, L. G. (1972). *Charles Lyell: The years to 1841—The revolution in geology.* New Haven, CT: Yale University Press.

Wilson, R. A. (Ed.). (1999). *Species: New interdisciplinary essays.* Cambridge: Bradford/MIT Press.

Wilson, R. A., & Mitchell, J. P. (Eds.). (2003). *Human rights in global perspective: Anthropological studies of rights, claims and entitlements.* New York: Routledge.

Wilson, S. M. (Ed.). (1997). *The indigenous people of the Caribbean.* Gainesville: University Press of Florida.

Wilson, W. J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy.* Chicago: University of Chicago Press.

Winch, D. (Ed.). (1987a). *An essay on the principle of population* (2nd ed.). Cambridge, UK: Cambridge University Press.

Winch, D. (Ed.). (1987b). *Malthus.* Cambridge, UK: Cambridge University Press.

Winchester, S. (2001). *The map that changed the world: William Smith and the birth of modern geology.* New York: HarperCollins.

Winnacker, E. L., Rendtorff, T., Hepp, H., Hofschneider, P. H., & Korff, W. (2002). *Gene technology: Interventions in humans. An escalation model for the ethical evaluation* (English and German 4th ed.). Munich: Utz. Bennett, J. H. (1983). *Natural selection, heredity, and eugenics.* New York: Clarendon Press.

Winstone, H. V. F. (1991). *Howard Carter and the discovery of the tomb of Tutankhamun.* London: Constable.

Winthrop, R. H. (1991). *Dictionary of concepts in cultural anthropology.* New York/Westport/London: Greenwood Press.

Wissler, C. (1929). *An introduction to social anthropology.* New York: H. Holt and Company.

Wissler, C. (1957). *The American indian: An introduction to the anthropology of the new world.* Gloucester, MA: P. Smith.

Wissler, C. (1989). *Indians of the United States.* New York: Anchor Books.

Witte, B. (1999). *Goethe-Handbuch-in vier Bänden.* Metzler: Stuttgart and Weimar.

Wittfogel, K. (1957). *Oriental despotism: A comparative study of total power.* New Haven: Yale University Press.

Wittgenstein, L. (1977). *Culture and value.* Chicago: University of Chicago Press.

Wolcott, H. (1995). *The art of fieldwork.* Walnut Creek, CA: Alta Mira.

Wolf, E. (1966). *Peasants.* Englewood Cliffs, NJ: Prentice Hall.

Wolf, E. R. (1959). *Sons of the shaking Earth.* Chicago: University of Chicago Press.

Wolf, E. R. (1969). *Peasant wars of the twentieth century.* New York: Harper and Row.

Wolf, E. R. (1974). *Anthropology.* New York: W. W. Norton. (Original work published 1964)

Wolf, E. R. (1982). *Europe and the people without history.* Berkeley and Los Angeles: University of California Press.

Wolf, E. R. (1999). *Envisioning power: Ideologies of dominance and crisis.* Berkeley and Los Angeles: University of California Press.

Wolf, E. R. (1999). *Envisioning power: Ideologies of dominance and crisis.* Los Angeles: University of California Press.

Wolf, E. R. (2001). *Pathways of power: Building an anthropology of the modern world.* Berkeley: University of California Press.

Wolfpoff, M. H. (1999). *Paleoanthropology.* New York: McGraw-Hill.

Wolfson, E. (2002). *Roman mythology.* Berkeley Heights, NJ: Enslow.

Woll, S. (2002). *Death and the king's horseman.* New York: W. W. Norton.

Wolpoff, M. H. (1999). *Paleoanthropology* (2nd ed.). New York: McGraw-Hill.

Wolpoff, M., Senut, B., Pickford, M. Y., & Hawks, J. (2002). Sahelanthropus or Sahelpithecus? *Nature, 419,* 581–582 (includes Brunet et al. reply).

Wood, B. (1991). *Making the U. N. system work.* Paper presented at the International Studies Association Annual Conference.

Wood, B. (2004). *Human evolution: A very short introduction.* Oxford: Oxford University Press.

Wood, B. A. (1988). Are "robust" australopithecines a monophyletic group? In F. E. Grine (Ed.), *Evolutionary history of the "robust" Australopithecine* (pp. 269–284). New York: Aldine de Gruyter.

Wood, B. A. (1992). Origin and evolution of the genus *Homo. Nature, 355,* 783–790.

Wood, B. A. (1993). Early *Homo.* How many species? In W. H. Kimbel & L. B. Martin (Eds.), *Species, species concepts, and primate evolution* (pp. 485–522). New York: Plenum Press.

Wood, B. A. (1994). Taxonomy and evolutionary relationships of *Homo ergaster. Courier Forschungs-Institut Senckenberg, 171,* 159–165.

Wood, B. A. (2002). Hominid revelations from Chad. *Nature, 418,* 133–135.

Wood, B. A., & Strait, D. S. (2004). Patterns of resource use in early *Homo* and *Paranthropus. Journal of Human Evolution, 46,* 119–162.

Wood, B., & Collard, M. (1999). The human genus. *Science's Compass, 284,* 65–71.

Woodcock, G. (1971). *Anarchism: A history of Libertarian ideas and movements.* New York: Meridian.

Woodcock, G. (1971). *The anarchist prince: Peter Kropotkin.* New York: Schocken.

Woodhead, M., & Montgomery, H. (2003). Understanding childhood. An *interdisciplinary approach.* Chichester, UK, and New York: Wiley & Sons.

Woodward, S. L., & McDonald, J. N. (2002). *Indian mounds of the middle Ohio Valley: A guide to the mounds and earthworks of the Adena, Hopewell, Cole, and Ft. Ancient people.* Newark: McDonald and Woodward Publishing.

Wrangham, R. W., et al. (Eds.). (1996). *Chimpanzee cultures.* Cambridge: Harvard University Press.

Wrangham, R. W., Heltne, P. G., McGrew, W. C., & De Waal, F. B. M. (Eds.). (1996). *Chimpanzee cultures.* Cambridge, MA: Harvard University Press.

Wright, A. F. (1965). *Confucianism and Chinese civilization.* New York: Atheneum.

Wright, K. R., & Zeggar, A. V. (2000). *Machu Picchu: A civil engineering marvel.* Reston, VA: American Society of Civil Engineers.

Wright, M. R. (1981). *Empedocles: The extant fragments.* New Haven, CT, and London: Yale University Press.

Wright, P., Simons, E. L., & Gursky, S. (Eds.). (2003). *Tarsiers: Past, present and future.* Rutgers, NJ: University of Rutgers Press.

Wrigley, A., & Souden, D. (Eds.). (1986). *The works of Thomas Robert Malthus.* London: Pickering & Chatto.

Wu Yin, B. (2001). *Choosing simplicity: A commentary on the Bhikshuni Pratimoksha by venerable Bhikshuni Wu Yin* (B. J. Shih, Trans., B. T. Chodron, Ed.). Ithaca, NY: Snow Lion Publications.

Wuketits, F. M. (1984). *Concepts and approaches in evolutionary epistemology: Towards an evolutionary theory of knowledge, theory, and decision library* (Vol. 36). Dordrecht, The Netherlands, Boston: D. Reidel.

Wurm, S. A., & Heyward, I. (2001). *Atlas of the world's languages in danger of disappearing* (2nd ed.). Paris: UNESCO.

Wysocki, D. K. (2004). *Readings in social research methods.* Belmont, CA:Wadsworth.

Yang, C. K. (1961). *Religion in Chinese society.* Berkeley: University of California.

Yankah, K. (1995). *Speaking for the chief: Okyeame and the politics of Akan royal oratory.* Bloomington, IN: Indiana University Press.

Yener, K. A. (2000). *Domestication of metals: The rise of complex metal industries in Anatolia.* Boston: Brill Academic.

Yerkes, R. M. (1926). *The mind of a gorilla.* Worchester, MA: Clark University.

Yerkes, R. M. (1934). *Modes of behavioral adaptation in chimpanzee to multiple-choice problems (Comparative psychology monographs).* Baltimore: Johns Hopkins Press.

Yerkes, R. M. (1982). *Psychological examining in the United States army.* Milwood, NY: Kraus Reprint.

Yonge, C. D. (1993). *The works of Philo.* Peabody, MA: Hendrickson.

York, D., & Farquhar, R. M. (1973). *The Earth's age and geochronology.* Toronto: Pergamon Press.

Young, E. (2003). Mungo Man has his say on Australia's first humans. *New Scientist, 177,* 15.

Young, M. (Ed.). (1979). *The ethnography of Malinowski.* London: Routledge & Kegan Paul.

Young, P. D. (1971). *Ngawbe: Tradition and change among the Western Guaymí of Panama, Illinois Studies in Anthropology,* Vol. 7. Urbana: University of Illinois Press.

Young, R. E., Becker, A. L., & Pike, K. L. (1970). *Rhetoric: discovery and change.* New York: Harcourt, Brace & World.

Zabilka, I. (1992). *Scientific malpractice: The creation/evolution debate.* Lexington, KY: Bristol Books.

Zeuner, F. E. (1946). *Dating the past.* London: Methuen.

Zihlman, A. (1997). The Paleolithic glass ceiling: Women in human evolution. In L. Hager (Ed.), *Women in human evolution* (pp. 91–113). London: Routledge.

Ziker, J. P. (2002). *Peoples of the Tundra: Northern Siberians in the post-communist transition.* Prospect Heights, IL: Waveland Press.

Zimmer, C. (1999). New date for the dawn of dream time. *Science, 280,* 1243–1246.

Zinkin, T. (1962). *Caste today.* London: Oxford University Press.

Zubbay, G. (2000). *Origins of life on earth and in the cosmos.* San Diego, CA: Academic Press.

Zubov, V. P. (1996). *Leonardo da Vinci.* New York: Barnes & Noble.

INDEX

A priori and *a posteriori* judgments, 1356
Abacus, 541
ABO blood group, 382, 518
Abominable snowman, 2354
Aborigines, 1–3. *See also* **Australian Aborigines**
Abortion, 358, 872–873
Abu Huryea, 2301
Abu-Lughod, Lila, 137
Abu Simbel, 796–797, 803, 804
Abydos, 794, 801–802
Academic evaluation, 1574–1575
Accelerator mass spectrometry (AMS), 437
Acculturation, 293, 626, 1492
  Arctic peoples, 832–838
  ethnohistory, 855
  Haida, 1131–1133
  linguistic, 1484
  syncretism, 2151
Acheulean culture, 3–6, 317–318, 1723, 2028, 2209
  hand axes, 1723, 2209, 2210–2211, 2213–2214
  Homo erectus, 1187
  Homo ergaster, 1189
  Narmada culture, 1664
  Oldowan culture, 1767–1768
  Terra Amata, 2179
Achumawi, 712
Acoustic space, 1566
Acquired immunodeficiency syndrome (AIDS). *See* **HIV/AIDS**
Acropolis, 6–7
Action anthropology, 8–11, 174–176, 179, 1230, 2021, 2164–2165, 2266
  stimulating class consciousness, 2101
  See also Applied anthropology
Action theory, 1869
Active scientific realism, 1707
Adae, 288
Adams, Herbert Baxter, 1878
Adapoids, 1959
Adaptation, 11–17, 1057
  aquatic ape hypothesis, 224–227
  evolutionary epistemology, 920–921
  humanness and epistemological niche in reality, 606
  measuring adaptiveness, 12–17
  moral naturalism, 611
  optimality models, 11–12, 15–17
  tacit post hoc imperative, 608–609
  vacuum theory, 1747
Adaptation, biological, 11–17. *See* also Adaptation
Adaptation, cultural, 17–19
Adaptive landscape, 927
Adaptive radiation, 898, 903
Adena, 433, 1756–1757
Adonque, 573
Adoption, 72, 935
Adultery, 1619
Advaita, 1280–1281
Advertising, 113–114
Aegean Sea, 1067
Aesthetic appreciation, 19–22. *See also* Art
Affirmative action, 22–23, 26, 30
Africa
  Asante, 283–292, 1370

Banyang medicine man, 332–336
Bushmen, 136, 530, **1388–1390**, 2186–2188, 2213
Ejagham culture, 1295–1299
Hottentots, 2187
Ik, 1273, 2232
Kenyan traditional pastoralists, 2047–2048
languages of, 29, 1408, 1488, 2147–2148
Lozi judicial process, 1433
Maasai, 978, **1507–1508**
Ndembu, 2232
occult economies, 2324
population growth, 1903, 1906
primate conservation problems, 1936
pygmies, 1558–1562, 2232
Sahara anthropology, 2042–2044
Samburu, 2047–2048
socialist schools in, 23–25
Sudanese society, 2139–2141
thinkers, 26–28
Tiriki initiation, 1471
Tswana Bantu, 2230–2232
Zande (Azande), 2317, 2320, **2358–2361**
Zulu, 2369–2371
African Americans, 27–29, 1601
academic achievement, 1757
Ebonics, 1757
Martin Luther King, 1368–1369
pathological societies, 1155
thinkers, 28–30
African Independent Churches, 2151
African masks, 1547
African thinkers, 29–30
Africanist model of ancestor worship, 73–74
Afro-Antilleans, 1822
Afro-Brazilian religions, 412–413, 2151
Afrocentricity, 29
Afro-Cuban religion, 615–616
Afterlife transitions, 75–76
Agape, 55
Agassiz, Luis, 448
Agency, 2097
complexity theory, 484–486
ethics versus cultural relativism, 844
negotiation of, 137
structure and, 605–606, 608
Aggression, 31–32, 2299
frustration theory, 2299
innate theory, 2299
Lorenz on, 1496
Mead's New Guinea studies, 1568–1569
socialization, 31
Yanomami controversy, 478, 668–672, 1144, 2270, 2350, 2351
See also **Conflict**; Warfare
Aggression, primate, 32–33, 271–272, 713
adaptive strategies, 713
baboons, 33, 325
bonobos, 391
chimpanzees, 502–503, 1100, 1897, 1899, 2180–2181
evolutionary perspective, 2303
Aging and elders, 806–807
gerontology, 1071–1073
Agnatic descent, 1370
Agnostic, 690, 691, 1301
Agrarian rituals, 322
Agricola, 1809
Agricultural revolution, 33–36
Agriculture
agricultural revolution, 33–36
Aztec, 320–322
Eastern Agricultural Complex, 1763
genomics applications, 1224
Hopewell moundbuilder culture, 1762–1763
horticulture, 1203–1204
intensive agriculture, 36–38, 321
Iroquois, 1324–1325
irrigation, 1332–1333
origins of, 38–40
Polynesia, 1888
Sumerian, 2143
Agriculture, intensive, 36–38, 321
Agriculture, origins of, 38–40
Agriculture, slash and burn, 40. *See also* Slash-and-burn agriculture
Ahimsa, 1160, 1283, 1284
Ahlquist, Jon, 1628–1629, 1632
Aichorn, August, 1008
AIDS. *See* **HIV/AIDS**
Ainu, 264–265, 267
Ajivkas, 1249

Akhenaten, 29, 802
Akkadians, 327, 1584
Akua'ba, 290
Alakalufs, 2188
Albania, 330
Albinism, 1577
Albumin, 1627
Alchemy, 41
Alcoholism, 836
Aleuts, 41–45, 1642
Alexander, Richard, 2108
Alexander the Great, 274–275, 328, 792, 1158, 2229, 2366
Alexandria, 795
ALFRED, 45–46
Algonquians, 46–49, 1488–1489
Alibek, Ken, 1040
Alienation, 50–52
  Islamic youth, 51–52
  Marxist conception, 50, 2342
Allen, Paul, 282
Alliance theory, 1370, 2097
Allozymes, 910–911
Alor, 1603–1604
Alpine "Iceman," 758, 1265–1268
Altamira Cave, 52–53, 416
Altered states of consciousness, 565, 2318
Althusser, Louis, 2139
Altruism, 53–55, 611, 772, 1908
  animals and, 2107–2109
  evolutionary ethics, 924–925
  evolutionary psychology, 1968
  mutual aid theory, 2037
  universal, 55
Alux, 1775
Alzheimer's disease, 725–726, 863
Amazonia, 56–65, 2267
  anthropology, 64–65
  culture regions, 61–62
  environmental activism, 830–831
  history of, 62–64
  languages, 59–61
  tribal groups, 58–59, 64
  Yabarana, 2345–2346
  See also **Brazil; Venezuela; Yanomami**
Ambedkar, Bhimrao Ramji, 2249–2250
Amber, 996
Ambilocal families, 947, 1538
American Anthropological Association (AAA), 92, 98, 177, 386, 537
  first female president, 2328
  human rights and, 1229, 1231
  Yanomami controversy, 667–672
American Civil Liberties Union (ACLU), 892
American Indian Movement (AIM), 1677
American Sign Language (ASL), 208, 213, 1379, 1403, 1408, 1427, 1429, 2304
American variety of human, 385
Amerind, 1684
Amino acid racemization, 705
Amish, 65–69, 1842
Amity-enmity principle, 1360–1361
Amphibian fossil record, 989
Amphioxus lanceolatus, 1381
Amun-Re, temple of, 793
Anabaptist, 66
Anal stage, 1006, 1469
Analytic models, 1605
Analytics, 1356–1357
Anarchism, 1385, 1386
Anasazi, 69–72, 435
Ancestor worship, 72–76, 1843
  Africanist model, 73–74
  Asante, 288
  body-soul model, 73
  divine ownership model, 74–75
  Maori, 1531
  multifunctionalist model, 74
  psychoanalytic model, 73
  transitions to afterlife, 75–76
Ancestral Puebloan, 69–72
Andean archaeology, 2034
Andean cultures
  Altiplano culture, visual anthropology, 190–194
  Chachapoya Indians, 469–477
  Huara (Wari), 1209–1210
  See also Inca; **Peru**
Andrae, Walter, 267–268
Andrews, Roy Chapman, 1612
Angkor Wat, 76–77
Animal behavior, study of. *See* **Ethology**
Animals, 78–79

altruism and, 2107–2109
anthropomorphism of, 198
Australian fauna, 303–304
biogeography, 360–362
cloning, 759–761, 1053
domestication, 2038–2039
interspecies communication, 533
legends, 1459
mummies, 1642, 1644
tropical rain forest, 2226
Yerkes' cognitive studies, 2352
zooarchaeology, 251–255, **2364–2365**
See also Apes; **Ethology**; **Monkeys, New World**; **Monkeys, Old World**; *specific types*
Animals and language, 1416–1417, 1420–1421
See also Apes, human language use; Primate communication and vocalizations
Animatism, **79**, 1533, 2004
Animism, 79, **80–81**, 624, 1298, 1440, 2004. *See also* **Totemism**
Ankarapithecus, 205
Ankarapithecus meteai, 886
Anomie, 50, 739
Antarctic glaciation, 993
Anthony, Susan B., 2331
Anthropic principle, **81**, 352
Anthropistic theory of consciousness, 563
Anthropocentrism, **82–83**, 1698
Haeckel's critique, 1120–1121
Anthropological genetics, 1054. *See also specific related fields*
Anthropologists, female. *See* **Women and anthropology**; *specific anthropologists*
Anthropology, 356, 363, 435
definitions of, 150, 165, 778
future of, 168–169
interpreting evidence, 882–883
medieval, 257–259
of space, 263
sociology and, 182–183
synthetic, 282
Anthropology, careers in, **138–141**, 178–179
skills and training, 139–140, 179–180
Anthropology, characteristics of, **142–144**
Anthropology, clinical, **144–149**. *See also* Clinically applied anthropology
Anthropology, cultural, **150–157**. *See also* Cultural anthropology
Anthropology, economic, **157–165**. *See also* **Economic anthropology**
Anthropology, history of, **165–168**, 177–178
cultural anthropology research traditions, 152–157
Anthropology, humanistic, **169–172**
Anthropology, philosophical, **172–176**, 606
diachronic perspectives, 173–175, 856
ethical conduct, 179
evolutional dynamics, 175–176
free will, 843
interactive perspectives, 174–176
synchronic perspectives, 174
See also **Cultural relativism**; Epistemology; Ethics; **Functionalism**; **Kant, Immanuel**; Marxist anthropology; **Nietzsche, Friedrich**; Structural functionalism; **Structuralism**
Anthropology, practicing, **176–180**. *See also* Practicing anthropology
Anthropology, professional ethics issues. *See* Professional ethics
Anthropology, social, **180–184.** *See also* **Social anthropology**
Anthropology, subdivisions of, 150, **184–185**, 356–357, 363, 778–780
Anthropology, theory in, **186–187**
Anthropology, urban, 512–513. *See also* Urbanism
Anthropology, visual, **187–196**
history of, 187–188
need for, 187
new directions, 194–195
photo-elicitation, 189–194
triadic relationship, 188–189
value of, 194
Anthropology and business, **83–117.** *See also* Applied anthropology; Business anthropology; Industrial anthropology
Anthropology and epistemology, **117–119**
Anthropology and the Third World, **120–125**
Anthropology of law, 1751–1752. *See also* **Justice and anthropology**; Legal anthropology
Anthropology of men, **126–128**, 1031
Anthropology of religion, **128–132**. *See also* **Religion**
Anthropology of women, **132–138**, 1031
Anthropology skills and training, 139–140, 179–180

Anthropometry, **196–197**, 964
craniometry, **582–584**
immigrant cranial measurement project, 583
phrenology, 584–585
physiognomy, 598
Anthropomorphism, **197–198**
Antikythera, 541
Antiquities trade, 243
Anti-Semitism, 1620
Jews and pseudo-anthropology, 1346–1347
Nazi eugenics project, 699, 871
skinhead culture, 820
See also **Eugenics**; Jewish Holocaust
Ants, 2315
Anzaldua, Gloria, 2334
Aotearoa (**New Zealand**), **198–202**, 1529. *See also* **Maori**
Apartheid, 2231
Ape aggression. *See* Aggression, primate
Ape biogeography, **202–207**
Ape cognition, **207–212**, 392, 503–504
abstract thought, 215–216
artwork, 210
cause and effect, 209
cross-fostering, 208–209
cultural variants, 212
deception, 211
history of, 208–209
imaginary play, 212
language training, 208–209
mirror studies, 211–212, 392, 503–504
object permanence, 209
physical world interactions, 209–210
primate brain, 408–411
quantitative skills, 209–210
social intelligence, 210–212
spatial knowledge, 209–210
theory of mind, 211
tool use, 212
valid comparisons, 211
See also Apes, human language use
Ape language, **213–215**. *See also* Apes, human language use
Ape taxonomy. *See* **Primate taxonomy**
Apel, K., 1996
Apes, 220–222, 1891–1898, 1941
biogeography, 203, 205
blood groups, 383
cladistics, 515
cognitive abilities, 207–212
cultures, 212, 917
genetic diversity, 220–221
hands, 1421
homosexuality, 1957
human evolution and, 694, 884–885
human protein similarities, 1179–1180
intragroup communication, 534
nest building, 263–264, 1212–1213
pongid-hominid split, 888–889
"subhuman architecture," 263–264
tool use, 221, 263
See also Apes, greater; Apes, lesser; *specific types*
Apes, behavioral ecology of. *See* **Primate behavioral ecology**
Apes, extinction. *See* **Primate extinction**
Apes, fossil, 205, **216–220**, 764, 886, 904–905, 1079–1080
evolutionary anthropology, 913–918
Himalayan sites, 2089–2090
orangutan-human morphological similarities, 1781
Oreopithecus controversy, 1789–1790
See also Hominid fossils and evolution
Apes, greater, 216, **220–221**, 1183, 1891–1898, 1941
taxonomy, 1945
See also Apes; **Bonobos**; **Chimpanzees**; **Gorillas**; **Orangutans**
Apes, human language use, 213–215, 391, 393–394, 1403–1404, 1421–1425
bonobos, 209, 213–214, 506, 1421
chimpanzees, 208–209, 213–215, 504, 534, 1403, 1422–1425, 2035, 2304–2305
cross-fostering, 208–209
gorillas, 209, 213, 533, 1379–1381, 1403, 1832
LANA Chimp Language Project, 2035
language training, 209
neuroanatomy, 1424–1425
orangutans, 209, 213
primate brain and, 409–410
speech organs, 1422–1423
Apes, lesser, 216, **221–222**, 1183, 1262–1263, 1941. *See also* Gibbons; Siamangs

Apes, tool use, 1957
bonobos, 391, 1898
chimpanzees, 212, 221, 506, 917, 1185, 1897
hominization theory, 263
orangutans, 212, 221
Apollo, 223
Apollonian, **223**, 555, 642, 2244
Applebaum, Herbert, 94–95
Applied anthropology, 138, 150, 780, 2164–2165
colonialist historical context, 83–84
definition, 177
graduate programs, 178
political and ethical issues, 91–92
practicing anthropology, 138, 176–180
values and, 2265–2266
See also Business anthropology; Industrial anthropology
Applied anthropology, clinical. *See* Clinically applied anthropology
Applied medical anthropology, 144–149
Aquatic ape hypothesis, **224–227**, 1624–1625
Aquatic hypothesis for bipedalism, 375
Aquinas, Thomas, 21, 172, **228**, 359, 1220, 1668
Arab youth, 51–52
Arabic language, Kiswahili and, 2147
Arapesh culture, 979, 1571
Arawak, 59–60, 616
Arboreal brachiation. *See* **Brachiation**
Arboreal hypothesis, **229–235**, 377, 885
canopy theory, 1210–1216
grip-climbing, 1212
orbital convergence, 232–234
visual predation hypothesis, 232–235
See also **Human canopy evolution**
Arc of Evolution, **881–882**
Archaean era fossil record, 983–984
Archaeological Resources Protection Act (ARPA), 260
Archaeology, 167, 185, **236–244**, 779
artifacts and features, 236
Binford-Lewis and New Archaeology, 354–355
conservation and cultural resource management, 239, 243
direct historical approach, 238
early female pioneers, 2328–2329
early French theories, 394–395
ethnohistory, 854–855
excavation, 240–241, 247, **928–931**
gender studies, 244–246
heritage tourism, 244
maritime, 256–257
medieval, 257–259
methods, 239–242, 962
middens, **1595**
of cult, 623
processual and post-processual, 239, 251
Schliemann's Troy excavations, 2057–2059
site and artifact legal protections, 242–243
Speculative period, 236
theoretical and methodological development, 236–239
threats to sites, 243–244
three-age system, 237
writer for popular audiences, 942–943
zooarchaeology, 251–255
See also **Stratigraphy**
Archaeology, biblical, **246–249**
Archaeology, environmental, **250–255**
Archaeology, maritime, **256–257**
Archaeology, salvage, 239, **259–261**
Archaeology and gender studies, **244–246**
Archaeomagnetism, 705, 1064–1065, 1803–1805
Archaeopteryx, 584, 748, 991, 1602
Archaic Period of Native American history, 1685
Archanthropinae, 2307
Arche Noah model, 1191
Archetti, Eduardo, 128
Archetypes, 2246
Architectural anthropology, **261–268**
domestic architecture, 266
fibrous/nondurable materials, 262–263, 265, 267–268
nuclear border demarcations, 267
sedentary architecture, 266–267
semantic architecture, 264–265
subhuman architecture, 263–264
urban and imperial architecture, 267–268
Arctic, **269–270**, 824
pollution, 835
Arctic peoples, 269–270, 838, 839–841, 1317–1319
acculturation, 832–838
Briggs' work, 418–419
See also **Eskimos**; **Inuit**

Ardipithecus, 206, 219, 314–315, 317, 354, 1781
Ardipithecus kadabba, 1180
Ardipithecus ramidus, 887, 888, 1180, 2311–2312
Ardrey, Robert, 270–272
Arduino, Giovanni, 1063
Arens, William, 435–436
Argentina, 128, **272–274**, 1060.
See also **Tierra del Fuego**
Arikiras, 1680
Aristotle, 172, **274–276**, 598, 730, 894, 1302
entelechy, 821
essentialism, 841
Ethika Nikomacheia, 842
nationalism and, 1667–1668, 1671
on art, 21
on justice, 1351
on reciprocity, 1994
social organization concepts, 1029, 1073–1074
teleology, 2172
Aristotle, Digital, 282
Armchair anthropologists, 142, 151. *See also* **Frazer, James G.; Spencer, Herbert; Tylor, Edward Burnett**
Arnold, Matthew, 653
Arnould, Eric, 113
Aron, Raymond, 1271
Arsuaga, J. L., 276–277, 294
Art
aesthetic appreciation, 19–22
ancient Celt, 457
Andean Chachapoya culture, 477
architectural anthropology, 261–268
Asante, 286, 290–292
Aurignacian culture, 301
Australian Aborigines, 304
Clovis culture, 524
defining, 277–278
forensic artists, 597
functions of, 279
Haida and Northwestern Indians, 1127–1128
Inuit, 837
jewelry, 1340–1343
Maya, 1375
native studies, 1692
naturalism in, 1699–1700
Navajo, 1711, 1998
Nietzsche's apollonian, 223
Olmec, 1770
ornamentation, 1790–1793
primitive, 277
ritual, 2014
role of the artist, 279
sandpaintings, 1998
split representation, 280
style, 279–280
textiles and, 2182
universals in, 277–281
Venus of Willendorf, 2271–2272
X-ray style, 2237
See also **Cave art; Rock art; Totem poles**
Artifacts, 236
convergence of natural form, 266
curation, 261
legal protections and requirements, 242–243, 259–261
ownership issues, 1232–1234
See also Art; Stone tools
Artificial intelligence (AI), 281–283, 547–548
robots, 282, 551
speech systems, 2122–2123
Artificial life, 1473
Arutyunov, Sergei, 19
Aryan culture, 1635–1636
Aryan race, 1276
Asante, 283–292
arts, 290–292
economy, 285–287
history of, 283–285
kinship, 287, 1370
life cycle, 289–290
religion and spirituality, 287–289
Ashkenazic Jews, 1344–1345
Asian origin theory, 884, 1122
Asian pottery and ceramics, 1923
Asian values, 1237
Assimilation, 293–294, 1409, 2264
Aymara, 319
Assur, 1583
Assyrians, 327, 1583, 1585
Atapuerca, 276, **294–295**, 344, 1186
Atavism, 596
Athabascan, 296–299

Atheistic naturalism, 1697
Athena Nike, 7
Athletic competition, 1218–1219
Atlatls, 523
Atomistic philosophy, 422
Attention-deficit hyperactivity disorder (ADHD), 407, 925
Attractors, 480
Auel, Jean Marie, 299–300
Augustine, 1307–1308, 1830
Aum Shin Rikyo, 624
Aunjetity culture, 1341
Aurignacian culture, 300–301, 525, 1208, 1723
Aurobindo, Sri, 1284
Austin, John, 1440
Australia, 301–305, 307
  creationism debate, 587
  women and anthropology, 305–306
Australian Aborigines, 1–3, 304–305, **306–311**
  body painting, 1791
  collector culture, 530
  domestic violence, 306
  ecology, 307
  economy, 308
  face painting, 1548
  identities, 308–309
  kinship, 309
  language, 1
  marriage and exchange of women, 309–310
  Mungo Lady/Man, 1645–1646
  plant use, 622
  polygyny, 1883–1884
  population, 307
  putative hominid ancestors, 1740
  racist evolutionary interpretations, 2092
  religion and cosmology, 309
  rock art at Ubirr, 2237–2238
  sacred landscapes, 574
  study of, 2–3
  technologies, 307–308
  white Australian society and, 310–311
  women's ethnography, 136
Australian women anthropologists, 305–306
Australoid, 569
Australopithecines, 271, **311–317**, 675–676, 886, 886, 887–889
  bipedalism, 373–377
  brain structure, 564, 1307
  climate change and extinction, 938
  fossil footprints, 996
  group behavior, 2303
  Homo habilis distinctions, 1189
  Johanson's work, 1347–1349
  Kenyanthropus and, 1363–1364
  orangutan similarities, 205–206, 1780–1782
  tool use, 1190, 2311–2312
  See also Ardipithecus; Orrorin; Sahelanthropus; specific species
Australopithecus aethiopicus, 315, 889
Australopithecus afarensis, 315, 401, 886, 887, 1456–1457
  bipedalism, 373–377
  footprint impressions, 1808
  Johanson's work, 1347–1349
  "Lucy," 887, 1348, 1349
  Lucy reconstruction models, 1500–1503, 1781–1782
  proposed evolutionary lineage, 1457
  tree-climbing ability, 1210
Australopithecus africanus, 271, 315–316, 354, 401, 675, 886, 887, 889
  proposed evolutionary lineage, 1457
  speech organs, 1423
Australopithecus anamensis, 219, 315, 317, 886, 1180
Australopithecus boisei, 315, 885, 889, 1450, 1451, 1453, 2329, 2364
  proposed evolutionary lineage, 1457
Australopithecus garhi, 316, 317, 885, 2311–2312
Australopithecus "habilis," 316. *See also Homo habilis*
Australopithecus robustus, 316, 884, 889
  proposed evolutionary lineage, 1457
Autism, 407
Automation, 2167
Avarna, 2248–2251
Avery, Oswald, 1036
Avunculocal families, 945, 947, 1538
Axelrod, Robert, 483
Axes, hand, 317–318. *See also* Hand axes
Aye-aye, 1959
Ayers Rock, 302
Aymara, 319–320
Ayoreo, 1113

Azande. *See* **Zande**
Aztecs, 1552, 1589, 1591
Aztec agriculture, 320–322
cannibalism, 1144
temples, 2175
Tenochtitlan, 2175–2178
Azusa Street Revival, 1836

Baba, Marietta, 100, 101
Babbage, Charles, 552
Baboons, 323–326, 466–468, 1617, 1930, 1932, 2138, 2329
aggressive behavior, 33, 325
bipedalism, 375
cladistics, 515
communication, 325
diseases, 326
locomotion study, 1949–1954
social system, 323–324
types, 323
vocalization and communication, 1420
Baby talk, 1405
Babylon, 326–328, 1583, 1584–1585
temples, 2174
Bachofen, Adolphe, 1439–1440
Bachofen, Johann Jakob, 535, 1553
Bacon, Francis, 1268
Baer, Karl E., 659
Bakhtin, Mikhail, 328–329
Balinese culture, 2199
Balkanization, 330
Balkans, 329–331
Baluchi language, 331
Baluchistan, 331
Bambuti, 1558–1562
Bands, 1871
Bankes, William, 804–805
Bantu-speaking people, 2230–2232
Banyang medicine man, 332–336
Baoulé, 292
Barbados, 103
Barham, Lawrence, 2211
Barnett, Steve, 111–112
Barnouw, Victor, 1604
Barnum, P. T., 1655
Bärsch, Claus-Ekkehard, 1272
Basic personality structure, 613–614, 1358–1359, 1603–1605
Basket Maker culture, 69–70
Basque language, 1489
Bass, William, 365–366
Bastian, Adolf, 1252, 1255
Bastide, Roger, 2151
Batchelor, John, 265
Bates, Daniel G., 332
Bateson, Gregory, 181, 188, 643–645, 657, 1569
Bateson, William, 1058
Battered child syndrome, 489
Baudrillard, J., 2088
Bauer, Bruno, 1860
Baugh, Carl, **1818**
Beadle, George, 1045
Beads, 292, 297, 524, 2182
Bear Feast, 297
Beauty, 609, 648, 2335
Beauvoir, Simone de, 2330
Becker, Gary S., 336–337
Becker, Howard, 740
Behar, Ruth, 137
Behavior, collective, 337–339
Behavior norms. *See* **Norms**
Behavioral ecology, 770, 771–773, 2303. *See also* **Human behavioral ecology; Primate behavioral ecology**
Behavioral genetics, 811, 899, 1964–1970
evolutionary behavioral sciences, 1967–1969
molecular genetics, 1967
quantitative behavioral genetics, 1966–1967
See also **Psychology and genetics**
Behavioral observation, 964–965
Behavioralism, 1879
Behaviorism, 731, 1299
Being and non-being, 663–664
Bell, Diane, 136
Bell, Gertrude Margaret Lowthian, 2329
Bella Coola, 954
The Bell Curve (Murray & Herrnstein), 1052–1053
Beltran, Gonzalo Aguirre, 1589
Benedict, Ruth, 169, **339–342**, 555, 632, 1470, 1493, 1568, 1569, 2328
cultural relativity of deviance, 1962

on culture and personality, 641, 642
Patterns of Culture, 555, 632, 858, 2328
Bengtsson, T., 1903–1904, 1905
Bentham, Jeremy, 55, 998
Berdache, 342–343, 642, 1032
Beresford, Maurice, 258
Bergson, Henri, 343–344, 722, 881, 895, 1862, 2168–2169, 2173
on duration and time, 2198
Bering land bridge, 269, 859, 1209, 1600, 1622–1623, 1684, 2083
Aleut origins, 42
Clovis origins, 525–527, 1684
Beringia, 525–526, 1684, 2083. *See also* Bering land bridge
Bermúdez de Castro, J. M., 294, **344–345**, 1186
Besançon, Alan, 1271
Bethune, Mary McLeod, 2332
Bhagavad Gita, 1279–1280
Bhakti, 1161
Bhaskar, Roy, 605
Bhutsuddhi, 1286
Bialystok, Ellen, 1311
Bibikov, S., 1802
Biblical archaeology, 246–249
Biblical creationism versus geology, 585–587. *See also* Creationism
Biblical research, 702, 2004
Big Bang theory, 347–354, 588
Big man societies, 2104, 2105
Bigfoot, 2054–2055, 2354, 2355
Bilateral descent, 1370
Bilineal descent, 1370
Bilingualism, 1311
Bilocal families, 945, 947, 1538
Binet, Alfred, 1308, 1310
Binford, Lewis Roberts, 354–355
Bingham, Hiram, 355–356
Biochemical genetics, 1045
Biodiversity, "father of," 2315
Bioengineering. *See* Genetic engineering
Bioethics and anthropology, 356–360
beginning of human life, 357–359
death and dying, 359–360
See also Ethics; Professional ethics
Biogeochemistry, 2275–2277
Biogeography, 202, **360–362**, 612–613, 1778, 2295, 2315
critique of imaginary centers of origin, 203
evidence for evolution, 899–900
evolutionary, 202–207
non-Darwinian evolutionary mechanisms, 1748–1749
paleobiogeography, 1813
panbiogeography, 202–203, 612
Biographical ethnography, 135–136
Bioinformatics, 362–363. *See also* Human Genome Project
Biological adaptation. *See* **Adaptation**
Biological anthropology, 167, 185, 357, **363–365**, 779
evolutionary synthesis and, 368–370
field methods, 962
HIV/AIDS and, 1167–1168
types of biological explanation, 912
See also Clinically applied anthropology; Forensic anthropology; Physical anthropology
Biological anthropology and neo-Darwinism, 368–370.
See also Modern synthesis; Neo-Darwinism
Biological observation, 964
Biological Species Concept (BSC), 1946
Biological weapons, 1040
Biomedical research, primates and, 506–507
Biomedicine, 370–371
biomedical culture, 145–146
diseases, 750
ethnomedicine, 860–861
obstetrics model, 493
technocratic model, 1146
U.S. medical hierarchy, 1147
See also Health and medicine
Biometrics, 371–372
biometricians, 1043
evolutionary synthesis and, 369
Biophysics, 362
Biosocial model of stress, 1217–1218
Biosphere evolution, 2272, 2276–2277
Biostratigraphy, 1811–1813, 2134–2135
Biostratinomy, 1807, 2160–2161
Biotic technics, 2166
Bioturbation, 1808

Bipedal locomotion, **372–378**, 884, 887, 1180
aquatic ape hypothesis, 225
arboreal hypothesis, 232, 375, 377
canopy theory, 1210–1216
dinosauroid, 748
evolution from quadrumanous primates, 1210–1211
evolutionary anthropology, 917
hominid evolution, 888
hominid footprint origins, 377–378
Homo habilis, 1189
infant carrying and, 1211
non-Darwinian evolutionary mechanisms, 1750
Oreopithecus, 1790
See also **Primate quadrupedalism**
Bird origins, 991
Bird songs, 867
Birdman Cult, 1987
Birds and speech, 1422
Birth-control technology, 2016
Birthing. *See* **Childbirth**
Birx, H. James, 172, 680, 786
Black, Davidson, **378–380**
Black Elk, 633, 1675, 1677
Black women and anthropology, 2328
Blended-inheritance theory, 693, 1139, 2307
Blessing, 1516
Bloch, Ernst, 1270
Blomberg, Jeanette, 108
Blombos Cave, **380–381**
Blood groups, **381–384**, 518
Blood serum proteins, 1626–1627
Blood transfusion, 381
Bloomfield, Leonard, 1481, 1482–1483
Bloor, David, 2064
Blue lotus, 803
Blumenbach, Johann Friedrich, **384–385**
Boas, Franz, 143, 167, **386–388**, 700, 1141
anthropology subfields and, 363
artistic style and, 280
Benedict and, 339, 340, 341, 555, 632, 2328
childhood studies and, 498–499
critics of, 388
cross-cultural research and, 613
cultural anthropology research traditions, 153–154
data collection approach, 968–969
descriptive linguistics, 1482
ethnographic writing, 851
ethnology goals and, 856
eugenics and, 1000–1001
historical particularism, 153–154, 769, 1253, 2094
immigrant cranial measurement project, 583
kulturkreise theory, 1388
psychic unity, 1253
racism and, 387, 388
salvage ethnography, 1233
Sapir and, 2050
school of possibilism, 18
social change stage theories and, 2094
social class theory, 2100
social Darwinism versus, 602–603
students of, 387, 388
totemism and, 2216, 2218
use of film technology, 188
Wissler and, 2316
Boas, Franz, cultural relativism and, 238, 632, 633, 880. *See also* **Cultural relativism**
Boasians, ahistorical tendencies of, 856–857
Body Farm, 365–366
Body mass index, 197
Body painting, 1791
Body piercing and augmentation, 1792
Body plans, 928
Body-soul model, 73
Bogoras, Waldemar G., 2083
Bohannan, Laura, 171
Bohannan, Paul, 1433, 1446
Bolivian fieldwork, 1667
Bollnow, Otto F., 263
Bolshevik Revolution, 1386, 1463, 1545, 2275
Bone tools, 676
Blombos Cave Paleolithic site, 380
Clovis culture, 521
Bonobos, 33, 216, 220, **389–394**, 714, 884, 1184, 1891, 1897–1898
anatomy, 389
behavior and society, 390–391
bipedalism, 389
chimpanzee differences, 505–506
cognitive abilities, 391
conservation, 392
early studies, 389

evolutionary anthropology, 916
human language use, 209, 213–214, 506, 1421
intragroup communication, 534
Kanzi, 213–214, 392, 393–394, 533, 534, 1421
language skills, 391, 393–394
sexual behavior, 390–391, 505, 1888–1889
tool use, 391, 1898
Bophutatswana, 2230, 2231
Borofsky, R., 65, 671
Boserup, Ester, 1904
Bosnia, 330
Botswana, 2230–2232
Bottleneck, 1033
Boucher de Perthes, Jacques, 4, 317–318, **394–395**
Bounty, H.M.S., 2155
Bourdieu, Pierre, **395–397**, 1416, 1471, 2097, 2199
Boxer Movement, 1979
Brace, C. Loring, **397–399**
Bracher, Karl-Dietrich, 1272
Brachiation, 374, **399**, 1078, 1939, 1944
Braidwood, Robert John, **400**, 1339
Brain, human, **404–407**
growth and development, 1194–1195
historical findings, 404
language and, 404, 407, 409, 1195, 1412, 1423–1426
nervous system, 404–405
neuroimaging technologies, 407
neurotheology, **1737–1740**
protective barrier, 405
structures, 406–407
Brain, James, 2322
Brain, primate, **408–411**
ecology, 410–411
relative size, 408–409
social relationships, 409
See also **Brain evolution**
Brain evolution, **400–403**, 889, 1307
arboreal hypothesis, 229
bipedalism evolution and, 374
canopy theory, 1210, 1212, 1216
consciousness, 564–565
dinosauroid, 748
extinction and, 403
issues in hominization, 1178
language and, 1424–1425
Neandertals, 1721
nest building and, 264
Brain measurement, craniometry, 582–584
Brassiere, 2335
Brazil, **411–414**
indigenous population, 411, 412
political organizations, 1877
race relations and racial classification, 1143–1144
spirituality, 412–413
Brazilian Amazon. *See* **Amazonia**
Breeding, 874, 899
Breuer, Josef, 576
Breuil, Henri, **415–417**
Bricolage, 642
Bride burning, 763, 1235
Bride price, **417–418**, 1537
dowry, **763**
Brief-therapy theories, 578–579
Briggs, Jean L., **418–419**
Briody, Elizabeth, 100
Bris, 2023–2024
British neolithic cultures, 1735
British political organizations, 1874–1875
British social anthropology. *See* **Evans-Pritchard, E. E.**; **Radcliffe-Brown, A. R.**; **Social anthropology**; Structural-functionalism
Broca, Paul, 404, 409, 1423, 1424
Broca's area, 404, 409, 1195, 1423, 1424
Brocchi, Gianbattista, 684–685
Brodmann, Korbinian, 1424
Bronze Age, 237, 702
Chinese culture, 1849
jewelry, 1341
Near Eastern culture, 247–248
Old World cities, 509
Brown, Joseph, 1675
Brown, Michael F., 1513
Brucke, Ernst, 1005
Bruno, Giordano, **420–423**, 931, 932
Brunvand, Jan Harold, 2256
Brusco, Elizabeth, 127
Bruun, Daniel, 250
Bryan, William Jennings, 674, 1615
Buber, Martin, **423–424**
Buck, Sir Peter, 1886
Buckland, William, 448

Buddhism, 424–427, 1282
ethics, 425–426
eudysphoria, 870
in China, 1844
in Mongolia, 1614
monastic tradition, 1609–1610
temple architecture, 2174
traditions, 426–427
Buechel, Eugene, 428–429
Buffon, Comte de, 1243
Bulgaria, 330
Bunch, Charlotte, 2334
Bunge, Mario, 1248
Bunzel, Ruth Leah, 430
Burckhardt, Jacob, 721
Bureau of American Ethnology, 1683, 1762
Burgess, Ernest, 2255
Burial and mortuary traditions, 75
Andean Chachapoya culture, 476
Chinese traditions, 76, 717–720
cremation, 1645, 2032
death rituals, 714–720
graves, 1108–1110
Maori placental burial, 200
mummies and mummification, 1642–1645
Neandertals, 1110, 1714–1715, 1722
See also Death; Funerals
Burial mounds, 430–434, 1172
European neolithic culture, 1736
Hopewell culture, 1758–1764
Myth of the Moundbuilders, 1761–1762
origins of, 432
types of, 432–433
use among cultures, 433–434
Burial objects, 1109–1110
Bushbabies, 1959
Bushmen, 2186–2188, 2213
Business anthropology, 83–117
boundary crossing in global context, 102–103
colonialist historical context, 83–84
communities of practice, 101
consumer behavior and marketing, 111–116
convergence of domains, 115–117
decline of industrial practice, 90–92
design ethnography, 107–111
ethical issues, 92
Fordism and post-Fordism, 97–98
Hawthorne Project, 85–88
high-technology entrepreneurs, 102
Human Relations School, 87–92
immigrant work experience, 105–106
knowledge management, 100
management and power issues, 106–107
Marxism and, 92–94
moral motivations, 104–105
non-Western industrialization, 95–97
occupations and professions, 94–95
organizational behavior and management, 98–99
organizational culture in technology-based firms, 99–102
practicing anthropology and, 177
regional perspectives, 103–107
social communication, 96–97
U.S. labor movement, 84–85
work culture, 94–95
worker-manager relations, 89
Butterfly effect, 480, 482

Cacao, 1376–1377
Cactus cultivation, 322
Caesar, Julius, 457
Cahokia, 1172
Calendar, Mayan Long Count, 1556
Calendars, 2198
Callitrichines. *See* **Tamarins**
Cambodia, 76–77
Cambrian fossil record, 986
Cameroon, Banyang culture, 332–336
Campbell, Donald T., 920
Canada, native language loss in, 49
Canestrini, Giovanni, 685–687
Canine reduction theory, 1179, 1180
Cannibalism, 435–436, 439, 1144, 1552, 2091, 2320
Canoe design, Oceania, 1799
Canopy theory, 1210–1216. *See also* **Arboreal hypothesis; Human canopy evolution**
Capitalism, 1872
role of the state, 1870
Tax's *Penny Capitalism,* 2165
world-system theory, 2297

Capitalism, Marxist critique of, 161–164, 605, 816–817, 1461–1483. *See also* Marxism; Marxist anthropology
Capitalist mode of production, 2325, 2326
Capoid, 569
Captive breeding programs, 2367
Capuchin monkeys, 455
Caral, Peru, 510, 1384
Carbon-14 (C14) dating, 238, 247, **436–438**, 704, 705, 706, 730, 976, 1468–1469
Carboniferous fossil record, 988–989
Carbonization, 996
Cardiff Giant hoax, **438–439**
Cardozo, Benjamin, 1443
Careers in anthropology, 138–141, 178–179
Cargo cults, 624
Caribs, 61, **439–440**
Carnegie, Andrew, 698
Carniero, Robert, 1871
Carnivalesque, 329
Carpenter, C. R., **440–442**
Carroll, Robert L., 904, 905
Carson, Rachel, **442–444**, 825
Carter, Howard, **444–445**
Cartesian dualism, 563–564, 730, 1700, 1703
Cartmill, Matt, 232–234
Carvakas, 1248, 1694–1695
Case studies, 1313, 1433–1434
Casique, Irene, 126
Cassirer, Ernst, 680
Castaneda, Carlos, 1676
Caste systems, **445–447**, 1161, 1276–1277
  challenges to, 447
  diaspora Hindus, 447, 1163
  endogamy, 813
  gotras, 446–447
  jati subcastes, 446
  modern India, 447
  untouchables, **2248–2251**
  varna, 445–446
Castro, Fidel, 617–619
Catastrophic extinction, 937–938
Catastrophism, 237, 398, **448–449**, 585, 589, 698, 1503–1504
  uniformitarianism versus, 2240
Categorical imperative, **449–451**, 1357
Caton-Thomas, Gertrude, 2329
Cattle complex, 809, 870, 1144, 1155
Caucasoid, 385, 569
Caulkins, Douglas, 102–103
Cause and effect understanding, apes and, 209
Causewayed enclosures, 1736
Cavalli-Sforza, Luigi Luca, **451–452**
Cave art, 416, **452–454**, 1431–1432, 2028
  Altamira Cave, 52–53
  evidence of warfare, 2300
  function and historical interpretation of, 452–454
  origin and evolution of, 452
Cayuga, 1322, 1325, 1326, 1327, 1328, 1330, 1331
Cazden, Courtney B., **454**
Cebids, **455–456**, 1616
Cech, Thomas, 2027
Celtic Europe, **456–464**
  early archaeological evidence, 457
  Gauls, 457
  headhunters, 459
  Iron Age, 1321
  lake dwellings, 457
  Middle Ages through Enlightenment, 461
  modern Europe, 462–464
  political economy, 458–459
  religion, 460–461
  social life, 459–460
Celtic languages, 457, 462–463
Cenobitic monasticism, 1608
Cenozoic era fossil record, 992–994
Centers of origin, 202, 203, 1748, 2038
Central American native peoples. *See* **South American and Central American native peoples**
Central Asian Chalcolithic, 570–571
Central Intelligence Agency (CIA), 537, 618
Central nervous system (CNS), 405
Cephalic index, 197, 582–583
Cercopithecines, **464–469**, 530, 917, 1617–1618. *See also* **Baboons**; **Macaques**
Cercopithecoids, 1182
  Himalayan fossil sites, 2090
  locomotion model, 1948–1950
  See also **Cercopithecines**; **Monkeys, Old World**
Cerebral spinal fluid (CSF), 405
Ceremonial masks, **1546–1549**

Cesarean sections, 493
Ceylonese ceremonial masks, 1547
Chachapoya Indians, 469–477
Chaco Canyon, New Mexico, 70–71, 2371
Chagnon, Napoleon, 61, **477–478**
Yanomami controversy, 65, 477–478, 556, 668–672, 852, 1144, 1234, 2269–2270, 2350, 2351
Chalcolithic, 570
Near Eastern culture, 247
See also Copper Age
Champollion, Jean François, 787, 792, 796, 798, 804–805
Chan tradition, 665
Chang, K. C., 1846
Chantek, 213
Chants, 478–479, 1162
mantra, 1285
Chaos theory, 480–487
Chargaff, Erwin, 753
Charles Darwin Research Station, 1017–1018
Châtelperronian industry, 1723, 1725
Chaucer, Geoffrey, 1485
Chavin, 1854, 2301
Chayanov, A. V., 158, 1834, 2037–2038
Cheirogaleids, 1958
Cheminformatics, 362
Chicago School of urban anthropology, 512, 2255
Chicano gangs, 1024
Chichén Itzá, 487–488
Chichimeca, 1858
Chiefdom, 1871
Child, Irving, 1470, 1513
Child abuse, 489–491
Child developmental psychology, 919
Child labor, 489, 496–497
Child rearing, primate studies, 1140–1141
Childbirth, 491–494, 1194
midwifery, 1596–1598
Childe, Vere Gordon, 38, **494–495**, 509, 2255, 2283
Childhood, 495–498, 1194
complexity of, 500
cultural changes, 496
culture of poverty, 651
economics, 496
enculturation, 810–811
Freud's stages, 811, 1006
human behavioral ecology, 773
innocence and purity, 497
rites of passage, 289, 2013
social spaces of, 499
socialization, 2098
street children, 497
structures of power and domination, 496
terms, 499
UN Convention, 498
See also Rites of passage
Childhood studies, 498–500. *See also* Childhood
Children
aggression, 31–32
imaginary play, 212
language acquisition, 454, 1403, 1404–1405, 1412
psychiatric medication, 925
Chilean prehistoric inhabitants, 522, 1622–1623
Chili peppers, 321
Chimpanzees, 216, **500–504**, 505, 1184–1185, 1891, 1896–1897, 2329
aggressive behavior, 1897, 1899, 2180–2181
artwork, 210
australopithecine comparisons, 313
biomedical research, 506–507
bipedalism and quadrupedalism, 374–377
bonobo differences, 505–506
bushmeat, 506–507, 508
calls, 501
captivity, 508, 2353
cognitive abilities, 207–212, 503–504
conservation, 504, 506–509
cooperative behavior, 33, 210–211, 502–503, 2181
courtship and mating, 1099
cross-fostering projects, 208–209, 2304
developmental differences, caged versus wild, 211
display behavior, 1899
evolutionary anthropology, 916
evolutionary lineage, 501
fossils, 205
Goodall's work, 208, 210, 500, 505, 506, 1098–1101, 1896–1897, 1899
hands, 1421
home range, 1930
hominid morphological similarities, 1780–1781
hominid reconstruction model, 1501–1503

human genetic relationship, 205, 220, 389, 401, 500–501, 884, 1178, 1778, 1780, 2303
human language use, 208–209, 213–215, 504, 534, 1403, 1422–1423, 2035, 2304–2305
human language use, neuroanatomy, 1424–1425
human language use, speech organs, 1422
human morphological relationship, 1780
hunting strategy, 1932
infanticide, 502
Köhler and, 1378
learning, 210
locomotion, 1944
nest building, 263–264
play, 212
saving, 506–509
sexual behavior, 501, 1896
social behavior, 502–503
tool use, 212, 221, 503, 506, 1185, 1897, 1957
vocalization, 1195
See also **Ape cognition**
Chimpanzees, pygmy. *See* **Bonobos**
China, **1838–1849**
ancestor worship, 72, 74
archaeological evidence of warfare, 2301
archaeology in, 1844–1846
Boxer Movement, 1979
concubinage, 1184
Copper Age, 570–571
cultural diversity, 1840–1844
Cultural Revolution, 562, 1876–1877
Daoism, 661–667
death rituals, 717–720
Great Wall, 1851
humanism, 1249
Indonesian hardwood imports, 1019–1020
Islam in, 1844
marriage traditions, 72
Ming Dynasty, 1977
mourning traditions, 76
mythology, 1660
naturalism, 1695, 1696
nomads, 1842
Opium War, 1978
oracle bones, 1849
philosopher-king, 721
political organizations, 1876–1877
prehistoric culture sites, 1846–1849
Qing Dynasty, 1977–1979
revolution, 1545–1546
rituals, 1843–1844
threat to Western culture, 1261
women in, 1843
See also Taiwan
China, Confucianism and. *See* **Confucianism**
Chinchirro mummies, 1853
Chinese fossil hominids, 378–380
Chinese language, 1840–1841
Chocolate, 321, 1376–1377
Chomsky, Noam, 214, 1403, 1404, 1405, 1412–1413, 1424, 1427, 1428, 1490
Chopper, 1767
Christening rites, 2023–2024
Christian creationism. *See* Creationism
Christianity, 129, 1151
biblical archaeology, 246–249
Coptic monasticism, 571–573
cults, 624
Haeckel's evolutionary monist critique, 1123–1124
ideology, 1270
Maori and, 1992–1993
marriage enforcement on indigenous peoples, 833
monastic traditions, 1610
Native Americans and, 1677–1678
Pentecostalism, 1836–1838
reconciling with scientific evolutionism, 588, 685, 1105–1106
religio, 1999
right-communitarianism, 1030
syncretism, 2151
Teilhard de Chardin and, 2168, 2169
Thomism, 228
traditional medicine and, 334
Trinity as polytheism, 1095
Tswana Bantu, 2231
Zulu and, 2370–2371
Chromosome abnormalities, 596, 737, 1054
aggression and, 32
eugenics, 872
Chromosomes, 753, 757. *See also* DNA; **Genetic engineering**
Cicatrization, 1792

Cicero, 1074, 1307
Cimmerians, 457, 458
Circumcision, 1562, 2023–2024
Cities. *See* **City, history of**
Cities of ancient Egypt, 2258–2259
Citizenship and migrations, 1599
City, history of, 509–511
early Mediterranean, 510
early New World, 509–510
early Old World, 509
global city, 511
industrial, 510
urban planning, 510
See also Urbanism
Civil disobedience, 513–514
Civil rights movement, 28, 338, 1368–1369
Cladistics, 229, 515–516, 914, 927, 1226, 1631. *See also specific applications*
Clans, 73, **516–518**, 1370
Aborigines, 1
exogamy, 934–936, 1441, 1765
Haida, 1126
Hopi, 1202
Iroquois, 1330
Ojibwa, 1765
Omaha Indians, 1772
Tlingit, 2202
Clans, totems and. *See* **Totem poles; Totemism**
Clark, Grahame, 250
Clark, Wilford, 232
Class, 2115
consciousness, 1108, 1541, 2101
multiculturalism and, 1640–1641
rank societies, 2104–2105
state power and, 1870
voluptuousness and, 648
Class conflict, 556, 557, 815–816, 2099, 2113
Class societies, 2099–2101
Classical Period Near Eastern culture, 248
Cleavers, 317
Clements, Tad, 1696–1697
Clever Hans, 868
Clifford, J., 852
Climate change, 826–827, 938
geomythology, 1066–1071
Clines, 518–519, 901
Clinical genetics, 519–520, 1223–1226. *See also* Gene therapy
Clinically applied anthropology, 144–149
biomedical culture, 145–146
education, 146–147
See also Medical anthropology
Clocks, 2197
Cloning, 759–761, 1053, 2015
Closed society, 1075, 2285
Clothing. *See* **Textiles and clothing**
"Cloud People" (Chachapoya), 469–477
Clovis culture, 520–527, 977, 1494–1495, 1680, 1684
Beringia and origins, 525–527, 1684
environmental context, 527
lifeways, 522–525
origins, 525–527
Cocaine, 1984
Cocco, Louis, 2350
Coevolution, 484, 603, 1211
Cognates, 1351, 1486
Cognatic descent, 1370
Cognition
bilingualism and, 1311
definition, 207
Haeckel's panpsychism, 1121–1122
primitive mentality, 1467
symbolism and, 2150
Yerkes' intelligence studies, 2352
See also **Intelligence**
Cognition, ape. *See* **Ape cognition**
Cognitive criteria, 2066
Cognitive ethology, 868–869
Cognitive map, 868, 2296
Cognitive-behavioral theories, 577
Cohn, Norman, 1270
Coliseum, 527–529
Collective bargaining, 91
Collective behavior, 337–339, 2116
Collective consciousness, 174, 1442
Collective unconscious, 1255
Collectors, 529–530. *See also* Hunter-gatherers
Colobines, 530–533
Colobus monkeys, 530, 1617, 1933, 1937–1938, 1948–1949
Himalayan fossil sites, 2090

Colonial Social Science Research Council (CSSRC), 84
Colonialism and anthropology, 83–84, 151, 166, 182, 188, 277, 2020–2021
postcolonialism and, 1910–1912
Color vision, 1932–1933
Colson, Elizabeth, 1445
Columbus, Christopher, 439
Commodification, 2088
Commodity economy, 162
Communal settlements, Israeli kibbutzim, 1367–1368
Communication
computer speech applications, 2122–2123
information ecologies, 103
intercultural, and business contexts, 96–97
interspecies, 533
See also **Language**
Communication, paralinguistic, 1826–1827
Communication, primate. *See* Apes, human language use; Primate communication and vocalizations
Communicational rationality, 1996
Communism, 534–538, 815–816, 1030, 1543
anticommunist views, 536–537
before Marx, 1545
Confucianism and, 562
evolutionism and, 2037–2038
Herskovitz and, 1156
inner strivings, 537
libertarian, 1384
official anthropology, 536
postmodernism and, 1914
primitive, 534–535
See also **Lenin, Vladimir I. U.**; Marxism
Communist China. *See* **People's Republic of China and Taiwan**
Communist Manifesto, 815–816, 1543–1545, 2100
Communitarianism, 1029–1030, 1995–1996
Communitas, 715, 1074
Communities, 538–539
Communities of practice, 101
Community (*gemeinschaft*), 1028–1030, 1442
Community-based needs assessment, 8
Compadrazgo, 319
Comparative ethnology, 857–858
Comparative ethology, 868
Comparative linguistics, 1486
Comparative psychology, 2035
Competition and stress, 1217–1219
Complementary and alternative medicine (CAM), 1146–1148
Complex societies, 2102–2103
Complexity, 481, 483–487, **539–540**. *See also* **Chaos theory**
Complexity, cultural, 711
Complexity, of society, 1669
superorganic, 2145–2146
Compliance archaeology, 259–261
Componential analysis, 865, 1383
Computational biology, 362
Computer games, 542
Computer languages, 552–553
Computer modeling, 543, 544
Computer simulation, 487
Computerized tomography (CT), 584
Computers, 541–553
artificial intelligence, 281–283, 547–548
cyberculture, 654–657
education and, 544–545, 551
electronic warfare, 892
future and, 550–552
genetics and, 543, 544
global village and, 545–547
hackers, 104–105
health issues, 542
history of, 541–542
research and, 543
space program, 548–550
speech systems, 2122–2123
virtual paleoanthropology, 914
Comte, Auguste, 553, 1440, 1907–1908, 2062–2063, 2113
Concerted evolution, 1749
Concubinage, 1184
Condorcet, Marquis de, 554–555, 818
Configurationism, 555
Conflict, 556–557
class and, 556, 557, 2099
cultural and human rights issues, 1231–1232
dispute resolution, 751–752, 1352, 1433–1434, 1445–1446
feuding, 959

Iroquois, 1325–1326
primate adaptive strategies, 713–714
role, 2028
xenophobia and, 2342
See also **Aggression**; Warfare
Conflict resolution. *See* **Dispute resolution**
Conflict theory of justice, 1352, 2113
Conflictual modernization theory, 781
Confucianism, 558–562, 1843
challenges to, 561–562
doctrine of the mean, 559–560
humanism, 1249
naturalism, 1695
neo-Confucianism, 560
philosophical tradition, 558
rectification of names, 559
self-cultivation, 558–559
spiritual tradition, 560–561
Congoid, 569
Conjugal family form, 946
Conklin, Harold, 846, 864
Consanguine family form, 946, 1625
Conscience, 1006
Consciousness, 563–566, 711
altered states, 565, 2318
anthropistic theory, 563
biological factors, 564–565
Cartesian dualism, 563–564
class, 1108, 1541, 2101
definition, 563
Dennett's evolutionary framework, 730–733
evolution of, 564
Freud and, 1006
internal conversation, 607
stream of, 2198
Consciousness, collective, 174, 1442
Consciousness, social, 630, 647–648
Conservation, cultural, 625–626
Conservative Judaism, 1344
Consortium of Practicing and Applied Anthropology Programs (COPAA), 178
Consumer behavior, 111–116
Consumption, 777
Continental drift, 566–568, 2305–2306. *See also* Plate tectonics
Contraceptive technology, 2016
Contraselection, 677, 678
Convergent evolution, 224, 481, 895
Cook Islands, 1887, 1990–1993
Cook, James, 304, 1798, 1986, 1992, 2154, 2207
Coon, Carlton S., 568–569
Cooperative learning, 784–785
Copan, 236
Copernicus, Nicholas, 345–346
Copi, M., 2066
Copper Age, 570–571
Copper-Bronze Age Celtic Europe, 456–457
Coprolites, 1808, 2161
Coptic language, 572, 793
Coptic monasticism, 571–573
Coptic Orthodox Church, 479, 571–573
Corporate culture, 99–102, 1408
Corporate descent groups, 1370
Corrective rituals, 2013
Cortés, Hernán, 2362
Cortisol levels, 1217, 1218
Cosmic evolution, 881, 949–951, 1120–1125
Cosmological anthropocentrism, 82
Cosmological naturalism, 1696
Cosmology, 573
ancient Greek, 810
anthropic principle, 352
Australian Aborigines, 309
biblical creationism versus geology, 585–587
Big Bang theory, 345, 347–354
Bruno and, 420–423
Copernicus, Galileo, and Newton, 345–346
Da Vinci's studies, 1464
Einstein, 346–347
Gaia hypothesis, 1015–1016
Haeckel's evolutionary monism, 1120–1125
Hinduism, 1279
Kwakiutl, 1392
legends, 1457–1459
life on other worlds, 422
Mayan, 1556
origins of life, 352–353
sacred landscapes and, 573–574
Teilhard de Chardin and, 2170
Cosmology, biblical creationism. *See* Creationism
Cotton, 321–322

Counseling, 575–581
brief-therapy theories, 578–579
cognitive-behavioral theories, 577
current trends, 579
family therapy theories, 577–578
historical perspectives, 575–576
psychoanalytic theory, 576–577
wellness, 579–581
Courtship rituals, 2075
Cousins, 935, 1372
Cousteau, Jacques-Yves, 581–582
Covarrubias, Miguel, 1770
Covering law model, 2184
Cranial morphology studies, 388, 583, 1718, 1720–1721, 2302, 2303
Craniometry, 582–584
Cranioscopy, 584–585
Creation date, 585
Creation Evidence Museum, 1818
Creationism, 587–591, 882–883, 1474
anthropologist dynamic integrity versus, 1304
anthropology and, 591
beliefs in, 587–591
evidence of human and dinosaur coexistence, 1818
evolutionism versus, 82, 588, 685, 688, 1105–1106
gap theory, 882
geography versus, 585–587
Great Traditions, 589–590
Hinduism, 682–683
indigenous, 590
Intelligent Design, 588, 883, 892, 2173
language origin, 1426
missing links and, 1602
non-Christian, 589
reconciliation attempts, 588, 685, 1105–1106
Scopes Trial, 586, 589, 674, 1614–1615, 2068–2069
teaching, 883
types of, 588–589
uniformitarianism versus, 2240
zielstreibigkeit, 660
Cremation, 1645, 2032
Creoles, 2112
Cretaceous fossil record, 992
Crete, ancient, 591–594, 2151
Crick, Francis, 700, 754, 757, 761, 896, 1037, 1048–1049
Crime, 594–597, 1752, 2115
anomie/strain theory, 739
biological theories, 737
differential association theory, 739
feminist theory, 740
forensic artists, 597
forensic DNA technology applications, 758–759
genetics and, 596–597
multiculturalism and, 1640–1641
Native Americans and, 1686
neo-Freudianism, 1008
phrenology, 700
radical criminology, 740
See also **Deviance**; Forensic anthropology; Forensics
Critical anthropologists, 2264–2265
Critical common-sensism, 599
Critical medical anthropology, 750
Critical race theory, 538
Critical realism, 598–599, 600–601, 605
critique of culturism, 600–605
hermeneutics, 1154–1155
immanent critique, 605–606
in ethnology, 600–611
inner conversation and experience, 607–608
morphogenesis, 607
prospect-refuge theory, 610
referential detachment, 606–607
reflectionism, 604, 607
See also **Ethnology, critical realism in**
Critical sociolinguistics, 1416
Critical theory, 1546
Crocodile cults, 950
Croizat, Leon C., 202–203, **612–613**, 1748–1749
Cro-Magnons, 889, 894
cave art, 1432
Cross-cultural approach to education, 1312–1313
Cross-cultural psychiatry, 862
Cross-cultural research, 143, **613–614**, 808, 1665–1666
Cross-Cultural Survey, 1646
Cross-fostering, 208–209, 2304
Crystal, David, 1427
Cuba, 615–621
Cuban Missile Crisis, 618–619
Cueva Morin, Spain, 301
Culler, Jonathan, 277

Cult of the Goddess, 1286–1288
Cultivation, plant, 621–623. *See also* Agriculture; **Horticulture**
Cults, 623–624
Cultural adaptation, 17–19
Cultural anthropologist, 849
Cultural anthropology, 181, 184–185, 357, 613, 779, 1962
colonialist historical context, 151
difference from sociology, 150–152
early female anthropologists, 2327–2328
etic and emic perspectives, 150
functionalism, 154–155
HIV/AIDS and, 1168
holistic approach, 152, 154
referential detachment, 606–607
research traditions, 152–157
salvage ethnology, 151
science or humanity, 157
theory and, 2186
See also **Cultural relativism**; Ethnography; **Ethnology**; **Participant-observation**; Social anthropology
Cultural anthropology, Wolfian perspective in, 2325–2327. *See also* **Wolf, Eric Robert**
Cultural assimilation. *See* Assimilation
Cultural belief systems, 634
Cultural complexity, 711
Cultural conservation, 625–626
Cultural constraints, 626–627. *See also* Morality; **Norms**; **Taboos**
Cultural convergence, 633
Cultural core, 629, 631
Cultural determinism, 339, 340, 555
Mead and, 644, 1568
Cultural diffusion, 173. *See also* **Diffusionism**
Cultural diversity and multicultural education, 1636–1641
Cultural ecology, 610–611, **628–631**, 776
cultural core, 629, 631
cultural materialism, 630–631
Diamond's work, 744–745
environmental philosophy, 827–830
ethnoecology, 846–848
Marx and, 628–629, 647–648
Steward's work, 629–630, 2128–2130
systems theory, 484–485
V. Andrew and, 2267
See also **Steward, Julian H.**
Cultural evolution, 636–640, 769, 811, 1626, 2045–2046, 2235, 2310
culture change, 646–649
evolutionary ethnology, 856
memes, 710, 733, 926, 1578–1579
multilinear framework, 2129
progressive evolution idea, 858, 922–924
Service's theory, 2071, 2072
social change, 2094–2095
unilineal evolution, 2235
See also Social Darwinism; **Tylor, Edward Burnett**
Cultural evolution, Spencer's theory of sociocultural evolution, 2123–2124. *See also* **Spencer, Herbert**
Cultural materialism, 630–631, 809, 1141–1145, **1549–1553**, 2314
criticisms of, 1552–1553
Darwinism, 1551
etic and emic, 1550
ideals, 1551–1552
Marxism, 1551
material infrastructure, 1550–1551
operationalism, 1550
religion and, 2005
Cultural psychiatry, 1961–1964
Cultural relativism, 154, 174, 238, 339, 340, 386, 555, **631–633**, 1313–1314
agency, 844
anthropologist values and, 2264
cross-cultural comparison, 632
deviance, 1962
epistemology, 631
ethical issues, 843–844
human rights and, 1229–1230
language and, 1403, 1415–1416
methodological relativism, 607
moral evil and, 880
religion, 1246
sexuality and, 632
xenophobia, 2341–2342
Cultural resource management (CRM), 239, 243
Cultural Revolution, 562
Cultural rights, 1232–1234
Cultural studies of science, 370

Cultural survival, **2146–2147**
Cultural traits, **633–635**, 746. *See also* **Diffusionism**
Cultural tree of life, **635–636**
Cultural type, 629
Cultural universals. *See* **Universals in cultures**
Cultural-historical types theory, 659–661
Culture, **636–640**, 972, 1407, 2114, 2314
banyan tree metaphor, 1493
characteristics of, **653–654**
childhood and, 496, 497
configurationism, 555
ecological function of, 18–19
human rights and, 1231
language and, 1407–1409
modes of production, 1872, 2325, 2326
ontology and teleology, 733
premodern conceptualizations, 166
religion and, 2149
sexuality and, 2077–2078
spiritual versus material, 636
systems theory, 483–485
values and, 2264
See also **Universals in cultures**
Culture, ape, 212, 917
Culture, corporate, 99–102
Culture, definitions of, 150, 606, 626, 633, 653–654, 655, 2316
Culture, political, 1868
Culture and personality, 613, **641–645**
Benedict and Mead, 642–643
Mead and Bateson, 643–644
Sapir, 641–642
temperament, 643–644
Culture area approach, 2316
Culture brokers, 179
Culture change, **646–649**, 2045–2046. *See also* Cultural evolution; **Globalization**
Culture circles (*kulturkreise*), 747–748, 1387–1388, 2059–2060
Culture of poverty, **649–652**
Culture shock, **652–653**
Culture stress, 1665–1666
Culture versus nature, 822
environmental philosophy, 827–830
ethnoscience, 864–865
See also **Environments**; Nature versus culture
Culturism, critical realist critique of, 600–605
positivism, 607
referential detachment, 606–607
Cuneiform writing, 2142, 2252
Cunningham Fletcher, Alice, 2327
Curse, 1516, 2119
Cuvier, Georges, 448, 685, 1800, 1810
Cuzco, 1855
Cyanobacteria, 984
Cyberculture, **654–657**
Cybernetic modeling, **657–658**
Cybernetics, 548, 657–658
Cybervillages, 2286
Cyclical history, 2125

Da Vinci, Leonardo, 1062–1063, **1463–1465**, 1809, 2159
Dakota Sioux, 723–725
Dalit (untouchables), 2248–2251
Dall, William Healey, 1595
Damas, David, 1318
DaMatta, Roberto A., 414
Dance, 292, 615–616
Danilevsky, Nikolai Jakovlevich, **659–661**
Daoism, **661–667**
D'Aquili, Eugene, 1737–1739
Dark matter, 350–351
***Darkness in El Dorado* controversy**, **667–672**, 852. *See also* **Chagnon, Napoleon**; **Yanomami**
Darrow, Clarence, **673–674**, 1615
Dart, Raymond A., 271, 374, **675–676**, 886
Darwin, Charles, 368, 401, **687–692**
agnosticism, 691
arc of evolution, 881–882, 1302
autobiography of, 692
bipedalism origin hypothesis, 374
concerns about fossil record, 903
dynamic integrity, 1303
dynamic philosophy, 1299–1301, 1861
education and, 782–784
evolutionary anthropology and, 186, 914
evolutionary psychology and, 1965
evolutionary worldview, 691
evolving tree of life, 895
Freud and, 1005
Galapagos and, 1016

geographic evolution theory, 202
Goethe and, 1098
Haeckel and, 1124
history of archaeology and, 237
history of genetics and, 1042
human evolution and *The Descent of Man,* 685–686, 690–691, 881, 883–884, 1301
Hume and, 1258
John Dewey and, 742, 783–784
Lyell and, 689, 782, 1504
Malthus and, 689–690, 698, 923, 1522, 2036, 2069
monogenesis versus polygenesis, 892
musings on other worlds, 931
nonreproducing insect caste issue, 2108
on domestication, 898
on origin of life, 353
reservations on implications of theory, 1741, 1747
social Darwinism and, 697
specimens for the Zoological Society, 2367
status in history of biology, 1727
thoughts, 690–691
transitional forms and, 1602
travels, 305, 689, 782, 2188, 2221
Wallace and, 2295
See also Darwinism; Evolutionism and anthropology; **Natural selection**
Darwin, Robert Waring, 691
Darwin and Germany, 173, **677–682**, 1120, 1124
Darwin and India, **682–684**, 1274–1278
Darwin and Italy, **684–687**
Darwin and Russia. *See* **Russia and evolution**
Darwin Museum, Moscow, 2039
Darwinian epistemology, 118–119
Darwinism, 271, 697, 896, 1472, 1732–1733
altruism and, 55
arc of evolution, 881–882, 1302
biblical creationism versus geology, 585–587
consequences of, 691–692
cultural materialism, 1551
Dewey and, 1303
dynamic philosophy, 1861
early anthropologists and, 186
ethics and, 678
evolutionary epistemology, 117–119, 609, **920–921**
genetics and modern synthesis, 167
Germany and, 173, **677–682**, 1120, 1124
India and, **682–684**, 1274–1278
Lamarckism versus, 696–697
Marx and, 679, 687, 1544
Mayr and, 696–697, 897, 927, 1044
moral nature, 271
naturalism and, 1695
Nietzsche and, 680, 1741–1744
origin of life and, 1475–1478
philosophical/metaphysical implications, 172, 928
Piltdown Man hoax context, 1169–1170
pragmatism and, 1926
progressive development, 922–924
Russian anti-Darwinism, 659–660
sexual selection, 609
teleology versus, 2172–2173
Thomism versus, 228
universal, 926–927, 1578
See also **Darwin, Charles**; **Evolution, organic**; Evolutionism and anthropology; **Natural selection**; *specific evolutionary concepts, subfields, theories*
Darwinism, Haeckel and. *See* Haeckel, Ernst
Darwinism, modern, **692–696**. *See also* Modern synthesis; Neo-Darwinism
Darwinism, social, **697–701**. *See also* Social Darwinism
Darwinism and anthropology. *See* Evolutionism and anthropology
Darwinism and Russia. *See* **Russia and evolution**
Das Kapital, 1541, 1545
Dasein, 1151–1152
Data quality control, 1665
Dating techniques, 247, **701–705**
absolute methods, 702, 705
basic information (table), 703–704
biblical research, 702
carbon-14, 238, **436–438**, 704, 705, 706, 730, 976, 1468–1469
dendrochronology, 238, 247, 437, 702, **729–730**
Egyptology, 801
fluorine, 1755–1756
geomagnetism, 1064–1065
glottochronology, **1090–1091**
new techniques, 705
paleomagnetism, 1804

potassium argon, **1916**
radiometric, 702–704, **706–707**
relative techniques, 702, 705, **707–709**
stratigraphy, 930, 2135
three-age systems, 702, 708
uranium-lead, 706, **2253–2254**
See also Stratigraphy
Daubentoniids, 1959
Davenport, Charles Benedict, 1046
Davidson, Iain, 2210
Davis, Edwin H., 1758
Davis, Wade, 1089
Dawkins, Richard, **709–711**, 733, 881, 926, 1578, 1696
Nietzsche and, 1743
religion as pathology, 1738
Day-age creationists, 588
De Angulo, Jaime, **712–713**
De Lumley, Henri, 2178–2179
De rerum natura, 1696
De Sanctis, Francesco, 686
De Waal, Frans B. M., **713–714**, 1898
Deacon, Hilary, 2212
Dead Sea, 1069
Deaf people, 1405, 1408, 2123
Death
afterlife transitions, 75–76
Amish and, 68–69
bioethical issues, 359–360
Haida belief, 1128, 1129
Mbuti Pygmy tradition, 1561
mourning, 76
origin of religion, 2004
philosophy, 734
pollution, 75
universals in cultures, 2246
witches and, 2320–2321
Death masks, 1548
Death rituals, **714–720**. *See also* Burial and mortuary traditions; Funerals
Deccan Chalcolithic, 571
Deconstruction, 175, 734, 1004–1005, 1412–1413
Deductive-nomological model, 2063, 2184
Deep Blue, 547–548
Deep Skull, 1145
Deforestation, 1987, 1989, 2227
Degenerationism, **721–722**
Deism, 1094
Deleuze, Gille, **722–723**, 2088
Della Porta, Giambattista, 598
Deloria, Ella Cara, **723–725**, 2328
Deloria, Vine, 1675–1676
Delphi, 223
Delpino, Federico, 687
Dementia, **725–726**, 863
Democracy, 743
Demography, **726–729**, 2116
transition models, 726–727
Dendrochronology, 238, 247, 437, 702
Dennett, Daniel C., **730–733**, 1743
Densmore, Frances Theresa, 2328
Dental anthropology, 364, 914, 1227, 2061
Deoxyribonucleic acid. *See* DNA
Dependency theory, 123, 163
Depression, 870, 1962–1963
Depth psychology, 576
Derrida, Jacques, **733–735**, 1005, 1467, 2136–2137
Descartes, René, 55, 730, 1700, 1830–1831, 1862
Descent, 1369–1371
groups, 1370
residence and, 1371
systems, 1370
theories, 1370, 2096
The Descent of Man (Darwin), 690–691, 881–882, 1300
The Descent of Woman (Morgan), 1624
Descriptive linguistics, **1480–1483**
Descriptive research, 2017
Desert environments, 824
Design ethnography, 107–111
Determinism, **735–736**, 819, 2264
economic, 647
genetic, 735–736
geographic, 735–736
linguistic, 1415, 2051–2052
Marxist, 736
See also Positivism
Determinism, cultural. *See* Cultural determinism
Developed Oldowan industry, 6
Development, 123–125, 162–163
Development anthropology, 2021. *See also* Action anthropology

Developmental genetics, 1749, 1965, 2061
Developmental psychology, 919
Devereux, George, 862–863, 1604–1605
Deviance, 595, 642–643, **736–740**, 1752–1753, 2115
anomie concept, 739
biological explanations, 737
control theory, 740
cultural relativity, 1962
differential association theory, 739
feminist theory, 740
functionalism, 739
labeling theory, 740
psychological explanations, 737–738
radical criminology, 740
social disorganization, 739
sociological explanations, 738–740
strain theory, 739
subcultures, 2139
See also **Crime**
Devil's Tower, 1687
Devonian fossil record, 987–988
Devore, Irven, 741
Dewey, John, 741–744, 783–784, 1303, 1862, 1925, 1927, 2341
Dharma, 1161
Diachronic anthropological perspectives, 173–175, 856
Diachronic linguistics, 1480–1481, 1483, 2056. *See also* **Linguistics, historical**
Diachronic societies, 1869
Diachronic time, 721–722, 856
Diagenesis, 1807, 2161–2162
Diagnostic and Statistical Manual (DSM-IV), 147, 862, 1962
Dialectical materialism, 153, 816, 1142, 1542
Dialectical method, Hegel's, 1150
Dialectology, 1402
Dialects, 973, 1418, 2120
folk speech, 2120
Diamond, Jared, 744–745
Dickens, Charles, 2244
Dictatorships, 745–746
Difference Engine, 552–553
Difference feminism, 957
Differential association theory, 739
Diffusion, technological, 96
Diffusionism, 173, 555, **746–748**, 2092
kulturkreise, 747–748, **1387–1388**, 2059–2060
Digger Indians, 555
Diggs, Ellen Irene, 2328
Digital Aristotle, 282
Digitigrady and primate locomotion, 1949–1954
Diglossia, 2112
Dignity, human, 1219–1221, 1357
Dine people, 1710. *See also* **Navajo**
Dingo, 304
Dinosaurian hominid, 748–749, 2035
Dinosaurs
extinction, 938, 940, 992
humans and, 1256–1257, 1818
Mesozoic era fossil record, 990–992
Dionysian, 223, 555, 642, 2244
Diop, C. A., 30
Dirac, Paul, 81
Disability, human mutants and, 1653–1655
Discourse analysis, 1412–1413
Discrimination, affirmative action and, 22–23
Diseases, 750
affluence, 2255
ethnomedicine, 860–861
stress and, 1219
See also Health and medicine
Dispersalism, 361, 1748
Dispute resolution, 751–752, 1352, 1433–1434, 1445–1446
Distributed work, 103
Ditheism, 1095
Diversity and education, 781
Divination, 1517, 2119–2120
Divine ownership model of ancestor worship, 74
Divorce, 1539–1540
Diwali, 1288
Djoser's pyramid, 802
DNA, 753–756, 1036–1037, 1048–1049, 1225
ALFRED database, 45–46
Alpine "Iceman," 758
concerted evolution theory, 1749
databases, 728
Dawkins' popularization, 710
fossil sources, 918, 995
functions of, 754–755
hybridization and sequence homology, 1628, 2303

linguistic structure, 1406
microsatellite analysis, 911–912
molecular evolution theory, 896–895
Neandertal studies, 695
origin of life, 1476
potential exobiology, 932–933
RNA and, 2027
sequences and evolutionary relationships, 1628–1631
sequencing technology, 758, 1038, 1051
Watson and Crick model, 700, 754, 757, 761, 896, 1037, 1048–1049
Y-STR, 2355–2356
See also RNA
DNA, genomics applications, 1224–1226. *See also* Genetic engineering; **Genomics**; Human Genome Project
DNA, mitochondrial. *See* Mitochondrial DNA
DNA, recombinant, 760–762
DNA and genetic engineering. *See* **Genetic engineering**
DNA and molecular genetics. *See* Molecular genetics
DNA consciousness, 563, 756
DNA electrophoresis, 905, 1051
DNA fingerprinting, 757, 2355
DNA mutation. *See* Mutations
DNA testing
forensic applications, 757, 758–759
human remains identification, 757–758
technology, 757–758
See also Genetic testing
Dobuans, 555, 642
Dobzhansky, Theodosius, 369, 696, 906, 913, 1044, 1058, 1731
Doctrine of the mean, 559–560
Dogs, 524
Dohrn, Anton, 721
"Dolly," 1053
Dolphins, 533
Domestic architecture, 266
Domestic sphere versus public sphere, 134
Domestication, 898, 2038–2039
reindeer, 2085
Domhoff, William G., 1870
Dorson, Richard Mercer, 2256
Dorstad, Netherlands, 258
Dostoevsky, Fyodor, 329, 661
Double descent, 1370
Douglas, Mary, 170, 277, **762**, 2154
Douglass, Andrew E., 238, 729–730
Douglass, Frederick, 29
Dowry, 763, 1537
bride price, 417–418
Drake, Durant, 598
Drake, Frank, 932
Dreams, 565
Dreamtime, 304, 309
Driesch, Hans, 821, 822, 2173
Drive, 867
Druids, 460
Dryopithecus, 218–219, **764**
Dubinskas, Frank, 99–100
DuBois, Cora, 1359, 1603–1604
Dubois, Eugene, 764–766, 886, 1340, 1740
DuBois, W. E. B., 29–30, 387, 1155
Duhem, Pierre, 2064
Duhem-Quine hypothesis, 2185
Durga, 1286–1287
Durkheim, David Émile, 155, **766–767**, 1004, 1513, 2113, 2337
ahistorical character of Durkheimian paradigm, 854
anomie concept, 50, 767
Australian Aborigines and, 306–311
defining religion, 129
division of labor and, 1398, 2337
Fortes and, 980
funeral rituals and, 715
law and society, 1441–1442
on magic and religion, 1513, 2004
on taboos, 2154
on temporality, 2198
organic and mechanical solidarity concepts, 517, 767
Radcliffe-Brown and, 1981
theory of rituals, 131
totemism and, 2218
Durkheim, Émile, functionalism and. *See* **Functionalism**
Duties, 1220
Dvaita, 1281–1282
Dynamic evolutionism, 175–176

Dynamic philosophy. *See* **Philosophy, dynamic**
Dyson, Freeman, 932
Dysphoric affect, 870

E Lab, 108, 109
Earth age estimates, 706
Earthquake mythology, 1067
East India Company, 83
Easter Island (**Rapa Nui**), **1985–1989**
Ebola virus, 1040
Ebonics, 1757
Echidnas, 303
Ecofeminism, 957
Ecological anthropology, 1989–1990
  spiritual ecology, 2006–2009
  V. Andrew's work, 2267
  See also Cultural anthropology; **Ecology and anthropology**
Ecological function of culture, 18–19
Ecological genetics, 899, 1057. *See also* **Population genetics**
Ecological knowledge models, 847
Ecological studies, 628. *See also* **Cultural ecology**; **Ecology and anthropology**
Ecological types, 823–824. *See also* **Environments**
Ecologies, information, 103
Ecology, cultural. *See* Cultural ecology
Ecology, human, 332
Ecology, human behavioral, 771–773. *See also* **Human behavioral ecology**
Ecology, spiritual, 2006–2009
Ecology and anthropology, 769–770
  neoevolutionary approach, 770
  nonfunctional approach, 770
  See also **Cultural ecology**; **Paleoecology**
Economic anthropology, 157–165
  Chayanov and, 158
  dependency theory, 123, 163
  formal economics, 158
  informal economy, 164–165
  market economy, 159–160
  Marxist anthropology, 161–164
  modes of production, 164, 1872, 2325, 2326
  Polanyi and the substantivists, 158–161
  See also **Economics and anthropology**; Economy; Marxist anthropology
Economic capital and symbolic capital, 396–397
Economic determinism, 647
Economic development, 123–125
Economic hierarchy, 927
Economic redistribution, 160. *See also* **Communism**; Socialism
Economics and anthropology, 774–777
  consumption, 777
  exchange and value, 776–777
  formalism versus substantivism, 774–775
  Marxist anthropology, 775–776
  subdisciplines of, 777
  See also Economic anthropology; Economy; **Marxism**
Economy, 336, 2115
  agricultural revolution, 34
  ancient Celtic Europe, 458–459
  Asante, 285–287
  Australian Aborigines, 308
  childhood and, 496
  contemporary Native Americans, 1688–1689
  culture of poverty, 649–652
  family labor, 158
  formal economics, 157
  gift-giving, **1555**
  informal and formal, 164–165
  !Kung *xaro* reciprocity networks, 1389
  laissez-faire theory, 698
  market, 159–160
  Milne Bay Kula Ring, 1386–1387
  occult, 2324
  origins of agriculture, 39
  Polynesia, 1888
  reciprocity and welfare, 159–160
  Tax's *Penny Capitalism,* 2165
  Third World nations, 120–122
  work and labor, 1396–1397
Economy, Marxist analysis. *See* Marxism
Ecosystem, 927
Ecotypes, 927
Ecovillages, 2286
Edelman, Marc, 1835
Education, 783–784
  affirmative action, 22–23
  ancient Rome, 2032
  child linguistic practices and, 1148

computers and, 544–545, 551
ethnography of schooling, 454
global, 1081–1088
intercultural, 1311–1314
minority academic performance, 1757
multiculturalism, 1636–1641
sociology of, 2116
tracking, 1574–1575, 2354
See also **Education and anthropology**
Education, teaching evolution. *See* Evolution, teaching
Education and anthropology, 778–786
areas of anthropology, 778–780
cooperative learning, 784–785
Darwin, 782
Dewey, 783–784
diversity and multiculturalism, 781
educational role of anthropologists, 146–147
Gardner's multiple intelligences, 785–786, 1308, 1638
value of anthropology to education, 780–781
Vygotsky, 784, 785
Egalitarian societies, 2103–2104
absence of witchcraft beliefs, 2322
Miami gender roles, 1883–1884
polygyny, 1593–1594
Yanomami, 2347
Egg-rolling behavior, 866–867
Ego, 1006
Egypt, ancient, 787–797
chemistry and metallurgy, 41
cults, 624
Fayoum culture, 949–951
geography, 788–789
history and chronology, 789–792
history of Egyptology, 787–788, 798–801
jewelry, 1342
language, 792–793, 798, 802, 804
modern tourism, 796, 803
Nubia and, 799, 802
pan-Egyptian school of cultural diffusion, 747
pyramids, 1972–1975
Ramses II, 1982–1984
religion, 793
settlement archaeology, 794–795
site preservation, 803–804
technological applications, 795
temples and funerary monuments, 793–794, 796–797, 2174
threats to sites, 795
tobacco and Ramses II mummy, 1983–1984
Tutankhamun forensic analysis, 797
urbanism in, 2258–2259
use of fossils, 1809
wild animal collections, 2366
Egyptian Christianity, 571–573
Egyptian mummies. *See* **Mummies and mummification**
Egyptology, 444–445, **797–804**
Champollion, 787, 792, 796, 798, 804–805
defined, 797
discoveries and research areas, 802–803
Egyptomania, 797–798
forensic analysis, 797
history of, 787–788, 798–801
interpretations and theories, 803
major sites, 801–802
methods, 801
preservation, 803–804
pyramids, 1972–1975
value to anthropology, 804
Vyörös and, 2289–2290
See also **Egypt, ancient**
Ehrlich, Eugen, 1439, 1446
Ehrlich, Paul R., 811
Einstein, Albert, 346–347, 348, 350
Ejagham culture, 1295–1299
Eko child, 335
El Cerén, 805–806
El Pariso, 1853
El Sawaadi, Nawal, 2334
Élan vital, 344, 2173
Elders, 806–807
gerontology, 1071–1073
Eldredge, Niles, 695
Electron spin resonance, 705, 706–707
Electrophoretic studies, 905, 1051
Elgin Marbles, 7, 1232
Eliade, Mircea, 807–809, 2000, 2079
Elite theory, 1869–1870
Elizalde, Manuel, 1174–1175
E-mail, 656

Embryology, evolutionary, 1381
Emics, 130, 150, 498, **809**, 1143, 1550, 1866–1867
Emotions, 1259, 1867–1868
Empedocles, 809–810
Empirical method, 882–883
Empiricism, 631, 1259
Employment, affirmative action in, 22–23
Employment and women, 2332
Employment opportunities in anthropology, 138–141, 178–179
Encompassment, 414
Enculturation, 810–811, 2097–2098
Encyclopédistes, 818–819
Endemism, 361
Endocannibalism, 435
Endogamy, 812–814, 1539
Engelbrecht, William Ernst, 814–815
Engels, Friedrich, 535, 536, 679, **815–817**, 923, 1398–1399, 1540, 2100, 2337
memorial address for Marx, 1544–1545
ENIAC, 552
Enlightenment, Age of, 142, **817–820**, 1151, 1164, 1438, 1669
Entelechy, 821–822, 2173
Entomology, 2315
Environmental anthropology, 823
Environmental archaeology, 250–255
architectural anthropology, 261–268
paleoecology, 1802–1803
Environmental circumscription theory, 1871
Environmental ethics, 827, 830–831
Environmental history, 744
Environmental justice, 825, 2256
Environmental philosophy, 827–830
Environmental sociology, 823
Environmentalism, 824
Amazonia, 830–831
anthropology and, 770
Rachel Carson and, 443–444, 825
Shell versus Ogoni culture, 1089–1090
Environments, 822–826
cultural adaptation, 17–19
ecological types, 823–824
euthenics, 873–875
geomythology, 1066–1071
global policy, 825
global warming, 826–827
Homo erectus and, 1187
population growth and, 1523–1524
religion and, 2006–2009
risk assessment, 824–825
sustainability, 825
traditional environmental knowledge, 2227
urban ecology, 2255
See also **Cultural ecology**
Enzymes and evolution, 910
Enzymes and genetics, 1045
Eoanthropus dawsoni, 831, 1169
Eoliths, 831–832
Epicurus, 1499, 1860
Epipaleolithic, 1580
Natufian culture, 1692–1693
Epiphenomenalism, 564
Epistemic fallacy, 601
Epistemology, 710, 730, 1151
anthropology and, 117–119
cultural relativism, 600–601, 631
cybernetics, 548
essentialism, 841
evolutionary models, 117–119
models of ecological knowledge, 847
philosophy of science, 2062–2065
positivism, 1907, 2062–2063
pragmatist philosophy, 1926
quantum mechanics, 1702–1710
Virchow's theory of, 2288
Xenophanes and, 2339
See also **Critical realism**
Epistemology, evolutionary, 117–119, 609, **920–921**
Equatorius, 218, 1365
Erechtheion, 6–7
Eremitic monasticism, 1608
Erickson, Erik, 1008, 1469
Eridu, 1068
Erie, 1322, 1327
Erik the Red, 269, 2279
Erlitou, 1848
Eros, 1007
Esame, 335
Eskaleut, 1684

Eskimos, 42, 269–270, 279, 386, **839–841**, 1317–1319
acculturation, **832–838**
artists, 837
European work schedule, 836
language, 837, 1488
marriage, 833–834
music, 837–838
religion, 840
schooling, 834
subsistence, 834–835, 839
substance abuse, 836–837
See also **Inuit**
Essentialism, **841–842**, 894–895
entelechy and, 821–822
postcolonialism versus, 1910–1911
Eternal fire, 1153
Ethics, 842–847, 1302
bioethics and anthropology, 356–360
Buddhist, 425–426
cultural relativism and, 2264
Darwinism and, 678
environmental, 827, 830–831
eugenics and, 871–873, 875
fieldwork, 967
foundations of multiculturalism, 1639
free will, 842–843
Kantian philosophy, 1357
moral relativism, 631
naturalist philosophy, 1698–1699
objectivity and subjectivity, 2264–2265
practical anthropology, 1357
reciprocity, 1993–1996. *See also* **Reciprocity**
Social Darwinism, 697
universal, 1385
universalism versus cultural relativism, 843–844
See also **Bioethics and anthropology**; **Ethics and anthropology**
Ethics, evolutionary, **921–925**
Ethics and anthropology, **842–844**
values and anthropology, **2263–2266**
See also Ethics; Professional ethics
Ethiopian, 385
Ethiopian population growth, 1906
Ethnic endogamy, 813–814
Ethnicity, 845, 1243, 2115
Ethnoarchaeology, Binford-Lewis and, 354–355
Ethnoarchaeology, field methods, 962
Ethnocentrism, 386, 781, **845–846**, 1624, 2264. *See also* **Cultural relativism**
Ethnoecology, **846–848**
Ethnogenesis, **848–849**
Ethnographer, **849**
guidelines for, 852
Ethnographic informants, 1295
Ethnographic semantics, **2070–2071**
Ethnographic writing, **851–852**
time in, 2199
Ethnography, 181, 779, **853–854**
about women, 135–136
biographical, 135–136
case study method, 1313
culture shock, 652–653
dualistic nature, 853
fieldwork, **968–969**, 1829
methods, 963
objectivity in, 850
of psychiatry, 1963
of schooling, 454
practice of, 853
salvage, 1233, 2350
subcultures, 2138–2139
verification in, 850–851
visual recording technology, 187–196
Ethnography, design, 107–111
Ethnography, industrial, 89, 93. *See also* Industrial anthropology
Ethnohistory, **854–857**
Ethnology, 150, 632, 779, **857–858**
disjunctiveness of fact and value, 605
Human Relations Area Files, 858
human rights, 602
immanent critique, 605
law and society, 1439–1440
ontology and, 600–601
referential detachment, 606–607
types of, 858
See also **Cultural relativism**
Ethnology, Boas and. *See* Boas, Franz
Ethnology, critical realism in, **600–611**
critique of Social Darwinism, 602–603
cultural ecology, 610–611
dialectics and reflectionism, 604–605

evolutionary epistemology, 609
evolutionary psychology, 609–610
inner conversation and experience, 607–608
investigations of reality, 608–609
material culture, 611
moral naturalism, 611
morphogenesis, 605
prospect-refuge theory, 610
reflectionism, 604
Ethnomedicine, 370, **859–861**
Ethnomethodology and interaction theory, 1414–1415
Ethnomusicology, 1650–1651
Ethnopharmacology, **861–862**
Ethnopsychiatry, **862–864**, 870
Ethnoscience, **864–865**
Ethnosemantics, **865–866**
Ethology, **866–868**
animal language, **1416–1417**, 1420–1421
cognitive, **868–869**
field methods, 962, 966
grooming, 1111–1112
instincts, **1299**
Lorenz's work, 1496
monogamy, 1618–1619
See also **Primate behavioral ecology**
Ethology, human, 1967
Ethology, sociobiology and. *See* **Sociobiology**
Etics, 130, 150, 869, 1143, 1550, 1864, 1866–1867
Etruscan city-states, 510
Eudemonism, 603–604
Eudysphoria, **870**
Eugenics, 167, 678, 681, **871–873**, 1020–1021, 1042, 1045–1048, 1965, 1969
bioengineering, 700
Boas versus, 1000–1001
criminals and, 596–597
ethical issues, 871–872, 875
ethnocentrism, 845–846
euthanasia solution, 681
euthenics and, 873–875
forced sterilization, 597, 846, 870, 1021, 1046
genetic engineering applications, 1040
immigration and, 1046
intelligence testing and, 2354
liberal, 871, 1969
modern reformulation, 871
Nazi, 677, 678, 699, 845, 871, 1047–1048
reproductive freedom, 1969
Eugenics Record Office (ERO), 1046
European Chalcolithic, 570
European Mesolithic culture, 1582
European pottery and ceramics, 1923
European Union, 2342
Euthanasia, 681
Euthenics, **873–875**
Evaluative beliefs, 634
Evans-Pritchard, E. E., **875–876**, 1868
colonialist bias, 182
interpretive analytical strategy, 170
lineage theory, 1479, 2096
on temporality, 2198
Sanusi Islam and, 1336
Zande witchcraft studies, 181, 1513, 2117, 2317, 2320, 2359–2360
Evans Stevenson, Matilda Coxe, 2327
Eve, mitochondrial, **876–878**
Evil, **878–881**
Evil eye, 1118, 2321
Evolution, arc of, **881–882**
Evolution, disbelief in, **883**
Gould's lack of dynamic integrity and, 1304
missing links and, 1602
See also Creationism
Evolution, Haeckel's naturalistic interpretation, 1120–1125. *See also* **Haeckel, Ernst**
Evolution, hominid fossil evidence. *See* Hominid fossils and evolution
Evolution, human, **883–891**. *See* also **Human evolution**
Evolution, models of, **894–895**
Evolution, molecular, **895–897**, 905–910
Evolution, mystical perspective, 881
Evolution, organic, 353–354, **895–913**
Darwin's development of, 687–692
enzyme variation, 910
exoevolution, 786, 931, 933–934
genetic variation, 905–910
morphology versus molecules, 1626–1633
"nearly neutral theory," 911
non-Darwinian mechanisms, **1747–1750**, 2061
physical anthropology and, 912–913

speciation, 907
See also **Darwin, Charles**; Darwinism; Evolutionism and anthropology; Neo-Darwinism
Evolution, organic, evidence for, 896–905
enzyme variation, 910
fossil record, 903–905
geographic variation in phenotypes, 901
homology, 903
industrial melanism, 900–901, 1366
See also **Fossil record**; Hominid fossils and evolution
Evolution, organic, Teilhard de Chardin and. *See* **Teilhard de Chardin, Pierre**
Evolution, synthetic theory of. *See* Modern synthesis
Evolution, teaching, 881, 892
Italian controversy, 687
Scopes Trial, 586, 589, 673–674, 1614–1615, 2068–2069
Evolution, theistic, 588
Evolution of altruism, 1968
Evolution of consciousness, 564
Evolution of human behavior, 868, 1964, 1967–1969, 2107. *See also* Behavioral genetics; Evolutionary psychology; **Human behavioral ecology**; **Psychology and genetics**; **Sociobiology**
Evolution of the biosphere, 2272, 2276–2277
Evolution of the horse, 903–905, 1382
Evolutional dynamics, 175–176
Evolutionary anthropological genetics, 917–918
Evolutionary anthropology, 856, **913–919**
developmental and comparative psychology, 919
importance of fieldwork, 915
nonhuman primate studies, 916–918
paleoanthropology, 914–916
population genetics, 918–919
progressive development, 922–924
See also Evolutionism and anthropology
Evolutionary biogeography, 202–207
Evolutionary creationism, 588
Evolutionary developmental biology (evo-devo), 695–696
Evolutionary embryology, 1381–1382
Evolutionary epistemology, 117–119, 609, **919–921**
Evolutionary ethics, 921–925
Evolutionary humanism, 1245
Evolutionary ontology, 926–928
Evolutionary origin of language, 1405–1406, 1417, 1419–1427. *See also* **Language, origin of**
Evolutionary psychology, 609–610, 811, 919, 925–926, 1867, 1883, 1965, 2315
Evolutionary synthesis, 368, 692–696, 1044, 1058, 2087. *See also* Modern synthesis; Neo-Darwinism
Evolutionary theory of origin of life, 1475–1478
Evolutionism and anthropology, 142, 151, 152–153, 166
biblical creationism versus geology, 585–587
cosmic perspectives, 948–949
critical realism in ethnology, 601–603
culturism's errors, 601–603
dynamic integrity, 1303
early theory in Anthropology, 186
elan vital, 344
evolutionary anthropology, 913–920
evolutionary ontology, 926–928
Germany and, 677–682
Islam and, 1336
Marxist-Leninist ideology and, 2037–2038
metaphysical interpretations, 172
multilinear framework, 494–495, 629, 2129
neo-Darwinism, 173
physical anthropology and, 912–913
received view, 926–927
secularization, 1251–1252
unilineal evolution, 153, 173, 237–238, 613, 1008–1009, 2102
See also Darwinism; **Evolution, organic**; **Evolutionary anthropology**
Evolutionism, Christian creationism versus. *See* Creationism; **Evolution, disbelief in**
Ewe, 75, 1419
Excavation, 240–241, 247, **928–931**
comprehensive Howellian approach, 1205
sampling strategies, 929–930
techniques, 930
underwater, 930–931
vertical dimensions, 930
See also **Archaeology**; **Stratigraphy**
Excellence, human, 1221–1223
Exchange of women, 134–135, 309–310
Exchange system, Milne Bay Kula Ring, 1386–1387

Exchange theory, 776–777
Existentialism, 634, 1151–1152, 1699, 2238–2239
Exobiology, 422, 756, 786, **931–933**
Exocannibalism, 435
Exoevolution, 786, **931**, **933–934**
Exogamy, 61, 517, 812, **934–936**, 1440, 1441, 1539, 1765
adoption and, 936
incest prevention, 935
Exorcism, 666, 2120
Expanding Matrix Distortion, 1364
Experimental psychology, 919
Experimentation, 2114
hypothetico-deductive model, 2063–2064
scientific method, **2065–2067**
Explanatory research, 2017
Exploratory research, 2017
Extended family, **943–944**, 945, 1298, 1530–1531
External conflict theory, 1871
Extinction, **936–940**
brain evolution and, 403
Brocchi's theory, 684–685
conservationists versus, 2056–2057
Devonian, 988
dinosaurs, 938, 940
fossil evidence, 1813–1814
Hawaiian fauna and flora, 254–255
Ordovician-Silurian, 987
Permo-Triassic, 989–990
Triassic/Jurassic event, 991, 992
Extinction, language. *See* Language loss
Extinction, primate, **1936–1938**
Extraterrestrial life, 422, 756, 786, 932–933, 2041–2042

Fa Hien Cave, **941–942**
Fabian, Johannes, 2199
Face painting, 1548
Facial recognition, 372
Facies fossils, 1812
Fagan, Brian M., **942–943**
False Face Society, 1329, 1572
Falsificationism, 2185
Family and kinship. *See* Kinship
Family, defined, 577–578, 945
Family, extended, **943–944**, 945, 1298, 1530–1531
Family, forms of, **944–947**
structure and composition, 944–945
Family, nuclear, 945, **947–948**, 978
Family therapy, 577–578
Family tree model of language, 1487
Farber, Marvin, **948–949**, 1303
Farming. *See* Agriculture
Fascism, 1793
right communitarianism, 1030
See also National socialism
Fasting, 1163
Faust, 1097
Fayoum culture, **949–951**
Feasts and festivals, **951–956**
categories, 952–953
Celtic, 460
evolution of, 953
manioc beer, 1527
rituals, 953–955
syncretism, 2150
See also **Potlatch**
Features, 236
Feedback, 657
Feigenbaum numbers, 480
Feil, Ernst, 2003
Feldhofer Cave, 1716, 1719
Feldman, Marcus W., 811
Female anthropologists. *See* **Women and anthropology**; *specific women anthropologists*
Female infanticide, 683, 763
Feminism, **956–957**, 2114
contribution of, 957
history, 956
Second Wave, 2330, 2331
theoretical perspectives, 956–957
theory of crime, 740
types of, 2333
women's liberation movement, 2335
Feminist anthropology, 132–138, 171, 175, 1031, 2329–2330
archaeology and gender studies, 244–246
Australians, 305–306
Benedict and, 341–342
division of labor, 1399
Islam and, 1653
Mead and, 1569

patriarchy theory, 1831–1832
reproductive technologies and, 2016
understanding of matriarchy, 1554
See also **Women and anthropology**
Fernea, Elizabeth Warnock, 136
Fertility, 35, 40, **958**
Venus of Willendorf, 2271–2272
Fertility masks, 1547
Festivals. *See* **Feasts and festivals**
Fetishism, 334, 1440
Venus of Willendorf, 2271–2272
Feudalism, 1872
Feuding, 959
Feuerbach, Ludwig, 960–962, 1860
Fictitious kinship, 935, 1369, 1371
Field methods, 962–968
direct communication, 965–966
ethical issues, 967
ethnographic fieldwork, 968–969
excavation, 928–931
intersubjectivity, 967
objectivity and subjectivity, 967
observation, 963–965
technologies of fieldwork, 966–967
visual recording technology, 187–196
See also Archaeology; Dating techniques; Participant-observation
Fieldwork, 144, 151–152, 915, 1801, 2019, 2114
ethical issues, 967
ethnographer culture shock and, 652–653
technologies of, 966–967
validity of data, 2019
Fieldwork, ethnographic, 968–969, 1829. *See also* **Participant-observation**
Fiji, 574, **969–970**
Finches, 902, 903, 1017, 2367
Fingerprinting, 371–372
Fire, eternal, 1153
Firth, Raymond, 971, 1013, 1247, 2148, 2191
Fischer, Michael M. J., 1336
Fish evolution, 910
Fisher, Elizabeth, 1554
Fisher, John L., 1413
Fisher, Ronald, 1058, 1729–1731
Fishes, Age of, 987–988
Fission track, 706–707
Fitness, 1730, 2069, 2108
critique of social Darwinism, 602–603
inclusive, 1967–1968, 2108
measuring adaptiveness, 12–17
Fixism, 685
Flat Earth Society, 588
Fletcher, Alice, 2329
Flew, Antony, 1697
Flotation, 240–241, 621
Fluorine dating technique, 1755–1756
Focus groups, 965
Folk culture, 972–973
Folk disorders, 858
Folk models, 1605
Folk pharmacology (ethnopharmacology), 861–862
Folk science and taxonomies, 863–865
Folk speech, 973–974, **2120–2122**
Folk technology, cultural conservation, 625
Folklore, 973, 974, 1774. *See also* **Folkways**
Folkways, 634, 737, 972, **974–975**, 1623–1624, 1751, 2145
Folsom culture, 520–521, **975–977**, 1494–1495, 1684. *See also* **Clovis culture**
Food, 978–979, 1601
fasting, 1163
genetic modifications, 1225
taboos, 979, 1144
Footprints, hominid, 377–378, 887, 996, 1808
Footprints, Paluxy, 1818
Forager culture, !Kung, 136, 1388–1390
Foraging behavior, 772
Fordism, 97
Forensic anthropology, 366–367, 913, 1563–1564
biometrics, 371–372
Body Farm, 365–366
Mary Manhein and, 367–368
mummies, 1645
Tutankhamun analysis, 797, 803
Forensic psychologists, 1970–1971
Forensics
artists, 597
DNA fingerprinting, 2355
DNA testing, 757, 758–759
genomics applications, 1224
palynology, 1807, 1820
Formal organization, 87

Fortes, Meyer, 73, **980**, 1013, 2098, 2198
FORTRAN, 552
Fortune, Reo, 2319
Fossey, Dian, 208, **980–982**, 1102–1103, 1894–1895, 2329
Fossil craniometry, 584
Fossil DNA, 918, 995
Fossil record, **982–984**, 1122, 1800, 1806–1808
  Archaean era, 983–984
  biostratigraphy, 1811–1813, 2134–2135
  Cenozoic era (mammals), 992–994
  Da Vinci's studies, 1464, 1809
  earth's origin to Hadean era, 983
  evidence for evolution, 903–905
  Homo sapiens, 1191–1192
  humans and dinosaurs, 1256–1257
  law of faunal succession, 2093
  Mesozoic era (dinosaurs), 990–992
  Old World monkeys, 1509
  Paleozoic era, 986–990
  prosimians, 1960
  Proterozoic era, 984–986
  taphonomy, 962, 1226, 1806, 1807, **2159–2162**
  See also Hominid fossils and evolution; **Paleontology**; **Stratigraphy**
Fossil record, transitional forms in. *See* **Missing link**
Fossil record, uniformitarianism principle. *See* **Uniformitarianism**
Fossils, **994–997**, 1226, 1805–1806
  Australian stromatolites, 302
  carbonization, 996
  coprolites, 1808, 2161
  diagenesis, 1807, 2161–2162
  early studies, 1809
  facies, 1812
  fossilization process, 995–996
  handling and preparation, 1816–1817
  ichnofossils, 1808
  macrofossils and microfossils, 1807
  molds and casts, 996
  original preservation, 996–997
  tracks and traces, 996
  uses in antiquity, 1809
  See also **Paleontology**; **Taphonomy**
Fossils, hominid. *See* Hominid fossils and evolution; **Human paleontology**
Foster siblings, 1372
Foucault, Michel, 723, **997–998**, 1413, 1910, 2136
Founder principle, 907, 1036
Fox (Mesquakie), 8–11, 2165
Fractals, 482
Frank, Lawrence, 641
Frankfurt School, 1546
Fraternal polyandry, 812, 1539, 1881, 1882. *See also* Polyandry
Frazer, James G., 128–129, 142, 635, 808, **999–1000**, 1513, 1515, 1669
  Marett's critique, 1533, 1534
  on spirit command, 2118
  taboos and, 2153, 2154
  totemism and, 2217, 2218
Frazier, Franklin, 1137
"Freaks" and "monsters," 1653–1655
Free will, 842–843
Freedman, Maurice, 74
Freedom, 1409
  Hegelian philosophy, 1151
Freedom of will, 1260
Freeman, Carla, 103
Freeman, Derek, 858, 1000–1002
French Celtic culture, 462
French Neandertal sites, 1714–1715
French Paleolithic site (Terra Amata), 2178–2179
French Revolution, 554–555, 1151, 1994
French structuralism. *See* **Structuralism, French**
Freud, Sigmund, 73, 576, 643, 738, 811, 1004, **1005–1007**, 1469, 2149, 2154
  neo-Freudianism, 1007–1008
  Popper versus, 1900
Fried, Morton H., **1008–1009**
Friedan, Betty, 956
Friendships, 55, **1009–1010**
Frobenius, Leo, 747
Fromm, Erich, 1008, **1010–1012**
Frustration-aggression theory, 2299
Fuller, J. L., 1966
Functional equilibrium theory, 87–88, 91
Functionalism, 154–155, 174, 181, 881, 1003, **1012–1013**, 1520, 1549, 2113
  ahistorical tendencies, 854
  deviant behavior, 739
  Islam and, 1336

justice and, 1352
Montagu and, 1620
religion and, 2005
static biases, 2095
See also **Malinowski, Bronislaw**
Functionalism, structural. *See* Structural-functionalism
Fundamentalism, 2068. *See also* Creationism; **Religion**
Funerals, 715, 2023–2024
Asante, 289–290
Chinese traditions, 717–720
Gypsy tradition, 1118
See also Burial and mortuary traditions
Furedi, F., 1904–1905
Futurology, 892
Fuzzy logic, 281, 548

Gaelic culture, 462. *See also* Celtic Europe
Gaia hypothesis, 1015–1016, 1069
Galagids, 1959
Galapagos finches, 902
Galapagos Islands, 1016–1018
Galdikas, Biruté Mary F., 208, **1018–1020**, 1892–1893, 2329
Galicia, 463
Galileo Galilei, 345–346, 422, 2168
Galton, Francis, 371, 408, 699, 777, 871, 874, **1020–1021**, 1042, 1056, 1964–1965
Gamow, George, 349
Ganapati, 1288
Gandhi, Mahatma, 1021–1022, 1283, 1284, 1368, 2249
Ganges, 1290
Gangs, 1023–1026
Gardner, Allen, 208, 2304
Gardner, Howard, 785–786, 1308, 1638
Garfield, Viola E., 2205
Garfinkel, Harold, 1414
Garrod, Dorothy Annie Elizabeth, 2329
Gaucho, 273
Gauls, 457
Gay, lesbian, bisexual, and transgender issues. *See* **Homosexuality**
Gê, 60–61, 64
Gebhard, Paul H., 1197
Geertz, Clifford, 1027–1028
"deep play" and "thick description," 2149
defining religion, 129
interpretive anthropology, 156–157, 170, 716, 851, 1027
on Islam, 1336
on transnationalism, 2221
religion as humanity, 1246
temporality and, 2199
Geese, egg-rolling behavior, 866–867
Gehlen, Arnold, 681
Gel electrophoresis, 905
Gelada, 1932
Gell-Mann, Murray, 483
***Gemeinschaft*, 1028–1030**, 1074–1075, 1442
Gender, 1031–1032, 2115
anthropology of men, 126–128
anthropology of women, 132–138
archaeology and, 244–246
berdache variant, **342–343**, 642, 1032
biology and nature and, 1031
cross-cultural perspectives, 1032
defining women, 136
environment and, 823
female infanticide, 683
future of anthropology, 1032
history as category in anthropology, 1031
homosexuality and identity, 137, 1198
industrial labor and, 93
language use, 1414
male dominance assumption, 133–134
multiculturalism and, 1640–1641
praxis theory, 137
sex identity, 2072–2073
social construct, 245, 2330
social relationships and, 2094
terminology, 244–246
transsexual, 1031
women's studies, 2330–2336
Gender division of labor. *See* Gender roles; Sexual division of labor
Gender equality and Qur'anic Islam, 1240–1241
Gender norms, 1751
Gender roles, 133, 1031, 2073–2074
feasting and, 953
Inuit culture, 419

learning and socialization, 811
Mead's studies, 133, 1471, 1571, 2332
Miami egalitarianism, 1593–1594
sex identity, 2072–2073
Tikopian culture, 2194
warfare, 2299
See also Sexual division of labor
Gene distribution, 1032–1033. *See also* Genetic variation; Natural selection
Gene flow, 906–907, 1033, **1034**
Gene pharming, 1039
Gene pool, 693–694
Gene therapy, 700, 1052, 1223, 1225–1226, 1571–1572, 1969, 2016
Genealogical hierarchy, 927
General Motors, 100
Generative grammar, 1034–1035
Genetic anthropology, 451–452
Genetic determinism, 699–700
Genetic disorders, 1054–1055. *See also* Gene therapy
Genetic drift, 895, 906, 907, 908–909, 1033, 1034, **1036**, 2070
explaining human variation, 1244
Genetic engineering, 700, 759–760, 874, **1036–1040**, 1050–1051, 1225
anthropology and, 1039–1040
applications of, 1038–1040
eugenics and, 1040
monkey modifications, 1125–1126
recombinant DNA technology, 760–762
types and techniques, 1037–1038
See also DNA; Human Genome Project
Genetic model of language, 918, 1351, 1406–1407, 1487
Genetic mutations. *See* Mutations
Genetic reductionism, 2185
Genetic testing, 757–760, 1053, 1225, 1969
ethical issues, 871
screening for genetic disorders, 1054–1055
See also **DNA testing**
Genetic variation, 905–910, 1057
apes, 220–221
gene distribution, 1032–1033
gene flow, 906–911, 1033, 1034
germ-plasm theory, 1728
Hardy-Weinberg equilibrium, 694, 1036, 1043, 1057, 1139–1140
neutral molecular evolution theory, 695, 895, 906, 908–909
non-Darwinian evolutionary mechanisms, 1747–1750
See also **Genetic drift; Genetics, history of; Molecular evolution; Mutations; Natural selection; Population Genetics**
Genetically modified foods, 1225
Genetics, history of, 1041–1053
classical genetics, 1042–1048
molecular genetics, 1048–1053
19th century roots, 1042
See also **Eugenics; Galton, Francis**; Mendel, Gregor; Mendelian genetics, modern evolutionary synthesis and
Genetics, human, 1054–1055
Genetics, medical. *See* Gene therapy; **Medical genetics**
Genetics, population, 1057–1058. *See also* **Population genetics**
Genetics
clinical, 519–520, 1223–1224
computers and, 543, 544
criminal behavior and, 596–597
Dawkins' *Selfish Gene,* 710, 2107
developmental, 1749
DNA sequencing technology, 758, 1038, 1051
ecological, 897
genes, 753
god gene, 1093–1094
human paleontology, 1227
intelligence and, 1309–1310
Mendelian genetics and evolutionary synthesis, 368–370, 693–694
modern synthesis with evolution, 167
nature and nurture, 811–812
one gene, one enzyme hypothesis, 1045
primate studies, 1056
unity of life, 1473–1474
See also **DNA; Eugenics; Population genetics**
Genetics and eugenics. *See* Eugenics
Genetics and psychology, 1964–1970. *See also* **Psychology and genetics**
Genocide, 1059–1060, 1230, 1235
threats to Yanomami, 2349

Genomics, 1060–1061, 1224
DNA hybridization and sequence homology, 1628
forensic applications, 1224
health applications, 1223–1224
theories of genomic change, 1628–1629
unity of life, 1473–1474
See also **Human Genome Project**
Genotype, 371, 677
Geocentric creationists, 588
Geoffroy Saint-Hilaire, Isidore, 685
Geographic determinism, 735–736
Geographic information systems (GIS), 242
Geologic column, 1061–1063
Geologic timescale, 1062
Geology
biblical creationism versus, **585–587**, 1105–1106
biogeochemistry, 2275–2277
catastrophism, 448–449
continental drift and plate tectonics, 566–568, 1064
uniformitarianism, 448, 449, 588, 1800, **2239–2241**
Geology, Lyell and. *See* Lyell, Charles
Geomagnetism, 1064–1065, 2134
paleomagnetism, 705, 1803–1805
Geomythology, 1066–1071
Geriatrics, 1073
Germ cell gene therapy, 1039
Germ line cells, 1037
German national socialism (Nazism), 677, 678, 699, 845, 871, 1047–1048, 1271, 1347, 2125
German Neandertal sites, 1717, 1719
German political organizations, 1875
German sociology, *gemeinschaft* and *gesellscahft,* 1028–1030, 1073–1076, 1442
Germanic and Icelandic mythology, 1659–1660
Germany and evolutionism, 173, 677–682, 1120, 1124
Germany, Turkish immigrants in, 169
Gerontology, 1071–1073
Gesellschaft, 1028–1030, **1073–1076**, 1442
Gestalt psychology, 1378
Gestation period, 1627–1628, 1779, 1787
Ghost Dance, 1076–1078
Ghost towns, 511–512
Ghosts, 1298
Gibbons, 222, 399, **1078–1079**, 1183, 1262, 1934, 1944
brachiation, 374
evolutionary anthropology, 916
See also **Siamangs**
Gibert, Josep, 1788–1789
Giddens, Anthony, 605, 2097, 2137
Gifts, 776–777, **1555**
Gigantopithecus, 205, 219, 886, **1079–1080**, 1781
bigfoot and yeti, 2354
Gilgamesh, 2142
Gilmore, David, 128
Gilyak, 2083
Gimbutas, Marija, 1554
Gladding, Samuel T., 577
Gladiators, 31, 528
Glazer, Myron Perez, 671
Glazier, Stephen D., 2151
Global city, 511
Global climate change, 826–827, 938
Global education, 1081–1088
Global environmental policy, 825
Global language, 1410
Global society, 1567–1568
Global society, human rights in the, 1234–1242
Global village, 546–547
Global warming, 826–827
Globalization, 97–98, **1081–1088**, 2045
advertising and, 114
computers and, 545–547
culture versus nature, 639–640
diversity and multicultural education, 1636–1641
human rights and, 1231
intercultural education, 1311–1314
justice issues, 1353
legal anthropology and, 1435–1436
ornamentation and, 1792
refugees, 183
transnationalism, 2220–2221
universal altruism, 55
vanishing cultures, 1089–1090
work and boundary crossing, 102–103
Glottochronology, 1090–1091
Gluckman, Max, 556, **1092**, 1433, 1445, 2322
Gnostic mythology, 1271
God gene, 1093–1094

God, Pascal's "proof" of existence of, 1829–1830
Goddard, Henry, 596–597
Goddess, cult of, 1286–1288
Goddess, Moon, 1376
God-Meme, 1739
Godparent system, 330, 935–936, 1372
Gods, 1094–1096
anthropomorphism of, 197–198
See also **Geomythology; Myths and Mythology; Religion**
Goethe, Johann Wolfgang von, 1097–1098
Goffer, Geoffrey, 1470
Gold, 291, 1342
Golden age, 721
Golden rule, 558
Golden Stool, 284, 285, 291
Goldschmidt, Richard, 1602
Gondwana, 989, 990, 991, 992
Good, Kenneth R., 668
Goodall, Jane, 208, 210, 500, 505, 506, **1098–1101**, 1896–1897, 1899, 2329
Goode, William Josiah, 1101
Goodman, M., 1627
Goodwin, John, 2209
Gordon, Deborah A., 137
Gorillas, 216, 220, **1102–1104**, 1184, 1891, 1893–1896
captivity, 1103–1104, 1895
cladistics, 515
conservation, 1104–1105
ecotourism, 1104
evolutionary anthropology, 916
Fossey's work, 208, 980–982, 1102–1103, 1894–1895
fossils, 205
home range, 1930
human language use, 209, 213, 533, 1379–1381, 1403, 1832
Koko, 209, 213, 533, **1379–1381**
locomotion, 1944
taxonomy, 311
threats to, 1895–1896
See also Apes
Gorillas, saving, 1104–1105
Gosse, Philip, 588, **1105–1106**
Gould, Stephen Jay, 695, 1867
lack of dynamic integrity, 1303–1304
Nietzsche and, 1743
Government, world, 2219–2220
Gradualism, 2239, 2307. *See also* **Uniformitarianism**
Graebner, Fritz, 747, 1387
Grammar, 1402, 1405, 1428
transformational, 1490
Grammar, generative, 1034–1035
Gramsci, Antonio, 1107–1108, 2103, 2139, 2314
Gran Chaco, 1112
Grateful Dead, 1676
Graves, 1108–1110. *See also* Burial and mortuary traditions; Funerals
Gravettian culture, 525
Great Chain of Being model, 685, 1121–1122
Great Flood, 585, 586, 702
Great Plains, native peoples of the, 1680–1682
Great Wall of China, 1851
Greece, ancient, 1150–1151
Acropolis, 6–7
alchemy, 41
animal collections, 2366
Apollonian, 223
city-states, 510
cosmology, 810
dynamic philosophy, 1859–1860
Empedocles, 809–810
golden age, 721
Heraclitus, 1153–1154
homosexual relations, 1198
human excellence, 1221–1222
humanism, 1249
mythology, 1658–1659
mythology and geomythology, 1069–1071
naturalist philosophy, 1695
pantheism, 1825
Sparta, 874
temples, 2175
use of fossils, 1809
Xenophanes, 2339
See also **Aristotle**; Plato
Greece, Balkans and, 330
Greek neolithic culture, 1734–1735
Greek Orthodox Church, 935
Green, Roger, 254
Green, Vera Mae, 2328

Greenberg, James, 557
Greenberg, Joseph, 1110–1111
Greenhouse gases, 988, 993
Greenland, 259, 2279
Gregory, Kathleen, 99
Grey, Mark, 105–106
Grid/group theory, 762
Griffin, Donald, 869
Griffith, Frederick, 753
Grimm, Jacob, 1438–1439, 1485–1486
Grimm, Wilhelm, 1438–1439
Grimm's Law, 1485–1486
Grooming, 1111–1112
Group marriage, 1539
Group selection, 928, 2108
Groves, Colin, 1780
Guangzhi, Zhang, 1846
Guanoco hunting, 1772–1773
Guantánamo, 617
Guaraní Ñandéva Indians, 1112–1113
Guardini, Romano, 1270
Guattari, Félix, 723
Guenons, 1617
Gurus, 1161
Gutenberg, Johannes, 1114–1115
Gynocentric approach, 245
Gypsies, 383, **1115–1118**, 1746–1747
Gypsy language, 1117

Haacke, William, 1748
Habermas, J., 1996
Habitat anthropology, 263
Habitus, 396, 2097
Hackers, 104–105
Haddon, A. C., 1119–1120
Hadean era fossil record, 983
Haeckel, Ernst, 1120–1125
  Asian origin theory, 883, 1122
  Darwin and, 677, 678, 884, 1741
  missing link theory, 401, 1122, 1602, 1800
  pantheism, 690, 1123, 1301
  recapitulation law, 1121, 2221
  tree of life, 895, 1121
Haida, 955, **1126–1134**, 2215
  acculturation, 1131–1133
  artistic expression, 1127–1128
  belief system, 1128–1129
  food, 1127
  life, 1126–1127
  potlatch, 1128, 1130–1131
  present-day, 1133–1134
  trade and influence, 1129–1130
Hair, facial, 1779, 1787
Hair, infant gripping function, 1211–1212
Hair color, 1577
Haircut, 191–192
Hairlessness, 1193, 1750
  aquatic ape hypothesis, 225
Hairy bipedal legendary primates, 2054–2055, 2354–2355
Haiti, 1134–1138
Haldane, J. B. S., 1043, 1058, 1729
Hall, Edward, 96–97
Hall, G. Stanley, 643, 1001
Hall, T. William, 1246
Hallstatt, 457, 1320–1321
Hamada, Tomoko, 102
Hamadryas baboons. *See* Baboons
Hamer, Dean, 1093–1094
Hamilton, William D., 1967–1968, 2108
Hammurabi, 327
Han Chinese, 1840
Hand axes, 3–5, 317–318, 1723, 2209, 2210–2211, 2213–2214
  arboreal "drop-chisel" theory, 1213–1215
Hands, 1192–1193, 1663
  apes, 1421
  arboreal function, 1211–1212
  language and, 1421
  quadrumanous primates, 1210–1211
Handsome Lake, 1329, 2296
Handwriting recognition, 372
Hanuman, 1161, 1510
Hanunoo, 864
Harappa, 1138–1139, 1291–1292, 1294, 1606–1608
Hardy, Alister, 224, 226
Hardy, G., 1057, 1139
Hardy-Weinberg principle, 694, 1036, 1043, 1057, **1139–1140**
Harems, primate, 1935
Harijan, 2248–2251
Harlow, Harry F., 1140–1141

Harmony ideology, 1352, 1434
Harrington, Michael, 652
Harris, Marvin, 186, 630, **1141–1145**, 1549–1553, 2270
Harrisson, Barbara, **1145**
Hartmann, Nicolai, 681
Haudenosaunee Confederacy, 815, 1322, 1325–1326, 1327
Haush, 2188
Hawaii
  environmental archaeology, 253–255
  rank society, 2105
  refuge for taboo violators, 1971
  seafaring, 1798
  taboo system, 2154
Hawass, Zahi, 797
Hawes, Harriet Boyd, 2329
Hawthorne Project, 85–88, 116, 351
Headdresses, 1791
Headhunters, 459, 1642
Healers, traditional, 1572–1573, 2360. *See also* **Medicine man**; Shamanism; **Witch doctor**
Health and medicine
  alternative health care, **1146–1148**
  anthropologist roles, 146–148
  anthropology of biomedicine, 861
  biomedicine, 370–371
  blood groups, 381–384
  blue lotus, 803
  childbirth, 491–494
  clinical genetics, 519–520
  complementary and alternative medicine, 1146–1148
  computer-associated disorders, 542
  diseases, **750**, 2255
  ethnomedicine, **859–861**
  ethnopharmacology, **861–862**
  euthenics, 875
  gene therapy, 700, 1052, 1223, 1225–1226
  genetic engineering applications, 1038–1040
  HIV/AIDS, 925, **1165–1168**
  human genetics, 1054–1055
  medical anthropology, 913–914
  medical genetics, **1571–1572**
  meditation effects, 1739
  melanin and disease, 1577–1578
  midwifery, **1596–1598**
  Native American public health status, 1682
  psychotropic medication and children, 925
  reproduction, **2015–2017**
  risk assessment, 824–825, 1224
  sickle-cell anemia, 1243, 1572, **2086–2087**
  sociology, 2116
  stress and disease, 1219
  urban pollution, 2255
  Virchow and German public health, 2286
  See also **Biomedicine**; Clinically applied anthropology; Traditional medicine
Health care, alternative, **1146–1148**
Heat shock proteins, 1632
Heath, Shirley Brice, **1148**
Heavenly Peace (Taiping) Movement, 1978
Hebrew creationism, 589–590
Hegel, G. W. F., 50, 54, 960, **1149–1150**, 1164, 1860
Hegemony theory, 1107–1108, 1873, 2314
  subcultures, 2139
Heidegger, Martin, 734, **1151–1152**, 1466
Heliolithic school of diffusionism, 747
Hemoglobin, 1627, 2086
Hempel, Carl, 2184
Henotheism, 1095, **1152–1153**
Heraclitus, **1153–1154**, 1825, 1859
Hercules, 1070–1071
Herdt, Gilbert, 127
Heritage tourism, 625
Hermeneutics, **1154–1155**
Herodotus, 702, 2229, 2247
Heroes, 1459
Herrnstein, Richard, 1052, 1966
Herskovits, Melville J., 1137, **1155–1156**, 1229, 1252, 2151, 2264
Hertz, Robert, 715
Herzegovina, 330
Herzen, Alexander, 685
Hesiod, 721, 1069
Hessler, R. M., 850–851
Heterosexuality, male power and, 127
Heterozygote screening, 1054–1055
Heyerdahl, Thor, **1156–1157**, 1529, 1886
Hieratic, 793
Hieroglyphs, 792–793, 798, 804
Highlife, 292

Himalayan fossil primate sites, 2089–2090
Himalayan Yeti, 2354–2355
Hindu caste systems. *See* **Caste systems**
Hinduism, 1095, **1157–1163**
beliefs, 1159–1161, 1275
cattle complex, 809, 869, 1144
converts to Buddhism, 2250
creationist tradition, 590, 682–683
Darwinism and, 682–684
diaspora, 447, 1163
marriage philosophy, 1276
monastic tradition, 1609
mythology, 1660
origins, 1158–1159
pantheism, 1824–1825
polytheism, 1890
rites of passage, 445–446
rituals, 1159, 1161–1163, **1285–1290**
temple architecture, 2174
the Vedas, 1278–1280
theory and practice of, 1159
Vedanta, 1280–1282
yoga, 1163
See also **India, rituals of**
Hirschi, Travis, 740
His, Wilhelm, 597
Hisarlik, 2057–2059
Hispanic women, 137
Hispanopithecus, 205
Historical archaeology, 251
Historical comparative research, 2019–2020
Historical ethnology, 855–856, 857
Historical linguistics. *See* **Linguistics, historical**
Historical materialism, 1541
Historical particularism, 153–154, 769, 1253, 2094
Historicism, **1164–1165**
History
cyclical, 2125
ethnohistory, **854–856**, 857
now concept, 2296–2297
prehistory, **1927–1929**
sociocultural anthropology and, 854–855
Toynbee's work, 2219–2220
world-system theory, 2297
Hitler, Adolf, 678, 699, 1047–1048, 1347, 1793, 2125
HIV/AIDS, 326, 925, **1165–1168**
primate studies, 1056
Hoaxes in anthropology, **1169–1175**
Cardiff giant, 438–439
Newark Holy Stones, 1172–1173
Sokal Hoax, 1915
Tasaday people of Mindanao, 1173–1175
yeti, 2355
See also Piltdown Man
Hobbes, Thomas, 697–698, **1176**, 1995
Hochschild, Arlie, 126
Hodgen, Margaret, 1400
Hoebel, E. Adamson, **1177**, 1433–1434, 1444–1445, 1752
Hoesle, Vittorio, 681
Hofstadter, Richard, 701
Hogans, 1712
Hokule'a, 1886
Holism and cultural anthropology, 152, 154
Holistic medicine, 1146–1147
Holmes, Oliver Wendell, Jr., 1443
Holocene Climatic Optimum, 1066
Homer, 1069
Homeric texts, oral origins of, 1776–1777
Hominid evolution. *See* Hominid fossils and evolution; Human evolution
Hominid footprints, 377–378, 887, 996, 1808
Hominid fossils and evolution, 205–207, 882
biogeography, 205–207
brain structure and linguistic capacity, 1425
catastrophism, 398
classification, 217
Dart's work, 675–676
dental reduction and probable mutation effect, 398
fossilization process, 995
human paleontology, **1226–1228**
issues in hominization, 1178–1182
Johanson's work, 1347–1349
Lazaret Cave, **1447–1448**
Leakey family and, 1448–1457
Lucy reconstruction models, 1500–1503
major discoveries, 884–886
Meganthropus, **1573–1574**
missing link, 1122
Modjokerto child, 1606
molecular clock and, 1180

Napier's work, 1663
Ngandong, Java, 1606, 1740
orangutan-human morphological similarities, 1778–1781
Oreopithecus controversy, 1789–1790
paleoanthropology, 914–916
pongid-hominid split, 886–888
proconsulids, 216–218
proposed evolutionary lineage, 1457
Return from Eurasia hypothesis, 1365
Sambungmachan site, 2046
Sangiran site, 2049–2050
Spanish sites, 276, 294–295, 344, 1186, **1788–1789**
speech organs, 1423
Teilhard de Chardin and, 2169, 2171
Weidenreich's evolutionary phase model, 2307
See also **Australopithecines; Dart, Raymond A.; *Dryopithecus; Homo erectus;*** Olduvai Gorge; **Paleontology**; *specific hominid species names*
Hominid fossils and evolution, Leakey family and, 1448–1457. *See also* **Leakey, Louis S. B.; Leakey, Mary D.; Leakey, Meave Epps; Leakey, Richard E. F.**
Hominid group behavior, 2303
Hominid taxonomy, 312, 1947
Weidenreich's evolutionary phase model, 2307–2308
See also **Primate taxonomy**
Hominid tool use, 1190, 1210, 2311–2312
Hominid-like dinosaurs, 748–749, 2035
Hominidae. *See* **Apes, greater; *Homo sapiens***
Hominin bipedalism. *See* **Bipedal locomotion**
Hominization, issues in, 1178–1182, 1191–1192
Hominoid fossil record. *See* Hominid fossils and evolution
Hominoids, 1182–1185. *See also* Apes; Apes, greater; Apes, lesser
Homo antecessor, 295, 344, **1186**, 1191, 1789
Homo erectus, 569, 886, 889, **1187–1188**
brain evolution and, 1307
Homo ergaster and, 1189
"*Meganthropus*" mandibles, 1574
Nariokotome Boy, 1187
Sambungmachan site, 2046
Sangiran site, 2049–2050
speech organs, 1423
tool use, 1210
tree-climbing ability, 1213
Homo erectus, Java man. *See* **Java man**
Homo erectus, Peking Man. *See* Peking Man
Homo erectus narmadensis, 1664
Homo ergaster, 361–362, **1188–1189**, 1768
Homo habilis, 316, 886, 889, **1189–1190**, 1450–1451, 1456
brain evolution and, 1307
brain structure and linguistic capability, 1425
Oldowan culture, 1768
proposed evolutionary lineage, 1457
Homo heidelbergensis, 276, 295, 1191, 1423
Homo modjokertensis, 1606
Homo Neandertalensis, 1207. *See also* Neandertals
Homo rudolfensis, 1190, 1450
Homo sapiens, **1191–1196**, 1243
age of, 1191
anatomy of, 1192–1193
birth, 1194
brain growth and development, 1194–1195
culture, 1196
fossil record, 1191–1192
head hair function, 1211–1212
hominization scenarios, 1191–1192
life cycle, 1469–1471
Linnaeus' taxonomy, 1491–1492
nakedness, 1193
Neandertal anatomical comparison, 1720
postnatal development and social behavior, 1194
sexuality, 1193–1194
speech and language evolution, 1195–1196
See also **Human variation**
Homo sapiens, evolution of. *See* Human evolution
Homo soloensis, 766, 1740
Homo troglodytes, 1492
Homoplasy, 515–516
Homosexuality, 127, 1196–2000
anthropoid primates, 1957
berdache gender variants, 342–343, 642, 1198
cross-cultural perspectives, 1197–1199
Freudian theory and neo-Freudianism, 1007–1008
gay and lesbian family forms, 946
gay, lesbian, transgender, and bisexual rights groups, 2331
lesbian gender identity, 137

life stages, 1198
marriage, 2078
persecution, 2078
Queers of color, 2335
same-sex conjugal families, 946
same-sex emotional attachments, 1197
women's studies and, 2334–2335
Honey, 1820
Honeybees, 1401, 1417, 1820
Hook, Sydney, 1544
Hooton, Earnest, 737
"Hopeful monster" hypothesis, 1602
Hopewell culture, 433, 1758–1764
agriculture, 1762–1763
demise, 1764
Myth of the Moundbuilders, 1761–1762
origins, 1760–1761
stone tools, 1763–1764
symbolism, 1761
Hopi Indians, 1200–1203, 2199
albinism, 1577
land claims, 1687
oral literature, 1774
Horace, 1964
Horizontal gene transfer, 1038
Horse fossils and evolution, 903–905, 1382
Horticulture, 1203–1204
domestication theory, 2038–2039
Iroquois, 1324–1325
irrigation, 1332–1333
plant cultivation, 621–623
Polynesia, 1888
Hottentots, 2187
Howell, Francis Clark, 1204–1205
Howiesons Poort industry, 2212–2214
Howling monkeys, 1206–1207, 1929, 1932, 1956
Hoyle, Fred, 348
Hrdlicka, Ales, 363, **1207–1209**
HTML, 1410
Huara (Wari), 1209–1210, 1854–1855
Hubble, Edwin, 348
Hui Tzu, 1695
Hull, David, 926, 928
Human anatomy, 1192–1193
Human behavioral ecology, 770, 771–773, 2107
altruism and cooperation, 772
foraging, 772
life history, 773
mating and marriage, 773
natural selection, 771
optimization, 771–772
xenophobia, 2340–2343
See also **Sociobiology**
Human biology, 364
Human canopy evolution, 1210–1216
brain evolution and, 1210, 1212, 1216
"drop chisel" or "drop spear," 1213–1215
grip climbing, 1212
hand and hair function and evolution, 1211–1212
hunting platforms, 1215
nests and tree platforms, 1212–1213
See also **Arboreal hypothesis**
Human competition and stress, 1217–1219
Human dignity, 1219–1221, 1357
Human ecology, 332, 2267
Human embryonic stem cells, 357, 761, 1041, 1053
moral status as a person, 358–359
Human ethology, 868, 1967
Human evolution, 883–891, 1498
adaptive radiation, 887
amity-enmity principle, 1360–1361
aquatic ape hypothesis, 224–227
biogeography and, 1778
bipedalism, 887
brain evolution and, 400–403, 889
canopy theory, 1210–1216
Cro-Magnons and, 889
Darwin and *The Descent of Man,* 690–691, 881, 882–883
"descent from apes," 685–686
fossil record, 1227
interpretations of, 891
Kropotkin's mutual aid theory, 1384–1386, 2036–2037
major discoveries, 883–888
Mitochondrial Eve, 876
monogenesis versus polygenesis, 892
Neandertals and, 889, 894, 1207, 1208, 1725–1726, 1727, 2308
omega point, 895, 932, 2168
pongid-hominid split, 887–888
processes, 914–915

sexuality and, 2076–2077
T. D. White's work, 2311–2312
Tattersall's research, 894
Virchow's theory of, 2289
Weidenreich's evolutionary phase model, 2307–2308
zoogeography, 361–362
See also Hominid fossils and evolution
Human evolution, arboreal theories. *See* **Arboreal hypothesis**
Human evolution, Teilhard de Chardin's work, 2168–2171. *See also* **Teilhard de Chardin, Pierre**
Human excellence, 1221–1223
Human factors research, 108
Human genetics, 1054–1055
Human Genome Diversity Project, 451, 1059
Human Genome Project, 520, 543, 756, 761, 874, 1040, 1051, 1052–1053, 1055, 1061, **1223–1226**, 1572
Human immunodeficiency syndrome. *See* **HIV/AIDS**
Human life, bioethical issues of beginning of, 357–359
Human life cycle, 1469–1471
Human nature, Hume on, 1258–1259
Human paleontology, 914, **1226–1228**. *See also* Hominid fossils and evolution
Human progress, Condorcet's philosophy, 554–555
Human Relations Area Files (HRAF), 613, 614, 858, 1470, 1666, 2096, 2145
Human Relations School, 87–92
Human remains identification, use of DNA testing, 757–758
Human rights, 602
anthropology and, 1228–1234
civil liberties, 1235
cultural issues of violence and conflict, 1231–1232
cultural rights, 1232–1234
global society and, 1231, 1234–1242
immigrants and, 1235
indigenous peoples and, 1436–1437
Islam and, 1236–1242
legal recourse, 1229
natural law doctrine, 1236
principles of self-determination, 1236–1238
reciprocity and, 1994
UN Universal Declaration, 1228–1229, 1994
women's rights, 1236–1237
Human rights and anthropology, 1228–1234. *See also* Human rights
Human rights in the global society, 1231, **1234–1242**. *See also* Human rights
Human sacrifice, 335, 461, 488, 591, 1552
Human skeletal and fossil remains, 914
Fa Hien Cave (Sri Lanka), **941–942**
Kennewick Man, 857–858, **1361–1362**, 1689, 2300
Mungo Lady/Man, 1645–1646
Narmada, India, 1664–1665
See also Cro-Magnons; Neandertals
Human variation, 928, 1059, **1243–1244**
characteristics and varieties, 384–385
clines, 519
cultural-historical types theory, 660–661
environmental factors, 2308
genetics and Washburn's work, 2302–2304
Linnaeus' taxonomy, 1492
mitochondrial DNA and, 876
mutation and, 1244
xenophobia and, 2342
See also Genetic variation; Human Genome Project; Mitochondrial DNA; Race; Y chromosome
Humanism, 53, 83, 1245, 1248
ancient world, 1248–1249
defined, 1248
pragmatism, 1926
Renaissance, 1249–1250
seven theses, 1248
Humanism, evolutionary, 1245
Humanism, religious, 1246–1247
Humanism, secular, 1247, **1248–1251**
Humanistic anthropology, 169–172
Humanitas, 1252
Humanities, universals in cultures and, 2244–2247
Humanity and entelechy, 821
Humankind, psychic unity of, 653, **1252–1255**, 1603, 2208
Humanness, moral component of, 602–603
Humanoid legendary hairy bipeds, 2054–2055, 2354–2355
Humans and dinosaurs, 1256–1257

Humboldt, Friedrich Wilhelm Heinrich Alexander von, 1257–1258
Hume, David, 54–55, **1258–1260**, 1698, 1873, 2184
Hungarian archaeology, 2289–2290
Hungary, 329
Hunt, Kevin, 376
Hunter-gatherers, 622–623, 978
aboriginal Tasmanians, 2163
collectors, 529–530
Mbuti Pygmy tradition, 1559
Mesolithic cultures, 1580–1582
skills, 2337–2338
warfare systems, 2298
See also **Australian Aborigines**
Huntington, Samuel P., 1260–1261
Huron, 1322, 1327
Hurston, Zora Neale, 171
Husserl, Edmund, 733, 1151
Hutchinson, G. Evelyn, 235
Hutton, James, 1503, 2239–2240
Hutu, 169
Huxley, Julian, 1058, 1120, 1245, 1731
Huxley, Thomas, 401, 690, 884, 923–924, 1301, 1741, 2221
Hydraulic civilization theory, 1871–1872
Hydrothermal vents, 353
***Hylobates*, 1262–1263**. *See also* Apes, lesser; Hylobatids
Hylobatids, 1183, 1262–1263, 1945, 2081–2082. *See also* **Apes, lesser**; ***Hylobates;*** *specific types*
Hylonomus, 988
Hymes, Dell, 2111
Hypergamy, 1538
Hyperreal, 2088
Hypogamy, 1538
Hypothesis, 2063–2064, 2066, 2184
Hypothetico-deductive model, 2063–2064

Ibn Khaldun, Rahman, 29–30, 166
Ice age, 994
Iceland, 259, 2279–2282
environmental archaeology, 252–253
Icelandic mythology, 1659–1660
Iceman, 758, **1265–1268**
Icon, 2088
Id, 1005–1006
Ideographs, 1865
Ideology, **1268–1272**, 2325, 2326, 2332
harmony, 1352, 1434
law as, 1434
nationalism, **1667–1671**
Iguana, 1017
Ik, **1273**, 2232
Iliad, 2228
oral origins of, 1776
Imaginary friends, 340
Imaginary play, 212
Imaging technologies, 407
Imhotep, 29
Imitation, 129
imitative rituals, 2013
socialization, 2098
Immanent critique of ethnology, 605
Immigrant work experience, 105–106
Immigration, 168–169
assimilation, 293
cranial formation studies, 388, 583
eugenics, 1046
human rights and, 1235
threat to Western culture, 1261
Immortality, 665
Immunology and primate evolution, 1626–1628
Imperialism
Marxist-Leninist critique of, 161–162
nationalism and, 1668
Imprinting, 866, 867
Inca, 1852, 1855, 1980
Aymara and, 319
Chachapoya and, 469–477
European contact, 1855
Howland's work, 2034
language, 474
Quechua, **1979–1980**
temples, 2175
Tiahuanaco, 2200
Incest, ancient Celts and, 459
Incest taboo, 627, 872, 935, **1273–1274**, 1538, 2078, 2097
Inclusive fitness theory, 1967–1968, 2108
Indeterminism, 736
India, 1235, 1274–1285
"bride burning," 763, 1235

Carvakas materialist school, 1248, 1694–1695
cattle complex, 809, 869, 1144
Chalcolithic period, 571
Darwinism and, 682–684
early colonial "anthropology," 83–84
ethnogenesis, 847
female infanticide, 763
Gandhi, 1021–1022, 1283, 1284, 2249
human genetic diversity, 1277–1278
humanist philosophies, 1248–1249
infanticide, 683, 763
jewelry, 1343, 1791
marriage traditions, 683–684
mythology, 1660
Narmada (Middle Pleistocene site), 1664–1665
sacred landscapes, 574
Sanskrit language, 1350–1351
Sanskritization, 1278
Taj Mahal, 2156–2157
temple architecture, 2173–2174
2004 tsunami and, 1850
Vijayanagar, 510
Westernization, 1278
yoga, 1163
See also Hinduism
India, caste systems. *See* **Caste systems**
India, philosophies of, 1278–1285
Buddhism, 1282
decolonizing period, 1283–1284
Jainism, 1282–1283
postindependence, 1284–1285
See also **Caste systems; Hinduism**
India, rituals of, 1285–1290
common elements, 1285–1286
cult of the God, 1288–1290
cult of the Goddess, 1286–1288
personification of river, 1290
India and evolution, 682–684, **1274–1278**
Indian Claims Commission Act, 856
Indian Ocean tsunami, 1064, 1850
Indigenous peoples, rights of, 1436–1437
Indigenous studies, **1689–1692**
Individual in culture, 641. *See also* **Culture and personality**
Individuality, 1098
Individuation, 495
Indo-European family of languages, 1487, 1960–1961
Indonesia, 1290–1291
2004 tsunami, 1064, 1850
Alor personality study, 1603–1604
burial rituals, 715
forest destruction, 1019–1020
Homo floresiensis, 888
Ngandong Man, 1606, 1740
Niah Cave and the Deep Skull, 1145
orangutan conservation issues, 1784–1785, 1787
Sambungmachan, 2046
Sangiran, 2049–2050, 2054
Sartono's work, 2054
Wallace's natural historical explorations, 2295
Indonesia, Java Man. *See* **Java Man**
Indonesia, orangutans in. *See* **Orangutans**
Indriids, 1959
Indris, 1934
Indus Civilization, 1138–1139, 1158, **1291–1294**, 1343, 1606–1608
Industrial anthropology
alienation, 94
boundary crossing in global context, 102–103
consumer behavior and marketing, 111–116
convergence of consumption and production, 116–117
convergence theory, 95
corporate culture, 99–102
decline of, 90–92
design ethnography, 107–111
diffusion theory, 96
early historical context, 83–85
ethnographies, 89
globalization, 97–98
Hawthorne Project, 85–88, 116
Human Relations School, 87–92
intercultural communication, 96–97
labor-management struggle, 107
management and power issues, 106–107
manager repatriation, 100
Marxism, 92–94
non-Western industrialization, 95–97
occupations and professions, 94–95
organizational behavior and management, 98–99
political and ethical issues, 91–92

regional perspectives, 103–107
Yankee City studies, 89–90
Industrial melanism, 900–901, 1366
Industrial Revolution, 496, 2167, 2182, 2244, 2296
pottery and ceramic production, 1923
Industrialization, division of labor and, 1398–1399
Industrialization, peasant society and, 1834
Infant carrying, canopy theory and, 1211–1212
Infant formula, 92
Infanticide, 683, 763
Infanticide, in primates, 502, 532
Infantile sexuality theory, 1006, 1469
Infinity, 421–422
Informal economy, 164–165
Informal organization, 87
Informants, 1295
Informatics industry, 103
Information ecologies, 103
Initiation masks, 1547
Initiation rites, 1470, 2014, 2023, 2073
secret society, 2106
Innate aggression theory, 2299
Inner conversation, 607–608
Inokun village, 1295–1299
Inquisition, 420
Insects, social, sterile caste paradox, 2108
Instincts, 1299
Institutional anthropology, 115
Institutional sociology, 2115–2116
Instrumentalism, 742–743, 783–784, 1870
Integrated circuit (IC) technology, 541
Integrity, dynamic, 1300–1306
Darwin, 1300, 1303
ethics, morals, and values, 1302
naturalism and pragmatism, 1303
Nietzsche, 1303–1306
quo vadis, 1304–1305
Teilhard de Chardin, 1304–1305
Intelligence, 1306–1309, 2352
brain evolution and, 1307
fluid and crystallized, 1307
Gardner's multiple intelligences, 785–786, 1308, 1638
genetics and, 1309–1310
history of, 1308
IQ testing, 1050, 1052–1053, 1307, 1309, 1310
language and, 1307
racial/ethnic differences in, 1050, 1052–1053, 1966
Western versus Eastern views of, 1307–1308
See also Brain evolution
Intelligence quotient (IQ), 1050, 1052–1053, 1307, 1309, 1310
Intelligence testing, 1050, 1052–1053, 1307, 1309, 1310, 2352, 2354
Intelligent Design, 588, 881, 892, 2173
Intelligent systems, 281–282
Intentional systems, 731–732
Interaction Chronograph, 89
Interaction theory and ethnomethodology, 1414–1415
Intercultural communication, 96–97
Intercultural education, 1311–1314
Internal conflict theory, 1871
Internal reconstruction, 1486–1487
International Business Machines (IBM), 541–542
International organizations. *See also* United Nations (UN)
International organizations, 1314–1317
framework for inquiry, 1315–1316, 2242
future of, 1316–1317, 2242–2243
nongovernmental organizations, 124, 1315, 2241–2243
universalism, 1315, 2242
International political economy (IPE), 1873
Internet, 104–105, 542, 546–547, 1410
cyberculture, 654–657
intelligent systems, 281–282
Interpretation, hermeneutics and, 1154–1155
Interpreting evidence, 882–883
Interpretive anthropology, 156–157, 170, 716, 851, 1027, 2097. *See also* **Geertz, Clifford**
Interspecies communication, 533
Intersubjectivity, 967
Interview methods, 965
Intifada, 1337
Inuit, 269–270, 386, 418–419, **1317–1319**
acculturation, 832–838
artists, 837
collector culture, 530
ethnogenesis, 847
European work schedule, 836

future of, 838
language, 837
medicine person, 1572
morality plays, 419
music, 837–838
religion, 840
subsistence, 834–835, 839
substance abuse, 836–837
Inupiat, 955
In-vitro fertilization (IVF), 2015–2016
Ipswich, England, 258
IQ testing, 1050, 1052–1053, 1307, 1309, 1310
Iraq, 400
Neandertal sites, 1717, 2081
neolithic agricultural settlement, 1339
women in, 136
See also **Mesopotamian civilization**
Ireland
language and Celtic culture, 462
protohistoric inhabitants, 457
Iridium layer, 992
Iris scan, 372
Irish Travellers, 1746
Iron Age, 237, 702, **1320–1322**
Celtic Europe, 457, 1321
Hallstatt period, 1320–1321
iron technology, 1320
La Tène, 457, 1321–1322
Near Eastern culture, 248
Iroquian nations, northern, 1322–1328. *See also* Iroquois
Iroquois, 153, 237, 535, 814–815, 968, **1328–1331**, 1625, 1676
conflict, 1325–1326
False Face Society, 1329
family, 1330
Handsome Lake, 1329, 2296
Haudenosaunee Confederacy, 815, 1322, 1325–1326, 1327
history, 1326–1328
horticulture, 1324–1325
Jesuit observations, 1399–1400
masks, 1548
matriarchy, 1554
northern nations, 1322–1328
origins, 1322
personality research, 1604
political structure, 1325
settlement patterns, 1324
social and political organization, 1330–1331
social structure, 1322–1323
spirituality and healing, 1328–1330
technology, 1323–1324
Irrigation, 1332–1333
Islam, 1334–1336
anthropology and, 1336, 1652–1653
beliefs and practices, 1334
colonialism versus, 1240
creationism, 590
feminism and, 1653
historical background, 1651–6152
historical development of, 1334–1336
human rights and, 1237–1242
in China, 1844
monasticism, 1610–1611
Muslims, 1651–1653
Pilgrimage to Mecca, 1334, 2223
Sudan and, 2140
Sufism, 1336, 2141–2142
threat to Western culture, 1261
women's rights and, 1236–1242
Islamic Period Near Eastern culture, 248
Islamic youth, 51–52
Israel, 1337–1338, 1345
Epipaleolithic culture (Natufian), 1692–1693
kibbutz movement, 1367–1368
Neandertal sites, 1563, 1718
Italian hominid fossil sites, 1789
Italian Neolithic cultures, 1735
Italy, Darwinism and, 684–687

Jagannath, 1289
Jainism, 1282–1283, 2174
Jakobson, Roman, 155, 2136
Jamaica, 649
James, William, 1862, 1924, 2198, 2341–2342
Jameson, Fredric, 2088
Jansenism, 1830
Jap, 1162
Japan
Ainu, 264–265, 267
Aleuts and, 44–45

burial mounds, 434
management and organizations, 96, 102
mythology, 1660
Japanese macaques, 466–468. *See also* **Macaques**
Japanese masks, 1548
Jarmo, 1339
Jati, 446
Java, Indonesia
Sambungmachan, 2046
Sangiran, 2049–2050, 2054
Java Man, 765–766, 883, 1122, 1187, **1340**, 1740
Jefferson, Thomas, 237
Jericho, 1332, 2301, 2329
Jerusalem, 1337
Jewelry, 291, **1340–1343**, 1791
Jewish American Princess, 2334
Jewish Holocaust, 699, 871, 1060, 1347
Jews, 1343–1345. *See also* Judaism
Jews and pseudo-anthropology, 1346–1347
Jhering, Rudolph von, 1439
Jieshi, Jiang, 1838
Joan of Arc, 1738
Jochelson, Waldemar, 2083
Johanson, Donald C., 1347–1349
Joint families, 943
Jolly, Cliff, 375
Jones, Frederic Wood, 883
Jones, Owen, 800
Jones, William, 1349–1351, 1479, 1485, 1960
Josephus, 1776
Judaism, 1343–1345
creationist tradition, 589–590
Jewish philosophy, 1466
Jews and pseudo-anthropology, 1346–1347
rituals, 2023–2024
State of Israel, 1337–1338, 1345
Jung, Carl, 1255, 2246
Jurassic fossil record, 991–992
Jurchens, 1977
Justice and anthropology, 1351–1353
conflict theory, 1352, 2113
reciprocity and, 1995
types of justice, 1352
See also **Law and anthropology**
Justinian, 1438
Juvenile suicide, 1970–1971
Kalahari Bushmen, 2186
Kalahari debate, 1390
Kali, 1287–1288
Kalinga, 436
Kallikak, 596–597
Kanevsky, Dimitri, 2123
Kano, Takayoshi, 389, 390
Kant, Immanuel, 1302, **1355–1358**
aesthetics, 21
Age of Enlightenment, 818
categorical imperative, 449–451
critique of reason, 1355–1357
dynamic philosophy, 1862
ethics issues, 1994
gemeinschaft and, 1028
on religion, 2000–2001
teleology, 2172
the Other and, 54
transcendental idealism, 609
Kantorowicz, Hermann, 1439
Kanzi, 213–214, 392, 393–394, 533, 534, 1421
Kardashev, Nikolai S., 932
Kardiner, Abram, 1358–1359, 1493
Karenga, Maulena, 28
Karma, 1160
Karnak, 793–794
Kathenotheism, 1095, 1278–1279
Kayak, 42, 43
Kayano, Shigeru, 264–265
Kayberry, Phyllis, 2329
Kazac, 1842
Kearney, Michael, 1835
Keil, Charles, 1651
Keith, Sir Arthur, 374, **1359–1361**
Kelheim, 1321–1322
Kelley, William, 626
Kempe, C. Henry, 489
Kempel, Carl, 2063
Kemper, Steve, 113–114
Kennewick Man, 857–858, **1361–1362**, 1689, 2300
Kenoraland, 985
Kenyanthropus platytops, 886, **1363–1364**, 1455
Kenyapithecus, 218
Kenyapithecus africanus, 1364–1365
Kenyapithecus wickeri, 1179, **1364–1365**, 1781
Kenyatta, Jomo, 169

Kenyon, Kathleen, 2329
Kepler, Johannes, 345–346
Kessler, Karl, 2036
Kettlewell, H. B. D., 1366
Keystone hoax, 1172–1173
Khmer Empire, 76–77
Khmer Rouge, 1060
Khoratpithecus, 205, 218
Khrushchev, Nikita, 618–619
Kibbutz, 1367–1368
Killke culture, 1855
Kimura, Motoo, 695, 897, 909
Kin selection theory, 2108
Kindred endogamy, 812
King, Dr. Martin Luther, Jr., 1368–1369
Kin-ordered mode of production, 1872, 2325, 2326
Kinsey, Alfred, 1197
Kinship, 1369–1370, 1371, 1625
  abbreviated terms, 1372
  Andean Altiplano culture, 191
  Asante, 287
  Australian Aborigines, 309
  compadrazgo, 319
  Confucianism, 559
  descriptive terms, 1372
  Ejagham culture, 1297–1298
  ethnosemantics, 865–866
  exchange of women, 134–135, 309–310
  fictitious exogamy, 936
  group selection, 928
  groups, 1370
  Gypsy, 1117
  incest, 459, 627, 872, 935
  Maori, 1530–1531
  Mongolian, 1613
  Native Americans, 1625–1626, 1683
  residence and, 1371
  structuralism, 1003
  symbols and, 2060
  systems, 1370, 1371
  terminology, 1371–1372
  theories, 1370
  Tikopia, 2193–2194
  Tlingit, 2206
Kinship, totemistic. *See* **Totemism**
Kiowa, 1395
Kircher, Athanasius, 798
Kiswahili, 2147–2148
Kitchen middens, 1595
Kitchi Manitou, 1673
Kivas, 70–71, 1201, 2371
Klasies River culture, 2212–2214
Kluckhohn, Clyde K. M., 626, 642, **1373**, 1624, 2320
Knowledge, epistemology and. *See* Epistemology
Knowledge management, 100
Knuckle-walking, 1939, 1944, 1953
Koba, 1373–1378
Kobti, Ziad, 486
Koch curve, 482
Koepping, Klaus Peter, 1252
Koffka, Kurt, 642
Kohlberg, Lawrence, 738
Köhler, Joseph, 1441–1442
Kohler, Tim, 486
Köhler, Wolfgang, 208, 500, **1378–1379**
Kohts, Nadie, 208
Koko, 209, 213, 533, **1379–1381**
Koldewey, Robert, 328
Kon-Tiki, 1156, 1529, 1886
Kopitoff, Igor, 2091
Kotosh Tradition, 1853
Kots, Alexander, 2039
Kovalevskii, Aleksandr O., 1381–1382
Kovalevskii, Vladimir O., 1382
Kraepelin, Emil, 1961
Krishna, 1288
Krishna, Daya, 1284
Kroeber, Alfred Louis, 1383–1384, 2145–2146
Kropotkin, Prince Peter A., 1384–1386, 2036–2037
KT boundary, 449
Kuhn, Thomas, 1697, 2063, 2185
Kula Ring, 1386–1387
Kulturkreise, 747–748, **1387–1388**, 2059–2060
Kuna, 1823
Kundalini, 1286
!Kung Bushmen, 136, **1388–1390**
Kuroda, Suehisa, 390
Kurtz, Paul, 1248, 1250
Kwakiutl, 386, 555, 642, 955, 1130, **1391–1394**, 1917–1921, 2325
Kwoma, 1470

La Chapelle-aux-Saints, 1714, 1717, 1719
La Tène, 457, 1321–1322
La Venta, 1768–1769
Labarre, Weston, 1395–1396
Labor, 1396–1397, 2326
child, 489, 496–497
women and industry, 93
work and skills, 2336–2338
See also Business anthropology; Sexual division of labor
Labor, division of, 1397–1399, 1542. *See also* Sexual division of labor
Labor movements, 84–85, 91, 107
Marxist analysis, 93
Lafitau, Joseph-François, 1399–1400
Laird, Carobeth Tucker, 2328
Laissez-faire theory, 698
Lake Titicaca, 1852, 1854, 2200
Lakota, 428–429, 723–725, 1673, 1676
land claims, 1676, 1687
Lakshmi, 1286
Lamarck, Jean-Baptiste, 697, 778, 895, 914, 1728, 1810
Lamarckism, 677, 696–697, 1728
Italian science and, 685
Lambruschini, Raffaello, 685
Lamphere, Louise, 93, 133–134, 1399
LANA Chimp Language Project, 2035
Lancet, 1381
Landscapes, sacred, 573–574
Langsonia, 205
Language, 1401–1404
assimilation and, 1409
behavior and, 2303
change and extinction, 1419
classification, 1110–1111, 1417–1419
cognates, 1486
cognitive aspects of bilingualism, 1311
corporate culture, 1408
critical social theory, 1416
cultural relativism, 1403, 1415
culture and, 1403, 1407–1409
descriptive linguistics, 1480–1483
diachronic perspectives, 2056
dialects, 973, 1402–1403, 1418, 2120
diglossia, 2112
discontinuous evolution, 1868
diseases of, 1635
education and, 1148
enculturation, 810–811
etic and emic perspectives, 1866–1867
evolution and change, 2110
evolutionary origin of, 1405–1406, 1417, 1419–1427
folk culture, 972
folk speech, 973–974, **2120–2122**
French structuralism, 156, 1002
gender differences in usage, 1414
general theory of structure, 1481
generative grammar, 1034–1035
genetic model of, 918, 1351, 1406–1407, 1487
global, 1410
glottochronology, 1090–1091
grammar, 1402, 1405, 1428
health care issues, 149
intelligence and, 1307
isolates, 1489–1490
learning, 2035
lexical borrowing, 1351, 1484
linguistic reconstruction, 1479–1480, 1485
media, 1566
Native American origins and, 1684
Neandertals and, 1863, 2303
paralanguage, 1826–1828
phonemics, 1482–1483
phonetics, 1402, 1550, **1863–1864**, 1866–1867
phonology, 1402, 1429, **1864–1865**
pidgins and creoles, 2112
power and, 1409
protolanguage, 1960–1961
registers, 2111, 2120–2121
Sapir-Whorf hypothesis, 1415, 2050, **2051–2052**, 2199, 2313
schooling and, 454
socialization and, 1415–1416
sociolinguistics, 1402, 1411, 1413, 1414, **2109–2112**
sociology of, 1411–1416
speech communities, 2111
structuralism, 2136, 2149
studying, 1401–1402
style, 2120

symbolic, 972, 2149
syntax, 1402, 1420, 1428
types of, 1427–1429
universals in, 918, 1110–1111, 1405, 1411–1413, **2247–2248**
See also Chomsky, Noam; **Sapir, Edward**; **Saussure, Ferdinand de**
Language, animal, 1416–1417, 1420–1421
bird speech, 1422
See also Apes, human language use; Primate communication and vocalizations
Language, apes and. *See* Apes, human language use
Language, classification of, 1110–1111, **1417–1419**, 1487
typology, 1427–1429
Language, origin of, 1405–1406, **1419–1427**
animal communication, 1420–1421
biological factors, 1421–1426
diversity of hypotheses, 1426–1427
hominid fossil record, 1423
tool use and, 1420–1421
Language, structuralism and. *See* **Structuralism**
Language, types of, 1427–1429
kinds of typology, 1428
language varieties, 2111–2112
phonological typology, 1429
semantics, 1428–1429
sign language typology, 1429
structures, 1428
syntactic typology and grammar, 1428
Language and biology, 1405–1407, 1421–1426
biology and culture, 1403
fossil record, 1425
hands and, 1421
larynx, 1422–1423
neuroanatomy, 404, 409, 1195, 1412, 1423–1426
Language and culture, 1407–1409. *See also* **Language**
Language loss, 49, 1233, 1411, 1419
Language minorities, 1409
Language use, sociology of, 1411–1416, 2047–2048. *See also* Structural functionalism; Structuralism
Languages
Aboriginal, 1, 308
African, 29, 1488
Algonquian, 46–49
Amazonian, 59–61
ancient Egyptian, 792–793, 798, 802, 804
Ashkenazi and Sephardic Jews, 1344–1345
Athabascan, 297
Celtic, 457
Chachapoya, 474
Chinese, 1840–1841
Coptic, 572, 793
Ebonics, 1757
Eskimo, 1488
Eurasian families, 1487
Gypsy, 1117
Hopi, 2199
Inuit, 837
Kiswahili, 2147–2148
Lakota, 723–724
Maori, 198, 199, 1532
Mayan, 1556
Native American, 712, 1488–1489
Oceania, 1487–1488
Quechua, 319, 474, 1979
Sanskrit, 1162, 1350–1351
Tongan, 2208
Viking, 2281–2282
Zuni, 2371
Languages, computer, 552–553
Langurs, 530–532, 1956
L'Anse aux Meadows, Newfoundland, 2282
Lapita, 1885, 2048
Laplace's determinism, 735
Lapps, 96, **1430**
Larue, Gerald, 1699
Larynx, 1422–1423
Lascaux Cave, 1431–1432
Latency stage, 1006, 1469
Latin America, 1261
Lattimore, Owen, 1612
Laurasia, 990, 991, 992
Lave, Jean, 100–101
Law, 1351–1352, 1433
definition of, 1446
ideology, 1434
Sumerian, 2144
See also **Taboos**
Law and anthropology, 1432–1436. *See also* Forensic anthropology; **Justice and anthropology**; Legal issues

Law and society, **1437–1447**
definition of law, 1446
dispute resolution, 751–752, 1352, 1433–1446
French sociology, 1441–1442
German sociology, 1442
lawyer-ethnologists, 1439–1440
neo-Hegelians, 1440–1441
19th century authoritarian theory, 1438–1439, 1440–1442
positivism, 1444–1446
pragmatism, 1443–1444
rebirth and Enlightenment, 1438
return to pragmatism, 1446–1447
Roman law and legal theory, 1437–1438
See also **Justice and anthropology**; Legal anthropology
Law of superposition, 928, 1063
Laws, 594–595, 627, 634, 737, 1519, 1751. *See also* **Maine, Henry Sumner**
Lazaret Cave, **1447–1448**
Leach, Edmund, 2095, 2198
Leacock, Eleanor Burke, 2328, 2329
League of Nations, 2243
Leakey, Louis S. B., 886, 980, 1098, 1189, 1363, 1364, **1448–1451**, 1663
bipedalism origin hypothesis, 374
Kenyan wildlife service and, 982
Oldowan culture and, 1767–1768
Leakey, Mary D., 377, 886, **1452–1453**, 2329, 2363
Leakey, Meave Epps, 886, 1180, 1363, **1454–1455**, 2329
Leakey, Richard E. F., 886, **1455–1457**
Learning, 603–604
bird songs, 867
cooperative, 784–785
imprinting, 866, 867
instincts and, 1306
language and, 1148, 2035
motor programs, 867
primates, 210
Learning style, 1638
Lee, Richard, 1389
Legal anthropology, 1432–1436, 1751–1752
conflict resolution, 751–752, 1433–1434, 1445–1446
globalization and, 1435–1436
Gluckman and legal reasoning, 1433
Henry Maine and, 1433
Hoebel and the case study method, 1433–1434
justice and anthropology, 1351–1353
lawyer-ethnologists, 1439–1440
legal process and pluralism, 1434
Lozi judicial process, 1433
Malinowski and norms of reciprocity, 1433
positivism, 1444–1446
pragmatism, 1443–1444, 1446–1447
trouble case method, 1177
See also Forensic anthropology; **Human rights**; **Law and society**; **Maine, Henry Sumner**
Legal issues
archaeological site and artifact protections, 242–243
Banyang medicine man, 336
euthenics and eugenics, 875
Gypsy culture and, 1116–1118
justice and anthropology, 1351–1353
Native American Graves Protection and Repatriation Act (NAGPRA), 242, 1233, 1361, 1682, 1689, 1758
salvage archaeology, 259–261
sexual harassment, 102, **2074–2075**
trouble case method, 1434
See also Human rights
Legal pluralism, 1434
Legal reasoning, 1433
Legal systems, 1177
ethnohistory, 854–855
Legends, **1457–1459**
Legends, urban, **2256–2258**
Legitimacy, 1869, 1874
Leibniz, G. W. von, 821–822, 1860
Leighton, Dorothea Leighton, 2328
Lemuria, 883, 1122
Lemurids, 1958–1959
Lemurs, 515, **1459–1461**, 1930, 1932, 1945, 1958–1959
biogeography, 203
Lenin, Vladimir I. U., 161–162, **1461–1463**, 1834, 2037, 2084
Lepilemurids, 1959
Lepsius, Carl Richard, 799, 800
Lernean Hydra, 1070–1071

Lesbians, 137
coparenting families, 946
women's studies, 2334–2335
See also **Homosexuality**
Levalloisian tradition, 1465–1466, 1723, 2213
Levant
archaeology and, 246–249
Chalcolithic, 570
Epipaleolithic culture (Natufian), 1692–1693
Levinas, Emmanuel, 1466–1467
Lévi-Strauss, Claude
Derrida and, 734–735
medicine men and, 1573
mythology studies, 131, 2138
non-historical approach, 854
on anthropological travel and adventure, 2223
on incest an exogamy, 935, 1274
on Mauss and mana, 1513
shaman studies, 2321
split representation and, 280
structuralism, 64, 155–156, 556, 1002–1004, 1412, 2096–2097, 2136–2138, 2149
structure dominating agency, 605
temporality and, 2198–2199
totemism and, 2218
See also **Structuralism**
Levitt, Norman, 1697
Lévy-Bruhl, Lucien, 1467–1468
Lewis, Oscar, 649–652, 858
Lewontin, Richard, 909
Lexical borrowing, 1351, 1484
Lexicostatistics, 1090
Leylines, 1525
Liang Bua, 888
Liangzhu culture, 571
Libby, Willard, 238, 437, **1468–1469**
Liberal eugenics, 871, 1969
Liberal feminism, 957, 2333
Liberal religion, 2009–2010
Liberté, egalité, fraternité, 817, 1994
Liberty, 602
Life, anthropic principle and, 81
Life, artificial, 1473
Life, characteristics of, 1471–1472
Life, definition of, 1476
Life, extraterrestrial, 422, 756, 786, 932–933, 2041–2042
Life, origin of, 352–353, 1472, **1474–1478**, 1773–1774
DNA and RNA and, 1476–1477
evolutionary theory, 1475–1478
extraterrestrial, 1475–1476
metaphysics, 1474–1475
See also Creationism
Life, unity of, 1473–1474
Life cycle, human, 1469–1471
Life history theory, 1968
Life-affirmation, 2247
Liminality, 131, 715, 2023
death and, 75–76
Lineage endogamy, 812
Lineage systems, segmentary, 1478–1479
Linear Pottery culture, 1735
Linguistic acculturation, 1484
Linguistic anthropology, 779–780, 1148
etic and emic perspectives, 1866–1867
field methods, 963
HIV/AIDS and, 1168
See also **Language**; Linguistics
Linguistic determinism, 1415, 2051–2052
Linguistic paleontology, 1486
Linguistic reconstruction, 1479–1480, 1485, 1486–1487. *See also* **Linguistics, historical**
Linguistic relativity, 1403, 1415, 2313
Linguistics, 185, 363, 779–780, 2109–2110
ethnosemantics, 865
See also **Language; Sapir, Edward; Saussure, Ferdinand de**
Linguistics, descriptive, 1480–1483
Linguistics, diachronic, 1480–1481, 1483, 2056
Linguistics, historical, 1402, **1483–1490**
Africa, 1488
classification, 1487
comparative method, 1486
Eurasia, 1487
Grimm's Law and Verner's Law, 1485–1486
internal reconstruction, 1486–1487
language isolates, 1489–1490
lexical borrowing, 1351, 1484
linguistic change, 1483–1485
new classification, 1489

North America, 1488–1489
Oceania, 1487–1488
reconstruction, 1479–1480, 1485
South American languages, 1489
Linguistics, transformational, 1490–1491
Linnaeus, Carolus, 895, 912, 1185, 1243, **1491–1492**, 1810
Linton, Ralph, 1492–1494
Linux, 104
List, John, 597
Literary genres, 328–329
Literature, oral, 1774–1775
Living Substance, 2276
Livingston, James, 1153
Lizot, Jacques, 668
Llano culture, 1494–1495
Llewellyn, Karl, 1433–1434, 1444
Loanwords, 1484
Locke, John, 841–842
Logic, 1149–1150
Logical positivism, 1899, 1909, 2062–2063. *See also* Positivism
Logocentrism, 734
Logograms, 1865
Logos, 1153–1154
Lombroso, Cesare, 596, 687, 721, 737
Lomnitz, Claudio, 2103
Longshan culture, 570
Looting, 243–244, 1644
Lopez de Leo de Laguna, Frederica Annis, 2329
Lorde, Audre, 2334
Lorenz, Edward, 480, 482
Lorenz, Konrad, 117, **1496–1497**
Lorises, 1497–1498, 1945, 1959
Love, 2245
Lovejoy, C. Owen, 375, 1498
Lovelock, James, 1015
Lozi, 1434
Lubbers, Rudd, 1081
Lübeck, Germany, 258
Lucretius, 1499–1500, 1696, 1860
Lucy, 886, 1348, 1349
Lucy reconstruction models, 1500–1503
orangutan model, 1781–1782
Lufengpithecus, 205, 218–219, 1781
Lukaes, Gyorgy, 1544
Luminescence dating, 705
Luxor, 793–794, 795
Lyell, Charles, 237, 684, 689, 782, 1063, **1503–1505**, 2221
uniformitarianism principle, 2240
Lynching, 29

Maasai, 978, **1507–1508**, 2047
Macaques, 464, 466–468, **1508–1510**, 1617, 1930
Macedonia, 330
Mach, Ernst, 1462, 1909
Machismo, 127–128
Machu Picchu, 356, **1511–1512**
MacIntyre, A., 1029–1030
Mack, Myrna, 1232
MacKinnon, John, 1892
Macrofossils, 1807
Madhva, 1281–1282
Magic, 1512–1518
blessing and curse, 1516
cosmic interconnections, 1515
divination, 1517
environmental uncertainty and, 154–155
explanations, 1517–1518
good magic, 1515
imitative or sympathetic, 2013
in history of anthropology, 1513–1514
mana, 1513, **1525–1526**, 2153, 2194–2195
medicine men and, 1573
natural forces, 1514–1515
power, 1514
primitive mentality, 1467
protection, 1517
religion and, 1513, 1518–1519, 1533, 2010–2011
similarity and contact, 1515
sorcery, 1515–1516, **2117–2120**
superstition, 1516–1517
symbols, 1515
sympathetic, 129, 1515, 2118–2119
taboo and, 1516–1517, 2154
world ethnology, 1514
Zande beliefs, 2360
See also **Sorcery; Taboos; Witchcraft**
The Magic Mountain (Mann), 1528
Magnetic field, 705, 1064–1065, 1803–1805
Magnetostratigraphy, 2134

Mahabalipuram, 1850
Mahabharata, 1158, 1159, 1777
Mahayana Buddhism, 426–427
Mahfuz, Naguib, 28
Maine, Henry Sumner, 1433, 1439–1440, **1519–1520**, 1832, 2283
Maize, 321, 1375, 1556
Makú, 61
Malaria, 1243, 1572
Malay, 385
Malaya, 971
Male dominance, 133–134
Malesian, 360
Malinowski, Bronislaw, **1520–1521**
"culture shock," 653
data collection approach, 968–969
ethnographic writing, 851
ethnology, 856
functionalism, 167, 1003, 1013, 1521, 1549
incest taboo and, 1274
Milne Bay Kula Ring, 1386
non-historical approach, 854
norms of reciprocity, 1433
on death in primitive society, 715
on law, 1443–1444, 1752
on magic, 1513
on myth, 131
on nature and culture, 18
origins of functionalism, 143, 154
social anthropology and, 143, 183
social class theory, 2100
static biases, 2095
totemism and, 2218
Trobriand Islands studies, 154–155, 774, 1254, 2319
See also **Functionalism**
Malthus, Thomas, 726, **1522–1524**, 2255
Darwin and, 689–690, 698, 922, 1522, 2036, 2069
Mammal-like reptiles, 989–990
Mammals, altruistic social hierarchy, 2108
Mammals, fossil record, 992
Mammoths, 521, 522, 523–534
Man the Hunter, 2129
Mana, 1513, **1525–1526**, 2153, 2194–2195
Manama Islands, 432, 433
Manchester School, 1092
Manching, 1321–1322
Manchus, 1977
Mandan, 2147
Manhein, Mary, 367–368
Manichaeistic ideology, 1271
Manioc beer, **1526–1527**
Manitou Mounds, 433
Mann, Thomas, **1527–1529**
Mantra, 1285
Manus, assimilation of, 293–294. *See also* New Guinea
Maori, 198–202, **1529–1532**, 1991–1993
Cook Islands and, 1991–1993
family and kinship, 1530–1531
language, 198, 1532
placenta burial, 200
religion, 1992–1993
revival, 201
tattoos, 1792
warfare, 200
Marable, Manning, 30
Marcus, G., 852
Marett, Robert Ranulph, 79, **1532–1534**, 2004
Mari people, 1437
Maritime archaeology, 256–257
Market economy, 159–160
Marketing research, 111–116
Marmosets, 455, **1534–1535**, 1932
Marquesas, **1535–1536**
Marriage, **1536–1540**, 2077–2078
adultery, 1619
ancient Celts, 460
Asante, 289
Australian Aborigines, 309–310
bride price, **417–418**, 1537
capture, 1440
Chinese traditions, 72
Christian enforcement on indigenous peoples, 833
consanguinity, 935
culture of poverty, 650
dissolution, 1539–1540
dowry, **763**, 1537
endogamy, 812–814
Eskimo, 833–834
exchange of women, 134–135, 309–310
group marriage, 1539

Hindu philosophy, 1276
human behavioral ecology, 773
in India, 683–684, 1235
Indian "bride burning," 763, 1235
Iroquois clans and, 1330
Kwakiutl "barter" tradition, 1393–1394
Maori, 1531
marital prestations, 1537–1538
Mbuti Pygmy, 1561, 1562
monogamy, 1619
processes, 1537
procreation, 1539
rules, 1538–1539
same-sex unions, 2078
Yabarana tradition, 2346
See also Exogamy; Polygamy; Polygyny
Marriage, incest taboo and. *See* **Incest taboo**
Mars, life on, 2042
Marshall, John, 1389
Marshall, Lorna, 1388
Marsupials, 303
Marti, José, 616–617, 620
Marx, Karl, 142, 173–174, 186, 535, 537, 923, **1540–1542**, 1543, 2244
alienation concept, 50
class conception, 2099
Communist Manifesto, 815–816, 1543–1545, 2100
Darwin and, 679
division of labor, 1398–1399
dynamic philosophy, 1860–1861
Engels and, 815–817
Engels' memorial address for, 1544
French structuralism and, 1004
historicism, 1164
immanent critique of capitalism, 605
materialism, 1542
nationalism and, 1670
peasant society and, 1834
philosophy of alienation, 2342
Marxism, 92–94, 173–174, 815–817, **1543–1546**
Bakhtin and, 328
Chinese revolution, 1545–1546
class conflict theory, 556, 557, 2099–2101, 2113
critical sociolinguistics, 1416
cultural ecology, 628–629
cultural materialism, 1551
Darwinism and, 687, 1544
dialectical materialism, 153, 816, 1142
evolutionism and, 2037–2038
Gramsci and, 1107–1108, 2103
industrial anthropology and, 92–94
Lenin and, 1463
Manchester School, 1092
material production and social consciousness, 647–648
modes of production, 2325
neo-Marxism, 1546
political economy and, 1873
Popper versus, 1900
postcolonialism and, 1911
postmodernism and, 1914
proletarianization of peasantry, 1834
radical criminology, 740
religion and, 2005
structural, 2097
Third World underdevelopment theory, 123, 162–163
women in, 134
See also **Communism**
Marxist anthropology, 142, 143, 161–164, 173–174, 536, 775–776
Marxist determinism, 736
Marxist feminism, 740, 957, 2333
Masculinity, 1031
anthropology of men, 126–128
masculine identity, 50
Masks, 292, 1329, 1546–1549, 2032
Masks, ceremonial, 1546–1549
Mass media, 31, 2116
Material culture and moral naturalism, 611
Material culture and spiritual culture, 636
Material observation, 963–964
Materialism, 816
Carvakas school (India), 1248–1249, 1694–1695
dialectical, 153, 816, 1142, 1542
Feuerbach and, 960–961
historical, 1541
See also **Secular humanism**
Materialism, cultural, 630–631, **1549–1553**
Matilda, 1473
Mating signals, 1420
Matriarchy, 28, 297, **1553–1554**, 1831–1832

contemporary societies, 1554
Iroquois, 1554
Matrifocal family, 946
Matrilineality, 287, 535, 1371, 1478, 1554
Matrilocal residence, 943, 945, 947, 1538
Mauss, Marcel, 155, 1004, 1254, 1471, 1513, **1555**
Maya, 1556–1558, 1589
administration and court structure, 1374–1375
art, 1375
calendar, 1556
Chichen Itza, 487–488
cities, 510
clothing, 2183
contemporary culture, 430
contemporary ethnography, 1666, 1667
Copan, 236
cosmology, 1556
El Cerén, 805–806
Koba, 1373–1378
maize, myth, and sacrifice, 1375–1377
myth as urban organization, 1377–1378
oral literature, 1775
symbolism, 1375
temples, 2175
Tikal, 2189–2191
"tree of life," 635
Uxmal, 2260–2261
Mayan languages, 1556
Mayer, Enrique, 1835
Mayo, Elton, 85–86, 88, 108
Mayr, Ernst, 696–697, 927, 1044, 1731–1732
Mazur, Allan, 1217–1218
Mbuti Pygmies, 1558–1562, 2232
McCown, Theodore D., 1563–1564
McCracken, Grant, 112
McCready Price, George, 589
McDougall, William, 643
McLennan, John F., 1440
McLuhan, Marshall, 546, 552, 1410, **1564–1568**
Mead, Herbert, 2098
Mead, Margaret, 169, **1568–1571**, 2328
Benedict and, 340, 341, 1568, 1569
cultural determinism, 644, 1568
culture and personality, 641, 642–644
cybernetics, 657
feminist anthropology, 1569, 2329
gender roles and, 133, 1470, 2332
Manus assimilation and, 293
on childhood and cultural norms, 496, 811, 2098
on division of labor, 1399
Samoan studies, 133, 496, 632, 811, 858, 1000–1001, 1568, 1570
Sapir and, 641
use of film technology, 188
Mead-Freeman debate, 858, 1000–1001
Mean, doctrine of the, 559–560
Means, Russell, 1677
Measurement
Hawthorne effect and, 351
Heisenberg uncertainty principle, 351
standards, 2017–2018
See also **Anthropometry**
Meat industry, 105
Mecca, 1334, 1651–1652, 2223
Media
aggression and territoriality, 31
global society, 1567–1568
language and, 1566
Medical anthropology, 145, 750, 913–914
ethnomedicine, 859–861
Virchow and, 2288
See also Clinically applied anthropology
Medical genetics, 1054–1055, **1571–1572**, 1969, 2016. *See also* Gene therapy
Medical informatics, 362
Medicine. *See* **Biomedicine**; Health and medicine; Traditional medicine
Medicine man, 1572–1573, 1672–1673, 2317
Banyang, 332–336
criminal/evil practices, 335
legal issues, 336
rituals, 334–335
witch doctor, 2317–2318, 2360
Medieval archaeology, 257–259
Medina, 1335
Meditation, 665
health benefits, 1739
neurophysiological changes, 1737–1739
Megalithic monuments, 1736
Stonehenge, 2130–2132
***Meganthropus*, 1573–1574**
Mehan, Hugh, 1574–1575

Mehta, Manjara, 822
Meillassoux, Claude, 2091
Meinecke, Friedrich, 1164
Melanesia
  "big man," 2104, 2105
  ceremonial masks, 1547
  mana concept, 1513, 1525–1526, 2153, 2194–2195
  society, 2025
Melanin, 1575–1578
  diseases and complications, 1577–1578
  skin color, 1243
  UV radiation and, 1576–1577
Melanism, 900–901
Melting pot, 626
Memes, 710, 733, 926, **1578–1579**
  religion and, 1739
Memory banking, 847
Memphis, 794, 801, 2259
Men, anthropology of, 126–128, 1031
  male dominance assumption, 133–134
Mencius, 558, 560–561
Mendel, Gregor, 368, 753, 1041, 1042
  rediscovery of inheritance laws, 871, 1043, 1139
Mendelian genetics, modern evolutionary synthesis and, 693–694, 1044, 1058, 1728–1730, 1732–1733, 1748, 1965, 2087
Mendelists, 1043
Menippean satires, 329
Menstrual taboo, 1673
Menstruation ritual, 1756
Mental disorders
  cultural relativity, 1962
  culture-bound syndromes, 1963
  dementia, 725–726
  dysphoric affect, 870
  ethnopsychiatry, 862–864
  Foucault's work, 997
  imaging technologies and, 407
  premodern view, 997
  transcultural psychiatry, 1961–1964
Mercantilism, 1873
Mercati, Michael, 702, 707
Merina, 75
Merriam, Allan P., 1650–1651
Mescaline, 1858
Mesoamerica, **1587–1590**
  archaeological evidence of warfare, 2301
  early urbanism, 509–510
  "mother culture" and "sister culture" models, 1770
  Olmecs, 1768–1771
  Tikal, 2189–2191
  Zapotecs, 2361–2363
  See also Aztecs; **Maya; Mexico**
Mesolithic cultures, 1580–1582
Mesomorph, 737
Mesopotamian civilization, 1583–1586, 2142
  archaeological evidence of warfare, 2301
  Babylonian culture, 326–328, 1584–1585
  demography, 728
  geomythology, 1068
  laws, 2144
  Sumerian civilization, 1068, 1583–1584, **2142–2144**
  Ur, 2144, **2251–2253**, 2366
  ziggurats, 2143, 2174, **2363**
Mesozoic era fossil record, 990–992
  Cretaceous, 992
  Jurassic, 991–992
  Triassic, 990–991
Messenger RNA (mRNA), 754–755, 1049, 2026
Mestizo, 1589, 1679, 1822, 2334
Metallurgy, 1586–1587
  alchemy, 41
Metaphysical evil, 878
Metaphysics of evolution, 928
Metaphysics of nature, 1356
Method, scientific. *See* **Scientific method**
Methodological materialism, 589
Methodological naturalism, 1696–1698
Methods of research. *See* **Research methods**
Methods of sociology, 2114
Métis, 847
Metric traits, 369
Metzger, Tom, 820–821
Mexican immigrants, 105–106, 1261, 1590
Mexico, 1587–1590
  machismo, 127–128
  Monte Alban, 509–510, 2362
  National Museum of Anthropology, 1591
  Olmecs, 1768–1771
  peyote rituals, 1858
  Redfield's studies, 1996–1997

Tenochtitlan, **2175–2178**
Uxmal, **2260–2261**
women in, 137
Zapotecs, **2361–2363**
See also Aztecs; Mesoamerica
Miami Indians, **1591–1594**
Michael (gorilla), 209
Michels, Robert, 1870
Microbial Genome Program, 1224
Microfossils, 1807
Micronesian ethnography, 2060
Micropaleontology, 1807
Microsatellite analysis, 911–912
Middens, 1595
Middle Eastern Mesolithic culture, 1582
Middle Eastern pottery and ceramics, 1923
Middle English, 1484–1485
Middle Horizon, 1209
Middle Pleistocene Asian site (Narmada), 1664–1665
Midwifery, 492, **1596–1598**
Migrations, **1598–1600**
Bering land bridge, 42, 269, 525–527, 857–858, 1209, 1600, 1622–1623, 1684
contemporary Sudan, 2141
Great Plains, 1680–1681
Heyerdahl's projects, 1156–1157
transnationalism, 2220–2221
Mi'kMaq, 1692
Mill, John Stuart, 553
Miller, Daniel, 112, 113, 117
Miller, Stanley, 352–353
Mills, C. Wright, 1544, 1870, 2113
Mind and nature, 1702, 1710
Mindanao "Stone Age" people hoax, 1173–1175
Ming Dynasty, 1977
Mining, 1586–1587, 1667, 2349
Minoan civilization, 594
Minotaur, 591
Mintz, Sidney Wilfred, **1601**, 2103
Mirror studies, apes and, 211–212, 392, 503–504
Missing link, 401, 676, 1122, **1601–1602**, 1755, 1800
Sasquatch, 2055
See also Piltdown Man; **Yeti**
Mississippian period, 988
Mitchell, Joni, 1173
Mitochondrial defects, 1054
Mitochondrial DNA, 694–695, 757, 758, 876–878, 1036, 1227
fossil sources, 918
hypervariability, 1629
lineages in India, 1278
monkey and human homologies, 1629
Neandertal studies, 1038, 1724, 1725, 1726
polygyny and, 1883
turtle evolution, 910–911
Mitochondrial Eve, 694–695, **874–876**
Mixed diet theory, 235
Mixtec, 1866
Moche culture, 1854
Modal personality, 613–614, **1603–1605**
Mode 2 technology, 6
Modeling, cybernetic, **657–658**
Models, anthropological, **1605–1606**
Models, computer, 543, 544
Modern synthesis, 167, 668–672, 692–696, 1044, 1058, 1728, 1731–1733, 1748, 1800, 1965, 2087. *See also* Neo-Darwinism
Modernism, 819
Modes of production, 164, 1872, 2325, 2326, 2337
Modjokerto, **1606**
Mohanty, Chandra Talpade, 2333
Mohanty, J. N., 1285
Mohave, 342
Mohawk, 1322, 1325, 1326, 1327, 1328, 1331, 1399–1400
Mohenjo Daro, 1138, 1291–1292, 1294, **1606–1608**
Mole rats, 2108
Molecular anthropology, 1179
ALFRED DNA database, 45–46
Molecular biology and Neo-Darwinism, 694–695
Molecular clock, 877, 878, 909, 1180, 1227, 1627–1628
Molecular drive, 1749
Molecular evolution, **895–896**, 905–910, 1179
allozymes, 910
microsatellite analysis, 911–912
molecular clock, 877, 878, 909
neutral theory, 695, 895, 906, 908–909
See also Genetic drift
Molecular genetics, 1048–1053, 1057, 1965, 1967. *See also* **Population genetics**; **Psychology and genetics**

Molecular medicine, 519–520, 1225–1226.
See also Gene therapy
Molecular phylogeny in hominid evolution, 1626–1633
cladistics, 1631
constant molecular change assumption, 1631–1632
genomic change theory, 1628–1629
mitochondrial DNA and, 1629
RNA and, 1633
Monads, 821
Monasticism, 1608–1611
Buddhist tradition, 1609–1610
Christian traditions, 1610
Coptic, 571–573
Hindu tradition, 1609
Islamic tradition, 1610–1611
Money, 160, 776–777
Mongolia, 1611–1614
Mongoloid, 385, 569
Monism, Haeckel's evolutionary cosmology, 1120–1125
Monistic metaphysics, Hegelian, 1149–1150
Monkey genetic modifications, 1125–1126
Monkey trial (1925), 586, 589, 673–674, **1614–1615**, 2068–2069
Monkeys, behavioral ecology of.
See **Primate behavioral ecology**
Monkeys, New World, 1615–1616, 1941
biogeography, 203, 204
cebids, 455–456
continental drift, 567
evolutionary lineage, 401, 1943
vision, 1932
See also **Howling monkeys; Marmosets; Primate behavioral ecology; Spider monkeys; Tamarins**
Monkeys, Old World, 1617–1618, 1941–1942
biogeography, 204
colobines, 530–533
color vision, 1932
continental drift, 567
evolution, 401, 1943
fossils, 218, 1509
Himalayan fossil sites, 2090
human DNA sequence homologies, 1629
locomotion, 1939, 1948–1950
See also **Baboons; Cercopithecines; Macaques; Primate behavioral ecology**
Monks Mound, 1172
Monod, Jacques, 1472
Monogamy, 1539, **1618–1619**, 1933, 2077
primates, 1934
serial, 1619
Monogenesis, 893
Monotheism, 1095, 1890
henotheism, 1095, **1152–1153**
Monotremes, 303
"Monsters" and "freaks," 1653–1655
Montagu, Ashley, 1620–1621
Montaigne, Michel Eyquem de, 1622, 1994
Monte Alban, 509–510, 2362
Monte Verde, 522, **1622–1623**, 1852
Montenegro, 330
Moon Goddess, 1376
Mooney, James, 1077
Moore, G. E., 1698
Moral evil, 880
Moral naturalism, 611
Moral nature, 271
Moral philosophy, 842
Moral relativism, 631
Moral sources of economic performance, 104–105
Moral status of human embryo, 358–359
Morality, 2145
Confucianism, 558–561
human excellence, 1221–1222
humanness and, 602–603
Hume's moral theory, 1260
Kantian categorical imperative, 1357
social Darwinism versus, 602
See also Ethics; **Norms**
Morality plays, 419
Morals, 1302
Moran, Emilio, 58
Mores, 634, **1623–1624**, 1751, 2145
Morgan, Elaine, 224–227, **1624–1625**
Morgan, Lewis Henry, 1625–1627
evolutionary ethnology, 858
gentlemanly approach to anthropology, 153
internal conflict theory, 1871
Iroquois study, 237, 535, 968, 1625

L. White and, 2310
on incest, 1274
on kinship terminology, 1440, 1441, 1625–1626, 1683
on labor and cultural evolution, 1396
psychic unity doctrine, 1253, 1255
Morotopithecus bishopi, 218
Morphogenesis, 1749
Morphology versus molecules in evolution, 1626–1633
Morphospace, 928
Morris, Desmond, 224, 1624, **1633–1634**
Mortuary cannibalism, 435
Mosca, Gaetano, 1870
Moses, 1738
Moth melanism, 900–901
Moth sexual selection, 2075
Mother culture model, 1770
Mothering behavior, monkey studies, 1140–1141
Mound City, 1758
Mourning, 76, 720
Mousterian culture, 1207–1208, 2357–2358
Movius Line, 3, 6, 318
Mozambique, 1144
Mudras, 1285–1286
Mukuri, Helson, 1179
Mulamadhyamakakarika, 1282
Müller, Friedrich Max, 128–129, 1152, **1634–1636**, 2004
Muller, Hermann J., 1043–1044
Multicultural diversity and education, 1311–1314
Multiculturalism, 781, **1636–1641**
beyond the rhetoric, 1640
business world, 1640
class, race, gender, and crime, 1640–1641
demographics, 1637–1638
ethical foundations, 1639
learning styles, 1638
promoting, 1640
Multifunctionalist model of ancestor worship, 74
Multilinear evolutionism, 494–495, 629, 2129
Multinational corporations, 92, 94
exploitation of Third World, 121
supranational network, 97
Multiple intelligences, 785–786, 1308, 1638
Multiregional hypothesis, 1191–1192
Mummies and mummification, 797, **1642–1645**
abuse and use, 1644–1645
animals, 1642, 1644
Chinchirro, Peru, 1853
desiccation, 996–997
forensic applications, 1645, 2092
mechanisms, 1643–1644
Ramses II and tobacco, 1983–1984
reasons, 1642–1643
Münchausen's Syndrome by Proxy, 489
Mundugamor, 1571
Mungo Lady/Man, 1645–1646
Munn, Nancy, 2199
Murdock, George Peter, 613, 614, 945, **1646–1647**, 2096, 2145
Murray, Charles, 1052, 1966
Murray, Margaret Alice, 2328
Museums, 1591, **1647–1649**
State Darwin Museum, Moscow, 2039
Music, 1650–1651
Asante, 292
Celtic Fringe, 463
Cuban, 615
Inuit, 837–838
Zande, 2361
Muslims, 1651–1653. *See also* **Islam**
Mutants, human, 1653–1655
Mutations, 756, 906, 1032, 1044–1045, **1656–1657**, 1733
constant molecular change assumption, 1632
explaining human variation, 1244
"hopeful monster" hypothesis, 1602
human genetic disorders, 1054
mutagenesis, 1656
Y-STR DNA, 2355–2356
Mutual aid, 1384–1386, 2036–2037
Myoglobin sequences, 1628
Myths and mythology, 1657–1661
ancient Egyptian, 793
ancient Greek, 1069–1071, 1658–1659
anthropomorphism in, 197–198
archetypes, 2246
Athabascan, 297
Australian Aborigines, 309
categories of myth, 2246
Celtic, 461

commonalities, 1660
degeneration, 721
geomythology, 1066–1071
gods, 1094–1096
henotheism, 1095, **1152–1153**
Hindu, 1660
ideology, 1269
legends, 1457–1459
Lévi-Strauss' structural analysis, 2138
Maya, 1375–1378
Mesopotamia, 1068
monkeys, 1510
Muller and, 1635–1636
nationalism and, 1669–1670
natural processes, 1635, 1636
Navajo, 1711–1712
Nazi gnosticism, 1271
Norse and Teutonic, 1659–1660, 2281
Oriental, 1660
reasons for, 1657–1658
ritual origins, 131
Roman, 1659
structuralism, 1003–1004
Tongan, 2207
Troy, 2228
universal themes, 1658
universals in cultures, 2245–2246
Xenophanes and, 2339
See also **Polytheism; Religion**

Na Dene, 1684
Nabataeans, 1856
Nacholapithecus, 218
Nader, Laura, 1352, 1445
Nagarjuna, 1282
The Naked Ape (Morris), 224, 1624, 1634
Naked mole rats, 2108
Nakedness, 1193
Nam Jap, 1162
Namazga, 570
Naming ceremony, 289
Nanotechnology, 658
Napier, J. R., 1663, 1948
Narcissism, 1007, 1699
Nariokotome Boy, 1187
Narmada Man, 1664–1665
Naroll, Raoul, 1665–1666
Nasal index, 197
Nash, June C., 1666–1667
National Aeronautics and Space Administration (NASA), 548–550
National anthropologies, 168
National Association for the Practice of Anthropology (NAPA), 98, 141, 177
National Center for Biotechnology Information (NCBI), 544
National Environmental Policy Act (NEPA), 260
National heroes, 1459
National Historic Preservation Act (NHPA), 242, 243, 260
National identity, 1874
National Museum of Anthropology, 1591
National Register of Historic Places, 260
National Science Foundation, 91, 95, 98
National socialism (Nazism), 677, 678, 699, 845, 871, 1271, 1347, 2125
Nationalism, 1667–1671
Age of Enlightenment, 1669
age of imperialism, 1668–1669
balkanization, 330
Marx and, 1670
Plato and Aristotle, 1667–1668, 1671
religion and mythology, 1669–1670
social evolution, 1669
Native American Church, 1675, 1688, 1858–1859
Native American Graves Protection and Repatriation Act (NAGPRA), 242, 1233, 1361, 1682, 1689, 1758
Native Americans
action anthropology, 8–11
Aleuts, 41–45
Algonquian languages, 46–49
Anasazi, 69–72, 435
Apollonian and Dionysian concepts, 555, 642
Asian origins, 1208–1209
berdache gender variants, 342–343, 642, 1032
biogeographic origins, 42, 269, 525–527, 613, 857–858, 1209, 1600, 1684
blood groups, 383
Bureau of American Ethnology, 1683, 1762
burial mounds, 430–434, 1172, 1758–1764
ceramic technology, 1756

creationist tradition, 590
crime and tribal control, 1686
cultural anthropology research traditions, 153
current U.S. status, 1682
ethnographies about women, 135
ethnohistory and, 854–855
ethnological research, 1683
female anthropologist advocacy, 2327–2328
Ghost Dance, 1076–1078
Great Plains peoples, 1680–1682
Haida, 1126–1134
historical relations between, 1685–1686
Hopewell culture, 433, 1758–1764
Hopi, 1200–1203, 1577, 1687, 1774, 2199
Indian Claims Commission Act, 854–855
Indian Reorganization Act, 1686
Jesuit observations, 1399–1400
jewelry, 1343
kinship, 1625–1626, 1683
kivas, 70–71, 1201, 2371
land claims and sacred sites, 1676, 1687–1688
language loss, 49
languages, 712, 1488–1489
masks, 1548
medicine men and, 1572–1573, 1672–1673
membership, 1686
Métis, 847
Miami Indians, 1591–1594
native studies, 1689–1692
Ojibwa, 1765–1766
Omaha Indians, 633, **1771–1772**
origin beliefs, 1683–1684
origins, linguistic evidence, 1684
public health status, 1682
reservation system, 1682, 1685–1686
salvage ethnology, 151
spatiality, 1672
tattoos, 1792
traditional healers, 1572–1573
Winnebago studies, 1982
Zuni, 430, 555, **2371–2372**
See also **Iroquois; Kwakiutl; Native North American religions; Native peoples of the Great Plains; Navajo**; Potlatch; *specific nations, peoples, or tribes*
Native Americans, Paleoindian cultures, 1623, 1684–1685
economic development, 1688–1689
Kennewick Man, 857–858, **1361–1362**, 1689, 2300
peyote religion, 1688
See also Bering land bridge; **Clovis culture; Folsom culture**
Native North American religions, 1671–1678, 1688
20th-century revitalization, 1675–1678
Carlos Castaneda and, 1676
Christianity, 1677–1678
community, spatiality, and nature, 1672
early studies, 1672
highest supernatural powers, 1673
individualism, 1672
medicine men and, 1572–1573, 1672–1673
menstrual taboo, 1673
peace pipe, 1674
peyote religion, 1395, 1675, 1688, 1858–1859
sacred origins, 1673–1674
sweat lodge, 1674
See also Native Americans; **Religion; Totem poles; Totemism**; *specific groups, peoples, or tribes*
Native peoples of Central and South America, 1678–1680. *See also* **South American and Central American native peoples**
Native peoples of the Great Plains, 1680–1682
anthropology and, 1682
current issues, 1682
early cultures, 1680
European contact, 1681
indigenous migrations, 1680–1681
legal battles, 1681–1682
resistance to European expansion, 1681
Native peoples of the United States, 1682–1689. *See also* Native Americans
Native studies, 1689–1692
need for separate discipline, 1690–1691
topics and issues, 1691–1692
Natufian culture, 1692–1693, 2283
Natural evil, 878
Natural history, ethnoscience and, 864
Natural selection, 368, 585, 782, 874, 895, 905–909, 1033, 1472, **2069–2070**
blended inheritance, 693, 1139, 2307
criticisms of, 2070

evidence for, 896–905
Fisher's genetic theory, 1729–1731
fitness, 12–17, 602–603, 1730, 2108
fundamental theorem of, 1730
group selection theory versus, 2108
human behavioral ecology, 771
logical and ethical critique, 922–924
Malthus and, 690, 2069
"nearly neutral theory," 911
neutralist-selectionist controversy, 695
non-Darwinian evolutionary mechanisms, 1747–1750
nonfunctional or nonbeneficial structures, 1747–1748
nonreproducing insect caste issue, 2108
Weismann's panselectionism, 1728–1729
See also Adaptation; Darwinism; Genetic variation; **Mutations**; **Weismann, August**
Natural selection, A. R. Wallace and, 2295–2296. *See also* **Wallace, Alfred Russel**
Natural selection, Neo-Darwinism and modern synthesis, 368, 693–694, 1727–1732, 1748, 1965, 2087. *See also* Modern synthesis; Neo-Darwinism
Naturalism, 1693–1700
atheistic, 1697
cosmological, 1696
ethics, 1698–1699
historical overview, 1694–1698
in art, 1699–1700
methodological, 1696–1698
supernaturalism, 1694, 2005
Naturalistic fallacy, 922, 1698–1699
Nature, 1700–1702
active scientific realism, 1707
Cartesian dualism, 1700, 1703
classical conception of, 1703–1704
Logos of, 1153–1154
personification and religion, 2004
quantum mechanics, 1702–1710
role of human mind in, 1702, 1708
Nature, Haeckel's monistic view, 1120. *See also* **Haeckel, Ernst**
Nature and nurture, 811–812, 1041, 1964
Nature versus culture, 636–640, 744–745, 822
cultural adaptation, 17–19
environmental philosophy, 827–830
fertility conceptualization, 958
postindustrial technology, 2167
See also **Environments**
Navajo, 342, 1201, 1573, **1710–1713**
art, 1711, 1998
hogans, 1712
mythology, 1711–1712
present day, 1712–1713
Reichard's studies, 1997–1998
reservation, 1682, 1710–1711
spirituality, 1712
way of life, 1711–1712
witchcraft beliefs, 2320
Navigation, oceanic, 1798–1799, 1886–1887
Nazca culture, 1384, **1713–1714**
Ndembu, 2232
Neandertal sites, 1717–1718
early site discoveries, 1717, 1719
fossil discoveries, 1170
Iraq, 1715, 1717, **2081**
Israel, 1563, 1717
Spain, 2357–2358
See also **Neandertals**
Neandertals, 1191, **1718–1726**
anatomy and morphology, 1717–1718, 1719–1722
behavior and society, 1722–1723, 1727
behavioral complexity, 2303
brains, 1721
burials, 1110, **1722**
cranial morphology, 1718, 1720–1721
DNA studies, 695, 1724, 1725, 1726
evidence, 1715–1717
evolutionary phase model, 2307–2308
fate of, 398, 1208, 1726
fictional accounts, 299–300
Hrdlicka's work, 1207–1209
human evolution and, 889, 894, 1207, 1208, 1725–1726, 1727, 2308
linguistic capacity, 1425, 2303
Loring's work, 397–398
mitochondrial DNA and, 1038
Mousterian culture, 1207–1208
replacement and continuity models, 1724–1726
speech capability, 1863
tool use, 1723

Near Eastern archaeology, 246–249
Near Eastern Epipaleolithic culture (Natufian), 1692–1693
"Nearly neutral theory," 911
Needham, Joseph, 923–924
Negative feedback, 657
Neihardt, John G., 633, 1675, 1677
Neoanthropinae, 2307
Neo-Darwinism, 173, 692–696, 895, 1058, 1304, 1727–1733, 1748, 2087
  ahistorical tendencies, 854–855
  applicability criteria, 692
  biological anthropology and, 368–370
  gene pool and, 693–694
  germ-plasm theory, 1728
  Mayr and the Modern Synthesis, 1731–1732
  molecular biology techniques, 694–695
  neutral theory, 695, 895
  origin of, 1727–1732
  punctated equilibrium theory, 695–696, 904, 908, 2061
  Weismann's panselectionism, 1728–1729
Neo-Enlightenment, 186
Neogene fossil record, 993–994
Neo-Hegelians, 1440–1441
Neolithic cultures, 1733–1736
  agricultural settlement, 1339
  Alpine "Iceman," 758, 1265–1268
  architectural anthropology, 267
  Celtic Europe, 456–457
  central and western Europe, 1735
  Chinese sites, 1847–1848
  fertility figurines, 958
  jewelry, 1341
  Mediterranean region, 1735–1736
  megalithic monumentality, 1736
  Near Eastern culture, 247
  Southeastern Europe and Greece, 1734–1735
Neolithic Revolution, 2166, 2283
Neolocal residence, 1538
Neo-Marxism, 92, 1546
Neonatal genetic screening, 1055
Neo-Platonism, 841
Neo-positivism, 1909
Nepal, 1881
Nero, 527–528
Nervous system, 404–405
Nest building, 263–264, 392, 1212–1213
Nestle, 92
Netiquette, 655–656
Netiv Hagdud, 622
Neural networks, 281, 548
Neutral Iroquois, 1322, 1327
Neutral molecular evolution theory, 695, 895, 906, 908–909, 911
New Archaeology, 354–355, 942–943, 1733–1734
New Ethnopsychiatry, 863–864
New Guinea, 360, 744, 1568–1569
  Mead's work, 1570, 1571, 2332
  See also Papua New Guinea
New World monkeys. *See* Monkeys, New World
New Zealand. *See* **Aotearoa; Maori**
Newark Holy Stones, 1172–1173, 1762
Newberg, Andrew, 1737–1738, 1739
Newton, Isaac, 346, 1544
Ngandong, 1606, **1740**
Ngöbe, 1822
Niah Cave, 1145
Niche, 235, 927, 1226
Nietzsche, Friedrich, 680, 721, 722, 734, 881, 895, 1302–1303, **1741–1745**
  aesthetics, 21
  Apollonian and Dionysian concepts, 223, 2244
  Darwinism and, 1741–1744
  death of, 1744–1745
  dynamic philosophy, 1861
  H.G. Wells and, 2310
  modern evolutionists and, 1743
  philosophical anthropology, 1744–1745
Nigeria, colonialist anthropology, 84
Nim Chimpsky, 209, 213
Nissan Motor Company, 112
Nkoya, 2101
Nkrumah, Kwame, 24
Noble savage, 819, 2155, 2227, 2342
Nomads, 1745–1747
  Chinese, 1842
  Gypsies and Travellers, 1746–1747
  hunter-gatherers, 1746
  pastoralism, 1745–1746
Nomological-deductive model, 2063, 2184
Non-aligned nations, 120, 1261–1262

Non-Darwinian evolutionary mechanisms, 1747–1750
biogeography, 1748–1749
developmental genetics, 1749
Intelligent Design, 588, 881, 892, 2173
morphogenesis, 1749
orthogenesis, 1748–1749
sudden origins, 2061
teleology, 1747
Nongovernmental organizations (NGOs), 124, 1315, 2241–2243
Nonviolence, 1160, 1283
Norms, 634–635, 736–737, 1434, **1750–1753**
deviance, 1752–1753
folkways, 737, 972, **974–975**, 1623–1624, 1751, 2145
gender, 1751
reciprocity, 1433
sanctions, 1752–1753
socialization, 1751
Norse mythology, 1659–1660, 2281
Norsemen (Vikings), 2279–2282
North American Mesolithic culture, 1582
North Atlantic environmental archaeology, 252–253
Northrup, F. S. C., 2065
Novgorod, Russia, 258
Nubia, 29. 30, 799, 802, 2139
Nuclear family, 945, **947–948**, 978
Nuer, 182
Nurse-anthropologists, 148
Nussbaum, M., 1030
Nuttall, George Henry Falkiner, 1626–1627
Nyanzipithecus harrisoni, 216
Nyas, 1286
Nyerere, Julius, 24

Oakley, Kenneth Page, 1755–1756
Oaxaca Valley, 509
Obesity, 197
Obesity gene, 1053
Object permanence, 209
Objectivity, 850, 967
criteria, 2066
values and, 2264–2265
visual recording technology and, 188
Observation methods, 963–965. *See also* Participant-observation
Obsidian, 1761
Obstetrics, 493
Occam's Razor, 1697, 1700, 2066
Occult economies, 2324
Ocean temperature change, 993
Oceania
canoe design, 1799
languages of, 1487–1488
Lapita, 1885, 2048
Rapa Nui, 1985–1989
Rarotonga, 1990–1993
seafaring, 1798–1799, 1886–1887, 1991
Ochre, 1756, 1758, 2237
Odwera, 288
Odyssey, 2228
oral origins of, 1776
Oedipus complex, 73, 1006–1007, 2154
Oedipus myth, 1003–1004
Ogbu, John, 1756–1757
Ogoni, 1089
Ohio Hopewell, 1758–1764
Ohta, T., 911
Ojibwa, 433, **1765–1766**
OK Corral, 511–512
Olavarría, José, 127
Old World monkeys. *See* Monkeys, Old World; *specific types*
Oldowan culture, 3, 1190, **1767–1768**
Developed Oldowan industry, 6
Olduvai Gorge, 886, 1098, 1189, 1215, 1349, 1449–1453, 1663, 1767–1768, 2329, 2363
Oligocene, 993
Olmecs, 510, **1768–1771**
Olmstead, Frederick Law, 2256
Olson, Barbara, 114
Omagua, 60, 63
Omaha Indians, 633, **1771–1772**
Omega point, 893, 932, 2168
Omomyoidea, 1960
Onas, 1772–1773, 2188, 2347
O'Neale, Lila Morris, 2328
Oneida, 1322, 1325, 1326, 1327, 1328, 1331
Onondaga, 1322, 1325, 1326, 1327, 1328, 1330, 1331
Ontogeny recapitulates phylogeny, 660, 678, 1121, 1602

Ontology, 926
culture and, 733
essentialism, 841
Ontology, evolutionary, 926–928
Oparin, A. I., 1773–1774
Open society, 1075, 2285
Operationalism, 1550
Opium War, 1978
Oppida, 1321–1322
Optimality models, 11–12, 15–17, 771–772
Oracle bones, 1849
Oracles, 2359–2360
Oral literature, 1774–1775
Zande and, 2360–2361
Oral stage, 1006
Orality and anthropology, 1775–1777
Orangutans, 213–215, 216, 220, 1183, **1785–1787**, 1891–1893, 1934, 1945
abstract thought, 215–216
Australopithecus similarities, 205–206, 1780–1782
Bornean and Sumatran differences, 1786
captivity, 1787–1788
ecology and behavior, 1783–1784
evolutionary anthropology, 916
fossils, 205–206, 216. *See also* **Apes, fossil**
Galdikas' studies, 208, 1018–1020, 1892–1893
Harrison's work, 1145
hominid reconstruction model, 1501–1502, 1781–1782
human genetic relationship, 1630
human language use, 209, 213
human morphological relationship, 205, 1778–1783, 2061–2062
Ramapithecus relationship, 1180
sexual behavior, 1782, 1934
Sivapithecus similarities, 1778–1779
survival, threats to, 1784–1785, 1787
tool use, 212, 221, 1957
Oratory skills, 2338
Orbital convergence, 232–234
Orce, 1788–1789
Ordovician fossil record, 986–987
Oreopithecus, 218, 888, **1789–1790**
Oreopithecus bambolii, 1789–1790
Organ transplantation, 357
Organizational behavior studies. *See* Industrial anthropology
Organizational culture, 99–102
Organizations, nongovernmental (NGOs). *See* Nongovernmental organizations
Organizations, political. *See* **Political organizations**
Orgasm, 1193
Orientalism, 1911
Origin of life. *See* **Life, origin of**
Orion, 803
Ornamentation, 1790–1793, 2183
body painting, 1791
body piercing and augmentation, 1792
cicatrization, 1792
globalization and, 1792
headdresses, 1791
jewelry, 1340–1343, 1791
scarification, 1792
tattoos, 1791–1792
Orr, David, 2065
Orr, Julian, 100, 108
Orrorin, 206, 219, 314, 1781
Orrorin tugenensis, 1181
Orthodox Judaism, 1343–1344
Orthogenesis, 612, 1748–1749, 1862
Ortner, Sherry, 133–134, 136–137, 2097, 2149–2150
Orwell, George, 1793–1794
Osteology, 1227
Osteology, human, 1795–1796
Ostracism, 627
Otavipithecus, 218
Other, the, 54, 150, 1467, 2221
Otto, Rudolf, 1999–2000
Ottoman Turks, 330
Otzi the Iceman, 1265–1268
Ouranopithecus, 205, 764, 1781
Owasco, 1322
Owl monkeys, 455, 1616, 1934
Oxidized carbon ratios, 705

Pacific Rim, 1797
Pacific seafaring, 1798–1799, 1886–1887, 1991
Paeloanthropus, 379
Paiute, 1076
Paleo-Eskimos, 269–270
Paleoanthropinae, 2307

Paleoanthropology, 914–916, 1227, **1800–1802**, 2169
approach, 1800–1801
Arsuaga's work, 276–277
fieldwork, 1801
history of, 1800
Howell and, 1205
issues in hominization, 1178–1182
key research issues, 1801
Teilhard de Chardin and, 2169
virtual paleoanthropology and 3-D imaging, 915
See also Hominid fossils and evolution; **Human paleontology**; **Teilhard de Chardin, Pierre**
Paleoanthropology, Leakey family and, 1448–1457. *See also* **Leakey, Louis S. B.**; **Leakey, Mary D.**; **Leakey, Meave Epps**; **Leakey, Richard E. F.**
Paleobiogeography, 1813
Paleobiology, 1813
Paleobotany, 252, 1813. *See also* **Palynology**
Paleocene/Eocene Thermal Maximum, 993
Paleoecology, **1802–1803**. *See also* **Ecology and anthropology**; Environmental archaeology
Paleogene fossil record, 993
Paleogeography and paleoenvironmental changes, 1066–1071
Paleoindians, 1623, 1684–1685
Kennewick Man, 857–858, **1361–1362**, 1689, 2300
See also Bering land bridge; **Clovis culture**; **Monte Verde**
Paleolithic art, **Venus of Willendorf**, **2271–2272**
Paleolithic Chinese sites, 1846–1847
Paleolithic human burial culture, 1110
Paleolithic jewelry, 1341
Paleolithic Near Eastern culture, 247
Paleomagnetism, 705, 1064–1065, **1803–1805**, 2134
geomagnetism, **1064–1065**
Paleontology, 1226, **1805–1817**
biblical creationism versus geology, 585–587
biostratigraphy, 1811–1813
Da Vinci's studies, 1464, 1809
evolution and, 1814
extinction evidence, 1813–1814
fossil handling and preparation, 1816–1817
human, **1226–1228**
infrastructure and methods, 1814–1816
law of faunal succession, 2093
micropaleontology, 1807
modern tools, 1817
origins and history, 1808–1810
paleobiology, 1813
palynology, 1807, **1818–1821**
reconciling Christian cosmogony with scientific evolutionism, 588, 685, 1105–1106
taphonomy, 962, 1226, **2159–2162**
taxonomy, 1810–1811
See also **Fossil record**; **Fossils**
Paleontology, linguistic, 1486
Paleozoic era fossil record, 986–990
Cambrian, 986
Carboniferous, 988–989
Devonian, 987–988
Ordovician, 986–987
Permian, 989–990
Silurian, 987
Palestine, archaeological sites, 622
Palestinian Intifada, 1337
Paley, William, 588, 2173
Palmigrady and primate locomotion, 1949–1954
Palo Alto Research Center (PARC), 100, 104, 108–109
Paluxy footprints, **1818**
Palynology, 1807, **1818–1821**
Pan African Sanctuary Alliance (PASA), 506
Panama, **1821–1824**
indigenous people, 1822–1823
Panama Canal, 1822, 1823–1824
Panama Isthmus, 910
Panbiogeography, 202–203, 612–613
Pan-Egyptian school, 747
Panentheism, 1095, 1159–1160, 1304
Pangaea, 989, 990, 991, 993, 1256
Pangenesis, 687, 693
Panopticon, 998
Panpsychism, 1121–1122
Panselectionism, 1728–1729
Pan-Slavism, 661
Panspermians, 589
Pantheism, 690, 1095, 1123, 1301, **1824–1826**
Haeckel's monism, 1123
Vedic, 1824–1825
Western, 1825–1826
Pantheon, 2175
Papago, 135
Papua New Guinea, 417, 436, 979, 1989

languages, 1419
Milne Bay Kula Ring, 1386–1387
See also New Guinea
Paraguay indigenous peoples, 1112–1113
Paraiso Tradition, 1853
Paralanguage, 1826–1828
Paralinguistic communication, 1826–1827
Parental imprinting, 866
Parenting studies, primate, 1140–1141
Pareto, Vilfredo, 1870
Parham, Charles Fox, 1836
Paris Commune, 1545
Park, Robert E., 512, **1828**, 2255
Parmenides, 1825
Parry, Milman, 1777
Parsons, Elsie Clews, 2327–2328, 2329
Parsons, Talcott, 496
Parthenon, 6
Participant-observation, 143–144, 151–152, 963, 966, 968, 1444, **1829**, 2019, 2114
action anthropology, 8
Particle model of cultural knowledge, 847
Pascal, Blaise, 1829–1831
Passions, 1259
Pastoralism
cattle complex, 1155
Islam and, 1652
Mongolian, 1612–1613
nomadism, 1745–1746
Samburu of Kenya, 2047–2048
Patagonia, 2188
Path choice model, 772
Patriarchy, 1831–1832
Patrilineality, 331, 446, 459, 1370, 1478, 1831, 2322
Patrilocal residence, 943, 945, 946, 1538, 1831
Patterns of Culture (Benedict), 555, 632, 858, 2328
Patterson, Francine G., 1832–1833
Patterson, Penny, 1379–1381
Pauling, Linus, 1627, 1631, 2086
Paz, Octavio, 127–128
Peace pipe, 1674
Peacocks, 609
Pearson, Karl, 1058
Peasant societies, 159, 2325
Peasants, 1833–1835
Chinese revolution and, 1545
migrations, 1599
Viking society, 2280–2281
village formation, 2284–2285
Pecos Classification, 69
Pedigree analysis, 1055
Pedology, 251
Peirce, Charles Sanders, 1862, 1924
Peking Man (*Sinanthropus pekinensis),* 378, 886, 1187, 1846, 2169, 2307
paleomagnetic data, 2134
Pelvic morphology, 1632, 1721
Pelvic structure, 373–374
Penis envy, 1007
Penitential rituals, 2013
Pennsylvania Dutch, 66
Pennsylvanian period, 988
Penny Capitalism (Tax), 2165
Pentecostalism, 1836–1838, 2004
Penzias, Arno, 349
People for the Ethical Treatment of Animals (PETA), 1125–1126
People's Republic of China and Taiwan, 1838–1849
archaeology in, 1844–1846
cultural changes, 1839–1840
cultural diversity, 1840–1844
prehistoric cultures, 1846–1848
See also China; Taiwan
Periodic rituals, 2013
Peripheral nervous system (PNS), 405
Permian fossil record, 989–990
Perry, W. J., 747
Persian Gulf, 1067
Personality, 613–614
abnormal behavior and, 738
evolutionary psychology, 1968
structure, 1358
Personality, culture and, 641–645
culture of poverty, 651
modal personality, 613–614, **1603–1605**
temperament, 643–644
Peru, 1851–1855
Caral city, 510, 1384
Chinchirro mummies, 1853
"Cloud People" (Chachapoya), 469–477
Early Horizon, 1854
Early Intermediate Period, 1854

Initial Period, 1853
Late Horizon, 1855
Late Intermediate Period, 1855
Lithic Period, 1852–1853
Middle Horizon, 1854–1855
Nazca culture, 1384, **1713–1714**
peasants, 1835
Preceramic Period, 1853
Petra, 1856–1857
Petrie, William Flinders, 238, 249, 800, 804
Petroglyphs, 1857–1858
pictographs, 1865–1866
See also Rock art
Petun, 1322
Peyote, 1395, 1675, 1688, 1858–1859
Peyote rituals, 1858–1859
Phallic stage, 1006, 1469
Pharmacogenetics, 362–363
Pharmacogenomics, 362–363, 1224
Pharmacology, 861–862
Phase I salvage surveys, 260
Phase II salvage excavations, 260
Phase III salvage excavations, 260–261
Phenomenology, 1151–1152, 1154–1155, 1467
Phenotype, 371, 677, 771–772, 1059, 1139
geographic variation, 899–901
Phenotypic gambit, 771–772
Philosophical anthropocentrism, 82
Philosophical anthropology. *See* **Anthropology, philosophical**
Philosophy, dynamic, 1859–1863
ancient, 1859–1860
early modern, 1860
19th century, 1860–1861
pragmatism, 1861–1862
Phoenix myth, 2247
Phonemics, 1482–1483, 1550, 1864
Phonetics, 1402, 1550, **1863–1864**, 1866–1867
Phonology, 1402, 1429, **1864–1865**
Photo-elicitation, 189–194
Photographic tools and anthropology, 187–196. *See also* **Anthropology, visual**
Photovoice, 192
Phrenology, 584–585, 700
Phyletic evolution, 904–905, 908
Phylogenetic objects, 927–928
Phylogenetic Species Concept (PSC), 1946
Phylogeny
cladistics, 515
molecular approaches to reconstructing, 694
morphology versus molecules in evolution, 1626–1633
phylogenics, 1811
recapitulation, 660, 678, 1121, 1602
Physical anthropology, 185, 363, 779, 1814
Blumenbach, "father" of, 384–385
early female pioneers, 2328–2329
evolution and, 912–913
field methods, 962
neo-Darwinism and, 368–370
theory and, 2186
See also **Anthropometry; Biological anthropology**
Physician-anthropologists, 147
Physics, quantum mechanics and, 1703–1710
Physiognomy, 598
Phytogeography, 360
Piaget, Jean, 209, 643, 1308, 1469
Pictographs, 1865–1866. *See also* Rock art
Picts, 459
Pidgins, 2112
Pierolapithecus, 218
Pigs for Ancestors (Rappaport), 1989–1990
Pike, Kenneth L., 809, 869, **1866–1867**
Pilgrimage to Mecca, 1334, 2223
Piltdown Man, 831, 1169–1171, 1178–1179, 1304, 1360, 1755, 2093, 2169
Pink-collar workers, 103
Pinker, Steven, 214, 811, **1867–1868**
Pitcairn Island, 2155
Pithecanthropus, 380
Pithecanthropus alalus, 883
Pithecanthropus erectus (Java Man), 764–766, 883, 1122, 1187, 1340
Pizarro, Francisco, 1855
Placebo effect, 861–862
Placenta burial, 200
Plano peoples, 1685
Plant domestication, 2038
Plate tectonics, 566–568, 1064, 1797. *See also* **Continental drift**
Plato, 274, 722, 730, 734, 1307
altruism and, 53–54

eugenics, 871, 1021
humanism and, 1249
nationalism and, 1667–1668, 1671
on art, 20–21
on justice, 1351
political philosophy, 1878
simulacra, 2088
Sophists and, 83
Platonic forms, 841–842
Platypus, 303
Platyrrhines, 1534, 1615–1616. *See also* **Monkeys, New World**
Plaza Hundida Tradition, 1853
Pleasure principle, 1005
Pleistocene, 994
Plessner, Helmuth, 681
Pliocene, 994
Pluralism, 632, 1869, 2264
legal, 1434
paradigm of justice, 1352
xenophobia versus, 2341
See also **Cultural relativism**
Plutarch, 2151
Poetry, 171, 398–399
Polanyi, K., 158, 774–775
Political anthropology, 1868–1872
action theory, 1869
elite theory, 1869–1870
instrumentalist/structuralism debate, 1870
nonstate society, 1871–1872
pluralism, 1869
political theory and structural functionalism, 1868
process theory, 1869
social organization, 1870
Political anthropology, E. O. Wolf's work, 2324–2325. *See also* **Wolf, Eric Robert**
Political culture, 1868
Political ecology, 770, 776, 2130
Political economy, 1872–1874
Political economy, Marxist analysis. *See* Marxism
Political history, Toynbee's work, 2219–2220
Political organizations, 1874–1878
Brazil, 1877
Britain, 1874–1875
China, 1876–1877
Germany, 1875
Russia, 1875–1876
South Africa, 1877–1878
Political power, decline of the West, 1260–1261
Political religion, 2002
Political rights, 1235
Political science, 1878–1880
Popper and, 1900
sociology, 2115–2116
Pollen analysis, 1267, 1807, 1818–1821
Pollution and taboo, 1516. *See also* Taboos
Polyandrous families, 945
Polyandry, 683–684, 773, 812, 1539, 1619, **1881**, 1882
primate, 1933, 1934–1935
Polygamy, 1538–1539, 1619, 1881, **1882**, 2077
polygamous families, 945
primate, 1933
Polygenesis, 893
Polygyny, 287, 289, 459, 773, 1539, 1619, **1882–1884**
Australian Aborigines, 1883–1884
Chinese concubines, 1884
distribution of, 1883
evolutionary psychology perspectives, 1883
in egalitarian societies, 1883–1884
in evolution, 1883
in hierarchical societies, 1184
polygynous families, 945
primate, 1933
sociobiological perspectives, 1883
traditional Zande culture, 2359
Polymerase chain reaction (PCR), 758, 1038, 1051, 2355
Polynesia, 1990
archaeology in, 1885–1886
Easter Island (**Rapa Nui**), **1985–1989**
environmental archaeology, 253–255
Fiji, 969–970
Heyerdahl's expeditions, 1156–1157
horticulture, 1888
indigenous origins, 1156
mana, 1513, 1525–1526
Marquesas, 1535–1536
Rarotonga, 1990–1993
seafaring, 1798–1799, 1991
Tahiti, 2155

Tikopia, **2191–2195**
Tonga, **2207–2208**
See also **Samoa**
Polynesian taboos, 2153–2154. *See also* **Taboos**
Polynesians, **1884–1889**
ancestors (Lapita), 1885, 2048
archaeological evidence, 1885–1886
exchange and social complexity, 1888–1889
seafaring and colonization, 1886–1887
settlement and lifeways, 1887–1888
Polytheism, 1094–1095, **1889–1891**, 2339
henotheism, 1095, **1152–1153**
Hinduism, 1159–1160, 1278
"Pompeii of the Americas," 805–806
Pongid-hominid split, 888–889
Pongids, **1891–1898**, 1945. *See also* Apes, greater
Popper, Karl, 117, 920, 1075, 1165, **1899–1900**, 2063, 2184
V. Andrew and, 2267
Population explosion, **1901–1907**. *See also* Population growth
Population genetics, 451, 728, 896, 905–906, 917, 1032, **1057–1058**
ALFRED DNA database, 45–46
clines, 518–519
evolutionary anthropology, 918–919
evolutionary synthesis and, 2087
explaining human variation, 1244
origin of Neo-Darwinism, 1731
Population growth, 726, 1522–1524, 2315
agriculture intensification, 37
alternative views, 1904–1906
ecological theories of urbanization, 2255
Ethiopian case, 1906
historical accounts and trends, 1901–1902
impacts of, 1902–1904
population explosion, **1901–1907**
primate conservation problems, 1936
Third World and, 120
Porcupine quillwork, 296
Portuguese language, 1408
Poseidon, 1067, 1069
Positive feedback, 657
Positivism, 553, 1444–1446, 1899, **1907–1910**
correspondence rules, 2063
culturism and, 607
logical positivism, 1899, 1909, 2062–2063
neo-positivism, 1909
post-positivism, 1910
See also Determinism
Pospisil, Leopold, 1446
Possibilism, 18
Possum, 234
Post, Albert Herman, 1440–1441
Postcolonialism, **1910–1912**
Postmodernism, 142, 175, 261, 819, **1912–1915**, 2064–2065
critical realism versus, 599
ethnographers and, 849
simulacra, 2088
skinhead culture, 820–821
Sokal Hoax, 1915
Postmodernity, 1912–1913
Post-positivism, 1910
Postprocessual archaeology, 239, 251
Poststructuralism, 1004–1005, 1411, 1412–1413, 2136
Potassium argon dating, 704, 705, 706, **1916**
Potlatch, 951, **1917–1921**
Aleut, 43
Athabascan, 296
ban of, 1394, 1919–1921
exchange system, 34
gender and, 953
Haida, 1126, 1128, 1130–1131
Kwakiutl, 1391, 1393, 1917
preparation, 1918–1919
revival, 1921
Tlingit, 2201, 2202
totem poles and, 2215
Pottery and ceramics, **1922–1924**
Asante, 291–292
Asian, 1923
Europe, 1923
history of, 1922–1923
industrial age and, 1923
Middle East, 1923
modern, 1923–1924
preparation of, 1922
Saharan, 2042–2043
seriation system, 238

Pound, Dean, 1443
Poverty, culture of, 649–652
Powdermaker, Hortense, 2328
Power
childhood and, 496
Foucault on, 997–998
language and, 1409
male heterosexuality and, 127
process theory, 1869
transition theory, 1873
Practical anthropology, 1357
Practicing anthropology, 176–180
advocacy, 179
applied anthropology versus, 177
domains of practice, 178
historical context, 177–178
practicing anthropologist roles, 178–179
See also **Action anthropology**; Applied anthropology; Clinically applied anthropology; Industrial anthropology; Medical anthropology
Pragmatic solidarity, 125
Pragmatics, 1402
Pragmatism, 742–743, 1303, 1861–1862, **1924–1927**, 2341
in anthropology, 1443–1444
in law, 1443, 1446–1447
Praxis theory, 137
Prehistory, 1927–1929
Premack, David and Ann, 215
Prenatal genetic screening, 1055
Presentational, 2012–2013
Prestige, 1984
Prey choice model, 771–772
Primate behavioral ecology, 33, **1929–1936**, 1956–1957
activity cycles, 1930
feeding ecology, 1931–1933
geographic range, 1929
habitats, 1929–1930
harems, 1935
home range, 1930–1931
social organization and mating, 1933–1936
taxonomy, 1929
Primate biomedical research subjects, 506–507
Primate brain evolution. *See* Brain evolution
Primate communication and vocalizations, 1079, 1195, 1401, 1417, 1420, 2081–2082
gesture-call systems, 1826
mate singing duets, 1934
See also Apes, human language use
Primate embryology, 1125–1126
Primate evolution, 1940, 1942–1943
arboreal hypothesis, 229–235
biogeographic approach, 202–207
canopy theory, 1210–1216
continental drift, 567
immunology and, 1626–1628
mixed diet theory, 235
prosimians, 1960
quadrupedalism, 235
visual predation hypothesis, 232–235
See also Hominid fossils and evolution; **Primate morphology and evolution**
Primate extinction, 1936–1938
Primate grooming behavior, 1111–1112
Primate locomotion, 1938–1939, 1943–1944
arboreal quadrupeds/branch runners, 1943
brachiators, 1944
cercopithecoid model, 1948–1950
clingers and leapers, 1943
knuckle- and fist-walkers, 1939, 1944
semi-terrestrial quadrupeds/ground-runners, 1943–1944
slow climbers, 1943
See also **Bipedal locomotion**; **Brachiation**; **Primate quadrupedalism**
Primate morphology and evolution, 1940–1944
evolutionary trends, 1940
locomotion, 1938–1939, 1943–1944
New World monkeys, 1941
Old World monkeys, 1941–1942
primate evolution, 1942–1943
prosimian characteristics, 1940–1941
prosimians versus anthropoids, 1940
taxonomy, 1940
See also specific primates
Primate quadrupedalism, 235, 374, 887, 1938, 1943–1944, **1948–1954**
cercopithecoid model, 1948–1950
digitigrady and palmigrady, 1949–1954

Primate taxonomy, 217, 312, 1185–1186, 1929, 1940, **1944–1948**, 1957
fossil taxa, 1947
species concept, 1946
See also **Apes, greater**; **Apes, lesser**; **Monkeys, New World**; **Monkeys, Old World**; **Prosimians**
Primate territoriality, 2180–2181
Primates. *See* Apes; **Monkeys, New World**; **Monkeys, Old World**; **Prosimians**; *specific types*
Primatology, 207, 364, **1955–1957**, 2353
ape cognitive abilities, 207–212
biogeography, 361
Carpenter's work on social processes, 441–442
de Waal's work, 713–714
DeVore's research, 741
Strum's work, 2138
See also **Apes, greater**; **Apes, lesser**; **Monkeys, Old World**; **Yerkes, Robert M.**; *specific primates*
Primitive art, 277
Primitive mentality, 1467
Printing press, 1114–1115
Prisoner's Dilemma, 483
Probable mutation effect, 398
Proboscis monkeys, 530
Process in anthropological models, 1605
Process philosophy, 1859, 1862, 1869, 2312–2313
Processualism, 175, 239, 251
Prochronic time, 721–722
Proconsul, 374, 399, 401, 888, 1663
Proconsul africanus, 1450, 1451, 1453
Proconsul heseloni, 218
Proconsul major, 216
Proconsul nyanzae, 218
Proconsulids, 216–218, 1943. *See also specific species*
Professional anthropology associations, 140
Professional ethics, 844, 967, 2020
cultural artifact ownership issues, 1232–1234
funding issues, 2265–2266
government actions and, 92, 537
guidelines, 141
informants and, 1295
measles epidemic, 1234
multinational corporation practices, 92
practicing anthropology and, 179
values and anthropology, **2263–2266**
Yanomami controversy, 65, 477–478, 556, 668–672, 852, 1144, 1234, 2270, 2350, 2351
Progressive creationists, 588
Progressive evolution theory, 858, 922–924. *See also* Cultural evolution; Social Darwinism
Projective systems, 1358
Proletarianization of peasantry, 1834
Propylae, 7
Prosimians, 1459, 1929, 1940–1941, 1955, **1957–1960**
adapoids and omomyoids (extinct), 1959–1960
biogeography, 203–204
bushbabies, 1959
daubentoniids, 1959
evolution, 1960
indriids, 1959
lemurs, 203, 515, **1459–1461**, 1930, 1932, 1945, 1958–1959
lorises, **1497–1498**, 1945, 1959
tarsiers, 204, 229, 1111, 1932, 1945, 1959, **2162–2163**
Protagoras, 83
Proteins, 1179–1180, 1474, 1628
Proteomics, 1225
Proterozoic era fossil record, 984–986
Protolanguage, **1960–1961**
Psychiatry
anthropology and, 1962
dysphoric affect, 870
ethnographic study of, 1963
ethnopsychiatry, **862–864**
traditional healing versus, 1963
Psychiatry, transcultural, **1961–1964**
Psychic unity of humankind, **1252–1255**, 1603, 2288
Psychoanalysis, 576–577
Psychoanalytic model of ancestor worship, 73
Psychoanalytical method, 1007
Psycholinguistics, 1402
Psychological anthropology, 657, 1358
Psychological gerontology, 1072–1073
Psychology
Cartesian materialism, 730
comparative method, 2035
deviance, 737–738

forensic applications, 1970–1971
Gestalt, 1378
human factors, 108
Psychology, evolutionary, 609–610, 811, 919, 925–926, 1867, 1965, 2315
Psychology, Soviet, 2291. *See also* **Vygotsky, Lev Semenovich**
Psychology and genetics, 1964–1970
eugenics and, 1969
evolutionary behavioral sciences, 867, 1964, 1967–1969
personality research, 1968
quantitative behavioral genetics, 1966–1967
See also Eugenics; Molecular genetics; Social Darwinism
Psychology of culture, 641–642
Pterosaurs, 584
Puberty, 2073
Puberty rites, 289, 2013
Puebloan cultures (Anasazi), 69–72
Pueblo I, 70–71
Pueblo II, 71
Pueblo III, 71
Pueblo IV, 71
Puerto Rico, 1601
Punctated equilibrium theory, 695–696, 904, 2061
Punishment, 998
Purification and pollution
death, 75
Gypsy culture and, 1116
rituals, 2011
Purushardha, 1275
Putnam, Frederick Ward, 238
Puuc-Chenes style, 2260
Pu'uhonua o Honaunau, 1971
Pygmies, 1558–1562, 2232
Pygmy chimpanzees. *See* Bonobos
Pyramid texts, 2258
Pyramids, 798, 802, 803, **1972–1975**
archaeologists of, 1972
construction methods, 1975
Egyptian religion and, 1974
history of, 1973–1974
origin and development of, 1972–1973
Pytheas of Marseille, 457, 458

Qafzeh, 1109, 1110, 1191
Qi, 560, 663, 665, 1525
Qijia culture, 570
Qin state, 1849
Qing Dynasty, 1977–1979
Quadrupedalism. *See* **Primate quadrupedalism**
Qualitative research methods, 2019–2020
Quantitative research methods, 2018
Quantitative trait loci (QTLs), 1967
Quantum mechanics, 1702–1710
Quechua, 62, 319, 474, **1979–1980**
Queer Nation, 2335
Quine, William Van Ormand, 117, 2064
Quintessential feeling of freedom, 2000
Qur'an (Koran), 1237–1242, 1334. *See also* **Islam**

Ra expeditions, 1157
Race, 519, 568–569, 928, 2115, 2302
academic achievement and, 1757
amity-enmity principle, 1360–1361
Blumenbach's varieties of humankind, 385
caste, 1276
categories in Brazil, 1143–1144
intelligence and, 1966
involuntary and voluntary minorities, 1757
Jews and, 1346–1347
Montagu's criticism, 1620–1621
multiculturalism and, 1640–1641
polygenesis and monogenesis, 893
social construct, 398, 1669, 2308, 2342
xenophobia and, 2342
Race memory, 226
Race relations, Brazilian studies, 1143–1144
Racial/ethnic differences in intelligence, 1050, 1052–1053
Racial hygiene. *See* Eugenics
Racism, 699
Australian Aborigines and, 2–3
Boas and, 387, 388
early evolutionists and, 2092
Jews and pseudo-anthropology, 1346–1347
Muller and Aryan culture, 1635–1636
skinhead culture, 820–821
Social Darwinism and eugenics, 698–699, 701

Spengler's racial superiority beliefs, 2125
See also Anti-Semitism; National socialism; Social Darwinism; **Spengler, Oswald**
Radcliffe-brown, A. R., 1981
Aboriginal social organization model, 308–309
cultural materialism, 1549
on law and primitive society, 1444, 1752
on magic, 1513
on rituals and religion, 131
on taboos, 2154
social class theory, 2100
structural-functionalism, 155, 854, 1003, 1013, 1981, 2096
totemism and, 2218
Radhakrishnan, Sarvepalli, 1284
Radical criminology, 740
Radical empiricism, 1907. *See also* **Positivism**
Radical feminism, 740, 2333
Radin, Paul, 1982
Radiocarbon (C14) dating, 238, 247, 436–438, 704, 705, 706, 730, 976, 1468–1469
Radiometric dating techniques, 702–704, **706–707**, 2253–2254
Raelians, 589
Raleigh, Sir Walter, 995
Ramacharitmanas, 1163
Ramanuja, 1281
Ramapithecus, 205, 1179–1180, 1365, 1627, 1778
Ramayana, 1158, 1159, 1510, 1777
Ramses II, 1982–1984
Rank and status, 1984–1985
Rank societies, 2104–2105
Rapa Nui, 1985–1989
Rapp, Rayna, 2015
Rappaport, Roy, 131, 657, **1989–1990**
Rarotonga, 1990–1993
Rask, Rasmas, 1485
Rational choice models, 484, 1880
Rational discourse, 2264
Rationalist Press Association, 1360
Rationality and Kantian ethics, 1357
Ratzel, Friedrich, 747, 1387
Ray, Rammohan, 1283
Realism, critical, 598–599
Reality and mind, 1707–1709
Reality, ethnological investigations of, 608–609
Reality principle, 1005
Reason, Age of, 817
Reason, Kant's critique of, 1355–1357
Rebellion, 1752
Rebirth, 1160–1161
Reciprocity, 53, 159–160, 1433, **1993–1996**
communitarianism, 1995–1996
human rights and, 1994
justice and, 1995
Yanomami culture, 2347
Recombinant DNA, 760–762
Reconstructionist Judaism, 1344
Red ochre, 1756, 1758, 2237
Redfield, Robert, 535, 1590, **1996–1997**, 2284–2285
Redistribution, 160
Redshift, 351
Rees, Martin, 81
Rees, William, 2255
Reflectionism, 604, 607
Reflexive anthropology, 277
Reflexivity, 188, 397, 851, 2341
Reform Judaism, 1343–1344
Refugees, 183
Registers, 2111, 2120–2121
Regression line, 408
Reichard, Gladys, 1997–1998, 2328
Reichel-Dolmofoff, Gerardo, 1573
Reindeer domestication, 2085
Relative fitness, 13
Relativism, cultural. *See* Cultural relativism
Religion, 690, 876, 1095, 1301, 1442, **1998–2003**
ancestor worship, 72–76
animatism, 79, 1533, 2004
animism, 79, 80–81, 624, 1298, 1440, 2004
anthropocentrism and, 82
anthropology and, 2003–2006, 2010, 2060
anthropology of, 128–132
anthropomorphism in, 197–198
belief systems, 634
chanting, 478–479
cults, 623–624
cultural relativism, 1246
culture and, 2149
defining, 129, 2296
Eliade's work, 807–809, 2000
etic and emic perspectives, 130

evolution of, 1532
Feuerbach's materialism versus, 960–961
god gene, 1093–1094
gods, 1094–1096
henotheism, 1095, **1152–1153**
ideology, 1269, 1270
Kant on, 2000–2001
liberal, 2009–2010
magic and, 129, 1513, 1518–1519, 1533, 2010–2011
Marett's work, 1532–1534
Marxism and, 2005
monasticism, 1608–1611
monotheism, 1095, 1890
nationalism and, 1669–1670
natural forces, 1635, 1636
naturalistic assumption, 2005
neurotheology, 1737–1740
origin of, 2004
Pascal's wager, 1829–1830
pathology and, 1635, 1738–1739
personification of nature, 2004
political, 2002
quintessential feeling of freedom, 2000
revitalization movements, 131, **2021–2022**
science of, 1635
scientism versus fundamentalism, 2068
secularization, 1251–1252
social psychology and, 1534
sociology of, 2116
spiritual ecology, 2006–2009
symbolism, 971
symbols and cognition, 131–132
syncretism, 1089, **2150–2152**
temples, 2173–2175
the Sacred, 2000
Tikopian, 2194–2195
Tillich's work, 2001–2002
totemism, 73, 309, 517, 624, 936, 1440, 1441
Tylor-Muller debate, 1635
voodoo, 1088–1089
See also **Myths and mythology; Native North American religions; Pantheism; Polytheism;** Religions; **Taboos**; *specific religions*
Religion, Frazer's work, 999–1000. *See also* **Frazer, James G.**
Religion and environment, 2006–2009
Religions
aboriginal Tasmanians, 2163–2164
Afro-Brazilian tradition, 412–413
ancient Egyptian, 793
ancient Roman, 2032
Andean Chachapoya culture, 476–477
Arctic peoples, 840
Asante, 287–289
Australian Aborigines, 309
Celtic Europe, 460–461
Coptic monasticism, 571–573
Daoism, 664–667
in Mongolia, 1614
Iroquois, 1328–1330
Jainism, 1282–1283
Maori, 1992
Native American, 1671–1678
Native American peyote religion, 1395, 1675, 1688, 1858–1859
Navajo, 1712
Omaha Indians, 1772
Pentecostalism, 1836–1838, 2004
Tlingit, 2206
Tswana Bantu, 2231
Viking, 2281
Zulu, 2370–2371
See also **Buddhism**; Christianity; **Hinduism; Islam**
Religious endogamy, 813
Religious Freedom Restoration Act, 1859
Religious object, 2001–2002
Religious rituals, 130–131, **2011–2014**. *See also* Rituals
Renaissance humanism, 1249–1250
Renaissance naturalism, 1695
Renfrew, Colin, 623
Repatriation of cultural artifacts, 1232–1234, 1361, 1689
Repatriation of overseas managers, 100
Representational, 2012–2013
Reproduction, 2015–2017
Reproductive freedom, 1969
Reproductive technologies, 2015–2016
Research methods, 2017–2020
design and measurement, 2017–2018
ethical issues, 2020

qualitative designs, 2019
quantitative designs, 2018
research proposal, 2018
scientific method, 2065–2067
specific designs, 2018–2020
See also Fieldwork; Professional ethics
Reservation system, 1685–1686
Resistance, subculture as, 2139
Restitution creationists, 588
Restriction enzymes, 1038
Restriction fragment length polymorphism (RFLP), 757, 1051
Retinal scan, 372
Reverse discrimination, 23
Revitalization movements, 131, **2021–2022**
Revolution, peasantry and, 1835
Reynolds, Robert, 486
Rh blood types, 382
Rhesus monkeys, 466–468, 713, 1125–1126
Rice, 80
Richards, Ellen Swallow, 873
Richardson, Frederick, 89
Ricoeur, Paul, 1994
Riepe, Dale, 1694
Rig Veda, 1278, 1635, 1636
Right-communitarianism, 1029–1030
Rights, 1220, 1235. *See also* Human rights
Risk assessment, 824–825, 1224
Ritalin, 925
Rites of passage, 131, 715, 1470, 2013–2014, **2022–2023**
afterlife transitions, 75
Asante, 289
christening, 2023–2024
first haircut, 191–192
Hindu, "twice-born," 445–446
Jewish, 2023–2024
Ritual kinship, 1369
Ritual of rebellion, 1752
Rituals, 130–131, 715–716
arts as, 2014
Asante, 288–290
Aztec agriculture, 322
Banyang medicine man, 334–335
beneficiaries, 2012
ceremonial masks, 1546–1549
Chinese traditions, 1843–1844
circumcision, 1562
cults, 623
death rituals, 714–720
defining, 715–716, 1285
feasting and, 953–955
Hindu, 1159, 1161–1163, **1285–1290**
Hopi, 1201
imitative or sympathetic, 2013
Mbuti Pygmy tradition, 1561
mythology and, 131
penitential or corrective, 2013
periodic, 2013
personal, public, and performer, 2012
peyote religion, 1858–1859
Pigs for Ancestors, 1989–1990
purification and sanctification, 2011–2012
religious, 2011–2014
representational versus presentational, 2012–2013
sexual selection, 2075
vows and, 2014
See also Burial and mortuary traditions; Funerals; **Magic**; **Myths and mythology**; **Religion**; **Rites of passage**; Shamanism
River worship, 1290
Rivers, W. H. R., 181, **2025–2026**
Rivière, Peter, 64
RNA, 1049, 1632, **2026–2027**
messenger RNA (mRNA), 754–755
origin of life, 1476–1477
RNA viruses, 2026
Robbins, Richard H., 2027
Robinson, Rick, 108, 109
Robot soldiers, 1473
Robots, 282, 551
Rock art, 2028–2029
Australian Aborigines, Ubirr site, 2237–2238
evidence of warfare, 2300
petroglyphs, 1857–1858
pictographs, 1865–1866
Saharan, 2043
sampling strategies, 930
See also **Cave art**
Role and status, 2028
Role conflict, 2028
Role confusion, 2028

Rolling Thunder, 1676
Roma (Gypsy) culture, 1115–1118
Roman Catholic Church
  syncretism, 1089
  Teilhard de Chardin and, 2168, 2169
Roman Empire, 257
  administration, 2032–2033
  cities, 510
  druids and, 460
  gladiators, 528
  jewelry, 1342
  law and legal theory, 1437–1438
  Lucretius, 1499–1500
  patriarchy, 1832
  Petra and, 1856
  temples, 2175
  urban planning, 511
  See also **Rome, ancient**
Romania, 330
Romanticism, 818
Rome, ancient, 1151, **2030–2034**
  administration, 2032–2033
  Coliseum, 527–529
  family and household, 2031–2032
  gladiators, 31
  mythology, 1659
  religion, 2032
  slavery, 2031
  social history, 2030–2031
  See also Roman Empire
Rongorongo, 1987
Rorty, Richard, 1927
Rosaldo, Michelle Zimbalist, 133–134, 1399
Rose, Mike, 375
Rosetta stone, 792, 798, 802, 804
Rousseau, Jean-Jacques, 53, 698, 734, 818, 1272, 1669
Rout, Ettie, 1119–1120
Rowe, John Howland, 2034
Rubins, Gayle, 134–135
Rudofsky, Bernard, 261
Rükkert, Henrich, 659
Rules, 1434
Rumbaugh, D. M., 2035
Runes, 2281–2282
Rush, John, 144–149
Russell, Bertrand, 1544, 1697–1698, 2312
Russell, Dale Allen, 2035–2036
Russia, Aleuts and, 44
Russia and evolution, 659–660, 1381–1382, 1773–1774, **2036–2039**
Russian and Soviet science, Vernadsky and, 2171, 2272–2277
Russian anthropology (pre-Revolution), 659–661
Russian anthropology, Siberia and, 2083–2085
Russian Association of Indigenous Peoples of the North, 2085
Russian ethnogenesis, 847–848
Russian paleoecology, 1802–1803
Russian political organizations, 1875–1876
Russian psychology, 2291. *See also* **Vygotsky, Lev Semenovich**
Russian Revolution, 1386, 1463, 1545, 2275

Sachs, Jeffrey, 123
Sacred cattle, 809
Sacred landscapes, cosmology and, 573–574
Sacrifice, 288
  human, 335, 461, 488, 591, 1552
Sagan, Carl, 2041–2042
Sahara anthropology, 2042–2044
Sahelanthropus, 206, 219, 314, 1781
Sahelanthropus tchadensis, 1181, **2044–2045**
  speech organs, 1423
Sahlins, Marshall D., 1552, **2045–2046**, 2337
Said, Edward, 1911
Saito, O., 1903–1904, 1905
Salmon, 1392
Saltation theory of evolution, 569
Salvage archaeology, 239, 259–261
Salvage ethnography, 1233, 2350
Salvage ethnology, 151
Sambungmachan, 2046
Samburu, 2047–2048
Samburupithecus, 219
Same-sex conjugal families, 946
Sámi, 1430
Samoa, 133, 632, 858, 1000–1001, 1568, 1570, **2048–2049**
San (Bushmen), 530, 2187–2188
San Lorenzo, 1768
Sanctions, 627, 1752–1753
Sanders, William, 2178

Sandoval, Chela, 2334
Sandpaintings, 1998
Sangiran, 2049–2050, 2054
Sangoan industry, 2211
Sanskara, 1280–1281
Sanskrit, 1162, 1350–1351, 1479, 1485
Santeria, 615–616, 1089
Sapir, Edward, 49, 641–642, 1415, **2050–2051**, 2149, 2313
De Angulo and, 712
on vocabulary, 1409
"superorganic" concept and Kroeber debate, 641, 2145–2146
Sapir-Whorf hypothesis, 1415, 2050, **2051–2052**, 2199, 2313
Sardinia, 2053–2054
Sarich, Vincent, 909, 1627
Saro-Wiwa, 1089–1090
Sartono, 2054
Sartre, Jean-Paul, 1152, 1699
Sasquatch, 2054–2055, 2354
Saussure, Ferdinand de, 734, 1002, 1411–1412, 1480–1481, **2055–2056**, 2136
Sauvy, Alfred, 120
Savage-Rumbaugh, Sue, 209, 504, 533–534
Savages, 722
noble, 819, 2155, 2227, 2342
stages of social change, 2094
Savanna, 823–824
Savigny, Carl Friedrich von, 1438–1439
Scandinavian indigenous people, Sámi, 1430
Scarification, 1792
Schaller, George B., 1102–1103, 1894, **2056–2057**
Schapera, Isaac, 2231
Schapiro, Meyer, 279
Scheler, Max, 680–681
Scheper-Hughes, Nancy, 137
Schiller, Ferdinand C. S., 1926
Schiller, Friedrich von, 1097
Schizophrenia, 407, 864, 1963
Schleicher, August, 1485, 1486, 1487
Schleiermacher, Friedrich E. D., 2000
Schliemann, Heinrich, 238, **2057–2059**, 2228, 2229, 2288
Schmidt, Wilhelm, 747, **2059–2060**
Schneider, David M., 2060–2061
Schopenhauer, Arthur, 55, 223
Schwartz, Jeffrey H., 525–527, 749, 1603, 1731–1732, 1747, 1778–1781, **2061–2062**
Science
biomedicine and, 370–371
cultural studies of, 370
deductive-nomological model, 2063, 2184
ethnoscience, 864–865
hypothetico-deductive model, 2063–2064
methodological naturalism and, 1697
philosophy of, 117, 1899–1900, **2062–2065**, 2185
positivism and, 1899, 1907–1910, 2062–2063
postmodernism, 2064–2065
Quine-Duhem thesis, 2064
scientism versus fundamentalism, 2068
social constructivism, 2064
theories, 117, **2184–2186**, 2288
Virchow's *einheitswissenschaft,* 2288
Science of religion, 1635
Scientific creationism, 586, 589
Scientific management, 84, 85
Scientific method, 2065–2067
Alexander von Humboldt and, 1257–1258
archaeology methodology, 239–240
values and, 2263–2266
Scientific realism, 1707
Scientific socialism, 1544
Scopes, John, 586, 589, 673–674, 1614–1615, **2068–2069**
Scorpion Tableau, 802
Scottish Celtic culture, 462
Scythians, 458
Sea level changes, 1067–1068, 2134
Second Wave feminism, 2330, 2331
Secondary analysis, 2019–2020
Secret societies, 2105–2107, 2360
masks, 1547
Secular humanism, 1247, **1248–1251**
Secularization, 1251–1252
Sedentary architecture, 266–267
Sedimentology, 2133
See also Molecular evolution, 905–910
Segmentary lineage systems, 1478–1479
Segregation, 28
Ségun, Ron, 2035
Selection, group, 928, 2108

Selection, natural, **2069–2070**. *See also* **Natural selection**
Selection, sexual, 609, 687, **2075–2076**, 2077
Selection gradient, 13
Selection theory of theory change, 117
Selective breeding, 872, 896
Selfish gene, 710, 926
Selk'nam, 1772–1773
Sellards, Elias H., 1494–1495
Sellars, Roy Wood, 598
Semantic architecture, 264–265
Semantic conception, 2185
Semantics, 1402, 1428–1429
  ethnographic, **2070–2071**
  ethnosemantics, **865–866**
Semiotics, 1925, 2055, 2056
Semon, Richard, 1578
Sen, Amartya, 1285
Seneca, 153, 1322, 1325, 1326, 1327, 1328, 1330, 1331
Senile dementia, 725
Sensory systems, evolution of, 229–230
Sephardic Jews, 1344–1345
September 11 terrorist attacks, 579
Serbia, 330
Serial monogamy, 1619, 1882, 1933
Serpent Mound, 1172
Serpent mounds, 434
Service, Elman R., **2071–2072**
Service learning courses, 10
SETI@Home project, 543
Settlement pattern approach, 254
Sex discrimination, 1236
Sex identity, **2072–2073**
Sex roles, **2073–2074**. *See also* Gender roles
Sexism, 2332
Sexual abstinence, 925
Sexual behavior
  adultery, 1619
  ancient Celts, 459
  bonobos, 390–391, 505, 1888–1889
  chimpanzees, 501, 1896
  cultural relativism, 632
  marriage and expectations of, 2078
  orangutans, 1785, 1934
  "witch" attributes, 2320
  See also **Sexuality**
Sexual division of labor, 1397–1399, 2074, 2077
  Tikopians, 2194
  Tswana Bantu, 2230–2231
  See also Gender roles
Sexual harassment, 102, **2074–2075**
Sexual selection, 609, 687, **2075–2076**, 2077
Sexuality, 1193–1194, **2076–2079**, 2115
  cultural relativism, 632
  culture and, 2077–2078
  Freudian theory, 1006–1007, 1469
  history of, 998
  human evolution and, 2076–2077
  male power and, 127
  marriage and exchange of women, 2077–2078
  Mbuti Pygmies, 1561
  Mead's Samoan study, 858, 1001, 1568
  men and, 127
  orgasm, 1193
  power and, 127, 1198
  See also **Incest taboo**; Sexual behavior
Shaka, 2369
Shaman, 624, **2079–2081**
  oratory skills, 2338
  See also Shamanism
Shamanism, 624, 1255, 1614, 2012, 2079–2081, 2083–2085, 2117, 2318
  Amazonian, 62
  Andean Chachapoya culture, 477
  Chinese, 1844
  Ojibwa, 1765–1766
  Olmecs, 1770
  rituals, 2080
  witch attributes and, 2321
  witch doctor, 2317
Shang state, 1848–1849
Shanidar Cave, 1722, **2081**
Shape-shifting, 2321
Shari'a law, 1237–1242, 2140. *See also* **Islam**
Sharp, Andrew, 1886
Sheldon, William, 596, 737
Shell, 1089–1090
Shelter theory, 266
Sherry, John, 113
Shia Islam, 1335, 1652
Shifting cultivation, 1203, 1204
Shipwreck sites, 256–257

Shirokogorov, Sergei Mikhailovich, 2083
Shiva, 1288
Shklovskii, Iosif, 932
Shostak, Marjorie, 136
Shternberg, Lev, 536, 2083
Shumaker, Robert, 215–216
Siamangs, 222, 399, 1183, 1262, 1263, 1934, 1944, **2081–2082**
Siberia, 2083–2085
Siberian origin hypothesis, 525–526, 857, 1600, 1622–1623, 1684, 2083
Siberian sacred trees, 635
Sibley, Charles, 1628–1629, 1632
Siblings, 1372
Sickle-cell anemia, 1243, 1572, **2086–2087**
Sifaka, 1959
Sign stimuli, 866–867
Silent Spring (Carson), 443–444, 825
Silicon Valley, 104
Silurian fossil record, 987
Sima de los Huesos, 276, 294–295
Simmel, Georg, 680, 1414, 1442
Simon, Julian (renowned optimist), 1904
Simpson, George Gaylord, 229, 1058, **2087–2088**
Simulacra, 2088–2089
Simulation, 543, 544
Sinanthropus pekinensis (Peking Man), 378–380, 886, 1187, 2169, 2307
Single-gene defects, 1054
Sioux, 1469
Sister culture model, 1770
SIV, 1056
Sivaladapids, 2090
Sivapithecus (Ramapithecus), 205–206, 218–219, 888, 1180, 1943
  Himalayan sites (Siwalik Hills), 2090
  orangutan affinities, 1778–1779
Siwalik Hills, 2089–2090
Six Cultures Project, 614
Skhul Cave, 1563
Skin cancer, 1577–1578
Skin pigmentation, 1243, 1575–1578
  clines, 518–519
Skinhead culture, 820–821
Skinner, B. F., 731, 1403
Slash-and-burn agriculture, 40, 320, 1204, 1888, 2345
Slavery, 1601, **2090–2092**
  Amazonia refugee communities, 63
  ancient Roman society, 2031
  Asante and slave trade, 284
  Viking society, 2280
Slavic, 660–661
Slocum, Lucy, 2329
Smallpox, 1855
Smith, Adam, 55, 1398, 1670, 1873
Smith, Grafton Elliot, 229–230, 235, 747, **2092–2093**
Smith, Joseph, 1673
Smith, Quentin, 1697
Smith, Valene, 2224
Smith, W. Robertson, 128–129
Smith, William, 1063, 1810, **2093**
Smuts, Barbara B., 2094, 2329
Social anthropology, 150, **181–184**, 357, 779
  anthropology and sociology, 182–183
  colonialist historical context, 182
  crime, 591–594
  political anthropology, 1868–1872
  See also Cultural anthropology; **Functionalism; Malinowski, Bronislaw; Radcliffe-Brown, A. R.**; Structural functionalism
Social change, 2094–2095. *See also* Cultural evolution; **Culture change**
Social consciousness, 630
Social constructivism, 2064
Social contract theory, 697–698, 1176, 1995
Social control theory, 740
Social Darwinism, 152, 697–701, 1042, 2124
  bioengineering, 700
  biology and culture, 699–700
  Boasian critique, 602–603
  degeneration theory, 721
  early philosophy, 697–698
  ethics, 697
  eugenics and, 681, 699, 1965
  evolutionary ethics, 921–925
  fascism and, 696
  nationalism and, 1669
  naturalistic fallacy, 1698
  nonstate societies, 1871–1872
  philanthropic philosophy, 698
  philanthropic project, 698
  racial/ethnic discrimination, 701

sociobiology, 2107
See also Cultural evolution; **Eugenics**; **Evolutionary ethics**; National socialism; **Sociobiology**; **Spencer, Herbert**
Social determinism, 1442. *See also* Cultural determinism
Social disorganization theory, 595, 739
Social fields, 396
Social insects, sterile caste paradox, 2108
Social movement sociology, 2116
Social psychology and religion, 1534
Social solidarity, 2113
Social status. *See* Status
Social stratification, 1008–1009, 2115
Social stress, witchcraft and, 2322
Social structures, 2096–2097
crime and, 595
See also Structural-functionalism; **Structuralism**
Socialism, 1461
African, 23–25
Engels and, 816
postmodernism and, 1914
scientific, 1544
Soviet collapse, 95
utopian, 816
See also **Lenin, Vladimir I. U.**; **Marx, Karl**; Marxism
Socialist feminism, 2333
Socialization, 1751, **2097–2099**, 2114–2115
aggression, 31
enculturation, 810–811
language and, 1415–1416
Societies, class, 2099–2101. *See also* Class; **Marxism**
Societies, complex, 2102–2103
Societies, egalitarian, 1593–1594, 1883–1884, **2103–2104**
Societies, rank, 2104–2105
Societies, secret, 2105–2107
Societies, typology of, 2972
Society, 166
complexity of, 1669
***gesellschaft*, 1073–1076**, 1442
peasant, 159, 2325
religion and, 1442
superorganic, 2145–2146
Society, origin of, 1274–1275
mutual aid theory, 1384–1386, 2036–2037
Society for Applied Anthropology (SfAA), 90, 177
Society Islands, 2155
Sociobiology, 603, 1620–1621, 1967, **2107–2109**, 2315
animal altruism, 2108–2109
evolutionary psychology, 609
inclusive fitness theory, 1967–1968, 2108
polygyny, 1883
See also **Human behavioral ecology**; Social Darwinism
Sociocentrism, 845
Sociocultural anthropology
ahistorical tendencies, 854–855
field methods, 962–963
See also **Cultural anthropology**; **Ethnology**
Sociocultural evolution, 386, 2123–2124
village formation, 2283–2284
See also Cultural evolution
Sociolinguistics, 1402, 1411, 1413, 1414, **2109–2112**
critical, 1416
diglossia, 2112
growth of, 2110
language evolution and change, 2110
language varieties, 2111–2112
pidgins and creoles, 2112
process, 2110–2111
Saussure and, 2110
speech communities, 2111
studying language use, 2111
See also **Saussure, Ferdinand de**; Structuralism
Sociological gerontology, 1073
Sociology, 2113–2116
anthropology and, 182–183
difference from cultural anthropology, 150–152
future of, 2116
methods, 2114
of law, 1439
Spencer's theory of sociocultural evolution, 2123–2124
theoretical perspectives, 2113–2114
topics and issues, 2114–2116
Sociology, founders of. *See* **Comte, Auguste**; **Durkheim, David Émile**; **Radcliffe-Brown, A. R.**; **Spencer, Herbert**; **Sumner, William Graham**

Sociology of language use, 1411–1416. *See also* **Sociolinguistics**
Socrates, 83, 1151
Sodom and Gomorrah, 1069
Soil science, 251
Sokal, Alan, 1915
Solidarity, 1441, 2113
Solidarity, pragmatic, 125
Solutrean culture, 526–527
Somatic gene therapy, 700, 1039
Somatology, 737
Sonakia, Arun, 1664
Songbird song learning, 867
Sophists, 83
Sorcery, 333, 1515–1516, **2117–2120**
  as magic, 2118–2119
  curse, 2119
  defense and remedy, 2119–2120, 2318
  explanations, 2120
  placebo effect, 2119
  spirit command, 2118
  Zande beliefs, 2360
Soul washing, 289
South Africa
  Paleolithic sites, 380–381
  political organizations, 1877–1878
  truth and reconciliation process, 1232
South American and Central American native peoples, 1678–1680. *See also* **Amazonia; Argentina; Brazil**; Inca; **Peru; Tierra del Fuego; Venezuela; Yanomami**
South American languages, 1489
South Asian Chalcolithic, 571
Southeast Asian Movius Line, 3, 6, 318
Soviet anthropology, Siberia and, 2083–2085
Soviet paleoecology, 1802–1803
Soviet psychology, 2291. *See also* **Vygotsky, Lev Semenovich**
Soviet Union, collapse of, 95
Space, anthropology of, 263
Space program, 548–550
Space settlement, 282
Spain
  fossil hominid sites, 276, 294–295, 344, 1186, 2357–2358
  Neolithic sites, 1735
  Orce, 1788–1789
Spanish civil war, 1793
Sparta, 872
Spatiality and Native American life, 1672
Spear-throwers (atlatls), 523
Speciation, 907, 1057, 1731
Species, 1946
Species evolution, group selection theory, 2108
Speech communities, 2111
Speech, computer applications, 2122–2123
Speech, folk, 2120–2122
Spencer, Frank, 363
Spencer, Herbert, 697–698, 701, 921, 1042, 1398, 1871, **2123–2124**
  cyclical theory, 895
  Sumner and, 2145
  "superorganic" concept, 153, 2145
  "survival of the fittest" concept, 152, 697, 701, 1669, 1861, 2124
Spengler, Oswald, 661, **2125**
Speranskii, Mikhail, 2084
Spider monkeys, 1929, 1930, 1944, **2125–2126**
Spinoza, Baruch, 55, 723, 1825, 1860
Spirit invocation, 2118
Spirit possession, 2318
Spiritual ecology, 2006–2009
Spirituality and neurotheology, 1737–1740
Spirituality and religion. *See* **Religion**
Spiro, Melford E., 129
Squier, Ephraim G., 1758
Squires, Susan, 110
Squirrel monkeys, 455
Sri Lanka, 1881
  Late Pleistocene, 941–942
Staatslehre, 1879
Stang, Dorothy, 830
Star Carr, England, 250
State Darwin Museum, 2039
State, origin of, 494–495, 1008, 1667–1668
State religion, 2002
State societies, 1871
  class and, 1870
  territoriality, 2180
Statistics, 736, 2019–2020
Status, 181–182, 1984–1985, 2028

Steenstrup, Japetus, 1595
Stem cells, human embryonic. *See* Human embryonic stem cells
Stem families, 943
Steno, Nicholas, 702, 708, 1063
Stenonychosaurus, 748–749
Stensen, Niels, 1809
Stereotypes, 2127–2128, 2336
Sternberg, William, 1308
Stevenson, Robert Louis, 722
Steward, Julian H., 2128–2130
  Amazonian anthropology, 56, 64
  anthropology of complex societies, 2102–2103
  cultural ecology and, 18, 153, 629–630, 646, 769, 1396, 2095, 2128–2130
  gender biases, 2129
  Mintz and, 1601
  village ecology, 2285
Still Bay industry, 380, 2211–2212, 2214
Stoicism, 1252
Stone Age, 237, 702
  Aurignacian culture, 300–301
  evidence for, 916
  See also **Neolithic cultures**
Stone, Michael, 852
Stone tools, 916, 1421, 2209–2215
  Acheulean culture, 3–6
  Aurignacian culture, 300
  Australian Aborigines, 1
  Bushmen and, 2213
  Chinese Paleolithic sites, 1847
  choppers (Oldowan culture), 1767
  classificatory schemes, 2209
  cleavers, 317
  Clovis culture, 520–527
  eoliths, 831–832
  Finished Artifact Fallacy, 2210
  Folsom culture, 520–521, 975–977, 1494–1495, 1684
  hand axes, 3–6, 317–318
  hominid use, 1190, 1210, 2311–2312
  Homo ergaster association, 1188–1189
  Hopewell moundbuilder culture, 1763–1764
  Howiesons Poort and Klasies River industries, 2212–2214
  Levallosian tradition, 1465–1466, 1723, 2213
  Lupemban industry, 2211
  Neandertals and, 1723
  Oldowan culture, 1190
  Sangoan industry, 2211
  Sri Lankan site, 941–942
  Still Bay industry, 380, 2211–2212, 2214
  typology, 2214
  See also Acheulean culture; Hand axes
Stonehenge, 2130–2132
Strain theory and crime, 595, 739
Strange attractors, 480, 481
Stratified random sampling, 929
Stratified reproduction, 2015
Stratigraphy, 237, 702, 707, 708–709, 929, **2132–2135**
  biostratigraphy, 1811–1813
  dating technique, 930, 931, 2135
  geologic column, 1061–1063
  law of superposition, 929, 1063
  Steno's Laws, 702, 708, 1063
  Troy excavation, 2229
  See also Fossil record
Stratonician Presumption, 1697
Strauss, David Friedrich, 679
Street children, 497
Stress, 1217–1219
  athletic competition and, 1218–1219
  biosocial model of, 1217–1218
  disease and, 1219
  hormonal responses, 1217
  social, witchcraft and, 2322
Stromatolites, 302, 983, 985
Structural history, 262–263
Structural Marxism, 2097
Structural-functionalism, 155, 174, 181, 556, 1013, 1413–1414, 1433, 1868, 1981, 2096, 2135
  African witchcraft studies, 2320
  ahistorical tendencies, 854
  descent theory, 2096
Structuralism, 881, 1411–1412, 1873, 2055, 2110, **2135–2138**, 2149
  Amazonian studies, 64
  instrumentalism versus, 1870
  McLuhan and, 1567
  poststructuralism, 175

theories and, 2185
See also Poststructuralism; **Saussure, Ferdinand de**
Structuralism, French, 156, 174, **1002–1005**, 2096–2097
deconstructionism and poststructuralism, 1004–1005
influences, 1004
prehistory, 1004
Saussure's premises, 1002
See also Lévi-Strauss, Claude
Structuration, 605, 2097
Structure and agency, 605–606, 608
Strum, Shirley C., 2138, 2329
Strychnine, 861
Style, 279–280
Subcultures, 2138–2139
Subhuman architecture, 263–264
Subjectivity, 967
Subject-object relationships, 963
Subject-subject relationships, 963
Sublimation, 1006
Subsistence and cultural ecology, 628
Substantivists, 158–161
Suchman, Lucy, 108–109
Sudanese society, **2139–2141**
Suffering and evil, 878–880
Sufi Islam, 1336, **2141–2142**
Suicide, 767, 1970–1971
Suicide bombings, 51
Sumerian civilization, 1068, 1583–1584, **2142–2144**
temple architecture, 2174
Ur, 2144, **2251–2253**, 2366
Sumner, William Graham, 634, 701, 1623–1624, **2144–2145**
Sunni Islam, 1335, 1652
Supe Tradition, 1853
Superorganic, 153, 154, 641, **2145–2146**
Superstition, 1516–1517
Supranational networks, 97
Survey methods, 965–966, 2114
Survival of the fittest, 152, 697, 701, 921, 923, 936, 1669, 1861, 2124
Survivals, cultural, **2146–2147**
Susquehannock, 1322
Sussman, Robert, 235
Sustainable development, 125
Sustainable villages, 2286
Sutherland, Edwin, 739
Swaddling hypothesis, 1470
Swahili, 1408, **2147–2148**
Sweat lodge, 1674
Swidden. *See* Slash-and-burn agriculture
Symbolic anthropology, 156, 762, 2060–2061, 2149–2150
religion and, 2005
Symbolic capital, 396–397
Symbolic interaction theories, 595, 646, 1415, 2113–2114
Symboling, **2148–2150**. *See also* Symbols and symbolism
Symbols and symbolism, 716, 2148–2150
cognition and, 2150
kinship, 2060
language and, 972, 2149
magic and, 1515
religion and, 131–132, 971
representational versus presentational, 2012–2013
reproductive power of, 2149
scientific, **2065–2067**
shamanism, 2080
Sympathetic magic, 129, 1515, 2013, 2118–2119
Sympatric speciation, 907
Synchronic theory, 1480, 1868
Syncretism, 1089, **2150–2152**
Syndemics, 751
Syntax, 1402, 1420, 1428, 1490
Synthetic anthropology, 282
Synthetic judgments, 1356
System determinism, 736
Systematics, 896
Systems, intentional, 731–732
Systems theory, 167, 481–485
cybernetics, 657–658
Szymanski, Albert, 1870

Taboos, 626, 627, 634, **2153–2154**
food, 979, 1144
Hawaiian refuge for violators, 1971
magic and, 2154
mana and, 1526
menstrual, 1673
See also **Incest taboo**

Tabun Cave, 1563
Tagore, Rabindranath, 1283–1284
Tahiti, 2155
Tahuantinsuyu, 1855
Taino, 616
Taiping Movement, 1978
Taiwan, 1839
archaeology in, 1844–1846
cultural diversity, 1840–1844
prehistoric sites, 1847
Taj Mahal, 2156–2157
Tamarins, 455, 1932, **2157–2158**
Tango, 274
Taoism (Daoism), 661–667
Taos Indians, 712
Taphonomy, 962, 1226, 1806, 1807, **2159–2162**
biostratinomy, 2160–2161
diagenesis, 1807, 2161–2162
history of, 2159
mortality, 2160
process and bias, 2159–2216
Taposiris Magna, 2290
Tarahumara, 1858
Tarsiers, 229, 1959, 1111, 1932, 1945, **2162–2163**
biogeography, 204
Tarsoid hypothesis, 883
Tasaday hoax, 1173–1175
Tasmania, 1060, **2163–2164**
Tattersall, Ian, 894
Tattoos, 1791–1792
Tatum, Edward, 1045
Tax, Sol, 8–11, **2164–2165**
Taxonomy, 1810–1811
Taxonomy, ethnoscience and ethnosemantics, 864–866
Taxonomy, Linnaeus and. *See* **Linnaeus, Carolus**
Taxonomy, primate. *See* **Primate taxonomy**
Taxonomy and cladistics. *See* **Cladistics**
Taylor, C., 1030
Taylor, Frederick, 84, 86, 108
Tchambulis, 1571
Te reo Maori, 198, 199
Technics, 2165–2167
Technology, 2165–2167
culture and, 636–640, 647–649, 2244
cyberculture, 654–657
cybernetics, 657–658
diffusion, modern era, 96
modes of, 2209
Technosphere, 2167
Tectonics, 566–568, 1064, 1797
continental drift theory, 2305–2306
Teilhard de Chardin, Pierre, 882, 886, 893, 932, 1304–1305, **2168–2171**
dynamic philosophy, 1862–1863
Peking Man and, 2169
Piltdown Man and, 2169
Teleology, 481, 691, 893, 1862, **2171–2173**
anthropic principle, 81
culture effects, 733
evolution theory and, 1747
Teleportation, 552
Temperament, 643–644, 738
Temperate environments, 824
Temples, 2173–2175
Tenochtitlan, 320, **2175–2178**
Teotihuacán, 510, 814, 2190
Teratology, 1653
Termite oracle, 2360
Terra Amata, 2178–2179
Terrace, Herb, 209, 213
Terraces, 320
Territoriality, 2179–2180
in primates, 2180–2181
Teshik-Tash, 1718, 1722
Testosterone, 1217–1218
Tethys Sea, 990
Textiles and clothing, 2181–2184
Andean Chachapoya culture, 477
Asante, 290, 291
cotton, 321–322
history of clothing, 2182–2184
history of textiles, 2181–2182
Thailand, 80
Thalamus, 565
Thales, 1249, 1695
Thanatos, 1007
Theban Mapping Project, 802
Theism, 1094
Haeckel's evolutionary monist critique, 1121, 1123–1124
See also **Religion**

Theistic evolution, 588, 690
Theories, 244, **2184–2186**, 2288
as explanation, 2184
in anthropology, 186–187, 2186
Popper's conception of, 117, 2184
social accounts, 2185
structural accounts, 2185
theory reduction, 2185–2186
values and, 2263
Theory of mind, apes and, 211
Theravada Buddhism, 426
Thermoluminescence, 706–707
Theropithecus oswaldi, 1949, 1950
Third World nations, 120–125
common characteristics, 120–122
dependency theory, 123, 163
development issues, 122–125, 162–163
threat to Western culture, 1260–1262
urbanization, 121
Third World women, 2333
Thomas, Cyrus, 1762
Thomas, Elizabeth Marshall, **2186–2187**
Thomsen, Christian, 708
Thomson, James A., 1041
Thrasher, Frederic, 1023
Thurstone, Louis L., 1308
Tibet, 1881
language, 1840
masks, 1548
Tierney, Patrick, 668–672, 852, 2351
Tierra del Fuego, 274, 1772–1773, **2188–2189**
Onas, **1772–1773**, 2188, 2347
Yaganes culture, 2346–2347
Tikal, 510, **2189–2191**
Tikopia, 971, **2191–2195**
Tillich, Paul, 2001–2002
Time, **2196–2197**
Bergson on, 343–344
business conceptions, 97
conceptions of, 2199
diachronic and prochronic, 721–722
in anthropology, **2197–2200**
in ethnographic writing, 2199
metaphysics of, 2196
metric of, 2197
now concept, 2296–2297
ordering systems, 701–702
perception of, 2196–2197
representations of, 2198
sacred landscapes, 574
stream of consciousness, 2198
Time allocation studies, 1397
Timiryazev, K. A., 1773, 2036
Tinbergen, Nikolass, 1496
Tinguians, 436
Tinkers, 1746
Tiriki, 1471
Titans, 1069
Tiv, 1651
Tiwanaku (**Tiahuanaco**), 1852, 1854–1855, **2200–2201**
Tlatelolco, 2178
Tlingit, 42, 954, 955, 1130, **2201–2206**
Tobacco, Ramses II mummy and, 1983–1984
Tobacco use, 836
Toennies, Ferdinand, 1028–1029, 1074–1075, 1442
Toffler, Alvin, 892
Togo, 1419
Tombstone, Arizona, 511–512
Tommaseo, Niccolò, 685
Tonga, **2207–2208**
Tool use
agricultural revolution, 34
Ainu material culture, 264–265
bipedalism origin hypothesis, 374
canopy theory, 1213–1215
hominids, 1210, 2311–2312. *See also* Stone tools
language development and, 1421–1422
Mesolithic cultures, 1580
Neandertals, 1723
See also **Stone tools**
Tool use, apes. *See* Apes, tool use
Tools and evolution, **2209–2215**. *See also* Stone tools; Tool use
Torres Straits islands, 1119, 2025
Torrijos, Omar, 1823–1824
Torture, 1235
Totalitarian dictatorships, 745–746
Totalitarian ideology, 1269, 1271
Totem feast, 954
Totem poles, 1128, 1132, 2201, 2202, 2205, **2215–2217**

Totemism, 73, 309, 517, 624, 1440, 1441, 2004, **2217–2218**
clan exogamy, 936
See also Clans
Toumaï, 1181, 2044–2045
Tourism, 2222–2224
archaeology and, 244
Cuba and, 620
cultural conservation, 625
Egyptian sites, 796, 803
gorilla ecotourism, 1104
totem poles and, 2216
Toynbee, Arnold J., 2219–2220
Tracking, 1574–1575, 2354
Tradition and cultural survival, 2146–2147
Traditional environmental knowledge, 2227
Traditional medicine
Banyang medicine man, 332–336
ethnomedicine, 859–861
ethnopharmacology, 861–862
Iroquois, 1329–1330
religion and, 334
Transactionalism, 175
Transcendental aesthetics, 1356
Transcultural psychiatry, 1961–1964
anthropology and psychiatry, 1962
history, 1961–1962
topics and issues, 1962–1963
Transformational linguistics, 1490–1491
Transgendered issues, 2334–2335
Transnationalism, 2220–2221
Transsexual, 1031
Travel, 2221–2224
Travellers, 1746
Treasure hunters, 256
Tree of life, 635–636, 893, 2080
Treeshrews, 229, 232, **2224–2226**
Tres Zapotes, 1769
Triassic fossil record, 990–991
Tribal Historic Preservation Offices (THPOs), 242, 260
Tribal society, 1871
Tributary mode of production, 1872, 2325, 2326
Trickster tales, 2360–2361
Trilobites, 986
Trinchera Dolina, 295, 344, 1804–1805
Trivers, Robert, 2109
Trobriand Islanders, 136, 154–155, 181, 774, 975, 1352, 1433, 1444, 1554, 2105, 2319
Troeltsch, Ernest, 1164
Trondheim, Norway, 258
Tropical rain forests, 57, 823, **2226–2228**
orangutan conservation issues, 1784–1785
primate habitat, 1929–1930
Trouble case method, 1177, 1434
Trowbridge, Charles C., 1593
Troy, 2057–2059, **2228–2230**, 2288
Trudgill, Peter, 1413–1414
Truth, Sojourner, 2331
Tryon, J. C., 899
Tsimshian, 1130
Tsunami, 1064, 1850
Tswana Bantu, 2230–2232
Tukano, 61
Tundra, 824
Tupaiidae, 2224–2226
Tupi, 60
Turing, Alan, 547
Turkanapithecus kalakolensis, 218
Turkey, 400
Balkans and, 329, 330
immigrant life in, 1235
Turkish immigrants in Germany, 169
Turnbull, Colin M., 1273, **2232–2233**
Turner, Edith, 170, 171, **2233–2234**
Turner, Victor, 156, 170, 715–716, 1573, 2013, 2022–2023, 2097, 2149–2150
Edith Turner and, 2232
Turtle evolution, 910–911
Turtle Island, 1673
Tuscarora, 1322, 1326, 1327, 1328, 1331, 1604
Tuskegee Institute, 1828
Tutankhamun, 444, 797–798, 802, 803
Tutsi, 169
Twin studies, 811, 1020, 1056–1057
Tylor, Edward Burnett, 2234–2235
animism and, 79, 80, 1440
anthropology of religion, 128–129
armchair approach, 153
defining culture, 150, 653
Marett's critique, 1533, 1534
on evolution of religion, 857

on magic, 1513
on origin of religion, 2004
psychic unity doctrine, 653, 1253
religious origin debate, 1635
totemism and, 2218
uniformitarianism principle, 2240
unilinear evolutionary paradigm, 855, 2235

Ubirr, 2237–2238
Uddalaka, 1694
Uhle, Max, 1209, 1851–1852
Uighur, 1840
Ultraviolet (UV) radiation
melanin and, 1576–1577
mutation rate and, 1632
Uluru, 302
Unamuno, Miguel de, 2238–2239
Uncertainty principle, 351
Unconscious mind, 1007
Underground economy, 1025
Underwater excavations, 930–931
Unfocus group, 111
Uniformitarianism, 448, 449, 588, 1800, **2239–2241**
Unilateral descent, 1370
Unilineal evolution
archaeology and, 237–238
complex societies, 2102
cultural anthropology and, 153, 613, 855, 2235
descent systems, 1370
diachronic perspectives, 173
Frieds stratified society typology, 1008–1009
Unions, 84–85, 91, 93, 107
United Nations (UN)
anthropology and, 2241–2243
Charter, 1219
convention against discrimination against women, 1241
Convention on the Rights of the Child (UNCRC), 498
future of, 1316–1317
High Commission for Refugees (UNHCR), 183
human rights and, 357, 1228–1229, 1235, 1436–1437
Security Council, 1314
Universal Declaration of Human Rights, 1994
United Nations Educational, Scientific, and Cultural Organization (UNESCO), 1229
Unity of life, 1473–1474
Unity of mankind, psychic, 653, 1252–1255, 1603, 2288
Universal altruism, 55
Universal Darwinism, 1578
Universal ethics, 1385
Universals in art, 277–281
Universals in cultures, 2244–2247
body and soul, 2245
death and life affirmation, 2246–2247
love, 2245
myths, 2245–2246
technology, 2244
Universals in language, 918, 1110–1111, 1405, 1411–1413, **2247–2248**
Untouchables, 2248–2251
Upanishads, 1159, 1163, 1279
Ur, 2144, **2251–2253**, 2366
Uranium-lead dating, 706, **2253–2254**
Uranium-thorium dating, 704
Urban and imperial architecture, 267–268
Urban anthropology, 512–513
culture of poverty, 649–652
Urban ecology, 2254–2256
Urban legends, 2256–2258
Urban planning, 511
Urbanism, 1828, 2116
ecological theories, 2255
environmental impacts and sustainability, 2255
history of city, 509–511
subcultures, 2138–2139
Tenochtitlan, 2178
Third World, 121
See also **City, history of**
Urbanism in ancient Egypt, 2258–2259
Uruk, 1068
Utopian ideology, 1270
Utopian socialism, 816
Uxmal, 2260–2261
Uxorilocal residence, 947, 1538
Uzbekistan Neandertal site, 1715

Vacuum theory of evolution and adaptation, 1747
Vacuum tubes, 541

Vajrayana Buddhism, 427
Valerio, Max, 2334
Valhalla, 2282
Valla, Lorenzo, 1249–1250
Valley of the Kings, 794, 802, 803
Value inquiry, 1301
Value-free research, 2264
Values, 1301
Values and anthropology, 2263–2266
  critical realist critique of ethnology, 605
Van Binsbergen, Wim, 2101
Van Deman, Esther Boise, 2328
Van Gennep, Arnold, 75, 131, 715, 1470, 1573, 2022–2023
Van Riet Lowe, Clarence, 2209
Van Uexkull, Jacob, 627
Vansina, Jan, 856
Varna, 445–446, 2248
Varve analysis, 702
Vavilov, Nikolai Ivanovich, 2038–2039
Vayda, Andrew, 2267
Vedic pantheism, 1824–1825
Vendian period, 985
Venezuela, 2267–2270
  street children, 497
  Yabarana culture, 2345–2346
Venice, 510
Venus, 2041
Venus of Willendorf, 2271–2272
Verhaegen, Marc, 224, 227
Vernacular architecture, 261
Vernadsky, Vladimir I., 2171, **2272–2277**
Verne, Jules, 2278
Verner, Karl, 1485
Verner's Law, 1486
Vervet monkeys, 466–468, 1949
Viagra, 803
Vicariance, 361
Vijayanagar, 510
Vikings, 252–253, 259, 269, **2279–2282**
  New World settlement, 2282
  religion, 2281
  runes and language, 2281–2282
  social structure, 2280–2281
Village simulation model, 486
Villages, 2282–2286
Violence. *See* **Aggression**; **Conflict**; Warfare
Virchow, Rudolf Ludwig Carl, 1719, **2287–2289**
Virilocal residence, 946, 1538
Virtual communities, 103
Virtual paleoanthropology, 915
Virtual reality, 542
Viruses, 2026
Vishnu, 1288
Vision, color, 1932–1933
Visual anthropology. *See also* **Anthropology, visual**
Visual predation hypothesis, 232–235
Vitalism, 822, 882, 893, 2170
Viuistadvaita, 1281
VMAT2 gene, 1093
Voegelin, Eric, 1252
Voice recognition, 372
Volcanoes, 448, 805–806
Voltaire, François, 818
Von Bertalanffy, Ludwig, 657
Von Humboldt, Alexander, 237, 2350
Von Koenigswald, G. H. R., 1079, 1573, 1606, 2049–2050
Voodoo, 1088–1089
Voodoo doll, 2119
Vows, 2014
Vygotsky, Lev Semenovich, 784, 785, 2098, **2291**
Vyörös, Gyozo, 2289–2290

Wagner, Richard, 2293–2295
Wakan Tanka, 1673
Wakuénai, 574
Wallace, Alfred Russel, 152, 1892, 2069, **2295–2296**
Wallace, Anthony F. C., 131, 368, 2021, **2296–2297**
Wallerstein, Immanuel, 497, **2297**
Wang Chong, 1696
War, anthropology of, 2298–2299
War, archaeology of, 2300–2301
Warfare, 557, 2298–2299
  aggression theories, 2299
  ancient Celts, 460
  future of, 892
  gender roles, 2299
  genetically engineered weapons, 1040
  Maori, 200
  myth of the peaceful band, 2298
  origins of life, 2301

refugees, 183
robot soldiers, 1473
Yanomamo, 478, 556, 668–672, 1144, 2270, 2350
See also **Aggression; Conflict**
Warfare system, 2298, 2300
Warner, W. Lloyd, 86, 89–90, 98–99, 115
Washburn, Sherwood L., 369, **2302–2304**
Washington, Booker T., 29, 1828
Washoe, 208, 210, 1403, **2304–2305**
Watson, James D., 700, 754, 757, 761, 896, 1037, 1048–1049, 1052
Watts, Charles Albert, 1360
Wave model of cultural knowledge, 847
Weber, Max, 50, 1251, 1442, 2115, 2337
Wednesday's child, 290
Wegener, Alfred, 566, **2305–2306**
Weidenreich, Franz, **2307–2308**
Weinberg, Wilhelm, 1043, 1057, 1139
Weiner, Annette, 136
Weiner, J. S. . *See also* Piltdown Man
Weismann, August, 677–678, 693, 1728–1729, 1965
Welfare capitalism, 85
Welfare system, 160
Wells, H. G., 722, **2308–2310**
Welsh language, 463
Wenger, Etienne, 101
Wenro, 1322, 1327
Were-animals, 2321
Wernhart, Karl R., 262
Wernicke, Carl, 409–410, 1423
Wernicke's area, 1195, 1423
Wertheimer, Max, 1378
Western culture, decline of, 1260–1261
Wheeler, Peter, 376
Wheeler, Sir Mortimer, 2329
Whirling dervish, 2141
White, Leslie A.
Chagnon and, 477
cultural adaptation theory, 18
cultural evolution and, 153, 186, 646–647, 769, 2095, **2310–2311**
cultural materialism, 1549
M. Harris versus, 1142
on symbolic meaning, 2148
"superorganic" debate, 2146
urbanization theory, 2255
White, Timothy D., **2311–2312**
White Supremacy movement, 820–821
Whitehead, Alfred North, 1862, **2312–2313**
Whiting, Beatrice, 1470
Whiting, John, 614, 1470
Whorf, Benjamin Lee, 641, 1415, 1483, 1774, 2051–2052, 2149, **2313**
Wicca, 2319
Wiener, Norbert, 657
Wilkinson, John Gardner, 799
Will, Tom, 588
Williams, Glyn, 1414
Williams, Raymond, **2313–2314**
Wilson, Allan, 1627
Wilson, Edward O., 2107, **2314–2316**
Wilson, Godfrey, 2095
Wilson, Robert, 349
Wilson, Woodrow, 1879
Winchester, England, 258
Wire mother study, 1140–1141
Wirth, Louis, 512
Wissler, Clark, **2316–2317**
Witch doctor, **2317–2318**, 2360
Witchcraft, 333, 2011, 2117, **2319–2324**
defense and remedy, 2321–2322
Ejagham culture and, 1298
Evil Eye, 2321
explanations, 2322
in anthropology, 2319–2320
in contemporary society, 2323–2324
occult economies, 2324
shape-shifting, 2321
witch attributes, 2320–2321
Zande studies, 181, 1513, 2117, 2317, 2320, 2359–2360
Wittfogel, Karl, 1333, 1871–1872
Wittgenstein, Ludwig, 1927
Wodziwob, 1076
Wolf, Eric Robert, 169, 1833, 1835, 1872, 2095, 2103, 2285, **2324–2325**
Wolfian perspective in cultural anthropology, **2325–2327**
Wolfe, Alvin, 97
Women
capitalism and exploitation of, 817
defining, 136

exchange of, 134–135
Islam and rights of, 1236–1242
Women, anthropology of, 132–138, 1031
Women, Culture, and Society (Rosaldo and Lamphere), 133–134
Women and anthropology, 132, **2327–2330**
Australians, 305–306
early Black women, 2328
early pioneers, archaeology and physical anthropology, 2328–2329
early pioneers, cultural and linguistic anthropology, 2327–2328
gender equity issues, 2330
See also **Benedict, Ruth**; Feminist anthropology; **Mead, Margaret**; *specific anthropologists*
Women in the workplace, 93, 103, 2332
sexual harassment, 102, **2074–2075**
Women's liberation movement, 2335
Women's studies, **2330–2336**
body image and symbols, 2335–2336
differing experiences within, 2334–2335
lesbian and transgender issues, 2331, 2334–2335
political perspectives, 2332–2333
Second Wave feminism, 2330, 2331
stereotypes, 2336
Women's suffrage, 2331
Wong, Nellie, 2335
Wood Jones, Frederic, 229–232, 235
Wooley, C. Leonard, 2144, 2252
Work and labor, 1396–1397. *See also* Business anthropology
Work and skills, **2336–2338**
Work and women. *See* Women in the workplace
Work culture, 94–95, 2115
Workplace Project, 109
World government, 2219–2220
World systems theory, 497, 2297
World Trade Organization (WTO), 1314
World Tree, 2080
World Wide Web, 542, 546–547, 656, 1410
World-openness, 354
Wormington, Hannah Marie, 2329
Worsley, Peter, 2095
Wovoka, 1076–1078
Wright, Sewall, 1043, 1729
Wurz, Sarah, 2212–2213
Xaro networks, 1389
Xenophanes, 197–198, **2339**
Xenophobia, **2340–2343**
Xerox Palo Alto Research Center, 100, 104, 108–109
X-ray art, 2237
XYY syndrome, 596, 737

Y chromosome, 32, 596, 757, 759, 878, 918, 1033, 1224
polygyny and, 1883
Y-chromosomal Adam, 878
Y-STR DNA, **2355–2356**
Yabarana Indians, **2345–2346**
Yaganes, 2188, **2346–2347**
Yaka, 636
Yankee City studies, 89–90
Yankton, 2328
Yanomamo, 2267, **2347–2351**
ancestral homeland, 2348
anthropological research trends, 2350
Chagnon's study and controversy, 65, 477–478, 556, 668–672, 852, 1144, 1234, 2270, 2350, 2351
division of labor, 1398
reciprocity and egalitarianism, 2347
threats to, 2349–2350
Yaqui, 1676
Yaya-mama culture, 1854
Yerkes, Robert M., 208, 389, 1955, **2351–2354**
Yerkes Primate Research Center, 713, 2352, 2353
Yerkes Regional Primate Center, 208, 533–534
Yeti, 2054–2055, **2354–2355**
Yin and yang, 662–663
Yoga, 808, 1163, 1286
Yorubá, 615, 2183
Yoruk, 332
Young, Robert, 701
Young Earth creationists, 589
Youth culture, 496
Youth gangs, 1023–1026
Y-STR DNA, **2355–2356**
Yurok, 1469

Zafarraya Cave, **2357–2358**
Zande (Azande), 2320, **2358–2361**
Evans-Pritchard's witchcraft studies, 181, 1513, 2117, 2317, 2320, 2359–2360

music, 2361
oral literature, 2360–2361
Zapotecs, 509, **2361–2363**
Zedong, Mao, 1838
Zeno, 1825
Zhoukoudian, 1804–1805, 1846, 1847, 2134, 2169, 2307
Ziggurats, 2143, 2174, **2363**
Zihlman, Adrienne, 1897
Zinjanthropus boisei, 886, 1450, 1451, 1453, 2329, **2363–2364**. *See also* A*ustralopithecus boisei*
Zionism, 1337–1338
Zone of proximal development (ZPD), 784–785
Zooarchaeology, 251–255, 915, **2364–2365**
Zoogeography, 360–362, 2315
evidence for evolution, 899–901
Zoos, 1787–1788, 2088–2089, **2365–2369**
gorillas and, 1104
Zuckerkandl, Emile, 1627, 1631
Zulu, **2369–2371**
Zuni, 430, 555, 2371–2372*